

The SOWA logo is rendered in a bold, italicized, yellow sans-serif font. The letters are thick and closely spaced, with a registered trademark symbol (®) at the end of the word. The background of the entire advertisement is a close-up photograph of a metalworking process, showing a multi-fluted metal drill bit or end mill cutting into a metal workpiece. Bright sparks are being ejected from the cutting point, creating a dynamic and industrial atmosphere. The lighting is dramatic, highlighting the metallic textures and the sharp edges of the tool.

**SOWA**®

TOOLING  
YOUR  
WORLD.

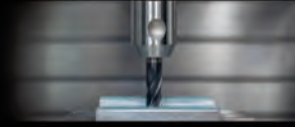
Serving the Metalworking Industry since 1960.

# Table Of Contents

## MILLING

Sowa High Performance End Mill Selection, Typhoon End Mills, Carbide End Mills, HSCO & HSS General Purpose End Mills

A



## DRILLING & HOLEMAKING

Premium Class Carbide Drills, Sowa High Performance Drills & Spade Drill System, Countersinks, General Purpose Drills including Jobber, Stub, Extra Length, Prentice, Taper Shank, Reamers Include: Chucking, Jobber, Bridge, Taper, Shell, and Expanding

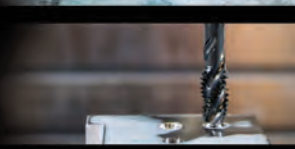
B



## THREADING & TAPPING

Sowa High Performance Taps, General Purpose Hand Taps, NPT Taps, Tap & Die Sets, Tap Wrenches, Screw Extractors, Round and Hex Dies

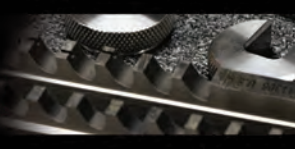
C



## CUTTING TOOLS

Cut-Off Blades, Toolbits, Boring Bars, Counterbores, Annular Cutters, Milling Cutters, Knurling Tools, Broaching Systems

D



## INDEXABLE CUTTING TOOLS

Sowa Indexable Cutting Tools featuring Turning, Boring, Parting, Grooving, Threading, Milling & Drilling Inserts and Holders complete with all technical information

E



## MEASURING & INSPECTING

Asimeto, STM, Mitutoyo, and Starrett Precision Tools including Micrometers, Calipers, Indicators, Magnetic Bases, Depth & Height Gauges, Surface Plates, Angle Blocks & Plates, Gauge Blocks & Pin Gauges, Hardness Tester, Profile Projectors, Parallels, Set-Up Blocks, Handbooks, and Tool Kits

F



## TOOL HOLDING

GS Premium Balance Rotary Tooling, including End Mill Holders, ER, TG, Collet Chucks, Retention Knobs, Milling Chucks, Shrink Fit Tooling, Tapping Chucks & Collets, Taper Adapters, Drill Chucks, Right Angle Heads, Boring and Facing Heads

G



## WORKHOLDING, CLAMPING & FIXTURING

GS Milling Vises, Double Clamp, Hydraulic, Bench & Drill Press Vises, Vee-Blocks, Angle Plates, Arbor Presses, Clamping Components, Mitee-Bite, 2, 3, 4, 6-Jaw Lathe Chucks, Big Bore Oil Country Chucks, F/A Fine Adjustment Precision Chucks, Power Chucks, Power Chuck Jaws & T-Nuts, Live Centres, Dead Centres, Face Drivers, Quick Change Tool Posts

H



## ACCESSORIES

Super & Simple Indexes, 5C Collet Chucks, Radius Dressers, Screw Jack Sets, Magnetic Lifters, Drill Sharpeners, Deluxe Shock Absorbers, Chip Collectors & Hooks, Coolants & Pastes, Coolant Hose System, Noga Minicool

I



## ABRASIVES & FINISHING

Ceramic, Surface, General Purpose Grinding Wheels, Depressed Centre Discs and Cut-off Wheels, Flap Discs, Shop Rolls, Cloth Sheets, Belts, Die Grinders and Diamond Files, Carbide Burrs & Sets, Deburring Systems, Blade Selection

J



## HAND TOOLS

Punches, Stamps, Chisels, Hammers, Hacksaws, Utility Knives, Grease Guns, Barrel Pumps, L-Wrenches, Torque Limiting Device, Screwdrivers & Bits, Sockets & Attachments, Combination Wrenches, Adjustable & Pipe Wrenches, Torque Wrenches, Pliers, and Wire Strippers

K



## CABINETS & CHESTS

Machinists' & Mechanics' Chests, Chest Bases, Top Chests, Heavy Duty Workstation, Roller Cabinets, Utility Carts, Tool Boxes, Parts Cabinets, End Mill Dispenser Cabinets, Drill Dispenser Cabinets

L





## To Our Valued Customers

Managing your daily business is full of challenges, worrying about having the right tools for the job should not be one of them. For over 60 years, Sowa Tool & Machine has been there to support North American manufacturers and distributors with world-class metalworking solutions. We offer a wide array of metalworking and MRO products, in stock and ready to ship same day. Our customer service team is just a call or click away, ready to support you with technical help or to source those hard to find products. We are here to keep your business moving forward.

We are proud to introduce our latest product catalogue, V62. Inside you will find the most comprehensive offering to date. This catalogue represents over 24,000 products, with upgrades and additions across most categories. We are equally excited to announce the launch of our brand-new website at [SowaTool.com](http://SowaTool.com). There you will have access to over 90,000 products from some of the best brands in the industry! On top of that, you no longer need to call in to receive a quote. You can now submit quote requests online directly from our website. Visit our website to see all that is new for yourself.

We appreciate the opportunity to serve you and thank all of you who have trusted us to keep your business moving forward. We take our customer's care very seriously. So, feel free to tell us how we are doing as we are continually striving to serve you better. Our purpose is to serve you, and tooling your world is our passion.

**Ryan Esposito**  
Chief Operating Officer | EVP

# Welcome to the family.

# What you can expect with Sowa.

Sowa Tool is a family of brands each with their own specialties. This includes our premium GS Tooling, our more economic STM Tooling solutions, our complete offering of high-performance Asimeto precision measuring tools, and our Sowa line of cutting, drilling, tapping and indexable tooling solutions. We also offer premium live centres from Skoda, and production grade boring heads and kits from Narex. We are uniquely qualified to serve your many needs under one roof.



## Same Day Shipping

We never want you to wait for your order, so we ship it same day when you order before 3:00pm EST on all in stock products.



## Order 24/7

Visit the new and improved SowaTool.com to check real-time inventory levels and get a 1% rebate for all orders placed online.



## Get A Quote Anywhere

Our new online quoting capabilities allow you to request a quote at anytime, you no longer need to call in. Just go to SowaTool.com and try it out!



## Expert Customer Service

Don't have a part number? Not sure what you need? That's ok! Our Customer Service Reps are second to none and are here to get you what you need, when you need it. You can contact them at 1-800-265-8221 or at sales@sowatool.com



## Uniquely Diverse Offering

Nowhere else can you get such a wide offering of products for a range of needs, specs, tolerance thresholds and budgets, all under one roof.



## Buy More, Save More!

Ask about our volume pricing available on top of our already competitively market priced stock.



## Always In-Stock

Sowa carries everything under your spindle, and more! Our 90% first pass fill rate ensures we will have what you need.



## Consolidated Experience

No longer do you need to shop around, as the Sowa family of brands will help consolidate freight charges, reduce your total number of purchase orders, and reduce the number of relationships you will need to maintain your business.

# Our Brands

We offer many familiar and popular industry brands along with our trusted Sowa family of brands. These brands allow us to provide you an even wider range of products to meet your tooling needs.

## Sowa Family of Brands



## Industry Brands



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**Order Templates**

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**Order History**

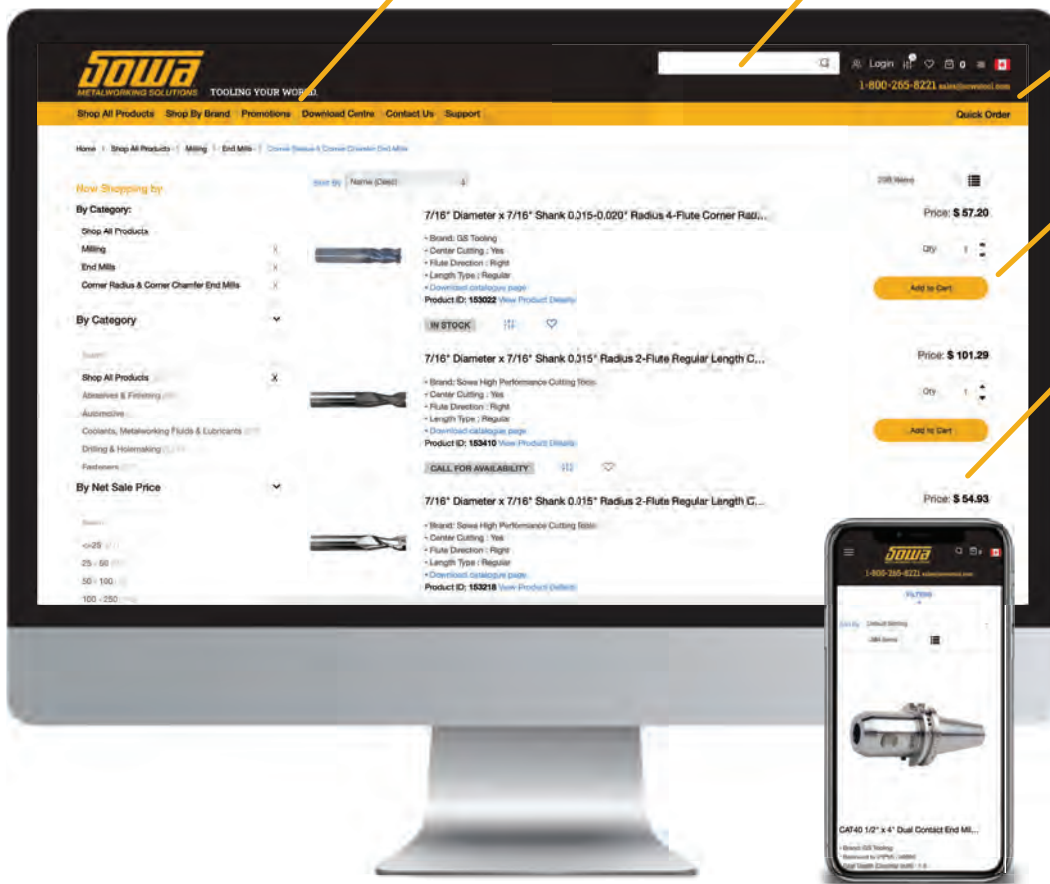
View your order history and search for past purchases quickly and easily.

**View Your Special Offers**

See your monthly special offers and flyer promotions as well as our current clearance items.

**Mobile Friendly**

Shop from anywhere with confidence on the new mobile friendly version of SowaTool.com.



**New Features**

**Updated User Experience**

SowaTool.com has been updated with a fresh coat of paint and new user experience. Finding what you need is faster and easier than ever before. Check it out for yourself!

**Request a Quote Online**

You no longer need to call in to receive a quote. You can now submit quote requests online directly from our website. Once we approve your quote, you are able to add to your cart and checkout with the new quoted price.

**Upload Order as CSV**

Do you have a larger order that would take a long time to input? You now have the ability to upload a CSV or Excel file containing your order and have items and quantities added directly to your cart with ease.

**Account Personalization**

Our account management now allows you to add, delete, and modify users associated with your business directly from our website.

## NEW STM Holders

Our STM Premium line is now offering competitive End Mill Holders and ER Collet Chucks at industry best prices. These holders provide DIN coolant option as standard and are factory balanced for increased tool life and productivity.



**STM CAT40/50 End Mill Holders**  
pg. G4 & G6



**STM CAT40/50 ER Collet Chucks**  
pg. G18 & G19

## Shrink Fit Holders

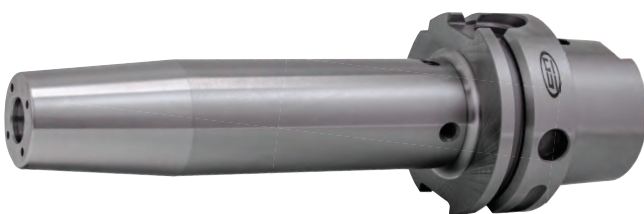
Our new and improved Shrink Fit Holders have been redesigned from the ground up. They've been re-engineered with new stand-out features including 4 coolant ports in the nose with the ability to be closed off to direct coolant through the centre of the holder. We include threaded holes in order to fine balance the holders.



**CAT40 Shrink Fit Holders  
With Coolant Ports**  
pg. G44



**CAT50 Shrink Fit Holders  
With Coolant Ports**  
pg. G44



**HSK 63A/100A Shrink Fit Holders  
With Coolant Ports**  
pg. G46



**BT30/40 Shrink Fit Holders  
With Coolant Ports**  
pg. G45



## Collets

GS Tooling is introducing Extreme Precision 5 Micron Collets. Nothing else compares! Our new GS Extreme Precision AA Collets offer 5 micron runout. We are also now offering Tap Collets for synchronous, rigid tapping operations using our ER collet chuck.



**ER20 Tap Collets**  
pg. G25



**5 Micron AA ER Collet Sets**  
pg. G22

## Live Centres

The GS Tooling brand has added Live Centres to their lineup. When precision is paramount and high accuracy is a necessity, our new line of Live Centres are the perfect choice. With 8 different varieties available for a range of rpm thresholds and bearing systems, you're sure to find the perfect one for you.



**CNC High Speed Live Centres — Standard Point**  
pg. H114



**60° Bull Head Live Centres — Extended A Type Point**  
pg. H116



**High Speed Live Centres — Extended A Type Point**  
pg. H116



**High Performance Live Centres**  
pg. H115



**High Speed Live Centres**  
pg. H115



**CNC High Speed Live Centres — Extended A Type Point**  
pg. H114



**80° Bull Nose Live Centres — Standard Point**  
pg. H117



**Interchangeable Points Live Centres**  
pg. H118

## Driven Tools

GS Tooling now carries Driven Tools for CNC turning centres. This allows milling, drilling, and tapping operations on the lathes without additional parts handling. GS Tooling also supplies a wide range of types in order to equip the CNC lathes and turrets of the most popular builders on the market with an unbeatable price to quality ratio.



Radial



Axial



**Driven Tools For DMG MORI Lathes**  
pg. G48

Radial



Axial



**Driven Tools For DOOSAN Lathes**  
pg. G48

Radial



Axial



**Driven Tools For HAAS Lathes**  
pg. G48

Radial



Offset Axial



**Driven Tools For MAZAK Lathes**  
pg. G48



## Vises



GS Tooling's new Multi-Tasking range of modular vises have been specially designed for 5-axis machines. Working on five sides of the workpiece, it allows the best optimization of the machining cycle. New GS Precision Milling and Versatile Vises are also available under the GS line. All of our vises offer the same or better specs as compared to our competitors, the biggest difference you'll find is the price!

Type 1 & 2



Vise shown with riser

### GS Multi-Tasking Modular Vises for 5-Axis Machining Centers

pg. H7

Type 3



### GSV60 6" Versatile Vise

pg. H2



### GS160G 6" x 9.13" Precision Milling Machine Vise

pg. H2

## Countersinks/Drills



Our countersink and drill lineups are ever expanding. We've added 6 new Cobalt Countersinks offering both a standard and TiN coated option. We've also added 2 new HSS Stub NC Spot Drills.



### 82° & 90° Cobalt 3 Flute Countersinks

pg. B58



### 82° & 90° Cobalt 3 Flute Countersinks - TiN Coated

pg. B58



### 60° HSS Combined Drill & Countersinks

pg. B43



### 60° HSS Combined Drill & Countersinks - TiN Coated

pg. B44



### 60° Combined Drill & Countersinks - Long Series

pg. B43



### 90° HSS Stub NC Spot Drills

pg. B45

## Dual Contact Collet Chucks

GS Dual Contact ER Collet Chucks are the perfect solution for when high rigidity and increased feed rate are paramount. With tight tolerance to the Big Plus standard, GS Tooling offers these high-performance tools at industry leading pricing.










### CAT40/50 DUAL CONTACT ER Collet Chucks










pg. G18 & G19

# Icon Legend

















## Surface Treatments

-  **Black/Gold Finish**  
Black Oxide on the grooves for greater lubricity and chip removal, special coating on the lands for greater tool life.
-  **Typhoon Coating**  
The hard PVD coating allows effective machining of hard mold, die, and tool steels up to 60HRC in dry or wet conditions.
-  **Titanium Carbon Nitride**  
TiCN coated tools have a very high surface hardness of approx. 90HRC. This coating is recommended for use in all steels, cast iron and aluminum.
-  **Black Oxide Surface**  
Reduces adhesion of chips to the surface of tool.
-  **Titanium Aluminum Nitride**  
This coating is applied by the PVD process and has a higher hardness than TiN and TiCN. This greatly increases the service life of the tool and can stand higher temperatures when machining cast iron and tough steels.
-  **Titanium Nitride**  
A gold coloured film with a hardness of approx. 85HRC is deposited on the tool which extends tool life by reducing friction and enables the tool to be operated at higher speeds and feeds.
-  **Bright Finish**















## Flutes

-  2-Flute
-  5-Flute
-  2-Flute Ball Nose
-  3-Flute
-  6-Flute
-  4-Flute Centre Cut
-  4-Flute Non-Centre Cut
-  Multi-Flute
-  4-Flute Ball Nose











## Rotary

-  NUT
-  ARBOR NUT
-  ARBOR SPACER
-  ARBOR SCREW
-  MOUNTING BOLT
-  COLLETS
-  ER COLLETS
-  DA COLLET
-  SA COLLET
-  TG COLLET
-  REPLACEMENT DRILL CHUCK
-  RETENTION KNIB
-  WRENCH
-  SET SCREW
-  O-RING
-  DRIVE KEY

## Tool Materials

-  CARBIDE
-  MICRO GRAIN CARBIDE
-  SUB MICRO GRAIN CARBIDE
-  SUPER MICRO GRAIN CARBIDE
-  COBALT
-  SUPER COBALT
-  M42 HSS COBALT
-  HSS
-  HSS-M2
-  HSS-M4
-  PREMIUM HSS
-  HSSE-V3
-  HSCO
-  SUPER HSCO-T15















## Helix Angles

-  15°
-  25°-30°
-  30°
-  35°
-  37°
-  40°
-  42°
-  45°
-  50°
-  60°












## Hole Types

-  HOLE TYPE Blind Hole
-  HOLE TYPE Through Hole





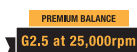
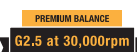


## Tool Dimensions

-  STUB LENGTH
-  SHORT LENGTH
-  REG LENGTH
-  MED LENGTH
-  LONG LENGTH
-  X-LONG LENGTH
-  JOBBER LENGTH
-  LONG REACH
-  EXTENDED REACH
-  EXTENDED SHANK
-  3x DIAMETER
-  5x DIAMETER
-  8x DIAMETER
-  MULTIPLE LENGTHS

## Drill Point Angles

-  90°
-  118° NOTCHED POINT
-  118°
-  120°
-  132°
-  132° SERIES 1-4
-  135°
-  135° SPLIT POINT
-  135° NOTCHED POINT
-  140°
-  144° SERIES 5-7

## Balance Ratings

-  BALANCE CERTIFICATE INCLUDED G2.5 at 6,000rpm
-  BALANCE CERTIFICATE INCLUDED G2.5 at 8,000rpm
-  BALANCE CERTIFICATE INCLUDED G2.5 at 15,000rpm
-  BALANCE CERTIFICATE INCLUDED G2.5 at 20,000rpm
-  PREMIUM BALANCE CERTIFICATE INCLUDED G2.5 at 25,000rpm
-  PREMIUM BALANCE CERTIFICATE INCLUDED G2.5 at 30,000rpm
-  PREMIUM BALANCE CERTIFICATE INCLUDED G6.3 at 25,000rpm
-  PREMIUM BALANCE CERTIFICATE INCLUDED G6.3 at 30,000rpm

# Milling



|   |        |
|---|--------|
| <b>SOWA HIGH PERFORMANCE END MILL SELECTION</b> .....       | A2     |
| <b>CARBIDE END MILLS - BRIGHT FINISH &amp; TiAIN COATED</b> |        |
| 2-Flute .....   | A3-6   |
| End Mill Dispenser Cabinets .....                           | A4     |
| End Mill Sheath Racks .....                                 | A4     |
| Drill Mills .....   | A5     |
| 3-Flute .....   | A7-8   |
| 4-Flute .....   | A8-12  |
| Multi-Flute .....   | A11    |
| Roughers .....  | A11    |
| <b>TYPHOON END MILLS - RED SERIES</b>                       |        |
| 2-Flute .....   | A13-14 |
| 4-Flute .....   | A14-15 |
| Multi-Flute .....   | A15    |
| Roughers .....  | A16    |
| 4 & 5-Flute Variable Helix .....                            | A16-17 |
| <b>QTT PREMIUM CLASS CARBIDE END MILLS</b>                  |        |
| 2-Flute .....   | A17-18 |
| 4-Flute .....   | A18    |
| <b>CARBIDE END MILLS FOR ALUMINUM - GREEN SERIES</b>        |        |
| 2-Flute .....   | A19-20 |
| 3-Flute .....   | A19-20 |
| <b>HSCO &amp; HSS GENERAL PURPOSE END MILLS</b>             |        |
| 2-Flute .....   | A20-23 |
| 3-Flute .....   | A23    |
| 4-Flute .....   | A24-26 |
| Multi-Flute .....   | A24-26 |
| Roughers .....  | A26-27 |
| Tapered End Mills .....                                     | A28-30 |
| <b>SPEEDS &amp; FEEDS</b> .....                             | A31-45 |



**Bright – Starting at page A3**

### Micrograin Carbide Bright Finish — Cutting Conditions

| Materials Main Group | Materials Sub-Group | Condition  | Hardness (HRC) | Cutting Speed (SFM) |
|----------------------|---------------------|------------|----------------|---------------------|
| Low Carbon           | 1018, 1010, 1035    | Normalized | <25            | 150-200             |
| Medium Carbon        | 1045, 1050, 1065    | Normalized | <25            | 150-200             |
| Aluminum             | Unalloyed, Cast     | –          | –              | 350-600             |
| Brass/Bronze         | –                   | –          | –              | 350-400             |
| Copper               | –                   | –          | –              | 250-300             |
| Cast Iron            | –                   | As Cast    | <15            | 150-225             |



**TiAlN Coated – Starting at page A3**

### Micrograin Carbide TiAlN Coated — Cutting Conditions

| Materials Main Group | Materials Sub-Group                      | Condition  | Hardness (HRC) | Cutting Speed (SFM) |
|----------------------|--|------------|----------------|---------------------|
| Stainless Steels     | 300, 400 Series                          | Annealed   | <29            | 200-350             |
| Tool Steels          | 01, A-2, D-2, H-13, P-20                 | Annealed   | <35            | 150-250             |
| Medium Carbon        | 1030, 1035, 1038, 1040, 1045, 1050       | Normalized | <28            | 190-275             |
| Alloyed High Carbon  | 1065, 1070, 1080, 1090, 1095, 1561, 1572 | Normalized | <32            | 150-250             |
| High Strength        | 4140, 4340                               | Normalized | <32            | 150-250             |
| Titanium             | Commercially pure                        | Annealed   | <32            | 150-250             |



**TYPHOON – Starting at page A13**

### TYPHOON Sub-Micrograin Carbide Modified AlTiN — Cutting Conditions

| Materials Main Group | Materials Sub-Group                                | Condition             | Hardness (HRC) | Cutting Speed (SFM) |
|----------------------|--|-----------------------|----------------|---------------------|
| Stainless Steel      | 17-4PH, 15-5, 17-7PH, AM350                        | Hardened              | <45            | 150-250             |
| Tool Steels          | 01, A-2, D-2, H-13, P-20                           | Hardened              | <60            | 80-270              |
| High Strength        | 4140, 4340, 50100                                  | Hardened              | <60            | 80-270              |
| Nickel Alloys        | Inconel, Hastaloy, Waspaloy, Astraloy, Rene, Monel | Annealed and Hardened | <45            | 150-225             |
| Titanium             | 6 AL 4   | Annealed/Hardened     | <42            | 175-275             |



**Aluminum Series – Starting at page A19**

### Carbide Bright Finish for Aluminum — Cutting Conditions

| Materials Main Group | Cutting Speed (SFM) |
|----------------------|---------------------|
| Aluminum             | 600-700             |
| Die Cast Aluminum    | 600-700             |

## 2-Flute Regular Length Carbide End Mills

A general purpose carbide end mill with maximum chip clearance added.

**For:** End milling,  
Slotting, Sinking  
**On:** Variety of Steels,  
Cast Iron, Non-Ferrous Metals,  
Plastics, Abrasive Type Materials

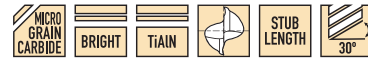


**Bright:** Speeds & Feeds > P. A31  
**TiAlN:** Speeds & Feeds > P. A34

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32  | 1/8        | 1/8          | 1-1/2          | 103770          | 14.56    | 102677         | 18.07    |
| 3/64  | 1/8        | 9/64         | 1-1/2          | 103772          | 14.56    | 102799         | 18.07    |
| 1/16  | 1/8        | 3/16         | 1-1/2          | 103848          | 13.51    | 102800         | 17.04    |
| 5/64  | 1/8        | 1/4          | 1-1/2          | 103773          | 13.51    | 102801         | 17.04    |
| 3/32  | 1/8        | 5/16         | 1-1/2          | 103849          | 12.78    | 102802         | 16.28    |
| 7/64  | 1/8        | 3/8          | 1-1/2          | 103775          | 12.78    | 102803         | 16.28    |
| 1/8   | 1/8        | 1/2          | 1-1/2          | 103850          | 11.79    | 102804         | 15.30    |
| 9/64  | 3/16       | 1/2          | 2              | 103776          | 17.44    | 102805         | 20.94    |
| 5/32  | 3/16       | 9/16         | 2              | 103851          | 17.44    | 102806         | 20.94    |
| 11/64   | 3/16       | 9/16         | 2              | 103777          | 17.44    | 102807         | 20.94    |
| 3/16  | 3/16       | 5/8          | 2              | 103852          | 16.55    | 102808         | 20.02    |
| 13/64   | 1/4        | 5/8          | 2-1/2          | 103778          | 21.91    | 102809         | 29.17    |
| 7/32  | 1/4        | 5/8          | 2-1/2          | 103853          | 21.91    | 102811         | 29.17    |
| 1/4   | 1/4        | 3/4          | 2-1/2          | 103854          | 19.94    | 102810         | 27.18    |
| 9/32  | 5/16       | 3/4          | 2-1/2          | 103855          | 34.98    | 102813         | 45.81    |
| 5/16  | 5/16       | 13/16        | 2-1/2          | 103856          | 27.97    | 102812         | 38.81    |
| 11/32   | 3/8        | 7/8          | 2-1/2          | 103779          | 41.43    | 102815         | 52.25    |
| 3/8   | 3/8        | 1            | 2-1/2          | 103857          | 34.86    | 102814         | 45.65    |
| 13/32   | 7/16       | 1            | 2-3/4          | 103780          | 49.54    | 102817         | 61.86    |
| 7/16  | 7/16       | 1            | 2-3/4          | 103858          | 42.51    | 102816         | 54.84    |
| 1/2   | 1/2        | 1            | 3              | 103859          | 55.80    | 102818         | 68.11    |
| 9/16  | 9/16       | 1-1/8        | 3-1/2          | 103886          | 95.33    | 102820         | 113.10   |
| 5/8   | 5/8        | 1-1/4        | 3-1/2          | 103887          | 107.61   | 102822         | 125.42   |
| 11/16   | 3/4        | 1-3/8        | 4              | 103888          | 179.21   | 102824         | 200.23   |
| 3/4   | 3/4        | 1-1/2        | 4              | 103889          | 157.77   | 102826         | 178.78   |
| 7/8   | 7/8        | 1-1/2        | 4              | 103890          | 227.05   | 102828         | 258.08   |
| 1   | 1          | 1-1/2        | 4              | 103891          | 236.05   | 102830         | 267.04   |
| <b>6pc set: 1/4", 5/16", 3/8", 1/2", 5/8", 3/4"</b> |            |              |                | 103846          | 372.57   | -              | -        |
| <b>5pc set: 3/16", 1/4", 5/16", 3/8", 1/2"</b>      |            |              |                | -               | -        | 102957         | 184.26   |
| <b>Metric</b>                                       |            |              |                |                 |          |                |          |
| 0.5   | 3          | 1.5          | 39             | 101552          | 15.30    | 102819         | 18.83    |
| 1   | 3          | 3            | 39             | 101553          | 15.30    | 102821         | 18.80    |
| 1.5   | 3          | 5            | 39             | 101432          | 15.30    | 102823         | 18.80    |
| 2   | 3          | 7            | 39             | 102696          | 14.17    | 102825         | 17.67    |
| 2.5   | 3          | 7            | 39             | 102697          | 13.41    | 102827         | 16.94    |
| 3   | 3          | 9            | 39             | 102698          | 12.39    | 102829         | 15.91    |
| 3.5   | 4          | 12           | 51             | 102699          | 18.33    | 102853         | 21.84    |
| 4   | 4          | 14           | 51             | 102700          | 17.40    | 102855         | 20.90    |
| 4.5   | 5          | 14           | 51             | 102701          | 21.28    | 102857         | 26.75    |
| 5   | 5          | 16           | 51             | 102702          | 20.29    | 102859         | 27.52    |
| 6   | 6          | 19           | 64             | 102703          | 20.94    | 102861         | 28.17    |
| 7   | 8          | 19           | 64             | 102704          | 28.77    | 102863         | 39.57    |
| 8   | 8          | 21           | 64             | 102705          | 29.37    | 102865         | 40.20    |
| 9   | 10         | 22           | 70             | 102706          | 36.58    | 102867         | 47.40    |
| 10  | 10         | 22           | 70             | 102707          | 42.41    | 102869         | 54.70    |
| 11  | 11         | 25           | 70             | 102708          | 44.65    | 102871         | 56.95    |
| 12  | 12         | 25           | 76             | 102709          | 58.61    | 102873         | 70.89    |
| 14  | 14         | 30           | 89             | 102711          | 100.06   | 102875         | 117.86   |
| 16  | 16         | 32           | 89             | 102712          | 113.00   | 102881         | 130.81   |
| 18  | 18         | 35           | 102            | 102713          | 165.69   | 102883         | 186.69   |
| 20  | 20         | 38           | 102            | 102714          | 210.65   | 102885         | 241.69   |
| 22  | 22         | 38           | 102            | 101451          | 234.08   | 102887         | 265.09   |
| 25  | 25         | 38           | 102            | 102715          | 244.74   | 102889         | 275.76   |

## 2-Flute Stub Length Carbide End Mills

2-Flute Stub has added strength and stability with the same geometry of our standard length series. Stub end mills are specifically designed for shallow milling and slotting in a variety of materials.



**Bright:** Speeds & Feeds > P. A31  
**TiAlN:** Speeds & Feeds > P. A34

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32          | 1/8        | 5/64         | 1-1/2          | 101220          | 14.56    | 102202         | 18.07    |
| 3/64          | 1/8        | 3/32         | 1-1/2          | 101221          | 14.56    | 102221         | 18.07    |
| 1/16          | 1/8        | 1/8          | 1-1/2          | 101222          | 13.51    | 102222         | 17.04    |
| 5/64          | 1/8        | 1/8          | 1-1/2          | 101223          | 13.51    | 102223         | 17.04    |
| 3/32          | 1/8        | 3/16         | 1-1/2          | 101224          | 12.78    | 102224         | 16.28    |
| 7/64          | 1/8        | 7/32         | 1-1/2          | 101225          | 12.78    | 102225         | 16.28    |
| 1/8           | 1/8        | 1/4          | 1-1/2          | 101226          | 11.79    | 102226         | 15.30    |
| 9/64          | 3/16       | 9/32         | 2              | 101227          | 17.44    | 102227         | 20.94    |
| 5/32          | 3/16       | 5/16         | 2              | 101228          | 17.44    | 102228         | 20.94    |
| 3/16          | 3/16       | 3/8          | 2              | 101229          | 16.55    | 102229         | 20.02    |
| 7/32          | 1/4        | 7/16         | 2              | 101230          | 18.74    | 102203         | 24.22    |
| 1/4           | 1/4        | 1/2          | 2              | 101231          | 18.47    | 102231         | 23.95    |
| 5/16          | 5/16       | 1/2          | 2              | 101232          | 25.28    | 102204         | 33.07    |
| 3/8           | 3/8        | 5/8          | 2              | 101233          | 31.22    | 102233         | 39.01    |
| 7/16          | 7/16       | 5/8          | 2-1/2          | 101234          | 38.60    | 102206         | 50.90    |
| 1/2           | 1/2        | 5/8          | 2-1/2          | 101235          | 51.49    | 102235         | 63.79    |
| 5/8           | 5/8        | 3/4          | 3              | 101236          | 98.41    | 102207         | 112.68   |
| 3/4           | 3/4        | 1            | 3              | 101237          | 141.54   | 102237         | 158.62   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 2            | 39             | 101640          | 15.64    | 102631         | 19.24    |
| 1.5           | 3          | 3            | 39             | 101641          | 15.64    | 102641         | 19.24    |
| 2             | 3          | 4            | 39             | 101642          | 12.42    | 102633         | 16.02    |
| 2.5           | 3          | 5            | 39             | 101643          | 11.76    | 102643         | 15.34    |
| 3             | 3          | 6            | 39             | 101644          | 11.47    | 102644         | 15.04    |
| 3.5           | 4          | 7            | 51             | 101645          | 16.05    | 102645         | 19.62    |
| 4             | 4          | 8            | 51             | 101646          | 15.17    | 102646         | 18.79    |
| 4.5           | 5          | 9            | 51             | 101647          | 20.15    | 102647         | 25.74    |
| 5             | 5          | 10           | 51             | 101648          | 18.79    | 102648         | 24.35    |
| 6             | 6          | 12           | 51             | 101649          | 19.90    | 102649         | 25.47    |
| 7             | 8          | 12           | 51             | 101650          | 25.86    | 102635         | 33.84    |
| 8             | 8          | 12           | 51             | 101651          | 27.15    | 102651         | 35.15    |
| 9             | 10         | 14           | 51             | 101652          | 33.55    | 102637         | 41.51    |
| 10            | 10         | 14           | 51             | 101653          | 37.08    | 102653         | 46.11    |
| 11            | 11         | 16           | 64             | 101654          | 43.33    | -              | -        |
| 12            | 12         | 16           | 64             | 101655          | 55.37    | -              | -        |

## 2-Flute 1/8" Shank Miniature Carbide End Mills

Designed for milling small precision components in a variety of materials.



**Bright:** Speeds & Feeds > P. A31  
**TiAlN:** Speeds & Feeds > P. A34

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 0.015        | 1/8        | 0.047        | 1-1/2          | 101210          | 25.29    | 102208         | 25.29    |
| 0.020        | 1/8        | 0.063        | 1-1/2          | 101211          | 24.47    | 102211         | 24.47    |
| 0.025        | 1/8        | 0.078        | 1-1/2          | 101212          | 22.80    | 102212         | 22.80    |
| 0.030        | 1/8        | 0.094        | 1-1/2          | 101213          | 20.45    | 102213         | 20.45    |
| 0.035        | 1/8        | 0.109        | 1-1/2          | 101214          | 15.64    | 102214         | 19.21    |
| 0.040        | 1/8        | 0.125        | 1-1/2          | 101215          | 15.64    | 102209         | 19.21    |
| 0.045        | 1/8        | 0.140        | 1-1/2          | 101216          | 15.64    | 102216         | 19.21    |
| 0.050        | 1/8        | 0.156        | 1-1/2          | 101217          | 15.64    | 102217         | 19.21    |
| 0.055        | 1/8        | 0.171        | 1-1/2          | 101218          | 15.64    | 102218         | 19.21    |
| 0.060        | 1/8        | 0.188        | 1-1/2          | 101219          | 15.64    | 102219         | 19.21    |

| Tolerances - Inch  |                |                  | Tolerances - Metric |                  |                  |
|--------------------|----------------|------------------|---------------------|------------------|------------------|
| Size               | Diameter       | Shank Diameter   | Size                | Diameter         | Shank Diameter   |
| 3/32 thru 1"       | +0.000"-0.002" | +0.0000"-0.0005" | 1mm-25mm            | +0.000mm-0.051mm | +0.000mm-0.013mm |
| Steel              |                |                  | Stainless Steel     |                  |                  |
| Cast Iron/Hardened |                |                  | Aluminum            |                  |                  |

## 2-Flute Long Length Carbide End Mills

Long length end mills combine added flute and overall length for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A31  
TiAIN: Speeds & Feeds > P. A34

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 3/4          | 2-1/4          | 102961          | 17.30    | 102902         | 18.17    |
| 3/16          | 3/16       | 3/4          | 2-1/4          | 102962          | 18.88    | 102904         | 19.88    |
| 1/4           | 1/4        | 1-1/8        | 3              | 102963          | 34.12    | 102906         | 41.36    |
| 5/16          | 5/16       | 1-1/8        | 3              | 102964          | 42.12    | 102908         | 52.95    |
| 3/8           | 3/8        | 1-1/8        | 3              | 102965          | 47.39    | 102910         | 58.24    |
| 7/16          | 7/16       | 2            | 4              | 102966          | 71.62    | 102912         | 87.54    |
| 1/2           | 1/2        | 2            | 4              | 102967          | 76.18    | 102914         | 92.10    |
| 5/8           | 5/8        | 2-1/4        | 5              | 102968          | 156.99   | 102916         | 183.42   |
| 3/4           | 3/4        | 2-1/4        | 5              | 102969          | 226.62   | 102918         | 238.55   |
| 1             | 1          | 2-1/4        | 5              | 102970          | 425.18   | 102920         | 355.42   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 3             | 3          | 19           | 57             | 101560          | 16.55    | 102921         | 19.32    |
| 4             | 4          | 19           | 57             | 101561          | 17.40    | 102923         | 20.90    |
| 5             | 5          | 25           | 64             | 101562          | 31.02    | 102925         | 38.22    |
| 6             | 6          | 28           | 76             | 101563          | 35.95    | 102927         | 43.14    |
| 8             | 8          | 29           | 76             | 101564          | 44.36    | 102929         | 55.16    |
| 10            | 10         | 32           | 76             | 101565          | 51.44    | 102931         | 63.75    |
| 12            | 12         | 51           | 102            | 101566          | 80.77    | 102933         | 96.69    |
| 14            | 14         | 57           | 127            | 101567          | 144.58   | -              | -        |
| 16            | 16         | 57           | 127            | 101568          | 156.99   | 102937         | 183.42   |
| 18            | 18         | 57           | 127            | 101569          | 236.05   | 102939         | 236.05   |
| 20            | 20         | 57           | 127            | 101570          | 263.46   | -              | -        |
| 25            | 25         | 57           | 127            | 101571          | 405.97   | -              | -        |

## 2-Flute Extra Long Length Carbide End Mills

Extra long length end mills combine added flute and overall length for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A31  
TiAIN: Speeds & Feeds > P. A34

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 1/8        | 1            | 3              | 102400          | 26.72    | 102500         | 30.99    |
| 3/16         | 3/16       | 1-1/8        | 3              | 102402          | 29.47    | 102502         | 34.94    |
| 1/4          | 1/4        | 1-1/2        | 4              | 102404          | 36.04    | 102504         | 44.50    |
| 5/16         | 5/16       | 1-5/8        | 4              | 102406          | 47.03    | 102506         | 60.75    |
| 3/8          | 3/8        | 1-3/4        | 4              | 102408          | 52.03    | 102508         | 65.80    |
| 7/16         | 7/16       | 3            | 6              | 102410          | 95.20    | 102510         | 117.61   |
| 1/2          | 1/2        | 3            | 6              | 102412          | 132.53   | 102512         | 132.53   |
| 5/8          | 5/8        | 3            | 6              | 102414          | 156.99   | 102514         | 183.42   |
| 3/4          | 3/4        | 3            | 6              | 102416          | 250.09   | 102516         | 280.69   |
| 1            | 1          | 3            | 6              | 102418          | 425.18   | 102518         | 464.89   |

### Tolerances - Inch

| Size         | Diameter       | Shank Diameter   |
|--------------|----------------|------------------|
| 3/32 thru 1" | +0.000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

## 2-Flute Double End Stub Length

Double end end mills offer the same tool geometry as the single end stub end mill, but with two cutters in one tool. Economy is an added feature of this tool.



Bright: Speeds & Feeds > P. A31  
TiAIN: Speeds & Feeds > P. A34

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/32         | 1/8        | 5/64         | 1-1/2          | 102260          | 21.40    | 102360         | 32.13    |
| 1/16         | 1/8        | 1/8          | 1-1/2          | 102262          | 21.40    | 102362         | 25.70    |
| 3/32         | 1/8        | 3/16         | 1-1/2          | 102264          | 21.40    | 102364         | 25.70    |
| 1/8          | 1/8        | 1/4          | 1-1/2          | 102266          | 13.27    | 102366         | 17.56    |
| 5/32         | 3/16       | 5/16         | 2              | 102268          | 23.56    | 102368         | 27.86    |
| 3/16         | 3/16       | 3/8          | 2              | 102270          | 19.22    | 102370         | 23.54    |
| 7/32         | 1/4        | 1/2          | 2-1/2          | 102272          | 27.47    | 102372         | 45.42    |
| 1/4          | 1/4        | 1/2          | 2-1/2          | 102274          | 25.03    | 102374         | 33.87    |
| 5/16         | 5/16       | 1/2          | 2-1/2          | 102276          | 38.92    | 102376         | 44.39    |
| 3/8          | 3/8        | 1/2          | 2-1/2          | 102278          | 33.10    | 102378         | 58.00    |
| 7/16         | 7/16       | 9/16         | 2-3/4          | 102280          | 70.35    | 102380         | 71.37    |
| 1/2          | 1/2        | 5/8          | 3              | 102282          | 56.28    | 102382         | 71.37    |

## 2-Flute Double End Regular Length

With maximum chip clearance, 2-flute end mills are ideal for milling, sinking, profiling or slotting in a variety of materials.



Bright: Speeds & Feeds > P. A31  
TiAIN: Speeds & Feeds > P. A34

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 3/8        | 3/8          | 3-1/16         | 101300          | 41.98    | 102001         | 55.26    |
| 5/32         | 3/8        | 7/16         | 3-1/8          | 101301          | 52.48    | 102003         | 69.07    |
| 3/16         | 3/8        | 1/2          | 3-1/4          | 101302          | 41.98    | 102005         | 69.07    |
| 7/32         | 3/8        | 9/16         | 3-3/8          | 101303          | 52.48    | 102007         | 69.07    |
| 1/4          | 3/8        | 5/8          | 3-3/8          | 101304          | 41.98    | 102009         | 66.41    |
| 9/32         | 3/8        | 11/16        | 3-3/8          | 101305          | 48.25    | 102011         | 81.36    |
| 5/16         | 3/8        | 3/4          | 3-1/2          | 101306          | 57.99    | 102013         | 81.36    |
| 11/32        | 3/8        | 3/4          | 3-1/2          | 101307          | 60.31    | -              | -        |
| 3/8          | 3/8        | 3/4          | 3-1/2          | 101308          | 48.25    | 102017         | 81.36    |
| 7/16         | 1/2        | 7/8          | 4              | 101309          | 73.19    | 102019         | 89.47    |
| 1/2          | 1/2        | 1            | 4              | 101310          | 77.86    | 102021         | 94.13    |

## End Mill Dispenser Cabinets

- Three drawer
- All steel



| Description  | Model No. | Code No. | Price \$ |
|--|-----------|----------|----------|
| Two flute single and double end for 1/16 to 1                | CZD10     | 113905   | 1,529.44 |
| Four flute single and double end for 1/16 to 1               | CZD11     | 113906   | 1,529.44 |
| Two and four flute single and double end for 1/8 to 1 x 8ths | CZD12     | 113907   | 372.97   |

## End Mill Sheath Rack

- ABS plastic
- 62 sheaths



| Model | Size Range (mm) | Dimensions | Code No. | Price \$ |
|-------|-----------------|------------|----------|----------|
| VMS-2 | Ø6-Ø42          | 205x205x80 | 326545   | 53.99    |

## 2-Flute Corner Radius Regular Length

2-flute carbide end mill with corner radius allows more strength and minimizes chipping on corners. Two-flute construction provides more chip space and clearance than three or four flute designs.

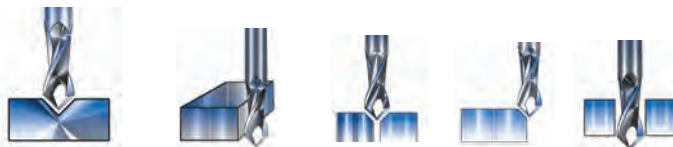


Bright: Speeds & Feeds > P. A31  
TiAlN: Speeds & Feeds > P. A34

| Cutting Dia. | Corner Radius | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |               |            |              |                |                 |          |                |          |
| 1/8          | 0.015         | 1/8        | 1/2          | 1-1/2          | 101140          | 15.46    | 102023         | 19.04    |
| 3/16         | 0.020         | 3/16       | 5/8          | 2              | 101141          | 20.37    | 102025         | 23.96    |
| 3/16         | 0.030         | 3/16       | 5/8          | 2              | 101142          | 20.37    | 102027         | 23.96    |
| 1/4          | 0.020         | 1/4        | 3/4          | 2-1/2          | 101143          | 25.32    | 102029         | 32.67    |
| 1/4          | 0.030         | 1/4        | 3/4          | 2-1/2          | 101144          | 25.32    | 102031         | 32.67    |
| 1/4          | 0.045         | 1/4        | 3/4          | 2-1/2          | 101145          | 25.32    | 102033         | 32.67    |
| 5/16         | 0.020         | 5/16       | 13/16        | 2-1/2          | 101146          | 33.18    | 102035         | 44.28    |
| 5/16         | 0.030         | 5/16       | 13/16        | 2-1/2          | 101147          | 33.18    | 102037         | 44.28    |
| 5/16         | 0.045         | 5/16       | 13/16        | 2-1/2          | 101148          | 33.18    | 102039         | 44.28    |
| 3/8          | 0.020         | 3/8        | 1            | 2-1/2          | 101149          | 40.61    | 102041         | 51.72    |
| 3/8          | 0.030         | 3/8        | 1            | 2-1/2          | 101150          | 40.61    | 102043         | 51.72    |
| 3/8          | 0.045         | 3/8        | 1            | 2-1/2          | 101151          | 40.61    | 102045         | 51.72    |
| 1/2          | 0.020         | 1/2        | 1            | 3              | 101152          | 75.59    | 102046         | 88.21    |
| 1/2          | 0.030         | 1/2        | 1            | 3              | 101153          | 75.59    | 102047         | 88.21    |
| 1/2          | 0.045         | 1/2        | 1            | 3              | 101154          | 75.59    | 102048         | 88.21    |
| 1/2          | 0.060         | 1/2        | 1            | 3              | 101155          | 75.59    | 102049         | 88.21    |
| 5/8          | 0.020         | 5/8        | 1-1/4        | 3-1/2          | 101156          | 122.26   | 102051         | 140.43   |
| 5/8          | 0.030         | 5/8        | 1-1/4        | 3-1/2          | 101157          | 122.26   | 102053         | 140.43   |
| 5/8          | 0.045         | 5/8        | 1-1/4        | 3-1/2          | 101158          | 122.26   | 102055         | 140.43   |
| 5/8          | 0.060         | 5/8        | 1-1/4        | 3-1/2          | 101159          | 122.26   | 102057         | 140.43   |
| 5/8          | 0.090         | 5/8        | 1-1/4        | 3-1/2          | 101160          | 122.26   | 102059         | 140.43   |
| 3/4          | 0.020         | 3/4        | 1-1/2        | 4              | 101162          | 179.92   | 102061         | 201.39   |
| 3/4          | 0.030         | 3/4        | 1-1/2        | 4              | 101163          | 179.92   | 102063         | 201.39   |
| 3/4          | 0.045         | 3/4        | 1-1/2        | 4              | 101164          | 179.92   | 102065         | 201.39   |
| 3/4          | 0.060         | 3/4        | 1-1/2        | 4              | 101165          | 179.92   | 102067         | 201.39   |
| 3/4          | 0.090         | 3/4        | 1-1/2        | 4              | 101166          | 179.92   | 102069         | 201.39   |
| 3/4          | 0.125         | 3/4        | 1-1/2        | 4              | 101161          | 179.92   | -              | -        |
| 1            | 0.020         | 1          | 1-1/2        | 4              | 101168          | 312.09   | 102073         | 343.81   |
| 1            | 0.030         | 1          | 1-1/2        | 4              | 101169          | 312.09   | 102075         | 343.81   |
| 1            | 0.045         | 1          | 1-1/2        | 4              | 101170          | 312.09   | 102077         | 343.81   |
| 1            | 0.060         | 1          | 1-1/2        | 4              | 101171          | 312.09   | 102079         | 343.81   |
| 1            | 0.090         | 1          | 1-1/2        | 4              | 101172          | 312.09   | 102081         | 343.81   |
| 1            | 0.125         | 1          | 1-1/2        | 4              | 101167          | 312.09   | 102083         | 343.81   |

## Carbide Drill Mills

- Drill/Mills can be used for drilling, slotting, profile milling
- 2-Flute - 60° & 90° included point angle
- Made from submicron grain carbide
- Cutting diameter tolerance: +0.000 / -0.002



| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Bright 60° Code No. | Price \$ | Bright 90° Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------------|----------|---------------------|----------|
| 1/16               | 1/8              | 3/16               | 1-1/2                | 153187              | 15.13    | 153186              | 15.13    |
| 3/32               | 1/8              | 3/8                | 1-1/2                | 153189              | 15.13    | 153188              | 15.13    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 153191              | 15.13    | 153190              | 15.13    |
| 3/16               | 3/16             | 5/8                | 2                    | 153193              | 19.94    | 153192              | 19.94    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 153195              | 24.77    | 153194              | 24.77    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 153197              | 32.47    | 153196              | 32.47    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 153199              | 39.74    | 153198              | 39.74    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 153201              | 48.91    | 153200              | 48.91    |
| 1/2                | 1/2              | 1                  | 3                    | 153203              | 73.96    | 153202              | 73.96    |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 153205              | 119.63   | 153204              | 119.63   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 153207              | 176.06   | 153206              | 176.06   |

## 2-Flute Ball Nose Regular Length

A general purpose carbide end mill with maximum chip clearance added.

For: End Milling, Slotting, Sinking, Contouring

On: Variety of Steels, Cast Iron, Non-Ferrous Metals, Plastics, Abrasive Type Materials



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 1/2          | 1-1/2          | 103872          | 15.13    | 102862         | 18.63    |
| 3/16          | 3/16       | 5/8          | 2              | 103873          | 19.94    | 102864         | 22.27    |
| 1/4           | 1/4        | 3/4          | 2-1/2          | 103874          | 24.77    | 102866         | 31.97    |
| 5/16          | 5/16       | 13/16        | 2-1/2          | 103877          | 32.47    | 102868         | 43.33    |
| 3/8           | 3/8        | 1            | 2-1/2          | 103875          | 39.74    | 102870         | 50.60    |
| 1/2           | 1/2        | 1            | 3              | 103876          | 73.96    | 102872         | 86.31    |
| 9/16          | 9/16       | 1-1/8        | 3-1/2          | 103892          | 107.73   | 102874         | 125.52   |
| 5/8           | 5/8        | 1-1/4        | 3-1/2          | 103893          | 119.63   | 102876         | 137.41   |
| 11/16         | 3/4        | 1-3/8        | 4              | 103894          | 199.15   | 102877         | 220.13   |
| 3/4           | 3/4        | 1-1/2        | 4              | 103895          | 176.06   | 102878         | 197.06   |
| 7/8           | 7/8        | 1-1/2        | 4              | 103896          | 282.06   | 102879         | 313.09   |
| 1             | 1          | 1-1/2        | 4              | 103897          | 305.38   | 102880         | 336.43   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 0.5           | 3          | 1.5          | 39             | 101460          | 30.58    | 102107         | 23.40    |
| 1             | 3          | 3            | 39             | 101461          | 19.83    | 102108         | 23.40    |
| 1.5           | 3          | 5            | 39             | 101462          | 19.83    | 102109         | 23.40    |
| 2             | 3          | 7            | 39             | 102740          | 18.69    | 102111         | 22.29    |
| 2.5           | 3          | 7            | 39             | 102741          | 17.91    | 102113         | 21.48    |
| 3             | 3          | 9            | 39             | 102742          | 16.26    | 102115         | 19.83    |
| 3.5           | 4          | 12           | 51             | 102743          | 23.87    | 102117         | 27.43    |
| 4             | 4          | 14           | 51             | 102744          | 21.40    | 102119         | 24.98    |
| 4.5           | 5          | 14           | 51             | 102745          | 26.93    | 102121         | 32.52    |
| 5             | 5          | 16           | 51             | 102746          | 25.95    | 102123         | 33.33    |
| 6             | 6          | 19           | 64             | 102747          | 26.59    | 102182         | 33.97    |
| 7             | 8          | 19           | 64             | 102748          | 34.14    | 102183         | 45.17    |
| 8             | 8          | 21           | 64             | 102749          | 34.92    | 102184         | 45.95    |
| 9             | 10         | 22           | 70             | 102750          | 42.66    | 102186         | 53.70    |
| 10            | 10         | 22           | 70             | 102751          | 49.85    | 102187         | 62.44    |
| 11            | 11         | 25           | 70             | 102752          | 52.48    | 102188         | 91.94    |
| 12            | 12         | 25           | 76             | 102753          | 79.40    | 102189         | 91.94    |
| 14            | 14         | 30           | 89             | 102755          | 115.59   | 102191         | 133.76   |
| 16            | 16         | 32           | 89             | 102756          | 128.35   | 102192         | 146.53   |
| 18            | 18         | 35           | 102            | 102757          | 188.88   | 102193         | 210.38   |
| 20            | 20         | 38           | 102            | 102758          | 253.30   | 102194         | 285.01   |
| 22            | 22         | 38           | 102            | 101481          | 294.96   | 102195         | 313.08   |
| 25            | 25         | 38           | 102            | 102759          | 294.96   | 102196         | 326.65   |

## 2-Flute Ball Nose Extra Long Length

Extra long length end mills combine added flute and overall lengths for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 1/8        | 1            | 3              | 102420          | 31.44    | 102520         | 35.71    |
| 3/16         | 3/16       | 1-1/8        | 3              | 102422          | 34.66    | 102522         | 40.11    |
| 1/4          | 1/4        | 1-1/2        | 4              | 102424          | 42.21    | 102524         | 50.71    |
| 5/16         | 5/16       | 1-5/8        | 4              | 102426          | 55.30    | 102526         | 69.06    |
| 3/8          | 3/8        | 1-3/4        | 4              | 102428          | 61.18    | 102528         | 74.94    |
| 7/16         | 7/16       | 3            | 6              | 102430          | 109.50   | 102530         | 131.90   |
| 1/2          | 1/2        | 3            | 6              | 102432          | 121.88   | 102532         | 144.25   |
| 5/8          | 5/8        | 3            | 6              | 102434          | 179.21   | 102534         | 205.62   |
| 3/4          | 3/4        | 3            | 6              | 102436          | 294.10   | 102536         | 324.68   |
| 1            | 1          | 3            | 6              | 102438          | 500.11   | 102538         | 539.85   |



## 2-Flute Ball Nose Stub Length

This series has added strength and stability with the same geometry of our standard length series. Stub end mills are specifically designed for shallow milling, contour milling and slotting.

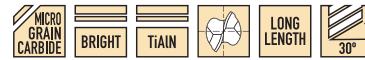


Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32          | 1/8        | 5/64         | 1-1/2          | 101240          | 18.47    | 102197         | 22.00    |
| 3/64          | 1/8        | 3/32         | 1-1/2          | 101241          | 18.47    | 102198         | 22.00    |
| 1/16          | 1/8        | 1/8          | 1-1/2          | 101242          | 13.62    | 102199         | 17.11    |
| 5/64          | 1/8        | 5/32         | 1-1/2          | 101243          | 14.33    | 102201         | 17.83    |
| 3/32          | 1/8        | 3/16         | 1-1/2          | 101244          | 12.85    | 102239         | 16.36    |
| 7/64          | 1/8        | 7/32         | 1-1/2          | 101245          | 13.51    | 102241         | 17.04    |
| 1/8           | 1/8        | 1/4          | 1-1/2          | 101246          | 12.52    | 102243         | 16.03    |
| 9/64          | 3/16       | 9/32         | 2              | 101247          | 18.44    | 102245         | 21.96    |
| 5/32          | 3/16       | 5/16         | 2              | 101248          | 17.54    | 102247         | 21.03    |
| 3/16          | 3/16       | 3/8          | 2              | 101249          | 16.64    | 102249         | 20.15    |
| 7/32          | 1/4        | 7/16         | 2              | 101250          | 22.07    | 102251         | 27.54    |
| 1/4           | 1/4        | 1/2          | 2              | 101251          | 21.71    | 102252         | 27.21    |
| 5/16          | 5/16       | 1/2          | 2              | 101252          | 29.71    | 102253         | 37.50    |
| 3/8           | 3/8        | 5/8          | 2              | 101253          | 36.70    | 102254         | 44.50    |
| 7/16          | 7/16       | 5/8          | 2-1/2          | 101254          | 45.41    | 102255         | 57.71    |
| 1/2           | 1/2        | 5/8          | 2-1/2          | 101255          | 60.54    | 102256         | 72.83    |
| 5/8           | 5/8        | 3/4          | 3              | 101256          | 119.63   | 102257         | 112.68   |
| 3/4           | 3/4        | 1            | 3              | 101257          | 166.55   | 102258         | 183.65   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 2            | 39             | 101670          | 19.83    | 102259         | 23.42    |
| 1.5           | 3          | 3            | 39             | 101671          | 19.83    | 102261         | 23.42    |
| 2             | 3          | 4            | 39             | 101672          | 14.64    | 102263         | 18.22    |
| 2.5           | 3          | 5            | 39             | 101673          | 13.81    | -              | -        |
| 3             | 3          | 6            | 39             | 101674          | 13.46    | 102267         | 17.04    |
| 3.5           | 4          | 7            | 51             | 101675          | 18.85    | 102269         | 22.43    |
| 4             | 4          | 8            | 51             | 101676          | 17.91    | 102271         | 21.48    |
| 4.5           | 5          | 9            | 51             | 101677          | 23.68    | -              | -        |
| 5             | 5          | 10           | 51             | 101678          | 22.30    | 102275         | 27.87    |
| 6             | 6          | 12           | 51             | 101679          | 23.42    | 102277         | 28.98    |
| 7             | 8          | 12           | 51             | 101680          | 30.63    | 102279         | 38.63    |
| 8             | 8          | 12           | 51             | 101681          | 31.97    | 102281         | 39.93    |
| 9             | 10         | 14           | 51             | 101682          | 39.48    | -              | -        |
| 10            | 10         | 14           | 51             | 101683          | 43.64    | 102285         | 52.66    |
| 11            | 11         | 16           | 64             | 101684          | 65.10    | -              | -        |
| 12            | 12         | 16           | 64             | 101685          | 65.10    | -              | -        |

## 2-Flute Ball Nose Long Length

Long length end mills combine added flute and overall lengths for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 3/4          | 2-1/4          | 102971          | 20.37    | 102780         | 21.39    |
| 3/16          | 3/16       | 3/4          | 2-1/2          | 102972          | 19.94    | 102782         | 22.27    |
| 1/4           | 1/4        | 1-1/8        | 3              | 102973          | 40.13    | 102784         | 47.37    |
| 5/16          | 5/16       | 1-1/8        | 3              | 102974          | 49.57    | 102786         | 60.41    |
| 3/8           | 3/8        | 1-1/8        | 3              | 102975          | 55.76    | 102788         | 66.59    |
| 7/16          | 7/16       | 2            | 4              | 102976          | 84.23    | 102790         | 100.22   |
| 1/2           | 1/2        | 2            | 4              | 102977          | 86.05    | 102792         | 102.00   |
| 5/8           | 5/8        | 2-1/4        | 5              | 102978          | 179.21   | 102794         | 205.62   |
| 3/4           | 3/4        | 2-1/4        | 5              | 102979          | 294.10   | 102796         | 324.68   |
| 1             | 1          | 2-1/4        | 5              | 102980          | 373.56   | 102798         | 393.23   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 3             | 3          | 19           | 57             | 101580          | 33.80    | 102085         | 37.38    |
| 4             | 4          | 19           | 57             | 101581          | 34.53    | 102086         | 40.11    |
| 5             | 5          | 25           | 64             | 101582          | 37.29    | 102087         | 44.66    |
| 6             | 6          | 28           | 76             | 101583          | 43.17    | 102089         | 50.53    |
| 8             | 8          | 29           | 76             | 101584          | 53.32    | -              | -        |
| 10            | 10         | 32           | 76             | 101585          | 80.71    | -              | -        |
| 12            | 12         | 51           | 102            | 101586          | 92.66    | -              | -        |
| 14            | 14         | 57           | 127            | 101587          | 173.80   | -              | -        |
| 16            | 16         | 57           | 127            | 101588          | 183.11   | -              | -        |
| 18            | 18         | 57           | 127            | 101589          | 281.69   | -              | -        |
| 20            | 20         | 57           | 127            | 101590          | 309.73   | -              | -        |
| 25            | 25         | 57           | 127            | 101591          | 491.47   | -              | -        |

## 2-Flute Ball Nose Double End Stub Length

These end mills offer the same tool geometry as the single end stub end mill, but with two cutters in one tool.



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/32         | 1/8        | 5/64         | 1-1/2          | 101331          | 25.13    | 102291         | 36.80    |
| 3/64         | 1/8        | 3/32         | 1-1/2          | 101332          | 25.13    | 102293         | 29.44    |
| 1/16         | 1/8        | 1/8          | 1-1/2          | 101333          | 25.13    | 102295         | 29.44    |
| 3/32         | 1/8        | 3/16         | 1-1/2          | 101334          | 25.13    | 102297         | 29.44    |
| 1/8          | 1/8        | 1/4          | 1-1/2          | 101335          | 19.49    | 102299         | 24.87    |
| 5/32         | 3/16       | 5/16         | 2              | 101336          | 34.62    | 102323         | 39.99    |
| 3/16         | 3/16       | 3/8          | 2              | 101337          | 28.29    | 102324         | 33.66    |
| 7/32         | 1/4        | 1/2          | 2-1/2          | 101338          | 29.44    | 102325         | 47.87    |
| 1/4          | 1/4        | 1/2          | 2-1/2          | 101339          | 36.80    | 102326         | 38.30    |
| 5/16         | 5/16       | 1/2          | 2-1/2          | 101351          | 50.66    | 102327         | 49.90    |
| 3/8          | 3/8        | 1/2          | 2-1/2          | 101352          | 45.59    | 102328         | 65.28    |
| 7/16         | 7/16       | 9/16         | 2-3/4          | 101353          | 68.87    | 102329         | 101.65   |
| 1/2          | 1/2        | 5/8          | 3              | 101354          | 70.35    | 102331         | 81.32    |

## 2-Flute Ball Nose Double End Regular Length

With maximum chip clearance, 2-flute ball nose end mills are ideal for milling, sinking, profiling or slotting various steels, non-ferrous materials, cast iron or highly abrasive materials.



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 3/8        | 3/8          | 3-1/16         | 101320          | 61.73    | 102333         | 78.31    |
| 5/32         | 3/8        | 7/16         | 3-1/8          | 101321          | 49.38    | 102335         | 78.31    |
| 3/16         | 3/8        | 1/2          | 3-1/4          | 101322          | 61.73    | 102337         | 78.31    |
| 7/32         | 3/8        | 9/16         | 3-3/8          | 101323          | 49.38    | 102339         | 78.31    |
| 1/4          | 3/8        | 5/8          | 3-3/8          | 101324          | 49.38    | 102341         | 78.31    |
| 9/32         | 3/8        | 11/16        | 3-3/8          | 101325          | 62.53    | 102343         | 91.97    |
| 5/16         | 3/8        | 3/4          | 3-1/2          | 101326          | 50.03    | 102345         | 91.97    |
| 11/32        | 3/8        | 3/4          | 3-1/2          | 101327          | 62.53    | 102347         | 91.97    |
| 3/8          | 3/8        | 3/4          | 3-1/2          | 101328          | 62.53    | 102349         | 91.97    |
| 7/16         | 1/2        | 7/8          | 4              | 101329          | 68.87    | -              | -        |
| 1/2          | 1/2        | 1            | 4              | 101330          | 87.93    | 102352         | 104.24   |

## 3-Flute Regular Length Carbide End Mills



3-flute carbide end mills offer maximum chip clearance therefore reducing chip packing.

**For:** End milling, Slotting, Sinking  
**On:** Steels, Cast Iron, Aluminum, Copper, Brass, Plastics, and Abrasive Type Materials



Bright: Speeds & Feeds > P. A31

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/16          | 1/8        | 3/16         | 1-1/2          | 101080          | 13.51    | 102353         | 17.04    |
| 5/64          | 1/8        | 3/16         | 1-1/2          | 101081          | 13.51    | 102354         | 17.04    |
| 3/32          | 1/8        | 5/16         | 1-1/2          | 101082          | 12.78    | 102355         | 16.28    |
| 7/64          | 1/8        | 7/16         | 1-1/2          | 101083          | 12.78    | 102356         | 16.28    |
| 1/8           | 1/8        | 1/2          | 1-1/2          | 101084          | 11.79    | 102357         | 15.30    |
| 9/64          | 3/16       | 1/2          | 2              | 101085          | 17.44    | 102358         | 20.94    |
| 5/32          | 3/16       | 9/16         | 2              | 101086          | 17.44    | 102359         | 20.94    |
| 11/64         | 3/16       | 5/8          | 2              | 101087          | 17.44    | 102361         | 20.94    |
| 3/16          | 3/16       | 5/8          | 2              | 101088          | 16.55    | 102363         | 20.02    |
| 13/64         | 1/4        | 5/8          | 2-1/2          | 101089          | 21.91    | 102365         | 29.17    |
| 7/32          | 1/4        | 5/8          | 2-1/2          | 101090          | 21.91    | 102367         | 29.17    |
| 15/64         | 1/4        | 3/4          | 2-1/2          | 101091          | 21.91    | 102369         | 29.17    |
| 1/4           | 1/4        | 3/4          | 2-1/2          | 101092          | 19.94    | 102371         | 27.18    |
| 17/64         | 5/16       | 3/4          | 2-1/2          | 101093          | 34.98    | 102373         | 45.81    |
| 9/32          | 5/16       | 3/4          | 2-1/2          | 101094          | 34.98    | 102375         | 45.81    |
| 19/64         | 5/16       | 13/16        | 2-1/2          | 101095          | 34.98    | 102377         | 45.81    |
| 5/16          | 5/16       | 13/16        | 2-1/2          | 101096          | 27.97    | 102379         | 38.81    |
| 3/8           | 3/8        | 1            | 2-1/2          | 101097          | 34.86    | 102381         | 45.65    |
| 7/16          | 7/16       | 1            | 2-3/4          | 101098          | 42.51    | 102383         | 54.84    |
| 1/2           | 1/2        | 1            | 3              | 101099          | 55.80    | 102384         | 68.11    |
| 9/16          | 9/16       | 1-1/8        | 3-1/2          | 101100          | 95.33    | 102385         | 113.10   |
| 5/8           | 5/8        | 1-1/4        | 3-1/2          | 101101          | 107.61   | 102386         | 125.42   |
| 11/16         | 3/4        | 1-3/8        | 4              | 101102          | 179.21   | -              | -        |
| 3/4           | 3/4        | 1-1/2        | 4              | 101103          | 157.77   | 102388         | 178.78   |
| 7/8           | 7/8        | 1-1/2        | 4              | 101104          | 227.05   | 102389         | 258.08   |
| 1             | 1          | 1-1/2        | 4              | 101105          | 236.05   | 102390         | 267.04   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 3            | 39             | 101490          | 15.30    | 102391         | 18.80    |
| 1.5           | 3          | 5            | 39             | 101491          | 15.30    | 102392         | 18.80    |
| 2             | 3          | 7            | 39             | 101492          | 14.17    | 102393         | 17.67    |
| 3             | 3          | 10           | 39             | 101494          | 12.39    | -              | -        |
| 3.5           | 4          | 12           | 51             | 101495          | 18.33    | 102396         | 21.84    |
| 4             | 4          | 14           | 51             | 101496          | 17.40    | -              | -        |
| 4.5           | 5          | 14           | 51             | 101497          | 21.28    | 102398         | 26.75    |
| 5             | 5          | 16           | 51             | 101498          | 20.29    | 102399         | 27.52    |
| 6             | 6          | 19           | 64             | 101499          | 20.94    | 102401         | 28.17    |
| 7             | 8          | 19           | 64             | 101500          | 28.77    | 102403         | 39.57    |
| 8             | 8          | 21           | 64             | 101501          | 29.37    | 102405         | 40.20    |
| 9             | 10         | 22           | 70             | 101502          | 36.58    | 102407         | 47.40    |
| 10            | 10         | 25           | 70             | 101503          | 42.41    | 102409         | 54.70    |
| 11            | 11         | 25           | 70             | 101504          | 44.65    | -              | -        |
| 12            | 12         | 25           | 76             | 101505          | 58.61    | 102413         | 70.89    |
| 14            | 14         | 30           | 89             | 101506          | 100.06   | 102415         | 117.86   |
| 16            | 16         | 32           | 89             | 101507          | 113.00   | 102417         | 130.81   |
| 18            | 18         | 35           | 102            | 101508          | 165.69   | 102419         | 186.69   |
| 20            | 20         | 38           | 102            | 101509          | 210.65   | 102421         | 241.69   |
| 22            | 22         | 38           | 102            | 101510          | 234.08   | 102423         | 265.09   |
| 25            | 25         | 38           | 102            | 101511          | 244.74   | 102425         | 293.68   |

## 3-Flute Ball Nose Regular Length



3-flute carbide end mills offer maximum chip clearance therefore reducing chip packing.

**For:** End Milling, Slotting, Sinking  
**On:** Steels, Cast Iron, Aluminum, Copper, Brass, Plastics, and Abrasive Type Materials



Bright: Speeds & Feeds > P. A33

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/16          | 1/8        | 3/16         | 1-1/2          | 101110          | 17.44    | 102455         | 20.94    |
| 5/64          | 1/8        | 3/16         | 1-1/2          | 101111          | 17.44    | 102457         | 20.94    |
| 3/32          | 1/8        | 5/16         | 1-1/2          | 101112          | 16.68    | 102459         | 20.18    |
| 7/64          | 1/8        | 7/16         | 1-1/2          | 101113          | 16.68    | 102461         | 20.18    |
| 1/8           | 1/8        | 1/2          | 1-1/2          | 101114          | 15.13    | 102463         | 18.63    |
| 9/64          | 3/16       | 1/2          | 2              | 101115          | 22.20    | 102465         | 25.73    |
| 5/32          | 3/16       | 9/16         | 2              | 101116          | 22.20    | 102467         | 25.73    |
| 11/64         | 3/16       | 5/8          | 2              | 101117          | 22.20    | 102469         | 25.73    |
| 3/16          | 3/16       | 5/8          | 2              | 101118          | 19.94    | 102470         | 23.44    |
| 13/64         | 1/4        | 5/8          | 2-1/2          | 101119          | 25.82    | 102471         | 33.06    |
| 7/32          | 1/4        | 5/8          | 2-1/2          | 101120          | 25.82    | 102472         | 33.06    |
| 15/64         | 1/4        | 3/4          | 2-1/2          | 101121          | 25.82    | 102473         | 33.06    |
| 1/4           | 1/4        | 3/4          | 2-1/2          | 101122          | 24.77    | 102474         | 31.97    |
| 17/64         | 5/16       | 3/4          | 2-1/2          | 101123          | 38.77    | 102475         | 49.58    |
| 9/32          | 5/16       | 3/4          | 2-1/2          | 101124          | 38.77    | 102476         | 49.58    |
| 19/64         | 5/16       | 13/16        | 2-1/2          | 101125          | 38.77    | 102477         | 49.58    |
| 5/16          | 5/16       | 13/16        | 2-1/2          | 101126          | 32.47    | 102478         | 43.33    |
| 3/8           | 3/8        | 1            | 2-1/2          | 101127          | 39.74    | 102479         | 50.60    |
| 7/16          | 7/16       | 1            | 2-3/4          | 101128          | 48.91    | 102481         | 61.18    |
| 1/2           | 1/2        | 1            | 3              | 101129          | 73.96    | 102483         | 86.31    |
| 9/16          | 9/16       | 1-1/8        | 3-1/2          | 101130          | 107.73   | -              | -        |
| 5/8           | 5/8        | 1-1/4        | 3-1/2          | 101131          | 119.63   | 102487         | 137.41   |
| 11/16         | 3/4        | 1-3/8        | 4              | 101132          | 199.15   | -              | -        |
| 3/4           | 3/4        | 1-1/2        | 4              | 101133          | 176.06   | 102491         | 197.06   |
| 7/8           | 7/8        | 1-1/2        | 4              | 101134          | 282.06   | -              | -        |
| 1             | 1          | 1-1/2        | 4              | 101135          | 305.38   | 102495         | 336.43   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 3            | 39             | 101520          | 19.83    | 102497         | 23.40    |
| 1.5           | 3          | 5            | 39             | 101521          | 19.83    | 102499         | 23.40    |
| 2             | 3          | 7            | 39             | 101522          | 18.69    | 102501         | 22.29    |
| 2.5           | 3          | 8            | 39             | 101523          | 17.91    | 102503         | 21.48    |
| 3             | 3          | 10           | 39             | 101524          | 16.26    | 102505         | 19.83    |
| 3.5           | 4          | 12           | 51             | 101525          | 23.87    | 102507         | 27.43    |
| 4             | 4          | 14           | 51             | 101526          | 21.40    | 102509         | 24.98    |
| 4.5           | 5          | 14           | 51             | 101527          | 26.93    | 102511         | 32.52    |
| 5             | 5          | 16           | 51             | 101528          | 25.95    | 102513         | 33.33    |
| 6             | 6          | 19           | 64             | 101529          | 26.59    | 102515         | 33.97    |
| 7             | 8          | 19           | 64             | 101530          | 34.14    | -              | -        |
| 8             | 8          | 21           | 64             | 101531          | 34.92    | 102519         | 45.95    |
| 9             | 10         | 22           | 70             | 101532          | 42.66    | 102521         | 53.70    |
| 10            | 10         | 25           | 70             | 101533          | 49.85    | 102523         | 62.44    |
| 11            | 11         | 25           | 70             | 101534          | 52.48    | -              | -        |
| 12            | 12         | 25           | 76             | 101535          | 79.40    | 102527         | 91.94    |
| 14            | 14         | 30           | 89             | 101536          | 115.59   | 102529         | 133.76   |
| 16            | 16         | 32           | 89             | 101537          | 128.35   | 102531         | 146.53   |
| 18            | 18         | 35           | 102            | 101538          | 188.88   | 102533         | 210.38   |
| 20            | 20         | 38           | 102            | 101539          | 253.30   | 102535         | 285.01   |
| 22            | 22         | 38           | 102            | 101540          | 281.33   | 102537         | 313.08   |
| 25            | 25         | 38           | 102            | 101541          | 294.96   | 102539         | 326.65   |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

### Tolerances - Inch

| Size         | Diameter       | Shank Diameter   |
|--------------|----------------|------------------|
| 3/32 thru 1" | +0.000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

## 3-Flute 60° High-Helix

These end mills are designed for milling stainless steel, titanium, inconel and other similar metals where high cutting forces are generated. The high helix angle increases length of cutting edge engaged in the cut, reducing cutting load variations and prolonging tool life. Excellent surface finish with high speed and feed capabilities are features of these tools.



Bright: Speeds & Feeds > P. A32  
TiAIN: Speeds & Feeds > P. A34

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 1/2          | 1-1/2          | 101000          | 21.00    | 102427         | 28.23    |
| 3/16          | 3/16       | 5/8          | 2              | 101002          | 21.00    | 102429         | 28.23    |
| 1/4           | 1/4        | 3/4          | 2-1/2          | 101004          | 21.00    | 102431         | 28.23    |
| 5/16          | 5/16       | 13/16        | 2-1/2          | 101006          | 29.46    | 102433         | 40.24    |
| 3/8           | 3/8        | 1            | 2-1/2          | 101008          | 36.67    | 102435         | 47.49    |
| 7/16          | 7/16       | 1            | 2-3/4          | 101010          | 44.76    | 102437         | 57.10    |
| 1/2           | 1/2        | 1            | 3              | 101012          | 58.74    | 102439         | 71.03    |
| 5/8           | 5/8        | 1-1/4        | 3-1/2          | 101014          | 113.29   | 102440         | 131.07   |
| 3/4           | 3/4        | 1-1/2        | 4              | 101016          | 166.11   | 102441         | 187.09   |
| 1             | 1          | 1-1/2        | 4              | 101018          | 248.45   | 102442         | 279.49   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 6             | 6          | 19           | 64             | 101730          | 21.00    | -              | -        |
| 8             | 8          | 21           | 64             | 101731          | 29.46    | -              | -        |
| 10            | 10         | 25           | 70             | 101732          | 44.76    | -              | -        |
| 12            | 12         | 25           | 76             | 101733          | 58.74    | -              | -        |
| 14            | 14         | 29           | 89             | 101734          | 113.29   | -              | -        |
| 16            | 16         | 32           | 89             | 101735          | 113.29   | -              | -        |
| 18            | 18         | 38           | 102            | 101736          | 166.11   | -              | -        |
| 20            | 20         | 38           | 102            | 101737          | 166.11   | -              | -        |
| 25            | 25         | 38           | 102            | 101738          | 248.45   | -              | -        |

## 4-Flute Regular Length Carbide End Mills

The industry standard. Wear resistance and minimal deflection for excellent size control.

For: Slotting, Production Milling, Profiling  
On: Variety of Steels



Bright: Speeds & Feeds > P. A32  
TiAIN: Speeds & Feeds > P. A35

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|---|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32  | 1/8        | 1/8          | 1-1/2          | 103781          | 14.56    | 102899         | 18.07    |
| 3/64  | 1/8        | 9/64         | 1-1/2          | 103782          | 14.56    | 102831         | 18.07    |
| 1/16  | 1/8        | 3/16         | 1-1/2          | 103870          | 13.51    | 102832         | 17.04    |
| 5/64  | 1/8        | 1/4          | 1-1/2          | 103783          | 13.51    | 102833         | 17.04    |
| 3/32  | 1/8        | 5/16         | 1-1/2          | 103871          | 12.78    | 102834         | 16.28    |
| 7/64  | 1/8        | 3/8          | 1-1/2          | 103784          | 12.78    | 102835         | 16.28    |
| 1/8   | 1/8        | 1/2          | 1-1/2          | 103860          | 11.79    | 102836         | 15.30    |
| 9/64  | 3/16       | 1/2          | 2              | 103785          | 17.44    | 102837         | 20.94    |
| 5/32  | 3/16       | 9/16         | 2              | 103861          | 17.44    | 102839         | 20.94    |
| 11/64   | 3/16       | 9/16         | 2              | 103786          | 17.44    | 102841         | 20.94    |
| 3/16  | 3/16       | 5/8          | 2              | 103862          | 16.55    | 102838         | 20.02    |
| 13/64   | 1/4        | 5/8          | 2-1/2          | 103787          | 21.91    | 102843         | 29.17    |
| 7/32  | 1/4        | 5/8          | 2-1/2          | 103863          | 21.91    | 102845         | 29.17    |
| 1/4   | 1/4        | 3/4          | 2-1/2          | 103864          | 19.94    | 102840         | 27.18    |
| 9/32  | 5/16       | 3/4          | 2-1/2          | 103865          | 34.98    | 102847         | 45.81    |
| 5/16  | 5/16       | 13/16        | 2-1/2          | 103866          | 27.97    | 102842         | 38.81    |
| 11/32   | 3/8        | 7/8          | 2-1/2          | 103789          | 41.43    | 102849         | 52.25    |
| 3/8   | 3/8        | 1            | 2-1/2          | 103867          | 34.86    | 102844         | 45.65    |
| 13/32   | 7/16       | 1            | 2-3/4          | 103790          | 49.54    | 102851         | 61.86    |
| 7/16  | 7/16       | 1            | 2-3/4          | 103868          | 42.51    | 102846         | 54.84    |
| 1/2   | 1/2        | 1            | 3              | 103869          | 55.80    | 102848         | 68.11    |
| 9/16  | 9/16       | 1-1/8        | 3-1/2          | 103933          | 95.33    | 102850         | 113.10   |
| 5/8   | 5/8        | 1-1/4        | 3-1/2          | 103934          | 107.61   | 102852         | 125.42   |
| 11/16   | 3/4        | 1-3/8        | 4              | 103935          | 179.21   | 102854         | 200.23   |
| 3/4   | 3/4        | 1-1/2        | 4              | 103936          | 157.77   | 102856         | 178.78   |
| 7/8   | 7/8        | 1-1/2        | 4              | 103937          | 227.05   | 102858         | 258.08   |
| 1   | 1          | 1-1/2        | 4              | 103938          | 236.05   | 102860         | 267.04   |
| <b>6pc Set: 1/4", 5/16", 3/8", 1/2", 5/8", 3/4"</b> |            |              |                |                 | 103847   | 372.57         | -        |
| <b>Metric</b>                                       |            |              |                |                 |          |                |          |
| 1   | 3          | 3            | 39             | 101550          | 15.30    | 102601         | 18.80    |
| 1.5   | 3          | 5            | 39             | 101551          | 15.30    | 102603         | 18.80    |
| 2   | 3          | 7            | 39             | 102716          | 14.17    | 102605         | 17.67    |
| 2.5   | 3          | 8            | 39             | 102717          | 13.41    | 102607         | 16.94    |
| 3   | 3          | 10           | 39             | 102718          | 12.39    | 102609         | 15.91    |
| 3.5   | 4          | 12           | 51             | 102719          | 18.33    | 102611         | 21.84    |
| 4   | 4          | 14           | 51             | 102720          | 17.40    | 102613         | 20.90    |
| 4.5   | 5          | 14           | 51             | 102721          | 21.28    | 102615         | 26.75    |
| 5   | 5          | 16           | 51             | 102722          | 20.29    | 102617         | 27.52    |
| 6   | 6          | 19           | 64             | 102723          | 20.94    | 102619         | 28.17    |
| 7   | 8          | 19           | 64             | 102724          | 28.77    | 102621         | 39.57    |
| 8   | 8          | 21           | 64             | 102725          | 29.37    | 102623         | 40.20    |
| 9   | 10         | 22           | 70             | 102726          | 36.58    | 102625         | 47.40    |
| 10  | 10         | 25           | 70             | 102727          | 42.41    | 102627         | 54.70    |
| 11  | 11         | 25           | 70             | 102728          | 44.65    | 102629         | 56.95    |
| 12  | 12         | 25           | 76             | 102729          | 58.61    | 102657         | 70.89    |
| 14  | 14         | 30           | 89             | 102731          | 100.06   | 102659         | 117.86   |
| 16  | 16         | 32           | 89             | 102732          | 113.00   | 102661         | 130.81   |
| 18  | 18         | 35           | 102            | 102733          | 165.69   | 102663         | 186.69   |
| 20  | 20         | 38           | 102            | 102734          | 210.65   | 102665         | 241.69   |
| 22  | 22         | 38           | 102            | 102736          | 234.08   | 102667         | 265.09   |
| 25  | 25         | 38           | 102            | 102735          | 244.74   | 102669         | 275.76   |

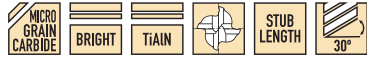


Contain and organize all your end mills.

See Page A4

## 4-Flute Stub Length Carbide End Mills

Strength, rigidity and improved tool life can be obtained with this stub length end mill. The premium micrograin carbide makes these mills tough enough to machine the very hard metals.



Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32          | 1/8        | 5/64         | 1-1/2          | 101260          | 14.56    | 102540         | 18.07    |
| 3/64          | 1/8        | 3/32         | 1-1/2          | 101261          | 14.56    | 102541         | 18.07    |
| 1/16          | 1/8        | 1/8          | 1-1/2          | 101262          | 13.51    | 102542         | 17.04    |
| 5/64          | 1/8        | 5/32         | 1-1/2          | 101263          | 13.51    | 102543         | 17.04    |
| 3/32          | 1/8        | 3/16         | 1-1/2          | 101264          | 12.78    | 102544         | 16.28    |
| 7/64          | 1/8        | 7/32         | 1-1/2          | 101265          | 12.78    | 102545         | 16.28    |
| 1/8           | 1/8        | 1/4          | 1-1/2          | 101266          | 11.79    | 102546         | 15.30    |
| 9/64          | 3/16       | 9/32         | 2              | 101267          | 17.44    | 102547         | 20.94    |
| 5/32          | 3/16       | 5/16         | 2              | 101268          | 17.44    | -              | -        |
| 3/16          | 3/16       | 3/8          | 2              | 101269          | 16.55    | 102549         | 20.02    |
| 7/32          | 1/4        | 7/16         | 2              | 101270          | 18.74    | 102551         | 24.22    |
| 1/4           | 1/4        | 1/2          | 2              | 101271          | 18.47    | 102553         | 23.95    |
| 5/16          | 5/16       | 1/2          | 2              | 101272          | 25.28    | 102555         | 33.07    |
| 3/8           | 3/8        | 5/8          | 2              | 101273          | 31.22    | 102557         | 39.01    |
| 7/16          | 7/16       | 5/8          | 2-1/2          | 101274          | 38.60    | 102559         | 50.90    |
| 1/2           | 1/2        | 5/8          | 2-1/2          | 101275          | 51.49    | 102561         | 63.79    |
| 5/8           | 5/8        | 3/4          | 3              | 101276          | 98.41    | 102563         | 112.68   |
| 3/4           | 3/4        | 1            | 3              | 101277          | 141.54   | 102565         | 158.62   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 2            | 39             | 101690          | 15.30    | 102567         | 18.83    |
| 1.5           | 3          | 3            | 39             | 101691          | 15.30    | 102569         | 18.83    |
| 2             | 3          | 4            | 39             | 101692          | 14.17    | 102570         | 17.67    |
| 2.5           | 3          | 5            | 39             | 101693          | 13.41    | 102571         | 16.94    |
| 3             | 3          | 6            | 39             | 101694          | 12.39    | 102572         | 15.91    |
| 3.5           | 4          | 7            | 51             | 101695          | 18.33    | 102573         | 21.84    |
| 4             | 4          | 8            | 51             | 101696          | 17.40    | 102574         | 20.90    |
| 4.5           | 5          | 9            | 51             | 101697          | 21.28    | -              | -        |
| 5             | 5          | 10           | 51             | 101698          | 20.29    | -              | -        |
| 6             | 6          | 12           | 51             | 101699          | 19.47    | 102577         | 24.92    |
| 7             | 8          | 12           | 51             | 101700          | 25.31    | 102578         | 33.10    |
| 8             | 8          | 12           | 51             | 101701          | 26.56    | 102579         | 34.39    |
| 10            | 10         | 14           | 51             | 101703          | 36.28    | 102583         | 45.12    |
| 11            | 11         | 16           | 64             | 101704          | 42.41    | -              | -        |
| 12            | 12         | 16           | 64             | 101705          | 54.18    | -              | -        |

## 4-Flute Long Length Carbide End Mills

Long length end mills combine added flute and overall length for greater reach when deep slotting or milling. These end mills have the capability to mill thicker material in one pass, eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 3/4          | 2-1/4          | 102981          | 19.73    | 102922         | 20.78    |
| 3/16          | 3/16       | 3/4          | 2-1/4          | 102982          | 21.16    | 102924         | 22.27    |
| 1/4           | 1/4        | 1-1/8        | 3              | 102983          | 34.12    | 102926         | 41.36    |
| 5/16          | 5/16       | 1-1/8        | 3              | 102984          | 42.12    | 102928         | 52.95    |
| 3/8           | 3/8        | 1-1/8        | 3              | 102985          | 47.39    | 102930         | 58.24    |
| 7/16          | 7/16       | 2            | 4              | 102986          | 71.62    | 102932         | 87.54    |
| 1/2           | 1/2        | 2            | 4              | 102987          | 76.18    | 102934         | 92.10    |
| 5/8           | 5/8        | 2-1/4        | 5              | 102988          | 156.99   | 102936         | 183.42   |
| 3/4           | 3/4        | 2-1/4        | 5              | 102989          | 226.62   | 102938         | 238.55   |
| 1             | 1          | 2-1/4        | 5              | 102990          | 337.64   | 102940         | 355.42   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 3             | 3          | 19           | 57             | 101600          | 16.55    | 102901         | 31.61    |
| 4             | 4          | 19           | 57             | 101601          | 17.40    | 102903         | 34.20    |
| 5             | 5          | 25           | 64             | 101602          | 31.02    | 102905         | 38.22    |
| 6             | 6          | 28           | 76             | 101603          | 35.95    | 102907         | 43.14    |
| 8             | 8          | 29           | 76             | 101604          | 44.36    | 102909         | 55.16    |
| 10            | 10         | 32           | 76             | 101605          | 51.44    | 102911         | 63.75    |
| 12            | 12         | 51           | 102            | 101606          | 80.77    | 102913         | 96.69    |
| 14            | 14         | 57           | 127            | 101607          | 110.89   | 102915         | 171.00   |
| 18            | 18         | 57           | 127            | 101609          | 236.05   | 102919         | 266.64   |
| 20            | 20         | 57           | 127            | 101610          | 263.46   | 102917         | 303.20   |
| 25            | 25         | 57           | 127            | 101611          | 405.97   | -              | -        |

## 4-Flute Extra Long Length Carbide End Mills

Extra long length end mills combine added flute and overall length for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 1/8        | 1            | 3              | 102450          | 26.72    | 102550         | 30.99    |
| 3/16         | 3/16       | 1-1/8        | 3              | 102452          | 29.47    | 102552         | 34.94    |
| 1/4          | 1/4        | 1-1/2        | 4              | 102454          | 36.04    | 102554         | 44.50    |
| 5/16         | 5/16       | 1-5/8        | 4              | 102456          | 47.03    | 102556         | 60.75    |
| 3/8          | 3/8        | 1-3/4        | 4              | 102458          | 52.03    | 102558         | 65.80    |
| 7/16         | 7/16       | 3            | 6              | 102460          | 95.20    | 102560         | 117.61   |
| 1/2          | 1/2        | 3            | 6              | 102462          | 110.14   | 102562         | 132.53   |
| 5/8          | 5/8        | 3            | 6              | 102464          | 156.99   | 102564         | 183.42   |
| 3/4          | 3/4        | 3            | 6              | 102466          | 250.09   | 102566         | 280.69   |
| 1            | 1          | 3            | 6              | 102468          | 425.18   | 102568         | 464.89   |

### Tolerances - Inch

| Size         | Diameter        | Shank Diameter   |
|--------------|-----------------|------------------|
| 3/32 thru 1" | +0.0000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

# Coolant Hoses

See Pages I8-13



## 4-Flute Double End Regular Length

Four-flute configuration with centre cutting permits plunging and milling on many ferrous and non-ferrous materials. It also offers lower chip-load for size control and finish.



Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 3/8        | 3/8          | 3-1/16         | 101340          | 41.98    | 102589         | 69.07    |
| 5/32         | 3/8        | 7/16         | 3-1/8          | 101341          | 52.48    | -              | -        |
| 3/16         | 3/8        | 1/2          | 3-1/4          | 101342          | 41.98    | 102593         | 55.26    |
| 7/32         | 3/8        | 9/16         | 3-3/8          | 101343          | 52.48    | 102595         | 69.07    |
| 1/4          | 3/8        | 5/8          | 3-3/8          | 101344          | 41.98    | 102597         | 55.26    |
| 9/32         | 3/8        | 11/16        | 3-3/8          | 101345          | 60.31    | 102599         | 81.36    |
| 5/16         | 3/8        | 3/4          | 3-1/2          | 101346          | 48.25    | 102671         | 65.09    |
| 11/32        | 3/8        | 3/4          | 3-1/2          | 101347          | 58.55    | -              | -        |
| 3/8          | 3/8        | 3/4          | 3-1/2          | 101348          | 60.31    | 102675         | 81.36    |
| 7/16         | 1/2        | 7/8          | 4              | 101349          | 80.53    | -              | -        |
| 1/2          | 1/2        | 1            | 4              | 101350          | 77.86    | 102679         | 94.13    |

## 4-Flute Corner Radius Regular Length

Four-flute carbide end mills with corner radius allows more strength and minimizes chipping on corners. Four-flute construction provides more strength than two or three-flute and will also result in excellent surface finishes.

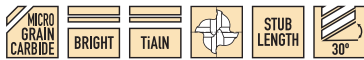


Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia. | Corner Radius (in.) | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|---------------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |                     |            |              |                |                 |          |                |          |
| 1/8          | 0.015               | 1/8        | 1/2          | 1-1/2          | 101175          | 15.13    | 101833         | 18.63    |
| 3/16         | 0.020               | 3/16       | 5/8          | 2              | 101176          | 19.94    | 101834         | 23.44    |
| 3/16         | 0.030               | 3/16       | 5/8          | 2              | 101177          | 19.94    | 101835         | 23.44    |
| 1/4          | 0.020               | 1/4        | 3/4          | 2-1/2          | 101178          | 24.77    | 101836         | 31.97    |
| 1/4          | 0.030               | 1/4        | 3/4          | 2-1/2          | 101179          | 24.77    | 101837         | 31.97    |
| 1/4          | 0.045               | 1/4        | 3/4          | 2-1/2          | 101180          | 24.77    | 101838         | 31.97    |
| 5/16         | 0.020               | 5/16       | 13/16        | 2-1/2          | 101181          | 32.47    | 101839         | 43.33    |
| 5/16         | 0.030               | 5/16       | 13/16        | 2-1/2          | 101182          | 32.47    | 101862         | 43.33    |
| 5/16         | 0.045               | 5/16       | 13/16        | 2-1/2          | 101183          | 32.47    | 101863         | 43.33    |
| 3/8          | 0.020               | 3/8        | 1            | 2-1/2          | 101184          | 39.74    | 101864         | 50.60    |
| 3/8          | 0.030               | 3/8        | 1            | 2-1/2          | 101185          | 39.74    | 101865         | 50.60    |
| 3/8          | 0.045               | 3/8        | 1            | 2-1/2          | 101186          | 39.74    | 101866         | 50.60    |
| 1/2          | 0.020               | 1/2        | 1            | 3              | 101187          | 73.96    | 101867         | 86.31    |
| 1/2          | 0.030               | 1/2        | 1            | 3              | 101188          | 73.96    | 101868         | 86.31    |
| 1/2          | 0.045               | 1/2        | 1            | 3              | 101189          | 73.96    | 101869         | 86.31    |
| 1/2          | 0.060               | 1/2        | 1            | 3              | 101190          | 73.96    | 101892         | 86.31    |
| 5/8          | 0.020               | 5/8        | 1-1/4        | 3-1/2          | 101191          | 119.63   | 101893         | 137.41   |
| 5/8          | 0.030               | 5/8        | 1-1/4        | 3-1/2          | 101192          | 119.63   | 101894         | 137.41   |
| 5/8          | 0.045               | 5/8        | 1-1/4        | 3-1/2          | 101193          | 119.63   | 101895         | 137.41   |
| 5/8          | 0.060               | 5/8        | 1-1/4        | 3-1/2          | 101194          | 119.63   | 101896         | 137.41   |
| 5/8          | 0.090               | 5/8        | 1-1/4        | 3-1/2          | 101195          | 119.63   | 101897         | 137.41   |
| 3/4          | 0.020               | 3/4        | 1-1/2        | 4              | 101197          | 176.06   | 101898         | 197.06   |
| 3/4          | 0.030               | 3/4        | 1-1/2        | 4              | 101198          | 176.06   | 101899         | 197.06   |
| 3/4          | 0.045               | 3/4        | 1-1/2        | 4              | 101199          | 176.06   | 101900         | 197.06   |
| 3/4          | 0.060               | 3/4        | 1-1/2        | 4              | 101200          | 176.06   | 101991         | 197.06   |
| 3/4          | 0.090               | 3/4        | 1-1/2        | 4              | 101201          | 176.06   | 101992         | 197.06   |
| 3/4          | 0.125               | 3/4        | 1-1/2        | 4              | 101196          | 176.06   | 101993         | 197.06   |
| 1            | 0.020               | 1          | 1-1/2        | 4              | 101203          | 305.38   | 101994         | 336.43   |
| 1            | 0.030               | 1          | 1-1/2        | 4              | 101204          | 305.38   | 101995         | 336.43   |
| 1            | 0.045               | 1          | 1-1/2        | 4              | 101205          | 305.38   | 101996         | 336.43   |
| 1            | 0.060               | 1          | 1-1/2        | 4              | 101206          | 305.38   | 101997         | 336.43   |
| 1            | 0.090               | 1          | 1-1/2        | 4              | 101207          | 305.38   | 101998         | 336.43   |
| 1            | 0.125               | 1          | 1-1/2        | 4              | 101202          | 305.38   | 101999         | 336.43   |

## 4-Flute Double End Stub Length

These end mills have a shorter flute length which provides greater rigidity with less deflection for shallow milling or slotting. This series is ideal for use on high tensile alloys and heat treated steels.



Bright: Speeds & Feeds > P. A32  
TiAlN: Speeds & Feeds > P. A35

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/16         | 1/8        | 1/8          | 1-1/2          | 102230          | 20.94    | 102330         | 25.15    |
| 3/32         | 1/8        | 3/16         | 1-1/2          | 102232          | 20.94    | 102332         | 25.15    |
| 1/8          | 1/8        | 1/4          | 1-1/2          | 102234          | 12.98    | 102334         | 17.18    |
| 5/32         | 3/16       | 5/16         | 2              | 102236          | 23.05    | 102336         | 27.26    |
| 3/16         | 3/16       | 3/8          | 2              | 102238          | 23.51    | 102338         | 23.02    |
| 7/32         | 1/4        | 1/2          | 2-1/2          | 102240          | 33.60    | 102340         | 35.57    |
| 1/4          | 1/4        | 1/2          | 2-1/2          | 102242          | 24.49    | 102342         | 33.15    |
| 5/16         | 5/16       | 1/2          | 2-1/2          | 102244          | 30.47    | 102344         | 43.45    |
| 3/8          | 3/8        | 1/2          | 2-1/2          | 102246          | 32.40    | 102346         | 45.40    |
| 7/16         | 7/16       | 9/16         | 2-3/4          | 102248          | 68.83    | 102348         | 87.28    |
| 1/2          | 1/2        | 5/8          | 3              | 102250          | 55.06    | 102350         | 69.82    |



## GS Tooling End Mill Holders

Unmatched precision and quality, at a price point you'll love!



See Pages G4-10

## 4-Flute Ball Nose Stub Length

Strength, rigidity and improved tool life can be obtained with this stub length end mill.



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/32          | 1/8        | 5/64         | 1-1/2          | 101280          | 18.47    | 102681         | 22.00    |
| 3/64          | 1/8        | 3/32         | 1-1/2          | 101281          | 18.47    | 102683         | 22.00    |
| 1/16          | 1/8        | 1/8          | 1-1/2          | 101282          | 13.62    | 102685         | 17.11    |
| 5/64          | 1/8        | 5/32         | 1-1/2          | 101283          | 12.85    | 102687         | 16.36    |
| 3/32          | 1/8        | 3/16         | 1-1/2          | 101284          | 12.85    | 102689         | 16.36    |
| 7/64          | 1/8        | 7/32         | 1-1/2          | 101285          | 13.17    | 102691         | 16.68    |
| 1/8           | 1/8        | 1/4          | 1-1/2          | 101286          | 12.52    | 102693         | 16.03    |
| 9/64          | 3/16       | 9/32         | 2              | 101287          | 17.54    | 102694         | 21.03    |
| 5/32          | 3/16       | 5/16         | 2              | 101288          | 17.54    | 102695         | 21.03    |
| 3/16          | 3/16       | 3/8          | 2              | 101289          | 16.64    | 102781         | 20.15    |
| 7/32          | 1/4        | 7/16         | 2              | 101290          | 22.07    | 102783         | 27.54    |
| 1/4           | 1/4        | 1/2          | 2              | 101291          | 21.71    | 102785         | 27.21    |
| 5/16          | 5/16       | 1/2          | 2              | 101292          | 29.71    | 102787         | 37.50    |
| 3/8           | 3/8        | 5/8          | 2              | 101293          | 36.70    | 102789         | 44.50    |
| 7/16          | 7/16       | 5/8          | 2-1/2          | 101294          | 45.41    | 102791         | 57.71    |
| 1/2           | 1/2        | 5/8          | 2-1/2          | 101295          | 60.54    | 102793         | 72.83    |
| 5/8           | 5/8        | 3/4          | 3              | 101296          | 166.55   | 102795         | 130.06   |
| 3/4           | 3/4        | 1            | 3              | 101297          | 166.55   | 102797         | 183.65   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 2            | 39             | 101710          | 19.83    | 102891         | 23.42    |
| 1.5           | 3          | 3            | 39             | 101711          | 19.83    | 102893         | 23.42    |
| 2             | 3          | 4            | 39             | 101712          | 14.64    | -              | -        |
| 2.5           | 3          | 5            | 39             | 101713          | 13.81    | -              | -        |
| 3             | 3          | 6            | 39             | 101714          | 13.46    | 102941         | 17.04    |
| 3.5           | 4          | 7            | 51             | 101715          | 18.85    | -              | -        |
| 4             | 4          | 8            | 51             | 101716          | 17.91    | -              | -        |
| 4.5           | 5          | 9            | 51             | 101717          | 23.68    | -              | -        |
| 5             | 5          | 10           | 51             | 101718          | 22.30    | 102935         | 27.87    |
| 6             | 6          | 12           | 51             | 101719          | 23.42    | 102945         | 28.98    |
| 7             | 8          | 12           | 51             | 101720          | 30.63    | -              | -        |
| 8             | 8          | 12           | 51             | 101721          | 31.97    | -              | -        |
| 9             | 10         | 14           | 51             | 101722          | 39.48    | 102943         | 47.46    |
| 10            | 10         | 14           | 51             | 101723          | 43.64    | -              | -        |
| 11            | 11         | 16           | 64             | 101724          | 46.40    | -              | -        |
| 12            | 12         | 16           | 64             | 101725          | 65.10    | -              | -        |

## 4-Flute Ball Nose Regular Length

The industry standard. Wear resistance and minimal deflection for excellent size control.

**For:** General Purpose Milling, Production Milling, Contouring  
**On:** Steels, Stainless Steels



Bright: Speeds & Feeds > P. A33  
TiAlN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 1/2          | 1-1/2          | 103880          | 15.13    | 102882         | 18.63    |
| 3/16          | 3/16       | 5/8          | 2              | 103881          | 19.94    | 102884         | 23.44    |
| 1/4           | 1/4        | 3/4          | 2-1/2          | 103882          | 24.77    | 102886         | 31.97    |
| 5/16          | 5/16       | 13/16        | 2-1/2          | 103883          | 32.47    | 102888         | 43.33    |
| 3/8           | 3/8        | 1            | 2-1/2          | 103884          | 39.74    | 102890         | 50.60    |
| 1/2           | 1/2        | 1            | 3              | 103885          | 73.96    | 102892         | 86.31    |
| 9/16          | 9/16       | 1-1/8        | 3-1/2          | 103939          | 107.73   | 102894         | 125.52   |
| 5/8           | 5/8        | 1-1/4        | 3-1/2          | 103940          | 119.63   | 102896         | 137.41   |
| 11/16         | 3/4        | 1-3/8        | 4              | 103941          | 199.15   | 102895         | 220.13   |
| 3/4           | 3/4        | 1-1/2        | 4              | 103942          | 176.06   | 102898         | 197.06   |
| 7/8           | 7/8        | 1-1/2        | 4              | 103943          | 282.06   | 102897         | 313.09   |
| 1             | 1          | 1-1/2        | 4              | 103944          | 305.38   | 102900         | 336.43   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 1             | 3          | 3            | 39             | 102737          | 19.83    | 101635         | 23.40    |
| 1.5           | 3          | 5            | 39             | 102738          | 19.83    | 101636         | 23.40    |
| 2             | 3          | 7            | 39             | 102760          | 18.69    | 101637         | 22.29    |
| 2.5           | 3          | 8            | 39             | 102761          | 17.91    | 101638         | 21.48    |
| 3             | 3          | 10           | 39             | 102762          | 16.26    | 101639         | 19.83    |
| 3.5           | 4          | 12           | 51             | 102763          | 23.87    | 101656         | 27.43    |
| 4             | 4          | 14           | 51             | 102764          | 21.40    | 101657         | 24.98    |
| 4.5           | 5          | 14           | 51             | 102765          | 26.93    | 101658         | 32.52    |
| 5             | 5          | 16           | 51             | 102766          | 25.95    | 101659         | 33.33    |
| 6             | 6          | 19           | 64             | 102767          | 26.59    | 101660         | 33.97    |
| 7             | 8          | 19           | 64             | 102768          | 34.14    | 101661         | 45.17    |
| 8             | 8          | 21           | 64             | 102769          | 34.92    | 101662         | 45.95    |
| 9             | 10         | 22           | 70             | 102770          | 42.66    | 101663         | 53.70    |
| 10            | 10         | 25           | 70             | 102771          | 49.85    | 101664         | 62.44    |
| 11            | 11         | 25           | 70             | 102772          | 52.48    | 101665         | 65.05    |
| 12            | 12         | 25           | 76             | 102773          | 64.22    | 101666         | 91.94    |
| 14            | 14         | 30           | 89             | 102775          | 115.59   | 101667         | 133.76   |
| 16            | 16         | 32           | 89             | 102776          | 128.35   | 101668         | 146.53   |
| 18            | 18         | 35           | 102            | 102777          | 188.88   | 101669         | 210.38   |
| 20            | 20         | 38           | 102            | 102778          | 253.30   | 101686         | 285.01   |
| 25            | 25         | 38           | 102            | 102779          | 294.96   | 101687         | 326.65   |

## Multi-Flute Rougher Regular Length — TiAlN Coated

These fine pitch roughing end mills have an excellent flute design for roughing applications in a variety of materials. TiAlN coating enhances speeds-feeds and tool life.

- 4 flutes



TiAlN: Speeds & Feeds > P. A35

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAlN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/4          | 1/4        | 3/4          | 2-1/2          | 102150          | 47.20    | 102185         | 53.55    |
| 5/16         | 5/16       | 3/4          | 2-1/2          | 102155          | 52.25    | 102190         | 61.48    |
| 3/8          | 3/8        | 1            | 2-1/2          | 102160          | 65.27    | 102200         | 74.48    |
| 1/2          | 1/2        | 1-1/4        | 3              | 102165          | 90.07    | 102205         | 95.67    |
| 5/8          | 5/8        | 1-1/4        | 3-1/2          | 102170          | 145.14   | 102210         | 152.41   |
| 3/4          | 3/4        | 1-5/8        | 4              | 102175          | 212.24   | 102215         | 218.83   |
| 1            | 1          | 1-3/4        | 4              | 102180          | 360.41   | 102220         | 386.91   |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

| Tolerances - Inch |                |                  | Tolerances - Metric |                  |                  |
|-------------------|----------------|------------------|---------------------|------------------|------------------|
| Size              | Diameter       | Shank Diameter   | Size                | Diameter         | Shank Diameter   |
| 3/32 thru 1"      | +0.000"-0.002" | +0.0000"-0.0005" | 1mm-25mm            | +0.000mm-0.051mm | +0.000mm-0.013mm |
| Steel             |                | Stainless Steel  | Cast Iron/Hardened  |                  | Aluminum         |

## 4-Flute Ball Nose Long Length

Added flute and overall length combine for greater reach when deep slotting or milling. These end mills have the capability to mill thicker material in one pass, eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A33

TiAIN: Speeds & Feeds > P. A36

| Cutting Dia.  | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|---------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>   |            |              |                |                 |          |                |          |
| 1/8           | 1/8        | 3/4          | 2-1/4          | 102991          | 20.37    | 102942         | 23.84    |
| 3/16          | 3/16       | 3/4          | 2-1/2          | 102992          | 19.94    | 102944         | 23.44    |
| 1/4           | 1/4        | 1-1/8        | 3              | 102993          | 40.13    | 102946         | 47.37    |
| 5/16          | 5/16       | 1-1/8        | 3              | 102994          | 49.57    | 102948         | 60.41    |
| 3/8           | 3/8        | 1-1/8        | 3              | 102995          | 55.76    | 102950         | 66.59    |
| 7/16          | 7/16       | 2            | 4              | 102996          | 84.23    | 102952         | 100.22   |
| 1/2           | 1/2        | 2            | 4              | 102997          | 86.05    | 102954         | 102.00   |
| 5/8           | 5/8        | 2-1/4        | 5              | 102998          | 179.21   | 102956         | 205.62   |
| 3/4           | 3/4        | 2-1/4        | 5              | 102999          | 294.10   | 102958         | 324.68   |
| 1             | 1          | 2-1/4        | 5              | 103000          | 373.56   | 102960         | 393.23   |
| <b>Metric</b> |            |              |                |                 |          |                |          |
| 3             | 3          | 19           | 57             | 101620          | 33.80    | 101764         | 37.38    |
| 4             | 4          | 19           | 57             | 101621          | 34.53    | 101765         | 40.11    |
| 5             | 5          | 25           | 64             | 101622          | 37.29    | 101766         | 44.66    |
| 6             | 6          | 28           | 76             | 101623          | 43.17    | 101767         | 50.53    |
| 8             | 8          | 29           | 76             | 101624          | 53.32    | 101768         | 64.36    |
| 10            | 10         | 32           | 76             | 101625          | 61.58    | 101769         | 74.18    |
| 12            | 12         | 51           | 102            | 101626          | 92.66    | 101770         | 108.92   |
| 14            | 14         | 57           | 127            | 101627          | 173.80   | -              | -        |
| 16            | 16         | 57           | 127            | 101628          | 183.11   | 101772         | 210.13   |
| 18            | 18         | 57           | 127            | 101629          | 281.69   | -              | -        |
| 20            | 20         | 57           | 127            | 101630          | 309.73   | 101774         | 350.38   |
| 25            | 25         | 57           | 127            | 101631          | 491.47   | -              | -        |

## 4-Flute Ball Nose Extra Long Length

Extra Long Length End mills combine added flute and overall length for greater reach when deep slotting or milling. These end mills have the capability to mill much thicker material in a single pass, thereby eliminating the interrupted cut that may be present with regular length end mills.



Bright: Speeds & Feeds > P. A33

TiAIN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 1/8        | 1            | 3              | 102480          | 31.44    | 102580         | 35.71    |
| 3/16         | 3/16       | 1-1/8        | 3              | 102482          | 34.66    | 102582         | 40.11    |
| 1/4          | 1/4        | 1-1/2        | 4              | 102484          | 42.21    | 102584         | 50.71    |
| 5/16         | 5/16       | 1-5/8        | 4              | 102486          | 55.30    | 102586         | 69.06    |
| 3/8          | 3/8        | 1-3/4        | 4              | 102488          | 61.18    | 102588         | 74.94    |
| 7/16         | 7/16       | 3            | 6              | 102490          | 109.50   | 102590         | 131.90   |
| 1/2          | 1/2        | 3            | 6              | 102492          | 121.88   | 102592         | 144.25   |
| 5/8          | 5/8        | 3            | 6              | 102494          | 179.21   | 102594         | 183.42   |
| 3/4          | 3/4        | 3            | 6              | 102496          | 294.10   | 102596         | 324.68   |
| 1            | 1          | 3            | 6              | 102498          | 500.11   | 102598         | 539.85   |

### Tolerances - Inch

| Size         | Diameter       | Shank Diameter   |
|--------------|----------------|------------------|
| 3/32 thru 1" | +0.000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

## 4-Flute Ball Nose Double End Regular Length

The ball nose 4-flute centre cut design allows for excellent finish while contour milling.



Bright: Speeds & Feeds > P. A33

TiAIN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/8          | 3/8        | 3/8          | 3-1/16         | 101360          | 61.73    | 101708         | 62.64    |
| 5/32         | 3/8        | 7/16         | 3-1/8          | 101361          | 61.73    | -              | -        |
| 3/16         | 3/8        | 1/2          | 3-1/4          | 101362          | 61.73    | 101726         | 78.31    |
| 7/32         | 3/8        | 9/16         | 3-3/8          | 101363          | 61.73    | -              | -        |
| 1/4          | 3/8        | 5/8          | 3-3/8          | 101364          | 61.73    | 101728         | 78.31    |
| 9/32         | 3/8        | 11/16        | 3-3/8          | 101365          | 62.53    | -              | -        |
| 5/16         | 3/8        | 3/4          | 3-1/2          | 101366          | 62.53    | 101739         | 91.97    |
| 11/32        | 3/8        | 3/4          | 3-1/2          | 101367          | 62.53    | -              | -        |
| 3/8          | 3/8        | 3/4          | 3-1/2          | 101368          | 62.53    | 101748         | 91.97    |
| 7/16         | 1/2        | 7/8          | 4              | 101369          | 86.09    | -              | -        |
| 1/2          | 1/2        | 1            | 4              | 101370          | 68.87    | 101763         | 104.24   |

## 4-Flute Ball Nose Double End Stub Length

These end mills have a shorter flute length which provides greater rigidity with less deflection for shallow milling or slotting. This series is ideal for use on high tensile alloys and heat treated steels.



Bright: Speeds & Feeds > P. A33

TiAIN: Speeds & Feeds > P. A36

| Cutting Dia. | Shank Dia. | Flute Length | Overall Length | Bright Code No. | Price \$ | TiAIN Code No. | Price \$ |
|--------------|------------|--------------|----------------|-----------------|----------|----------------|----------|
| <b>Inch</b>  |            |              |                |                 |          |                |          |
| 1/32         | 1/8        | 5/64         | 1-1/2          | 101355          | 31.42    | 101776         | 29.44    |
| 3/64         | 1/8        | 3/32         | 1-1/2          | 101356          | 31.42    | 101777         | 36.80    |
| 1/16         | 1/8        | 1/8          | 1-1/2          | 101357          | 25.13    | 101778         | 29.44    |
| 3/32         | 1/8        | 3/16         | 1-1/2          | 101358          | 31.42    | 101779         | 36.80    |
| 1/8          | 1/8        | 1/4          | 1-1/2          | 101359          | 15.59    | 101802         | 24.87    |
| 5/32         | 3/16       | 5/16         | 2              | 101371          | 27.70    | 101803         | 31.99    |
| 3/16         | 3/16       | 3/8          | 2              | 101372          | 22.64    | 101804         | 33.66    |
| 7/32         | 1/4        | 1/2          | 2-1/2          | 101373          | 36.80    | 101805         | 39.84    |
| 1/4          | 1/4        | 1/2          | 2-1/2          | 101374          | 29.44    | 101806         | 47.87    |
| 5/16         | 5/16       | 1/2          | 2-1/2          | 101375          | 56.52    | 101807         | 62.38    |
| 3/8          | 3/8        | 1/2          | 2-1/2          | 101376          | 62.53    | 101808         | 65.28    |
| 7/16         | 7/16       | 9/16         | 2-3/4          | 101377          | 86.09    | 101809         | 101.65   |
| 1/2          | 1/2        | 5/8          | 3              | 101378          | 70.35    | 101832         | 101.65   |



NOGA

# Deburring Systems

See Pages J19-28

# 2-Flute Typhoon End Mills

## 2-Flute Regular Length — Typhoon

These end mills are manufactured with Premium Sub-Micron carbide and are designed to cut hardened materials. The unique geometry of the Typhoon end mill combined with its modified AlTiN coating make it an excellent choice for demanding applications.



Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/8              | 3/16               | 1-1/2                | 104602   | 18.50    |
| 3/32               | 1/8              | 5/16               | 1-1/2                | 104601   | 17.66    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 104600   | 16.59    |
| 5/32               | 3/16             | 9/16               | 2                    | 104603   | 21.87    |
| 3/16               | 3/16             | 5/8                | 2                    | 104604   | 20.92    |
| 7/32               | 1/4              | 5/8                | 2-1/2                | 104605   | 30.63    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 104608   | 28.23    |
| 9/32               | 5/16             | 3/4                | 2-1/2                | 104607   | 48.10    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 104612   | 40.24    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 104616   | 47.49    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 104618   | 57.10    |
| 1/2                | 1/2              | 1                  | 3                    | 104620   | 71.03    |
| 9/16               | 9/16             | 1-1/8              | 3-1/2                | 104622   | 118.12   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 104624   | 131.07   |
| 11/16              | 3/4              | 1-3/8              | 4                    | 104630   | 210.24   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 104628   | 187.09   |
| 7/8                | 7/8              | 1-1/2              | 4                    | 104631   | 279.49   |
| 1                  | 1                | 1-1/2              | 4                    | 104632   | 279.49   |
| <b>Metric</b>      |                  |                    |                      |          |          |
| 1                  | 3                | 3                  | 39                   | 101780   | 19.62    |
| 1.5                | 3                | 5                  | 39                   | 101781   | 19.62    |
| 2                  | 3                | 7                  | 39                   | 101782   | 18.50    |
| 2.5                | 3                | 8                  | 39                   | 101783   | 16.59    |
| 3                  | 3                | 10                 | 39                   | 101784   | 16.59    |
| 3.5                | 4                | 12                 | 51                   | 101785   | 31.15    |
| 4                  | 4                | 14                 | 51                   | 101786   | 31.15    |
| 4.5                | 5                | 14                 | 51                   | 101787   | 30.50    |
| 5                  | 5                | 16                 | 51                   | 101788   | 30.50    |
| 6                  | 6                | 19                 | 64                   | 101789   | 29.23    |
| 7                  | 8                | 19                 | 64                   | 101790   | 51.44    |
| 8                  | 8                | 21                 | 64                   | 101791   | 41.72    |
| 9                  | 10               | 22                 | 70                   | 101792   | 64.42    |
| 10                 | 10               | 25                 | 70                   | 101793   | 56.95    |
| 11                 | 12               | 25                 | 70                   | 101794   | 73.96    |
| 12                 | 12               | 25                 | 76                   | 101795   | 73.96    |
| 14                 | 14               | 30                 | 89                   | 101796   | 130.88   |
| 16                 | 16               | 32                 | 89                   | 101797   | 136.72   |
| 18                 | 18               | 35                 | 102                  | 101798   | 205.86   |
| 20                 | 20               | 38                 | 102                  | 101799   | 252.76   |
| 22                 | 22               | 38                 | 102                  | 101800   | 306.36   |
| 25                 | 25               | 38                 | 102                  | 101801   | 288.65   |

## 2-Flute Long Length — Typhoon

These Typhoon end mills have the added reach and depth of cut required for longer reach applications in hardened materials.

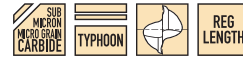


Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 1/8              | 3/4                | 2-1/4                | 104815   | 19.08    |
| 3/16               | 3/16             | 3/4                | 2-1/4                | 104816   | 20.92    |
| 1/4                | 1/4              | 1-1/8              | 3                    | 104818   | 47.37    |
| 5/16               | 5/16             | 1-1/8              | 3                    | 104820   | 60.41    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 104822   | 66.59    |
| 1/2                | 1/2              | 2                  | 4                    | 104824   | 96.12    |
| 5/8                | 5/8              | 2-1/4              | 5                    | 104826   | 205.62   |
| 3/4                | 3/4              | 2-1/4              | 5                    | 104830   | 251.10   |
| 1                  | 1                | 2-1/4              | 5                    | 104831   | 374.13   |

## 2-Flute Corner Radius — Typhoon

Typhoon end mills with corner radius allow more strength and minimize chipping on the corners in demanding applications.



Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Corner Radius (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|---------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                     |                  |                    |                      |          |          |
| 1/8                | 0.015               | 1/8              | 1/2                | 1-1/2                | 102602   | 19.08    |
| 3/16               | 0.020               | 3/16             | 5/8                | 2                    | 102610   | 23.96    |
| 1/4                | 0.020               | 1/4              | 3/4                | 2-1/2                | 102616   | 32.67    |
| 1/4                | 0.030               | 1/4              | 3/4                | 2-1/2                | 102618   | 32.67    |
| 5/16               | 0.020               | 5/16             | 13/16              | 2-1/2                | 102620   | 44.28    |
| 3/8                | 0.020               | 3/8              | 1                  | 2-1/2                | 102628   | 51.72    |
| 3/8                | 0.030               | 3/8              | 1                  | 2-1/2                | 102630   | 51.72    |
| 1/2                | 0.020               | 1/2              | 1                  | 3                    | 102636   | 88.21    |
| 1/2                | 0.030               | 1/2              | 1                  | 3                    | 102638   | 88.21    |
| 1/2                | 0.060               | 1/2              | 1                  | 3                    | 102640   | 88.21    |

## 2-Flute Ball Nose Regular Length — Typhoon

Typhoon ball nose end mills are designed for contour milling applications in hardened materials.



Speeds & Feeds > P. A38

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/8              | 3/16               | 1-1/2                | 104649   | 20.97    |
| 3/32               | 1/8              | 5/16               | 1-1/2                | 104651   | 20.21    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 104650   | 19.57    |
| 5/32               | 3/16             | 9/16               | 2                    | 104653   | 25.73    |
| 3/16               | 3/16             | 5/8                | 2                    | 104654   | 23.44    |
| 7/32               | 1/4              | 5/8                | 2-1/2                | 104655   | 33.06    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 104658   | 33.57    |
| 9/32               | 5/16             | 3/4                | 2-1/2                | 104657   | 43.33    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 104662   | 45.50    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 104666   | 53.14    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 104668   | 61.18    |
| 1/2                | 1/2              | 1                  | 3                    | 104670   | 90.63    |
| 9/16               | 9/16             | 1-1/8              | 3-1/2                | 104672   | 131.79   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 104674   | 144.28   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 104678   | 206.91   |
| 7/8                | 7/8              | 1-1/2              | 4                    | 104681   | 336.43   |
| 1                  | 1                | 1-1/2              | 4                    | 104682   | 353.25   |
| <b>Metric</b>      |                  |                    |                      |          |          |
| 1                  | 3                | 3                  | 39                   | 101810   | 22.74    |
| 1.5                | 3                | 5                  | 39                   | 101811   | 22.74    |
| 2                  | 3                | 7                  | 39                   | 101812   | 21.42    |
| 2.5                | 3                | 8                  | 39                   | 101813   | 20.65    |
| 3                  | 3                | 10                 | 39                   | 101814   | 19.08    |
| 3.5                | 4                | 12                 | 51                   | 101815   | 19.08    |
| 4                  | 4                | 14                 | 51                   | 101816   | 32.32    |
| 4.5                | 5                | 14                 | 51                   | 101817   | 35.09    |
| 5                  | 5                | 16                 | 51                   | 101818   | 35.09    |
| 6                  | 6                | 19                 | 64                   | 101819   | 33.97    |
| 7                  | 8                | 19                 | 64                   | 101820   | 44.28    |
| 8                  | 8                | 21                 | 64                   | 101821   | 45.95    |
| 9                  | 10               | 22                 | 70                   | 101822   | 51.72    |
| 10                 | 10               | 25                 | 70                   | 101823   | 62.44    |
| 11                 | 12               | 25                 | 70                   | 101824   | 91.94    |
| 12                 | 12               | 25                 | 76                   | 101825   | 91.94    |
| 14                 | 14               | 30                 | 89                   | 101826   | 133.76   |
| 16                 | 16               | 32                 | 89                   | 101827   | 146.53   |
| 18                 | 18               | 35                 | 102                  | 101828   | 210.38   |
| 20                 | 20               | 38                 | 102                  | 101829   | 285.01   |
| 22                 | 22               | 38                 | 102                  | 101830   | 326.65   |
| 25                 | 25               | 38                 | 102                  | 101831   | 326.65   |



## 2-Flute Ball Nose Long Length — Typhoon



Typhoon ball nose end mills are designed for contour milling in hardened materials. The long length allows for milling tougher materials in longer reach applications.



Speeds & Feeds > P. A38

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 1/8              | 3/4                | 2-1/4                | 104652   | 22.45    |
| 3/16               | 3/16             | 3/4                | 2-1/4                | 104656   | 23.44    |
| 1/4                | 1/4              | 1-1/8              | 3                    | 104660   | 49.74    |
| 5/16               | 5/16             | 1-1/8              | 3                    | 104663   | 63.43    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 104667   | 69.92    |
| 1/2                | 1/2              | 2                  | 4                    | 104671   | 107.10   |
| 3/4                | 3/4              | 2-1/4              | 5                    | 104679   | 340.91   |
| 1                  | 1                | 2-1/4              | 5                    | 104683   | 413.93   |

## 2-Flute Mold Mill — Typhoon



The Typhoon Mold Mill offers excellent performance and tool life in mold milling applications on tougher materials.



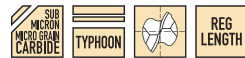
Speeds & Feeds > P. A39

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 1/8              | 5/16               | 2-3/8                | 104034   | 40.11    |
| 3/16               | 3/16             | 3/8                | 3-1/8                | 104036   | 40.11    |
| 1/4                | 1/4              | 1/2                | 3-1/2                | 104038   | 61.94    |
| 5/16               | 5/16             | 15/32              | 4                    | 104040   | 83.54    |
| 3/8                | 3/8              | 3/4                | 4                    | 104042   | 89.42    |
| 1/2                | 1/2              | 7/8                | 4-1/4                | 104044   | 116.43   |
| 5/8                | 5/8              | 15/16              | 6                    | 104046   | 220.07   |
| 3/4                | 3/4              | 1-1/8              | 6                    | 104048   | 339.24   |
| 1                  | 1                | 1-1/2              | 6                    | 104050   | 487.32   |

## 2-Flute Spherical Ball End — Typhoon



- High performance ball nose plus end mills are used in the mold industry and have a full 220 degree arc cutting capability
- Modified AlTiN coated for improved tool life and increased production output
- Made from premium sub-micron grain carbide



Speeds & Feeds > P. A38

| Cutting Dia. (in.)    | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-----------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Regular Length</b> |                  |                    |                      |          |          |
| 1/8                   | 1/8              | 3/32               | 1-1/2                | 153110   | 39.41    |
| 3/16                  | 3/16             | 9/64               | 2                    | 153112   | 39.81    |
| 1/4                   | 1/4              | 3/16               | 2-1/2                | 153114   | 57.94    |
| 3/8                   | 3/8              | 9/32               | 2-1/2                | 153116   | 81.55    |
| 1/2                   | 1/2              | 3/8                | 3                    | 153118   | 120.69   |
| <b>Long Length</b>    |                  |                    |                      |          |          |
| 1/8                   | 1/8              | 3/32               | 3                    | 153120   | 44.63    |
| 3/16                  | 3/16             | 9/64               | 3                    | 153122   | 45.30    |
| 1/4                   | 1/4              | 3/16               | 4                    | 153124   | 78.66    |
| 3/8                   | 3/8              | 9/32               | 4                    | 153126   | 91.85    |
| 1/2                   | 1/2              | 3/8                | 6                    | 153128   | 172.04   |

### Tolerances - Inch

| Size         | Diameter       | Shank Diameter   |
|--------------|----------------|------------------|
| 3/32 thru 1" | +0.000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

## 4-Flute Regular Length — Typhoon



These end mills are manufactured with premium sub-micron carbide and are designed to cut hardened materials. The unique geometry of the Typhoon end mill combined with its modified AlTiN coating make it an excellent choice for demanding applications.



Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/8              | 3/16               | 1-1/2                | 104702   | 18.50    |
| 3/32               | 1/8              | 5/16               | 1-1/2                | 104701   | 17.66    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 104700   | 16.59    |
| 5/32               | 3/16             | 9/16               | 2                    | 104703   | 21.87    |
| 3/16               | 3/16             | 5/8                | 2                    | 104704   | 20.92    |
| 7/32               | 1/4              | 5/8                | 2-1/2                | 104705   | 30.63    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 104708   | 28.23    |
| 9/32               | 5/16             | 3/4                | 2-1/2                | 104707   | 48.10    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 104712   | 40.24    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 104716   | 47.49    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 104718   | 57.10    |
| 1/2                | 1/2              | 1                  | 3                    | 104720   | 71.03    |
| 9/16               | 9/16             | 1-1/8              | 3-1/2                | 104722   | 118.12   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 104724   | 131.07   |
| 11/16              | 3/4              | 1-3/8              | 4                    | 104730   | 210.24   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 104728   | 187.09   |
| 7/8                | 7/8              | 1-1/2              | 4                    | 104731   | 279.49   |
| 1                  | 1                | 1-1/2              | 4                    | 104732   | 279.49   |
| <b>Metric</b>      |                  |                    |                      |          |          |
| 1                  | 3                | 3                  | 39                   | 101840   | 19.62    |
| 1.5                | 3                | 5                  | 39                   | 101841   | 19.62    |
| 2                  | 3                | 7                  | 39                   | 101842   | 18.50    |
| 2.5                | 3                | 8                  | 39                   | 101843   | 17.79    |
| 3                  | 3                | 10                 | 39                   | 101844   | 16.59    |
| 3.5                | 4                | 12                 | 51                   | 101845   | 31.15    |
| 4                  | 4                | 14                 | 51                   | 101846   | 31.15    |
| 4.5                | 5                | 14                 | 51                   | 101847   | 33.32    |
| 5                  | 5                | 16                 | 51                   | 101848   | 33.32    |
| 6                  | 6                | 19                 | 64                   | 101849   | 29.23    |
| 7                  | 8                | 19                 | 64                   | 101850   | 51.44    |
| 8                  | 8                | 21                 | 64                   | 101851   | 41.72    |
| 9                  | 10               | 22                 | 70                   | 101852   | 64.42    |
| 10                 | 10               | 25                 | 70                   | 101853   | 56.95    |
| 11                 | 12               | 25                 | 70                   | 101854   | 69.33    |
| 12                 | 12               | 25                 | 76                   | 101855   | 73.96    |
| 14                 | 14               | 30                 | 89                   | 101856   | 130.88   |
| 16                 | 16               | 32                 | 89                   | 101857   | 136.72   |
| 18                 | 18               | 35                 | 102                  | 101858   | 205.86   |
| 20                 | 20               | 38                 | 102                  | 101859   | 252.76   |
| 22                 | 22               | 38                 | 102                  | 101860   | 306.36   |
| 25                 | 25               | 38                 | 102                  | 101861   | 288.65   |

## 4-Flute Long Length — Typhoon



These end mills are manufactured with premium sub-micron carbide and are designed to cut hardened materials. The unique geometry of the Typhoon end mill combined with its modified AlTiN coating make it an excellent choice for demanding and longer reach applications.



Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 1/8              | 3/4                | 2-1/4                | 104832   | 21.87    |
| 3/16               | 3/16             | 3/4                | 2-1/4                | 104834   | 23.44    |
| 1/4                | 1/4              | 1-1/8              | 3                    | 104836   | 47.37    |
| 5/16               | 5/16             | 1-1/8              | 3                    | 104838   | 60.41    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 104840   | 66.59    |
| 1/2                | 1/2              | 2                  | 4                    | 104842   | 96.12    |
| 5/8                | 5/8              | 2-1/4              | 5                    | 104844   | 205.62   |
| 3/4                | 3/4              | 2-1/4              | 5                    | 104846   | 251.10   |
| 1                  | 1                | 2-1/4              | 5                    | 104848   | 374.13   |

# 4-Flute Typhoon End Mills

## 4-Flute Corner Radius — Typhoon

Typhoon end mills with corner radius provides greater strength and minimizes chipping on the corners in demanding applications.



Speeds & Feeds > P. A37

| Cutting Dia. (in.) | Corner Radius (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|---------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                     |                  |                    |                      |          |          |
| 1/8                | 0.015               | 1/8              | 1/2                | 1-1/2                | 102652   | 19.57    |
| 1/8                | 0.030               | 1/8              | 1/2                | 1-1/2                | 102656   | 18.66    |
| 3/16               | 0.020               | 3/16             | 5/8                | 2                    | 102660   | 24.61    |
| 1/4                | 0.020               | 1/4              | 3/4                | 2-1/2                | 102666   | 33.57    |
| 1/4                | 0.030               | 1/4              | 3/4                | 2-1/2                | 102668   | 33.57    |
| 5/16               | 0.020               | 5/16             | 13/16              | 2-1/2                | 102670   | 45.50    |
| 5/16               | 0.030               | 5/16             | 13/16              | 2-1/2                | 102672   | 45.50    |
| 3/8                | 0.020               | 3/8              | 1                  | 2-1/2                | 102678   | 53.14    |
| 3/8                | 0.030               | 3/8              | 1                  | 2-1/2                | 102680   | 53.14    |
| 1/2                | 0.020               | 1/2              | 1                  | 3                    | 102686   | 90.63    |
| 1/2                | 0.030               | 1/2              | 1                  | 3                    | 102688   | 90.63    |
| 1/2                | 0.060               | 1/2              | 1                  | 3                    | 102690   | 90.63    |

## 4-Flute Spherical Ball End — Typhoon

- High performance ball nose plus end mills are used in the mold industry and have a full 220 degree arc cutting capability
- Modified AlTiN coated for improved tool life and increased production output
- Made from premium sub-micron grain carbide



Speeds & Feeds > P. A38

| Cutting Dia. (in.)    | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-----------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Regular Length</b> |                  |                    |                      |          |          |
| 1/8                   | 1/8              | 3/32               | 1-1/2                | 153130   | 37.63    |
| 3/16                  | 3/16             | 9/64               | 2                    | 153132   | 51.07    |
| 1/4                   | 1/4              | 3/16               | 2-1/2                | 153134   | 71.13    |
| 3/8                   | 3/8              | 9/32               | 2-1/2                | 153136   | 81.55    |
| 1/2                   | 1/2              | 3/8                | 3                    | 153138   | 168.19   |
| <b>Long Length</b>    |                  |                    |                      |          |          |
| 1/8                   | 1/8              | 3/32               | 3                    | 153140   | 44.63    |
| 3/16                  | 3/16             | 9/64               | 3                    | 153142   | 45.30    |
| 1/4                   | 1/4              | 3/16               | 4                    | 153144   | 81.97    |
| 3/8                   | 3/8              | 9/32               | 4                    | 153146   | 91.85    |
| 1/2                   | 1/2              | 3/8                | 6                    | 153148   | 243.29   |

## 4-Flute Ball Nose Long Length — Typhoon

Typhoon ball nose end mills are designed for long reach contour milling applications in hardened materials.



Speeds & Feeds > P. A38

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 1/8              | 3/4                | 2-1/4                | 104833   | 25.73    |
| 3/16               | 3/16             | 3/4                | 2-1/4                | 104835   | 24.61    |
| 1/4                | 1/4              | 1-1/8              | 3                    | 104837   | 49.74    |
| 5/16               | 5/16             | 1-1/8              | 3                    | 104839   | 63.43    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 104841   | 69.92    |
| 1/2                | 1/2              | 2                  | 4                    | 104843   | 107.10   |
| 5/8                | 5/8              | 2-1/4              | 5                    | 104845   | 215.90   |
| 3/4                | 3/4              | 2-1/4              | 5                    | 104847   | 340.91   |
| 1                  | 1                | 2-1/4              | 5                    | 104849   | 413.93   |

## 4-Flute Ball Nose Regular Length — Typhoon

Typhoon ball nose end mills are designed for contour milling applications in hardened materials.



Speeds & Feeds > P. A38

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/8              | 3/16               | 1-1/2                | 104752   | 18.50    |
| 3/32               | 1/8              | 5/16               | 1-1/2                | 104751   | 17.66    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 104750   | 19.57    |
| 5/32               | 3/16             | 9/16               | 2                    | 104753   | 25.73    |
| 3/16               | 3/16             | 5/8                | 2                    | 104754   | 24.61    |
| 7/32               | 1/4              | 5/8                | 2-1/2                | 104755   | 33.06    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 104758   | 33.57    |
| 9/32               | 5/16             | 3/4                | 2-1/2                | 104757   | 43.33    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 104762   | 45.50    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 104766   | 53.14    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 104768   | 61.18    |
| 1/2                | 1/2              | 1                  | 3                    | 104770   | 90.63    |
| 9/16               | 9/16             | 1-1/8              | 3-1/2                | 104772   | 131.79   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 104774   | 144.28   |
| 11/16              | 3/4              | 1-3/8              | 4                    | 104780   | 231.14   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 104778   | 206.91   |
| 7/8                | 7/8              | 1-1/2              | 4                    | 104781   | 336.43   |
| 1                  | 1                | 1-1/2              | 4                    | 104782   | 353.25   |
| <b>Metric</b>      |                  |                    |                      |          |          |
| 1                  | 3                | 3                  | 39                   | 101870   | 22.74    |
| 1.5                | 3                | 5                  | 39                   | 101871   | 22.74    |
| 2                  | 3                | 7                  | 39                   | 101872   | 21.42    |
| 2.5                | 3                | 8                  | 39                   | 101873   | 20.65    |
| 3                  | 3                | 10                 | 39                   | 101874   | 19.08    |
| 3.5                | 4                | 12                 | 51                   | 101875   | 26.30    |
| 4                  | 4                | 14                 | 51                   | 101876   | 32.32    |
| 4.5                | 5                | 14                 | 51                   | 101877   | 35.09    |
| 5                  | 5                | 16                 | 51                   | 101878   | 35.09    |
| 6                  | 6                | 19                 | 64                   | 101879   | 33.97    |
| 7                  | 8                | 19                 | 64                   | 101880   | 44.28    |
| 8                  | 8                | 21                 | 64                   | 101881   | 45.95    |
| 9                  | 10               | 22                 | 70                   | 101882   | 51.72    |
| 10                 | 10               | 25                 | 70                   | 101883   | 62.44    |
| 11                 | 12               | 25                 | 70                   | 101884   | 62.53    |
| 12                 | 12               | 25                 | 76                   | 101885   | 91.94    |
| 14                 | 14               | 30                 | 89                   | 101886   | 133.76   |
| 16                 | 16               | 32                 | 89                   | 101887   | 146.53   |
| 18                 | 18               | 35                 | 102                  | 101888   | 210.38   |
| 20                 | 20               | 38                 | 102                  | 101889   | 285.01   |
| 22                 | 22               | 38                 | 102                  | 101890   | 326.65   |
| 25                 | 25               | 38                 | 102                  | 101891   | 326.65   |

## Multi-Flute Regular Length — Typhoon

Multi-Flute Typhoon end mill design allow them to be run at higher rpm than conventional end mills as well as increase tool life without chipping.



Speeds & Feeds > P. A39

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | No. of Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |               |          |          |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 4             | 101050   | 16.59    |
| 3/16               | 3/16             | 5/8                | 2                    | 4             | 101052   | 20.92    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 6             | 101054   | 28.23    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 6             | 101056   | 40.24    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 6             | 101058   | 47.49    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 6             | 101060   | 57.10    |
| 1/2                | 1/2              | 1                  | 3                    | 6             | 101062   | 71.03    |
| 9/16               | 9/16             | 1-1/8              | 3-1/2                | 6             | 101064   | 118.12   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 6             | 101066   | 131.07   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 6             | 101068   | 187.09   |
| 7/8                | 7/8              | 1-1/2              | 4                    | 6             | 101070   | 279.49   |
| 1                  | 1                | 1-1/2              | 4                    | 8             | 101072   | 279.49   |

## Roughers Regular Length — Typhoon

This fine pitch rougher is designed for milling harder metals and has updated geometry in the design of this tool for higher feed rates with no vibration or chatter and chipbreakers to eliminate birdnesting.



Speeds & Feeds > P. A40

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | No. of Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |               |          |          |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 3             | 104800   | 53.55    |
| 5/16               | 5/16             | 3/4                | 2-1/2                | 3             | 104802   | 61.48    |
| 3/8                | 3/8              | 7/8                | 2-1/2                | 3             | 104804   | 74.48    |
| 1/2                | 1/2              | 1                  | 3                    | 4             | 104806   | 100.69   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 4             | 104810   | 160.43   |
| 3/4                | 3/4              | 1-5/8              | 4                    | 4             | 104812   | 230.36   |
| 1                  | 1                | 1-3/4              | 4                    | 5             | 104814   | 386.91   |

## 5pc 4-Flute Variable Helix Carbide End Mill Set

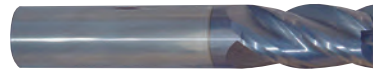
- Helix changes along flutes
- Increased stability during cutting action
- Substantial increase in speed
- Small corner radius for added strength and smoother cutting action
- AlTiN coated for improved tool life and increased production output
- Made from premium sub-micron grain carbide



| Description  | Code No. | Price \$ |
|--|----------|----------|
| Set Includes: 153002, 153006, 153012, 153018, 153027 | 153005   | 233.82   |

## 4-Flute Variable Helix Carbide End Mill — Typhoon

- Helix changes along flutes
- Increased stability during cutting action
- Substantial increase in speed
- Small corner radius for added strength and smoother cutting action
- AlTiN coated for improved tool life and increased production output
- Made from premium sub-micron grain carbide



Speeds & Feeds > P. A16

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Corner Radius | With Radius Code No. | Price \$ | Without Radius Code No. | Price \$ | Weld on Flat Without Radius Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------|----------------------|----------|-------------------------|----------|--------------------------------------|----------|
| 1/8                | 1/8              | 1/2                | 1-1/2                | 0.010-0.015   | 153000               | 18.66    | 153250                  | 16.59    | -                                    | -        |
| 3/16               | 3/16             | 3/8                | 1-1/2                | 0.010-0.015   | 153001               | 23.44    | -                       | -        | -                                    | -        |
| 3/16               | 3/16             | 5/8                | 2                    | 0.015-0.020   | 153002               | 23.44    | 153252                  | 20.92    | -                                    | -        |
| 1/4                | 1/4              | 1/2                | 2                    | 0.015-0.020   | 153004               | 28.86    | 153254                  | 28.86    | -                                    | -        |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 0.015-0.020   | 153006               | 31.97    | 153256                  | 28.23    | -                                    | -        |
| 1/4                | 1/4              | 1-1/8              | 3                    | 0.015-0.020   | 153008               | 47.37    | 153258                  | 47.37    | -                                    | -        |
| 5/16               | 5/16             | 1/2                | 2                    | 0.015-0.020   | 153010               | 39.42    | 153260                  | 34.39    | -                                    | -        |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 0.015-0.020   | 153012               | 43.33    | 153262                  | 40.24    | -                                    | -        |
| 5/16               | 5/16             | 1-1/8              | 3                    | 0.015-0.020   | 153014               | 60.41    | 153264                  | 60.41    | -                                    | -        |
| 3/8                | 3/8              | 5/8                | 2                    | 0.015-0.020   | 153016               | 46.54    | 153266                  | 40.63    | 153500                               | 40.63    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 0.015-0.020   | 153018               | 50.60    | 153268                  | 47.49    | 153502                               | 47.49    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 0.015-0.020   | 153020               | 66.59    | 153270                  | 66.59    | 153504                               | 66.59    |
| 7/16               | 7/16             | 1                  | 2-3/4                | 0.015-0.020   | 153022               | 61.18    | 153272                  | 57.10    | 153506                               | 57.10    |
| 1/2                | 1/2              | 5/8                | 2-1/2                | 0.025-0.030   | 153024               | 77.33    | 153274                  | 66.49    | 153508                               | 66.49    |
| 1/2                | 1/2              | 1                  | 3                    | 0.025-0.030   | 153026               | 86.31    | 153276                  | 71.03    | 153510                               | 71.03    |
| 1/2                | 1/2              | 1-1/4              | 3                    | 0.025-0.030   | 153027               | 86.31    | 153277                  | 71.03    | 153512                               | 71.03    |
| 1/2                | 1/2              | 2                  | 4                    | 0.025-0.030   | 153028               | 102.00   | 153278                  | 96.12    | 153514                               | 96.12    |
| 5/8                | 5/8              | 3/4                | 3                    | 0.030-0.035   | 153030               | 133.70   | 153280                  | 127.34   | 153516                               | 127.34   |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 0.030-0.035   | 153032               | 137.41   | 153282                  | 131.07   | -                                    | -        |
| 5/8                | 5/8              | 2-1/4              | 5                    | 0.030-0.035   | 153034               | 205.62   | 153284                  | 205.62   | 153518                               | 205.62   |
| 3/4                | 3/4              | 1                  | 3                    | 0.030-0.035   | 153036               | 192.87   | 153286                  | 183.07   | 153520                               | 183.07   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 0.030-0.035   | 153038               | 197.06   | 153288                  | 187.09   | -                                    | -        |
| 3/4                | 3/4              | 2-1/4              | 5                    | 0.030-0.035   | 153040               | 273.33   | 153290                  | 251.10   | 153522                               | 251.10   |
| 1                  | 1                | 1-1/2              | 4                    | 0.030-0.035   | 153042               | 336.43   | 153292                  | 279.49   | 153524                               | 279.49   |
| 1                  | 1                | 2-1/4              | 5                    | 0.030-0.035   | 153041               | 413.93   | 153293                  | 374.13   | 153524                               | 374.13   |
| 1-1/4              | 1-1/4            | 2-1/4              | 5                    | 0.030-0.035   | 153043               | 970.57   | 153294                  | 776.39   | -                                    | -        |

## Speeds & Feeds — 4 & 5-Flute Variable Helix End Mills

| Material                         | SFM     | 1/8"   | 1/4"   | 1/2"   | 1"     |
|----------------------------------|---------|--------|--------|--------|--------|
| Aluminum Alloys                  | 1120    | 0.0010 | 0.0020 | 0.0040 | 0.0080 |
| Carbon Steel                     | 300-600 | 0.0010 | 0.0015 | 0.0030 | 0.0060 |
| Cast Iron                        | 350-550 | 0.0010 | 0.0015 | 0.0030 | 0.0060 |
| Copper Alloys                    | 500-900 | 0.0010 | 0.0020 | 0.0030 | 0.0060 |
| Steel - Annealed                 | 350-500 | 0.0010 | 0.0020 | 0.0030 | 0.0050 |
| Steel - 18-24 HRC                | 150-500 | 0.0004 | 0.0008 | 0.0015 | 0.0045 |
| Steel - 25-37 HRC                | 125-200 | 0.0003 | 0.0005 | 0.0010 | 0.0030 |
| Stainless Steel - Free Machining | 250-400 | 0.0005 | 0.0010 | 0.0020 | 0.0030 |
| Stainless Steel - Other          | 150-300 | 0.0005 | 0.0010 | 0.0020 | 0.0030 |
| Inconel/Monel                    | 60-100  | 0.0005 | 0.0010 | 0.0015 | 0.0030 |
| Titanium                         | 175-300 | 0.0005 | 0.0008 | 0.0015 | 0.0030 |

\* All speeds and feeds are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc.

## 5-Flute Variable Helix Carbide End Mill – Typhoon



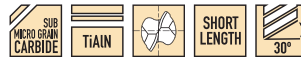
- 25% increase in feed rates over 4-flute version
- Helix changes along flutes
- Increased stability during cutting action
- Substantial increase in speed
- Small corner radius for added strength and smoother cutting action
- Modified AITIN coated for improved tool life and increase production output



Speeds & Feeds > P. A16

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Corner Radius | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------|----------|----------|
| 1/4                | 1/4              | 3/4                | 2-1/2                | 0.015-0.020   | 153100   | 36.74    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 0.015-0.020   | 153102   | 58.20    |
| 1/2                | 1/2              | 1                  | 3                    | 0.025-0.030   | 153104   | 99.26    |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 0.030-0.035   | 153106   | 158.02   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 0.030-0.035   | 153108   | 226.61   |
| 1                  | 1                | 1-1/2              | 4                    | 0.030-0.035   | 153109   | 386.90   |

## 2-Flute Ball Nose Necked Design – Short Length

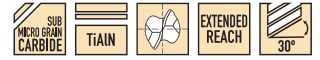


PC413

Speeds & Feeds > P. A41

| Cutting Dia. (mm) | Flute Length (mm) | Neck Length (mm) | Neck Dia. (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|------------------|----------------|-----------------|---------------------|----------|----------|
| 1.0               | 2.0               | 2.5              | 0.95           | 6               | 50                  | 101935   | 81.41    |
| 1.2               | 1.2               | 3.0              | 1.15           | 6               | 50                  | 101936   | 81.41    |
| 1.4               | 1.4               | 7.0              | 1.35           | 6               | 50                  | 101937   | 95.01    |
| 1.5               | 1.5               | 3.8              | 1.45           | 6               | 50                  | 101938   | 84.83    |
| 1.6               | 1.6               | 4.0              | 1.55           | 6               | 50                  | 101939   | 95.01    |
| 1.8               | 1.8               | 4.5              | 1.75           | 6               | 50                  | 101940   | 95.01    |
| 2.0               | 2.0               | 5.0              | 1.95           | 6               | 50                  | 101941   | 84.83    |
| 2.5               | 2.5               | 5.0              | 2.40           | 6               | 50                  | 101942   | 90.81    |
| 3.0               | 3.0               | 6.0              | 2.85           | 6               | 50                  | 101943   | 90.81    |
| 3.5               | 3.5               | 6.0              | 3.35           | 6               | 50                  | 101944   | 100.20   |
| 4.0               | 4.0               | 6.0              | 3.85           | 6               | 50                  | 101945   | 90.81    |
| 5.0               | 5.0               | 7.5              | 4.85           | 6               | 50                  | 101946   | 96.77    |
| 6.0               | 6.0               | 9.0              | 5.85           | 6               | 50                  | 101947   | 102.52   |

## 2-Flute Ball Nose Necked Design – Standard/Extended Reach



PC419/PC419L

Speeds & Feeds > P. A41

| Cutting Dia. (mm) | Flute Length (mm) | Neck Length (mm) | Neck Dia. (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|------------------|----------------|-----------------|---------------------|----------|----------|
| 0.5               | 0.7               | 2.5              | 0.45           | 6               | 60                  | 102125   | 102.19   |
| 0.5               | 0.5               | 2.5              | 0.45           | 6               | 60                  | 102126   | 115.26   |
| 0.6               | 0.6               | 3.0              | 0.55           | 6               | 60                  | 102127   | 102.19   |
| 0.6               | 0.6               | 6.0              | 0.55           | 6               | 60                  | 102128   | 106.41   |
| 0.8               | 0.8               | 4.0              | 0.75           | 6               | 60                  | 102129   | 104.85   |
| 0.8               | 0.8               | 8.0              | 0.75           | 6               | 60                  | 102130   | 107.84   |
| 1.0               | 1.0               | 5.0              | 0.95           | 6               | 60                  | 102131   | 92.80    |
| 1.0               | 1.0               | 8.0              | 0.95           | 6               | 60                  | 102132   | 94.45    |
| 1.0               | 1.0               | 10               | 0.95           | 6               | 60                  | 102133   | 95.89    |
| 1.0               | 1.0               | 12               | 0.95           | 6               | 60                  | 102134   | 97.00    |
| 1.0               | 1.0               | 16               | 0.95           | 6               | 60                  | 102135   | 99.44    |
| 1.0               | 1.0               | 20               | 0.95           | 6               | 60                  | 102136   | 101.65   |
| 1.2               | 1.2               | 6.0              | 1.15           | 6               | 60                  | 102137   | 93.34    |
| 1.2               | 1.2               | 12               | 1.15           | 6               | 60                  | 102138   | 97.00    |
| 1.4               | 1.4               | 7.0              | 1.35           | 6               | 60                  | 102139   | 93.90    |
| 1.4               | 1.4               | 12               | 1.35           | 6               | 60                  | 102140   | 97.00    |
| 1.5               | 1.5               | 6.0              | 1.45           | 6               | 60                  | 102141   | 93.34    |
| 1.5               | 1.5               | 7.5              | 1.45           | 6               | 60                  | 102142   | 94.45    |
| 1.5               | 1.5               | 10               | 1.45           | 6               | 60                  | 102143   | 95.89    |
| 1.5               | 1.5               | 12               | 1.45           | 6               | 60                  | 102144   | 97.00    |
| 1.5               | 1.5               | 20               | 1.45           | 6               | 60                  | 102145   | 101.65   |
| 1.6               | 1.6               | 8.0              | 1.55           | 6               | 60                  | 102146   | 94.45    |
| 1.6               | 1.6               | 16               | 1.55           | 6               | 60                  | 102147   | 99.44    |
| 1.8               | 1.8               | 9.0              | 1.75           | 6               | 60                  | 102148   | 95.45    |
| 1.8               | 1.8               | 16               | 1.75           | 6               | 60                  | 102149   | 99.44    |
| 2.0               | 2.0               | 8.0              | 1.95           | 6               | 60                  | 102151   | 94.45    |
| 2.0               | 2.0               | 10               | 1.95           | 6               | 60                  | 102152   | 92.91    |
| 2.0               | 2.0               | 12               | 1.95           | 6               | 60                  | 102154   | 92.91    |
| 2.0               | 2.0               | 16               | 1.95           | 6               | 60                  | 102153   | 93.01    |
| 2.0               | 2.0               | 20               | 1.95           | 6               | 60                  | 102156   | 93.01    |
| 2.0               | 2.0               | 25               | 2.40           | 6               | 60                  | 102157   | 93.14    |
| 2.5               | 2.5               | 12.5             | 2.40           | 6               | 60                  | 102158   | 92.91    |
| 2.5               | 2.5               | 16               | 2.40           | 6               | 60                  | 102159   | 93.01    |
| 2.5               | 2.5               | 20               | 2.40           | 6               | 60                  | 102161   | 93.01    |
| 3.0               | 3.0               | 10               | 2.85           | 6               | 70                  | 102162   | 101.32   |
| 3.0               | 3.0               | 12               | 2.85           | 6               | 70                  | 102164   | 102.52   |
| 3.0               | 3.0               | 15               | 2.85           | 6               | 70                  | 102167   | 104.29   |
| 3.0               | 3.0               | 20               | 2.85           | 6               | 70                  | 102163   | 107.84   |
| 3.0               | 3.0               | 25               | 2.85           | 6               | 70                  | 102166   | 110.83   |
| 3.0               | 3.0               | 30               | 2.85           | 6               | 70                  | 102168   | 113.93   |
| 3.0               | 3.0               | 35               | 2.85           | 6               | 70                  | 102169   | 113.93   |
| 3.5               | 3.5               | 17.5             | 3.35           | 6               | 70                  | 102171   | 105.52   |
| 4.0               | 4.0               | 8.0              | 3.85           | 6               | 70                  | 102172   | 99.98    |
| 4.0               | 4.0               | 12               | 3.85           | 6               | 70                  | 102173   | 102.52   |
| 4.0               | 4.0               | 16               | 3.85           | 6               | 70                  | 102174   | 104.96   |
| 4.0               | 4.0               | 20               | 3.85           | 6               | 70                  | 102177   | 107.84   |
| 4.0               | 4.0               | 25               | 3.85           | 6               | 70                  | 102176   | 110.83   |
| 4.0               | 4.0               | 30               | 3.85           | 6               | 70                  | 102178   | 113.93   |
| 5.0               | 5.0               | 25               | 4.85           | 6               | 80                  | 102179   | 111.16   |
| 6.0               | 6.0               | 30               | 5.85           | 6               | 90                  | 102181   | 117.91   |

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### Tolerances - Inch

| Size         | Diameter       | Shank Diameter   |
|--------------|----------------|------------------|
| 3/32 thru 1" | +0.000"-0.002" | +0.0000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum

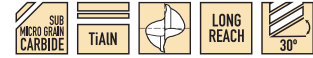
## 2-Flute Square End Necked Design – Standard & Long



PC410 Speeds & Feeds > P. A40

| Cutting Dia. (mm) | Flute Length (mm) | Neck Length (mm) | Neck Dia. (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|------------------|----------------|-----------------|---------------------|----------|----------|
| 0.5               | 0.7               | 2.5              | 0.45           | 6               | 60                  | 101900   | 75.43    |
| 0.5               | 0.7               | 4.0              | 0.45           | 6               | 60                  | 101901   | 67.91    |
| 0.5               | 0.7               | 6.0              | 0.45           | 6               | 60                  | 101902   | 67.91    |
| 0.6               | 0.9               | 3.0              | 0.55           | 6               | 60                  | 101903   | 75.43    |
| 0.6               | 0.9               | 6.0              | 0.55           | 6               | 60                  | 101904   | 67.91    |
| 0.8               | 1.2               | 4.0              | 0.75           | 6               | 60                  | 101905   | 74.44    |
| 0.8               | 1.2               | 6.0              | 0.75           | 6               | 60                  | 101906   | 67.91    |
| 1.0               | 1.5               | 5.0              | 0.95           | 6               | 60                  | 101907   | 65.37    |
| 1.0               | 1.5               | 8.0              | 0.95           | 6               | 60                  | 101908   | 58.73    |
| 1.0               | 1.5               | 12               | 0.95           | 6               | 60                  | 101909   | 58.73    |
| 1.2               | 1.8               | 6.0              | 1.15           | 6               | 60                  | 101910   | 73.10    |
| 1.2               | 1.8               | 10               | 1.15           | 6               | 60                  | 101911   | 65.70    |
| 1.4               | 2.1               | 7.0              | 1.35           | 6               | 60                  | 101912   | 74.22    |
| 1.4               | 2.1               | 12               | 1.35           | 6               | 60                  | 101913   | 66.47    |
| 1.4               | 2.1               | 16               | 1.35           | 6               | 60                  | 101914   | 66.47    |
| 1.5               | 2.3               | 7.5              | 1.45           | 6               | 60                  | 101915   | 65.70    |
| 1.5               | 2.3               | 10               | 1.45           | 6               | 60                  | 101916   | 59.17    |
| 1.5               | 2.3               | 20               | 1.45           | 6               | 60                  | 101917   | 60.95    |
| 1.6               | 2.4               | 8.0              | 1.55           | 6               | 60                  | 101918   | 101.27   |
| 1.6               | 2.4               | 12               | 1.55           | 6               | 60                  | 101919   | 66.80    |
| 1.6               | 2.4               | 20               | 1.55           | 6               | 60                  | 101920   | 68.34    |
| 1.8               | 2.7               | 6.0              | 1.75           | 6               | 60                  | 101921   | 66.80    |
| 1.8               | 2.7               | 9.0              | 1.75           | 6               | 60                  | 101922   | 74.22    |
| 1.8               | 2.7               | 12               | 1.75           | 6               | 60                  | 101923   | 67.25    |
| 1.8               | 2.7               | 20               | 1.75           | 6               | 60                  | 101924   | 68.68    |
| 2.0               | 3.0               | 6.0              | 1.95           | 6               | 60                  | 101925   | 61.17    |
| 2.0               | 3.0               | 10               | 1.95           | 6               | 60                  | 101926   | 61.17    |
| 2.0               | 3.0               | 16               | 1.95           | 6               | 60                  | 101927   | 62.05    |
| 2.0               | 3.0               | 20               | 1.95           | 6               | 60                  | 101928   | 63.38    |
| 2.5               | 3.7               | 12.5             | 2.4            | 6               | 60                  | 101929   | 61.94    |

## 2-Flute Square End – Long Reach



PC412 Speeds & Feeds > P. A40

| Cutting Dia. (mm) | Radius (mm) | Flute Length (mm) | Neck Length (mm) | Neck Dia. (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------|-------------------|------------------|----------------|-----------------|---------------------|----------|----------|
| 0.5               | 0.05        | 0.7               | 2.0              | 0.46           | 6               | 50                  | 101948   | 112.26   |
| 0.5               | 0.05        | 0.7               | 4.0              | 0.46           | 6               | 50                  | 101949   | 112.26   |
| 1.0               | 0.1         | 1.5               | 4.0              | 0.95           | 6               | 50                  | 101950   | 91.35    |
| 1.0               | 0.1         | 1.5               | 8.0              | 0.95           | 6               | 50                  | 101951   | 108.17   |
| 1.0               | 0.1         | 1.5               | 12               | 0.95           | 6               | 50                  | 101952   | 91.35    |
| 1.0               | 0.2         | 1.5               | 4.0              | 0.95           | 6               | 50                  | 101953   | 108.17   |
| 1.0               | 0.2         | 1.5               | 8.0              | 0.95           | 6               | 50                  | 101954   | 108.17   |
| 1.0               | 0.2         | 1.5               | 12               | 0.95           | 6               | 50                  | 101955   | 91.35    |
| 1.0               | 0.3         | 1.5               | 4.0              | 0.95           | 6               | 50                  | 101956   | 108.17   |
| 1.0               | 0.3         | 1.5               | 8.0              | 0.95           | 6               | 50                  | 101957   | 108.17   |
| 1.0               | 0.3         | 1.5               | 12               | 0.95           | 6               | 50                  | 101958   | 108.17   |
| 1.5               | 0.3         | 2.3               | 6.0              | 1.45           | 6               | 50                  | 101959   | 95.78    |
| 1.5               | 0.3         | 2.3               | 12               | 1.45           | 6               | 50                  | 101960   | 95.78    |
| 1.5               | 0.3         | 2.3               | 18               | 1.45           | 6               | 50                  | 101961   | 104.19   |
| 1.5               | 0.5         | 2.3               | 6.0              | 1.45           | 6               | 60                  | 101963   | 120.01   |
| 1.5               | 0.5         | 2.3               | 12               | 1.45           | 6               | 60                  | 101964   | 104.19   |
| 1.5               | 0.5         | 2.3               | 18               | 1.45           | 6               | 60                  | 101965   | 118.24   |
| 2.0               | 0.3         | 3.0               | 10               | 1.94           | 6               | 60                  | 101966   | 120.01   |
| 2.0               | 0.3         | 3.0               | 16               | 1.94           | 6               | 60                  | 101967   | 101.32   |
| 2.0               | 0.3         | 3.0               | 24               | 1.94           | 6               | 70                  | 101968   | 118.24   |
| 2.0               | 0.3         | 3.0               | 30               | 1.94           | 6               | 70                  | 101969   | 111.27   |
| 2.0               | 0.5         | 3.0               | 10               | 1.94           | 6               | 60                  | 102300   | 101.32   |
| 2.0               | 0.5         | 3.0               | 16               | 1.94           | 6               | 60                  | 102301   | 101.32   |
| 2.0               | 0.5         | 3.0               | 24               | 1.94           | 6               | 70                  | 102302   | 123.54   |
| 2.0               | 0.5         | 3.0               | 30               | 1.94           | 6               | 70                  | 102303   | 118.24   |
| 2.5               | 0.5         | 3.7               | 15               | 2.40           | 6               | 70                  | 102304   | 128.08   |
| 2.5               | 0.5         | 3.7               | 30               | 2.40           | 6               | 70                  | 102305   | 118.24   |
| 3.0               | 0.5         | 4.5               | 12               | 2.85           | 6               | 70                  | 102306   | 134.38   |
| 3.0               | 0.5         | 4.5               | 24               | 2.85           | 6               | 80                  | 102307   | 134.38   |
| 3.0               | 1.0         | 4.5               | 12               | 2.85           | 6               | 70                  | 102309   | 134.38   |
| 3.0               | 1.0         | 4.5               | 24               | 2.85           | 6               | 80                  | 102310   | 134.38   |
| 3.0               | 1.0         | 4.5               | 36               | 2.85           | 6               | 80                  | 102311   | 134.38   |
| 3.5               | 0.5         | 5.0               | 16               | 3.35           | 6               | 80                  | 102312   | 134.38   |
| 3.5               | 0.5         | 5.0               | 32               | 3.35           | 6               | 80                  | 102313   | 134.38   |
| 3.5               | 1.0         | 5.0               | 16               | 3.35           | 6               | 80                  | 102314   | 134.38   |
| 4.0               | 0.5         | 6.0               | 16               | 3.80           | 6               | 80                  | 102315   | 129.74   |
| 4.0               | 0.5         | 6.0               | 24               | 3.80           | 6               | 80                  | 102316   | 134.38   |
| 4.0               | 0.5         | 6.0               | 32               | 3.80           | 6               | 80                  | 102317   | 129.74   |
| 4.0               | 1.0         | 6.0               | 16               | 3.80           | 6               | 80                  | 102318   | 134.38   |
| 4.0               | 1.0         | 6.0               | 24               | 3.80           | 6               | 80                  | 102319   | 134.38   |
| 4.0               | 1.0         | 6.0               | 32               | 3.80           | 6               | 80                  | 102320   | 134.38   |
| 4.5               | 0.5         | 8.0               | 16               | 4.30           | 6               | 80                  | 102321   | 134.38   |
| 4.5               | 0.5         | 8.0               | 32               | 4.30           | 6               | 80                  | 102322   | 134.38   |

## 2-Flute Tapered Pencil Neck Ball Nose



PC418 Speeds & Feeds > P. A42

| Cutting Dia. (mm) | Flute Length (mm) | Non Taper Neck Length (mm) | Neck Length (mm) | Max. Neck Dia. (mm) | Neck Incline | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|----------------------------|------------------|---------------------|--------------|-----------------|---------------------|----------|----------|
| 1.0               | 2.5               | 4.0                        | 20               | 3.8                 | 5°           | 6               | 60                  | 101970   | 102.52   |
| 1.0               | 2.5               | 4.0                        | 40               | 4.8                 | 3°           | 6               | 80                  | 101971   | 109.05   |
| 1.0               | 2.5               | 4.0                        | 20               | 1.8                 | 1.5°         | 6               | 70                  | 101972   | 105.62   |
| 2.0               | 5.0               | 7.0                        | 20               | 4.3                 | 5°           | 6               | 60                  | 101973   | 102.52   |
| 2.0               | 5.0               | 7.0                        | 40               | 5.5                 | 3°           | 6               | 80                  | 101974   | 109.05   |
| 2.0               | 5.0               | 7.0                        | 20               | 2.7                 | 1.5°         | 6               | 70                  | 101975   | 105.62   |
| 3.0               | 8.0               | 10.5                       | 30               | 5.0                 | 3°           | 6               | 70                  | 101976   | 105.62   |
| 3.0               | 8.0               | 10.5                       | 50               | 5.1                 | 1.5°         | 6               | 90                  | 101977   | 112.26   |
| 4.0               | 8.0               | 10.5                       | 28               | 6.0                 | 3°           | 6               | 70                  | 101978   | 105.41   |
| 4.0               | 8.0               | 10.5                       | 48               | 6.0                 | 1.5°         | 6               | 90                  | 101979   | 111.93   |
| 5.0               | 10                | 12.5                       | 40               | 8.0                 | 3°           | 8               | 90                  | 101980   | 134.71   |
| 5.0               | 10                | 12.5                       | 60               | 7.5                 | 1.5°         | 8               | 110                 | 101981   | 142.56   |
| 6.0               | 12                | 14.5                       | 33.5             | 8.0                 | 3°           | 8               | 90                  | 101982   | 140.91   |
| 6.0               | 12                | 14.5                       | 52               | 8.0                 | 1.5°         | 8               | 110                 | 101983   | 140.91   |
| 8.0               | 14                | 16.5                       | 35.5             | 10                  | 3°           | 10              | 100                 | 101984   | 182.83   |
| 8.0               | 14                | 16.5                       | 54.5             | 10                  | 1.5°         | 10              | 120                 | 101985   | 194.66   |
| 10                | 18                | 20.5                       | 39.5             | 12                  | 3°           | 12              | 110                 | 101986   | 225.73   |
| 10                | 18                | 20.5                       | 58.5             | 12                  | 1.5°         | 12              | 130                 | 101987   | 237.69   |
| 12                | 22                | 25                         | 60               | 16                  | 3°           | 16              | 140                 | 101988   | 338.45   |
| 12                | 22                | 25                         | 80               | 14.9                | 1.5°         | 16              | 160                 | 101989   | 369.64   |

## 4-Flute Square End Long Reach

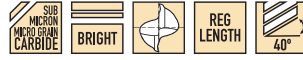


PC411 Speeds & Feeds > P. A42

| Cutting Dia. (mm) | Flute Length (mm) | Neck Length (mm) | Neck Dia. (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|------------------|----------------|-----------------|---------------------|----------|----------|
| 3.0               | 4.5               | 15               | 2.85           | 6               | 70                  | 101930   | 76.32    |
| 3.5               | 5.3               | 17.5             | 3.35           | 6               | 70                  | 101931   | 80.52    |
| 4.0               | 6.0               | 20               | 3.85           | 6               | 70                  | 101932   | 78.97    |
| 5.0               | 7.5               | 25               | 4.85           | 6               | 80                  | 101933   | 84.94    |
| 6.0               | 9.0               | 30               | 5.85           | 6               | 90                  | 101934   | 88.70    |

## 2-Flute For Aluminum

This carbide aluminum end mill has been designed specially for milling aluminum and all non-ferrous materials. The unique geometry permits much higher speed and feed rates without loading. Spindle and feed rates can be increased by fifty percent for greater productivity with excellent piece/part finishes.



Speeds & Feeds > P. A19

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 101020   | 21.00    |
| 1/4                | 1/4              | 1-1/2              | 4                    | 101022   | 37.92    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 101024   | 44.33    |
| 5/16               | 5/16             | 1-5/8              | 4                    | 101026   | 49.46    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 101028   | 36.67    |
| 3/8                | 3/8              | 1-3/4              | 4                    | 101030   | 54.80    |
| 1/2                | 1/2              | 1                  | 3                    | 101032   | 58.74    |
| 1/2                | 1/2              | 2                  | 4                    | 101034   | 80.18    |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 101036   | 113.29   |
| 5/8                | 5/8              | 2-1/4              | 5                    | 101038   | 165.26   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 101040   | 166.11   |
| 3/4                | 3/4              | 2-1/4              | 5                    | 101042   | 263.27   |
| 1                  | 1                | 2-1/4              | 5                    | 101044   | 248.45   |
| 1                  | 1                | 3                  | 6                    | 101046   | 447.59   |
| <b>Metric</b>      |                  |                    |                      |          |          |
| 6                  | 6                | 19                 | 63                   | 101390   | 22.03    |
| 6                  | 6                | 38                 | 102                  | 101391   | 39.93    |
| 8                  | 8                | 21                 | 63                   | 101392   | 30.92    |
| 10                 | 10               | 25                 | 70                   | 101394   | 44.65    |
| 10                 | 10               | 51                 | 102                  | 101395   | 69.82    |
| 12                 | 12               | 51                 | 102                  | 101397   | 84.99    |
| 16                 | 16               | 32                 | 89                   | 101398   | 118.94   |
| 16                 | 16               | 57                 | 127                  | 101399   | 165.26   |
| 20                 | 20               | 38                 | 102                  | 101400   | 221.75   |
| 20                 | 20               | 57                 | 127                  | 101401   | 277.34   |
| 25                 | 25               | 57                 | 127                  | 101402   | 257.61   |
| 25                 | 25               | 76                 | 152                  | 101403   | 427.37   |

## 2-Flute Aluminum Speeds & Feeds

Side Milling

Slotting

| Work Material    |    | Aluminum  |        | Aluminum  |        |
|------------------|----|-----------|--------|-----------|--------|
| Hardness         |    |           |        |           |        |
| Depth of Cut     |    |           |        |           |        |
| Mill Dia. (inch) | mm | V=660 SFM |        | V=660 SFM |        |
|                  |    | Speed     | Feed   | Speed     | Feed   |
|                  |    | RPM       | in/min | RPM       | in/min |
| 1/4              | 6  | 10000     | 60     | 10000     | 30     |
| 5/16             | 8  | 8000      | 64     | 8000      | 32     |
| 3/8              | 10 | 8000      | 80     | 8000      | 40     |
| 1/2              | 12 | 8000      | 96     | 8000      | 48     |
| 5/8              | 16 | 6000      | 84     | 6000      | 42     |
| 3/4              | 20 | 4000      | 64     | 4000      | 32     |
| 1                | 25 | 4000      | 64     | 4000      | 32     |

## 3-Flute Square End 40° Helix Carbide End Mills



Speeds & Feeds > P. A19

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Bright Finish Code No. | Price \$ | TiCN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|------------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |                        |          |                      |          |
| 1/32               | 1/8              | 3/32               | 1-1/2                | 153300                 | 14.77    | 153350               | 18.17    |
| 3/64               | 1/8              | 1/8                | 1-1/2                | 153302                 | 14.77    | 153352               | 18.17    |
| 1/16               | 1/8              | 3/16               | 1-1/2                | 153304                 | 14.77    | 153354               | 18.17    |
| 3/32               | 1/8              | 3/8                | 1-1/2                | 153306                 | 14.77    | 153356               | 18.17    |
| 1/8                | 1/8              | 1/2                | 1-1/2                | 153308                 | 14.77    | 153358               | 18.17    |
| 9/64               | 3/16             | 9/16               | 2                    | 153310                 | 17.41    | 153360               | 21.41    |
| 5/32               | 3/16             | 9/16               | 2                    | 153312                 | 17.41    | 153362               | 21.41    |
| 11/64              | 3/16             | 9/16               | 2                    | 153314                 | 17.41    | 153364               | 21.41    |
| 3/16               | 3/16             | 5/8                | 2                    | 153316                 | 17.41    | 153366               | 21.41    |
| 13/64              | 1/4              | 5/8                | 2-1/2                | 153318                 | 21.00    | 153368               | 25.83    |
| 7/32               | 1/4              | 5/8                | 2-1/2                | 153320                 | 21.00    | 153370               | 25.83    |
| 15/64              | 1/4              | 3/4                | 2-1/2                | 153322                 | 21.00    | 153372               | 25.83    |
| 1/4                | 1/4              | 3/4                | 2-1/2                | 153324                 | 21.00    | 153374               | 25.83    |
| 17/64              | 5/16             | 3/4                | 2-1/2                | 153326                 | 29.46    | 153376               | 36.23    |
| 5/16               | 5/16             | 13/16              | 2-1/2                | 153328                 | 29.46    | 153378               | 36.23    |
| 5/16               | 5/16             | 1-5/8              | 4                    | 153330                 | 49.46    | 153380               | 60.84    |
| 3/8                | 3/8              | 1                  | 2-1/2                | 153332                 | 36.67    | 153382               | 45.10    |
| 3/8                | 3/8              | 1-1/8              | 3                    | 153334                 | 54.80    | 153384               | 67.39    |
| 1/2                | 1/2              | 1                  | 3                    | 153336                 | 58.74    | 153386               | 72.25    |
| 1/2                | 1/2              | 2                  | 4                    | 153338                 | 80.18    | 153388               | 98.62    |
| 5/8                | 5/8              | 1-1/4              | 3-1/2                | 153340                 | 113.29   | 153390               | 139.34   |
| 5/8                | 5/8              | 2-1/4              | 5                    | 153342                 | 165.26   | 153392               | 203.28   |
| 3/4                | 3/4              | 1-1/2              | 4                    | 153344                 | 166.11   | 153394               | 204.31   |

## 3-Flute Aluminum Speeds & Feeds

| Material        | Chip Load Per Tooth |        |        |        |        |
|-----------------|---------------------|--------|--------|--------|--------|
|                 | SFM                 | 1/8"   | 1/4"   | 1/2"   | 1"     |
| Aluminum Alloys | 600/1200            | 0.0010 | 0.0020 | 0.0040 | 0.0080 |

RPM = 3.82 x sfm ÷ dia SFM = rpm x 0.262 ÷ dia  
IPM = chip load x No. of teeth x rpm

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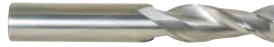
Images are representational only and may not reflect actual product.

| Tolerances - Inch |                |                  | Tolerances - Metric |                  |                  |
|-------------------|----------------|------------------|---------------------|------------------|------------------|
| Size              | Diameter       | Shank Diameter   | Size                | Diameter         | Shank Diameter   |
| 3/32 thru 1"      | +0.000"-0.002" | +0.0000"-0.0005" | 1mm-25mm            | +0.000mm-0.051mm | +0.000mm-0.013mm |
| Steel             |                | Stainless Steel  | Cast Iron/Hardened  |                  | Aluminum         |

## 2-Flute Corner Radius For Aluminum



- Special geometry allows for high chip loads and feed rates
- Excellent for slotting and profiling at high speeds
- Made from premium sub-micron grain carbide
- Cutting diameter tolerance +0.000 / -0.002



Speeds & Feeds > P. A20

| Cutting Dia. (in.)    | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Corner Radius | Bright Finish Code No. | Price \$ | TiCN Coated Code No. | Price \$ |
|-----------------------|------------------|--------------------|----------------------|---------------|------------------------|----------|----------------------|----------|
| <b>Regular Length</b> |                  |                    |                      |               |                        |          |                      |          |
| 1/8                   | 1/8              | 3/8                | 1-1/2                | 0.010         | 153208                 | 14.77    | 153400               | 18.17    |
| 3/16                  | 3/16             | 5/8                | 2                    | 0.010         | 153210                 | 18.44    | 153402               | 22.68    |
| 1/4                   | 1/4              | 3/4                | 2-1/2                | 0.010         | 153212                 | 21.00    | 153404               | 25.83    |
| 5/16                  | 5/16             | 13/16              | 2-1/2                | 0.010         | 153214                 | 44.33    | 153406               | 54.53    |
| 3/8                   | 3/8              | 1                  | 2-1/2                | 0.015         | 153216                 | 36.67    | 153408               | 45.10    |
| 7/16                  | 7/16             | 1                  | 2-3/4                | 0.015         | 153218                 | 57.05    | 153410               | 70.17    |
| 1/2                   | 1/2              | 1                  | 3                    | 0.020         | 153220                 | 58.74    | 153412               | 72.25    |
| 5/8                   | 5/8              | 1-1/4              | 3-1/2                | 0.020         | 153222                 | 113.29   | 153414               | 139.34   |
| 3/4                   | 3/4              | 1-1/2              | 4                    | 0.030         | 153224                 | 166.11   | 153416               | 204.31   |
| 1                     | 1                | 1-1/2              | 4                    | 0.030         | 153226                 | 248.45   | 153418               | 305.59   |
| <b>Long Length</b>    |                  |                    |                      |               |                        |          |                      |          |
| 1/4                   | 1/4              | 1-1/8              | 3                    | 0.010         | 153228                 | 37.92    | 153420               | 46.65    |
| 5/16                  | 5/16             | 1-1/8              | 3                    | 0.010         | 153230                 | 44.33    | 153422               | 54.53    |
| 3/8                   | 3/8              | 1-1/8              | 3                    | 0.015         | 153232                 | 54.80    | 153424               | 67.39    |
| 1/2                   | 1/2              | 2                  | 4                    | 0.020         | 153234                 | 80.18    | 153426               | 98.62    |
| 5/8                   | 5/8              | 2-1/4              | 5                    | 0.020         | 153236                 | 165.26   | 153428               | 203.28   |
| 3/4                   | 3/4              | 2-1/4              | 5                    | 0.030         | 153238                 | 263.27   | 153430               | 323.82   |
| 1                     | 1                | 2-1/4              | 5                    | 0.030         | 153240                 | 447.59   | 153432               | 550.54   |

## 2-Flute Corner Radius Aluminum Speeds & Feeds

| Material        | Chip load per tooth |        |        |        |        |
|-----------------|---------------------|--------|--------|--------|--------|
|                 | SFM                 | 1/8"   | 1/4"   | 1/2"   | 1"     |
| Aluminum Alloys | 600/1200            | 0.0010 | 0.0020 | 0.0040 | 0.0080 |

RPM = 3.82 x sfm ÷ dia SFM = rpm x 0.262 ÷ dia IPM = chip load x No. of teeth x rpm

## 3-Flute Corner Radius For Aluminum



- Special geometry allows for high chip loads and feed rates
- 3-flute design excellent for slotting and profiling at high speeds
- Made from premium sub-micron grain carbide
- Cutting diameter tolerance +0.000 / -0.002



Speeds & Feeds > P. A20

| Cutting Dia. (in.)    | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Corner Radius | Bright Finish Code No. | Price \$ | TiCN Coated Code No. | Price \$ |
|-----------------------|------------------|--------------------|----------------------|---------------|------------------------|----------|----------------------|----------|
| <b>Regular Length</b> |                  |                    |                      |               |                        |          |                      |          |
| 1/8                   | 1/8              | 3/8                | 1-1/2                | 0.005         | 153150                 | 14.77    | 153044               | 18.17    |
| 3/16                  | 3/16             | 5/8                | 2                    | 0.005         | 153152                 | 17.41    | 153046               | 21.41    |
| 1/4                   | 1/4              | 3/4                | 2-1/2                | 0.005         | 153154                 | 21.00    | 153048               | 25.83    |
| 5/16                  | 5/16             | 13/16              | 2-1/2                | 0.005         | 153156                 | 29.46    | 153050               | 36.23    |
| 3/8                   | 3/8              | 1                  | 2-1/2                | 0.005         | 153158                 | 36.67    | 153052               | 45.10    |
| 7/16                  | 7/16             | 1                  | 2-3/4                | 0.005         | 153160                 | 44.76    | 153054               | 55.06    |
| 1/2                   | 1/2              | 1-1/4              | 3                    | 0.005         | 153162                 | 58.74    | 153056               | 72.25    |
| 5/8                   | 5/8              | 1-5/8              | 3-1/2                | 0.005         | 153164                 | 113.29   | 153058               | 139.34   |
| 3/4                   | 3/4              | 1-5/8              | 4                    | 0.005         | 153166                 | 166.11   | 153060               | 204.31   |
| 1                     | 1                | 1-1/2              | 4                    | 0.005         | 153168                 | 248.45   | 153062               | 305.59   |
| <b>Long Length</b>    |                  |                    |                      |               |                        |          |                      |          |
| 1/4                   | 1/4              | 1-1/8              | 3                    | 0.005         | 153170                 | 35.95    | 153434               | 44.22    |
| 5/16                  | 5/16             | 1-1/8              | 3                    | 0.005         | 153172                 | 49.46    | 153436               | 60.84    |
| 3/8                   | 3/8              | 1-1/8              | 3                    | 0.005         | 153174                 | 54.80    | 153438               | 67.39    |
| 1/2                   | 1/2              | 1-1/2              | 4                    | 0.005         | 153176                 | 80.18    | 153440               | 98.62    |
| 1/2                   | 1/2              | 2                  | 4                    | 0.005         | 153178                 | 80.18    | 153442               | 98.62    |
| 5/8                   | 5/8              | 2-1/4              | 5                    | 0.005         | 153180                 | 165.26   | 153444               | 203.28   |
| 3/4                   | 3/4              | 2-1/4              | 5                    | 0.005         | 153182                 | 263.27   | 153446               | 323.82   |
| 1                     | 1                | 2-1/4              | 5                    | 0.005         | 153184                 | 447.59   | 153448               | 550.54   |

## 3-Flute Corner Radius Aluminum Speeds & Feeds

| Material        | Chip load per tooth |        |        |        |        |
|-----------------|---------------------|--------|--------|--------|--------|
|                 | SFM                 | 1/8"   | 1/4"   | 1/2"   | 1"     |
| Aluminum Alloys | 600/1200            | 0.0010 | 0.0020 | 0.0040 | 0.0080 |

RPM = 3.82 x sfm ÷ dia SFM = rpm x 0.262 ÷ dia IPM = chip load x No. of teeth x rpm

## 2-Flute Regular Length HSCO & HSS

These end mills come standard with right-hand cutting and right-hand helical flutes. All shanks are flatted for holder set screw. Designed for slotting, drilling, pocketing and general-purpose operation.



- 2 helical flutes
- Single end with weldon shank
- Centre cutting
- Keyway tolerance



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.)      | Flute Length (in.) | Overall Length (in.) | HSCO Weldon Flat |          | HSCO TiAN Coated Weldon Flat |          | HSS Weldon Flat |          | HSCO Comb. Shank |          |
|--------------------|-----------------------|--------------------|----------------------|------------------|----------|------------------------------|----------|-----------------|----------|------------------|----------|
|                    |                       |                    |                      | Code No.         | Price \$ | Code No.                     | Price \$ | Code No.        | Price \$ | Code No.         | Price \$ |
| <b>Inch</b>        |                       |                    |                      |                  |          |                              |          |                 |          |                  |          |
| 1/8                | 3/8                   | 3/8                | 2-5/16               | 103050           | 22.95    | 104570                       | 44.85    | 104450          | 16.03    | -                | -        |
| 5/32               | 3/8                   | 7/16               | 2-5/16               | 103052           | 22.95    | -                            | -        | 104452          | 16.03    | -                | -        |
| 3/16               | 3/8                   | 7/16               | 2-5/16               | 103054           | 22.95    | 104571                       | 44.85    | 104454          | 15.39    | -                | -        |
| 7/32               | 3/8                   | 1/2                | 2-5/16               | 103056           | 22.95    | -                            | -        | 104456          | 13.91    | 103005           | 16.14    |
| 1/4                | 3/8                   | 1/2                | 2-5/16               | 103058           | 22.95    | 104572                       | 44.85    | 104458          | 15.39    | -                | -        |
| 9/32               | 3/8                   | 9/16               | 2-5/16               | 103060           | 22.95    | -                            | -        | 104460          | 16.03    | 103007           | 16.14    |
| 5/16               | 3/8                   | 9/16               | 2-5/16               | 103062           | 22.95    | 104573                       | 44.82    | 104462          | 16.03    | -                | -        |
| 11/32              | 3/8                   | 9/16               | 2-5/16               | 103064           | 22.95    | -                            | -        | 104464          | 12.75    | -                | -        |
| 3/8                | 3/8                   | 9/16               | 2-5/16               | 103066           | 22.95    | 104574                       | 44.87    | 104466          | 16.03    | 103010           | 19.96    |
| 13/32              | 3/8                   | 13/16              | 2-1/2                | 103068           | 36.36    | -                            | -        | 104468          | 27.96    | -                | -        |
| 7/16               | 3/8                   | 13/16              | 2-1/2                | 103070           | 32.90    | 104575                       | 54.72    | 104470          | 22.10    | 103011           | 30.36    |
| 15/32              | 3/8                   | 13/16              | 2-1/2                | 103072           | 36.36    | -                            | -        | 104472          | 27.96    | -                | -        |
| 1/2                | 1/2                   | 1                  | 3                    | 103074           | 32.90    | 104576                       | 58.58    | 104474          | 23.90    | -                | -        |
| 17/32              | 1/2                   | 1                  | 3                    | 103076           | 43.94    | -                            | -        | -               | -        | -                | -        |
| 9/16               | 1/2                   | 1-1/8              | 3-1/8                | 103078           | 52.23    | -                            | -        | 104476          | 36.20    | -                | -        |
| 5/8                | 5/8                   | 1-5/16             | 3-7/16               | 103082           | 52.19    | 104577                       | 86.21    | 104478          | 37.63    | -                | -        |
| 11/16              | 5/8                   | 1-5/16             | 3-7/16               | 103086           | 58.10    | -                            | -        | 104480          | 45.10    | 103015           | 52.15    |
| 3/4                | 3/4                   | 1-5/16             | 3-7/16               | 103090           | 58.09    | 104578                       | 100.20   | 104482          | 42.48    | -                | -        |
| 13/16              | 5/8                   | 1-1/2              | 3-5/8                | 103094           | 74.52    | -                            | -        | 104484          | 52.96    | -                | -        |
| 7/8                | 3/4                   | 1-1/2              | 3-3/4                | 103098           | 74.54    | 104579                       | 119.86   | 104486          | 50.97    | -                | -        |
| 1                  | 1                     | 1-5/8              | 4-1/8                | 103110           | 94.21    | 104580                       | 150.09   | 104488          | 65.34    | -                | -        |
| 1-1/8              | 1                     | 1-5/8              | 4-1/8                | 103112           | 134.65   | 104581                       | 196.38   | 104490          | 104.01   | -                | -        |
| 1-1/4              | 1-1/4                 | 1-5/8              | 4-1/8                | 103116           | 147.84   | 104582                       | 226.34   | 104492          | 108.78   | 103019           | 186.28   |
| 1-3/8              | 1-1/4                 | 1-5/8              | 4-1/8                | 103120           | 218.32   | -                            | -        | -               | -        | -                | -        |
| 1-1/2              | 1-1/4                 | 1-5/8              | 4-1/8                | 103124           | 212.66   | -                            | -        | 104494          | 165.39   | -                | -        |
| 1-3/4              | 1-1/4                 | 1-5/8              | 4-1/8                | 103126           | 267.56   | -                            | -        | 104496          | 215.00   | -                | -        |
| 2                  | 1-1/4                 | 1-5/8              | 4-1/8                | 103128           | 318.64   | -                            | -        | 104498          | 268.77   | -                | -        |
| 6pc Set            | Contains: 1/4" - 3/4" |                    |                      | 103574           | 204.30   | -                            | -        | -               | -        | -                | -        |

## 2-Flute Regular Length HSCO – Metric

These end mills come standard with right-hand cutting and right-hand helical flutes. All shanks are flatted for holder set screw. Designed for slotting, drilling, pocketing and general-purpose operation.

- 2 helical flutes
- Single end with weldon shank
- Centre cutting
- Keyway tolerance



Speeds & Feeds > P. A43

| Cutting Dia. (mm) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Metric</b>     |                  |                    |                      |          |          |
| 2 mm              | 3/8              | 5/16               | 2-5/16               | 103700   | 29.39    |
| 3 mm              | 3/8              | 5/16               | 2-5/16               | 103702   | 24.47    |
| 3.5 mm            | 3/8              | 7/16               | 2-5/16               | 103703   | 30.05    |
| 4 mm              | 3/8              | 7/16               | 2-5/16               | 103704   | 29.39    |
| 5 mm              | 3/8              | 1/2                | 2-5/16               | 103706   | 29.39    |
| 5.5 mm            | 3/8              | 1/2                | 2-5/16               | 103707   | 28.31    |
| 6 mm              | 3/8              | 1/2                | 2-5/16               | 103708   | 29.39    |
| 7 mm              | 3/8              | 9/16               | 2-5/16               | 103710   | 29.39    |
| 8 mm              | 3/8              | 9/16               | 2-5/16               | 103712   | 29.39    |
| 9 mm              | 3/8              | 9/16               | 2-5/16               | 103713   | 29.39    |
| 10 mm             | 3/8              | 13/16              | 2-1/2                | 103714   | 29.39    |
| 11 mm             | 3/8              | 13/16              | 2-1/2                | 103715   | 44.85    |
| 12 mm             | 3/8              | 13/16              | 2-1/2                | 103716   | 44.85    |
| 14 mm             | 1/2              | 1-1/8              | 3-1/8                | 103718   | 52.18    |
| 16 mm             | 5/8              | 1-5/16             | 3-7/16               | 103720   | 63.98    |
| 18 mm             | 5/8              | 1-5/16             | 3-7/16               | 103722   | 74.71    |
| 20 mm             | 5/8              | 1-1/2              | 3-3/4                | 103724   | 83.22    |
| 22 mm             | 3/4              | 1-1/2              | 3-3/4                | 103726   | 96.00    |
| 24 mm             | 3/4              | 2                  | 4-1/2                | 103728   | 123.80   |

## 2-Flute Long Length HSCO



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 3/8              | 1-1/4              | 3-1/8                | 103130   | 33.53    |
| 5/16               | 3/8              | 1-3/8              | 3-1/8                | 103132   | 33.53    |
| 3/8                | 3/8              | 1-1/2              | 3-1/4                | 103134   | 33.53    |
| 1/2                | 1/2              | 2                  | 4                    | 103136   | 47.21    |
| 5/8                | 5/8              | 2                  | 4-1/8                | 103138   | 68.31    |
| 3/4                | 3/4              | 2-1/4              | 4-1/2                | 103140   | 77.95    |
| 7/8                | 7/8              | 2-1/2              | 4-3/4                | 103142   | 93.49    |
| 1                  | 1                | 3                  | 5-1/2                | 103144   | 130.53   |
| 1-1/8              | 1                | 3                  | 5-1/2                | 103146   | 161.65   |
| 1-1/4              | 1-1/4            | 3                  | 5-1/2                | 103150   | 177.08   |
| 1-1/2              | 1-1/4            | 3                  | 5-1/2                | 103152   | 242.67   |
| 1-3/4              | 1-1/4            | 3                  | 5-1/2                | 103154   | 296.83   |
| 2                  | 1-1/4            | 3                  | 5-1/2                | 103156   | 435.03   |

## 2-Flute Extended Shank HSCO



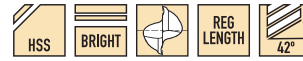
Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Length Below Shank (in.) | Overall Length (in.) | Comb. Shank Code No. | Price \$ | Weldon Flat Code No. | Price \$ |
|--------------------|------------------|--------------------|--------------------------|----------------------|----------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                          |                      |                      |          |                      |          |
| 1/8                | 3/8              | 3/8                | 13/16                    | 2-3/8                | -                    | -        | 103158               | 28.46    |
| 3/16               | 3/8              | 1/2                | 1-1/8                    | 2-11/16              | 103622               | 27.26    | 103160               | 30.46    |
| 1/4                | 3/8              | 5/8                | 1-1/2                    | 3-1/16               | 103624               | 25.43    | 103162               | 30.46    |
| 5/16               | 3/8              | 3/4                | 1-3/4                    | 3-5/16               | -                    | -        | 103164               | 30.48    |
| 3/8                | 3/8              | 3/4                | 1-3/4                    | 3-5/16               | 103628               | 25.70    | 103166               | 30.48    |
| 1/2                | 1/2              | 1                  | 2-7/32                   | 4                    | 103630               | 29.62    | 103168               | 42.79    |
| 5/8                | 5/8              | 1-3/8              | 2-23/32                  | 4-5/8                | 103632               | 76.08    | 103170               | 70.87    |
| 3/4                | 3/4              | 1-5/8              | 3-11/32                  | 5-3/8                | 103634               | 103.32   | 103172               | 82.08    |
| 7/8                | 7/8              | 2                  | 4                        | 6                    | 103636               | 102.36   | 103174               | 118.47   |
| 1                  | 1                | 2-1/2              | 4-31/32                  | 7-1/4                | -                    | -        | 103176               | 159.07   |
| 1-1/4              | 1-1/4            | 3                  | 4-31/32                  | 7-1/4                | -                    | -        | 103178               | 196.50   |

## 2-Flute Regular Length HSS For Aluminum



The 2-flute end mills for aluminum have high helix flute design making them well suited for milling aluminum and other non-ferrous materials.



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 103506   | 22.85    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 103507   | 22.85    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 103508   | 22.85    |
| 7/16               | 3/8              | 1                  | 2-11/16              | 103509   | 33.14    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 103510   | 33.14    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 103511   | 53.28    |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 103512   | 69.35    |
| 7/8                | 3/4              | 1-7/8              | 4-1/8                | 103513   | 83.72    |
| 1                  | 1                | 2                  | 4-1/2                | 103514   | 104.79   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 103515   | 154.71   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 103516   | 241.46   |
| 2                  | 1-1/4            | 2                  | 4-1/2                | 103517   | 365.54   |

## 2-Flute Extra Long Length HSS For Aluminum



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 3/8              | 1-3/4              | 3-9/16               | 103529   | 30.44    |
| 5/16               | 3/8              | 2                  | 3-3/4                | 103530   | 30.44    |
| 3/8                | 3/8              | 2-1/2              | 4-1/4                | 103531   | 30.44    |
| 1/2                | 1/2              | 3                  | 5                    | 103532   | 51.57    |
| 5/8                | 5/8              | 4                  | 6-1/8                | 103533   | 90.07    |
| 3/4                | 3/4              | 4                  | 6-1/4                | 103534   | 117.21   |
| 1                  | 1                | 6                  | 8-1/2                | 103535   | 174.27   |
| 1-1/4              | 1-1/4            | 6                  | 8-1/2                | 103536   | 277.40   |
| 1-1/2              | 1-1/4            | 8                  | 10-1/2               | 103537   | 375.85   |

## 2-Flute Long Length HSS For Aluminum



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 3/8              | 1-1/4              | 3-1/16               | 103518   | 28.23    |
| 5/16               | 3/8              | 1-3/8              | 3-1/8                | 103519   | 28.22    |
| 3/8                | 3/8              | 1-1/2              | 3-1/4                | 103520   | 28.22    |
| 7/16               | 1/2              | 1-3/4              | 3-3/4                | 103521   | 43.83    |
| 1/2                | 1/2              | 2                  | 4                    | 103522   | 42.16    |
| 5/8                | 5/8              | 2-1/2              | 4-5/8                | 103523   | 69.24    |
| 3/4                | 3/4              | 3                  | 5-1/4                | 103524   | 91.80    |
| 1                  | 1                | 4                  | 6-1/2                | 103525   | 149.32   |
| 1-1/4              | 1-1/4            | 4                  | 6-1/2                | 103526   | 218.80   |
| 1-1/2              | 1-1/4            | 4                  | 6-1/2                | 103527   | 312.14   |
| 2                  | 1-1/4            | 4                  | 6-1/2                | 103528   | 484.11   |

### Tolerances - Inch

| Size         | Diameter        | Shank Diameter    |
|--------------|-----------------|-------------------|
| 3/32 thru 1" | +0.0000"-0.002" | +0.00000"-0.0005" |

### Tolerances - Metric

| Size     | Diameter         | Shank Diameter   |
|----------|------------------|------------------|
| 1mm-25mm | +0.000mm-0.051mm | +0.000mm-0.013mm |

Steel

Stainless Steel

Cast Iron/Hardened

Aluminum



## 2-Flute Double End Regular Length HSCO

Excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.

- 2 helical flutes
- Centre cutting
- Double end with weldon shank

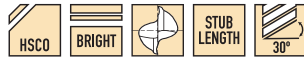


Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 3/8              | 3/8                | 3-1/16               | 103180   | 32.50    |
| 5/32               | 3/8              | 7/16               | 3-1/8                | 103182   | 32.50    |
| 3/16               | 3/8              | 7/16               | 3-1/8                | 103184   | 32.50    |
| 7/32               | 3/8              | 1/2                | 3-1/8                | 103186   | 31.28    |
| 1/4                | 3/8              | 1/2                | 3-1/8                | 103188   | 32.50    |
| 9/32               | 3/8              | 9/16               | 3-1/8                | 103190   | 31.28    |
| 5/16               | 3/8              | 9/16               | 3-1/8                | 103192   | 32.50    |
| 11/32              | 3/8              | 9/16               | 3-1/8                | 103194   | 32.50    |
| 3/8                | 3/8              | 9/16               | 3-1/8                | 103196   | 31.28    |
| 13/32              | 1/2              | 9/16               | 3-1/8                | 103198   | 50.65    |
| 7/16               | 1/2              | 13/16              | 3-3/4                | 103200   | 50.65    |
| 15/32              | 1/2              | 13/16              | 3-3/4                | 103202   | 38.42    |
| 1/2                | 1/2              | 13/16              | 3-3/4                | 103204   | 50.65    |
| 9/16               | 5/8              | 1-1/8              | 4-1/2                | 103206   | 84.59    |
| 5/8                | 5/8              | 1-1/8              | 4-1/2                | 103208   | 84.55    |
| 11/16              | 3/4              | 1-5/16             | 5                    | 103210   | 78.72    |
| 3/4                | 3/4              | 1-5/16             | 5                    | 103212   | 99.66    |
| 1                  | 1                | 1-5/8              | 5-7/8                | 103220   | 144.21   |

## 2-Flute Double End Stub Length Miniature HSCO

Tools under Miniature End Mills have 3/16" shank diameter without flats. Designed with positive rake angle geometry and a high helix angle to ensure free cutting action. Flute design provides good strength behind the cutting edge. Suitable for finishing of precision components such as watch, camera and electronic apparatus molds.



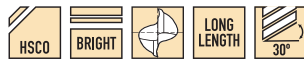
Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/32               | 3/16             | 3/64               | 2                    | 103281   | 24.99    |
| 3/64               | 3/16             | 1/16               | 2                    | 103282   | 23.86    |
| 1/16               | 3/16             | 3/32               | 2                    | 103283   | 22.67    |
| 5/64               | 3/16             | 1/8                | 2                    | 103284   | 22.53    |
| 3/32               | 3/16             | 9/64               | 2                    | 103285   | 24.26    |
| 7/64               | 3/16             | 5/32               | 2                    | 103286   | 19.75    |
| 1/8                | 3/16             | 3/16               | 2                    | 103288   | 22.67    |
| 9/64               | 3/16             | 7/32               | 2                    | 103289   | 21.83    |
| 5/32               | 3/16             | 15/64              | 2                    | 103290   | 24.04    |
| 11/64              | 3/16             | 1/4                | 2                    | 103291   | 22.67    |
| 3/16               | 3/16             | 9/32               | 2                    | 103292   | 19.75    |

## 2-Flute Double End Long Length Miniature HSCO

Longer flute length. Suitable for finishing of precision components such as watch, camera and electronic apparatus molds.

- Long length
- 2 helical flutes
- Double end with straight shank

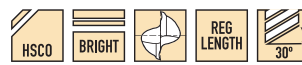


Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 7/32               | 2-1/2                | 103452   | 24.44    |
| 5/64               | 3/16             | 1/4                | 2-1/2                | 103453   | 24.44    |
| 3/32               | 3/16             | 9/32               | 2-5/8                | 103454   | 24.44    |
| 7/64               | 3/16             | 9/32               | 2-5/8                | 103455   | 25.94    |
| 1/8                | 3/16             | 3/4                | 3-1/8                | 103456   | 25.04    |
| 9/64               | 3/16             | 3/4                | 3-1/8                | 103457   | 27.64    |
| 5/32               | 3/16             | 7/8                | 3-1/4                | 103458   | 26.04    |
| 11/64              | 3/16             | 7/8                | 3-1/4                | 103459   | 25.04    |
| 3/16               | 3/16             | 1                  | 3-3/8                | 103460   | 26.04    |

## 2-Flute Double End Regular Length Miniature HSCO

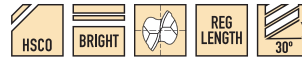
Excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/32               | 3/16             | 3/32               | 2-1/4                | 103441   | 24.99    |
| 3/64               | 3/16             | 9/64               | 2-1/4                | 103442   | 23.86    |
| 1/16               | 3/16             | 3/16               | 2-1/4                | 103443   | 22.67    |
| 5/64               | 3/16             | 15/64              | 2-1/4                | 103444   | 22.67    |
| 3/32               | 3/16             | 9/32               | 2-1/4                | 103445   | 22.67    |
| 7/64               | 3/16             | 21/64              | 2-1/4                | 103446   | 22.67    |
| 1/8                | 3/16             | 3/8                | 2-1/4                | 103447   | 22.67    |
| 9/64               | 3/16             | 13/32              | 2-1/4                | 103448   | 21.83    |
| 5/32               | 3/16             | 7/16               | 2-1/4                | 103449   | 21.83    |
| 11/64              | 3/16             | 1/2                | 2-1/4                | 103450   | 21.83    |
| 3/16               | 3/16             | 1/2                | 2-1/4                | 103451   | 22.67    |

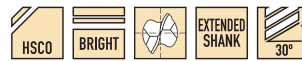
## 2-Flute Ball Nose Regular Length HSCO



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Comb. Shank Code No. | Price \$ | Weldon Flat Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |                      |          |                      |          |
| 1/8                | 3/8              | 3/8                | 2-5/16               | 103801               | 33.26    | 103394               | 30.84    |
| 3/16               | 3/8              | 1/2                | 2-3/8                | 103802               | 25.45    | 103395               | 30.84    |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 103803               | 26.46    | 103396               | 30.84    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 103804               | 25.45    | 103397               | 33.58    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | -                    | -        | 103398               | 33.58    |
| 7/16               | 1/2              | 1                  | 3                    | 103806               | 36.03    | 103399               | 50.07    |
| 1/2                | 1/2              | 1                  | 3                    | -                    | -        | 103400               | 50.17    |
| 5/8                | 5/8              | 1-3/8              | 3-1/2                | 103808               | 61.33    | 103402               | 73.54    |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 103809               | 78.45    | 103404               | 96.93    |
| 7/8                | 3/4              | 2                  | 4-1/4                | 103810               | 90.26    | 103405               | 133.92   |
| 1                  | 1                | 2-1/4              | 4-3/4                | 103811               | 136.57   | 103406               | 155.02   |

## 2-Flute Ball Nose Extended Shank HSCO



Speeds & Feeds > P. A43

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Length Below Shank | Overall Length (in.) | Comb. Shank Code No. | Price \$ | Weldon Flat Code No. | Price \$ |
|--------------------|------------------|--------------------|--------------------|----------------------|----------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                    |                      |                      |          |                      |          |
| 1/8                | 3/8              | 3/8                | 13/16              | 2-3/8                | 103821               | 33.79    | 103410               | 42.90    |
| 3/16               | 3/8              | 1/2                | 1-1/8              | 2-11/16              | 103822               | 33.79    | 103411               | 42.90    |
| 1/4                | 3/8              | 5/8                | 1-1/2              | 3-1/16               | 103823               | 33.79    | 103412               | 42.90    |
| 5/16               | 3/8              | 3/4                | 1-3/4              | 3-5/16               | -                    | -        | 103413               | 53.63    |
| 3/8                | 3/8              | 3/4                | 1-3/4              | 3-5/16               | 103825               | 33.94    | 103414               | 53.63    |
| 7/16               | 1/2              | 1                  | 1-7/8              | 3-11/16              | -                    | -        | 103415               | 68.02    |
| 1/2                | 1/2              | 1                  | 2-1/4              | 4                    | 103827               | 41.03    | 103416               | 70.66    |
| 5/8                | 5/8              | 1-3/8              | 2-3/4              | 4-5/8                | -                    | -        | 103417               | 96.54    |
| 3/4                | 3/4              | 1-5/8              | 3-3/8              | 5-3/8                | -                    | -        | 103418               | 123.12   |
| 1                  | 1                | 2-1/2              | 5                  | 7-1/4                | 103830               | 152.29   | 103419               | 192.94   |

### 2-Flute Ball Nose Double End HSCO & HSS



Speeds & Feeds > P. A43

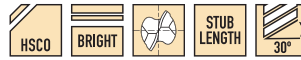
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | HSCO Code No. | Price \$ | HSS Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|---------------|----------|--------------|----------|
| <b>Inch</b>        |                  |                    |                      |               |          |              |          |
| 1/8                | 3/8              | 3/8                | 3-1/16               | 104174        | 52.84    | 104226       | 41.33    |
| 3/16               | 3/8              | 7/16               | 3-1/8                | 104176        | 44.50    | 104228       | 42.95    |
| 1/4                | 3/8              | 1/2                | 3-1/8                | 104178        | 56.06    | 104230       | 37.15    |
| 5/16               | 3/8              | 9/16               | 3-1/8                | 104180        | 56.06    | 104232       | 21.48    |
| 3/8                | 3/8              | 9/16               | 3-1/8                | 104182        | 52.84    | 104234       | 37.15    |
| 7/16               | 1/2              | 13/16              | 3-3/4                | 104184        | 74.60    | 104236       | 52.15    |
| 1/2                | 1/2              | 13/16              | 3-3/4                | 104186        | 77.51    | 104238       | 54.20    |
| 5/8                | 5/8              | 1-1/8              | 4-1/2                | 104188        | 100.61   | 104240       | 92.06    |
| 3/4                | 3/4              | 1-5/16             | 5                    | 104190        | 154.62   | 104242       | 72.38    |
| 1                  | 1                | 1-5/8              | 5-7/8                | 104192        | 202.91   | 104244       | 162.45   |

### 2-Flute Ball Nose Double End Stub Length Mini HSCO



Helical flute on the nose radius. Suitable for high efficiency copying process and cutting of die mold corner radius.

- Stub length
- 2 helical flutes, ball end
- Double end with straight shank



Speeds & Feeds > P. A43

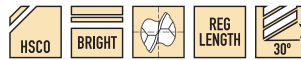
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 3/32               | 2                    | 103270   | 42.88    |
| 3/32               | 3/16             | 9/64               | 2                    | 103271   | 42.88    |
| 1/8                | 3/16             | 3/16               | 2                    | 103272   | 37.51    |
| 5/32               | 3/16             | 15/64              | 2                    | 103273   | 36.10    |
| 3/16               | 3/16             | 9/32               | 2                    | 103274   | 39.80    |

### 2-Flute Ball Nose Double End Regular Length Mini HSCO



Helical flute on the nose radius. Suitable for high efficiency copying process and cutting of die mold corner radius.

- Regular length
- 2 helical flutes, ball end
- Double end with straight shank



Speeds & Feeds > P. A43

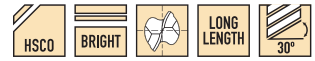
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/32               | 3/16             | 3/32               | 2                    | 103420   | 48.37    |
| 3/64               | 3/16             | 1/16               | 2                    | 103421   | 48.65    |
| 1/16               | 3/16             | 3/32               | 2                    | 103488   | 43.60    |
| 5/64               | 3/16             | 1/8                | 2                    | 103489   | 44.02    |
| 3/32               | 3/16             | 9/64               | 2                    | 103490   | 43.60    |
| 7/64               | 3/16             | 21/64              | 2-1/4                | 103491   | 48.50    |
| 1/8                | 3/16             | 3/8                | 2-1/4                | 103492   | 38.42    |
| 9/64               | 3/16             | 13/32              | 2-1/4                | 103493   | 38.95    |
| 5/32               | 3/16             | 7/16               | 2-1/4                | 103494   | 38.12    |
| 11/64              | 3/16             | 1/2                | 2-1/4                | 103495   | 38.95    |
| 3/16               | 3/16             | 1/2                | 2-1/4                | 103496   | 42.77    |

### 2-Flute Ball Nose Double End Long Length Mini HSCO



Longer flute length. Helical flute on the nose radius. Suitable for high efficiency copying process and cutting of die mold corner radius.

- Long length
- 2 helical flutes, ball end
- Double end with straight shank



Speeds & Feeds > P. A43

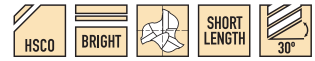
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 7/32               | 2-1/2                | 103497   | 46.19    |
| 3/32               | 3/16             | 9/32               | 2-5/8                | 103499   | 44.44    |
| 1/8                | 3/16             | 3/4                | 3-1/8                | 103501   | 43.11    |
| 5/32               | 3/16             | 7/8                | 3-1/4                | 103503   | 45.76    |
| 3/16               | 3/16             | 1                  | 3-3/8                | 103504   | 41.46    |

### 3-Flute Short Length Throwaway HSCO



Well balanced web design to minimize deflection and chattering. High accuracy for outside diameter is guaranteed under the strict tolerance control.

- 3 helical flutes
- Single end with weldon shank



Speeds & Feeds > P. A44

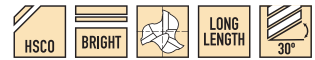
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/4              | 3/32               | 31/32                | 103580   | 14.89    |
| 3/32               | 1/4              | 5/32               | 1-1/64               | 103582   | 14.89    |
| 1/8                | 1/4              | 3/16               | 1-3/32               | 103584   | 14.89    |
| 5/32               | 1/4              | 1/4                | 1-9/32               | 103586   | 14.89    |
| 3/16               | 1/4              | 9/32               | 1-11/32              | 103588   | 14.89    |
| 7/32               | 1/4              | 5/16               | 1-13/32              | 103590   | 14.89    |
| 1/4                | 1/4              | 3/8                | 1-13/32              | 103592   | 14.89    |

### 3-Flute Long Length Throwaway HSCO



Well balanced web design to minimize deflection and chattering. High accuracy for outside diameter is guaranteed under the strict tolerance control.

- 3 helical flutes
- Single end with weldon shank



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 1/4              | 5/32               | 1-3/32               | 103594   | 16.69    |
| 5/64               | 1/4              | 7/32               | 1-3/16               | 103596   | 16.18    |
| 3/32               | 1/4              | 1/4                | 1-1/4                | 103598   | 16.18    |
| 7/64               | 1/4              | 9/32               | 1-9/32               | 103600   | 16.18    |
| 1/8                | 1/4              | 5/16               | 1-11/32              | 103602   | 16.69    |
| 9/64               | 1/4              | 11/32              | 1-7/16               | 103604   | 16.18    |
| 5/32               | 1/4              | 3/8                | 1-17/32              | 103606   | 16.69    |
| 11/64              | 1/4              | 13/32              | 1-19/32              | 103608   | 13.59    |
| 3/16               | 1/4              | 7/16               | 1-21/32              | 103610   | 16.69    |
| 13/64              | 1/4              | 15/32              | 1-11/16              | 103612   | 16.18    |
| 7/32               | 1/4              | 1/2                | 1-3/4                | 103614   | 16.69    |
| 15/64              | 1/4              | 9/16               | 1-13/16              | 103616   | 13.08    |
| 1/4                | 1/4              | 5/8                | 1-3/4                | 103618   | 16.69    |

## 4-Flute Regular Length HSCO - Metric



Centre cutting allows these end mills to drill into the part for the beginning of a slot. These centre cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting. • Single end with weldon shank



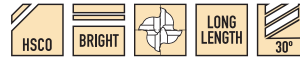
Speeds & Feeds > P. A44

| Cutting Dia. (mm) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------------------|------------------|--------------------|----------------------|----------|----------|
| 2 mm              | 3/8              | 3/8                | 2-5/16               | 103730   | 29.39    |
| 3 mm              | 3/8              | 3/8                | 2-5/16               | 103731   | 29.39    |
| 4 mm              | 3/8              | 1/2                | 2-3/8                | 103732   | 29.39    |
| 5 mm              | 3/8              | 9/16               | 2-1/2                | 103733   | 29.39    |
| 6 mm              | 3/8              | 5/8                | 2-1/2                | 103734   | 29.39    |
| 7 mm              | 3/8              | 11/16              | 2-1/2                | 103735   | 29.39    |
| 8 mm              | 3/8              | 3/4                | 2-1/2                | 103736   | 29.39    |
| 10 mm             | 3/8              | 1                  | 2-11/16              | 103737   | 29.39    |
| 11 mm             | 3/8              | 1                  | 2-11/16              | 103749   | 44.85    |
| 12 mm             | 3/8              | 1                  | 2-11/16              | 103738   | 44.85    |
| 13 mm             | 1/2              | 1-1/4              | 3-1/4                | 103750   | 55.36    |
| 14 mm             | 1/2              | 1-3/8              | 3-3/8                | 103739   | 52.18    |
| 16 mm             | 5/8              | 1-5/8              | 3-3/4                | 103740   | 63.98    |
| 18 mm             | 5/8              | 1-5/8              | 3-3/4                | 103741   | 74.71    |
| 20 mm             | 5/8              | 1-7/8              | 4-1/8                | 103742   | 83.22    |
| 22 mm             | 3/4              | 1-7/8              | 4-1/8                | 103743   | 95.98    |
| 24 mm             | 3/4              | 2                  | 4-1/2                | 103744   | 123.80   |

## Multi-Flute Long Length HSCO



- Multiple helical flutes
- Centre cutting
- Single end with weldon shank



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Comb. Shank Code No. | Price \$ | Weldon Flat Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                      |          |                      |          |
| 1/4                | 3/8              | 1-1/4              | 3-1/16               | 4      | -                    | -        | 103360               | 34.18    |
| 5/16               | 3/8              | 1-3/8              | 3-1/8                | 4      | -                    | -        | 103361               | 34.18    |
| 3/8                | 3/8              | 1-1/2              | 3-1/4                | 4      | -                    | -        | 103362               | 34.18    |
| 1/2                | 1/2              | 2                  | 4                    | 4      | 103658               | 39.46    | 103363               | 51.16    |
| 5/8                | 5/8              | 2-1/2              | 4-5/8                | 4      | -                    | -        | 103364               | 79.57    |
| 3/4                | 3/4              | 3                  | 5-1/4                | 4      | -                    | -        | 103365               | 96.01    |
| 7/8                | 3/4              | 3-1/2              | 5-3/4                | 4      | 103664               | 199.85   | 103366               | 115.63   |
| 1                  | 1                | 4                  | 6-1/2                | 4      | 103666               | 166.47   | 103367               | 174.48   |
| 1-1/4              | 1-1/4            | 4                  | 6-1/2                | 6      | -                    | -        | 103368               | 227.28   |
| 1-1/2              | 1-1/4            | 4                  | 6-1/2                | 6      | -                    | -        | 103369               | 317.04   |

## Multi-Flute Regular Length HSCO & HSS

Centre cutting allows these end mills to drill into the part for the beginning of a slot. These centre cutting end mills are recommended for pocketing, tracer milling, cam milling, die sinking and slotting.



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.)             | Flute Length (in.) | Overall Length (in.) | Flutes | HSCO Weldon Flat |          | HSCO TiAIN Coated Weldon Flat |          | HSS Weldon Flat |          | HSCO Comb. Shank |          |
|--------------------|------------------------------|--------------------|----------------------|--------|------------------|----------|-------------------------------|----------|-----------------|----------|------------------|----------|
|                    |                              |                    |                      |        | Code No.         | Price \$ | Code No.                      | Price \$ | Code No.        | Price \$ | Code No.         | Price \$ |
| <b>Inch</b>        |                              |                    |                      |        |                  |          |                               |          |                 |          |                  |          |
| 1/8                | 3/8                          | 3/8                | 2-5/16               | 4      | 103222           | 25.23    | 104522                        | 48.15    | 104400          | 16.01    | -                | -        |
| 5/32               | 3/8                          | 7/16               | 2-3/8                | 4      | 103223           | 22.94    | -                             | -        | 104402          | 15.60    | 103021           | 16.83    |
| 3/16               | 3/8                          | 1/2                | 2-3/8                | 4      | 103224           | 26.19    | 104524                        | 48.15    | 104404          | 17.02    | -                | -        |
| 7/32               | 3/8                          | 9/16               | 2-7/16               | 4      | 103225           | 19.79    | -                             | -        | 104406          | 15.98    | 103023           | 18.77    |
| 1/4                | 3/8                          | 5/8                | 2-7/16               | 4      | 103226           | 26.19    | 104526                        | 44.84    | 104408          | 17.02    | -                | -        |
| 9/32               | 3/8                          | 11/16              | 2-1/2                | 4      | 103227           | 26.19    | -                             | -        | 104410          | 17.02    | -                | -        |
| 5/16               | 3/8                          | 3/4                | 2-1/2                | 4      | 103228           | 26.19    | 104528                        | 48.18    | 104412          | 17.68    | -                | -        |
| 11/32              | 3/8                          | 3/4                | 2-1/2                | 4      | 103229           | 26.19    | -                             | -        | 104414          | 18.74    | 103027           | 16.83    |
| 3/8                | 3/8                          | 3/4                | 2-1/2                | 4      | 103230           | 26.19    | 104530                        | 48.17    | 104416          | 17.67    | -                | -        |
| 13/32              | 3/8                          | 1                  | 2-11/16              | 4      | 103231           | 37.80    | -                             | -        | 104418          | 27.12    | -                | -        |
| 7/16               | 3/8                          | 1                  | 2-11/16              | 4      | 103232           | 39.29    | 104532                        | 61.16    | 104420          | 27.13    | -                | -        |
| 1/2                | 1/2                          | 1-1/4              | 3-1/4                | 4      | 103235           | 39.29    | 104535                        | 70.45    | 104422          | 27.13    | -                | -        |
| 9/16               | 1/2                          | 1-3/8              | 3-3/8                | 4      | 103237           | 52.07    | -                             | -        | 104424          | 37.62    | 103031           | 64.04    |
| 5/8                | 5/8                          | 1-5/8              | 3-3/4                | 4      | 103240           | 60.20    | 104540                        | 97.58    | 104426          | 39.72    | -                | -        |
| 11/16              | 5/8                          | 1-5/8              | 3-3/4                | 4      | 103242           | 66.84    | -                             | -        | 104428          | 45.09    | 103033           | 57.44    |
| 3/4                | 3/4                          | 1-5/8              | 3-7/8                | 4      | 103246           | 71.19    | 104546                        | 108.48   | 104430          | 51.80    | -                | -        |
| 13/16              | 3/4                          | 1-7/8              | 4-1/8                | 4      | 103248           | 74.31    | -                             | -        | -               | -        | -                | -        |
| 7/8                | 3/4                          | 1-7/8              | 4-1/8                | 4      | 103252           | 89.42    | -                             | -        | -               | -        | -                | -        |
| 1                  | 1                            | 2                  | 4-1/2                | 4      | 103259           | 107.86   | 104559                        | 172.39   | 104432          | 64.93    | -                | -        |
| 1-1/8              | 1                            | 2                  | 4-1/2                | 4      | -                | -        | 104561                        | 209.70   | 104434          | 66.42    | -                | -        |
| 1-1/8              | 1                            | 2                  | 4-1/2                | 6      | 103261           | 145.26   | -                             | -        | 104436          | 151.15   | -                | -        |
| 1-1/4              | 1-1/4                        | 2                  | 4-1/2                | 4      | -                | -        | 104564                        | 250.81   | -               | -        | -                | -        |
| 1-1/4              | 1-1/4                        | 2                  | 4-1/2                | 6      | 103264           | 172.83   | -                             | -        | 104438          | 136.16   | -                | -        |
| 1-3/8              | 1                            | 2                  | 4-1/2                | 6      | 103265           | 197.66   | -                             | -        | -               | -        | -                | -        |
| 1-1/2              | 1-1/4                        | 2                  | 4-1/2                | 4      | -                | -        | -                             | -        | -               | -        | 103046           | 275.37   |
| 1-1/2              | 1-1/4                        | 2                  | 4-1/2                | 6      | 103267           | 228.51   | 104567                        | 349.10   | 104442          | 196.34   | 103044           | 327.79   |
| 2                  | 1-1/4                        | 2                  | 4-1/2                | 6      | 103269           | 360.32   | -                             | -        | 104444          | 257.60   | -                | -        |
| <b>6pc Set</b>     | <b>Contains: 1/4" - 3/4"</b> |                    |                      |        | 103581           | 240.06   |                               |          |                 |          |                  |          |

## Multi-Flute Extra Long Length HSCO



- Multiple helical flutes
- Centre cutting
- Single end with weldon shank



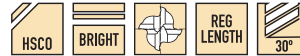
Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |        |          |          |
| 1/4                | 3/8              | 1-3/4              | 3-9/16               | 4      | 103370   | 40.67    |
| 5/16               | 3/8              | 2                  | 3-3/4                | 4      | 103371   | 44.41    |
| 3/8                | 3/8              | 2-1/2              | 4-1/4                | 4      | 103372   | 46.93    |
| 1/2                | 1/2              | 3                  | 5                    | 4      | 103373   | 60.69    |
| 5/8                | 5/8              | 4                  | 6-1/8                | 4      | 103374   | 96.07    |
| 3/4                | 3/4              | 4                  | 6-1/4                | 4      | 103375   | 116.74   |
| 7/8                | 3/4              | 5                  | 7-1/4                | 4      | 103376   | 138.56   |
| 1                  | 1                | 6                  | 8-1/2                | 4      | 103377   | 195.65   |
| 1-1/4              | 1-1/4            | 6                  | 8-1/2                | 6      | 103378   | 263.77   |
| 1-1/2              | 1-1/4            | 8                  | 10-1/2               | 6      | 103378A  | 478.08   |

## 4-Flute Double End Regular Length HSCO



Double end economy. Used for slabbing, shallow pocketing, tracer milling or die sinking and similar operations.



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 3/8              | 3/8                | 3-1/16               | 103379   | 36.48    |
| 3/16               | 3/8              | 1/2                | 3-1/4                | 103380   | 36.48    |
| 1/4                | 3/8              | 5/8                | 3-3/8                | 103381   | 36.48    |
| 5/16               | 3/8              | 3/4                | 3-1/2                | 103382   | 36.48    |
| 3/8                | 3/8              | 3/4                | 3-1/2                | 103383   | 36.48    |
| 1/2                | 1/2              | 1                  | 4-1/8                | 103384   | 53.21    |
| 5/8                | 5/8              | 1-3/8              | 5                    | 103385   | 91.58    |
| 3/4                | 3/4              | 1-5/8              | 5-5/8                | 103386   | 105.27   |
| 7/8                | 7/8              | 1-7/8              | 6-1/8                | 103387   | 140.87   |
| 1                  | 1                | 1-7/8              | 6-3/8                | 103388   | 174.28   |

## 4-Flute Double End Stub Length Miniature HSCO

Suitable for finishing of precision components such as watch, camera, and electronic apparatus molds.

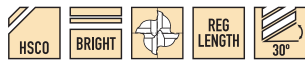


Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 3/32               | 2                    | 103461   | 24.04    |
| 5/64               | 3/16             | 1/8                | 2                    | 103462   | 22.67    |
| 3/32               | 3/16             | 9/64               | 2                    | 103463   | 22.67    |
| 7/64               | 3/16             | 5/32               | 2                    | 103464   | 20.51    |
| 1/8                | 3/16             | 3/16               | 2                    | 103465   | 22.67    |
| 9/64               | 3/16             | 7/32               | 2                    | 103466   | 19.75    |
| 5/32               | 3/16             | 15/64              | 2                    | 103467   | 24.04    |
| 11/64              | 3/16             | 1/4                | 2                    | 103468   | 19.75    |
| 3/16               | 3/16             | 9/32               | 2                    | 103469   | 19.75    |

## 4-Flute Double End Regular Length Miniature HSCO

Suitable for finishing of precision components such as watch, camera, and electronic apparatus molds, etc.

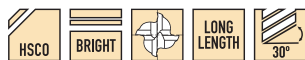


Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 3/16               | 2-1/4                | 103470   | 22.67    |
| 5/64               | 3/16             | 15/64              | 2-1/4                | 103471   | 22.67    |
| 3/32               | 3/16             | 9/32               | 2-1/4                | 103472   | 22.67    |
| 7/64               | 3/16             | 21/64              | 2-1/4                | 103473   | 22.67    |
| 1/8                | 3/16             | 3/8                | 2-1/4                | 103474   | 22.67    |
| 9/64               | 3/16             | 13/32              | 2-1/4                | 103475   | 24.04    |
| 5/32               | 3/16             | 7/16               | 2-1/4                | 103476   | 22.67    |
| 11/64              | 3/16             | 1/2                | 2-1/4                | 103477   | 21.69    |
| 3/16               | 3/16             | 1/2                | 2-1/4                | 103478   | 22.67    |

## 4-Flute Double End Long Length Miniature HSCO

Longer flute length. Suitable for finishing of precision components such as watch, camera and electronic apparatus molds.



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/16               | 3/16             | 7/32               | 2-1/2                | 103479   | 24.44    |
| 5/64               | 3/16             | 1/4                | 2-1/2                | 103480   | 23.51    |
| 3/32               | 3/16             | 9/32               | 2-5/8                | 103481   | 24.44    |
| 7/64               | 3/16             | 9/32               | 2-5/8                | 103482   | 21.15    |
| 1/8                | 3/16             | 3/4                | 3-1/8                | 103483   | 26.04    |
| 9/64               | 3/16             | 3/4                | 3-1/8                | 103484   | 25.04    |
| 5/32               | 3/16             | 7/8                | 3-1/4                | 103485   | 26.04    |
| 11/64              | 3/16             | 7/8                | 3-1/4                | 103486   | 25.46    |
| 3/16               | 3/16             | 1                  | 3-3/8                | 103487   | 26.04    |

## Multi-Flute Centre Cut Heavy Duty HSCO



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 2                  | 2                | 2                  | 5-3/4                | 103389   | 487.73   |
| 2                  | 2                | 4                  | 7-3/4                | 103390   | 504.18   |
| 2                  | 2                | 5                  | 8-3/4                | 103391   | 648.44   |
| 2                  | 2                | 6                  | 9-3/4                | 103392   | 689.40   |
| 2                  | 2                | 8                  | 11-3/4               | 103393   | 815.93   |

## 60° High Helix Regular Length HSCO

Faster feed and speed than normal HSS can be applied to even hardened steels over 35HRC.

- Centre cutting



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |        |          |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 3      | 103538   | 38.05    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 3      | 103539   | 38.05    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 3      | 103540   | 38.05    |
| 7/16               | 3/8              | 1                  | 2-11/16              | 3      | 103541   | 52.63    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 3      | 103542   | 55.39    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 3      | 103543   | 80.12    |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 3      | 103544   | 112.60   |
| 1                  | 1                | 2                  | 4-1/2                | 4      | 103546   | 171.81   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 4      | 103547   | 234.96   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 4      | 103548   | 425.71   |
| 2                  | 1-1/4            | 2                  | 4-1/2                | 4      | 103549   | 659.76   |

## 3/4" Shank Regular Length HSCO

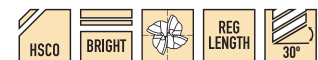


Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |        |          |          |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 4      | 103336   | 57.95    |
| 7/8                | 3/4              | 1-7/8              | 4-1/8                | 4      | 103338   | 74.54    |
| 1                  | 3/4              | 1-7/8              | 4-1/8                | 4      | 103340   | 92.65    |
| 1-1/8              | 3/4              | 2                  | 4-1/4                | 6      | 103341   | 132.38   |
| 1-1/4              | 3/4              | 2                  | 4-1/4                | 6      | 103342   | 145.37   |
| 1-1/2              | 3/4              | 1-1/2              | 4-1/4                | 6      | 103343   | 202.16   |
| 1-3/4              | 3/4              | 1-1/2              | 4-1/2                | 6      | 103344   | 263.10   |
| 2                  | 3/4              | 1-1/2              | 4-1/2                | 8      | 103345   | 301.85   |

## 4-Flute Ball Nose Regular Length HSCO

The 4-Flute Ball End Mills are designed for milling of radius bottom slots, fillets and special contours. The end teeth are cut to centre allowing these end mills to drill into material at the beginning of a slotting cut.

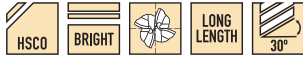


Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/8                | 3/8              | 3/8                | 2-5/16               | 104950   | 39.96    |
| 3/16               | 3/8              | 1/2                | 2-3/8                | 104952   | 39.96    |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 104954   | 39.96    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 104956   | 39.96    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 104958   | 39.96    |
| 7/16               | 3/8              | 1                  | 2-11/16              | 104960   | 55.10    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 104962   | 55.10    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 104964   | 88.58    |
| 11/16              | 3/4              | 1-5/8              | 3-3/4                | 104966   | 112.65   |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 104968   | 112.65   |
| 7/8                | 7/8              | 1-7/8              | 4-1/8                | 104970   | 140.02   |
| 1                  | 1                | 2                  | 4-1/2                | 104972   | 165.98   |
| 1-1/8              | 1                | 2                  | 4-1/2                | 104974   | 218.59   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 104976   | 272.77   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 104978   | 306.61   |
| 2                  | 1-1/4            | 2                  | 4-1/2                | 104980   | 464.09   |

## 4-Flute Ball Nose Long Length HSCO

Longer flute length than regular length ball end mills and suitable for high efficiency copying process and deep cutting of die mold corner radius.



Speeds & Feeds > P. A44

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |          |          |
| 1/4                | 3/8              | 1-1/4              | 3-1/16               | 104982   | 51.58    |
| 5/16               | 3/8              | 1-3/8              | 3-1/8                | 104984   | 51.58    |
| 3/8                | 3/8              | 1-1/2              | 3-1/4                | 104986   | 51.58    |
| 1/2                | 1/2              | 2                  | 4                    | 104988   | 63.97    |
| 5/8                | 5/8              | 2-1/2              | 4-5/8                | 104990   | 105.09   |
| 3/4                | 3/4              | 3                  | 5-1/4                | 104992   | 135.68   |
| 7/8                | 7/8              | 3-1/2              | 5-3/4                | 104994   | 151.96   |
| 1                  | 1                | 4                  | 6-1/2                | 104996   | 197.87   |

## Regular Length Roughing End Mills HSCO

Multiple-Flute: This general purpose rougher is designed for high production metal removal in a wide range of workpiece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a centre hole design for many accurate resharpenings.



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | O.A.L. (in.) | Fl. | Comb. Shank Code No. | Price \$ | Bright Finish Code No. | Price \$ | TiAIN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|--------------|-----|----------------------|----------|------------------------|----------|-----------------------|----------|
| <b>Inch</b>        |                  |                    |              |     |                      |          |                        |          |                       |          |
| 1/4                | 3/8              | 5/8                | 2-7/16       | 3   | 103950               | 37.83    | 103900                 | 38.15    | 104500                | 56.66    |
| 5/16               | 3/8              | 3/4                | 2-1/2        | 3   | 103951               | 39.32    | 103901                 | 38.15    | 104501                | 56.65    |
| 3/8                | 3/8              | 3/4                | 2-1/2        | 4   | -                    | -        | 103902                 | 38.15    | 104502                | 56.65    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4        | 4   | 103953               | 64.04    | 103903                 | 53.19    | 104503                | 82.38    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4        | 4   | -                    | -        | 103904                 | 64.89    | 104504                | 90.33    |
| 3/4                | 5/8              | 1-5/8              | 3-3/4        | 4   | 103955               | 77.32    | 103905                 | 80.66    | 104505                | 113.56   |
| 3/4                | 3/4              | 1-5/8              | 3-3/4        | 4   | -                    | -        | 103906                 | 80.66    | 104506                | 119.34   |
| 7/8                | 3/4              | 1-7/8              | 4-1/8        | 5   | 103957               | 103.34   | 103907                 | 99.83    | 104507                | 151.03   |
| 1                  | 1                | 2                  | 4-1/2        | 5   | -                    | -        | 103908                 | 116.68   | 104508                | 182.04   |
| 1-1/8              | 1                | 2                  | 4-1/2        | 6   | 103959               | 140.75   | 103909                 | 154.06   | 104509                | 226.19   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2        | 6   | -                    | -        | 103910                 | 178.31   | 104510                | 259.16   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2        | 6   | -                    | -        | 103911                 | 238.82   | 104511                | 352.51   |
| 1-3/4              | 1-1/4            | 2                  | 4-1/2        | 6   | -                    | -        | 103912                 | 313.87   | -                     | -        |
| 2                  | 2                | 2                  | 5-3/4        | 8   | -                    | -        | 103913                 | 440.03   | -                     | -        |
| 2                  | 2                | 3                  | 6-3/4        | 8   | -                    | -        | 103914                 | 472.43   | -                     | -        |
| 2                  | 2                | 4                  | 7-3/4        | 8   | -                    | -        | 103915                 | 573.13   | -                     | -        |

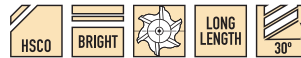
## Medium Length Roughing End Mills HSCO



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |        |          |          |
| 1                  | 1                | 3                  | 5-1/2                | 5      | 103916   | 144.12   |
| 1-1/4              | 1-1/4            | 3                  | 5-1/2                | 6      | 103917   | 216.00   |
| 1-1/2              | 1-1/4            | 3                  | 5-1/2                | 6      | 103918   | 249.21   |
| 2                  | 2                | 6                  | 9-3/4                | 8      | 103919   | 723.52   |

## Long Length Roughing End Mills HSCO



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Comb. Shank Code No. | Price \$ | Weldon Flat Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                      |          |                      |          |
| 3/8                | 3/8              | 1-1/2              | 4                    | 4      | -                    | -        | 103932               | 62.88    |
| 1/2                | 1/2              | 2                  | 4                    | 4      | 103970               | 69.39    | 103920               | 68.45    |
| 5/8                | 5/8              | 2-1/2              | 4-5/8                | 4      | 103971               | 101.60   | 103921               | 93.62    |
| 3/4                | 5/8              | 3                  | 5-1/8                | 4      | -                    | -        | 103922               | 100.82   |
| 3/4                | 3/4              | 3                  | 5-1/4                | 4      | -                    | -        | 103923               | 100.82   |
| 7/8                | 3/4              | 3-1/2              | 5-3/4                | 5      | -                    | -        | 103924               | 122.49   |
| 1                  | 1                | 4                  | 6-1/2                | 5      | -                    | -        | 103925               | 167.44   |
| 1-1/4              | 1-1/4            | 4                  | 6-1/2                | 6      | -                    | -        | 103926               | 240.56   |
| 1-1/2              | 1-1/4            | 4                  | 6-1/2                | 6      | -                    | -        | 103927               | 285.61   |
| 1-3/4              | 1-1/4            | 4                  | 6-1/2                | 6      | -                    | -        | 103928               | 373.50   |
| 2                  | 2                | 8                  | 11-3/4               | 8      | -                    | -        | 103929               | 933.01   |

## Regular Length Centre Cut Roughing End Mills HSCO

This general purpose rougher is designed for high production metal removal in a wide range of workpiece material. It is recommended for cutting steel grades and many non-ferrous materials.



- Multiple helical flutes
- Single end with weldon shank
- Centre cutting
- Round profile
- Coarse pitch



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ | TiAIN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|-----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |                       |          |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 4      | 103100                 | 58.65    | 103585                | 56.07    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 4      | 103101                 | 72.53    | 103591                | 118.05   |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 4      | 103102                 | 90.23    | 103587                | 100.84   |
| 1                  | 1                | 2                  | 4-1/2                | 5      | 103103                 | 128.38   | 103593                | 119.47   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 6      | 103104                 | 196.15   | 103589                | 145.87   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 6      | 103105                 | 262.77   | 103595                | 261.02   |

## Stub Length Centre Cutting Rougher HSCO

This general purpose rougher is designed for high production metal removal in a wide range of workpiece material. Suitable for a very broad spectrum of materials having high tensile strengths. Milled surfaces are of exceptional quality.



- 3 helical flutes
- Centre cutting
- Coarse pitch
- Round profile



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ | TiAIN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|-----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |                       |          |
| 1/4                | 3/8              | 1/4                | 2-1/16               | 3      | 104340                 | 45.81    | 104360                | 68.17    |
| 3/8                | 3/8              | 3/8                | 2-5/32               | 3      | 104342                 | 45.81    | 104362                | 60.26    |
| 1/2                | 1/2              | 1/2                | 2-1/2                | 3      | 104344                 | 62.91    | 104364                | 85.75    |
| 5/8                | 5/8              | 5/8                | 2-3/4                | 3      | 104346                 | 73.87    | 104366                | 103.84   |
| 3/4                | 3/4              | 3/4                | 2-7/8                | 3      | 104348                 | 96.76    | 104368                | 153.38   |
| 1                  | 1                | 1                  | 3-1/2                | 3      | 104350                 | 145.29   | 104370                | 204.87   |

## Regular Length Roughing End Mills For Aluminum HSCO



Speeds & Feeds > P. A45

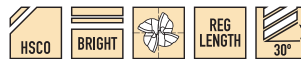
| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|----------|----------|
| <b>Inch</b>        |                  |                    |                      |        |          |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 3      | 104052   | 53.49    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 3      | 104054   | 57.81    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 3      | 104056   | 53.49    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 3      | 104058   | 73.44    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 3      | 104060   | 90.79    |
| 3/4                | 3/4              | 1-5/8              | 3-3/4                | 3      | 104062   | 115.03   |
| 1                  | 1                | 2                  | 4-1/2                | 3      | 104066   | 170.05   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 3      | 104068   | 239.77   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 3      | 104070   | 284.68   |

## Regular Length Ball Nose Rougher HSCO



This general purpose rougher is designed for high production metal removal in a wide range of workpiece material.

- Multiple helical flutes
- Single end with weldon shank
- Ball end
- Round profile
- Coarse pitch



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 3      | 104088                 | 68.71    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 3      | 104089                 | 73.04    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 4      | 104090                 | 68.71    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 4      | 104091                 | 94.42    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 4      | 104092                 | 116.71   |
| 3/4                | 3/4              | 1-3/4              | 4                    | 4      | 104093                 | 145.23   |
| 1                  | 3/4              | 2                  | 4-1/2                | 5      | 104094                 | 202.42   |
| 1                  | 1                | 2                  | 4-1/2                | 5      | 104095                 | 210.01   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 6      | 104096                 | 308.75   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 6      | 104097                 | 413.85   |

## Stub Length Fine Pitch Rougher HSCO



### Fine Pitch Roughers

This general purpose rougher is designed for high production metal removal in a wide range of workpiece material. Suitable for a very broad spectrum of materials having high tensile strengths. Milled surfaces are of exceptional quality.

- Centre cutting
- Round profile
- Single end with weldon shank



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ | TIAN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |                      |          |
| 1/4                | 3/8              | 1/4                | 2-1/16               | 3      | 104300                 | 50.36    | 104320               | 66.21    |
| 3/8                | 3/8              | 3/8                | 2-5/32               | 3      | 104302                 | 47.70    | 104322               | 72.97    |
| 1/2                | 1/2              | 1/2                | 2-1/2                | 3      | 104304                 | 69.16    | 104324               | 92.04    |
| 5/8                | 5/8              | 5/8                | 2-3/4                | 3      | 104306                 | 85.60    | 104326               | 129.03   |
| 3/4                | 3/4              | 3/4                | 2-7/8                | 3      | 104308                 | 106.38   | 104328               | 146.37   |
| 7/8                | 3/4              | 7/8                | 3-1/8                | 3      | 104310                 | 124.75   | 104330               | 168.89   |
| 1                  | 1                | 1                  | 3-3/4                | 3      | 104312                 | 148.26   | 104332               | 204.87   |

## Regular Length Fine Pitch Rougher HSCO



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ | TIAN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |                      |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 3      | 104150                 | 41.99    | 104202               | 57.22    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 3      | 104152                 | 41.99    | 104204               | 60.41    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 4      | 104154                 | 41.98    | 104206               | 60.42    |
| 7/16               | 3/8              | 1                  | 2-11/16              | 4      | 104156                 | 57.65    | 104208               | 77.90    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 4      | 104158                 | 57.67    | 104210               | 86.93    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 4      | 104160                 | 71.33    | 104212               | 104.29   |
| 3/4                | 3/4              | 1-5/8              | 3-7/8                | 4      | 104162                 | 88.74    | 104214               | 127.43   |
| 7/8                | 3/4              | 1-7/8              | 4-1/8                | 5      | 104164                 | 109.82   | 104216               | 171.19   |
| 1                  | 1                | 2                  | 4-1/2                | 5      | 104166                 | 128.38   | 104218               | 193.66   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 6      | 104168                 | 208.12   | 104220               | 266.62   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 6      | 104170                 | 278.76   | 104222               | 400.18   |
| 2                  | 1-1/4            | 2                  | 4-1/2                | 6      | 104172                 | 334.84   | 104224               | 686.22   |

## Long Length Fine Pitch Rougher HSCO



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ | TIAN Coated Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|----------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |                      |          |
| 1/2                | 1/2              | 2                  | 4                    | 4      | 104250                 | 75.21    | 104266               | 104.42   |
| 5/8                | 5/8              | 2-1/2              | 4-5/8                | 4      | 104252                 | 102.97   | 104268               | 144.01   |
| 3/4                | 3/4              | 3                  | 5-1/4                | 4      | 104254                 | 110.96   | 104270               | 166.96   |
| 7/8                | 7/8              | 3-1/2              | 5-3/4                | 5      | 104256                 | 134.76   | 104272               | 192.34   |
| 1                  | 1                | 4                  | 6-1/2                | 5      | 104258                 | 172.80   | 104274               | 254.23   |
| 1-1/4              | 1-1/4            | 4                  | 6-1/2                | 6      | 104260                 | 254.73   | 104276               | 329.55   |
| 1-1/2              | 1-1/4            | 4                  | 6-1/2                | 6      | 104262                 | 302.34   | 104278               | 474.18   |
| 2                  | 1-1/4            | 4                  | 6-1/2                | 6      | 104264                 | 466.74   | 104280               | 621.48   |

## Rougher Finisher HSCO



Tools are finishing end mills with chipbreakers.

- Prevents chattering while achieving good chip control and high efficiency
- Centre cutting



Speeds & Feeds > P. A45

| Cutting Dia. (in.) | Shank Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Flutes | Bright Finish Code No. | Price \$ |
|--------------------|------------------|--------------------|----------------------|--------|------------------------|----------|
| <b>Inch</b>        |                  |                    |                      |        |                        |          |
| 1/4                | 3/8              | 5/8                | 2-7/16               | 4      | 103550                 | 42.73    |
| 5/16               | 3/8              | 3/4                | 2-1/2                | 4      | 103551                 | 42.73    |
| 3/8                | 3/8              | 3/4                | 2-1/2                | 4      | 103552                 | 42.73    |
| 7/16               | 3/8              | 1                  | 2-11/16              | 4      | 103553                 | 57.67    |
| 1/2                | 1/2              | 1-1/4              | 3-1/4                | 4      | 103554                 | 57.67    |
| 5/8                | 5/8              | 1-5/8              | 3-3/4                | 4      | 103555                 | 71.35    |
| 3/4                | 3/4              | 1-5/8              | 3-3/4                | 4      | 103556                 | 88.74    |
| 7/8                | 3/4              | 1-7/8              | 4-1/8                | 5      | 103557                 | 114.11   |
| 1                  | 1                | 2                  | 4-1/2                | 5      | 103559                 | 128.38   |
| 1-1/4              | 1-1/4            | 2                  | 4-1/2                | 6      | 103560                 | 254.57   |
| 1-1/2              | 1-1/4            | 2                  | 4-1/2                | 6      | 103561                 | 309.10   |
| 2                  | 1-1/4            | 2                  | 4-1/2                | 6      | 103562                 | 438.92   |

## High Speed Steel Tapered End Mills

- Made from Premium-Grade High Speed Steel
- End cutting
- Weldon flat



| Angle Per Side | Tool No. | Tip Dia. (in.) | Length Of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Code No. | Price \$ |
|----------------|----------|----------------|---------------------|------------------|----------------------|----------|----------|
| <b>Inch</b>    |          |                |                     |                  |                      |          |          |
| <b>1/2°</b>    |          |                |                     |                  |                      |          |          |
|                | AX103    | 3/32           | 3/4                 | 3/8              | 2-7/8                | 154200   | 36.11    |
|                | AX105    | 3/32           | 1-1/4               | 3/8              | 3-1/4                | 154201   | 41.17    |
|                | AX203    | 1/8            | 3/4                 | 3/8              | 2-7/8                | 154202   | 36.11    |
|                | AX305    | 3/16           | 1-1/4               | 3/8              | 3-1/4                | 154203   | 44.12    |
|                | AX405    | 1/4            | 1-1/4               | 3/8              | 3-1/4                | 154204   | 46.45    |
|                | AX409    | 1/4            | 2-1/4               | 1/2              | 4-1/4                | 154205   | 66.56    |
|                | AX609    | 3/8            | 2-1/4               | 1/2              | 4-1/4                | 154206   | 73.40    |
| <b>1°</b>      |          |                |                     |                  |                      |          |          |
|                | A102     | 3/32           | 1/2                 | 3/8              | 2-5/8                | 154207   | 34.20    |
|                | A103     | 3/32           | 3/4                 | 3/8              | 2-7/8                | 154208   | 36.63    |
|                | A201     | 1/8            | 1/4                 | 3/8              | 2-5/8                | 154209   | 32.76    |
|                | A203     | 1/8            | 3/4                 | 3/8              | 2-7/8                | 154210   | 36.63    |
|                | A204     | 1/8            | 1                   | 3/8              | 2-7/8                | 154211   | 40.75    |
|                | A303     | 3/16           | 3/4                 | 3/8              | 2-7/8                | 154212   | 37.14    |
|                | A305     | 3/16           | 1-1/4               | 3/8              | 3-1/4                | 154213   | 44.52    |
|                | A403     | 1/4            | 3/4                 | 3/8              | 2-7/8                | 154214   | 37.43    |
|                | A405     | 1/4            | 1-1/4               | 3/8              | 3-1/4                | 154215   | 46.70    |
|                | A409     | 1/4            | 2-1/4               | 1/2              | 4-1/8                | 154216   | 70.82    |
|                | A605     | 3/8            | 1-1/4               | 1/2              | 3-1/4                | 154217   | 56.76    |
|                | A609     | 3/8            | 2-1/4               | 1/2              | 4-1/4                | 154218   | 78.94    |
|                | A805     | 1/2            | 1-1/4               | 1/2              | 3-1/4                | 154219   | 72.74    |
|                | A809     | 1/2            | 2-1/4               | 1/2              | 4-1/4                | 154220   | 89.40    |
|                | A813     | 1/2            | 3-1/4               | 1/2              | 5-1/2                | 154221   | 110.83   |
| <b>1-1/2°</b>  |          |                |                     |                  |                      |          |          |
|                | AAX203   | 1/8            | 3/4                 | 3/8              | 2-7/8                | 154222   | 37.14    |
|                | AAX405   | 1/4            | 1-1/4               | 3/8              | 3-1/4                | 154223   | 46.93    |
| <b>2°</b>      |          |                |                     |                  |                      |          |          |
|                | B103     | 3/32           | 3/4                 | 3/8              | 2-7/8                | 154225   | 37.29    |
|                | B105     | 3/32           | 1-1/4               | 3/8              | 3-1/4                | 154226   | 42.30    |
|                | B204     | 1/8            | 1                   | 3/8              | 2-7/8                | 154227   | 42.20    |
|                | B303     | 3/16           | 3/4                 | 3/8              | 2-7/8                | 154228   | 37.80    |
|                | B305     | 3/16           | 1-1/4               | 3/8              | 3-1/4                | 154229   | 45.66    |
|                | B403     | 1/4            | 3/4                 | 3/8              | 2-7/8                | 154230   | 38.07    |
|                | B405     | 1/4            | 1-1/4               | 3/8              | 3-1/4                | 154231   | 47.20    |
|                | B409     | 1/4            | 2-1/4               | 1/2              | 4-1/4                | 154232   | 74.04    |
|                | B413     | 1/4            | 3-1/4               | 1/2              | 5-1/2                | 154233   | 109.92   |
|                | B605     | 3/8            | 1-1/4               | 1/2              | 3-1/4                | 154234   | 68.49    |
|                | B609     | 3/8            | 2-1/4               | 1/2              | 4-1/4                | 154235   | 85.91    |
|                | B805     | 1/2            | 1-1/4               | 1/2              | 3-1/4                | 154236   | 73.77    |
|                | B809     | 1/2            | 2-1/4               | 1/2              | 4-1/4                | 154237   | 93.12    |
| <b>3°</b>      |          |                |                     |                  |                      |          |          |
|                | C104     | 3/32           | 1                   | 3/8              | 2-7/8                | 154238   | 41.41    |
|                | C106     | 3/32           | 1-1/4               | 3/8              | 3-1/4                | 154239   | 44.89    |
|                | C203     | 1/8            | 3/4                 | 3/8              | 2-7/8                | 154240   | 37.92    |
|                | C204     | 1/8            | 1                   | 3/8              | 2-7/8                | 154241   | 42.44    |
|                | C303     | 3/16           | 3/4                 | 3/8              | 2-7/8                | 154242   | 38.71    |
|                | C305     | 3/16           | 1-1/4               | 3/8              | 3-1/4                | 154243   | 46.93    |
|                | C403     | 1/4            | 3/4                 | 3/8              | 2-7/8                | 154244   | 40.50    |
|                | C405     | 1/4            | 1-1/4               | 3/8              | 3-1/4                | 154245   | 47.87    |
|                | C409     | 1/4            | 2-1/4               | 1/2              | 4-1/4                | 154246   | 83.09    |
|                | C605     | 3/8            | 1-1/4               | 1/2              | 3-1/4                | 154247   | 71.21    |
|                | C805     | 1/2            | 1-1/4               | 1/2              | 3-1/4                | 154248   | 76.51    |
|                | C809     | 1/2            | 2-1/4               | 5/8              | 4-3/8                | 154249   | 110.91   |
| <b>5°</b>      |          |                |                     |                  |                      |          |          |
|                | E004     | 1/16           | 1                   | 3/8              | 2-7/8                | 154250   | 44.89    |
|                | E103     | 3/32           | 3/4                 | 3/8              | 2-7/8                | 154251   | 39.62    |
|                | E104     | 3/32           | 1                   | 3/8              | 2-7/8                | 154252   | 42.03    |
|                | E106     | 3/32           | 1-1/2               | 3/8              | 3-1/4                | 154253   | 45.91    |
|                | E203     | 1/8            | 3/4                 | 3/8              | 2-7/8                | 154254   | 38.43    |
|                | E204     | 1/8            | 1                   | 3/8              | 2-7/8                | 154255   | 42.59    |
|                | E205     | 1/8            | 1-1/4               | 3/8              | 3-1/4                | 154256   | 45.66    |
|                | E206     | 1/8            | 1-1/2               | 3/8              | 3-1/4                | 154257   | 52.77    |
|                | E208     | 1/8            | 2                   | 1/2              | 3-7/8                | 154258   | 69.14    |
|                | E210B    | 1/8            | 2-1/2               | 1/2              | 4-1/2                | 154259   | 90.54    |
|                | E303     | 3/16           | 3/4                 | 3/8              | 2-7/8                | 154260   | 39.37    |
|                | E305     | 3/16           | 1-1/4               | 1/2              | 3-1/4                | 154261   | 49.17    |

| Angle Per Side | Tool No.     | Tip Dia. | Length Of Cut | Shank Dia. | Overall Length | Code No. | Price \$ |
|----------------|--------------|----------|---------------|------------|----------------|----------|----------|
| <b>5°</b>      |              |          |               |            |                |          |          |
|                | E403         | 1/4      | 3/4           | 3/8        | 2-7/8          | 154262   | 41.95    |
|                | E405         | 1/4      | 1-1/4         | 1/2        | 3-1/4          | 154264   | 51.35    |
|                | E409A        | 1/4      | 2-1/4         | 5/8        | 4-1/2          | 154265   | 99.73    |
|                | E605         | 3/8      | 1-1/4         | 1/2        | 3-1/4          | 154266   | 75.84    |
|                | E609         | 3/8      | 2-1/4         | 3/4        | 4-3/4          | 154267   | 115.84   |
|                | E613         | 3/8      | 3-1/4         | 3/4        | 5-1/2          | 154268   | 180.84   |
|                | E805         | 1/2      | 1-1/4         | 1/2        | 3-1/4          | 154269   | 91.84    |
|                | E809         | 1/2      | 2-1/4         | 3/4        | 4-1/2          | 154270   | 147.96   |
| <b>7°</b>      |              |          |               |            |                |          |          |
|                | G004         | 1/16     | 1             | 3/8        | 2-7/8          | 154271   | 46.93    |
|                | G104         | 3/32     | 1             | 3/8        | 2-7/8          | 154272   | 43.73    |
|                | G203         | 1/8      | 3/4           | 3/8        | 2-7/8          | 154273   | 39.87    |
|                | G206         | 1/8      | 1-1/2         | 1/2        | 3-1/4          | 154274   | 53.16    |
|                | G305         | 3/16     | 1-1/4         | 1/2        | 3-1/8          | 154275   | 59.62    |
|                | G403         | 1/4      | 3/4           | 1/2        | 3              | 154276   | 53.16    |
|                | G405         | 1/4      | 1-1/4         | 1/2        | 3-1/4          | 154277   | 61.55    |
|                | G409         | 1/4      | 2-1/4         | 3/4        | 4-1/2          | 154278   | 130.01   |
|                | G609         | 3/8      | 2-1/4         | 3/4        | 4-1/2          | 154279   | 166.66   |
| <b>10°</b>     |              |          |               |            |                |          |          |
|                | J102         | 3/32     | 1/2           | 3/8        | 2-5/8          | 154280   | 40.75    |
|                | J106         | 3/32     | 1-1/2         | 1/2        | 3-1/2          | 154281   | 84.88    |
|                | J203         | 1/8      | 3/4           | 3/8        | 2-7/8          | 154282   | 43.99    |
|                | J205         | 1/8      | 1-1/4         | 1/2        | 3-1/4          | 154283   | 66.17    |
|                | J309         | 3/16     | 2-1/4         | 3/4        | 4-1/2          | 154284   | 178.41   |
|                | J403         | 1/4      | 3/4           | 1/2        | 2-7/8          | 154285   | 54.07    |
|                | J405         | 1/4      | 1-1/4         | 1/2        | 3-1/4          | 154286   | 85.53    |
|                | J409         | 1/4      | 2-1/4         | 3/4        | 4-1/2          | 154287   | 185.49   |
|                | J605         | 3/8      | 1-1/4         | 5/8        | 3-1/2          | 154288   | 105.00   |
|                | J805         | 1/2      | 1-1/4         | 3/4        | 3-1/2          | 154289   | 125.28   |
| <b>15°</b>     |              |          |               |            |                |          |          |
|                | P103         | 3/32     | 3/4           | 1/2        | 2-3/4          | 154290   | 54.41    |
|                | P106         | 3/32     | 1-1/2         | 3/4        | 3-3/4          | 154291   | 106.18   |
|                | P202         | 1/8      | 1/2           | 3/8        | 2-7/8          | 154292   | 47.10    |
|                | P204         | 1/8      | 1             | 1/2        | 3              | 154293   | 68.24    |
|                | P304         | 3/16     | 1             | 1/2        | 3              | 154294   | 110.28   |
|                | P404         | 1/4      | 1             | 1/2        | 3              | 154295   | 103.60   |
|                | P406         | 1/4      | 1-1/2         | 3/4        | 3-3/4          | 154296   | 135.82   |
|                | P605         | 3/8      | 1-1/4         | 3/4        | 3-5/8          | 154297   | 143.56   |
|                | P805         | 1/2      | 1-1/4         | 3/4        | 3-1/2          | 154298   | 170.00   |
| <b>20°</b>     |              |          |               |            |                |          |          |
|                | T0002        | 1/32     | 1/2           | 3/8        | 2-1/2          | 154319   | 84.00    |
|                | T002         | 1/16     | 1/2           | 3/8        | 2-1/2          | 154320   | 67.08    |
|                | T103         | 3/32     | 3/4           | 1/2        | 2-3/4          | 154321   | 68.24    |
|                | T202         | 1/8      | 1/2           | 3/8        | 2-1/2          | 154299   | 69.03    |
|                | T204         | 1/8      | 1             | 1/2        | 3              | 154322   | 118.42   |
|                | T304         | 3/16     | 1             | 1/2        | 3              | 154323   | 126.57   |
|                | T404         | 1/4      | 1             | 1/2        | 3              | 154324   | 132.48   |
|                | T406         | 1/4      | 1-1/2         | 3/4        | 4              | 154325   | 204.72   |
|                | T504         | 5/16     | 1             | 3/4        | 3-3/8          | 154326   | 143.06   |
|                | T506         | 5/16     | 1-1/2         | 3/4        | 3-1/2          | 154327   | 211.94   |
|                | T606         | 3/8      | 1-1/2         | 3/4        | 4              | 154328   | 312.57   |
|                | T608         | 3/8      | 2             | 1          | 4-1/2          | 154329   | 418.18   |
|                | T809         | 1/2      | 2-1/4         | 1-1/4      | 4-3/4          | 154330   | 477.00   |
| <b>30°</b>     |              |          |               |            |                |          |          |
|                | U002A        | 1/16     | 1/2           | 1/2        | 2-1/2          | 154331   | 93.63    |
|                | U103         | 3/32     | 3/4           | 1/2        | 2-3/4          | 154332   | 94.93    |
|                | U202         | 1/8      | 1/2           | 1/2        | 2-1/2          | 154333   | 89.13    |
|                | U204B        | 1/8      | 1             | 1/2        | 3-1/8          | 154334   | 192.08   |
|                | U204A        | 1/8      | 1             | 5/8        | 3-1/8          | 154335   | 192.08   |
|                | U404         | 1/4      | 1             | 3/4        | 3-1/2          | 154336   | 215.69   |
|                | U406         | 1/4      | 1-1/2         | 1          | 4-1/8          | 154337   | 374.33   |
|                | U605         | 3/8      | 1-1/4         | 1          | 4              | 154338   | 370.83   |
|                | U606         | 3/8      | 1-1/2         | 1          | 4-1/4          | 154339   | 412.91   |
|                | U805         | 1/2      | 1-1/4         | 1          | 4              | 154340   | 408.52   |
|                | U806         | 1/2      | 1-1/2         | 1          | 4-1/4          | 154341   | 440.37   |
| <b>35°</b>     |              |          |               |            |                |          |          |
|                | V203 (4-fl.) | 1/8      | 3/4           | 1/2        | 3              | 154342   | 250.13   |
|                | V404 (4-fl.) | 1/4      | 1             | 1          | 3-1/4          | 154344   | 322.09   |
| <b>45°</b>     |              |          |               |            |                |          |          |
|                | WA215        | 1/8      | 5/16          | 1/2        | 2-5/8          | 154345   | 106.67   |
|                | WA215 (SP)   | 1/8      | 5/16          | 1/2        | 2-5/8          | 154346   | 111.57   |
|                | WA203        | 1/8      | 3/4           | 5/8        | 3-1/4          | 154347   | 246.10   |
|                | WA203 (SP)   | 1/8      | 3/4           | 5/8        | 3-1/4          | 154348   | 250.91   |
|                | WA204B       | 1/8      | 1             | 3/4        | 3-3/4          | 154349   | 342.09   |
|                | WA204B (SP)  | 1/8      | 1             | 3/4        | 3-3/4          | 154350   | 349.94   |
|                | WA204A       | 1/8      | 1             | 1          | 3-3/4          | 154351   | 342.09   |
|                | WA204A (SP)  | 1/8      | 1             | 1          | 3-3/4          | 154352   | 349.94   |



**GS Tooling  
Shrink Fit Holders**  
Focusing on the cutting  
edge, coolant ports come  
standard!

See Pages G43-46

**Carbide Miniature Tapered End Mills**



- End cutting
- Weldon flat



| Angle Per Side | Tool No.   | Tip Dia. (in.) | Length Of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Code No. | Price \$ |
|----------------|------------|----------------|---------------------|------------------|----------------------|----------|----------|
| <b>Inch</b>    |            |                |                     |                  |                      |          |          |
| <b>1/2°</b>    |            |                |                     |                  |                      |          |          |
|                | CM-AX1001  | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154001   | 73.64    |
|                | CM-AX1002  | 1/32           | 1/2                 | 1/8              | 2-1/2                | 154002   | 79.45    |
|                | CM-AX011   | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154003   | 73.64    |
|                | CM-AX012   | 3/64           | 1/2                 | 1/8              | 2-1/2                | 154004   | 79.45    |
|                | CM-AX002   | 1/16           | 1/2                 | 1/8              | 2-1/2                | 154005   | 79.45    |
|                | CM-AX003   | 1/16           | 3/4                 | 1/8              | 2-1/2                | 154006   | 85.26    |
|                | CM-AX004   | 1/16           | 1                   | 1/8              | 2-1/2                | 154007   | 91.08    |
|                | CM-AX022   | 5/64           | 1/2                 | 1/8              | 2-1/2                | 154008   | 73.64    |
|                | CM-AX023   | 5/64           | 3/4                 | 1/8              | 2-1/2                | 154009   | 79.45    |
|                | CM-AX024   | 5/64           | 1                   | 1/8              | 2-1/2                | 154010   | 85.26    |
| <b>1°</b>      |            |                |                     |                  |                      |          |          |
|                | CM-A0001   | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154011   | 75.57    |
|                | CM-A0002   | 1/32           | 1/2                 | 1/8              | 2-1/2                | 154012   | 81.39    |
|                | CM-A001    | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154013   | 75.57    |
|                | CM-A012    | 3/64           | 1/2                 | 1/8              | 2-1/2                | 154014   | 81.39    |
|                | CM-A002    | 1/16           | 1/2                 | 1/8              | 2-1/2                | 154015   | 81.39    |
|                | CM-A003    | 1/16           | 3/4                 | 1/8              | 2-1/2                | 154016   | 87.20    |
|                | CM-A004    | 1/16           | 1                   | 1/8              | 2-1/2                | 154017   | 93.01    |
|                | CM-A022    | 5/64           | 1/2                 | 1/8              | 2-1/2                | 154018   | 75.57    |
|                | CM-A023    | 5/64           | 3/4                 | 1/8              | 2-1/2                | 154019   | 81.39    |
|                | CM-A024    | 5/64           | 1                   | 1/8              | 2-1/2                | 154020   | 87.20    |
| <b>1-1/2°</b>  |            |                |                     |                  |                      |          |          |
|                | CM-AAX1001 | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154022   | 77.51    |
|                | CM-AAX1002 | 1/32           | 1/2                 | 1/8              | 2-1/2                | 154023   | 83.32    |
|                | CM-AAX011  | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154024   | 77.51    |
|                | CM-AAX012  | 3/64           | 1/2                 | 1/8              | 2-1/2                | 154025   | 83.32    |
|                | CM-AAX002  | 1/16           | 1/2                 | 1/8              | 2-1/2                | 154026   | 83.32    |
|                | CM-AAX003  | 1/16           | 3/4                 | 1/8              | 2-1/2                | 154027   | 89.13    |
|                | CM-AAX004  | 1/16           | 1                   | 3/16             | 3                    | 154028   | 94.96    |
|                | CM-AAX022  | 5/64           | 1/2                 | 1/8              | 2-1/2                | 154029   | 77.51    |
|                | CM-AAX023  | 5/64           | 3/4                 | 1/8              | 2-1/2                | 154030   | 83.32    |
|                | CM-AAX024  | 5/64           | 1                   | 3/16             | 3                    | 154032   | 89.13    |
| <b>2°</b>      |            |                |                     |                  |                      |          |          |
|                | CM-B0001   | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154033   | 79.45    |
|                | CM-B0002   | 1/32           | 1/2                 | 1/8              | 2-1/2                | 154034   | 85.26    |
|                | CM-B011    | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154035   | 79.45    |
|                | CM-B012    | 3/64           | 1/2                 | 1/8              | 2-1/2                | 154036   | 85.26    |
|                | CM-B002    | 1/16           | 1/2                 | 1/8              | 2-1/2                | 154037   | 85.26    |
|                | CM-B003    | 1/16           | 3/4                 | 1/8              | 2-1/2                | 154038   | 91.08    |
|                | CM-B004    | 1/16           | 1                   | 3/16             | 3                    | 154039   | 104.65   |
|                | CM-B022    | 5/64           | 1/2                 | 1/8              | 2-1/2                | 154040   | 79.45    |
|                | CM-B023    | 5/64           | 3/4                 | 3/16             | 3                    | 154041   | 93.01    |
|                | CM-B024    | 5/64           | 1                   | 3/16             | 3                    | 154042   | 98.84    |
| <b>3°</b>      |            |                |                     |                  |                      |          |          |
|                | CM-C0001   | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154043   | 81.39    |
|                | CM-C0002   | 1/32           | 1/2                 | 1/8              | 2-1/2                | 154044   | 87.20    |
|                | CM-C001    | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154045   | 81.39    |
|                | CM-C012    | 3/64           | 1/2                 | 1/8              | 2-1/2                | 154046   | 87.20    |
|                | CM-C002    | 1/16           | 1/2                 | 1/8              | 2-1/2                | 154047   | 87.20    |
|                | CM-C003    | 1/16           | 3/4                 | 3/16             | 3                    | 154048   | 100.77   |
|                | CM-C004    | 1/16           | 1                   | 3/16             | 3                    | 154049   | 106.58   |
|                | CM-C022    | 5/64           | 1/2                 | 3/16             | 3                    | 154050   | 87.20    |
|                | CM-C023    | 5/64           | 3/4                 | 3/16             | 3                    | 154051   | 94.96    |
|                | CM-C024    | 5/64           | 1                   | 3/16             | 3                    | 154052   | 100.77   |
| <b>5°</b>      |            |                |                     |                  |                      |          |          |
|                | CM-E0001   | 1/32           | 1/4                 | 1/8              | 2-1/2                | 154053   | 83.32    |
|                | CM-E0002   | 1/32           | 1/2                 | 3/16             | 3                    | 154054   | 96.89    |
|                | CM-E011    | 3/64           | 1/4                 | 1/8              | 2-1/2                | 154055   | 83.32    |
|                | CM-E012    | 3/64           | 1/2                 | 3/16             | 3                    | 154056   | 96.89    |
|                | CM-E002    | 1/16           | 1/2                 | 1/4              | 2-1/2                | 154057   | 102.71   |
|                | CM-E003    | 1/16           | 3/4                 | 1/4              | 2-1/2                | 154058   | 108.52   |
|                | CM-E004    | 1/16           | 1                   | 1/4              | 2-1/2                | 154059   | 114.33   |
|                | CM-E022    | 5/64           | 1/2                 | 3/16             | 3                    | 154060   | 91.08    |
|                | CM-E023    | 5/64           | 3/4                 | 1/4              | 2-1/2                | 154061   | 104.65   |
|                | CM-E024    | 5/64           | 1                   | 3/8              | 2-1/2                | 154062   | 118.21   |



## Carbide Tapered End Mills

- End cutting
- Weldon flat

| Angle Per Side | Tool No. | Tip Dia. (in.) | Length Of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Code No. | Price \$      |
|----------------|----------|----------------|---------------------|------------------|----------------------|----------|---------------|
| <b>Inch</b>    |          |                |                     |                  |                      |          |               |
| <b>1/2°</b>    |          |                |                     |                  |                      |          |               |
|                | AX103C   | 3/32           | 3/4                 | 1/4              | 2-1/2                | 154063   | <b>70.82</b>  |
|                | AX203C   | 1/8            | 3/4                 | 1/4              | 2-1/2                | 154064   | <b>71.68</b>  |
|                | AX205C   | 1/8            | 1-1/4               | 1/4              | 3-1/2                | 154065   | <b>80.87</b>  |
|                | AX305C   | 3/16           | 1-1/4               | 1/4              | 3-1/2                | 154067   | <b>86.83</b>  |
|                | AX405C   | 1/4            | 1-1/4               | 3/8              | 3-1/2                | 154069   | <b>99.19</b>  |
| <b>1°</b>      |          |                |                     |                  |                      |          |               |
|                | A102C    | 3/32           | 1/2                 | 1/4              | 2                    | 154070   | <b>65.16</b>  |
|                | A104C    | 3/32           | 1                   | 1/4              | 3                    | 154071   | <b>72.93</b>  |
|                | A203C    | 1/8            | 3/4                 | 1/4              | 2-1/2                | 154072   | <b>76.19</b>  |
|                | A204C    | 1/8            | 1                   | 1/4              | 3                    | 154073   | <b>77.09</b>  |
|                | A206C    | 1/8            | 1-1/2               | 1/4              | 3-1/2                | 154074   | <b>87.26</b>  |
|                | A303C    | 3/16           | 3/4                 | 1/4              | 2-1/2                | 154075   | <b>77.90</b>  |
|                | A305C    | 3/16           | 1-1/4               | 1/4              | 3-1/2                | 154076   | <b>87.67</b>  |
|                | A308C    | 3/16           | 2                   | 3/8              | 4                    | 154077   | <b>121.05</b> |
|                | A403C    | 1/4            | 3/4                 | 3/8              | 3                    | 154078   | <b>86.14</b>  |
|                | A405C    | 1/4            | 1-1/4               | 3/8              | 3-1/2                | 154079   | <b>102.91</b> |
|                | A409C    | 1/4            | 2-1/4               | 3/8              | 4                    | 154080   | <b>147.73</b> |
| <b>1-1/2°</b>  |          |                |                     |                  |                      |          |               |
|                | AAX104C  | 3/32           | 1                   | 1/4              | 3                    | 154081   | <b>75.51</b>  |
|                | AAX204C  | 1/8            | 1                   | 1/4              | 3                    | 154082   | <b>77.90</b>  |
|                | AAX206C  | 1/8            | 1-1/2               | 1/4              | 3-1/2                | 154083   | <b>92.10</b>  |
|                | AAX305C  | 3/16           | 1-1/4               | 3/8              | 3-1/2                | 154084   | <b>92.25</b>  |
|                | AAX308C  | 3/16           | 2                   | 3/8              | 4                    | 154085   | <b>143.31</b> |
|                | AAX403C  | 1/4            | 3/4                 | 3/8              | 3                    | 154086   | <b>145.23</b> |
|                | AAX405C  | 1/4            | 1-1/4               | 3/8              | 3-1/2                | 154087   | <b>103.44</b> |
| <b>2°</b>      |          |                |                     |                  |                      |          |               |
|                | B103C    | 3/32           | 3/4                 | 1/4              | 2-1/2                | 154088   | <b>75.33</b>  |
|                | B104C    | 3/32           | 1                   | 1/4              | 3                    | 154089   | <b>78.60</b>  |
|                | B203C    | 1/8            | 3/4                 | 1/4              | 2-1/2                | 154090   | <b>77.63</b>  |
|                | B206C    | 1/8            | 1-1/2               | 1/4              | 3-1/2                | 154091   | <b>96.93</b>  |
|                | B303C    | 3/16           | 3/4                 | 1/4              | 2-1/2                | 154092   | <b>79.74</b>  |
|                | B305C    | 3/16           | 1-1/4               | 3/8              | 3-1/2                | 154093   | <b>96.78</b>  |
|                | B307C    | 3/16           | 1-3/4               | 3/8              | 3-1/2                | 154094   | <b>112.97</b> |
|                | B403C    | 1/4            | 3/4                 | 3/8              | 3                    | 154095   | <b>92.10</b>  |
|                | B405C    | 1/4            | 1-1/4               | 3/8              | 3-1/2                | 154096   | <b>104.30</b> |
|                | B409C    | 1/4            | 2-1/4               | 1/2              | 4-1/2                | 154097   | <b>151.12</b> |
| <b>3°</b>      |          |                |                     |                  |                      |          |               |
|                | C104C    | 3/32           | 1                   | 1/4              | 3                    | 154098   | <b>78.88</b>  |
|                | C106C    | 3/32           | 1-1/2               | 1/4              | 3-1/2                | 154099   | <b>92.10</b>  |
|                | C203C    | 1/8            | 3/4                 | 1/4              | 2-1/2                | 154100   | <b>78.60</b>  |
|                | C204C    | 1/8            | 1                   | 1/4              | 2-1/2                | 154101   | <b>80.01</b>  |
|                | C206C    | 1/8            | 1-1/2               | 3/8              | 3-1/2                | 154102   | <b>101.73</b> |
|                | C209C    | 1/8            | 2-1/4               | 3/8              | 4                    | 154103   | <b>145.00</b> |
|                | C256C    | 5/32           | 1-1/2               | 3/8              | 3-1/2                | 154104   | <b>106.00</b> |
|                | C257C    | 5/32           | 1-3/4               | 3/8              | 3-1/2                | 154105   | <b>123.79</b> |
|                | C303C    | 3/16           | 3/4                 | 3/8              | 3                    | 154106   | <b>87.26</b>  |
|                | C305C    | 3/16           | 1-1/4               | 3/8              | 3-1/2                | 154107   | <b>100.44</b> |
|                | C403C    | 1/4            | 3/4                 | 3/8              | 3                    | 154108   | <b>94.50</b>  |
|                | C405C    | 1/4            | 1-1/4               | 3/8              | 3-1/2                | 154109   | <b>105.00</b> |
|                | C409C    | 1/4            | 2-1/4               | 1/2              | 4-1/2                | 154110   | <b>184.95</b> |
| <b>4°</b>      |          |                |                     |                  |                      |          |               |
|                | D104C    | 3/32           | 1                   | 1/4              | 3                    | 154111   | <b>79.46</b>  |
|                | D203C    | 1/8            | 3/4                 | 1/4              | 2-1/2                | 154112   | <b>80.56</b>  |
|                | D204C    | 1/8            | 1                   | 3/8              | 3                    | 154113   | <b>81.03</b>  |
|                | D303C    | 3/16           | 3/4                 | 3/8              | 3                    | 154114   | <b>88.43</b>  |
|                | D305C    | 3/16           | 1-1/4               | 3/8              | 3-1/2                | 154115   | <b>105.83</b> |
|                | D405C    | 1/4            | 1-1/4               | 1/2              | 3-1/2                | 154117   | <b>113.68</b> |
| <b>5°</b>      |          |                |                     |                  |                      |          |               |
|                | E103C    | 3/32           | 3/4                 | 1/4              | 3                    | 154118   | <b>82.74</b>  |
|                | E104C    | 3/32           | 1                   | 3/8              | 3                    | 154119   | <b>92.94</b>  |
|                | E106C    | 3/32           | 1-1/2               | 3/8              | 3-1/2                | 154120   | <b>104.15</b> |
|                | E203C    | 1/8            | 3/4                 | 1/4              | 3                    | 154121   | <b>79.34</b>  |
|                | E204C    | 1/8            | 1                   | 3/8              | 3                    | 154122   | <b>93.95</b>  |
|                | E206C    | 1/8            | 1-1/2               | 3/8              | 3-1/2                | 154123   | <b>104.42</b> |
|                | E303C    | 3/16           | 3/4                 | 3/8              | 3                    | 154124   | <b>94.50</b>  |
|                | E305C    | 3/16           | 1-1/4               | 1/2              | 3-1/2                | 154125   | <b>120.75</b> |
|                | E403C    | 1/4            | 3/4                 | 3/8              | 3                    | 154126   | <b>104.02</b> |
|                | E405C    | 1/4            | 1-1/4               | 1/2              | 3-1/2                | 154128   | <b>119.45</b> |
|                | E408C    | 1/4            | 2                   | 5/8              | 4                    | 154129   | <b>330.47</b> |



| Angle Per Side | Tool No. | Tip Dia. (in.) | Length Of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Code No. | Price \$        |
|----------------|----------|----------------|---------------------|------------------|----------------------|----------|-----------------|
| <b>7°</b>      |          |                |                     |                  |                      |          |                 |
|                | G104C    | 3/32           | 1                   | 3/8              | 3                    | 154130   | <b>104.59</b>   |
|                | G202C    | 1/8            | 1/2                 | 1/4              | 2-1/2                | 154131   | <b>90.80</b>    |
|                | G203C    | 1/8            | 3/4                 | 3/8              | 3                    | 154132   | <b>97.79</b>    |
|                | G204C    | 1/8            | 1                   | 3/8              | 3                    | 154133   | <b>104.30</b>   |
|                | G206C    | 1/8            | 1-1/2               | 1/2              | 3-1/2                | 154134   | <b>117.07</b>   |
|                | G253C    | 5/32           | 3/4                 | 3/8              | 2-1/2                | 154135   | <b>87.99</b>    |
|                | G305C    | 3/16           | 1-1/4               | 1/2              | 3-1/2                | 154136   | <b>131.10</b>   |
|                | G403C    | 1/4            | 3/4                 | 1/2              | 3                    | 154137   | <b>110.51</b>   |
|                | G405C    | 1/4            | 1-1/4               | 5/8              | 3-1/2                | 154138   | <b>182.06</b>   |
| <b>10°</b>     |          |                |                     |                  |                      |          |                 |
|                | J102C    | 3/32           | 1/2                 | 3/8              | 2-1/2                | 154140   | <b>90.24</b>    |
|                | J106C    | 3/32           | 1-1/2               | 5/8              | 3-1/2                | 154141   | <b>188.87</b>   |
|                | J203C    | 1/8            | 3/4                 | 3/8              | 2-1/2                | 154142   | <b>97.33</b>    |
|                | J204C    | 1/8            | 1                   | 1/2              | 3-1/2                | 154143   | <b>121.59</b>   |
|                | J205C    | 1/8            | 1-1/4               | 5/8              | 3-1/2                | 154144   | <b>192.00</b>   |
|                | J305C    | 3/16           | 1-1/4               | 5/8              | 3-1/2                | 154145   | <b>192.00</b>   |
|                | J403C    | 1/4            | 3/4                 | 1/2              | 3                    | 154146   | <b>134.11</b>   |
|                | J404C    | 1/4            | 1                   | 5/8              | 3                    | 154147   | <b>178.96</b>   |
| <b>15°</b>     |          |                |                     |                  |                      |          |                 |
|                | P0003C   | 1/32           | 3/4                 | 1/2              | 3                    | 154300   | <b>163.89</b>   |
|                | P001C    | 1/16           | 1/4                 | 1/4              | 2                    | 154301   | <b>89.81</b>    |
|                | P103C    | 3/32           | 3/4                 | 1/2              | 3                    | 154302   | <b>123.32</b>   |
|                | P204C    | 1/8            | 1                   | 5/8              | 3                    | 154148   | <b>315.65</b>   |
|                | P304CA   | 3/16           | 1                   | 3/4              | 3                    | 154149   | <b>375.50</b>   |
|                | P404CA   | 1/4            | 1                   | 3/4              | 3                    | 154150   | <b>384.79</b>   |
|                | P606C    | 3/8            | 1-1/2               | 3/4              | 4                    | 154303   | <b>650.38</b>   |
|                | P805C    | 1/2            | 1-1/4               | 3/4              | 3-1/2                | 154304   | <b>605.31</b>   |
|                | P809C    | 1/2            | 2-1/4               | 1                | 4-1/4                | 154305   | <b>1,335.43</b> |
| <b>20°</b>     |          |                |                     |                  |                      |          |                 |
|                | T0001C   | 1/32           | 1/4                 | 1/4              | 2                    | 154306   | <b>87.98</b>    |
|                | T001C    | 1/16           | 1/4                 | 1/4              | 2                    | 154307   | <b>93.55</b>    |
|                | T002C    | 1/16           | 1/2                 | 1/2              | 3                    | 154308   | <b>121.47</b>   |
|                | T102C    | 3/32           | 1/2                 | 1/2              | 3                    | 154309   | <b>127.28</b>   |
|                | T202C    | 1/8            | 1/2                 | 1/2              | 3                    | 154310   | <b>142.61</b>   |
|                | T304CB   | 3/16           | 1                   | 1/2              | 3                    | 154311   | <b>405.51</b>   |
|                | T404CB   | 1/4            | 1                   | 1/2              | 3                    | 154312   | <b>477.51</b>   |
| <b>30°</b>     |          |                |                     |                  |                      |          |                 |
|                | U001C    | 1/16           | 1/4                 | 3/8              | 2-1/2                | 154313   | <b>119.62</b>   |
|                | U101C    | 3/32           | 1/4                 | 3/8              | 2-1/2                | 154314   | <b>124.86</b>   |
|                | U201C    | 1/8            | 1/4                 | 1/2              | 3                    | 154315   | <b>143.46</b>   |
|                | U202CB   | 1/8            | 1/2                 | 1/2              | 2-1/2                | 154316   | <b>316.68</b>   |
|                | U404C    | 1/4            | 1                   | 3/4              | 3                    | 154317   | <b>865.34</b>   |
| <b>45°</b>     |          |                |                     |                  |                      |          |                 |
|                | WA215CB  | 1/8            | 7/16                | 1/2              | 2-1/2                | 154318   | <b>351.06</b>   |

## ASIMETO

## Dial Indicators

See Page F12



## 2 & 3-Flute Square End, 2-Flute Corner Radius, & 2-Flute Miniature Bright Carbide End Mills

### Slot Milling — 2-Flute Regular Length, 2-Flute Stub Length, 2-Flute Double End Reg & Stub Length, 2-Flute Corner Radius

• For side milling, increase Feeds 25% or more

#### 2-Flute Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 2-fl. Long Length
- Reduce Speeds and Feeds 50% for 2-fl. Extra Long Length

#### 3-Flute Regular Length

- Increase Speeds and Feeds 20% for 3-fl. Reg. Length

| Hardness      |      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                   |        | 30 to 38 HRC                                       |        | 38 to 45 HRC  |        |  |        |                 |        |
|---------------|------|---|--------|-------------------------------|--------|--|--------|---|--------|--|--------|-----------------|--------|
| Work Material |      | Cast Iron                                       |        | Mild Steels,<br>Carbon Steels |        | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Aluminum Alloys |        |
| Depth of Cut  |      |   |        | Ad                            |        | $D < 1/8$ 0.3D<br>$1/8 \leq D$ 0.5D                |        |   |        |  |        |                 |        |
|               |      |   |        |                               |        |  |        |   |        |  |        |                 |        |
| Dia. (in)     | (mm) | 170 SFM   |        | 155 SFM                       |        | 130 SFM  |        | 110 SFM   |        | 90 SFM   |        | 390 SFM         |        |
|               |      | Speed   | Feed   | Speed                         | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   |
|               |      | RPM   | in/min | RPM                           | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min |
| 1/32          | 0.5  | 32,000  | 6.6    | 30,000                        | 4.5    | 25,230   | 1.9    | 21,350  | 1.4    | 16,890   | 1.2    | 50,000          | 9.4    |
|               | 0.8  | 20,790  | 6.6    | 18,950                        | 4.5    | 15,900   | 1.9    | 13,450  | 1.4    | 10,640   | 1.2    | 47,700          | 9.4    |
|               | 1    | 16,800  | 6.6    | 15,000                        | 4.5    | 12,600   | 1.9    | 10,680  | 1.4    | 8,400  | 1.2    | 37,800          | 9.4    |
| 3/64          |      | 15,225  | 6.6    | 13,590                        | 4.5    | 11,430   | 1.9    | 9,660   | 1.4    | 7,595  | 1.2    | 34,140          | 9.4    |
| 1/16          | 1.5  | 11,970  | 6.6    | 10,660                        | 4.6    | 9,000  | 2.0    | 7,540   | 1.4    | 5,925  | 1.2    | 26,520          | 9.4    |
| 5/64          | 2    | 8,705   | 6.6    | 7,730                         | 4.7    | 6,570  | 2.1    | 5,415   | 1.4    | 4,260  | 1.2    | 18,900          | 9.4    |
| 3/32          |      | 7,480   | 6.8    | 6,635                         | 4.7    | 5,650  | 2.4    | 4,650   | 1.4    | 3,645  | 1.2    | 16,305          | 9.4    |
| 7/64          |      | 6,335   | 6.9    | 5,610                         | 4.7    | 4,790  | 2.6    | 3,935   | 1.4    | 3,075  | 1.2    | 13,925          | 9.4    |
| 1/8           | 3    | 5,445   | 7.1    | 4,815                         | 4.7    | 4,125  | 3.0    | 3,375   | 1.4    | 2,640  | 1.2    | 12,060          | 10.3   |
| 9/64          |      | 4,870   | 7.3    | 4,310                         | 4.7    | 3,700  | 3.4    | 3,020   | 1.4    | 2,380  | 1.2    | 10,845          | 12.1   |
| 5/32          | 4    | 4,300   | 7.5    | 3,815                         | 4.7    | 3,270  | 3.7    | 2,660   | 1.4    | 2,115  | 1.2    | 9,630           | 14.0   |
| 11/64         |      | 3,945   | 7.6    | 3,490                         | 4.7    | 2,990  | 3.8    | 2,440   | 1.4    | 1,940  | 1.2    | 8,835           | 14.2   |
| 3/16          |      | 3,615   | 7.7    | 3,180                         | 4.7    | 2,735  | 3.8    | 2,225   | 1.4    | 1,775  | 1.2    | 8,075           | 14.2   |
| 13/64         | 5    | 3,320   | 8.0    | 2,920                         | 4.7    | 2,505  | 3.8    | 2,040   | 1.4    | 1,630  | 1.2    | 7,415           | 14.2   |
| 7/32          |      | 3,080   | 8.6    | 2,730                         | 4.7    | 2,345  | 3.8    | 1,895   | 1.4    | 1,510  | 1.2    | 6,915           | 14.2   |
| 1/4           | 6    | 2,690   | 9.5    | 2,400                         | 4.7    | 2,060  | 3.8    | 1,660   | 1.4    | 1,320  | 1.2    | 6,070           | 14.2   |
| 9/32          |      | 2,405   | 10.2   | 2,140                         | 4.7    | 1,845  | 3.8    | 1,490   | 1.4    | 1,185  | 1.2    | 5,430           | 14.2   |
| 5/16          | 8    | 2,115   | 10.8   | 1,875                         | 4.7    | 1,630  | 3.8    | 1,330   | 1.4    | 1,055  | 1.2    | 4,785           | 14.2   |
| 11/32         |      | 1,940   | 10.9   | 1,725                         | 4.7    | 1,485  | 3.8    | 1,220   | 1.4    | 970  | 1.2    | 4,385           | 14.2   |
| 3/8           |      | 1,775   | 10.9   | 1,580                         | 4.7    | 1,340  | 3.8    | 1,120   | 1.4    | 885  | 1.2    | 4,005           | 14.2   |
| 13/32         | 10   | 1,630   | 10.9   | 1,455                         | 4.7    | 1,230  | 3.8    | 1,035   | 1.4    | 815  | 1.2    | 3,680           | 14.2   |
| 7/16          |      | 1,510   | 10.9   | 1,360                         | 4.7    | 1,155  | 3.8    | 965   | 1.4    | 755  | 1.2    | 3,440           | 14.2   |
| 1/2           | 12   | 1,310   | 10.9   | 1,190                         | 4.7    | 1,020  | 3.8    | 840   | 1.4    | 660  | 1.2    | 3,010           | 14.2   |
| 9/16          |      | 1,175   | 10.9   | 1,060                         | 4.7    | 905  | 3.8    | 740   | 1.4    | 585  | 1.2    | 2,645           | 14.2   |
| 5/8           | 16   | 1,080   | 11.1   | 960                           | 4.7    | 815  | 3.8    | 670   | 1.6    | 520  | 1.2    | 2,355           | 14.2   |
| 11/16         |      | 980   | 11.1   | 870                           | 4.7    | 740  | 3.8    | 610   | 1.7    | 470  | 1.2    | 2,160           | 14.2   |
| 3/4           | 20   | 880   | 11.1   | 780                           | 4.7    | 665  | 3.8    | 545   | 1.7    | 425  | 1.2    | 1,920           | 14.2   |
| 7/8           | 22   | 765   | 11.1   | 675                           | 4.7    | 580  | 3.8    | 480   | 1.7    | 370  | 1.2    | 1,660           | 14.2   |
| 1             | 25   | 670   | 10.9   | 590                           | 4.7    | 500  | 3.8    | 420   | 1.7    | 330  | 1.2    | 1,475           | 14.2   |

## Slot Milling — 2-Flute Miniature End Mills

| Hardness      |  | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                   |        | 30 to 38 HRC                                       |        | 38 to 45 HRC  |        |  |        |                 |        |               |        |
|---------------|--|---|--------|-------------------------------|--------|--|--------|---|--------|--|--------|-----------------|--------|---------------|--------|
| Work Material |  | Cast Iron                                       |        | Mild Steels,<br>Carbon Steels |        | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Aluminum Alloys |        | Copper Alloys |        |
| Depth of Cut  |  |   |        | Ad                            |        | $D < 0.04$ 0.1D<br>$0.04 \leq D$ 0.3D              |        |   |        |  |        |                 |        |               |        |
|               |  |   |        |                               |        |  |        |   |        |  |        |                 |        |               |        |
| Dia. (in)     |  | 145 SFM   |        | 130 SFM                       |        | 110 SFM  |        | 90 SFM  |        | 70 SFM   |        | 330 SFM         |        | 130 SFM       |        |
|               |  | Speed   | Feed   | Speed                         | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   | Speed         | Feed   |
|               |  | RPM   | in/min | RPM                           | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min | RPM           | in/min |
| 0.015         |  | 31,500  | 2.2    | 31,500                        | 2.2    | 27,425   | 1.5    | 22,900  | 0.9    | 18,210   | 0.7    | 32,000          | 3.0    | 31,500        | 2.2    |
| 0.020         |  | 27,180  | 2.7    | 25,830                        | 2.4    | 22,140   | 1.6    | 17,950  | 1.0    | 14,260   | 0.8    | 32,000          | 4.0    | 25,830        | 2.4    |
| 0.025         |  | 22,450  | 3.0    | 20,035                        | 2.6    | 17,210   | 1.6    | 13,885  | 1.0    | 11,015   | 0.8    | 32,000          | 5.0    | 20,035        | 2.6    |
| 0.030         |  | 18,640  | 3.1    | 16,545                        | 2.7    | 14,355   | 1.6    | 11,665  | 1.0    | 9,270  | 0.8    | 32,000          | 6.0    | 16,545        | 2.7    |
| 0.035         |  | 15,940  | 3.4    | 14,165                        | 3.0    | 12,165   | 1.6    | 10,065  | 1.1    | 7,970  | 0.9    | 32,000          | 7.1    | 14,165        | 3.0    |
| 0.040         |  | 13,800  | 3.7    | 12,340                        | 3.3    | 10,380   | 1.6    | 8,780   | 1.2    | 6,900  | 1.0    | 31,560          | 8.0    | 12,340        | 3.3    |
| 0.045         |  | 12,210  | 3.7    | 11,070                        | 3.3    | 9,425  | 1.6    | 7,825   | 1.2    | 6,140  | 1.0    | 28,065          | 7.9    | 11,070        | 3.3    |
| 0.050         |  | 11,325  | 3.7    | 9,990                         | 3.3    | 8,545  | 1.6    | 7,030   | 1.2    | 5,520  | 1.0    | 25,100          | 7.9    | 9,990         | 3.3    |
| 0.055         |  | 11,005  | 3.7    | 9,070                         | 3.3    | 7,715  | 1.7    | 6,365   | 1.2    | 5,010  | 1.0    | 22,560          | 7.9    | 9,070         | 3.3    |
| 0.060         |  | 9,725   | 3.9    | 8,365                         | 3.5    | 7,110  | 1.8    | 5,850   | 1.2    | 4,595  | 1.0    | 20,640          | 7.9    | 8,365         | 3.3    |

# Milling Speeds & Feeds

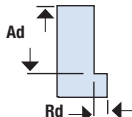
## 4-Flute Square End, 4-Flute Corner Radius & 3-Flute 60° Bright Carbide End Mills

Side Milling — 4-Flute Regular Length, 4-Flute Stub Length, 4-Flute Double End Regular & Stub Length, 4-Flute Corner Radius



### 4-Flute Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 4-fl. Long Length
- Reduce Speeds and Feeds 50% for 4-fl. Extra Long Length
- For slot milling, reduce Feeds 20% to 50%

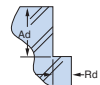

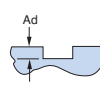


| Hardness      |      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>                                   |        | Up to 30HRC                   |        | 30 to 38 HRC                                       |        | 38 to 45 HRC  |        |  |        |                 |        |
|---------------|------|---|--------|-------------------------------|--------|--|--------|---|--------|--|--------|-----------------|--------|
| Work Material |      | Cast Iron   |        | Mild Steels,<br>Carbon Steels |        | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Aluminum Alloys |        |
| Depth of Cut  |      |  |        | Ad = 1.5D<br>Rd = 0.1D        |        |  |        |   |        |  |        |                 |        |
| Dia. (in)     | (mm) | 160 SFM   |        | 175 SFM                       |        | 130 SFM  |        | 120 SFM   |        | 95 SFM   |        | 470 SFM         |        |
|               |      | Speed   | Feed   | Speed                         | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   |
|               |      | RPM   | in/min | RPM                           | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min |
| 1/32          | 0.5  | 32,000  | 23.9   | 32,000                        | 11.8   | 25,240   | 10.9   | 23,300  | 4.5    | 19,400   | 3.5    | 50,000          | 39.4   |
|               | 0.8  | 21,150  | 23.9   | 23,240                        | 11.8   | 15,900   | 10.9   | 14,600  | 4.5    | 12,200   | 3.5    | 50,000          | 39.4   |
|               | 1    | 15,600  | 23.9   | 17,400                        | 11.8   | 12,600   | 10.9   | 11,400  | 4.5    | 9,000  | 3.5    | 44,400          | 39.4   |
| 3/64          |      | 14,140  | 23.9   | 15,680                        | 11.8   | 11,390   | 10.9   | 10,305  | 4.5    | 8,145  | 3.5    | 40,275          | 39.4   |
| 1/16          | 1.5  | 11,115  | 23.9   | 12,105                        | 11.8   | 8,895  | 10.9   | 8,045   | 4.5    | 6,390  | 3.5    | 31,710          | 39.4   |
| 5/64          | 2    | 8,090   | 23.9   | 8,535                         | 11.8   | 6,395  | 10.9   | 5,780   | 4.5    | 4,625  | 3.5    | 23,135          | 39.4   |
| 3/32          |      | 6,970   | 23.9   | 7,320                         | 12.6   | 5,495  | 10.9   | 4,965   | 4.4    | 3,960  | 3.4    | 19,820          | 40.6   |
| 7/64          |      | 5,920   | 23.9   | 6,200                         | 13.5   | 4,660  | 10.9   | 4,205   | 4.3    | 3,340  | 3.4    | 16,725          | 41.8   |
| 1/8           | 3    | 5,090   | 24.6   | 5,330                         | 14.4   | 4,005  | 10.9   | 3,610   | 4.3    | 2,870  | 3.3    | 14,370          | 42.9   |
| 9/64          |      | 4,545   | 26.3   | 4,785                         | 15.4   | 3,580  | 10.9   | 3,225   | 4.3    | 2,585  | 3.3    | 12,935          | 43.8   |
| 5/32          | 4    | 4,000   | 28.0   | 4,240                         | 16.4   | 3,150  | 10.9   | 2,850   | 4.3    | 2,295  | 3.3    | 11,505          | 44.8   |
| 11/64         |      | 3,670   | 28.1   | 3,885                         | 16.9   | 2,895  | 11.2   | 2,620   | 4.3    | 2,100  | 3.3    | 10,565          | 45.2   |
| 3/16          |      | 3,360   | 28.1   | 3,555                         | 17.2   | 2,655  | 11.6   | 2,405   | 4.3    | 1,910  | 3.3    | 9,660           | 45.6   |
| 13/64         | 5    | 3,090   | 28.1   | 3,260                         | 17.6   | 2,445  | 11.8   | 2,205   | 4.3    | 1,750  | 3.3    | 8,880           | 46.0   |
| 7/32          |      | 2,870   | 28.1   | 3,020                         | 17.9   | 2,285  | 11.8   | 2,045   | 4.3    | 1,630  | 3.3    | 8,280           | 46.3   |
| 1/4           | 6    | 2,520   | 28.1   | 2,640                         | 18.2   | 2,000  | 11.8   | 1,775   | 4.3    | 1,430  | 3.3    | 7,280           | 46.8   |
| 9/32          |      | 2,260   | 28.1   | 2,380                         | 18.3   | 1,785  | 11.8   | 1,580   | 4.3    | 1,295  | 3.3    | 6,520           | 47.0   |
| 5/16          | 8    | 1,995   | 28.1   | 2,115                         | 18.4   | 1,570  | 11.8   | 1,390   | 4.3    | 1,150  | 3.3    | 5,760           | 47.2   |
| 11/32         |      | 1,820   | 28.3   | 1,940                         | 19.4   | 1,445  | 11.8   | 1,290   | 4.3    | 1,055  | 3.3    | 5,280           | 47.2   |
| 3/8           |      | 1,655   | 28.6   | 1,775                         | 20.4   | 1,325  | 11.8   | 1,200   | 4.3    | 965  | 3.3    | 4,830           | 47.2   |
| 13/32         | 10   | 1,515   | 28.9   | 1,630                         | 21.0   | 1,220  | 11.8   | 1,110   | 4.3    | 885  | 3.3    | 4,430           | 48.0   |
| 7/16          |      | 1,420   | 29.1   | 1,510                         | 21.1   | 1,140  | 11.8   | 1,035   | 4.3    | 825  | 3.3    | 4,120           | 49.8   |
| 1/2           | 12   | 1,250   | 30.9   | 1,310                         | 22.5   | 995  | 12.2   | 900   | 4.3    | 720  | 3.3    | 3,585           | 52.0   |
| 9/16          |      | 1,120   | 34.3   | 1,175                         | 24.9   | 880  | 13.1   | 795   | 4.3    | 635  | 3.3    | 3,170           | 52.0   |
| 5/8           | 16   | 1,005   | 35.5   | 1,055                         | 25.7   | 790  | 13.8   | 720   | 4.3    | 570  | 3.3    | 2,840           | 52.0   |
| 11/16         |      | 915   | 38.4   | 960                           | 25.9   | 720  | 13.9   | 650   | 4.3    | 515  | 3.3    | 2,595           | 52.0   |
| 3/4           | 20   | 820   | 39.4   | 860                           | 26.3   | 640  | 13.9   | 580   | 4.1    | 465  | 3.3    | 2,340           | 52.0   |
| 7/8           | 22   | 710   | 35.5   | 750                           | 23.6   | 560  | 12.6   | 510   | 3.7    | 405  | 3.0    | 2,015           | 49.1   |
| 1             | 25   | 630   | 31.2   | 660                           | 20.7   | 490  | 10.9   | 440   | 3.3    | 360  | 2.6    | 1,775           | 43.5   |

## 3-Flute 60° High Helix

Side Milling

Slotting



| Work Material    | Aluminum  | Medium Carbon Steels<br>Mild Steels | Pre-hardened Steels<br>Stainless Steels Die & Alloy Steels | Pre-hardened Steels<br>Stainless Steels Die & Alloy Steels  | Hardened Steels | Medium Carbon Steels<br>Mild Steels   | Pre-hardened Steels<br>Stainless Steels Die & Alloy Steels | Pre-hardened Steels<br>Stainless Steels Die & Alloy Steels                                       | Hardened Steels  |              |        |             |        |              |        |              |        |              |        |
|------------------|---|-------------------------------------|--|---|-----------------|---|--|--|--|--------------|--------|-------------|--------|--------------|--------|--------------|--------|--------------|--------|
| Hardness         |   |                                     | < 35HRC  | 35-45 HRC   | 45-55 HRC       |   | < 35HRC  | 35-45 HRC  | 45-55 HRC  |              |        |             |        |              |        |              |        |              |        |
| Depth of Cut     | <br>Ad = 1.5D<br>Rd = 0.1D |                                     |  | <br>Ad = 1.5D<br>Rd = 0.1D |                 | <br>up to 1/2" Ad = 1.0D<br>over 1/2" Ad = 0.5D |  | <br>Ad=0.5D | <br>Ad=0.5D |              |        |             |        |              |        |              |        |              |        |
| Mill Dia. (inch) | mm  | 390-460 SFM                         |  | 130-164 SFM   |                 | Up to 100 SFM   |  | Up to 66 SFM   |  | Up to 50 SFM |        | 110-140 SFM |        | Up to 85 SFM |        | Up to 56 SFM |        | Up to 43 SFM |        |
|                  |   | Speed                               | Feed   | Speed   | Feed            | Speed   | Feed   | Speed  | Feed   | Speed        | Feed   | Speed       | Feed   | Speed        | Feed   | Speed        | Feed   | Speed        | Feed   |
|                  |   | RPM                                 | in/min   | RPM   | in/min          | RPM   | in/min   | RPM  | in/min   | RPM          | in/min | RPM         | in/min | RPM          | in/min | RPM          | in/min | RPM          | in/min |
| 1/4              | 6   | 6900                                | 21.7   | 2400  | 10.6            | 1600  | 6.7  | 1060   | 3.0  | 800          | 1.2    | 2040        | 7.9    | 1360         | 4.7    | 900          | 2.0    | 680          | 0.8    |
| 5/16             | 8   | 5200                                | 21.7   | 1800  | 10.6            | 1200  | 6.7  | 800  | 3.0  | 600          | 1.2    | 1530        | 7.9    | 1020         | 4.7    | 680          | 2.0    | 510          | 0.8    |
| 3/8              | 10  | 4200                                | 23.6   | 1400  | 13.4            | 950   | 6.7  | 640  | 3.0  | 480          | 1.2    | 1190        | 9.1    | 810          | 4.7    | 540          | 2.0    | 410          | 0.8    |
| 1/2              | 12  | 3500                                | 23.6   | 1200  | 14.2            | 800   | 7.1  | 530  | 3.0  | 400          | 1.2    | 1020        | 9.8    | 680          | 5.1    | 450          | 2.0    | 340          | 0.8    |
| 5/8              | 16  | 2600                                | 23.6   | 900   | 15.7            | 600   | 7.1  | 400  | 3.0  | 300          | 1.2    | 760         | 10.6   | 510          | 5.1    | 340          | 2.0    | 260          | 0.8    |
| 3/4              | 20  | 2100                                | 23.6   | 720   | 16.1            | 480   | 7.9  | 320  | 3.0  | 240          | 1.2    | 620         | 11.0   | 410          | 5.5    | 270          | 2.0    | 200          | 0.8    |
| 1                | 25  | 1700                                | 23.6   | 580   | 13.8            | 380   | 7.1  | 250  | 3.0  | 190          | 1.2    | 500         | 9.4    | 320          | 5.1    | 210          | 2.0    | 160          | 0.8    |

## 2, 3 & 4-Flute Ball Nose Bright Carbide End Mills

Profiling — 2-Flute Regular Length, 2-Flute Stub Length, 2-Flute Double End Regular & Stub Length Ball Nose End Mills

### 2-Flute Ball Nose Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 2-fl. Ball Nose Long Length
- Reduce Speeds and Feeds 50% for 2-fl. Ball nose Extra Long Length

### 3-Flute Regular Length

- Increase Speeds and Feeds 20% for 3-fl. Reg. Length

### 4-Flute Ball Nose

- Increase Speeds and Feeds 40% for 4-fl. Ball Nose Reg. & Stub Length, also 4-fl Double End Reg. & Stub Length
- Reduce Speeds 25% and Increase Feeds 10% for 4-fl. Ball Nose Long Length
- Reduce Speeds 50% and Increase Feeds 10% for 4-fl. Ball Nose Extra Long Length

| Hardness      |      |           |        | Tensile Strength; Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                                     |        | 30 to 38 HRC   |        | 38 to 45 HRC  |        |                 |        |
|---------------|------|-----------|--------|--|--------|---|--------|--|--------|---|--------|-----------------|--------|
| Work Material |      | Cast Iron |        | Mild Steels, Carbon Steels                   |        | Alloy Steels, Tool Steels, Ti Alloys (Annealed) |        | Hardened Steels, Prehardened Steels, Ti Alloys (Solution Treated and Aged) |        | Hardened Steels, Prehardened Steels, Stainless Steels, Inconel, Ni Based Alloys |        | Aluminum Alloys |        |
| Depth of Cut  |      |           |        |  |        | Ad  |        | pf   |        |   |        |                 |        |
|               |      |           |        |  |        | D < 1/8   |        | 1/8 ≤ D  |        |   |        |                 |        |
|               |      |           |        |  |        | 0.1D  |        | 0.3D   |        |   |        |                 |        |
|               |      |           |        |  |        | 0.2D  |        | 0.7D   |        |   |        |                 |        |
| Dia. (in)     | (mm) | 160 SFM   |        | 160 SFM                                      |        | 120 SFM   |        | 100 SFM  |        | 80 SFM  |        | 490 SFM         |        |
|               |      | Speed     | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed   | Feed   | Speed           | Feed   |
|               |      | RPM       | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM   | in/min | RPM             | in/min |
|               | 0.5  | 31,000    | 4.8    | 31,000                                       | 4.5    | 23,300  | 2.5    | 19,400   | 1.2    | 15,500  | 0.9    | 50,000          | 6.8    |
| 1/32          | 0.8  | 19,600    | 4.8    | 19,600                                       | 4.5    | 14,680  | 2.5    | 12,200   | 1.2    | 9,780   | 0.9    | 50,000          | 6.8    |
|               | 1    | 15,600    | 5.0    | 15,600                                       | 4.7    | 11,400  | 2.8    | 9,540  | 1.4    | 7,620   | 0.9    | 38,400          | 7.1    |
| 3/64          |      | 14,140    | 5.2    | 14,140                                       | 4.8    | 10,305  | 3.0    | 8,620  | 1.5    | 6,885   | 1.0    | 35,535          | 8.0    |
| 1/16          | 1.5  | 11,115    | 5.8    | 11,115                                       | 5.1    | 8,045   | 3.4    | 6,720  | 1.7    | 5,360   | 1.2    | 29,585          | 9.8    |
| 5/64          | 2    | 8,090     | 6.3    | 8,090  | 5.4    | 5,780   | 3.7    | 4,810  | 1.8    | 3,840   | 1.4    | 23,630          | 11.7   |
|               |      | 6,970     | 6.5    | 6,970  | 5.7    | 4,965   | 3.9    | 4,140  | 1.9    | 3,290   | 1.4    | 20,420          | 11.8   |
| 7/64          |      | 5,920     | 6.7    | 5,920  | 6.0    | 4,205   | 4.1    | 3,520  | 1.9    | 2,795   | 1.4    | 17,325          | 11.8   |
| 1/8           | 3    | 5,090     | 7.2    | 5,090  | 6.1    | 3,610   | 4.3    | 3,030  | 1.9    | 2,400   | 1.4    | 14,945          | 11.8   |
| 9/64          |      | 4,545     | 7.9    | 4,545  | 6.2    | 3,225   | 4.3    | 2,690  | 1.9    | 2,140   | 1.4    | 13,470          | 11.8   |
| 5/32          | 4    | 4,000     | 8.6    | 4,000  | 6.3    | 2,850   | 4.3    | 2,360  | 1.9    | 1,875   | 1.4    | 11,990          | 11.8   |
| 11/64         |      | 3,670     | 9.2    | 3,670  | 6.6    | 2,620   | 4.3    | 2,160  | 1.9    | 1,725   | 1.4    | 11,020          | 12.7   |
| 3/16          |      | 3,360     | 9.6    | 3,360  | 6.9    | 2,405   | 4.4    | 1,970  | 1.9    | 1,580   | 1.4    | 10,090          | 13.6   |
| 13/64         | 5    | 3,090     | 10.1   | 3,090  | 7.1    | 2,205   | 4.4    | 1,810  | 1.9    | 1,455   | 1.4    | 9,275           | 14.2   |
| 7/32          |      | 2,870     | 10.4   | 2,870  | 7.1    | 2,045   | 4.3    | 1,690  | 1.9    | 1,360   | 1.4    | 8,630           | 14.2   |
| 1/4           | 6    | 2,520     | 11.3   | 2,520  | 6.9    | 1,775   | 4.2    | 1,490  | 1.9    | 1,205   | 1.4    | 7,570           | 14.6   |
| 9/32          |      | 2,260     | 12.5   | 2,260  | 6.4    | 1,580   | 4.1    | 1,350  | 1.9    | 1,080   | 1.4    | 6,785           | 15.5   |
| 5/16          | 8    | 1,995     | 13.6   | 1,995  | 5.9    | 1,390   | 4.0    | 1,200  | 1.9    | 960   | 1.4    | 6,000           | 16.4   |
| 11/32         |      | 1,820     | 13.7   | 1,820  | 5.8    | 1,290   | 4.0    | 1,100  | 1.9    | 880   | 1.4    | 5,495           | 16.5   |
| 3/8           |      | 1,655     | 13.7   | 1,655  | 5.7    | 1,200   | 4.0    | 1,005  | 1.9    | 800   | 1.4    | 5,020           | 16.5   |
| 13/32         | 10   | 1,515     | 13.7   | 1,515  | 5.6    | 1,110   | 3.9    | 920  | 1.9    | 735   | 1.4    | 4,610           | 16.9   |
| 7/16          |      | 1,420     | 13.7   | 1,420  | 5.4    | 1,035   | 3.7    | 855  | 1.9    | 690   | 1.4    | 4,300           | 17.8   |
| 1/2           | 12   | 1,250     | 13.7   | 1,250  | 5.2    | 900   | 3.5    | 750  | 1.9    | 600   | 1.4    | 3,750           | 18.9   |
| 9/16          |      | 1,120     | 13.9   | 1,120  | 5.2    | 795   | 3.5    | 660  | 1.9    | 530   | 1.4    | 3,290           | 18.5   |
| 5/8           | 16   | 1,005     | 13.9   | 1,005  | 5.2    | 720   | 3.5    | 590  | 1.9    | 470   | 1.4    | 2,960           | 16.7   |
| 11/16         |      | 915       | 13.9   | 915  | 5.2    | 650   | 3.5    | 540  | 1.9    | 430   | 1.4    | 2,715           | 16.5   |
| 3/4           | 20   | 820       | 12.9   | 820  | 5.2    | 580   | 3.5    | 485  | 1.9    | 380   | 1.4    | 2,415           | 16.5   |
| 7/8           | 22   | 710       | 11.2   | 710  | 5.2    | 510   | 3.5    | 425  | 1.8    | 335   | 1.4    | 2,100           | 16.5   |
| 1             | 25   | 630       | 9.8    | 630  | 5.1    | 440   | 3.5    | 370  | 1.6    | 300   | 1.4    | 1,830           | 16.3   |

## 2-Flute Square End, TiAlN Coated Carbide End Mills

Slot Milling — 2-Flute Regular Length, 2-Flute Stub Length, 2-Flute Double End Regular & Stub Length



### 2-Flute Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 2-fl. Long Length
- Reduce Speeds and Feeds 50% for 2-fl. Extra Long Length
- For side milling, increase Feeds 25% or more.

| Hardness      |       |              |                | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |                | Up to 30HRC  |                | 30 to 38 HRC  |                | 38 to 45 HRC   |                |                 |                |
|---------------|-------|--------------|----------------|---|----------------|--|----------------|---|----------------|--|----------------|-----------------|----------------|
| Work Material |       | Cast Iron    |                | Mild Steels,<br>Carbon Steels                   |                | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |                | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |                | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |                | Aluminum Alloys |                |
| Depth of Cut  |       |              |                |   |                |  |                |   |                |  |                |                 |                |
|               |       |              |                |   |                |  |                |   |                |  |                |                 |                |
| Dia. (in)     | (mm)  | 220 SFM      |                | 200 SFM   |                | 170 SFM  |                | 140 SFM   |                | 110 SFM  |                | 500 SFM         |                |
|               |       | Speed<br>RPM | Feed<br>in/min | Speed<br>RPM                                    | Feed<br>in/min | Speed<br>RPM                                       | Feed<br>in/min | Speed<br>RPM  | Feed<br>in/min | Speed<br>RPM   | Feed<br>in/min | Speed<br>RPM    | Feed<br>in/min |
|               | 0.5   | 40,000       | 8.25           | 37,500  | 5.63           | 31,537   | 2.38           | 26,687  | 1.75           | 21,112   | 1.50           | 62,500          | 11.75          |
| 1/32          | 0.8   | 25,987.      | 8.25           | 23,687  | 5.63           | 19,875   | 2.38           | 16,812  | 1.75           | 13,300   | 1.50           | 59,625          | 11.75          |
|               | 1     | 21,000       | 8.25           | 18,750  | 5.63           | 15,750   | 2.38           | 13,350  | 1.75           | 10,500   | 1.50           | 47,250          | 11.75          |
| 3/64          |       | 19,031       | 8.25           | 16,987  | 5.63           | 14,287   | 2.38           | 12,075  | 1.75           | 9,493  | 1.50           | 42,675          | 11.75          |
|               | 1.5   | 14,962       | 8.25           | 13,325  | 5.75           | 11,250   | 2.50           | 9,425   | 1.75           | 7,406  | 1.50           | 33,150          | 11.75          |
| 5/64          | 2     | 10,881       | 8.25           | 9,662   | 5.88           | 8,212  | 2.63           | 6,768   | 1.75           | 5,325  | 1.50           | 23,625          | 11.75          |
|               |       | 9,350        | 8.50           | 8,293   | 5.88           | 7,062  | 3.00           | 5,812   | 1.75           | 4,556  | 1.50           | 20,381          | 11.75          |
| 7/64          |       | 7,918        | 8.63           | 7,012   | 5.88           | 5,987  | 3.25           | 4,918   | 1.75           | 3,843  | 1.50           | 17,406          | 11.75          |
|               | 1/8   | 6,806        | 8.88           | 6,018   | 5.88           | 5,156  | 3.75           | 4,218   | 1.75           | 3,300  | 1.50           | 15,075          | 12.88          |
| 9/64          |       | 6,087        | 9.13           | 5,387   | 5.88           | 4,625  | 4.25           | 3,775   | 1.75           | 2,975  | 1.50           | 13,556          | 15.13          |
|               | 5/32  | 5,375        | 9.38           | 4,768   | 5.88           | 4,087  | 4.63           | 3,325   | 1.75           | 2,643  | 1.50           | 12,037          | 17.50          |
| 11/64         |       | 4,931        | 9.50           | 4,362   | 5.88           | 3,737  | 4.75           | 3,050   | 1.75           | 2,425  | 1.50           | 11,043          | 17.75          |
|               | 3/16  | 4,518        | 9.63           | 3,975   | 5.88           | 3,418  | 4.75           | 2,781   | 1.75           | 2,218  | 1.50           | 10,093          | 17.75          |
| 13/64         | 5     | 4,150        | 10.00          | 3,650   | 5.88           | 3,131  | 4.75           | 2,550   | 1.75           | 2,037  | 1.50           | 9,268           | 17.75          |
|               |       | 3,850        | 10.75          | 3,412   | 5.88           | 2,931  | 4.75           | 2,368   | 1.75           | 1,887  | 1.50           | 8,643           | 17.75          |
| 1/4           | 6     | 3,362        | 11.88          | 3,000   | 5.88           | 2,575  | 4.75           | 2,075   | 1.75           | 1,650  | 1.50           | 7,587           | 17.75          |
|               |       | 3,006        | 12.75          | 2,675   | 5.88           | 2,306  | 4.75           | 1,862   | 1.75           | 1,481  | 1.50           | 6,787           | 17.75          |
| 5/16          | 8     | 2,643        | 13.50          | 2,343   | 5.88           | 2,037  | 4.75           | 1,662   | 1.75           | 1,318  | 1.50           | 5,981           | 17.75          |
|               |       | 2,425        | 13.63          | 2,156   | 5.88           | 1,856  | 4.75           | 1,525   | 1.75           | 1,212  | 1.50           | 5,481           | 17.75          |
| 3/8           |       | 2,218        | 13.63          | 1,975   | 5.88           | 1,675  | 4.75           | 1,400   | 1.75           | 1,106  | 1.50           | 5,006           | 17.75          |
|               | 13/32 | 2,037        | 13.63          | 1,818   | 5.88           | 1,537  | 4.75           | 1,293   | 1.75           | 1,018  | 1.50           | 4,600           | 17.75          |
| 7/16          |       | 1,887        | 13.63          | 1,700   | 5.88           | 1,443  | 4.75           | 1,206   | 1.75           | 943  | 1.50           | 4,300           | 17.75          |
|               | 1/2   | 1,637        | 13.63          | 1,487   | 5.88           | 1,275  | 4.75           | 1,050   | 1.75           | 825  | 1.50           | 3,762           | 17.75          |
| 9/16          |       | 1,468        | 13.63          | 1,325   | 5.88           | 1,131  | 4.75           | 925   | 1.75           | 731  | 1.50           | 3,306           | 17.75          |
|               | 5/8   | 1,350        | 13.88          | 1,200   | 5.88           | 1,018  | 4.75           | 837   | 2.00           | 650  | 1.50           | 2,943           | 17.75          |
| 11/16         |       | 1,225        | 13.88          | 1,087   | 5.88           | 925  | 4.75           | 762   | 2.13           | 587  | 1.50           | 2,700           | 17.75          |
|               | 3/4   | 1,100        | 13.88          | 975   | 5.88           | 831  | 4.75           | 681   | 2.13           | 531  | 1.50           | 2,400           | 17.75          |
| 7/8           | 22    | 956          | 13.88          | 843   | 5.88           | 725  | 4.75           | 600   | 2.13           | 462  | 1.50           | 2,075           | 17.75          |
|               | 1     | 837          | 13.63          | 737   | 5.88           | 625  | 4.75           | 525   | 2.13           | 412  | 1.50           | 1,843           | 17.75          |

## 4-Flute Square End, TiAlN Coated Carbide End Mills

### Side Milling — 4-Flute Regular Length, 4-Flute Double End Stub Length

#### 4-Flute Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 4-fl. Long Length
- Reduce Speeds and Feeds 50% for 4-fl. Extra Long Length
- For slot milling, reduce Feeds 20% to 50%.

| Hardness      |      | Tensile Strength: Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                |        | 30 to 38 HRC                                    |        | 38 to 45 HRC   |        |   |        |                 |        |
|---------------|------|--|--------|----------------------------|--------|---|--------|--|--------|---|--------|-----------------|--------|
| Work Material |      | Cast Iron                                    |        | Mild Steels, Carbon Steels |        | Alloy Steels, Tool Steels, Ti Alloys (Annealed) |        | Hardened Steels, Prehardened Steels, Ti Alloys (Solution Treated and Aged) |        | Hardened Steels, Prehardened Steels, Stainless Steels, Inconel, Ni Based Alloys |        | Aluminum Alloys |        |
| Depth of Cut  |      |  |        |                            |        |   |        |  |        |   |        |                 |        |
| Dia. (in)     | (mm) | 200 SFM                                      |        | 215 SFM                    |        | 165 SFM   |        | 150 SFM  |        | 120 SFM   |        | 590 SFM         |        |
|               |      | Speed  | Feed   | Speed                      | Feed   | Speed   | Feed   | Speed  | Feed   | Speed   | Feed   | Speed           | Feed   |
|               |      | RPM  | in/min | RPM                        | in/min | RPM   | in/min | RPM  | in/min | RPM   | in/min | RPM             | in/min |
| 1/32          | 0.5  | 40,000                                       | 29.88  | 40,000                     | 14.75  | 31,550  | 13.63  | 29,125   | 5.63   | 24,250  | 4.38   | 62,500          | 49.25  |
|               | 0.8  | 26,437                                       | 29.88  | 29,050                     | 14.75  | 19,875  | 13.63  | 18,250   | 5.63   | 15,250  | 4.38   | 62,500          | 49.25  |
|               | 1    | 19,500                                       | 29.88  | 21,750                     | 14.75  | 15,750  | 13.63  | 14,250   | 5.63   | 11,250  | 4.38   | 55,500          | 49.25  |
| 3/64          |      | 17,675                                       | 29.88  | 19,600                     | 14.75  | 14,237  | 13.63  | 12,881   | 5.63   | 10,181  | 4.38   | 50,343          | 49.25  |
| 1/16          | 1.5  | 13,893                                       | 29.88  | 15,131                     | 14.75  | 11,118  | 13.63  | 10,056   | 5.63   | 7,987   | 4.38   | 39,637          | 49.25  |
| 5/64          | 2    | 10,112                                       | 29.88  | 10,668                     | 14.75  | 7,993   | 13.63  | 7,225  | 5.63   | 5,781   | 4.38   | 28,918          | 49.25  |
| 3/32          |      | 8,712  | 29.88  | 9,150                      | 15.75  | 6,868   | 13.63  | 6,206  | 5.50   | 4,950   | 4.25   | 24,775          | 50.75  |
| 7/64          |      | 7,400  | 29.88  | 7,750                      | 16.88  | 5,825   | 13.63  | 5,256  | 5.38   | 4,175   | 4.25   | 20,906          | 52.25  |
| 1/8           | 3    | 6,362  | 30.75  | 6,662                      | 18.00  | 5,006   | 13.63  | 4,512  | 5.38   | 3,587   | 4.13   | 17,962          | 53.63  |
| 9/64          |      | 5,681  | 32.88  | 5,981                      | 19.25  | 4,475   | 13.63  | 4,031  | 5.38   | 3,231   | 4.13   | 16,168          | 54.75  |
| 5/32          | 4    | 5,000  | 35.00  | 5,300                      | 20.50  | 3,937   | 13.63  | 3,562  | 5.38   | 2,868   | 4.13   | 14,381          | 56.00  |
| 11/64         |      | 4,587  | 35.13  | 4,856                      | 21.13  | 3,618   | 14.00  | 3,275  | 5.38   | 2,625   | 4.13   | 13,206          | 56.50  |
| 3/16          |      | 4,200  | 35.13  | 4,443                      | 21.50  | 3,318   | 14.50  | 3,006  | 5.38   | 2,387   | 4.13   | 12,075          | 57.00  |
| 13/64         | 5    | 3,862  | 35.13  | 4,075                      | 22.00  | 3,056   | 14.75  | 2,756  | 5.38   | 2,187   | 4.13   | 11,100          | 57.50  |
| 7/32          |      | 3,587  | 35.13  | 3,775                      | 22.38  | 2,856   | 14.75  | 2,556  | 5.38   | 2,037   | 4.13   | 10,350          | 57.88  |
| 1/4           | 6    | 3,150  | 35.13  | 3,300                      | 22.75  | 2,500   | 14.75  | 2,218  | 5.38   | 1,787   | 4.13   | 9,100           | 58.50  |
| 9/32          |      | 2,825  | 35.13  | 2,975                      | 22.88  | 2,231   | 14.75  | 1,975  | 5.38   | 1,618   | 4.13   | 8,150           | 58.75  |
| 5/16          | 8    | 2,493  | 35.13  | 2,643                      | 23.00  | 1,962   | 14.75  | 1,737  | 5.38   | 1,437   | 4.13   | 7,200           | 59.00  |
| 11/32         |      | 2,275  | 35.38  | 2,425                      | 24.25  | 1,806   | 14.75  | 1,612  | 5.38   | 1,318   | 4.13   | 6,600           | 59.00  |
| 3/8           |      | 2,068  | 35.75  | 2,218                      | 25.50  | 1,656   | 14.75  | 1,500  | 5.38   | 1,206   | 4.13   | 6,037           | 59.00  |
| 13/32         | 10   | 1,893  | 36.13  | 2,037                      | 26.25  | 1,525   | 14.75  | 1,387  | 5.38   | 1,106   | 4.13   | 5,537           | 60.00  |
| 7/16          |      | 1,775  | 36.38  | 1,887                      | 26.38  | 1,425   | 14.75  | 1,293  | 5.38   | 1,031   | 4.13   | 5,150           | 62.25  |
| 1/2           | 12   | 1,562  | 38.63  | 1,637                      | 28.13  | 1,243   | 15.25  | 1,125  | 5.38   | 900   | 4.13   | 4,481           | 65.00  |
| 9/16          |      | 1,400  | 42.88  | 1,468                      | 31.13  | 1,100   | 16.38  | 993  | 5.38   | 793   | 4.13   | 3,962           | 65.00  |
| 5/8           | 16   | 1,256  | 44.38  | 1,318                      | 32.13  | 987   | 17.25  | 900  | 5.38   | 712   | 4.13   | 3,550           | 65.00  |
| 11/16         |      | 1,143  | 48.00  | 1,200                      | 32.38  | 900   | 17.38  | 812  | 5.38   | 643   | 4.13   | 3,243           | 65.00  |
| 3/4           | 20   | 1,025  | 49.25  | 1,075                      | 32.88  | 800   | 17.38  | 725  | 5.13   | 581   | 4.13   | 2,925           | 65.00  |
| 7/8           | 22   | 887  | 44.38  | 937                        | 29.50  | 700   | 15.75  | 637  | 4.63   | 506   | 3.75   | 2,518           | 61.38  |
| 1             | 25   | 787  | 39.00  | 825                        | 25.88  | 612   | 13.63  | 550  | 4.13   | 450   | 3.25   | 2,218           | 54.38  |

## TiAlN Coated Carbide Roughing End Mills — Side Milling



| Hardness      |      | Tensile Strength: Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                |        | 30 to 38 HRC                                    |        | 38 to 45 HRC                        |        |         |        |
|---------------|------|--|--------|----------------------------|--------|---|--------|-------------------------------------|--------|---------|--------|
| Work Material |      | Cast Iron                                    |        | Mild Steels, Carbon Steels |        | Alloy Steels, Tool Steels, Ti Alloys (Annealed) |        | Hardened Steels, Prehardened Steels |        |         |        |
| Depth of Cut  |      |  |        |                            |        |   |        |                                     |        |         |        |
| Dia. (in)     | (mm) | 420 SFM                                      |        | 350 SFM                    |        | 300 SFM   |        | 225 SFM                             |        | 175 SFM |        |
|               |      | Speed  | Feed   | Speed                      | Feed   | Speed   | Feed   | Speed                               | Feed   | Speed   | Feed   |
|               |      | RPM  | in/min | RPM                        | in/min | RPM   | in/min | RPM                                 | in/min | RPM     | in/min |
| 1/4           | 6    | 6,350  | 29.9   | 5,300                      | 25.2   | 4,500   | 14.2   | 3,450                               | 11.0   | 2,650   | 8.3    |
| 5/16          | 8    | 4,750  | 29.9   | 4,000                      | 25.2   | 3,400   | 16.1   | 2,600                               | 12.2   | 2,000   | 9.4    |
| 3/8           | 10   | 3,800  | 29.9   | 3,200                      | 25.2   | 2,700   | 16.9   | 2,050                               | 13.0   | 1,600   | 10.2   |
| 1/2           | 12   | 3,200  | 30.3   | 2,650                      | 25.2   | 2,250   | 17.7   | 1,700                               | 13.4   | 1,350   | 10.6   |
| 5/8           | 16   | 2,400  | 30.3   | 2,000                      | 25.2   | 1,700   | 18.9   | 1,300                               | 14.2   | 1,000   | 11.0   |
| 3/4           | 20   | 1,900  | 29.9   | 1,600                      | 24.0   | 1,350   | 18.5   | 1,050                               | 13.8   | 800     | 10.2   |
| 1             | 25   | 1,500  | 29.9   | 1,150                      | 24.0   | 1,000   | 18.5   | 800                                 | 13.8   | 600     | 10.2   |

## TiAlN Coated Carbide Roughing End Mills — Slotting



| Hardness      |      | Tensile Strength: Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                |        | 30 to 38 HRC                                    |        | 38 to 45 HRC                        |        |         |        |
|---------------|------|--|--------|----------------------------|--------|---|--------|-------------------------------------|--------|---------|--------|
| Work Material |      | Cast Iron                                    |        | Mild Steels, Carbon Steels |        | Alloy Steels, Tool Steels, Ti Alloys (Annealed) |        | Hardened Steels, Prehardened Steels |        |         |        |
| Depth of Cut  |      |  |        |                            |        |   |        |                                     |        |         |        |
| Dia. (in)     | (mm) | 350 SFM                                      |        | 300 SFM                    |        | 250 SFM   |        | 190 SFM                             |        | 160 SFM |        |
|               |      | Speed  | Feed   | Speed                      | Feed   | Speed   | Feed   | Speed                               | Feed   | Speed   | Feed   |
|               |      | RPM  | in/min | RPM                        | in/min | RPM   | in/min | RPM                                 | in/min | RPM     | in/min |
| 1/4           | 6    | 5,300  | 25.2   | 4,500                      | 21.3   | 3,700   | 11.8   | 2,900                               | 9.1    | 2,400   | 7.5    |
| 5/16          | 8    | 4,000  | 25.2   | 3,400                      | 21.3   | 2,800   | 13.4   | 2,200                               | 10.2   | 1,800   | 8.7    |
| 3/8           | 10   | 3,200  | 25.2   | 2,700                      | 21.3   | 2,250   | 14.2   | 1,750                               | 11.0   | 1,450   | 9.1    |
| 1/2           | 12   | 2,650  | 25.2   | 2,250                      | 21.3   | 1,850   | 14.6   | 1,450                               | 11.4   | 1,200   | 9.4    |
| 5/8           | 16   | 2,000  | 25.2   | 1,700                      | 21.3   | 1,400   | 15.4   | 1,100                               | 12.2   | 900     | 9.8    |
| 3/4           | 20   | 1,600  | 25.2   | 1,350                      | 20.1   | 1,100   | 15.4   | 900                                 | 11.8   | 700     | 9.1    |
| 1             | 25   | 1,150  | 25.2   | 950                        | 20.1   | 800   | 15.4   | 700                                 | 11.8   | 500     | 9.1    |

## 2 & 4-Flute Ball Nose TiAlN Coated Carbide End Mills

### Profiling — 2-Flute Regular Length Ball Nose End Mills

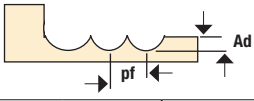


#### 2-Flute Long & Extra Long Length

- Reduce Speeds and Feeds 25% for 2-fl. Ball Nose Long Length
- Reduce Speeds and Feeds 50% for 2-fl. Ball Nose Extra Long Length

#### 4-Flute Ball Nose

- Increase Speeds and Feeds 40% for 4-fl. Ball Nose Reg. Length
- Reduce Speeds 25% and Increase Feeds 10% for 4-fl. Ball Nose Long Length
- Reduce Speeds 50% and Increase Feeds 10% for 4-fl. Ball Nose Extra Long Length

| Hardness      |      |   |        | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |        | Up to 30HRC  |        | 30 to 38 HRC  |        | 38 to 45 HRC   |        |                 |        |
|---------------|------|---|--------|---|--------|--|--------|---|--------|--|--------|-----------------|--------|
| Work Material |      | Cast Iron   |        | Mild Steels,<br>Carbon Steels                   |        | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Aluminum Alloys |        |
| Depth of Cut  |      |  |        |   |        |  |        |   |        |  |        |                 |        |
|               |      |   |        |   |        |  |        | Ad  |        | pf   |        |                 |        |
|               |      |   |        |   |        |  |        | D < 1/8   |        | 0.1D   |        | 0.2D            |        |
|               |      |   |        |   |        |  |        | 1/8 ≤ D   |        | 0.3D   |        | 0.7D            |        |
| Dia. (in)     | (mm) | 200 SFM   |        | 205 SFM   |        | 150 SFM  |        | 125 SFM   |        | 100 SFM  |        | 600 SFM         |        |
|               |      | Speed   | Feed   | Speed   | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   |
|               |      | RPM   | in/min | RPM   | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min |
|               | 0.5  | 38,750  | 6.00   | 38,750  | 5.63   | 29,125   | 3.13   | 24,250  | 1.50   | 14,375   | 1.13   | 62,500          | 8.50   |
| 1/32          | 0.8  | 24,500  | 6.00   | 24,500  | 5.63   | 18,350   | 3.13   | 15,250  | 1.50   | 12,225   | 1.13   | 62,500          | 8.50   |
|               | 1    | 19,500  | 6.25   | 19,500  | 5.88   | 14,250   | 3.50   | 11,925  | 1.75   | 9,525  | 1.13   | 48,000          | 8.88   |
| 3/64          |      | 17,675  | 6.50   | 17,675  | 6.00   | 12,881   | 3.75   | 10,775  | 1.88   | 8,606  | 1.25   | 44,418          | 10.00  |
| 1/16          | 1.5  | 13,893  | 7.25   | 13,893  | 6.38   | 10,056   | 4.25   | 8,400   | 2.13   | 6,700  | 1.50   | 36,981          | 12.25  |
| 5/64          | 2    | 10,112  | 7.88   | 10,112  | 6.75   | 7,225  | 4.63   | 6,012   | 2.25   | 4,800  | 1.75   | 29,537          | 14.63  |
| 3/32          |      | 8,712   | 8.13   | 8,712   | 7.13   | 6,206  | 4.88   | 5,175   | 2.38   | 4,112  | 1.75   | 25,525          | 14.75  |
| 7/64          |      | 7,400   | 8.38   | 7,400   | 7.50   | 5,256  | 5.13   | 4,400   | 2.38   | 3,493  | 1.75   | 21,656          | 14.75  |
| 1/8           | 3    | 6,362   | 9.00   | 6,362   | 7.63   | 4,512  | 5.38   | 3,787   | 2.38   | 3,000  | 1.75   | 18,681          | 14.75  |
| 9/64          |      | 5,681   | 9.88   | 5,681   | 7.75   | 4,031  | 5.38   | 3,362   | 2.38   | 2,675  | 1.75   | 16,837          | 14.75  |
| 5/32          | 4    | 5,000   | 10.75  | 5,000   | 7.88   | 3,562  | 5.38   | 2,950   | 2.38   | 2,343  | 1.75   | 14,987          | 14.75  |
| 11/64         |      | 4,587   | 11.50  | 4,587   | 8.25   | 3,275  | 5.38   | 2,700   | 2.38   | 2,156  | 1.75   | 13,775          | 15.88  |
| 3/16          |      | 4,200   | 12.00  | 4,200   | 8.63   | 3,006  | 5.50   | 2,462   | 2.38   | 1,975  | 1.75   | 12,612          | 17.00  |
| 13/64         | 5    | 3,862   | 12.63  | 3,862   | 8.88   | 2,756  | 5.50   | 2,262   | 2.38   | 1,818  | 1.75   | 11,593          | 17.75  |
| 7/32          |      | 3,587   | 13.00  | 3,587   | 8.88   | 2,556  | 5.38   | 2,112   | 2.38   | 1,700  | 1.75   | 10,787          | 17.75  |
| 1/4           | 6    | 3,150   | 14.13  | 3,150   | 8.63   | 2,218  | 5.25   | 1,862   | 2.38   | 1,506  | 1.75   | 9,462           | 18.25  |
| 9/32          |      | 2,825   | 15.63  | 2,825   | 8.00   | 1,975  | 5.13   | 1,687   | 2.38   | 1,350  | 1.75   | 8,481           | 19.38  |
| 5/16          | 8    | 2,493   | 17.00  | 2,493   | 7.38   | 1,737  | 5.00   | 1,500   | 2.38   | 1,200  | 1.75   | 7,500           | 20.50  |
| 11/32         |      | 2,275   | 17.13  | 2,275   | 7.25   | 1,612  | 5.00   | 1,375   | 2.38   | 1,100  | 1.75   | 6,868           | 20.63  |
| 3/8           |      | 2,068   | 17.13  | 2,068   | 7.13   | 1,500  | 5.00   | 1,256   | 2.38   | 1,000  | 1.75   | 6,275           | 20.63  |
| 13/32         | 10   | 1,893   | 17.13  | 1,893   | 7.00   | 1,387  | 4.88   | 1,150   | 2.38   | 918  | 1.75   | 5,762           | 21.13  |
| 7/16          |      | 1,775   | 17.13  | 1,775   | 6.75   | 1,293  | 4.63   | 1,068   | 2.38   | 862  | 1.75   | 5,375           | 22.25  |
| 1/2           | 12   | 1,562   | 17.13  | 1,562   | 6.50   | 1,125  | 4.38   | 937   | 2.38   | 750  | 1.75   | 4,687           | 23.63  |
| 9/16          |      | 1,400   | 17.38  | 1,400   | 6.50   | 993  | 4.38   | 825   | 2.38   | 662  | 1.75   | 4,112           | 23.13  |
| 5/8           | 16   | 1,256   | 17.38  | 1,256   | 6.50   | 900  | 4.38   | 737   | 2.38   | 587  | 1.75   | 3,700           | 20.88  |
| 11/16         |      | 1,143   | 17.38  | 1,143   | 6.50   | 812  | 4.38   | 675   | 2.38   | 537  | 1.75   | 3,393           | 20.63  |
| 3/4           | 20   | 1,025   | 16.13  | 1,025   | 6.50   | 725  | 4.38   | 606   | 2.38   | 475  | 1.75   | 3,018           | 20.63  |
| 7/8           | 22   | 887   | 14.00  | 887   | 6.50   | 637  | 4.38   | 531   | 2.25   | 418  | 1.75   | 2,625           | 20.63  |
| 1             | 25   | 787   | 12.25  | 787   | 6.38   | 550  | 4.38   | 462   | 2.00   | 375  | 1.75   | 2,287           | 20.38  |

## Typhoon Modified AlTiN Carbide End Mills



### Slot Milling — 2-Flute Square End & 2-Flute Corner Radius

| Hardness       |       | Tensile Strength: Up to 750N/mm <sup>2</sup> |                            | Up to 30HRC                                     | 30 to 38 HRC   | 38 to 45 HRC  | 45 to 55 HRC    | 55 to 60 HRC    |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
|----------------|-------|--|----------------------------|---|--|---|-----------------|-----------------|--------|----------------|--------|---------|--------|---------|--------|--|--|----------|----|----------|-------|----------|-------|--|--|----------|----|----------------|-------|---------|-------|---------|-------|
| Work Material  |       | Cast Iron                                    | Mild Steels, Carbon Steels | Alloy Steels, Tool Steels, Ti Alloys (Annealed) | Hardened Steels, Prehardened Steels, Ti Alloys (Solution Treated and Aged) | Hardened Steels, Prehardened Steels, Stainless Steels, Inconel, Ni Based Alloys   | Hardened Steels | Hardened Steels |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| Depth of Cut   |       |  |                            |   |  | <table border="1"> <tr><td>D &lt; 1/16</td><td>Ad</td></tr> <tr><td>1/16 ≤ D &lt; 1/8</td><td>0.1D</td></tr> <tr><td>1/8 ≤ D</td><td>0.3D</td></tr> <tr><td>1/8 ≤ D</td><td>0.5D</td></tr> </table> |                 | D < 1/16        | Ad     | 1/16 ≤ D < 1/8 | 0.1D   | 1/8 ≤ D | 0.3D   | 1/8 ≤ D | 0.5D   | <table border="1"> <tr><td>D &lt; 1/16</td><td>Ad</td></tr> <tr><td>1/16 ≤ D</td><td>0.02D</td></tr> <tr><td>1/16 ≤ D</td><td>0.05D</td></tr> </table> |  | D < 1/16 | Ad | 1/16 ≤ D | 0.02D | 1/16 ≤ D | 0.05D | <table border="1"> <tr><td>D &lt; 1/16</td><td>Ad</td></tr> <tr><td>1/16 ≤ D &lt; 1/8</td><td>0.01D</td></tr> <tr><td>1/8 ≤ D</td><td>0.02D</td></tr> <tr><td>1/8 ≤ D</td><td>0.05D</td></tr> </table> |  | D < 1/16 | Ad | 1/16 ≤ D < 1/8 | 0.01D | 1/8 ≤ D | 0.02D | 1/8 ≤ D | 0.05D |
| D < 1/16       | Ad    |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/16 ≤ D < 1/8 | 0.1D  |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/8 ≤ D        | 0.3D  |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/8 ≤ D        | 0.5D  |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| D < 1/16       | Ad    |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/16 ≤ D       | 0.02D |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/16 ≤ D       | 0.05D |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| D < 1/16       | Ad    |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/16 ≤ D < 1/8 | 0.01D |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/8 ≤ D        | 0.02D |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/8 ≤ D        | 0.05D |  |                            |   |  |   |                 |                 |        |                |        |         |        |         |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| Dia. (in)      | (mm)  | 360 SFM                                      |                            | 330 SFM   |  | 260 SFM   |                 | 220 SFM         |        | 280 SFM        |        | 120 SFM |        | 80 SFM  |        |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
|                |       | Speed  | Feed                       | Speed   | Feed   | Speed   | Feed            | Speed           | Feed   | Speed          | Feed   | Speed   | Feed   | Speed   | Feed   |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
|                |       | RPM  | in/min                     | RPM   | in/min   | RPM   | in/min          | RPM             | in/min | RPM            | in/min | RPM     | in/min | RPM     | in/min |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/16           | 1.5   | 19,145                                       | 6.9                        | 17,405  | 6.2  | 13,095  | 5.9             | 11,115          | 4.2    | 9,915          | 3.2    | 6,245   | 1.7    | 4,430   | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 3/32           |       | 12,710                                       | 8.3                        | 11,550  | 7.6  | 9,135   | 6.3             | 7,620           | 4.3    | 6,750          | 3.4    | 4,185   | 2.0    | 2,950   | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/8            | 3     | 9,450  | 10.7                       | 8,570   | 9.8  | 7,310   | 7.4             | 6,135           | 4.9    | 5,135          | 3.7    | 3,180   | 2.2    | 2,300   | 1.4    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 5/32           | 4     | 7,910  | 12.2                       | 7,190   | 11.1   | 5,930   | 8.6             | 5,145           | 5.8    | 4,230          | 4.2    | 2,655   | 2.4    | 1,870   | 1.4    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 3/16           |       | 7,190  | 15.4                       | 6,540   | 14.0   | 5,325   | 10.5            | 4,455           | 6.0    | 3,785          | 4.5    | 2,360   | 2.6    | 1,590   | 1.4    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 7/32           |       | 6,365  | 16.3                       | 5,790   | 14.7   | 4,690   | 11.1            | 3,855           | 6.1    | 3,285          | 4.7    | 2,045   | 2.6    | 1,365   | 1.3    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/4            | 6     | 5,600  | 16.0                       | 5,090   | 14.5   | 4,125   | 11.1            | 3,375           | 6.0    | 2,870          | 4.7    | 1,775   | 2.6    | 1,205   | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 9/32           |       | 5,000  | 15.6                       | 4,545   | 14.2   | 3,700   | 11.1            | 3,020           | 6.0    | 2,585          | 4.7    | 1,580   | 2.5    | 1,080   | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 5/16           | 8     | 4,395  | 15.3                       | 4,000   | 13.9   | 3,270   | 11.1            | 2,660           | 5.9    | 2,295          | 4.7    | 1,390   | 2.4    | 960     | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 11/32          |       | 4,035  | 15.0                       | 3,670   | 13.7   | 2,990   | 11.1            | 2,440           | 5.9    | 2,100          | 4.6    | 1,290   | 2.4    | 880     | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 3/8            |       | 3,695  | 14.7                       | 3,360   | 13.3   | 2,735   | 11.0            | 2,225           | 5.9    | 1,910          | 4.5    | 1,200   | 2.4    | 800     | 1.2    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 13/32          | 10    | 3,400  | 14.5                       | 3,090   | 13.2   | 2,505   | 10.9            | 2,040           | 5.9    | 1,750          | 4.4    | 1,110   | 2.4    | 735     | 1.1    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 7/16           |       | 3,160  | 14.5                       | 2,870   | 13.2   | 2,345   | 10.9            | 1,895           | 5.9    | 1,630          | 4.4    | 1,035   | 2.3    | 690     | 1.0    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1/2            | 12    | 2,760  | 14.5                       | 2,510   | 13.2   | 2,030   | 10.6            | 1,655           | 5.6    | 1,415          | 4.4    | 900     | 2.1    | 600     | 0.9    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 9/16           |       | 2,460  | 14.2                       | 2,230   | 13.0   | 1,770   | 10.1            | 1,480           | 5.1    | 1,240          | 4.3    | 795     | 1.9    | 530     | 0.8    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 5/8            |       | 2,195  | 12.6                       | 1,995   | 12.3   | 1,625   | 9.5             | 1,330           | 4.7    | 1,150          | 4.0    | 720     | 1.7    | 470     | 0.7    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 11/16          |       | 1,980  | 12.1                       | 1,800   | 11.2   | 1,485   | 8.7             | 1,215           | 4.3    | 1,040          | 3.7    | 650     | 1.5    | 430     | 0.7    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 3/4            | 20    | 1,760  | 11.1                       | 1,605   | 10.0   | 1,305   | 7.6             | 1,095           | 3.8    | 935            | 3.2    | 580     | 1.4    | 380     | 0.6    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 7/8            | 22    | 1,565  | 9.8                        | 1,420   | 8.9  | 1,140   | 6.8             | 960             | 3.3    | 815            | 2.8    | 510     | 1.2    | 340     | 0.5    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |
| 1              | 25    | 1,360  | 8.5                        | 1,240   | 7.7  | 1,020   | 6.0             | 840             | 3.0    | 720            | 2.6    | 440     | 0.9    | 300     | 0.5    |  |  |          |    |          |       |          |       |  |  |          |    |                |       |         |       |         |       |

Milling

## Typhoon Modified AlTiN Carbide End Mills



### Side Milling — 4-Flute Square End & 4-Flute Corner Radius

| Hardness      |       | Tensile Strength: Up to 750N/mm <sup>2</sup> |                            | Up to 30HRC                                     | 30 to 38 HRC   | 38 to 45 HRC  | 45 to 55 HRC    | 55 to 60 HRC    |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
|---------------|-------|--|----------------------------|---|--|---|-----------------|-----------------|--------|---------|---------|---------|--------|---------|--------|------|--|--|----|----|----|-------|
| Work Material |       | Cast Iron                                    | Mild Steels, Carbon Steels | Alloy Steels, Tool Steels, Ti Alloys (Annealed) | Hardened Steels, Prehardened Steels, Ti Alloys (Solution Treated and Aged) | Hardened Steels, Prehardened Steels, Stainless Steels, Inconel, Ni Based Alloys   | Hardened Steels | Hardened Steels |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| Depth of Cut  |       |  |                            |   |  | <table border="1"> <tr><td>D &lt; 1/8</td><td>Ad</td><td>Rd</td></tr> <tr><td>1/8 ≤ D</td><td>1.5D</td><td>0.05D</td></tr> <tr><td>1/8 ≤ D</td><td>1.5D</td><td>0.1D</td></tr> </table> |                 | D < 1/8         | Ad     | Rd      | 1/8 ≤ D | 1.5D    | 0.05D  | 1/8 ≤ D | 1.5D   | 0.1D | <table border="1"> <tr><td>Ad</td><td>Rd</td></tr> <tr><td>1D</td><td>0.02D</td></tr> </table> |  | Ad | Rd | 1D | 0.02D |
| D < 1/8       | Ad    | Rd   |                            |   |  |   |                 |                 |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| 1/8 ≤ D       | 1.5D  | 0.05D  |                            |   |  |   |                 |                 |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| 1/8 ≤ D       | 1.5D  | 0.1D   |                            |   |  |   |                 |                 |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| Ad            | Rd    |  |                            |   |  |   |                 |                 |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| 1D            | 0.02D |  |                            |   |  |   |                 |                 |        |         |         |         |        |         |        |      |  |  |    |    |    |       |
| Dia. (in)     | (mm)  | 390 SFM                                      |                            | 330 SFM   |  | 270 SFM   |                 | 220 SFM         |        | 190 SFM |         | 120 SFM |        | 80 SFM  |        |      |  |  |    |    |    |       |
|               |       | Speed  | Feed                       | Speed   | Feed   | Speed   | Feed            | Speed           | Feed   | Speed   | Feed    | Speed   | Feed   | Speed   | Feed   |      |  |  |    |    |    |       |
|               |       | RPM  | in/min                     | RPM   | in/min   | RPM   | in/min          | RPM             | in/min | RPM     | in/min  | RPM     | in/min | RPM     | in/min |      |  |  |    |    |    |       |
| 1/16          | 1.5   | 20,825                                       | 15.4                       | 18,070  | 12.5   | 15,670  | 11.2            | 10,870          | 4.7    | 9,915   | 4.2     | 6,740   | 2.6    | 5,400   | 1.6    |      |  |  |    |    |    |       |
| 3/32          |       | 16,305                                       | 21.5                       | 13,720  | 18.1   | 11,550  | 14.5            | 8,075           | 5.4    | 6,885   | 4.9     | 4,185   | 2.9    | 2,950   | 2.0    |      |  |  |    |    |    |       |
| 1/8           | 3     | 12,060                                       | 28.4                       | 10,205  | 24.0   | 8,700   | 16.9            | 7,125           | 5.9    | 5,475   | 5.2     | 3,180   | 2.9    | 2,290   | 2.2    |      |  |  |    |    |    |       |
| 5/32          | 4     | 9,630  | 29.9                       | 8,060   | 25.0   | 7,890   | 17.5            | 5,170           | 6.3    | 4,475   | 5.3     | 2,655   | 3.3    | 1,815   | 2.2    |      |  |  |    |    |    |       |
| 3/16          |       | 8,075  | 33.7                       | 6,740   | 28.3   | 5,930   | 19.4            | 4,455           | 6.5    | 3,935   | 5.7     | 2,360   | 3.5    | 1,565   | 2.0    |      |  |  |    |    |    |       |
| 7/32          |       | 7,580  | 34.8                       | 5,790   | 29.1   | 4,835   | 20.0            | 3,855           | 6.7    | 3,440   | 6.0     | 2,045   | 3.4    | 1,360   | 1.9    |      |  |  |    |    |    |       |
| 1/4           | 6     | 7,060  | 34.4                       | 5,090   | 28.9   | 4,235   | 20.0            | 3,375           | 6.9    | 3,030   | 6.1     | 1,775   | 3.3    | 1,205   | 1.9    |      |  |  |    |    |    |       |
| 9/32          |       | 5,945  | 34.0                       | 4,545   | 28.3   | 3,785   | 19.9            | 3,020           | 6.9    | 2,690   | 6.1     | 1,580   | 3.3    | 1,080   | 1.8    |      |  |  |    |    |    |       |
| 5/16          | 8     | 4,820  | 33.6                       | 4,000   | 27.8   | 3,330   | 19.8            | 2,660           | 6.9    | 2,360   | 6.1     | 1,390   | 3.2    | 960     | 1.7    |      |  |  |    |    |    |       |
| 11/32         |       | 4,385  | 33.6                       | 3,670   | 27.8   | 3,050   | 19.8            | 2,440           | 6.9    | 2,160   | 6.1     | 1,290   | 3.5    | 880     | 1.7    |      |  |  |    |    |    |       |
| 3/8           |       | 4,005  | 33.6                       | 3,360   | 27.8   | 2,795   | 19.8            | 2,225           | 6.9    | 1,970   | 6.1     | 1,200   | 3.8    | 800     | 1.7    |      |  |  |    |    |    |       |
| 13/32         | 10    | 3,680  | 33.6                       | 3,090   | 27.8   | 2,565   | 19.8            | 2,040           | 6.9    | 1,810   | 6.1     | 1,110   | 3.9    | 735     | 1.7    |      |  |  |    |    |    |       |
| 7/16          |       | 3,440  | 33.6                       | 2,870   | 27.8   | 2,405   | 19.8            | 1,895           | 6.9    | 1,690   | 6.1     | 1,035   | 3.4    | 690     | 1.5    |      |  |  |    |    |    |       |
| 1/2           | 12    | 3,010  | 32.7                       | 2,510   | 27.5   | 2,090   | 19.7            | 1,655           | 6.9    | 1,475   | 6.0     | 900     | 2.7    | 600     | 1.3    |      |  |  |    |    |    |       |
| 9/16          |       | 2,645  | 31.2                       | 2,230   | 26.9   | 1,820   | 19.6            | 1,470           | 6.7    | 1,295   | 5.8     | 795     | 2.4    | 530     | 1.1    |      |  |  |    |    |    |       |
| 5/8           |       | 2,355  | 31.4                       | 1,995   | 26.1   | 1,630   | 19.6            | 1,325           | 6.1    | 1,200   | 5.4     | 720     | 2.3    | 470     | 0.9    |      |  |  |    |    |    |       |
| 11/16         |       | 2,160  | 31.0                       | 1,800   | 25.7   | 1,485   | 19.2            | 1,215           | 5.6    | 1,090   | 5.0     | 650     | 2.0    | 430     | 0.9    |      |  |  |    |    |    |       |
| 3/4           | 20    | 1,920  | 29.7                       | 1,605   | 24.9   | 1,350   | 15.7            | 1,095           | 5.0    | 975     | 4.5     | 580     | 1.7    | 380     | 0.9    |      |  |  |    |    |    |       |
| 7/8           | 22    | 1,660  | 26.2                       | 1,420   | 22.4   | 1,185   | 15.9            | 960             | 4.3    | 850     | 3.9     | 510     | 1.4    | 335     | 0.8    |      |  |  |    |    |    |       |
| 1             | 25    | 1,485  | 23.3                       | 1,240   | 19.5   | 1,050   | 14.0            | 840             | 3.9    | 750     | 3.5     | 440     | 1.4    | 300     | 0.7    |      |  |  |    |    |    |       |



## 2 & 4-Flute Ball Nose Typhoon Modified AlTiN Carbide End Mills



### Profiling — 2-Flute Ball Nose

4-Flute Ball Nose: Increase Feeds 40% to 50%

| Hardness      |      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |        | Up to 30HRC                   |        | 30 to 38 HRC  |        | 38 to 45 HRC  |        | 45 to 55 HRC   |        | 55 to 60 HRC    |        |                 |        |  |  |    |    |       |      |  |  |
|---------------|------|---|--------|-------------------------------|--------|---|--------|---|--------|--|--------|-----------------|--------|-----------------|--------|--|--|----|----|-------|------|--|--|
| Work Material |      | Cast Iron                                       |        | Mild Steels,<br>Carbon Steels |        | Alloy Steels, Tool<br>Steels, Ti Alloys<br>(Annealed)   |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Hardened Steels |        | Hardened Steels |        |  |  |    |    |       |      |  |  |
| Depth of Cut  |      |   |        |                               |        | <table border="1"> <tr><td>Ad</td><td>pf</td></tr> <tr><td>0.1D</td><td>0.2D</td></tr> </table> |        | Ad  | pf     | 0.1D   | 0.2D   |                 |        |                 |        | <table border="1"> <tr><td>Ad</td><td>pf</td></tr> <tr><td>0.05D</td><td>0.1D</td></tr> </table> |  | Ad | pf | 0.05D | 0.1D |  |  |
| Ad            | pf   |   |        |                               |        |   |        |   |        |  |        |                 |        |                 |        |  |  |    |    |       |      |  |  |
| 0.1D          | 0.2D |   |        |                               |        |   |        |   |        |  |        |                 |        |                 |        |  |  |    |    |       |      |  |  |
| Ad            | pf   |   |        |                               |        |   |        |   |        |  |        |                 |        |                 |        |  |  |    |    |       |      |  |  |
| 0.05D         | 0.1D |   |        |                               |        |   |        |   |        |  |        |                 |        |                 |        |  |  |    |    |       |      |  |  |
| Dia. (in)     | (mm) | 575 SFM   |        | 460 SFM                       |        | 375 SFM   |        | 310 SFM   |        | 260 SFM  |        | 230 SFM         |        | 165 SFM         |        |  |  |    |    |       |      |  |  |
|               |      | Speed   | Feed   | Speed                         | Feed   | Speed   | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   | Speed           | Feed   |  |  |    |    |       |      |  |  |
|               |      | RPM   | in/min | RPM                           | in/min | RPM   | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min | RPM             | in/min |  |  |    |    |       |      |  |  |
| 1/16          | 1.5  | 32,405  | 41.0   | 29,230                        | 36.1   | 26,520  | 29.3   | 21,185  | 18.9   | 18,640   | 13.6   | 16,095          | 9.9    | 11,970          | 6.6    |  |  |    |    |       |      |  |  |
| 3/32          |      | 24,540  | 44.4   | 19,820                        | 36.1   | 16,305  | 29.4   | 13,145  | 18.9   | 11,550   | 13.7   | 9,950           | 9.9    | 7,480           | 6.6    |  |  |    |    |       |      |  |  |
| 1/8           | 3    | 17,760  | 44.4   | 14,370                        | 36.1   | 12,060  | 29.8   | 9,695   | 19.5   | 8,490  | 14.4   | 7,280           | 10.4   | 5,445           | 6.9    |  |  |    |    |       |      |  |  |
| 5/32          | 4    | 13,950  | 44.4   | 11,505                        | 36.1   | 9,630   | 29.8   | 7,695   | 20.9   | 6,725  | 17.3   | 5,760           | 12.7   | 4,300           | 8.2    |  |  |    |    |       |      |  |  |
| 3/16          |      | 11,100  | 48.3   | 9,660                         | 39.4   | 8,075   | 29.9   | 6,425   | 21.0   | 5,650  | 17.5   | 4,830           | 13.3   | 3,615           | 8.3    |  |  |    |    |       |      |  |  |
| 7/32          |      | 10,360  | 49.6   | 8,280                         | 40.4   | 6,915   | 30.9   | 5,490   | 21.5   | 4,835  | 18.0   | 4,120           | 13.7   | 3,080           | 8.5    |  |  |    |    |       |      |  |  |
| 1/4           | 6    | 9,120   | 51.6   | 7,280                         | 42.0   | 6,070   | 32.6   | 4,815   | 22.7   | 4,235  | 18.9   | 3,610           | 14.2   | 2,690           | 8.9    |  |  |    |    |       |      |  |  |
| 9/32          |      | 8,165   | 56.3   | 6,520                         | 45.6   | 5,430   | 34.9   | 4,310   | 24.4   | 3,785  | 20.2   | 3,225           | 14.7   | 2,405           | 9.4    |  |  |    |    |       |      |  |  |
| 5/16          | 8    | 7,210   | 61.0   | 5,760                         | 49.3   | 4,785   | 37.1   | 3,815   | 26.1   | 3,330  | 21.4   | 2,850           | 15.3   | 2,115           | 9.9    |  |  |    |    |       |      |  |  |
| 11/32         |      | 6,610   | 59.7   | 5,280                         | 48.0   | 4,385   | 36.5   | 3,490   | 25.7   | 3,050  | 21.0   | 2,620           | 15.5   | 1,940           | 9.9    |  |  |    |    |       |      |  |  |
| 3/8           |      | 6,040   | 57.8   | 4,830                         | 46.3   | 4,005   | 35.7   | 3,180   | 25.1   | 2,795  | 20.6   | 2,405           | 15.7   | 1,775           | 9.9    |  |  |    |    |       |      |  |  |
| 13/32         | 10   | 5,540   | 55.9   | 4,430                         | 44.6   | 3,680   | 34.8   | 2,920   | 24.5   | 2,565  | 20.3   | 2,205           | 15.6   | 1,630           | 9.8    |  |  |    |    |       |      |  |  |
| 7/16          |      | 5,165   | 54.0   | 4,120                         | 42.7   | 3,440   | 34.0   | 2,730   | 23.9   | 2,405  | 20.3   | 2,045           | 15.2   | 1,510           | 9.5    |  |  |    |    |       |      |  |  |
| 1/2           | 12   | 4,505   | 51.1   | 3,585                         | 40.7   | 3,010   | 32.6   | 2,390   | 22.9   | 2,090  | 19.7   | 1,775           | 14.5   | 1,310           | 9.1    |  |  |    |    |       |      |  |  |
| 9/16          |      | 4,000   | 49.6   | 3,170                         | 40.7   | 2,645   | 31.7   | 2,110   | 22.4   | 1,820  | 18.3   | 1,580           | 13.9   | 1,175           | 8.9    |  |  |    |    |       |      |  |  |
| 5/8           | 16   | 3,570   | 49.6   | 2,840                         | 39.7   | 2,355   | 30.5   | 1,875   | 22.4   | 1,630  | 18.0   | 1,390           | 12.8   | 1,080           | 8.7    |  |  |    |    |       |      |  |  |
| 11/16         |      | 3,275   | 47.9   | 2,595                         | 38.1   | 2,160   | 29.2   | 1,725   | 22.4   | 1,485  | 18.0   | 1,290           | 12.4   | 980             | 8.4    |  |  |    |    |       |      |  |  |
| 3/4           | 20   | 2,915   | 45.2   | 2,340                         | 36.5   | 1,920   | 27.4   | 1,545   | 21.5   | 1,350  | 17.6   | 1,175           | 11.9   | 880             | 8.1    |  |  |    |    |       |      |  |  |
| 7/8           | 22   | 2,540   | 42.1   | 2,130                         | 33.8   | 1,775   | 24.4   | 1,365   | 19.2   | 1,185  | 15.9   | 1,025           | 10.8   | 765             | 7.7    |  |  |    |    |       |      |  |  |
| 1             | 25   | 2,240   | 36.8   | 1,775                         | 31.5   | 1,475   | 21.8   | 1,180   | 16.8   | 1,050  | 13.7   | 900             | 9.8    | 670             | 6.7    |  |  |    |    |       |      |  |  |

### High-Speed Light Milling — 2-Flute Ball Nose

4-Flute Ball Nose: Increase Feeds 40% to 50%

| Hardness      |        | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |        | Up to 30HRC  |        | 30 to 38 HRC  |        | 38 to 45 HRC   |        | 45 to 55 HRC    |        | 55 to 60 HRC    |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
|---------------|--------|---|--------|--|--------|---|--------|--|--------|-----------------|--------|-----------------|--------|--|--|--|--|---------|----|----|--|-------|-------|---------|--------|-------|--|--|
| Work Material |        | Mild Steels,<br>Carbon Steels                   |        | Alloy Steels, Tool Steels,<br>Ti Alloys (Annealed) |        | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged)               |        | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys |        | Hardened Steels |        | Hardened Steels |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| Depth of Cut  |        |   |        |  |        | <table border="1"> <tr><td>Ad</td><td>pf</td></tr> <tr><td>0.02D</td><td>0.05D</td></tr> </table> |        | Ad   | pf     | 0.02D           | 0.05D  |                 |        |  |  | <table border="1"> <tr><td>D &lt; 5/8</td><td>Ad</td><td>pf</td></tr> <tr><td></td><td>0.02D</td><td>0.05D</td></tr> <tr><td>5/8 ≤ D</td><td>0.012"</td><td>0.05D</td></tr> </table> |  | D < 5/8 | Ad | pf |  | 0.02D | 0.05D | 5/8 ≤ D | 0.012" | 0.05D |  |  |
| Ad            | pf     |   |        |  |        |   |        |  |        |                 |        |                 |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 0.02D         | 0.05D  |   |        |  |        |   |        |  |        |                 |        |                 |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| D < 5/8       | Ad     | pf  |        |  |        |   |        |  |        |                 |        |                 |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
|               | 0.02D  | 0.05D   |        |  |        |   |        |  |        |                 |        |                 |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 5/8 ≤ D       | 0.012" | 0.05D   |        |  |        |   |        |  |        |                 |        |                 |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| Dia. (in)     | (mm)   | 985 SFM   |        | 855 SFM  |        | 740 SFM   |        | 590 SFM  |        | 590 SFM         |        | 400 SFM         |        |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
|               |        | Speed   | Feed   | Speed  | Feed   | Speed   | Feed   | Speed  | Feed   | Speed           | Feed   | Speed           | Feed   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
|               |        | RPM   | in/min | RPM  | in/min | RPM   | in/min | RPM  | in/min | RPM             | in/min | RPM             | in/min |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 1/16          | 1.5    | 39,125  | 126.4  | 35,305   | 110.2  | 35,010  | 98.4   | 33,400   | 88.6   | 88.6            | 59.4   | 17,650          | 39.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 3/32          |        | 27,490  | 137.8  | 21,750   | 110.2  | 21,250  | 98.4   | 20,450   | 88.6   | 88.6            | 61.0   | 10,950          | 39.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 1/8           | 3      | 20,475  | 139.2  | 16,325   | 114.4  | 15,825  | 100.1  | 15,150   | 90.0   | 90.0            | 63.4   | 8,355           | 40.0   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 5/32          | 4      | 18,085  | 145.4  | 15,525   | 133.1  | 15,025  | 108.0  | 13,555   | 96.2   | 96.2            | 74.4   | 7,960           | 43.1   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 3/16          |        | 16,085  | 154.6  | 15,110   | 153.3  | 14,230  | 112.8  | 11,585   | 91.9   | 91.9            | 80.8   | 7,675           | 46.3   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 7/32          |        | 15,215  | 175.0  | 14,160   | 164.9  | 12,600  | 110.9  | 10,160   | 89.4   | 89.4            | 85.9   | 7,035           | 46.1   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 1/4           | 6      | 14,380  | 181.0  | 12,880   | 161.7  | 11,050  | 103.8  | 9,080  | 84.8   | 84.8            | 84.8   | 6,305           | 43.5   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 9/32          |        | 12,990  | 163.1  | 11,490   | 144.5  | 10,035  | 93.6   | 8,150  | 76.2   | 76.2            | 76.2   | 5,650           | 39.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 5/16          | 8      | 11,600  | 145.1  | 10,100   | 127.3  | 9,025   | 83.5   | 7,215  | 67.6   | 67.6            | 67.6   | 5,000           | 35.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 11/32         |        | 10,760  | 134.3  | 9,355  | 117.3  | 8,285   | 76.9   | 6,610  | 61.9   | 61.9            | 61.9   | 4,575           | 32.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 3/8           |        | 9,975   | 124.2  | 8,660  | 108.0  | 7,575   | 70.7   | 6,035  | 56.4   | 56.4            | 56.4   | 4,180           | 29.6   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 13/32         | 10     | 9,250   | 115.0  | 8,025  | 99.5   | 6,950   | 65.0   | 5,540  | 51.6   | 51.6            | 51.6   | 3,840           | 27.2   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 7/16          |        | 8,630   | 107.1  | 7,465  | 92.5   | 6,475   | 60.4   | 5,165  | 47.6   | 47.6            | 47.6   | 3,580           | 25.3   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 1/2           | 12     | 7,540   | 93.6   | 6,510  | 80.5   | 5,650   | 52.4   | 4,500  | 41.5   | 41.5            | 41.5   | 3,125           | 22.0   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 9/16          |        | 6,675   | 83.2   | 5,785  | 71.4   | 5,000   | 46.4   | 3,975  | 37.5   | 37.5            | 37.5   | 2,740           | 19.3   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 5/8           | 16     | 6,000   | 75.4   | 5,190  | 63.6   | 4,485   | 41.7   | 3,575  | 33.7   | 33.7            | 33.7   | 2,465           | 17.4   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 11/16         |        | 5,465   | 67.6   | 4,705  | 58.7   | 4,075   | 38.3   | 3,250  | 30.7   | 30.7            | 30.7   | 2,260           | 16.0   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 3/4           | 20     | 4,890   | 60.6   | 4,215  | 52.8   | 3,650   | 34.4   | 2,925  | 27.6   | 27.6            | 27.6   | 2,010           | 14.3   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 7/8           | 22     | 4,255   | 53.2   | 3,710  | 46.3   | 3,190   | 30.2   | 2,550  | 24.0   | 24.0            | 24.1   | 1,755           | 12.3   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |
| 1             | 25     | 3,740   | 46.6   | 3,250  | 40.8   | 2,805   | 26.4   | 2,215  | 21.0   | 21.0            | 21.0   | 1,525           | 10.7   |  |  |  |  |         |    |    |  |       |       |         |        |       |  |  |

# Typhoon Modified AlTiN Mold Mills



## Mold Mills for Profile Milling

| Hardness      |       | Tensile Strength:<br>Up to 750N/mm <sup>2</sup> |                               | Up to 30HRC   | 30 to 38 HRC  | 38 to 45 HRC   | 45 to 55 HRC    | 55 to 60 HRC    |         |         |         |         |        |         |        |  |  |  |
|---------------|-------|---|-------------------------------|---|---|--|-----------------|-----------------|---------|---------|---------|---------|--------|---------|--------|--|--|--|
| Work Material |       | Cast Iron                                       | Mild Steels,<br>Carbon Steels | Alloy Steels, Tool<br>Steels, Ti Alloys<br>(Annealed) | Hardened Steels,<br>Prehardened Steels,<br>Ti Alloys (Solution<br>Treated and Aged)   | Hardened Steels,<br>Prehardened Steels,<br>Stainless Steels, Inconel,<br>Ni Based Alloys | Hardened Steels | Hardened Steels |         |         |         |         |        |         |        |  |  |  |
| Depth of Cut  |       |   |                               |   | <table border="1"> <tr><td colspan="2">Ad</td></tr> <tr><td>D &lt; 5/8</td><td>0.05D</td></tr> <tr><td>5/8 ≤ D</td><td>0.03"</td></tr> </table> |  | Ad              |                 | D < 5/8 | 0.05D   | 5/8 ≤ D | 0.03"   |        |         |        |  |  |  |
| Ad            |       |   |                               |   |   |  |                 |                 |         |         |         |         |        |         |        |  |  |  |
| D < 5/8       | 0.05D |   |                               |   |   |  |                 |                 |         |         |         |         |        |         |        |  |  |  |
| 5/8 ≤ D       | 0.03" |   |                               |   |   |  |                 |                 |         |         |         |         |        |         |        |  |  |  |
| Dia. (in)     | (mm)  | 550 SFM   |                               | 550 SFM   |   | 450 SFM  |                 | 360 SFM         |         | 270 SFM |         | 230 SFM |        | 200 SFM |        |  |  |  |
|               |       | Speed   | Feed                          | Speed   | Feed  | Speed  | Feed            | Speed           | Feed    | Speed   | Feed    | Speed   | Feed   | Speed   | Feed   |  |  |  |
|               |       | RPM   | in/min                        | RPM   | in/min  | RPM  | in/min          | RPM             | in/min  | RPM     | in/min  | RPM     | in/min | RPM     | in/min |  |  |  |
| 1/8           | 3     | 14,400  | 40.8                          | 14,400  | 34.8  | 12,720   | 28.8            | 10,200          | 19.2    | 7,680   | 14.4    | 6,528   | 10.5   | 5,683   | 9.4    |  |  |  |
| 3/16          | 5     | 11,520  | 43.2                          | 11,520  | 34.8  | 9,600  | 28.8            | 7,680           | 21.6    | 5,760   | 16.8    | 4,896   | 12.3   | 4,262   | 10.9   |  |  |  |
| 1/4           | 6     | 9,120   | 43.2                          | 9,120   | 34.8  | 7,680  | 28.8            | 6,120           | 22.8    | 4,560   | 16.8    | 3,876   | 12.3   | 3,374   | 10.9   |  |  |  |
| 5/16          | 8     | 7,680   | 43.2                          | 7,680   | 36.0  | 6,360  | 28.8            | 5,040           | 24.0    | 3,840   | 18.0    | 3,264   | 13.1   | 2,842   | 11.7   |  |  |  |
| 3/8           | 10    | 5,760   | 32.4                          | 5,760   | 27.6  | 4,800  | 22.8            | 3,840           | 18.0    | 2,880   | 13.2    | 2,448   | 9.6    | 2,131   | 8.6    |  |  |  |
| 7/16          | 11    | 4,560   | 25.2                          | 4,560   | 21.6  | 3,840  | 18.0            | 3,000           | 14.4    | 2,280   | 10.8    | 1,938   | 7.9    | 1,687   | 7.0    |  |  |  |
| 1/2           | 12    | 4,200   | 24.0                          | 4,200   | 19.2  | 3,480  | 16.8            | 2,760           | 13.2    | 2,040   | 9.6     | 1,734   | 7.0    | 1,510   | 6.2    |  |  |  |
| 9/16          | 14    | 3,840   | 21.6                          | 3,840   | 18.0  | 3,120  | 15.6            | 2,520           | 12.0    | 1,920   | 9.6     | 1,632   | 7.0    | 1,421   | 6.2    |  |  |  |
| 5/8           | 16    | 2,880   | 16.8                          | 2,880   | 13.2  | 2,400  | 10.8            | 1,920           | 9.6     | 1,440   | 7.2     | 1,224   | 5.3    | 1,066   | 4.7    |  |  |  |
| 3/4           | 20    | 2,280   | 13.2                          | 2,280   | 10.8  | 1,920  | 9.6             | 1,560           | 7.2     | 1,140   | 6.0     | 969     | 4.4    | 844     | 3.9    |  |  |  |
| 1             | 25    | 1,800   | 10.8                          | 1,800   | 8.4   | 1,560  | 7.2             | 1,200           | 6.0     | 912     | 4.8     | 775     | 3.5    | 675     | 3.1    |  |  |  |

Milling

# Multi-Flute 50° High Spiral Typhoon Modified AlTiN Carbide End Mills



## Side Milling

| Work Material |      | Mild Steel<br>Carbon Steel<br>Cast Iron |        | Alloy Steels<br>Tool Steels |        | Hardened Steels<br>Tool Steels |        | Hardened Steels<br>Tool Steels |        | Titanium Alloy |        | Nickel Base<br>High-Temp Alloy |        |
|---------------|------|---|--------|-----------------------------|--------|--------------------------------|--------|--------------------------------|--------|----------------|--------|--------------------------------|--------|
| Hardness      |      | Up to 25HRC                             |        | 25-45 HRC                   |        | 45-55 HRC                      |        | 55-60 HRC                      |        | 30-40 HRC      |        | 25-45 HRC                      |        |
| Depth of Cut  |      |   |        |                             |        |                                |        |                                |        |                |        |                                |        |
| Dia. (in)     | (mm) | 312-540 SFM                             |        | 156-312 SFM                 |        | 96-156 SFM                     |        | 60-96 SFM                      |        | 156-276 SFM    |        | 48-80 SFM                      |        |
|               |      | Speed                                   | Feed   | Speed                       | Feed   | Speed                          | Feed   | Speed                          | Feed   | Speed          | Feed   | Speed                          | Feed   |
|               |      | RPM                                     | in/min | RPM                         | in/min | RPM                            | in/min | RPM                            | in/min | RPM            | in/min | RPM                            | in/min |
| 1/8           | 3    | 11,400                                  | 70.8   | 6,360                       | 19.2   | 3,240                          | 7.2    | 2,280                          | 4.8    | 5,040          | 33.6   | 1,680                          | 2.4    |
| 5/32          | 4    | 8,640                                   | 70.8   | 4,800                       | 19.2   | 2,640                          | 9.6    | 1,800                          | 4.8    | 3,840          | 36.0   | 1,260                          | 2.4    |
| 3/16          | 5    | 6,840                                   | 61.2   | 3,840                       | 19.2   | 2,160                          | 10.8   | 1,560                          | 4.8    | 3,000          | 36.0   | 984                            | 3.6    |
| 1/4           | 6    | 6,360                                   | 122.4  | 3,480                       | 39.6   | 1,920                          | 14.4   | 1,320                          | 7.2    | 2,520          | 42.0   | 840                            | 4.8    |
| 5/16          | 8    | 4,800                                   | 112.8  | 2,640                       | 39.6   | 1,440                          | 14.4   | 996                            | 7.2    | 1,920          | 42.0   | 624                            | 4.8    |
| 3/8           | 10   | 3,840                                   | 99.6   | 2,160                       | 39.6   | 1,152                          | 13.2   | 804                            | 7.2    | 1,560          | 37.2   | 480                            | 4.8    |
| 1/2           | 12   | 3,480                                   | 99.6   | 1,920                       | 36.0   | 960                            | 13.2   | 672                            | 6.0    | 1,260          | 36.0   | 408                            | 3.6    |
| 5/8           | 16   | 2,640                                   | 75.6   | 1,440                       | 27.6   | 720                            | 10.8   | 528                            | 4.8    | 960            | 33.6   | 312                            | 3.6    |
| 3/4           | 20   | 2,160                                   | 61.2   | 1,140                       | 21.6   | 576                            | 7.2    | 420                            | 3.6    | 780            | 28.8   | 240                            | 3.6    |
| 1             | 25   | 1,500                                   | 56.4   | 900                         | 22.8   | 450                            | 8.4    | 300                            | 3.6    | 720            | 24.0   | 216                            | 2.4    |
| 1/8           | 3    | 11,400                                  | 70.8   | 6,360                       | 19.2   | 3,240                          | 7.2    | 2,280                          | 4.8    | 5,040          | 33.6   | 1,680                          | 2.4    |
| 5/32          | 4    | 8,640                                   | 70.8   | 4,800                       | 19.2   | 2,640                          | 9.6    | 1,800                          | 4.8    | 3,840          | 36.0   | 1,260                          | 2.4    |
| 3/16          | 5    | 6,840                                   | 61.2   | 3,840                       | 19.2   | 2,160                          | 10.8   | 1,560                          | 4.8    | 3,000          | 36.0   | 984                            | 3.6    |
| 1/4           | 6    | 6,360                                   | 122.4  | 3,480                       | 39.6   | 1,920                          | 14.4   | 1,320                          | 7.2    | 2,520          | 42.0   | 840                            | 4.8    |
| 5/16          | 8    | 4,800                                   | 112.8  | 2,640                       | 39.6   | 1,440                          | 14.4   | 996                            | 7.2    | 1,920          | 42.0   | 624                            | 4.8    |
| 3/8           | 10   | 3,840                                   | 99.6   | 2,160                       | 39.6   | 1,152                          | 13.2   | 804                            | 7.2    | 1,560          | 37.2   | 480                            | 4.8    |
| 1/2           | 12   | 3,480                                   | 99.6   | 1,920                       | 36.0   | 960                            | 13.2   | 672                            | 6.0    | 1,260          | 36.0   | 408                            | 3.6    |
| 5/8           | 16   | 2,640                                   | 75.6   | 1,440                       | 27.6   | 720                            | 10.8   | 528                            | 4.8    | 960            | 33.6   | 312                            | 3.6    |
| 3/4           | 20   | 2,160                                   | 61.2   | 1,140                       | 21.6   | 576                            | 7.2    | 420                            | 3.6    | 780            | 28.8   | 240                            | 3.6    |
| 1             | 25   | 1,500                                   | 56.4   | 900                         | 22.8   | 450                            | 8.4    | 300                            | 3.6    | 720            | 24.0   | 216                            | 2.4    |

## Typhoon Modified AlTiN Carbide Roughing End Mills



### Roughing Side Cutting

| Hardness      |          | Up to 30HRC                                     |                | 30 to 38 HRC                              |                | 38 to 45 HRC                              |                | 45 to 55 HRC                  |                | 55 to 65 HRC            |                |
|---------------|----------|---|----------------|---|----------------|---|----------------|-------------------------------|----------------|-------------------------|----------------|
| Work Material |          | Non-Alloyed Steels<br>Alloy Steels<br>Cast Iron |                | Alloys Steels<br>Heat Resistant<br>Steels |                | Alloys Steels<br>Heat Resistant<br>Steels |                | Hardened Steels               |                | Hardened Steels         |                |
| Depth of Cut  |          |   |                |   |                |   |                |                               |                |                         |                |
| Dia. (in)     | Strength | Up to 1000N/mm <sup>2</sup>                     |                | 1000 to 1200N/mm <sup>2</sup>             |                | 1200 to 1400N/mm <sup>2</sup>             |                | 1400 to 2000N/mm <sup>2</sup> |                | 2000N/mm <sup>2</sup> ~ |                |
|               | (mm)     | Speed<br>RPM                                    | Feed<br>in/min | Speed<br>RPM                              | Feed<br>in/min | Speed<br>RPM                              | Feed<br>in/min | Speed<br>RPM                  | Feed<br>in/min | Speed<br>RPM            | Feed<br>in/min |
| 1/4           | 6        | 15,600  | 91.35          | 12,400                                    | 33.10          | 8,400                                     | 22.45          | 3,400                         | 10.25          | 2,400                   | 7.50           |
| 5/16          | 8        | 11,600  | 91.35          | 9,200                                     | 33.10          | 6,300                                     | 22.45          | 2,400                         | 9.50           | 1,800                   | 7.10           |
| 3/8           | 10       | 9,200   | 91.35          | 7,600                                     | 33.10          | 5,100                                     | 22.45          | 2,000                         | 11.40          | 1,300                   | 7.50           |
| 1/2           | 12       | 8000  | 94.50          | 6,000                                     | 31.50          | 4,200                                     | 22.45          | 1,680                         | 10.25          | 1,200                   | 7.50           |
| 5/8           | 16       | 6000  | 94.50          | 4,800                                     | 29.90          | 3,300                                     | 20.05          | 1,200                         | 6.30           | 800                     | 4.35           |
| 3/4           | 20       | 5200  | 91.35          | 4,400                                     | 28.35          | 2,700                                     | 16.55          | 1,100                         | 5.90           | 700                     | 3.95           |
| 1             | 25       | 4800  | 85.05          | 3,600                                     | 22.05          | 2,400                                     | 14.15          | 1,000                         | 5.90           | 660                     | 3.95           |

## 2-Flute Square End, Necked Design, Standard & Long Length Carbide End Mills — PC410



### Slot Milling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>   | Up to 30HRC                                       |                | 30 to 38 HRC  |              | 38 to 45 HRC  |              | 45 to 55 HRC    |              | 55 to 60 HRC    |              |                       |  |  |  |  |  |
|---------------|---|---|----------------|---|--------------|---|--------------|-----------------|--------------|-----------------|--------------|-----------------------|--|--|--|--|--|
| Work Material | Mild Steel,<br>Carbon Steel   | Alloy Steels, Tool Steel,<br>Ti Alloys (Annealed) |                | Hardened Steel,<br>Prehardened Steel,<br>Ti Alloys (Solution<br>Treated and Aged) |              | Hardened Steel,<br>Prehardened Steel,<br>Stainless Steel, Inconel,<br>Ni Based Alloys |              | Hardened Steels |              | Hardened Steels |              |                       |  |  |  |  |  |
| Cut Speed     | 96 m/min  | 78 m/min  |                | 66 m/min  |              | 60 m/min  |              | 36 m/min        |              | 18 m/min        |              |                       |  |  |  |  |  |
| Depth of Cut  | <table border="1"> <tr><th>a<sub>a</sub></th></tr> <tr><td>D &lt; 1/16</td><td>0.05D</td></tr> <tr><td>1/16 ≤ D</td><td>0.1D</td></tr> </table> |   | a <sub>a</sub> | D < 1/16  | 0.05D        | 1/16 ≤ D  | 0.1D         |                 |              |                 |              | a <sub>a</sub> =0.02D |  |  |  |  |  |
|               | a <sub>a</sub>  |   |                |   |              |   |              |                 |              |                 |              |                       |  |  |  |  |  |
| D < 1/16      | 0.05D   |   |                |   |              |   |              |                 |              |                 |              |                       |  |  |  |  |  |
| 1/16 ≤ D      | 0.1D  |   |                |   |              |   |              |                 |              |                 |              |                       |  |  |  |  |  |
| Dia. (mm)     | Speed<br>RPM  | Feed<br>mm/min                                    | Speed<br>RPM   | Feed<br>mm/min  | Speed<br>RPM | Feed<br>mm/min  | Speed<br>RPM | Feed<br>mm/min  | Speed<br>RPM | Feed<br>mm/min  | Speed<br>RPM | Feed<br>mm/min        |  |  |  |  |  |
| 0.5           | 44,160  | 350   | 44,160         | 280   | 44,160       | 280   | 42,090       | 210             | 26,220       | 110             | 13,800       | 40                    |  |  |  |  |  |
| 0.6           | 44,160  | 410   | 44,160         | 350   | 40,710       | 300   | 34,500       | 280             | 21,390       | 110             | 11,660       | 40                    |  |  |  |  |  |
| 0.8           | 43,470  | 550   | 37,260         | 480   | 30,360       | 350   | 26,220       | 280             | 15,870       | 110             | 8,760        | 40                    |  |  |  |  |  |
| 1.0           | 36,570  | 690   | 29,670         | 620   | 24,150       | 480   | 20,700       | 350             | 13,110       | 110             | 6,970        | 40                    |  |  |  |  |  |
| 1.5           | 24,150  | 830   | 19,320         | 690   | 15,870       | 550   | 13,800       | 350             | 8,760        | 110             | 4,620        | 40                    |  |  |  |  |  |
| 2.0           | 17,940  | 830   | 14,490         | 690   | 12,280       | 550   | 10,490       | 350             | 6,550        | 110             | 3,450        | 40                    |  |  |  |  |  |
| 2.5           | 14,490  | 830   | 11,940         | 690   | 9,800        | 550   | 8,420        | 350             | 5,240        | 110             | 2,760        | 40                    |  |  |  |  |  |

## 2-Flute Square End Long Reach Carbide End Mills — PC412




### Slot Milling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>   | Up to 30HRC                                       |                | 30 to 38 HRC  |        | 38 to 45 HRC  |        | 45 to 55 HRC    |       | 55 to 60 HRC    |       |                       |  |  |  |  |  |
|---------------|---|---|----------------|---|--------|---|--------|-----------------|-------|-----------------|-------|-----------------------|--|--|--|--|--|
| Work Material | Mild Steel,<br>Carbon Steel   | Alloy Steels, Tool Steel,<br>Ti Alloys (Annealed) |                | Hardened Steel,<br>Prehardened Steel,<br>Ti Alloys (Solution<br>Treated and Aged) |        | Hardened Steel,<br>Prehardened Steel,<br>Stainless Steel, Inconel,<br>Ni Based Alloys |        | Hardened Steels |       | Hardened Steels |       |                       |  |  |  |  |  |
| Cut Speed     | 103 m/min   | 88 m/min  |                | 75 m/min  |        | 66 m/min  |        | 41 m/min        |       | 22 m/min        |       |                       |  |  |  |  |  |
| Depth of Cut  | <table border="1"> <tr><th>a<sub>a</sub></th></tr> <tr><td>D &lt; 1/16</td><td>0.05D</td></tr> <tr><td>1/16 ≤ D</td><td>0.1D</td></tr> </table> |   | a <sub>a</sub> | D < 1/16  | 0.05D  | 1/16 ≤ D  | 0.1D   |                 |       |                 |       | a <sub>a</sub> =0.02D |  |  |  |  |  |
|               | a <sub>a</sub>  |   |                |   |        |   |        |                 |       |                 |       |                       |  |  |  |  |  |
| D < 1/16      | 0.05D   |   |                |   |        |   |        |                 |       |                 |       |                       |  |  |  |  |  |
| 1/16 ≤ D      | 0.1D  |   |                |   |        |   |        |                 |       |                 |       |                       |  |  |  |  |  |
| Dia. (mm)     | RPM   | Feed mm/min                                       | RPM            | Feed mm/min   | RPM    | Feed mm/min   | RPM    | Feed mm/min     | RPM   | Feed mm/min     | RPM   | Feed mm/min           |  |  |  |  |  |
| 2             | 17,940  | 830   | 14,490         | 690   | 12,280 | 550   | 10,490 | 350             | 6,550 | 110             | 3,450 | 40                    |  |  |  |  |  |
| 2.5           | 14,490  | 830   | 11,940         | 690   | 9,800  | 550   | 8,420  | 350             | 5,240 | 110             | 2,760 | 40                    |  |  |  |  |  |
| 3             | 10,870  | 745   | 9,330          | 665   | 7,990  | 555   | 6,960  | 355             | 4,340 | 110             | 2,310 | 40                    |  |  |  |  |  |
| 3.5           | 9,210   | 745   | 7,900          | 660   | 6,770  | 540   | 5,900  | 345             | 3,680 | 110             | 1,960 | 40                    |  |  |  |  |  |
| 4             | 8,150   | 755   | 7,000          | 665   | 5,990  | 535   | 5,220  | 350             | 3,250 | 110             | 1,740 | 40                    |  |  |  |  |  |
| 4.5           | 7,250   | 750   | 6,220          | 665   | 5,330  | 555   | 4,640  | 355             | 2,890 | 110             | 1,540 | 40                    |  |  |  |  |  |

## 2-Flute Ball Nose Necked Design Short Length & Extended Reach Carbide End Mills — PC413, PC419



### High Speed Milling


| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>  |             | Up to 30HRC                                    |             | 30 to 38 HRC   |             | 38 to 45 HRC  |             | 45 to 55 HRC    |             | 55 to 60 HRC    |             |  |       |       |         |       |       |         |        |       |
|---------------|--|-------------|--|-------------|--|-------------|---|-------------|-----------------|-------------|-----------------|-------------|--|-------|-------|---------|-------|-------|---------|--------|-------|
| Work Material | Mild Steel, Carbon Steel   |             | Alloy Steels, Tool Steel, Ti Alloys (Annealed) |             | Hardened Steel, Prehardened Steel, Ti Alloys (Solution Treated and Aged) |             | Hardened Steel, Prehardened Steel, Stainless Steel, Inconel, Ni Based Alloys  |             | Hardened Steels |             | Hardened Steels |             |  |       |       |         |       |       |         |        |       |
| Cut Speed     | 290 m/min  |             | 250 m/min                                      |             | 220 m/min  |             | 175 m/min   |             | 175 m/min       |             | 120 m/min       |             |  |       |       |         |       |       |         |        |       |
| Depth of Cut  | $a_a=0.02D$<br>$a_r=0.05D$  |             |  |             |  |             | <table border="1"> <thead> <tr> <th></th> <th><math>a_a</math></th> <th><math>a_r</math></th> </tr> </thead> <tbody> <tr> <td><math>D &lt; 8</math></td> <td>0.02D</td> <td>0.05D</td> </tr> <tr> <td><math>8 &lt; R</math></td> <td>0.32mm</td> <td>0.05D</td> </tr> </tbody> </table> |             |                 |             |                 |             |  | $a_a$ | $a_r$ | $D < 8$ | 0.02D | 0.05D | $8 < R$ | 0.32mm | 0.05D |
|               |  |             |  |             |  |             |   | $a_a$       | $a_r$           |             |                 |             |  |       |       |         |       |       |         |        |       |
| $D < 8$       | 0.02D  | 0.05D       |  |             |  |             |   |             |                 |             |                 |             |  |       |       |         |       |       |         |        |       |
| $8 < R$       | 0.32mm   | 0.05D       |  |             |  |             |   |             |                 |             |                 |             |  |       |       |         |       |       |         |        |       |
| Dia. (mm)     | Speed RPM  | Feed mm/min | Speed RPM                                      | Feed mm/min | Speed RPM  | Feed mm/min | Speed RPM   | Feed mm/min | Speed RPM       | Feed mm/min | Speed RPM       | Feed mm/min |  |       |       |         |       |       |         |        |       |
| 0.5           | 57,500   | 1,670       | 57,500   | 1,610       | 57,500   | 1,610       | 57,500  | 1,380       | 36,800          | 850         | 36,800          | 850         |  |       |       |         |       |       |         |        |       |
| 0.6           | 57,500   | 1,900       | 57,500   | 1,900       | 57,500   | 1,900       | 57,500  | 1,610       | 36,800          | 1,010       | 36,800          | 1,010       |  |       |       |         |       |       |         |        |       |
| 0.8           | 57,500   | 2,530       | 57,500   | 2,530       | 57,500   | 2,300       | 57,500  | 2,190       | 36,800          | 1,320       | 36,800          | 1,150       |  |       |       |         |       |       |         |        |       |
| 1             | 57,500   | 3,220       | 57,500   | 3,220       | 57,500   | 2,880       | 54,620  | 2,590       | 36,800          | 1,670       | 28,750          | 1,150       |  |       |       |         |       |       |         |        |       |
| 2             | 36,550   | 4,010       | 29,190   | 3,220       | 28,620   | 2,880       | 27,460  | 2,590       | 19,810          | 1,780       | 14,590          | 1,150       |  |       |       |         |       |       |         |        |       |
| 3             | 23,550   | 4,070       | 18,770   | 3,340       | 18,200   | 2,920       | 17,420  | 2,630       | 12,650          | 1,850       | 9,610           | 1,170       |  |       |       |         |       |       |         |        |       |
| 4             | 20,800   | 4,250       | 17,850   | 3,890       | 17,280   | 3,150       | 15,590  | 2,810       | 12,650          | 2,170       | 9,150           | 1,260       |  |       |       |         |       |       |         |        |       |
| 5             | 17,730   | 4,750       | 16,970   | 4,700       | 15,640   | 3,310       | 12,370  | 2,640       | 11,400          | 2,440       | 8,550           | 1,370       |  |       |       |         |       |       |         |        |       |
| 6             | 16,540   | 5,290       | 14,810   | 4,720       | 12,710   | 3,030       | 10,440  | 2,480       | 10,440          | 2,480       | 7,250           | 1,270       |  |       |       |         |       |       |         |        |       |
| 8             | 13,340   | 4,240       | 11,620   | 3,720       | 10,380   | 2,440       | 8,300   | 1,970       | 8,300           | 1,970       | 5,750           | 1,030       |  |       |       |         |       |       |         |        |       |
| 10            | 10,640   | 3,360       | 9,230  | 2,910       | 7,990  | 1,900       | 6,370   | 1,510       | 6,370           | 1,510       | 4,420           | 790         |  |       |       |         |       |       |         |        |       |
| 12            | 8,670  | 2,730       | 7,490  | 2,350       | 6,500  | 1,530       | 5,180   | 1,210       | 5,180           | 1,210       | 3,590           | 640         |  |       |       |         |       |       |         |        |       |

Milling

## 2-Flute Ball Nose Necked Design Short Length & Extended Reach Carbide End Mills — PC413, PC419




### Profiling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>  |       | Up to 30HRC              |       | 30 to 38 HRC                                   |       | 38 to 45 HRC   |           | 45 to 55 HRC   |           | 55 to 60 HRC    |           |             |           |
|---------------|--|-------|--------------------------|-------|--|-------|--|-----------|--|-----------|-----------------|-----------|-------------|-----------|
| Work Material | Cast Iron  |       | Mild Steel, Carbon Steel |       | Alloy Steels, Tool Steel, Ti Alloys (Annealed) |       | Hardened Steel, Prehardened Steel, Ti Alloys (Solution Treated and Aged) |           | Hardened Steel, Prehardened Steel, Stainless Steel, Inconel, Ni Based Alloys |           | Hardened Steels |           |             |           |
| Cut Speed     | 210 m/min  |       | 168 m/min                |       | 138 m/min                                      |       | 108 m/min  |           | 96 m/min   |           | 84 m/min        |           |             |           |
| Depth of Cut  | $a_a=0.1D$<br>$a_r=0.2D$  |       |                          |       |  |       | $a_a=0.05D$<br>$a_r=0.01D$   |           |  |           |                 |           |             |           |
|               |  |       |                          |       |  |       | Dia. (mm)  | Speed RPM | Feed mm/min  | Speed RPM | Feed mm/min     | Speed RPM | Feed mm/min | Speed RPM |
| 0.5           | 52,990   | 1,040 | 52,990                   | 1,040 | 52,990   | 830   | 52,990   | 520       | 52,990   | 410       | 63,290          | 280       | 46,370      | 210       |
| 0.6           | 52,990   | 1,120 | 52,990                   | 1,120 | 52,990   | 910   | 52,990   | 550       | 52,990   | 440       | 63,290          | 300       | 46,370      | 210       |
| 0.8           | 52,990   | 1,240 | 52,990                   | 1,240 | 52,990   | 980   | 52,990   | 580       | 52,990   | 460       | 39,580          | 330       | 28,980      | 220       |
| 1             | 52,990   | 1,260 | 52,990                   | 1,260 | 52,160   | 1,020 | 41,400   | 660       | 36,430   | 470       | 31,460          | 350       | 23,180      | 230       |
| 2             | 39,120   | 1,550 | 31,800                   | 1,260 | 26,080   | 1,020 | 21,020   | 660       | 18,490   | 480       | 15,970          | 350       | 12,010      | 230       |
| 3             | 24,510   | 1,550 | 19,830                   | 1,260 | 16,640   | 1,040 | 13,370   | 680       | 11,720   | 500       | 10,050          | 360       | 7,510       | 240       |
| 4             | 19,250   | 1,550 | 15,870                   | 1,260 | 13,290   | 1,040 | 10,610   | 730       | 9,270  | 610       | 7,950           | 440       | 5,930       | 280       |
| 5             | 15,320   | 1,740 | 12,250                   | 1,410 | 10,230   | 1,060 | 8,130  | 740       | 7,160  | 610       | 6,110           | 470       | 4,580       | 290       |
| 6             | 12,590   | 1,810 | 10,050                   | 1,470 | 8,380  | 1,140 | 6,640  | 790       | 5,840  | 660       | 4,980           | 500       | 3,710       | 310       |
| 8             | 9,950  | 2,140 | 7,950                    | 1,720 | 6,600  | 1,300 | 5,260  | 910       | 4,600  | 750       | 3,930           | 530       | 2,910       | 350       |
| 10            | 7,650  | 1,960 | 6,110                    | 1,560 | 5,080  | 1,210 | 4,030  | 860       | 3,530  | 710       | 3,040           | 550       | 2,250       | 340       |
| 12            | 6,210  | 1,790 | 4,940                    | 1,420 | 4,150  | 1,140 | 3,300  | 800       | 2,880  | 680       | 2,440           | 500       | 1,810       | 320       |


## 2-Flute Tapered Pencil Neck Ball Nose End Mills — PC418



### High Speed Milling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>  |             | Up to 30HRC                                    |             | 30 to 38 HRC   |             | 38 to 45 HRC  |             | 45 to 55 HRC    |             | 55 to 60 HRC    |             |  |       |       |       |       |       |       |        |       |
|---------------|--|-------------|--|-------------|--|-------------|---|-------------|-----------------|-------------|-----------------|-------------|--|-------|-------|-------|-------|-------|-------|--------|-------|
| Work Material | Mild Steel, Carbon Steel   |             | Alloy Steels, Tool Steel, Ti Alloys (Annealed) |             | Hardened Steel, Prehardened Steel, Ti Alloys (Solution Treated and Aged) |             | Hardened Steel, Prehardened Steel, Stainless Steel, Inconel, Ni Based Alloys  |             | Hardened Steels |             | Hardened Steels |             |  |       |       |       |       |       |       |        |       |
| Cut Speed     | 261 m/min  |             | 226 m/min                                      |             | 196 m/min  |             | 157 m/min   |             | 157 m/min       |             | 109 m/min       |             |  |       |       |       |       |       |       |        |       |
| Depth of Cut  | $a_a=0.02D$<br>$a_r=0.05D$  |             |  |             |  |             | <table border="1"> <thead> <tr> <th></th> <th><math>a_a</math></th> <th><math>a_r</math></th> </tr> </thead> <tbody> <tr> <td>D &lt; 8</td> <td>0.02D</td> <td>0.05D</td> </tr> <tr> <td>8 &lt; R</td> <td>0.32mm</td> <td>0.05D</td> </tr> </tbody> </table> |             |                 |             |                 |             |  | $a_a$ | $a_r$ | D < 8 | 0.02D | 0.05D | 8 < R | 0.32mm | 0.05D |
|               |  |             |  |             |  |             |   | $a_a$       | $a_r$           |             |                 |             |  |       |       |       |       |       |       |        |       |
| D < 8         | 0.02D  | 0.05D       |  |             |  |             |   |             |                 |             |                 |             |  |       |       |       |       |       |       |        |       |
| 8 < R         | 0.32mm   | 0.05D       |  |             |  |             |   |             |                 |             |                 |             |  |       |       |       |       |       |       |        |       |
| Dia. (mm)     | RPM  | Feed mm/min | RPM  | Feed mm/min | RPM  | Feed mm/min | RPM   | Feed mm/min | RPM             | Feed mm/min | RPM             | Feed mm/min |  |       |       |       |       |       |       |        |       |
| 1             | 50,000   | 2,800       | 50,000   | 2,800       | 50,000   | 2,500       | 47,500  | 2,250       | 32,000          | 1,450       | 25,000          | 1,000       |  |       |       |       |       |       |       |        |       |
| 2             | 31,780   | 3,480       | 25,390   | 2,800       | 24,890   | 2,500       | 23,880  | 2,250       | 17,220          | 1,540       | 12,690          | 1,000       |  |       |       |       |       |       |       |        |       |
| 3             | 20,470   | 3,530       | 16,330   | 2,900       | 15,830   | 2,540       | 15,150  | 2,280       | 11,000          | 1,610       | 8,350           | 1,010       |  |       |       |       |       |       |       |        |       |
| 4             | 18,080   | 3,690       | 15,520   | 3,380       | 15,020   | 2,740       | 13,560  | 2,440       | 11,000          | 1,880       | 7,960           | 1,090       |  |       |       |       |       |       |       |        |       |
| 5             | 15,410   | 4,120       | 14,750   | 4,080       | 13,600   | 2,870       | 10,750  | 2,290       | 9,920           | 2,120       | 7,430           | 1,190       |  |       |       |       |       |       |       |        |       |
| 6             | 14,380   | 4,590       | 12,880   | 4,100       | 11,050   | 2,630       | 9,080   | 2,150       | 9,080           | 2,150       | 6,310           | 1,100       |  |       |       |       |       |       |       |        |       |
| 8             | 11,600   | 3,680       | 10,100   | 3,230       | 9,030  | 2,120       | 7,220   | 1,710       | 7,220           | 1,710       | 5,000           | 890         |  |       |       |       |       |       |       |        |       |
| 10            | 9,250  | 2,920       | 8,020  | 2,520       | 6,950  | 1,650       | 5,540   | 1,310       | 5,540           | 1,310       | 3,840           | 690         |  |       |       |       |       |       |       |        |       |
| 12            | 7,540  | 2,370       | 6,510  | 2,040       | 5,650  | 1,330       | 4,500   | 1,050       | 4,500           | 1,050       | 3,120           | 550         |  |       |       |       |       |       |       |        |       |


### Profiling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>  |       | Up to 30HRC              |       | 30 to 38 HRC                                   |       | 38 to 45 HRC   |     | 45 to 55 HRC   |     | 55 to 60 HRC    |     |             |     |
|---------------|--|-------|--------------------------|-------|--|-------|--|-----|--|-----|-----------------|-----|-------------|-----|
| Work Material | Cast Iron  |       | Mild Steel, Carbon Steel |       | Alloy Steels, Tool Steel, Ti Alloys (Annealed) |       | Hardened Steel, Prehardened Steel, Ti Alloys (Solution Treated and Aged) |     | Hardened Steel, Prehardened Steel, Stainless Steel, Inconel, Ni Based Alloys |     | Hardened Steels |     |             |     |
| Cut Speed     | 210 m/min  |       | 168 m/min                |       | 138 m/min                                      |       | 108 m/min  |     | 96 m/min   |     | 84 m/min        |     |             |     |
| Depth of Cut  | $a_a=0.1D$<br>$a_r=0.2D$  |       |                          |       |  |       | $a_a=0.05D$<br>$a_r=0.01D$   |     |  |     |                 |     |             |     |
|               |  |       |                          |       |  |       | Dia. (mm)  | RPM | Feed mm/min  | RPM | Feed mm/min     | RPM | Feed mm/min | RPM |
| 1             | 46,080   | 1,100 | 46,080                   | 1,100 | 45,360   | 890   | 36,000   | 580 | 31,680   | 410 | 27,360          | 300 | 20,160      | 200 |
| 2             | 34,030   | 1,340 | 27,650                   | 1,100 | 22,680   | 890   | 18,280   | 580 | 16,080   | 410 | 13,880          | 300 | 10,450      | 200 |
| 3             | 21,310   | 1,350 | 17,240                   | 1,100 | 14,470   | 910   | 11,630   | 590 | 10,190   | 430 | 8,740           | 310 | 6,530       | 210 |
| 4             | 16,740   | 1,350 | 13,810                   | 1,100 | 11,560   | 910   | 9,230  | 640 | 8,070  | 530 | 6,910           | 380 | 5,160       | 250 |
| 5             | 13,320   | 1,510 | 10,660                   | 1,230 | 8,900  | 920   | 7,070  | 640 | 6,230  | 530 | 5,320           | 410 | 3,980       | 250 |
| 6             | 10,940   | 1,570 | 8,740                    | 1,280 | 7,280  | 990   | 5,780  | 690 | 5,080  | 580 | 4,330           | 430 | 3,230       | 270 |
| 8             | 8,650  | 1,860 | 6,910                    | 1,500 | 5,740  | 1,130 | 4,580  | 790 | 4,000  | 650 | 3,420           | 460 | 2,540       | 300 |
| 10            | 6,650  | 1,700 | 5,320                    | 1,360 | 4,420  | 1,060 | 3,500  | 740 | 3,080  | 620 | 2,650           | 470 | 1,960       | 290 |
| 12            | 5,410  | 1,550 | 4,300                    | 1,240 | 3,610  | 990   | 2,870  | 700 | 2,510  | 590 | 2,130           | 440 | 1,570       | 280 |

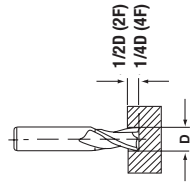
## 4-Flute Square End Long Reach Carbide End Mills — PC411



### Slot Milling

| Hardness      | Tensile Strength:<br>Up to 750N/mm <sup>2</sup>  |       | Up to 30HRC                                    |     | 30 to 38 HRC   |     | 38 to 45 HRC   |     | 45 to 55 HRC    |     | 55 to 60 HRC    |     |
|---------------|--|-------|--|-----|--|-----|--|-----|-----------------|-----|-----------------|-----|
| Work Material | Mild Steel, Carbon Steel   |       | Alloy Steels, Tool Steel, Ti Alloys (Annealed) |     | Hardened Steel, Prehardened Steel, Ti Alloys (Solution Treated and Aged) |     | Hardened Steel, Prehardened Steel, Stainless Steel, Inconel, Ni Based Alloys |     | Hardened Steels |     | Hardened Steels |     |
| Cut Speed     | 100 m/min  |       | 80 m/min                                       |     | 68 m/min   |     | 56 m/min   |     | 36 m/min        |     | 25 m/min        |     |
| Depth of Cut  | $a_a=0.1D$  |       |  |     |  |     | $a_a=0.02D$  |     |                 |     |                 |     |
|               |  |       |  |     |  |     | Dia. (mm)  | RPM | Feed mm/min     | RPM | Feed mm/min     | RPM |
| 3             | 12,280   | 1,380 | 9,940  | 970 | 8,140  | 690 | 7,040  | 550 | 4,420           | 210 | 2,900           | 70  |
| 4             | 9,250  | 1,380 | 7,450  | 970 | 6,210  | 690 | 5,240  | 550 | 3,310           | 210 | 2,210           | 70  |
| 5             | 7,310  | 1,380 | 5,930  | 970 | 4,970  | 690 | 4,280  | 550 | 2,620           | 210 | 1,790           | 70  |
| 6             | 6,210  | 1,380 | 4,970  | 970 | 4,140  | 690 | 3,450  | 550 | 2,210           | 210 | 1,520           | 70  |

| Materials | 1. Mild Steels<br>(Up to 70 x 10 <sup>3</sup> lb/in <sup>2</sup> ) |                             | 2. Brass<br>3. Bronze   |                          | 1. Medium Tensile Steels<br>(70 x 10 <sup>3</sup> - 115 x 10 <sup>3</sup> lb/in <sup>2</sup> ) |                          | 2. Mild Steel Forgings<br>3. Cast Iron<br>4. Hard Brass and Bronze<br>5. Copper |                  | 1. High Tensile Steels<br>(115 x 10 <sup>3</sup> - 142 x 10 <sup>3</sup> lb/in <sup>2</sup> ) |                  | 2. Unalloyed Titanium<br>3. Heat Resistant Ferritic Low Alloys |                  | 1. High Tensile Sheets<br>(142 x 10 <sup>3</sup> - 200 x 10 <sup>3</sup> lb/in <sup>2</sup> ) |                  | 2. Tool Steels<br>3. Medium Strength Stainless Steels<br>4. Medium Strength Titanium Alloys |                  | 1. Heat Resistant High Alloys<br>2. High Strength Stainless Steels<br>3. High Strength Titanium Alloys |                  | 1. Aluminum<br>2. Alloyed Aluminum<br>3. Plastic<br>4. Woods |                  |
|-----------|--|-----------------------------|-------------------------|--------------------------|--|--------------------------|---|------------------|---|------------------|--|------------------|---|------------------|---|------------------|--|------------------|--|------------------|
|           | Hardness   | Up to Bhn 145<br>Up to 0HRC | Bhn 145-237<br>0-22 HRC | Bhn 237-286<br>22-30 HRC | Bhn 286-390<br>30-42 HRC   | Bhn 390-451<br>42-48 HRC | rpm   | Feed<br>(in/min) | rpm   | Feed<br>(in/min) | rpm  | Feed<br>(in/min) | rpm   | Feed<br>(in/min) | rpm   | Feed<br>(in/min) | rpm  | Feed<br>(in/min) | rpm  | Feed<br>(in/min) |
| 1/8       | 4000   | 4.05                        | 3000                    | 2.70                     | 1800   | 1.35                     | 1250  | 0.079            | 800   | 0.34             | 10000  | 9.00             |   |                  |   |                  |  |                  |  |                  |
| 5/32      | 3150   | 4.50                        | 2360                    | 3.04                     | 1400   | 1.46                     | 1000  | 0.090            | 630   | 0.34             | 8000   | 10.24            |   |                  |   |                  |  |                  |  |                  |
| 3/16      | 2500   | 4.95                        | 1900                    | 3.38                     | 1120   | 1.58                     | 800   | 1.01             | 500   | 0.45             | 6300   | 10.80            |   |                  |   |                  |  |                  |  |                  |
| 1/4       | 2000   | 5.74                        | 1500                    | 3.83                     | 900  | 1.80                     | 630   | 1.13             | 400   | 0.56             | 5000   | 11.93            |   |                  |   |                  |  |                  |  |                  |
| 5/16      | 1600   | 6.41                        | 1180                    | 4.28                     | 710  | 2.03                     | 500   | 1.24             | 315   | 0.56             | 4000   | 13.73            |   |                  |   |                  |  |                  |  |                  |
| 3/8       | 1400   | 6.64                        | 1060                    | 4.50                     | 630  | 2.14                     | 450   | 1.35             | 280   | 0.56             | 3550   | 13.50            |   |                  |   |                  |  |                  |  |                  |
| 7/16      | 1120   | 6.75                        | 850                     | 4.61                     | 500  | 2.25                     | 355   | 1.35             | 224   | 0.68             | 2800   | 13.39            |   |                  |   |                  |  |                  |  |                  |
| 1/2       | 1000   | 6.75                        | 750                     | 4.28                     | 450  | 2.14                     | 315   | 1.35             | 200   | 0.68             | 2500   | 13.50            |   |                  |   |                  |  |                  |  |                  |
| 9/16      | 900  | 6.53                        | 670                     | 4.28                     | 400  | 2.14                     | 280   | 1.46             | 180   | 0.68             | 2240   | 12.71            |   |                  |   |                  |  |                  |  |                  |
| 5/8       | 800  | 6.08                        | 600                     | 4.05                     | 355  | 2.14                     | 250   | 1.46             | 160   | 0.68             | 2000   | 12.04            |   |                  |   |                  |  |                  |  |                  |
| 11/16     | 710  | 6.08                        | 530                     | 3.83                     | 315  | 2.03                     | 224   | 1.46             | 140   | 0.68             | 1800   | 12.15            |   |                  |   |                  |  |                  |  |                  |
| 3/4       | 710  | 6.08                        | 530                     | 3.83                     | 315  | 2.03                     | 224   | 1.46             | 140   | 0.68             | 1800   | 12.15            |   |                  |   |                  |  |                  |  |                  |
| 13/16     | 630  | 5.63                        | 475                     | 3.83                     | 280  | 2.03                     | 200   | 1.46             | 125   | 0.68             | 1600   | 11.48            |   |                  |   |                  |  |                  |  |                  |
| 7/8       | 560  | 5.29                        | 425                     | 3.04                     | 250  | 1.80                     | 180   | 1.35             | 112   | 0.68             | 1400   | 10.69            |   |                  |   |                  |  |                  |  |                  |
| 15/16     | 500  | 5.29                        | 375                     | 2.70                     | 224  | 1.58                     | 160   | 1.13             | 100   | 0.68             | 1250   | 10.13            |   |                  |   |                  |  |                  |  |                  |
| 1         | 500  | 5.29                        | 375                     | 2.70                     | 224  | 1.58                     | 160   | 1.13             | 100   | 0.68             | 1250   | 10.13            |   |                  |   |                  |  |                  |  |                  |
| 1-1/8     | 450  | 4.50                        | 335                     | 2.36                     | 200  | 1.46                     | 140   | 1.01             | 90  | 0.68             | 1120   | 9.56             |   |                  |   |                  |  |                  |  |                  |
| 1-1/4     | 400  | 4.28                        | 300                     | 2.14                     | 180  | 1.35                     | 125   | 0.90             | 80  | 0.56             | 1000   | 8.55             |   |                  |   |                  |  |                  |  |                  |
| 1-3/8     | 355  | 3.83                        | 265                     | 1.91                     | 160  | 1.13                     | 112   | 0.79             | 71  | 0.56             | 900  | 8.10             |   |                  |   |                  |  |                  |  |                  |
| 1-1/2     | 315  | 3.60                        | 236                     | 1.69                     | 140  | 1.01                     | 100   | 0.68             | 63  | 0.45             | 800  | 7.20             |   |                  |   |                  |  |                  |  |                  |
| 1-3/4     | 280  | 3.15                        | 212                     | 1.58                     | 125  | 0.90                     | 90  | 0.68             | 56  | 0.45             | 710  | 6.41             |   |                  |   |                  |  |                  |  |                  |
| 2         | 250  | 2.81                        | 190                     | 1.35                     | 112  | 0.79                     | 80  | 0.56             | 50  | 0.34             | 630  | 5.63             |   |                  |   |                  |  |                  |  |                  |



**NOTES:**  
 1) The cutting conditions in this table are given for reference, which should be varied depending on the machine, tooling, depth of cut, cutting fluid and other conditions  
 2) Use a holder of strong gripping force and machine of high stiffness  
 3) In case of deeper operation, slow down feed by 20-50%  
 4) The feed, in long types, should be reduced by around 50%

**NOTES:**

- The cutting conditions in this table are given for reference, which should be varied depending on the machine, tooling, depth of cut, cutting fluid and other conditions
- Use a holder of strong gripping force and machine of high stiffness
- For 2-fl end mill slow down to 1/2 of feed speed
- For finish cut put rpm, up to 1.5 to 1.3 times faster
- The feed, in long types should be reduced by around 50%

| Hardness | Up to Bhn 145<br>Up to 0HRC |               | Bhn 145-237<br>0-22 HRC |               | Bhn 237-286<br>22-30 HRC |               | Bhn 286-390<br>30-42 HRC |               | Bhn 390-451<br>42-48 HRC |               | 325-590 SFM |               |
|----------|-----------------------------|---------------|-------------------------|---------------|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|-------------|---------------|
|          | rpm                         | Feed (in/min) | rpm                     | Feed (in/min) | rpm                      | Feed (in/min) | rpm                      | Feed (in/min) | rpm                      | Feed (in/min) | rpm         | Feed (in/min) |
| 1/8      | 4500                        | 9.11          | 3550                    | 6.41          | 2240                     | 3.26          | 1250                     | 1.46          | 800                      | 0.68          | 16000       | 28.80         |
| 5/32     | 3550                        | 10.24         | 2800                    | 7.20          | 1800                     | 3.60          | 1000                     | 1.69          | 630                      | 0.79          | 12500       | 31.95         |
| 3/16     | 2800                        | 11.14         | 2240                    | 8.10          | 1400                     | 4.05          | 800                      | 1.91          | 500                      | 0.90          | 10000       | 34.20         |
| 1/4      | 2240                        | 12.94         | 1800                    | 9.11          | 1120                     | 4.50          | 630                      | 2.14          | 400                      | 1.01          | 8000        | 38.03         |
| 5/16     | 1800                        | 14.51         | 1400                    | 10.13         | 900                      | 5.18          | 500                      | 2.36          | 315                      | 1.13          | 6300        | 43.09         |
| 3/8      | 1600                        | 15.30         | 1250                    | 10.58         | 800                      | 5.51          | 450                      | 2.59          | 280                      | 1.24          | 5600        | 42.75         |
| 7/16     | 1250                        | 15.06         | 1000                    | 10.80         | 630                      | 5.63          | 355                      | 2.70          | 224                      | 1.13          | 4500        | 42.98         |
| 1/2      | 1120                        | 15.06         | 900                     | 10.24         | 560                      | 5.29          | 315                      | 2.70          | 200                      | 1.35          | 4000        | 43.20         |
| 9/16     | 1000                        | 14.40         | 800                     | 10.24         | 500                      | 5.60          | 280                      | 2.81          | 180                      | 1.35          | 3550        | 40.28         |
| 5/8      | 900                         | 13.73         | 710                     | 9.56          | 450                      | 5.60          | 250                      | 2.81          | 160                      | 1.24          | 3150        | 38.03         |
| 11/16    | 800                         | 13.73         | 630                     | 8.55          | 400                      | 5.06          | 224                      | 2.81          | 140                      | 1.24          | 2800        | 37.80         |
| 3/4      | 800                         | 13.73         | 630                     | 8.55          | 400                      | 5.06          | 224                      | 2.81          | 140                      | 1.24          | 2800        | 37.80         |
| 13/16    | 710                         | 12.83         | 560                     | 7.54          | 355                      | 5.06          | 200                      | 2.93          | 125                      | 1.24          | 2500        | 36.00         |
| 7/8      | 630                         | 12.04         | 500                     | 6.75          | 315                      | 4.50          | 180                      | 2.59          | 112                      | 1.24          | 2240        | 34.31         |
| 15/16    | 560                         | 11.25         | 450                     | 6.08          | 280                      | 4.05          | 160                      | 2.25          | 100                      | 1.24          | 2000        | 32.40         |
| 1        | 560                         | 11.25         | 450                     | 6.08          | 280                      | 4.05          | 160                      | 2.25          | 100                      | 1.24          | 2000        | 32.40         |
| 1-1/8    | 500                         | 13.97         | 400                     | 7.45          | 250                      | 4.97          | 140                      | 2.79          | 90                       | 1.86          | 1800        | 42.54         |
| 1-1/4    | 450                         | 13.35         | 355                     | 6.68          | 224                      | 4.50          | 125                      | 2.48          | 80                       | 1.55          | 1600        | 37.73         |
| 1-3/8    | 400                         | 11.95         | 315                     | 5.90          | 200                      | 4.04          | 112                      | 2.17          | 71                       | 1.40          | 1400        | 34.78         |
| 1-1/2    | 355                         | 11.18         | 280                     | 5.28          | 180                      | 3.57          | 100                      | 2.02          | 63                       | 1.24          | 1250        | 31.05         |
| 1-3/4    | 315                         | 10.69         | 250                     | 5.06          | 160                      | 3.49          | 90                       | 1.91          | 56                       | 1.24          | 1120        | 30.26         |
| 2        | 280                         | 9.56          | 224                     | 4.50          | 140                      | 3.04          | 80                       | 1.69          | 50                       | 1.13          | 1000        | 27.00         |

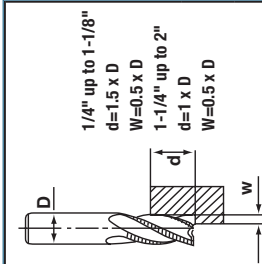
| End Mill Cutting Diameter & Shank Tolerances |              |        |                 |               |                        |  |
|--|--------------|--------|-----------------|---------------|------------------------|--|
| Type   | No. of Flute | Series | Shank Type      | Size          | Cutting Edge Tolerance | Shank Dia. Tolerance                         |
| Slot Drill & Ball Nose                       | 2-Flute      | Short  | Plain / Flatted | < 12mm & 1/2" | -0.025mm               | +0.000mm<br>-0.025mm                         |
|  |              | Long   |                 | > 12mm & 1/2" | h9                     |  |
| End Mill & Ball Nose                         | 4-Flute      | Short  | Threaded        | < 12mm & 1/2" | -0.025mm               | +0.000mm<br>-0.025mm                         |
|  |              | Long   |                 | > 12mm & 1/2" | h9                     |  |
| Slot Drill & Ball Nose                       | 2-Flute      | Short  | Threaded        | < 1.1/2"      | -0.025mm               | +0.000mm<br>-0.025mm                         |
|  |              | Long   |                 | > 1.1/2"      | h9                     |  |
| Unimill                                      | 3-Flute      | Short  | Threaded        | < 12mm & 1/2" | -0.025mm               | +0.000mm<br>-0.025mm                         |
|  |              | Long   |                 | > 12mm & 1/2" | h9                     |  |
| End Mill & Ball Nose                         | 4-Flute      | Short  | Threaded        | < 1.1/2"      | -0.025mm               | +0.000mm<br>-0.025mm                         |
|  |              | Long   |                 | > 1.1/2"      | h9                     |  |
| End Mill & Ball Nose                         | 4-Flute      | Short  | Plain / Flatted | All           | js10                   | +0.000mm<br>-0.010mm<br>+0.000mm<br>-0.025mm |
|  |              | Long   |                 | Threaded      |                        |  |

**4-Flute Ball Nose**

- Increase Feeds 40% to 50% for 4-Flute Ball Nose

**Roughing HSCO**

| Hardness | Cutting Speeds | Up to Bhn 237<br>Up to 22HRC |               | Bhn 237-286<br>22-30 HRC |               | Bhn 286-390<br>30-42 HRC |               | Bhn 390-451<br>42-48 HRC |               | 195-330 SFM |               |
|----------|----------------|------------------------------|---------------|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|-------------|---------------|
|          |                | rpm                          | Feed (in/min) | rpm                      | Feed (in/min) | rpm                      | Feed (in/min) | rpm                      | Feed (in/min) | rpm         | Feed (in/min) |
| 1/4      | 1320           | 2.36                         | 1.46          | 750                      | 0.90          | 500                      | 0.63          | 4000                     | 10.01         |             |               |
| 5/16     | 1060           | 2.70                         | 1.69          | 600                      | 1.01          | 400                      | 0.75          | 3150                     | 11.14         |             |               |
| 3/8      | 950            | 2.81                         | 1.80          | 530                      | 0.90          | 355                      | 0.75          | 2800                     | 11.70         |             |               |
| 1/2      | 670            | 3.38                         | 2.14          | 375                      | 1.35          | 250                      | 0.79          | 2000                     | 14.18         |             |               |
| 5/8      | 600            | 4.28                         | 2.36          | 300                      | 1.46          | 200                      | 0.90          | 1600                     | 15.86         |             |               |
| 3/4      | 475            | 4.05                         | 2.48          | 265                      | 1.58          | 180                      | 0.90          | 1400                     | 16.65         |             |               |
| 7/8      | 375            | 4.05                         | 2.48          | 212                      | 1.58          | 140                      | 0.90          | 1120                     | 16.88         |             |               |
| 1        | 335            | 3.71                         | 2.36          | 190                      | 1.46          | 125                      | 0.90          | 1000                     | 15.98         |             |               |
| 1-1/8    | 300            | 3.60                         | 2.25          | 170                      | 1.46          | 112                      | 0.79          | 900                      | 15.19         |             |               |
| 1-1/4    | 256            | 4.16                         | 2.70          | 150                      | 1.69          | 100                      | 1.01          | 800                      | 17.89         |             |               |
| 1-1/2    | 212            | 3.71                         | 2.36          | 118                      | 1.46          | 80                       | 0.90          | 630                      | 15.86         |             |               |
| 1-3/4    | 190            | 3.60                         | 2.25          | 106                      | 1.35          | 71                       | 0.90          | 560                      | 14.8          |             |               |
| 2        | 170            | 3.15                         | 2.02          | 95                       | 1.24          | 63                       | 0.79          | 500                      | 13.28         |             |               |



**NOTES:**  
 1) The cutting conditions in this table are given for reference, which should be varied depending on the machine, tooling, depth of cut, cutting fluid and other conditions  
 2) Use a holder of strong gripping force and machine of high stiffness  
 3) For TiN-Coated End Mills put cutting speed, feed up to 1.5-1.8 times faster  
 4) The feed, in long types, should be reduced by around 50%

**Materials**  
 1. Mild Steels (Up to 115 x 10<sup>3</sup> lb/in<sup>2</sup>)  
 2. Mild Steel Forgings  
 3. Cast Iron  
 4. Hard Brass and Bronze  
 5. Copper

**1. High Tensile Steels** (145 x 10<sup>3</sup> - 200 x 10<sup>3</sup> lb/in<sup>2</sup>)  
 2. Tool Steels  
 3. Medium Strength Titanium Alloys

**1. High Tensile Sheets** (145 x 10<sup>3</sup> - 200 x 10<sup>3</sup> lb/in<sup>2</sup>)  
 2. Heat Resistant High Alloys  
 3. High Strength Titanium Alloys  
 4. Woods

**1. Aluminum**  
 2. Alloyed Aluminum  
 3. Plastic Materials



# Drilling & Holemaking



# Drilling & Holemaking

## QTT PREMIUM CLASS CARBIDE DRILLS

|                                     |       |
|-------------------------------------|-------|
| Non-Coolant Fed 3xD, 5xD . . . . .  | B6-7  |
| Coolant Fed 3xD, 5xD, 8xD . . . . . | B8-10 |

## GENERAL DRILL INDEX

|  |        |
|--|--------|
| Jobber Length Twist Drill Sets . . . . .               | B2-4   |
| Drill Sets, Stands & Dispensers . . . . .              | B2-5   |
| Jobber Drills . . . . .                                | B2-20  |
| Black & Gold Jobber Drills . . . . .                   | B15    |
| Slow & Fast Spiral Drills . . . . .                    | B16-17 |
| Left Hand Drills . . . . .                             | B19-20 |
| Stub Drills . . . . .                                  | B21-22 |
| Prentice Drills . . . . .                              | B22-23 |
| Taper Length Drills . . . . .                          | B23-25 |
| Aircraft Extension Drills . . . . .                    | B26-27 |
| Extra Length Drills . . . . .                          | B28-29 |
| Taper Shank Drills . . . . .                           | B29-37 |
| Knock-Out Drill Drifts . . . . .                       | B34    |
| Oil Hole Drills & Coolant Inducer Sockets . . . . .    | B37-38 |
| Core Drills . . . . .                                  | B39    |
| Carbide Tipped Drills . . . . .                        | B39-42 |
| Masonry Drills . . . . .                               | B42    |
| Combined Drill & Countersinks, Centre Drills . . . . . | B44-45 |
| Spotting And Centering Drills . . . . .                | B44    |
| Vent Drills . . . . .                                  | B45    |
| Drill And Reamer Blanks . . . . .                      | B45-46 |

|                                     |        |
|-------------------------------------|--------|
| <b>SPADE DRILL SYSTEM</b> . . . . . | B47-53 |
|-------------------------------------|--------|

## COUNTERSINKS

|                                 |        |
|---------------------------------|--------|
| Chatterfree 0-Flute . . . . .   | B54    |
| Single Flute . . . . .          | B54-56 |
| 3 & 4-Flute . . . . .           | B57-58 |
| 6-Flute & Multi-Flute . . . . . | B59-61 |

## REAMERS

|  |          |
|--|----------|
| Chucking Reamers . . . . .                       | B62-68   |
| Taper Pin & Bridge Reamers . . . . .             | B69-70   |
| Jobber & Hand Reamers . . . . .                  | B70-71   |
| Taper Pipe Reamers . . . . .                     | B70, B72 |
| Shell Reamers & Arbors . . . . .                 | B71      |
| Brown and Sharpe & Morse Taper Reamers . . . . . | B72      |
| Expansion Chucking Reamers . . . . .             | B72      |
| Adjustable Blade Reamers . . . . .               | B72      |

|   |        |
|---|--------|
| <b>DRILL SPEEDS &amp; FEEDS</b> . . . . . | B73-76 |
|---|--------|

## Jobber Length Straight Shank Twist Drill Sets



1/16 to 1/2 by 64th  
Folding Metal Case Included  
29 Piece Set



Number Sizes 1 through 60  
Folding Metal Case Included  
60 Piece Set



A to Z Inclusive  
Folding Metal Case Included  
26 Piece Set



1/16 to 1/2 by 64th Inclusive  
1 to 60 Inclusive  
A to Z Inclusive  
115 Piece Set

### Sowa Premium

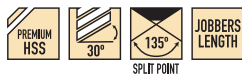
### US Made

### Quality Import

| No. pcs.      | HSS    | Price \$ | No. pcs.      | HSS    | Price \$ | Cobalt | Price \$ | TiN Coated | Price \$ | HSS    | Price \$ | TiN Coated | Price \$ | Black/Gold | Price \$ |
|---------------|--------|----------|---------------|--------|----------|--------|----------|------------|----------|--------|----------|------------|----------|------------|----------|
| 29 - 1/16-1/2 | 128119 | 288.19   | 29 - 1/16-1/2 | 118119 | 225.21   | 118121 | 394.31   | 118122     | 482.98   | -      | -        | 105370     | 142.99   | 105380     | 139.71   |
| 60 - #1-60    | 128190 | 245.57   | 60 - #1-60    | 118124 | 183.52   | -      | -        | -          | -        | -      | -        | -          | -        | -          | -        |
| 26 - A-Z      | 128276 | 317.84   | 20 - #61-80   | -      | -        | -      | -        | -          | -        | 105830 | 58.95    | -          | -        | -          | -        |
| 115 - 3 in 1  | 128280 | 872.63   | 26 - A-Z      | 118125 | 230.73   | -      | -        | -          | -        | -      | -        | -          | -        | -          | -        |
|               |        |          | 115 - 3 in 1  | 118123 | 648.73   | -      | -        | -          | -        | -      | -        | -          | -        | -          | -        |

## Premium HSS Jobber Length Drill Sets

These Premium HSS drills can be used in a variety of applications. Their surface treatment increases abrasion resistance, which reduces the amount of chip welding and improves chip flow.

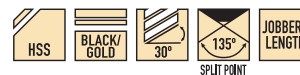


| Description                       | Pieces Per Set | Code No. | Price \$ |
|-----------------------------------|----------------|----------|----------|
| 1/16 - 1/2 x 64ths Fractional Set | 29             | 128119   | 288.19   |
| #1 - #60 Number Set               | 60             | 128190   | 245.57   |
| A - Z Letter Set                  | 26             | 128276   | 317.84   |
| 3 in 1 Fractional/Number/Letter   | 115            | 128280   | 872.63   |

## Black/Gold Jobber Length Drill Set



- High Speed Steel
- Black/Gold finish extends tool life
- 135° split point penetrates faster and prevents bit "walk"



| Description                         | Pieces Per Set | Code No. | Price \$ |
|-------------------------------------|----------------|----------|----------|
| 1/16" - 1/2" x 64ths Fractional Set | 29             | 105380   | 139.71   |



Store & organize all your drills in this cabinet.

See Page B5



# Jobber Length Drill Sets



\* Sizes under 1/16 - NOT split

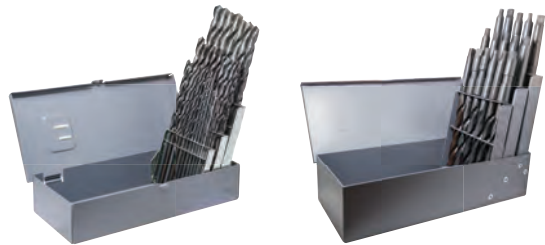
| Description                                     | Pieces Set | Empty Case No. | Price \$ | Set Code No. | Price \$ | Sowa Premium Code No. | Price \$ | Quality Import Code No. | Price \$ |
|---|------------|----------------|----------|--------------|----------|-----------------------|----------|-------------------------|----------|
| <b>High Speed Steel - General Purpose</b>       |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | 105374         | 23.61    | 118119       | 225.21   | -                     | -        | -                       | -        |
| Fractional 1/16 - 1/4 by 64ths                  | 13         | 105349         | 12.70    | 113847       | 62.79    | -                     | -        | -                       | -        |
| Fractional 1/16 - 3/8 by 64ths                  | 21         | 113800         | 23.61    | 113848       | 147.89   | -                     | -        | -                       | -        |
| Fractional 1/16 - 1/2 by 32nds                  | 15         | 113801         | 23.61    | 113849       | 164.02   | -                     | -        | -                       | -        |
| Letter A-Z                                      | 26         | 105989         | 27.23    | 118125       | 230.73   | -                     | -        | -                       | -        |
| Wire Gauge 1 - 60                               | 60         | 105824         | 23.61    | 118124       | 183.52   | -                     | -        | -                       | -        |
| Wire Gauge 61 - 80                              | 20         | 113802         | 13.62    | 113850       | 110.35   | -                     | -        | 105830                  | 58.95    |
| Metric 1.0mm - 6.0mm by 0.5mm                   | 11         | 113803         | 14.52    | 113851       | 78.34    | -                     | -        | -                       | -        |
| Metric 1.0mm - 10.00mm by 0.5mm                 | 19         | 113804         | 22.69    | 113852       | 198.01   | -                     | -        | -                       | -        |
| Metric 1.0mm - 13.0mm by 0.5mm                  | 25         | 113805         | 30.86    | 113853       | 392.44   | -                     | -        | -                       | -        |
| <b>Black/Gold High Speed Steel</b>              |            |                |          |              |          |                       |          |                         |          |
| 135° Split Point 1/16 - 1/2 by 64ths            | 29         | -              | -        | -            | -        | -                     | -        | 105380                  | 139.71   |
| <b>Titanium Coated, High Speed Steel</b>        |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | -              | -        | 118122       | 482.98   | -                     | -        | 105370                  | 142.99   |
| Fractional 1/16 - 1/4 by 64ths                  | 13         | 105349         | 12.70    | 113854       | 160.24   | -                     | -        | -                       | -        |
| Fractional 1/16 - 1/2 by 32nds                  | 15         | -              | -        | 113855       | 416.28   | -                     | -        | -                       | -        |
| Letter A - Z                                    | 26         | -              | -        | 113856       | 723.96   | -                     | -        | -                       | -        |
| Wire Gauge 1 - 60                               | 60         | -              | -        | 113857       | 654.04   | -                     | -        | -                       | -        |
| <b>Cobalt, 135° Split Point</b>                 |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | -              | -        | 118121       | 394.31   | -                     | -        | -                       | -        |
| Fractional 1/16 - 1/2 by 32nds                  | 15         | -              | -        | 113858       | 336.77   | -                     | -        | -                       | -        |
| Fractional 1/16 - 3/8 by 64ths                  | 21         | -              | -        | 113859       | 289.26   | -                     | -        | -                       | -        |
| Fractional 1/16 - 1/4 by 64ths                  | 13         | 105349         | 12.70    | 113860       | 111.35   | -                     | -        | -                       | -        |
| Letter A - Z                                    | 26         | -              | -        | 113861       | 598.96   | -                     | -        | -                       | -        |
| *Wire Gauge 1 - 60                              | 60         | -              | -        | 113862       | 442.01   | -                     | -        | -                       | -        |
| *Wire Gauge 61 - 80                             | 20         | -              | -        | 113863       | 177.71   | -                     | -        | -                       | -        |
| <b>Combination Sets, General Purpose</b>        |            |                |          |              |          |                       |          |                         |          |
| 1/16 - 1/2 by 64ths, A - Z, 1 - 60              | 115        | 105994         | 87.15    | 118123       | 648.73   | -                     | -        | -                       | -        |
| 1/16 - 1/2 by 64ths, A - Z, 1 - 80              | 135        | -              | -        | 113864       | 1,075.77 | -                     | -        | -                       | -        |
| 1/16-1/2 by 64ths, 1-80, 1-13mm by 0.5mm        | 134        | -              | -        | 113865       | 1,006.13 | -                     | -        | -                       | -        |
| <b>Combination Set, Titanium Coated</b>         |            |                |          |              |          |                       |          |                         |          |
| 1/16 - 1/2 by 64ths, A - Z, 1 - 60              | 115        | -              | -        | 113866       | 2,155.35 | -                     | -        | -                       | -        |
| <b>Combination Set, Cobalt</b>                  |            |                |          |              |          |                       |          |                         |          |
| 135° Sp. Pt. 1/16 - 1/2 by 64ths, A - Z, 1 - 60 | 115        | -              | -        | 113867       | 1,661.62 | -                     | -        | -                       | -        |
| <b>Split Point, High Speed Steel</b>            |            |                |          |              |          |                       |          |                         |          |
| 118° Split Point 1/16 - 1/2 by 64ths            | 29         | -              | -        | 113868       | 379.42   | -                     | -        | -                       | -        |
| 135° Split Point 1/16 - 1/2 by 64ths            | 29         | -              | -        | 113869       | 379.42   | 128119                | 288.19   | -                       | -        |
| 135° Split Point Wire Gauge 1 - 60              | 60         | -              | -        | -            | -        | 128190                | 245.57   | -                       | -        |
| 135° Split Point Letter A - Z                   | 26         | -              | -        | -            | -        | 128276                | 317.84   | -                       | -        |
| <b>Combination Set, Split Point HSS</b>         |            |                |          |              |          |                       |          |                         |          |
| 135° 1/16- 1/2 by 64ths, A - Z, 1 - 60          | 115        | -              | -        | -            | -        | 128280                | 872.63   | -                       | -        |
| <b>Left Hand, High Speed Steel</b>              |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | -              | -        | 113870       | 655.20   | -                     | -        | -                       | -        |
| Letter A - Z                                    | 26         | -              | -        | 113871       | 1,002.58 | -                     | -        | -                       | -        |
| Wire Gauge 1 - 60                               | 60         | -              | -        | 113872       | 706.41   | -                     | -        | -                       | -        |
| <b>Fast Spiral, High Speed Steel</b>            |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | -              | -        | 113873       | 401.88   | -                     | -        | -                       | -        |
| <b>Parabolic Flute, High Speed Steel</b>        |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 64ths                  | 29         | -              | -        | 113875       | 528.32   | -                     | -        | -                       | -        |
| <b>Carbide Tip, High Speed Steel</b>            |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/8 - 1/2 by 64ths                   | 25         | -              | -        | 113876       | 2,079.50 | -                     | -        | -                       | -        |
| <b>Carbide</b>                                  |            |                |          |              |          |                       |          |                         |          |
| Fractional 1/16 - 1/2 by 32nds                  | 15         | -              | -        | 113877       | 2,395.27 | -                     | -        | -                       | -        |
| Fractional 1/8 - 1/4 by 64ths                   | 9          | -              | -        | 113878       | 675.10   | -                     | -        | -                       | -        |

## Screw Machine Length Drill Sets



| Description                                  | Pieces per Set | Set No. | Empty Case No. | Price \$ | Code No. | Price \$ |
|--|----------------|---------|----------------|----------|----------|----------|
| <b>High Speed Steel, 135° Split Point</b>    |                |         |                |          |          |          |
| Fractional 1/16 - 1/2 by 64ths               | 29             | 607F    | 113807         | 36.31    | 113879   | 344.92   |
| Fractional 1/16 - 1/4 by 64ths               | 13             | 607G    | 113808         | 19.97    | 113880   | 83.85    |
| Letter A-Z                                   | 26             | 607L    | 113809         | 36.31    | 113881   | 398.79   |
| *Wire Gauge 1-60                             | 60             | 607W    | 113810         | 36.31    | 113882   | 318.42   |
| *Comb. 1/16-1/2 by 64ths, A-Z, 1-60          | 115            | 607X    | 113811         | 108.92   | 113883   | 1,063.59 |
| <b>High Speed Steel, 118° Standard Point</b> |                |         |                |          |          |          |
| Fractional 1/2 - 1" by 64ths"                | 33             | 607H    | -              | -        | 113884   | 4,387.89 |
| <b>Cobalt, 135° Split Point</b>              |                |         |                |          |          |          |
| Fractional 1/16 - 1/2 by 64ths               | 29             | 607CF   | 113807         | 36.31    | 113885   | 777.06   |
| Letter A - Z                                 | 26             | 607CL   | 113809         | 36.31    | 113886   | 741.60   |
| *Wire Gauge 1-60                             | 60             | 607CW   | 113810         | 36.31    | 113887   | 626.71   |

## Taper Length/Taper Shank Drill Sets



| Description                          | Pieces per Set | Set No. | Empty Case No. | Price \$ | Code No. | Price \$ |
|--------------------------------------|----------------|---------|----------------|----------|----------|----------|
| <b>High Speed Steel</b>              |                |         |                |          |          |          |
| Fractional 1/16 - 1/2 by 64ths       | 29             | 407A    | 113812         | 54.47    | 113888   | 583.34   |
| Fractional 33/64 - 3/4 by 64ths      | 16             | 407B    | 113813         | 199.70   | 113889   | 1,264.99 |
| Fractional 49/64 - 1" by 64ths       | 16             | 407C    | 113814         | 236.00   | 113890   | 2,262.23 |
| Letter A-Z                           | 26             | 407L    | 113815         | 54.47    | 113891   | 837.06   |
| Wire Gauge 1-60                      | 60             | 407W    | 113816         | 88.96    | 113892   | 1,068.16 |
| <b>Cobalt, 135° Split Point</b>      |                |         |                |          |          |          |
| Fractional 1/16 - 1/2 by 64ths       | 29             | 407CF   | 113807         | 36.31    | 113893   | 1,529.79 |
| <b>Taper Shank, High Speed Steel</b> |                |         |                |          |          |          |
| Fractional 33/64 - 3/4 by 64ths      | 16             | 200A    | 113813         | 199.70   | 113894   | 1,317.72 |
| Fractional 49/64 - 1" by 64ths       | 16             | 200B    | 113814         | 236.00   | 113895   | 2,322.12 |

## Aircraft Extension Drill Sets



| Description                      | Pieces per Set | Set No. | Empty Case No. | Price \$ | Code No. | Price \$ |
|----------------------------------|----------------|---------|----------------|----------|----------|----------|
| <b>High Speed Steel</b>          |                |         |                |          |          |          |
| Frac. - 6" OAL 1/16-3/8 x 64ths  | 21             | 906SF   | 113908         | 16.19    | 113896   | 385.59   |
| Frac. - 12" OAL 1/16-1/2 x 64ths | 29             | 912SF   | 113908         | 16.19    | 113897   | 1,103.24 |
| Letter - 12" OAL A-Z             | 26             | 912SL   | 113909         | 16.19    | 113898   | 1,608.58 |
| Wire Gauge - 6" OAL 1-60         | 60             | 906SW   | 113910         | 16.19    | 113899   | 589.08   |
| Wire Gauge - 12" OAL 1-60        | 60             | 912SW   | 113910         | 16.19    | 113900   | 1,507.23 |

## Extra Length Drill Sets



| Description                             | Pieces per Set | Set No. | Empty Case No. | Price \$ | Code No. | Price \$ |
|---|----------------|---------|----------------|----------|----------|----------|
| <b>Straight Shank, High Speed Steel</b> |                |         |                |          |          |          |
| 8" Overall 1/8 - 3/8 by 64ths           | 17             | 208ES   | 113908         | 16.19    | 113901   | 678.27   |
| 10" Overall 3/16 - 1/2 by 64ths         | 21             | 210ES   | 113908         | 16.19    | 113902   | 1,513.30 |
| 12" Overall 1/8 - 1/2 by 64ths          | 25             | 212ES   | 113908         | 16.19    | 113903   | 1,576.19 |
| 18" Overall 3/16 - 1/2 by 32nds         | 11             | 218ES   | 113908         | 16.19    | 113904   | 1,062.30 |

## Reduced Shank Drill Sets



| Description                             | Pieces per Set | Set No. | Empty Case No. | Price \$ | Code No. | Price \$ |
|---|----------------|---------|----------------|----------|----------|----------|
| <b>High Speed Steel</b>                 |                |         |                |          |          |          |
| 1/4" shank 1/16 - 1/2 by 64ths          | 29             | 304A    | 113911         | 27.33    | 113913   | 438.88   |
| 1/4" shank 1/4 - 1/2 by 16ths drill,    | 10             | 304B    | -              | -        | 113914   | 173.71   |
| 1/4 - 1/2 by 1/16ths CT masonry         |                |         |                |          |          |          |
| 3/8" shank 1/16 - 1/2 by 64ths          | 29             | 308A    | -              | -        | 113915   | 475.90   |
| 3/8" shank 3/8 - 5/8 by 32nds           | 8              | 308D    | -              | -        | 113916   | 344.15   |
| 1/2" shank 9/16 - 1" by 16ths           | 8              | 303SA   | 113912         | 59.88    | 113917   | 644.01   |
| 1/2" shank 1-1/16 - 1-1/2 by 16ths      | 8              | 303SB   | -              | -        | 113918   | 1,685.47 |
| 1/2" shk. 9/16-1" x 16ths, 1-1/8, 1-1/4 | 10             | 303SC   | -              | -        | 113919   | 891.59   |
| 1/2" shk. 17/32 - 3/4 by 32nds,         | 13             | 303SD   | -              | -        | 113920   | 891.40   |
| 13/16 - 1" by 16ths, 31/32              |                |         |                |          |          |          |
| 1/2" shank 33/64 - 1" by 64ths          | 32             | 303SE   | -              | -        | 113921   | 2,263.42 |
| 3/4" shank 1" - 1-1/2 by 8ths           | 5              | 306A    | -              | -        | 113922   | 1,626.30 |
| 3/4" shank 1"-2" by 4ths                | 5              | 306B    | -              | -        | 113923   | 2,860.95 |
| <b>Cobalt</b>                           |                |         |                |          |          |          |
| 1/2" shank 9/16 - 1" by 16ths           | 8              | 303CA   | 113912         | 59.88    | 113924   | 1,367.10 |
| 1/2" shank 9/16-1"x 16ths, 1-1/8, 1-1/4 | 10             | 303CS   | -              | -        | 113925   | 2,144.69 |
| 1/2" shank 1-1/16-1-1/2 by 16ths        | 8              | 303CB   | -              | -        | 113926   | 4,319.53 |
| 1/2" shank 17/32 - 3/4 by 32nds,        | 13             | 303CD   | -              | -        | 113927   | 2,012.33 |
| 13/16 - 1" by 16ths, 31/32              |                |         |                |          |          |          |
| 1/2" shank 33/64 - 1" by 64ths          | 32             | 303CE   | -              | -        | 113928   | 5,108.33 |
| 3/4" shank 1" - 1-1/2 by 8ths           | 5              | 306D    | -              | -        | 113929   | 3,135.18 |
| 3/4" shank 1"-2" by 4ths                | 5              | 306E    | -              | -        | 113930   | 4,816.22 |

## Drill Stands



| Description                    | Pieces per Set | Code No. | Price \$ |
|--------------------------------|----------------|----------|----------|
| <b>Standard Shanks</b>         |                |          |          |
| Fractional 1/16 - 1/2 by 64ths | 29             | 113908   | 16.19    |
| Letter A-Z                     | 26             | 113909   | 16.19    |
| Wire Gauge 1-60                | 60             | 113910   | 16.19    |

## Prentice Drill Sets HSS

**QUALITY  
IMPORT**



| Set                  | Dia. (in.)  | HSS Code No. | Price \$ |
|----------------------|---|--------------|----------|
| 8pc in Metal Case    | 9/16; 5/8; 11/16; 3/4; 13/16; 7/8; 15/16; 1                             | 107225       | 510.79   |
| 8pc on Wooden Block  | 9/16; 5/8; 11/16; 3/4; 13/16; 7/8; 15/16; 1                             | 107226       | 783.52   |
| 12pc on Wooden Block | 17/32; 9/16; 19/32; 5/8; 21/32; 11/16; 23/32; 3/4; 13/16; 7/8; 15/16; 1 | 107227       | 1,187.22 |
| 5pc on Wooden Block  | 1; 1-1/8; 1-1/4; 1-3/8; 1-1/2   | 107228       | 950.69   |

## Drill Dispenser Cabinets

**STM  
PREMIUM**



| Description  | Case No. | Code No. | Price \$ |
|--|----------|----------|----------|
| Steel Cabinet holds 1/16-1/2 x 64ths Jobber Drills | 13000    | 113826   | 157.94   |
| Steel Cabinet holds #1-60 Jobber Drills            | 13025    | 113827   | 199.70   |

## Chatterfree HSS Countersink Sets

**STM**



HSS

| Description | Set Contents  | Set Code No. | Price \$ |
|-------------|---------------|--------------|----------|
| 82°         | 0, 1, 2, 3, 4 | 121035       | 257.55   |
| 90°         | 0, 1, 2, 3, 4 | 121033       | 257.55   |

## 3-Flute Countersink Sets HSS

**STM**



HSS

| Description                     | 82° HSS Code No. | Price \$ | 90° HSS Code No. | Price \$ |
|---------------------------------|------------------|----------|------------------|----------|
| 5 piece - 1/4, 3/8, 1/2, 3/4, 1 | 121048           | 434.24   | 121060           | 449.78   |

## 5pc 3-Flute Countersink Sets

**SOWA**

- M35 Cobalt
- Wide flutes provide good chip evacuation
- Positive cut
- Constant profile aids regrinding of the tool
- Self-centering of the cutting mill (three bearing points)
- Virtually eliminates vibration



| Description   | Code No. | Price \$ |
|---|----------|----------|
| <b>Includes 6.3mm, 10.4mm, 16.5mm, 20.5mm, 25.0mm</b> |          |          |
| 82° HSCO  | 121860   | 369.38   |
| 90° HSS   | 121865   | 405.50   |
| <b>TiN Coated 10.4mm, 16.5mm, 20.5mm, 25mm, 31mm</b>  |          |          |
| 82° HSCO TiN  | 121870   | 611.37   |

## 3-Flute Countersink Sets HSS

**STM**



HSS

| Set Size (in.)             | 60° Code No. | Price \$ | 82° Code No. | Price \$ | 90° Code No. | Price \$ | 100° Code No. | Price \$ |
|----------------------------|--------------|----------|--------------|----------|--------------|----------|---------------|----------|
| <b>5 piece</b>             |              |          |              |          |              |          |               |          |
| 1/4, 3/8, 1/2, 3/4, 1      | 120865       | 262.76   | 120854       | 262.76   | 120856       | 262.76   | -             | -        |
| <b>6 piece</b>             |              |          |              |          |              |          |               |          |
| 1/4, 3/8, 1/2, 5/8, 3/4, 1 | 120866       | 315.31   | 120868       | 312.69   | 120870       | 312.69   | 120872        | 249.60   |

## 6-Flute HSS Machine Countersink Sets

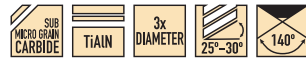
**STM**



HSS

| Set Size (in.)  | 60° Code No. | Price \$ | 82° Code No. | Price \$ | 90° Code No. | Price \$ |
|---|--------------|----------|--------------|----------|--------------|----------|
| <b>5 piece</b>  |              |          |              |          |              |          |
| 1/4, 3/8, 1/2, 3/4, 1                                     | -            | -        | 120877       | 317.89   | 120881       | 317.89   |
| <b>8 piece</b>  |              |          |              |          |              |          |
| 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1                     | 120874       | 515.01   | 120878       | 515.01   | 120882       | 512.53   |
| <b>10 piece</b>   |              |          |              |          |              |          |
| 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2       | 120875       | 765.22   | 120879       | 765.22   | 120883       | 1,025.17 |
| <b>11 piece</b>   |              |          |              |          |              |          |
| 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2 | 120876       | 785.56   | 120880       | 785.56   | 120884       | 785.56   |

## 3 X D Premium Class Sub-Micrograin Carbide Drills



PC243

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 3.0               | 20                | 6               | 62                  | 133400   | 58.83    |
| 3.1               | 20                | 6               | 62                  | 133401   | 58.83    |
| 3.2               | 20                | 6               | 62                  | 133402   | 58.83    |
| 3.3               | 20                | 6               | 62                  | 133403   | 58.83    |
| 3.4               | 20                | 6               | 62                  | 133404   | 58.83    |
| 3.5               | 20                | 6               | 62                  | 133405   | 71.45    |
| 3.6               | 20                | 6               | 62                  | 133406   | 71.45    |
| 3.7               | 24                | 6               | 62                  | 133407   | 58.83    |
| 3.8               | 24                | 6               | 66                  | 133408   | 58.83    |
| 3.9               | 24                | 6               | 66                  | 133409   | 71.45    |
| 4.0               | 24                | 6               | 66                  | 133410   | 58.83    |
| 4.1               | 24                | 6               | 66                  | 133411   | 71.45    |
| 4.2               | 24                | 6               | 66                  | 133412   | 58.83    |
| 4.3               | 24                | 6               | 66                  | 133413   | 58.83    |
| 4.4               | 24                | 6               | 66                  | 133414   | 71.45    |
| 4.5               | 24                | 6               | 66                  | 133415   | 58.83    |
| 4.6               | 24                | 6               | 66                  | 133416   | 71.45    |
| 4.7               | 24                | 6               | 66                  | 133417   | 58.83    |
| 4.8               | 28                | 6               | 66                  | 133418   | 58.83    |
| 4.9               | 28                | 6               | 66                  | 133419   | 71.45    |
| 5.0               | 28                | 6               | 66                  | 133420   | 58.83    |
| 5.1               | 28                | 6               | 66                  | 133421   | 58.83    |
| 5.2               | 28                | 6               | 66                  | 133422   | 71.45    |
| 5.3               | 28                | 6               | 66                  | 133423   | 58.83    |
| 5.4               | 28                | 6               | 66                  | 133424   | 71.45    |
| 5.5               | 28                | 6               | 66                  | 133425   | 58.83    |
| 5.6               | 28                | 6               | 66                  | 133426   | 58.83    |
| 5.7               | 28                | 6               | 66                  | 133427   | 71.45    |
| 5.8               | 28                | 6               | 66                  | 133428   | 58.83    |
| 5.9               | 28                | 6               | 66                  | 133429   | 58.83    |
| 6.0               | 28                | 6               | 66                  | 133430   | 58.83    |
| 6.1               | 34                | 8               | 79                  | 133431   | 95.67    |
| 6.2               | 34                | 8               | 79                  | 133432   | 95.67    |
| 6.3               | 34                | 8               | 79                  | 133433   | 95.67    |
| 6.4               | 34                | 8               | 79                  | 133434   | 95.67    |
| 6.5               | 34                | 8               | 79                  | 133435   | 95.67    |
| 6.6               | 34                | 8               | 79                  | 133436   | 95.67    |
| 6.7               | 34                | 8               | 79                  | 133437   | 95.67    |
| 6.8               | 34                | 8               | 79                  | 133438   | 95.67    |
| 6.9               | 34                | 8               | 79                  | 133439   | 95.67    |
| 7.0               | 34                | 8               | 79                  | 133440   | 95.67    |
| 7.1               | 41                | 8               | 79                  | 133441   | 95.67    |
| 7.2               | 41                | 8               | 79                  | 133442   | 95.67    |
| 7.3               | 41                | 8               | 79                  | 133443   | 99.44    |
| 7.4               | 41                | 8               | 79                  | 133444   | 95.67    |
| 7.5               | 41                | 8               | 79                  | 133445   | 95.67    |
| 7.6               | 41                | 8               | 79                  | 133446   | 95.67    |
| 7.7               | 41                | 8               | 79                  | 133447   | 95.67    |
| 7.8               | 41                | 8               | 79                  | 133448   | 95.67    |
| 7.9               | 41                | 8               | 79                  | 133449   | 95.67    |
| 8.0               | 41                | 8               | 79                  | 133450   | 95.67    |
| 8.1               | 47                | 10              | 89                  | 133451   | 156.62   |
| 8.2               | 47                | 10              | 89                  | 133452   | 156.62   |
| 8.3               | 47                | 10              | 89                  | 133453   | 156.62   |
| 8.4               | 47                | 10              | 89                  | 133454   | 156.62   |
| 8.5               | 47                | 10              | 89                  | 133455   | 156.62   |
| 8.6               | 47                | 10              | 89                  | 133456   | 156.62   |
| 8.7               | 47                | 10              | 89                  | 133457   | 156.62   |
| 8.8               | 47                | 10              | 89                  | 133458   | 156.62   |
| 8.9               | 47                | 10              | 89                  | 133459   | 156.62   |

PC243

Speeds & Feeds > P. B73

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 9.0               | 47                | 10              | 89                  | 133460   | 156.62   |
| 9.1               | 47                | 10              | 89                  | 133461   | 156.62   |
| 9.2               | 47                | 10              | 89                  | 133462   | 156.62   |
| 9.3               | 47                | 10              | 89                  | 133463   | 156.62   |
| 9.4               | 47                | 10              | 89                  | 133464   | 156.62   |
| 9.5               | 47                | 10              | 89                  | 133465   | 156.62   |
| 9.6               | 47                | 10              | 89                  | 133466   | 156.62   |
| 9.7               | 47                | 10              | 89                  | 133467   | 156.62   |
| 9.8               | 47                | 10              | 89                  | 133468   | 156.62   |
| 9.9               | 47                | 10              | 89                  | 133469   | 156.62   |
| 10.0              | 47                | 10              | 89                  | 133470   | 156.62   |
| 10.1              | 55                | 12              | 102                 | 133471   | 234.48   |
| 10.2              | 55                | 12              | 102                 | 133472   | 234.48   |
| 10.3              | 55                | 12              | 102                 | 133473   | 234.48   |
| 10.4              | 55                | 12              | 102                 | 133474   | 234.48   |
| 10.5              | 55                | 12              | 102                 | 133475   | 234.48   |
| 10.6              | 55                | 12              | 102                 | 133476   | 234.48   |
| 10.7              | 55                | 12              | 102                 | 133477   | 234.48   |
| 10.8              | 55                | 12              | 102                 | 133478   | 234.48   |
| 10.9              | 55                | 12              | 102                 | 133479   | 234.48   |
| 11.0              | 55                | 12              | 102                 | 133480   | 234.48   |
| 11.1              | 55                | 12              | 102                 | 133481   | 234.48   |
| 11.2              | 55                | 12              | 102                 | 133482   | 234.48   |
| 11.3              | 55                | 12              | 102                 | 133483   | 234.48   |
| 11.4              | 55                | 12              | 102                 | 133484   | 234.48   |
| 11.5              | 55                | 12              | 102                 | 133485   | 234.48   |
| 11.6              | 55                | 12              | 102                 | 133486   | 234.48   |
| 11.7              | 55                | 12              | 102                 | 133487   | 234.48   |
| 11.8              | 55                | 12              | 102                 | 133488   | 234.48   |
| 11.9              | 55                | 12              | 102                 | 133489   | 234.48   |
| 12.0              | 55                | 12              | 102                 | 133490   | 234.48   |
| 12.1              | 60                | 14              | 107                 | 133491   | 273.52   |
| 12.2              | 60                | 14              | 107                 | 133492   | 273.52   |
| 12.3              | 60                | 14              | 107                 | 133493   | 273.52   |
| 12.4              | 60                | 14              | 107                 | 133494   | 273.52   |
| 12.5              | 60                | 14              | 107                 | 133495   | 273.52   |
| 12.6              | 60                | 14              | 107                 | 133496   | 273.52   |
| 12.7              | 60                | 14              | 107                 | 133497   | 249.30   |
| 12.8              | 60                | 14              | 107                 | 133498   | 273.52   |
| 12.9              | 60                | 14              | 107                 | 133499   | 273.52   |
| 13.0              | 60                | 14              | 107                 | 133500   | 273.52   |
| 13.1              | 60                | 14              | 107                 | 133501   | 273.52   |
| 13.2              | 60                | 14              | 107                 | 133502   | 273.52   |
| 13.3              | 60                | 14              | 107                 | 133503   | 273.52   |
| 13.4              | 60                | 14              | 107                 | 133504   | 273.52   |
| 13.5              | 60                | 14              | 107                 | 133505   | 273.52   |
| 14.0              | 60                | 14              | 107                 | 133506   | 273.52   |
| 14.5              | 65                | 16              | 115                 | 133507   | 407.90   |
| 15.0              | 65                | 16              | 115                 | 133508   | 407.90   |
| 15.5              | 65                | 16              | 115                 | 133509   | 407.90   |
| 16.0              | 65                | 16              | 115                 | 133510   | 407.90   |
| 16.5              | 73                | 18              | 123                 | 133511   | 573.26   |
| 17.0              | 73                | 18              | 123                 | 133512   | 573.26   |
| 17.5              | 73                | 18              | 123                 | 133513   | 573.26   |
| 18.0              | 73                | 18              | 123                 | 133514   | 573.26   |
| 18.5              | 79                | 20              | 131                 | 133515   | 647.25   |
| 19.0              | 79                | 20              | 131                 | 133516   | 647.25   |
| 19.5              | 79                | 20              | 131                 | 133517   | 647.25   |
| 20.0              | 79                | 20              | 131                 | 133518   | 647.25   |



## 5 X D Premium Class Sub-Micrograin Carbide Drills



PC245

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 3.0               | 28                | 6               | 66                  | 133520   | 79.74    |
| 3.1               | 28                | 6               | 66                  | 133521   | 59.83    |
| 3.2               | 28                | 6               | 66                  | 133522   | 59.83    |
| 3.3               | 28                | 6               | 66                  | 133523   | 79.74    |
| 3.4               | 28                | 6               | 66                  | 133524   | 79.74    |
| 3.5               | 28                | 6               | 66                  | 133525   | 79.74    |
| 3.6               | 28                | 6               | 66                  | 133526   | 79.74    |
| 3.7               | 28                | 6               | 66                  | 133527   | 64.92    |
| 3.8               | 36                | 6               | 74                  | 133528   | 64.92    |
| 3.9               | 36                | 6               | 74                  | 133529   | 64.92    |
| 4.0               | 36                | 6               | 74                  | 133530   | 64.92    |
| 4.1               | 36                | 6               | 74                  | 133531   | 86.71    |
| 4.2               | 36                | 6               | 74                  | 133532   | 64.92    |
| 4.3               | 36                | 6               | 74                  | 133533   | 64.92    |
| 4.4               | 36                | 6               | 74                  | 133534   | 86.71    |
| 4.5               | 36                | 6               | 74                  | 133535   | 64.92    |
| 4.6               | 36                | 6               | 74                  | 133536   | 64.92    |
| 4.7               | 44                | 6               | 82                  | 133537   | 86.71    |
| 4.8               | 44                | 6               | 82                  | 133538   | 64.92    |
| 4.9               | 44                | 6               | 82                  | 133539   | 86.71    |
| 5.0               | 44                | 6               | 82                  | 133540   | 64.92    |
| 5.1               | 44                | 6               | 82                  | 133541   | 64.92    |
| 5.2               | 44                | 6               | 82                  | 133542   | 64.92    |
| 5.3               | 44                | 6               | 82                  | 133543   | 86.71    |
| 5.4               | 44                | 6               | 82                  | 133544   | 86.71    |
| 5.5               | 44                | 6               | 82                  | 133545   | 86.71    |
| 5.6               | 44                | 6               | 82                  | 133546   | 86.71    |
| 5.7               | 44                | 6               | 82                  | 133547   | 86.71    |
| 5.8               | 44                | 6               | 82                  | 133548   | 86.71    |
| 5.9               | 44                | 6               | 82                  | 133549   | 86.71    |
| 6.0               | 44                | 6               | 82                  | 133550   | 64.92    |
| 6.1               | 53                | 8               | 91                  | 133551   | 123.54   |
| 6.2               | 53                | 8               | 91                  | 133552   | 99.44    |
| 6.3               | 53                | 8               | 91                  | 133553   | 99.44    |
| 6.4               | 53                | 8               | 91                  | 133554   | 99.44    |
| 6.5               | 53                | 8               | 91                  | 133555   | 99.44    |
| 6.6               | 53                | 8               | 91                  | 133556   | 123.54   |
| 6.7               | 53                | 8               | 91                  | 133557   | 123.54   |
| 6.8               | 53                | 8               | 91                  | 133558   | 99.44    |
| 6.9               | 53                | 8               | 91                  | 133559   | 99.44    |
| 7.0               | 53                | 8               | 91                  | 133560   | 99.44    |
| 7.1               | 53                | 8               | 91                  | 133561   | 99.44    |
| 7.2               | 53                | 8               | 91                  | 133562   | 123.54   |
| 7.3               | 53                | 8               | 91                  | 133563   | 123.54   |
| 7.4               | 53                | 8               | 91                  | 133564   | 123.54   |
| 7.5               | 53                | 8               | 91                  | 133565   | 123.54   |
| 7.6               | 53                | 8               | 91                  | 133566   | 123.54   |
| 7.7               | 53                | 8               | 91                  | 133567   | 123.54   |
| 7.8               | 53                | 8               | 91                  | 133568   | 123.54   |
| 7.9               | 53                | 8               | 91                  | 133569   | 99.44    |
| 8.0               | 53                | 8               | 91                  | 133570   | 123.54   |
| 8.1               | 61                | 10              | 103                 | 133571   | 145.99   |
| 8.2               | 61                | 10              | 103                 | 133572   | 145.99   |
| 8.3               | 61                | 10              | 103                 | 133573   | 145.99   |
| 8.4               | 61                | 10              | 103                 | 133574   | 145.99   |
| 8.5               | 61                | 10              | 103                 | 133575   | 145.99   |
| 8.6               | 61                | 10              | 103                 | 133576   | 145.99   |
| 8.7               | 61                | 10              | 103                 | 133577   | 145.99   |
| 8.8               | 61                | 10              | 103                 | 133578   | 145.99   |
| 8.9               | 61                | 10              | 103                 | 133579   | 145.99   |



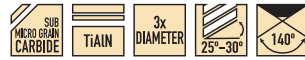
PC245

Speeds & Feeds > P. B73

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 9.0               | 61                | 10              | 103                 | 133580   | 145.99   |
| 9.1               | 61                | 10              | 103                 | 133581   | 145.99   |
| 9.2               | 61                | 10              | 103                 | 133582   | 145.99   |
| 9.3               | 61                | 10              | 103                 | 133583   | 145.99   |
| 9.4               | 61                | 10              | 103                 | 133584   | 145.99   |
| 9.5               | 61                | 10              | 103                 | 133585   | 145.99   |
| 9.6               | 61                | 10              | 103                 | 133586   | 145.99   |
| 9.7               | 61                | 10              | 103                 | 133587   | 145.99   |
| 9.8               | 61                | 10              | 103                 | 133588   | 145.99   |
| 9.9               | 61                | 10              | 103                 | 133589   | 145.99   |
| 10.0              | 61                | 10              | 103                 | 133590   | 145.99   |
| 10.1              | 71                | 12              | 118                 | 133591   | 231.94   |
| 10.2              | 71                | 12              | 118                 | 133592   | 231.94   |
| 10.3              | 71                | 12              | 118                 | 133593   | 231.94   |
| 10.4              | 71                | 12              | 118                 | 133594   | 231.94   |
| 10.5              | 71                | 12              | 118                 | 133595   | 231.94   |
| 10.6              | 71                | 12              | 118                 | 133596   | 231.94   |
| 10.7              | 71                | 12              | 118                 | 133597   | 231.94   |
| 10.8              | 71                | 12              | 118                 | 133598   | 231.94   |
| 10.9              | 71                | 12              | 118                 | 133599   | 231.94   |
| 11.0              | 71                | 12              | 118                 | 133600   | 231.94   |
| 11.1              | 71                | 12              | 118                 | 133601   | 231.94   |
| 11.2              | 71                | 12              | 118                 | 133602   | 231.94   |
| 11.3              | 71                | 12              | 118                 | 133603   | 231.94   |
| 11.4              | 71                | 12              | 118                 | 133604   | 231.94   |
| 11.5              | 71                | 12              | 118                 | 133605   | 231.94   |
| 11.6              | 71                | 12              | 118                 | 133606   | 231.94   |
| 11.7              | 71                | 12              | 118                 | 133607   | 231.94   |
| 11.8              | 71                | 12              | 118                 | 133608   | 231.94   |
| 11.9              | 71                | 12              | 118                 | 133609   | 231.94   |
| 12.0              | 71                | 12              | 118                 | 133610   | 231.94   |
| 12.1              | 77                | 14              | 124                 | 133611   | 322.07   |
| 12.2              | 77                | 14              | 124                 | 133612   | 322.07   |
| 12.3              | 77                | 14              | 124                 | 133613   | 322.07   |
| 12.4              | 77                | 14              | 124                 | 133614   | 322.07   |
| 12.5              | 77                | 14              | 124                 | 133615   | 322.07   |
| 12.6              | 77                | 14              | 124                 | 133616   | 322.07   |
| 12.7              | 77                | 14              | 124                 | 133617   | 218.89   |
| 12.8              | 77                | 14              | 124                 | 133618   | 322.07   |
| 12.9              | 77                | 14              | 124                 | 133619   | 322.07   |
| 13.0              | 77                | 14              | 124                 | 133620   | 322.07   |
| 13.1              | 77                | 14              | 124                 | 133621   | 322.07   |
| 13.2              | 77                | 14              | 124                 | 133622   | 322.07   |
| 13.3              | 77                | 14              | 124                 | 133623   | 322.07   |
| 13.4              | 77                | 14              | 124                 | 133624   | 322.07   |
| 13.5              | 77                | 14              | 124                 | 133625   | 322.07   |
| 14.0              | 77                | 14              | 124                 | 133626   | 322.07   |
| 14.5              | 83                | 16              | 133                 | 133627   | 446.73   |
| 15.0              | 83                | 16              | 133                 | 133628   | 446.73   |
| 15.5              | 83                | 16              | 133                 | 133629   | 446.73   |
| 16.0              | 83                | 16              | 133                 | 133630   | 446.73   |
| 16.5              | 93                | 18              | 143                 | 133631   | 602.80   |
| 17.0              | 93                | 18              | 143                 | 133632   | 602.80   |
| 17.5              | 93                | 18              | 143                 | 133633   | 602.80   |
| 18.0              | 93                | 18              | 143                 | 133634   | 602.80   |
| 18.5              | 101               | 20              | 153                 | 133635   | 829.19   |
| 19.0              | 101               | 20              | 153                 | 133636   | 829.19   |
| 19.5              | 101               | 20              | 153                 | 133637   | 829.19   |
| 20.0              | 101               | 20              | 153                 | 133638   | 829.19   |



## 3 X D Premium Class Coolant-Fed Sub-Micrograin Carbide Drills



PC253

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 3.0               | 20                | 6               | 62                  | 138210   | 95.78    |
| 3.1               | 20                | 6               | 62                  | 138211   | 95.78    |
| 3.2               | 20                | 6               | 62                  | 138212   | 95.78    |
| 3.3               | 20                | 6               | 62                  | 138213   | 95.78    |
| 3.4               | 20                | 6               | 62                  | 138214   | 95.78    |
| 3.5               | 20                | 6               | 62                  | 138215   | 95.78    |
| 3.6               | 20                | 6               | 62                  | 138216   | 95.78    |
| 3.7               | 24                | 6               | 62                  | 138217   | 95.78    |
| 3.8               | 24                | 6               | 66                  | 138218   | 95.78    |
| 3.9               | 24                | 6               | 66                  | 138219   | 95.78    |
| 4.0               | 24                | 6               | 66                  | 138220   | 95.78    |
| 4.1               | 24                | 6               | 66                  | 138221   | 95.78    |
| 4.2               | 24                | 6               | 66                  | 138222   | 95.78    |
| 4.3               | 24                | 6               | 66                  | 138223   | 95.78    |
| 4.4               | 24                | 6               | 66                  | 138224   | 95.78    |
| 4.5               | 24                | 6               | 66                  | 138225   | 95.78    |
| 4.6               | 24                | 6               | 66                  | 138226   | 95.78    |
| 4.7               | 24                | 6               | 66                  | 138227   | 95.78    |
| 4.8               | 28                | 6               | 66                  | 138228   | 95.78    |
| 4.9               | 28                | 6               | 66                  | 138229   | 95.78    |
| 5.0               | 28                | 6               | 66                  | 138230   | 95.78    |
| 5.1               | 28                | 6               | 66                  | 138231   | 95.78    |
| 5.2               | 28                | 6               | 66                  | 138232   | 95.78    |
| 5.3               | 28                | 6               | 66                  | 138233   | 95.78    |
| 5.4               | 28                | 6               | 66                  | 138234   | 95.78    |
| 5.5               | 28                | 6               | 66                  | 138235   | 95.78    |
| 5.6               | 28                | 6               | 66                  | 138236   | 95.78    |
| 5.7               | 28                | 6               | 66                  | 138237   | 95.78    |
| 5.8               | 28                | 6               | 66                  | 138238   | 95.78    |
| 5.9               | 28                | 6               | 66                  | 138239   | 95.78    |
| 6.0               | 28                | 6               | 66                  | 138240   | 95.78    |
| 6.1               | 34                | 8               | 79                  | 138241   | 108.40   |
| 6.2               | 34                | 8               | 79                  | 138242   | 108.40   |
| 6.3               | 34                | 8               | 79                  | 138243   | 108.40   |
| 6.4               | 34                | 8               | 79                  | 138244   | 132.39   |
| 6.5               | 34                | 8               | 79                  | 138245   | 108.40   |
| 6.6               | 34                | 8               | 79                  | 138246   | 108.40   |
| 6.7               | 34                | 8               | 79                  | 138247   | 108.40   |
| 6.8               | 34                | 8               | 79                  | 138248   | 108.40   |
| 6.9               | 34                | 8               | 79                  | 138249   | 108.40   |
| 7.0               | 34                | 8               | 79                  | 138250   | 108.40   |
| 7.1               | 41                | 8               | 79                  | 138251   | 108.40   |
| 7.2               | 41                | 8               | 79                  | 138252   | 108.40   |
| 7.3               | 41                | 8               | 79                  | 138253   | 108.40   |
| 7.4               | 41                | 8               | 79                  | 138254   | 108.40   |
| 7.5               | 41                | 8               | 79                  | 138255   | 108.40   |
| 7.6               | 41                | 8               | 79                  | 138256   | 108.40   |
| 7.7               | 41                | 8               | 79                  | 138257   | 108.40   |
| 7.8               | 41                | 8               | 79                  | 138258   | 108.40   |
| 7.9               | 41                | 8               | 79                  | 138259   | 108.40   |
| 8.0               | 41                | 8               | 79                  | 138260   | 108.40   |
| 8.1               | 47                | 10              | 89                  | 138261   | 183.50   |
| 8.2               | 47                | 10              | 89                  | 138262   | 183.50   |
| 8.3               | 47                | 10              | 89                  | 138263   | 183.50   |
| 8.4               | 47                | 10              | 89                  | 138264   | 183.50   |
| 8.5               | 47                | 10              | 89                  | 138265   | 183.50   |
| 8.6               | 47                | 10              | 89                  | 138266   | 183.50   |
| 8.7               | 47                | 10              | 89                  | 138267   | 183.50   |
| 8.8               | 47                | 10              | 89                  | 138268   | 183.50   |
| 8.9               | 47                | 10              | 89                  | 138269   | 183.50   |

PC253

Speeds & Feeds > P. B74

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 9.0               | 47                | 10              | 89                  | 138270   | 183.50   |
| 9.1               | 47                | 10              | 89                  | 138271   | 183.50   |
| 9.2               | 47                | 10              | 89                  | 138272   | 183.50   |
| 9.3               | 47                | 10              | 89                  | 138273   | 183.50   |
| 9.4               | 47                | 10              | 89                  | 138274   | 183.50   |
| 9.5               | 47                | 10              | 89                  | 138275   | 183.50   |
| 9.6               | 47                | 10              | 89                  | 138276   | 183.50   |
| 9.7               | 47                | 10              | 89                  | 138277   | 183.50   |
| 9.8               | 47                | 10              | 89                  | 138278   | 183.50   |
| 9.9               | 47                | 10              | 89                  | 138279   | 183.50   |
| 10.0              | 47                | 10              | 89                  | 138280   | 183.50   |
| 10.1              | 55                | 12              | 102                 | 138281   | 280.70   |
| 10.2              | 55                | 12              | 102                 | 138282   | 280.70   |
| 10.3              | 55                | 12              | 102                 | 138283   | 280.70   |
| 10.4              | 55                | 12              | 102                 | 138284   | 280.70   |
| 10.5              | 55                | 12              | 102                 | 138285   | 280.70   |
| 10.6              | 55                | 12              | 102                 | 138286   | 280.70   |
| 10.7              | 55                | 12              | 102                 | 138287   | 280.70   |
| 10.8              | 55                | 12              | 102                 | 138288   | 280.70   |
| 10.9              | 55                | 12              | 102                 | 138289   | 280.70   |
| 11.0              | 55                | 12              | 102                 | 138290   | 280.70   |
| 11.1              | 55                | 12              | 102                 | 138291   | 280.70   |
| 11.2              | 55                | 12              | 102                 | 138292   | 280.70   |
| 11.3              | 55                | 12              | 102                 | 138293   | 280.70   |
| 11.4              | 55                | 12              | 102                 | 138294   | 280.70   |
| 11.5              | 55                | 12              | 102                 | 138295   | 280.70   |
| 11.6              | 55                | 12              | 102                 | 138296   | 280.70   |
| 11.7              | 55                | 12              | 102                 | 138297   | 280.70   |
| 11.8              | 55                | 12              | 102                 | 138298   | 280.70   |
| 11.9              | 55                | 12              | 102                 | 138299   | 280.70   |
| 12.0              | 55                | 12              | 102                 | 138300   | 280.70   |
| 12.1              | 60                | 14              | 107                 | 138301   | 292.66   |
| 12.2              | 60                | 14              | 107                 | 138302   | 292.66   |
| 12.3              | 60                | 14              | 107                 | 138303   | 292.66   |
| 12.4              | 60                | 14              | 107                 | 138304   | 292.66   |
| 12.5              | 60                | 14              | 107                 | 138305   | 340.89   |
| 12.6              | 60                | 14              | 107                 | 138306   | 340.89   |
| 12.7              | 60                | 14              | 107                 | 138307   | 242.00   |
| 12.8              | 60                | 14              | 107                 | 138308   | 340.89   |
| 12.9              | 60                | 14              | 107                 | 138309   | 340.89   |
| 13.0              | 60                | 14              | 107                 | 138310   | 340.89   |
| 13.1              | 60                | 14              | 107                 | 138311   | 340.89   |
| 13.2              | 60                | 14              | 107                 | 138312   | 340.89   |
| 13.3              | 60                | 14              | 107                 | 138313   | 340.89   |
| 13.4              | 60                | 14              | 107                 | 138314   | 340.89   |
| 13.5              | 60                | 14              | 107                 | 138315   | 340.89   |
| 14.0              | 60                | 14              | 107                 | 138316   | 340.89   |
| 14.5              | 65                | 16              | 115                 | 138317   | 477.70   |
| 15.0              | 65                | 16              | 115                 | 138318   | 477.70   |
| 15.5              | 65                | 16              | 115                 | 138319   | 477.70   |
| 16.0              | 65                | 16              | 115                 | 138320   | 477.70   |
| 16.5              | 73                | 18              | 123                 | 138321   | 701.23   |
| 17.0              | 73                | 18              | 123                 | 138322   | 553.45   |
| 17.5              | 73                | 18              | 123                 | 138323   | 553.45   |
| 18.0              | 73                | 18              | 123                 | 138324   | 553.45   |
| 18.5              | 79                | 20              | 131                 | 138325   | 808.52   |
| 19.0              | 79                | 20              | 131                 | 138326   | 808.52   |
| 19.5              | 79                | 20              | 131                 | 138327   | 808.52   |
| 20.0              | 79                | 20              | 131                 | 138328   | 808.52   |

## 5 X D Premium Class Coolant-Fed Sub-Micrograin Carbide Drills



PC255

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 3.0               | 28                | 6               | 66                  | 138330   | 99.32    |
| 3.1               | 28                | 6               | 66                  | 138331   | 99.32    |
| 3.2               | 28                | 6               | 66                  | 138332   | 99.32    |
| 3.3               | 28                | 6               | 66                  | 138333   | 99.32    |
| 3.4               | 28                | 6               | 66                  | 138334   | 99.32    |
| 3.5               | 28                | 6               | 66                  | 138335   | 99.32    |
| 3.6               | 28                | 6               | 66                  | 138336   | 99.32    |
| 3.7               | 28                | 6               | 66                  | 138337   | 99.32    |
| 3.8               | 36                | 6               | 74                  | 138338   | 104.19   |
| 3.9               | 36                | 6               | 74                  | 138339   | 104.19   |
| 4.0               | 36                | 6               | 74                  | 138340   | 104.19   |
| 4.1               | 36                | 6               | 74                  | 138341   | 104.19   |
| 4.2               | 36                | 6               | 74                  | 138342   | 132.29   |
| 4.3               | 36                | 6               | 74                  | 138343   | 104.19   |
| 4.4               | 36                | 6               | 74                  | 138344   | 104.19   |
| 4.5               | 36                | 6               | 74                  | 138345   | 104.19   |
| 4.6               | 36                | 6               | 74                  | 138346   | 104.19   |
| 4.7               | 44                | 6               | 82                  | 138347   | 104.19   |
| 4.8               | 44                | 6               | 82                  | 138348   | 104.19   |
| 4.9               | 44                | 6               | 82                  | 138349   | 104.19   |
| 5.0               | 44                | 6               | 82                  | 138350   | 104.19   |
| 5.1               | 44                | 6               | 82                  | 138351   | 104.19   |
| 5.2               | 44                | 6               | 82                  | 138352   | 104.19   |
| 5.3               | 44                | 6               | 82                  | 138353   | 104.19   |
| 5.4               | 44                | 6               | 82                  | 138354   | 104.19   |
| 5.5               | 44                | 6               | 82                  | 138355   | 104.19   |
| 5.6               | 44                | 6               | 82                  | 138356   | 104.19   |
| 5.7               | 44                | 6               | 82                  | 138357   | 104.19   |
| 5.8               | 44                | 6               | 82                  | 138358   | 104.19   |
| 5.9               | 44                | 6               | 82                  | 138359   | 104.19   |
| 6.0               | 44                | 6               | 82                  | 138360   | 104.19   |
| 6.1               | 53                | 8               | 91                  | 138361   | 119.68   |
| 6.2               | 53                | 8               | 91                  | 138362   | 119.68   |
| 6.3               | 53                | 8               | 91                  | 138363   | 119.68   |
| 6.4               | 53                | 8               | 91                  | 138364   | 119.68   |
| 6.5               | 53                | 8               | 91                  | 138365   | 119.68   |
| 6.6               | 53                | 8               | 91                  | 138366   | 119.68   |
| 6.7               | 53                | 8               | 91                  | 138367   | 119.68   |
| 6.8               | 53                | 8               | 91                  | 138368   | 119.68   |
| 6.9               | 53                | 8               | 91                  | 138369   | 119.68   |
| 7.0               | 53                | 8               | 91                  | 138370   | 119.68   |
| 7.1               | 53                | 8               | 91                  | 138371   | 119.68   |
| 7.2               | 53                | 8               | 91                  | 138372   | 119.68   |
| 7.3               | 53                | 8               | 91                  | 138373   | 119.68   |
| 7.4               | 53                | 8               | 91                  | 138374   | 119.68   |
| 7.5               | 53                | 8               | 91                  | 138375   | 119.68   |
| 7.6               | 53                | 8               | 91                  | 138376   | 119.68   |
| 7.7               | 53                | 8               | 91                  | 138377   | 119.68   |
| 7.8               | 53                | 8               | 91                  | 138378   | 119.68   |
| 7.9               | 53                | 8               | 91                  | 138379   | 119.68   |
| 8.0               | 53                | 8               | 91                  | 138380   | 119.68   |
| 8.1               | 61                | 10              | 103                 | 138381   | 192.34   |
| 8.2               | 61                | 10              | 103                 | 138382   | 192.34   |
| 8.3               | 61                | 10              | 103                 | 138383   | 192.34   |
| 8.4               | 61                | 10              | 103                 | 138384   | 192.34   |
| 8.5               | 61                | 10              | 103                 | 138385   | 197.87   |
| 8.6               | 61                | 10              | 103                 | 138386   | 192.34   |
| 8.7               | 61                | 10              | 103                 | 138387   | 192.34   |
| 8.8               | 61                | 10              | 103                 | 138388   | 192.34   |
| 8.9               | 61                | 10              | 103                 | 138389   | 192.34   |

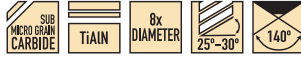
PC255

Speeds & Feeds > P. B74

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 9.0               | 61                | 10              | 103                 | 138390   | 192.34   |
| 9.1               | 61                | 10              | 103                 | 138391   | 192.34   |
| 9.2               | 61                | 10              | 103                 | 138392   | 192.34   |
| 9.3               | 61                | 10              | 103                 | 138393   | 192.34   |
| 9.4               | 61                | 10              | 103                 | 138394   | 192.34   |
| 9.5               | 61                | 10              | 103                 | 138395   | 192.34   |
| 9.6               | 61                | 10              | 103                 | 138396   | 192.34   |
| 9.7               | 61                | 10              | 103                 | 138397   | 192.34   |
| 9.8               | 61                | 10              | 103                 | 138398   | 192.34   |
| 9.9               | 61                | 10              | 103                 | 138399   | 192.34   |
| 10.0              | 61                | 10              | 103                 | 138400   | 192.34   |
| 10.1              | 71                | 12              | 118                 | 138401   | 269.10   |
| 10.2              | 71                | 12              | 118                 | 138402   | 269.10   |
| 10.3              | 71                | 12              | 118                 | 138403   | 269.10   |
| 10.4              | 71                | 12              | 118                 | 138404   | 269.10   |
| 10.5              | 71                | 12              | 118                 | 138405   | 269.10   |
| 10.6              | 71                | 12              | 118                 | 138406   | 269.10   |
| 10.7              | 71                | 12              | 118                 | 138407   | 269.10   |
| 10.8              | 71                | 12              | 118                 | 138408   | 269.10   |
| 10.9              | 71                | 12              | 118                 | 138409   | 269.10   |
| 11.0              | 71                | 12              | 118                 | 138410   | 269.10   |
| 11.1              | 71                | 12              | 118                 | 138411   | 269.10   |
| 11.2              | 71                | 12              | 118                 | 138412   | 269.10   |
| 11.3              | 71                | 12              | 118                 | 138413   | 269.10   |
| 11.4              | 71                | 12              | 118                 | 138414   | 269.10   |
| 11.5              | 71                | 12              | 118                 | 138415   | 269.10   |
| 11.6              | 71                | 12              | 118                 | 138416   | 269.10   |
| 11.7              | 71                | 12              | 118                 | 138417   | 269.10   |
| 11.8              | 71                | 12              | 118                 | 138418   | 269.10   |
| 11.9              | 71                | 12              | 118                 | 138419   | 269.10   |
| 12.0              | 71                | 12              | 118                 | 138420   | 269.10   |
| 12.1              | 77                | 14              | 124                 | 138421   | 358.25   |
| 12.2              | 77                | 14              | 124                 | 138422   | 358.25   |
| 12.3              | 77                | 14              | 124                 | 138423   | 358.25   |
| 12.4              | 77                | 14              | 124                 | 138424   | 358.25   |
| 12.5              | 77                | 14              | 124                 | 138425   | 337.89   |
| 12.6              | 77                | 14              | 124                 | 138426   | 337.89   |
| 12.7              | 77                | 14              | 124                 | 138427   | 337.89   |
| 12.8              | 77                | 14              | 124                 | 138428   | 337.89   |
| 12.9              | 77                | 14              | 124                 | 138429   | 337.89   |
| 13.0              | 77                | 14              | 124                 | 138430   | 337.89   |
| 13.1              | 77                | 14              | 124                 | 138431   | 337.89   |
| 13.2              | 77                | 14              | 124                 | 138432   | 337.89   |
| 13.3              | 77                | 14              | 124                 | 138433   | 337.89   |
| 13.4              | 77                | 14              | 124                 | 138434   | 337.89   |
| 13.5              | 77                | 14              | 124                 | 138435   | 337.89   |
| 14.0              | 77                | 14              | 124                 | 138436   | 337.89   |
| 14.5              | 83                | 16              | 133                 | 138437   | 531.13   |
| 15.0              | 83                | 16              | 133                 | 138438   | 531.13   |
| 15.5              | 83                | 16              | 133                 | 138439   | 531.13   |
| 16.0              | 83                | 16              | 133                 | 138440   | 531.13   |
| 16.5              | 93                | 18              | 143                 | 138441   | 744.15   |
| 17.0              | 93                | 18              | 143                 | 138442   | 586.43   |
| 17.5              | 93                | 18              | 143                 | 138443   | 586.43   |
| 18.0              | 93                | 18              | 143                 | 138444   | 586.43   |
| 18.5              | 101               | 20              | 153                 | 138445   | 913.48   |
| 19.0              | 101               | 20              | 153                 | 138446   | 913.48   |
| 19.5              | 101               | 20              | 153                 | 138447   | 913.48   |
| 20.0              | 101               | 20              | 153                 | 138448   | 913.48   |

Drilling & Holemaking

### 8 X D Premium Class Coolant-Fed Sub-Micrograin Carbide Drills



PC258

Speeds & Feeds > P. B74

| Cutting Dia. (mm) | Flute Length (mm) | Shank Dia. (mm) | Overall Length (mm) | Code No. | Price \$ |
|-------------------|-------------------|-----------------|---------------------|----------|----------|
| 3.0               | 50                | 6               | 95                  | 138450   | 109.16   |
| 3.1               | 50                | 6               | 95                  | 138451   | 109.16   |
| 3.2               | 50                | 6               | 95                  | 138452   | 109.16   |
| 3.3               | 50                | 6               | 95                  | 138453   | 109.16   |
| 3.4               | 50                | 6               | 95                  | 138454   | 109.16   |
| 3.5               | 50                | 6               | 95                  | 138455   | 219.22   |
| 3.6               | 50                | 6               | 95                  | 138456   | 109.16   |
| 3.7               | 50                | 6               | 95                  | 138457   | 109.16   |
| 3.8               | 50                | 6               | 95                  | 138458   | 121.11   |
| 3.9               | 50                | 6               | 95                  | 138459   | 121.11   |
| 4.0               | 50                | 6               | 95                  | 138460   | 121.11   |
| 4.1               | 50                | 6               | 95                  | 138461   | 121.11   |
| 4.2               | 50                | 6               | 95                  | 138462   | 121.11   |
| 4.3               | 50                | 6               | 95                  | 138463   | 121.11   |
| 4.4               | 50                | 6               | 95                  | 138464   | 121.11   |
| 4.5               | 50                | 6               | 95                  | 138465   | 291.67   |
| 4.6               | 50                | 6               | 95                  | 138466   | 121.11   |
| 4.7               | 50                | 6               | 95                  | 138467   | 121.11   |
| 4.8               | 50                | 6               | 95                  | 138468   | 116.91   |
| 4.9               | 50                | 6               | 95                  | 138469   | 116.91   |
| 5.0               | 50                | 6               | 90                  | 138470   | 116.91   |
| 5.5               | 57                | 6               | 97                  | 138471   | 116.91   |
| 6.0               | 57                | 6               | 97                  | 138472   | 116.91   |
| 6.5               | 66                | 8               | 106                 | 138473   | 268.43   |
| 7.0               | 76                | 8               | 116                 | 138474   | 268.43   |
| 7.5               | 76                | 8               | 116                 | 138475   | 268.43   |
| 8.0               | 76                | 8               | 116                 | 138476   | 268.43   |
| 8.5               | 87                | 10              | 131                 | 138477   | 281.93   |
| 9.0               | 87                | 10              | 131                 | 138478   | 281.93   |
| 9.5               | 95                | 10              | 139                 | 138479   | 281.93   |
| 10.0              | 95                | 10              | 139                 | 138480   | 281.93   |
| 10.5              | 106               | 12              | 155                 | 138481   | 419.30   |
| 11.0              | 106               | 12              | 155                 | 138482   | 419.30   |
| 11.5              | 114               | 12              | 163                 | 138483   | 419.30   |
| 12.0              | 114               | 12              | 163                 | 138484   | 419.30   |
| 12.5              | 133               | 14              | 182                 | 138485   | 520.28   |
| 13.0              | 133               | 14              | 182                 | 138486   | 520.28   |
| 13.5              | 133               | 14              | 182                 | 138487   | 520.28   |
| 14.0              | 133               | 14              | 182                 | 138488   | 692.28   |
| 14.5              | 152               | 16              | 204                 | 138489   | 722.02   |
| 15.0              | 152               | 16              | 204                 | 138490   | 722.02   |
| 15.5              | 152               | 16              | 204                 | 138491   | 722.02   |
| 16.0              | 152               | 16              | 204                 | 138492   | 722.02   |
| 16.5              | 171               | 18              | 223                 | 138493   | 1,167.54 |
| 17.0              | 171               | 18              | 223                 | 138494   | 1,167.54 |
| 17.5              | 171               | 18              | 223                 | 138495   | 1,167.54 |
| 18.0              | 171               | 18              | 223                 | 138496   | 1,167.54 |
| 18.5              | 190               | 20              | 244                 | 138497   | 1,824.74 |
| 19.0              | 190               | 20              | 244                 | 138498   | 1,824.74 |
| 19.5              | 190               | 20              | 244                 | 138499   | 1,824.74 |
| 20.0              | 190               | 20              | 244                 | 138500   | 1,824.74 |



**TOOLING**



## GS Tooling Drill Chucks

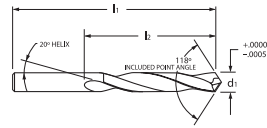
High precision & premium tolerance for improved life.

See Pages G70-71

## Carbide Jobber Drills

- Aluminum
- Low & Med Carbon Steel
- Glass, Plastics, Composite Materials
- Titanium Alloy
- Copper
- Cast Iron
- High Carbon Steel

| Size        | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------------|--------------------|--------------------|----------------------|----------|----------|
| <b>Inch</b> |                    |                    |                      |          |          |
| 56          | 0.0465             | 3/4                | 1-1/2                | 171063   | 20.27    |
| 3/64        | 0.0469             | 3/4                | 1-1/2                | 170600   | 20.56    |
| 55          | 0.0520             | 3/4                | 1-1/2                | 171064   | 21.04    |
| 54          | 0.0550             | 3/4                | 1-1/2                | 171065   | 21.04    |
| 53          | 0.0595             | 3/4                | 1-1/2                | 171066   | 21.04    |
| 1/16        | 0.0625             | 3/4                | 1-1/2                | 170602   | 20.72    |
| 52          | 0.0635             | 3/4                | 1-1/2                | 171067   | 20.68    |
| 51          | 0.0670             | 3/4                | 1-1/2                | 171068   | 20.68    |
| 50          | 0.0700             | 7/8                | 1-3/4                | 171069   | 21.15    |
| 49          | 0.0730             | 7/8                | 1-3/4                | 171070   | 21.15    |
| 48          | 0.0760             | 7/8                | 1-3/4                | 171071   | 21.88    |
| 5/64        | 0.0781             | 7/8                | 1-3/4                | 170604   | 21.88    |
| 47          | 0.0785             | 7/8                | 1-3/4                | 171072   | 21.88    |
| 46          | 0.0810             | 7/8                | 1-3/4                | 171073   | 22.37    |
| 45          | 0.0820             | 7/8                | 1-3/4                | 171074   | 22.37    |
| 44          | 0.0860             | 1                  | 2                    | 171075   | 23.09    |
| 43          | 0.0890             | 1                  | 2                    | 171076   | 23.82    |
| 42          | 0.0935             | 1                  | 2                    | 171077   | 24.07    |
| 3/32        | 0.0938             | 1                  | 2                    | 170606   | 24.07    |
| 41          | 0.0960             | 1                  | 2                    | 171078   | 24.54    |
| 40          | 0.0980             | 1                  | 2                    | 171079   | 24.67    |
| 39          | 0.0995             | 1-1/4              | 2-1/4                | 171080   | 25.51    |
| 38          | 0.1015             | 1-1/4              | 2-1/4                | 171081   | 25.51    |
| 37          | 0.1040             | 1-1/4              | 2-1/4                | 171082   | 26.12    |
| 36          | 0.1065             | 1-1/4              | 2-1/4                | 171083   | 27.31    |
| 7/64        | 0.1094             | 1-1/4              | 2-1/4                | 170608   | 27.31    |
| 35          | 0.1100             | 1-1/4              | 2-1/4                | 171084   | 27.31    |
| 34          | 0.1110             | 1-1/4              | 2-1/4                | 171085   | 27.31    |
| 33          | 0.1130             | 1-1/4              | 2-1/4                | 171086   | 28.29    |
| 32          | 0.1160             | 1-1/4              | 2-1/4                | 171087   | 28.65    |
| 31          | 0.1200             | 1-1/4              | 2-1/4                | 171088   | 28.54    |
| 1/8         | 0.1250             | 1-1/4              | 2-1/4                | 170610   | 29.14    |
| 30          | 0.1285             | 1-1/4              | 2-1/4                | 171089   | 30.59    |
| 29          | 0.1360             | 1-3/8              | 2-1/2                | 171090   | 32.17    |
| 28          | 0.1405             | 1-3/8              | 2-1/2                | 171091   | 32.17    |
| 9/64        | 0.1406             | 1-3/8              | 2-1/2                | 170612   | 32.17    |
| 27          | 0.1440             | 1-3/8              | 2-1/2                | 171092   | 33.25    |
| 26          | 0.1470             | 1-3/8              | 2-1/2                | 171093   | 33.72    |
| 25          | 0.1495             | 1-3/8              | 2-1/2                | 171094   | 33.72    |
| 24          | 0.1520             | 1-3/8              | 2-1/2                | 171096   | 34.95    |
| 23          | 0.1540             | 1-3/8              | 2-1/2                | 171097   | 36.03    |
| 5/32        | 0.1562             | 1-3/8              | 2-1/2                | 170614   | 36.03    |
| 22          | 0.1570             | 1-3/8              | 2-1/2                | 171098   | 36.03    |
| 21          | 0.1590             | 1-3/8              | 2-1/2                | 171099   | 37.48    |
| 20          | 0.1610             | 1-3/8              | 2-1/2                | 171100   | 37.48    |
| 19          | 0.1660             | 1-5/8              | 2-3/4                | 171101   | 39.42    |
| 18          | 0.1695             | 1-5/8              | 2-3/4                | 171102   | 39.89    |
| 11/64       | 0.1719             | 1-5/8              | 2-3/4                | 170616   | 42.55    |
| 17          | 0.1730             | 1-5/8              | 2-3/4                | 171103   | 42.55    |
| 16          | 0.1770             | 1-5/8              | 2-3/4                | 171104   | 44.49    |
| 15          | 0.1800             | 1-5/8              | 2-3/4                | 171105   | 44.49    |
| 14          | 0.1820             | 1-5/8              | 2-3/4                | 171106   | 45.33    |
| 13          | 0.1850             | 1-5/8              | 2-3/4                | 171107   | 46.06    |
| 3/16        | 0.1875             | 1-5/8              | 2-3/4                | 170618   | 43.76    |
| 12          | 0.1890             | 1-5/8              | 2-3/4                | 171108   | 47.16    |
| 11          | 0.1910             | 1-5/8              | 2-3/4                | 171109   | 47.16    |
| 10          | 0.1935             | 1-5/8              | 2-3/4                | 171110   | 47.75    |
| 9           | 0.1960             | 1-3/4              | 3                    | 171111   | 48.36    |
| 8           | 0.1991             | 1-3/4              | 3                    | 171112   | 48.84    |
| 7           | 0.2010             | 1-3/4              | 3                    | 171113   | 49.21    |
| 13/64       | 0.2031             | 1-3/4              | 3                    | 170620   | 50.05    |
| 6           | 0.2040             | 1-3/4              | 3                    | 171114   | 50.66    |
| 5           | 0.2055             | 1-3/4              | 3                    | 171115   | 50.66    |
| 4           | 0.2090             | 1-3/4              | 3                    | 171116   | 52.00    |
| 3           | 0.2130             | 1-3/4              | 3                    | 171117   | 53.31    |



Speeds & Feeds ▶ P. B75

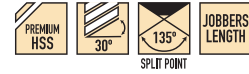
| Size          | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|---------------|--------------------|--------------------|----------------------|----------|----------|
| 7/32          | 0.2188             | 1-3/4              | 3                    | 170622   | 55.61    |
| 2             | 0.2210             | 1-3/4              | 3                    | 171118   | 55.61    |
| 1             | 0.2280             | 1-3/4              | 3                    | 171119   | 57.92    |
| A             | 0.2340             | 2                  | 3-1/4                | 171120   | 63.47    |
| 15/64         | 0.2344             | 2                  | 3-1/4                | 170624   | 62.76    |
| B             | 0.2380             | 2                  | 3-1/4                | 171121   | 66.25    |
| C             | 0.2420             | 2                  | 3-1/4                | 171122   | 66.62    |
| D             | 0.2460             | 2                  | 3-1/4                | 171123   | 67.47    |
| 1/4           | 0.2500             | 2                  | 3-1/4                | 170626   | 66.37    |
| E             | 0.2500             | 2                  | 3-1/4                | 171124   | 66.37    |
| F             | 0.2570             | 2                  | 3-1/4                | 171125   | 73.50    |
| G             | 0.2610             | 2-1/8              | 3-1/2                | 171126   | 77.98    |
| 17/64         | 0.2656             | 2-1/8              | 3-1/2                | 170628   | 74.72    |
| H             | 0.2660             | 2-1/8              | 3-1/2                | 171127   | 79.67    |
| I             | 0.2720             | 2-1/8              | 3-1/2                | 171128   | 80.76    |
| J             | 0.2770             | 2-1/8              | 3-1/2                | 171129   | 83.06    |
| K             | 0.2810             | 2-1/8              | 3-1/2                | 171130   | 83.79    |
| 9/32          | 0.2812             | 2-1/8              | 3-1/2                | 170630   | 77.74    |
| L             | 0.2900             | 2-1/8              | 3-1/2                | 171131   | 88.50    |
| M             | 0.2950             | 2-1/8              | 3-1/2                | 171132   | 90.07    |
| 19/64         | 0.2969             | 2-1/8              | 3-1/2                | 170632   | 87.16    |
| N             | 0.3020             | 2-1/8              | 3-1/2                | 171133   | 95.87    |
| 5/16          | 0.3125             | 2-1/8              | 3-1/2                | 170634   | 91.63    |
| O             | 0.3160             | 2-1/8              | 3-1/2                | 171134   | 101.08   |
| P             | 0.3230             | 2-1/8              | 3-1/2                | 171135   | 104.82   |
| 21/64         | 0.3281             | 2-1/2              | 4                    | 170636   | 99.75    |
| Q             | 0.3320             | 2-1/2              | 4                    | 171136   | 108.69   |
| R             | 0.3390             | 2-1/2              | 4                    | 171137   | 113.52   |
| 11/32         | 0.3438             | 2-1/2              | 4                    | 170638   | 109.16   |
| S             | 0.3480             | 2-1/2              | 4                    | 171138   | 121.15   |
| T             | 0.3580             | 2-1/2              | 4                    | 171139   | 125.12   |
| 23/64         | 0.3594             | 2-1/2              | 4                    | 170640   | 121.98   |
| U             | 0.3680             | 2-3/4              | 4-1/4                | 171140   | 131.18   |
| 3/8           | 0.3750             | 2-3/4              | 4-1/4                | 170642   | 129.37   |
| V             | 0.3770             | 2-3/4              | 4-1/4                | 171141   | 145.20   |
| W             | 0.3860             | 2-7/8              | 4-1/2                | 171142   | 156.45   |
| 25/64         | 0.3906             | 2-7/8              | 4-1/2                | 170644   | 151.36   |
| X             | 0.3970             | 2-7/8              | 4-1/2                | 171143   | 170.83   |
| Y             | 0.4040             | 2-7/8              | 4-1/2                | 171144   | 176.52   |
| 13/32         | 0.4062             | 2-7/8              | 4-1/2                | 170646   | 165.86   |
| Z             | 0.4130             | 2-7/8              | 4-1/2                | 171145   | 184.48   |
| 27/64         | 0.4219             | 2-7/8              | 4-1/2                | 170648   | 180.01   |
| 7/16          | 0.4375             | 2-7/8              | 4-1/2                | 170650   | 188.72   |
| 29/64         | 0.4531             | 3                  | 4-3/4                | 170652   | 218.44   |
| 15/32         | 0.4688             | 3                  | 4-3/4                | 170654   | 227.64   |
| 31/64         | 0.4844             | 3                  | 4-3/4                | 170656   | 234.18   |
| 1/2           | 0.5000             | 3                  | 4-3/4                | 170658   | 234.18   |
| <b>Metric</b> |                    |                    |                      |          |          |
| 1.5           | 0.0591             | 19                 | 38                   | 171146   | 21.76    |
| 2.0           | 0.0787             | 22                 | 44                   | 171147   | 23.09    |
| 2.5           | 0.0984             | 25                 | 51                   | 171148   | 25.99    |
| 3.0           | 0.1181             | 32                 | 57                   | 171149   | 29.14    |
| 3.5           | 0.1378             | 35                 | 64                   | 171150   | 34.46    |
| 4.0           | 0.1575             | 35                 | 64                   | 171151   | 38.69    |
| 4.5           | 0.1772             | 41                 | 70                   | 171152   | 45.58    |
| 5.0           | 0.1968             | 44                 | 76                   | 171153   | 49.81    |
| 5.5           | 0.2165             | 44                 | 76                   | 171154   | 56.58    |
| 6.0           | 0.2362             | 51                 | 83                   | 171155   | 63.47    |
| 6.5           | 0.2559             | 51                 | 83                   | 171156   | 70.96    |
| 7.0           | 0.2756             | 54                 | 89                   | 171157   | 83.06    |
| 7.5           | 0.2953             | 60                 | 92                   | 171158   | 90.91    |
| 8.0           | 0.3150             | 60                 | 92                   | 171159   | 102.88   |
| 8.5           | 0.3346             | 64                 | 102                  | 171160   | 112.92   |
| 9.0           | 0.3543             | 64                 | 102                  | 171161   | 130.44   |
| 9.5           | 0.3740             | 70                 | 108                  | 171162   | 146.89   |
| 10.0          | 0.3937             | 73                 | 114                  | 171163   | 171.30   |
| 10.5          | 0.4134             | 73                 | 114                  | 171164   | 184.12   |
| 11.0          | 0.4331             | 73                 | 114                  | 171165   | 212.53   |
| 11.5          | 0.4528             | 76                 | 121                  | 171166   | 230.66   |
| 12.0          | 0.4724             | 76                 | 121                  | 171167   | 238.77   |

Drilling & Holemaking

## Premium HSS Jobber Length Drills



These Premium HSS drills can be used in a variety of applications. Their surface treatment increases abrasion resistance, which reduces the amount of chip welding and improves chip flow.



| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 60         | 0.0400             | 11/16              | 1-5/8                | 128189   | 3.48     |
| 59         | 0.0410             | 11/16              | 1-5/8                | 128188   | 3.48     |
| 58         | 0.0420             | 11/16              | 1-5/8                | 128187   | 3.48     |
| 57         | 0.0430             | 3/4                | 1-3/4                | 128186   | 3.48     |
| 56         | 0.0465             | 3/4                | 1-3/4                | 128185   | 3.48     |
| 55         | 0.0520             | 7/8                | 1-7/8                | 128184   | 3.48     |
| 54         | 0.0540             | 7/8                | 1-7/8                | 128183   | 3.48     |
| 53         | 0.0595             | 7/8                | 1-7/8                | 128182   | 3.48     |
| 1/16       | 0.0625             | 7/8                | 1-7/8                | 128001   | 3.05     |
| 52         | 0.0635             | 7/8                | 1-7/8                | 128181   | 3.48     |
| 51         | 0.0670             | 1                  | 2                    | 128180   | 3.48     |
| 50         | 0.0700             | 1                  | 2                    | 128179   | 3.17     |
| 49         | 0.0730             | 1                  | 2                    | 128178   | 3.17     |
| 48         | 0.0760             | 1                  | 2                    | 128177   | 3.17     |
| 5/64       | 0.0781             | 1                  | 2                    | 128002   | 3.05     |
| 47         | 0.0785             | 1                  | 2                    | 128176   | 3.17     |
| 46         | 0.0810             | 1-1/8              | 2-1/8                | 128175   | 3.17     |
| 45         | 0.0820             | 1-1/8              | 2-1/8                | 128174   | 3.17     |
| 44         | 0.0860             | 1-1/8              | 2-1/8                | 128173   | 3.17     |
| 43         | 0.0890             | 1-1/4              | 2-1/4                | 128172   | 3.17     |
| 42         | 0.0935             | 1-1/4              | 2-1/4                | 128171   | 3.17     |
| 3/32       | 0.0938             | 1-1/4              | 2-1/4                | 128003   | 3.05     |
| 41         | 0.0960             | 1-3/8              | 2-3/8                | 128170   | 3.17     |
| 40         | 0.0980             | 1-3/8              | 2-3/8                | 128169   | 3.17     |
| 39         | 0.0995             | 1-3/8              | 2-3/8                | 128168   | 3.17     |
| 38         | 0.1015             | 1-7/16             | 2-1/2                | 128167   | 3.17     |
| 37         | 0.1040             | 1-7/16             | 2-1/2                | 128166   | 3.17     |
| 36         | 0.1065             | 1-7/16             | 2-1/2                | 128165   | 3.17     |
| 7/64       | 0.1094             | 1-1/2              | 2-5/8                | 128004   | 3.47     |
| 35         | 0.1100             | 1-1/2              | 2-5/8                | 128164   | 3.17     |
| 34         | 0.1110             | 1-1/2              | 2-5/8                | 128163   | 3.17     |
| 33         | 0.1130             | 1-1/2              | 2-5/8                | 128162   | 3.17     |
| 32         | 0.1160             | 1-5/8              | 2-3/4                | 128161   | 3.17     |
| 31         | 0.1200             | 1-5/8              | 2-3/4                | 128160   | 3.17     |
| 1/8        | 0.1250             | 1-5/8              | 2-3/4                | 128005   | 3.47     |
| 30         | 0.1285             | 1-5/8              | 2-3/4                | 128159   | 3.17     |
| 29         | 0.1360             | 1-3/4              | 2-7/8                | 128158   | 3.17     |
| 28         | 0.1405             | 1-3/4              | 2-7/8                | 128157   | 3.17     |
| 9/64       | 0.1406             | 1-3/4              | 2-7/8                | 128006   | 3.45     |
| 27         | 0.1440             | 1-7/8              | 3                    | 128156   | 3.61     |
| 26         | 0.1470             | 1-7/8              | 3                    | 128155   | 3.61     |
| 25         | 0.1495             | 1-7/8              | 3                    | 128154   | 3.61     |
| 24         | 0.1520             | 2                  | 3-1/8                | 128153   | 3.61     |
| 23         | 0.1540             | 2                  | 3-1/8                | 128152   | 3.61     |
| 5/32       | 0.1562             | 2                  | 3-1/8                | 128007   | 3.45     |
| 22         | 0.1570             | 2                  | 3-1/8                | 128151   | 3.61     |
| 21         | 0.1590             | 2-1/8              | 3-1/4                | 128150   | 3.61     |
| 20         | 0.1610             | 2-1/8              | 3-1/4                | 128149   | 3.92     |
| 19         | 0.1660             | 2-1/8              | 3-1/4                | 128148   | 3.91     |
| 18         | 0.1695             | 2-1/8              | 3-1/4                | 128147   | 3.91     |
| 11/64      | 0.1719             | 2-1/8              | 3-1/4                | 128008   | 3.62     |
| 17         | 0.1730             | 2-3/16             | 3-3/8                | 128146   | 4.52     |
| 16         | 0.1770             | 2-3/16             | 3-3/8                | 128145   | 4.52     |
| 15         | 0.1800             | 2-3/16             | 3-3/8                | 128144   | 4.52     |
| 14         | 0.1820             | 2-3/16             | 3-3/8                | 128143   | 4.52     |
| 13         | 0.1850             | 2-5/16             | 3-1/2                | 128142   | 4.52     |
| 3/16       | 0.1875             | 2-5/16             | 3-1/2                | 128009   | 4.05     |
| 12         | 0.1890             | 2-5/16             | 3-1/2                | 128141   | 4.52     |
| 11         | 0.1910             | 2-5/16             | 3-1/2                | 128140   | 4.52     |
| 10         | 0.1935             | 2-7/16             | 3-5/8                | 128139   | 5.05     |
| 9          | 0.1960             | 2-7/16             | 3-5/8                | 128138   | 5.05     |
| 8          | 0.1991             | 2-7/16             | 3-5/8                | 128137   | 5.05     |
| 7          | 0.2010             | 2-7/16             | 3-5/8                | 128136   | 5.05     |
| 13/64      | 0.2031             | 2-7/16             | 3-5/8                | 128010   | 4.50     |

| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 6          | 0.2040             | 2-1/2              | 3-3/4                | 128135   | 5.52     |
| 5          | 0.2055             | 2-1/2              | 3-3/4                | 128134   | 5.52     |
| 4          | 0.2090             | 2-1/2              | 3-3/4                | 128133   | 5.63     |
| 3          | 0.2130             | 2-1/2              | 3-3/4                | 128132   | 5.63     |
| 7/32       | 0.2188             | 2-1/2              | 3-3/4                | 128011   | 5.22     |
| 2          | 0.2210             | 2-5/8              | 3-7/8                | 128131   | 5.91     |
| 1          | 0.2280             | 2-5/8              | 3-7/8                | 128130   | 5.91     |
| A          | 0.2340             | 2-5/8              | 3-7/8                | 128250   | 5.94     |
| 15/64      | 0.2344             | 2-5/8              | 3-7/8                | 128012   | 5.64     |
| B          | 0.2380             | 2-3/4              | 4                    | 128251   | 6.08     |
| C          | 0.2420             | 2-3/4              | 4                    | 128252   | 6.08     |
| D          | 0.2460             | 2-3/4              | 4                    | 128253   | 6.34     |
| 1/4        | 0.2500             | 2-3/4              | 4                    | 128013   | 5.94     |
| E          | 0.2500             | 2-3/4              | 4                    | 128254   | 6.34     |
| F          | 0.2570             | 2-7/8              | 4-1/8                | 128255   | 8.98     |
| G          | 0.2610             | 2-7/8              | 4-1/8                | 128256   | 8.83     |
| 17/64      | 0.2656             | 2-7/8              | 4-1/8                | 128014   | 7.52     |
| H          | 0.2660             | 2-7/8              | 4-1/8                | 128257   | 8.84     |
| I          | 0.2720             | 2-7/8              | 4-1/8                | 128258   | 8.96     |
| J          | 0.2770             | 2-7/8              | 4-1/8                | 128259   | 9.27     |
| K          | 0.2810             | 2-15/16            | 4-1/4                | 128260   | 9.54     |
| 9/32       | 0.2812             | 2-15/16            | 4-1/4                | 128015   | 7.52     |
| L          | 0.2900             | 2-15/16            | 4-1/4                | 128261   | 9.67     |
| M          | 0.2950             | 3-1/16             | 4-3/8                | 128262   | 10.43    |
| 19/64      | 0.2969             | 3-1/16             | 4-3/8                | 128016   | 8.83     |
| N          | 0.3020             | 3-1/16             | 4-3/8                | 128263   | 10.57    |
| 5/16       | 0.3125             | 3-3/16             | 4-1/2                | 128017   | 9.25     |
| O          | 0.3160             | 3-3/16             | 4-1/2                | 128264   | 11.25    |
| P          | 0.3230             | 3-5/16             | 4-5/8                | 128265   | 12.43    |
| 21/64      | 0.3281             | 3-5/16             | 4-5/8                | 128018   | 10.42    |
| Q          | 0.3320             | 3-7/16             | 4-3/4                | 128266   | 12.88    |
| R          | 0.3390             | 3-7/16             | 4-3/4                | 128267   | 13.33    |
| 11/32      | 0.3438             | 3-7/16             | 4-3/4                | 128019   | 11.25    |
| S          | 0.3480             | 3-1/2              | 4-7/8                | 128268   | 14.14    |
| T          | 0.3580             | 3-1/2              | 4-7/8                | 128269   | 14.62    |
| 23/64      | 0.3594             | 3-1/2              | 4-7/8                | 128020   | 12.57    |
| U          | 0.3680             | 3-5/8              | 5                    | 128270   | 16.05    |
| 3/8        | 0.3750             | 3-5/8              | 5                    | 128021   | 12.90    |
| V          | 0.3770             | 3-5/8              | 5                    | 128271   | 16.46    |
| W          | 0.3860             | 3-3/4              | 5-1/8                | 128272   | 17.51    |
| 25/64      | 0.3906             | 3-3/4              | 5-1/8                | 128022   | 15.05    |
| X          | 0.3970             | 3-3/4              | 5-1/8                | 128273   | 18.54    |
| Y          | 0.4040             | 3-7/8              | 5-1/4                | 128274   | 19.37    |
| 13/32      | 0.4062             | 3-7/8              | 5-1/4                | 128023   | 15.31    |
| Z          | 0.4130             | 3-7/8              | 5-1/4                | 128275   | 19.51    |
| 27/64      | 0.4219             | 3-15/16            | 5-3/8                | 128024   | 17.35    |
| 7/16       | 0.4375             | 4-1/16             | 5-1/2                | 128025   | 17.49    |
| 29/64      | 0.4531             | 4-3/16             | 5-5/8                | 128026   | 20.56    |
| 15/32      | 0.4688             | 4-5/16             | 5-3/4                | 128027   | 21.10    |
| 31/64      | 0.4844             | 4-3/8              | 5-7/8                | 128028   | 22.42    |
| 1/2        | 0.5000             | 4-1/2              | 6                    | 128029   | 22.27    |

# General Purpose HSS & Cobalt Jobber Drills — Fractional



• General Purpose



| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | General Purpose 118° Code No. | Price \$ | HD Split Point 135° Code No. | Price \$ | General Purpose TiN Coated 118° Code No. | Price \$ | General Purpose Cobalt 135° Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|-------------------------------|----------|------------------------------|----------|--|----------|--------------------------------------|----------|
| 1/64       | 0.0156             | 3/16               | 3/4                  | 117995                        | 6.02     | -                            | -        | -  | -        | 117985                               | 7.23     |
| 1/32       | 0.0312             | 1/2                | 1-3/8                | 117996                        | 3.37     | -                            | -        | -  | -        | 117986                               | 6.27     |
| 3/64       | 0.0469             | 3/4                | 1-3/4                | 117997                        | 2.89     | -                            | -        | -  | -        | 117987                               | 4.95     |
| 1/16       | 0.0625             | 7/8                | 1-7/8                | 118001                        | 2.54     | 118030                       | 3.08     | 118090                                   | 7.39     | 118060                               | 3.91     |
| 5/64       | 0.0781             | 1                  | 2                    | 118002                        | 2.54     | 118031                       | 3.08     | 118091                                   | 7.70     | 118061                               | 3.91     |
| 3/32       | 0.0938             | 1-1/4              | 2-1/4                | 118003                        | 2.63     | 118032                       | 3.08     | 118092                                   | 7.26     | 118062                               | 3.91     |
| 7/64       | 0.1094             | 1-1/2              | 2-5/8                | 118004                        | 2.63     | 118033                       | 3.50     | 118093                                   | 7.42     | 118063                               | 4.16     |
| 1/8        | 0.1250             | 1-5/8              | 2-3/4                | 118005                        | 2.66     | 118034                       | 3.50     | 118094                                   | 7.70     | 118064                               | 4.91     |
| 9/64       | 0.1406             | 1-3/4              | 2-7/8                | 118006                        | 2.95     | 118035                       | 3.47     | 118095                                   | 7.83     | 118065                               | 5.30     |
| 5/32       | 0.1562             | 2                  | 3-1/8                | 118007                        | 3.34     | 118036                       | 3.47     | 118096                                   | 8.50     | 118066                               | 5.32     |
| 11/64      | 0.1719             | 2-1/8              | 3-1/4                | 118008                        | 3.51     | 118037                       | 3.77     | 118097                                   | 8.67     | 118067                               | 5.44     |
| 3/16       | 0.1875             | 2-5/16             | 3-1/2                | 118009                        | 3.78     | 118038                       | 4.19     | 118098                                   | 9.25     | 118068                               | 6.86     |
| 13/64      | 0.2031             | 2-7/16             | 3-5/8                | 118010                        | 4.17     | 118039                       | 4.62     | 118099                                   | 13.99    | 118069                               | 8.08     |
| 7/32       | 0.2188             | 2-1/2              | 3-3/4                | 118011                        | 4.61     | 118040                       | 5.32     | 118100                                   | 14.38    | 118070                               | 8.25     |
| 15/64      | 0.2344             | 2-5/8              | 3-7/8                | 118012                        | 4.91     | 118041                       | 5.87     | 118101                                   | 14.85    | 118071                               | 9.35     |
| 1/4        | 0.2500             | 2-3/4              | 4                    | 118013                        | 4.88     | 118042                       | 5.90     | 118102                                   | 15.23    | 118072                               | 9.67     |
| 17/64      | 0.2656             | 2-7/8              | 4-1/8                | 118014                        | 5.74     | 118043                       | 7.70     | 118103                                   | 22.23    | 118073                               | 10.90    |
| 9/32       | 0.2812             | 2-15/16            | 4-1/4                | 118015                        | 6.84     | 118044                       | 7.70     | 118104                                   | 22.80    | 118074                               | 11.59    |
| 19/64      | 0.2969             | 3-1/16             | 4-3/8                | 118016                        | 7.85     | 118045                       | 8.93     | 118105                                   | 23.63    | 118075                               | 14.38    |
| 5/16       | 0.3125             | 3-3/16             | 4-1/2                | 118017                        | 8.68     | 118046                       | 9.38     | 118106                                   | 24.17    | 118076                               | 14.95    |
| 21/64      | 0.3281             | 3-5/16             | 4-5/8                | 118018                        | 9.67     | 118047                       | 10.62    | 118107                                   | 27.98    | 118077                               | 16.93    |
| 11/32      | 0.3438             | 3-7/16             | 4-3/4                | 118019                        | 10.46    | 118048                       | 11.61    | 118108                                   | 28.64    | 118078                               | 18.48    |
| 23/64      | 0.3594             | 3-1/2              | 4-7/8                | 118020                        | 11.59    | 118049                       | 13.28    | 118109                                   | 29.79    | 118079                               | 18.43    |
| 3/8        | 0.3750             | 3-5/8              | 5                    | 118021                        | 11.75    | 118050                       | 13.55    | 118110                                   | 30.60    | 118080                               | 18.73    |
| 25/64      | 0.3906             | 3-3/4              | 5-1/8                | 118022                        | 14.10    | 118051                       | 15.52    | 118111                                   | 34.52    | 118081                               | 22.39    |
| 13/32      | 0.4062             | 3-7/8              | 5-1/4                | 118023                        | 14.38    | 118052                       | 15.64    | 118112                                   | 36.07    | 118082                               | 25.00    |
| 27/64      | 0.4219             | 3-15/16            | 5-3/8                | 118024                        | 16.09    | 118053                       | 17.88    | 118113                                   | 37.17    | 118083                               | 28.49    |
| 7/16       | 0.4375             | 4-1/16             | 5-1/2                | 118025                        | 16.47    | 118054                       | 18.05    | 118114                                   | 38.88    | 118084                               | 29.05    |
| 29/64      | 0.4531             | 4-3/16             | 5-5/8                | 118026                        | 18.86    | 118055                       | 20.80    | 118115                                   | 42.79    | 118085                               | 33.27    |
| 15/32      | 0.4688             | 4-5/16             | 5-3/4                | 118027                        | 20.27    | 118056                       | 21.51    | 118116                                   | 44.47    | 118086                               | 34.10    |
| 31/64      | 0.4844             | 4-3/8              | 5-7/8                | 118028                        | 20.80    | 118057                       | 23.07    | 118117                                   | 46.02    | 118087                               | 36.20    |
| 1/2        | 0.5000             | 4-1/2              | 6                    | 118029                        | 21.12    | 118058                       | 23.10    | 118118                                   | 47.10    | 118088                               | 36.46    |
| 33/64      | 0.5156             | 4-13/16            | 6-5/8                | 117970                        | 41.40    | -                            | -        | -  | -        | 117988                               | 102.55   |
| 17/32      | 0.5312             | 4-13/16            | 6-5/8                | 117971                        | 42.60    | -                            | -        | -  | -        | 117989                               | 116.80   |
| 35/64      | 0.5469             | 4-13/16            | 6-5/8                | 117972                        | 46.97    | -                            | -        | -  | -        | 117990                               | 123.64   |
| 9/16       | 0.5625             | 4-13/16            | 6-5/8                | 117973                        | 48.24    | -                            | -        | -  | -        | 117991                               | 133.09   |
| 37/64      | 0.5781             | 4-13/16            | 6-5/8                | 117974                        | 49.35    | -                            | -        | -  | -        | 117992                               | 137.18   |
| 19/32      | 0.5938             | 5-3/16             | 7-1/8                | 117975                        | 50.64    | -                            | -        | -  | -        | 117993                               | 138.06   |
| 39/64      | 0.6094             | 5-3/16             | 7-1/8                | 117976                        | 54.26    | -                            | -        | -  | -        | 117994                               | 146.30   |
| 5/8        | 0.6250             | 5-3/16             | 7-1/8                | 117977                        | 53.29    | -                            | -        | -  | -        | 117998                               | 147.60   |
| 41/64      | 0.6406             | 5-3/16             | 7-1/8                | 117978                        | 58.16    | -                            | -        | -  | -        | 117999                               | 154.39   |
| 21/32      | 0.6562             | 5-3/16             | 7-1/8                | 117979                        | 60.96    | -                            | -        | -  | -        | 117983                               | 163.17   |
| 43/64      | 0.6719             | 5-5/8              | 7-5/8                | 117980                        | 65.87    | -                            | -        | -  | -        | 117984                               | 175.35   |
| 11/16      | 0.6875             | 5-5/8              | 7-5/8                | 117981                        | 65.87    | -                            | -        | -  | -        | 117969                               | 178.63   |
| 3/4        | 0.7500             | 5-5/8              | 7-5/8                | 117982                        | 86.54    | -                            | -        | -  | -        | -                                    | -        |

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## General Purpose HSS Jobber Drills — Number



• General Purpose



| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | General Purpose 118° Code No. | Price \$ | HD Split Point 135° Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|-------------------------------|----------|------------------------------|----------|
| 1    | 0.2280             | 2-5/8              | 3-7/8                | 118130                        | 5.30     | 118200                       | 6.16     |
| 2    | 0.2210             | 2-5/8              | 3-7/8                | 118131                        | 5.30     | 118201                       | 6.16     |
| 3    | 0.2130             | 2-1/2              | 3-3/4                | 118132                        | 4.89     | 118202                       | 5.72     |
| 4    | 0.2090             | 2-1/2              | 3-3/4                | 118133                        | 4.89     | 118203                       | 5.72     |
| 5    | 0.2055             | 2-1/2              | 3-3/4                | 118134                        | 4.89     | 118204                       | 5.74     |
| 6    | 0.2040             | 2-1/2              | 3-3/4                | 118135                        | 4.89     | 118205                       | 5.74     |
| 7    | 0.2010             | 2-7/16             | 3-5/8                | 118136                        | 4.36     | 118206                       | 5.06     |
| 8    | 0.1990             | 2-7/16             | 3-5/8                | 118137                        | 4.36     | 118207                       | 5.06     |
| 9    | 0.1960             | 2-7/16             | 3-5/8                | 118138                        | 4.36     | 118208                       | 5.06     |
| 10   | 0.1935             | 2-7/16             | 3-5/8                | 118139                        | 4.36     | 118209                       | 5.06     |
| 11   | 0.1910             | 2-5/16             | 3-1/2                | 118140                        | 4.16     | 118210                       | 4.91     |
| 12   | 0.1890             | 2-5/16             | 3-1/2                | 118141                        | 4.16     | 118211                       | 4.91     |
| 13   | 0.1850             | 2-5/16             | 3-1/2                | 118142                        | 4.16     | 118212                       | 4.91     |
| 14   | 0.1820             | 2-3/16             | 3-3/8                | 118143                        | 4.16     | 118213                       | 4.91     |
| 15   | 0.1800             | 2-3/16             | 3-3/8                | 118144                        | 4.16     | 118214                       | 4.91     |
| 16   | 0.1770             | 2-3/16             | 3-3/8                | 118145                        | 4.16     | 118215                       | 4.91     |
| 17   | 0.1730             | 2-3/16             | 3-3/8                | 118146                        | 4.16     | 118216                       | 4.91     |
| 18   | 0.1695             | 2-1/8              | 3-1/4                | 118147                        | 3.50     | 118217                       | 3.93     |
| 19   | 0.1660             | 2-1/8              | 3-1/4                | 118148                        | 3.50     | 118218                       | 3.93     |
| 20   | 0.1610             | 2-1/8              | 3-1/4                | 118149                        | 3.50     | 118219                       | 3.64     |
| 21   | 0.1590             | 2-1/8              | 3-1/4                | 118150                        | 3.08     | 118220                       | 3.76     |
| 22   | 0.1570             | 2                  | 3-1/8                | 118151                        | 3.08     | 118221                       | 3.76     |
| 23   | 0.1540             | 2                  | 3-1/8                | 118152                        | 3.08     | 118222                       | 3.76     |
| 24   | 0.1520             | 2                  | 3-1/8                | 118153                        | 3.08     | 118223                       | 3.76     |
| 25   | 0.1495             | 1-7/8              | 3                    | 118154                        | 3.08     | 118224                       | 3.76     |
| 26   | 0.1470             | 1-7/8              | 3                    | 118155                        | 3.08     | 118225                       | 3.76     |
| 27   | 0.1440             | 1-7/8              | 3                    | 118156                        | 3.08     | 118226                       | 3.76     |
| 28   | 0.1405             | 1-3/4              | 2-7/8                | 118157                        | 2.95     | 118227                       | 3.34     |
| 29   | 0.1360             | 1-3/4              | 2-7/8                | 118158                        | 2.95     | 118228                       | 3.34     |
| 30   | 0.1285             | 1-5/8              | 2-3/4                | 118159                        | 2.95     | 118229                       | 3.34     |
| 31   | 0.1200             | 1-5/8              | 2-3/4                | 118160                        | 2.95     | 118230                       | 3.34     |
| 32   | 0.1160             | 1-5/8              | 2-3/4                | 118161                        | 2.95     | 118231                       | 3.34     |
| 33   | 0.1130             | 1-1/2              | 2-5/8                | 118162                        | 2.95     | 118232                       | 3.34     |
| 34   | 0.1110             | 1-1/2              | 2-5/8                | 118163                        | 2.95     | 118233                       | 3.34     |
| 35   | 0.1100             | 1-1/2              | 2-5/8                | 118164                        | 2.95     | 118234                       | 3.34     |
| 36   | 0.1065             | 1-7/16             | 2-1/2                | 118165                        | 2.95     | 118235                       | 3.34     |
| 37   | 0.1040             | 1-7/16             | 2-1/2                | 118166                        | 2.95     | 118236                       | 3.34     |
| 38   | 0.1015             | 1-7/16             | 2-1/2                | 118167                        | 2.95     | 118237                       | 3.34     |
| 39   | 0.0995             | 1-3/8              | 2-3/8                | 118168                        | 2.95     | 118238                       | 3.34     |
| 40   | 0.0980             | 1-3/8              | 2-3/8                | 118169                        | 2.95     | 118239                       | 3.34     |
| 41   | 0.0960             | 1-3/8              | 2-3/8                | 118170                        | 2.95     | -                            | -        |
| 42   | 0.0935             | 1-1/4              | 2-1/4                | 118171                        | 2.95     | -                            | -        |
| 43   | 0.0890             | 1-1/4              | 2-1/4                | 118172                        | 2.95     | -                            | -        |
| 44   | 0.0860             | 1-1/8              | 2-1/8                | 118173                        | 2.95     | -                            | -        |
| 45   | 0.0820             | 1-1/8              | 2-1/8                | 118174                        | 2.95     | -                            | -        |
| 46   | 0.0810             | 1-1/8              | 2-1/8                | 118175                        | 2.95     | -                            | -        |
| 47   | 0.0785             | 1                  | 2                    | 118176                        | 2.95     | -                            | -        |
| 48   | 0.0760             | 1                  | 2                    | 118177                        | 2.95     | -                            | -        |
| 49   | 0.0730             | 1                  | 2                    | 118178                        | 2.95     | -                            | -        |
| 50   | 0.0700             | 1                  | 2                    | 118179                        | 2.95     | -                            | -        |
| 51   | 0.0670             | 1                  | 2                    | 118180                        | 2.95     | -                            | -        |
| 52   | 0.0635             | 7/8                | 1-7/8                | 118181                        | 2.95     | -                            | -        |
| 53   | 0.0595             | 7/8                | 1-7/8                | 118182                        | 2.95     | -                            | -        |
| 54   | 0.0550             | 7/8                | 1-7/8                | 118183                        | 2.95     | -                            | -        |
| 55   | 0.0520             | 7/8                | 1-7/8                | 118184                        | 2.95     | -                            | -        |
| 56   | 0.0465             | 3/4                | 1-3/4                | 118185                        | 2.95     | -                            | -        |
| 57   | 0.0430             | 3/4                | 1-3/4                | 118186                        | 2.95     | -                            | -        |
| 58   | 0.0420             | 11/16              | 1-5/8                | 118187                        | 2.95     | -                            | -        |
| 59   | 0.0410             | 11/16              | 1-5/8                | 118188                        | 2.95     | -                            | -        |
| 60   | 0.0400             | 11/16              | 1-5/8                | 118189                        | 2.95     | -                            | -        |

## General Purpose HSS Jobber Drills — Number



• General Purpose



| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 61   | 0.0390             | 11/16              | 1-5/8                | 105705   | 6.25     |
| 62   | 0.0380             | 5/8                | 1-1/2                | 105710   | 6.25     |
| 63   | 0.0370             | 5/8                | 1-1/2                | 105715   | 2.98     |
| 64   | 0.0360             | 5/8                | 1-1/2                | 105720   | 5.45     |
| 65   | 0.0350             | 5/8                | 1-1/2                | 105725   | 6.25     |
| 66   | 0.0330             | 1/2                | 1-3/8                | 105730   | 6.25     |
| 67   | 0.0320             | 1/2                | 1-3/8                | 105735   | 6.25     |
| 68   | 0.0310             | 1/2                | 1-3/8                | 105740   | 5.50     |
| 69   | 0.0292             | 1/2                | 1-3/8                | 105745   | 3.50     |
| 70   | 0.0280             | 3/8                | 1-1/4                | 105750   | 3.76     |
| 71   | 0.0260             | 3/8                | 1-1/4                | 105755   | 3.50     |
| 72   | 0.0250             | 5/16               | 1-1/8                | 105760   | 3.76     |
| 73   | 0.0240             | 5/16               | 1-1/8                | 105765   | 5.88     |
| 74   | 0.0225             | 1/4                | 1                    | 105770   | 6.22     |
| 75   | 0.0210             | 1/4                | 1                    | 105775   | 3.76     |
| 76   | 0.0200             | 3/16               | 7/8                  | 105780   | 4.59     |
| 77   | 0.0180             | 3/16               | 7/8                  | 105785   | 6.22     |
| 78   | 0.0160             | 3/16               | 7/8                  | 105790   | 3.76     |
| 79   | 0.0145             | 1/8                | 3/4                  | 105795   | 5.58     |
| 80   | 0.0135             | 1/8                | 3/4                  | 105800   | 5.25     |

## General Purpose HSS Jobber Drills — Letter A-Z



• General Purpose



| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | General Purpose 118° Code No. | Price \$ | HD Split Point 135° Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|-------------------------------|----------|------------------------------|----------|
| A    | 0.234              | 2-5/8              | 3-7/8                | 118250                        | 5.46     | 118280                       | 6.12     |
| B    | 0.238              | 2-3/4              | 4                    | 118251                        | 5.72     | 118281                       | 6.28     |
| C    | 0.242              | 2-3/4              | 4                    | 118252                        | 5.72     | 118282                       | 6.28     |
| D    | 0.246              | 2-3/4              | 4                    | 118253                        | 5.89     | 118283                       | 6.86     |
| E    | 0.250              | 2-3/4              | 4                    | 118254                        | 5.90     | 118284                       | 6.86     |
| F    | 0.257              | 2-7/8              | 4-1/8                | 118255                        | 8.51     | 118285                       | 8.24     |
| G    | 0.261              | 2-7/8              | 4-1/8                | 118256                        | 8.08     | 118286                       | 8.97     |
| H    | 0.266              | 2-7/8              | 4-1/8                | 118257                        | 8.24     | 118287                       | 8.95     |
| I    | 0.272              | 2-7/8              | 4-1/8                | 118258                        | 8.54     | 118288                       | 9.35     |
| J    | 0.277              | 2-7/8              | 4-1/8                | 118259                        | 8.67     | 118289                       | 9.67     |
| K    | 0.281              | 2-15/16            | 4-1/4                | 118260                        | 8.97     | 118290                       | 9.64     |
| L    | 0.290              | 2-15/16            | 4-1/4                | 118261                        | 9.21     | 118291                       | 10.10    |
| M    | 0.295              | 3-1/16             | 4-3/8                | 118262                        | 9.80     | 118292                       | 10.62    |
| N    | 0.302              | 3-1/16             | 4-3/8                | 118263                        | 10.07    | 118293                       | 10.92    |
| O    | 0.316              | 3-3/16             | 4-1/2                | 118264                        | 10.63    | 118294                       | 11.74    |
| P    | 0.323              | 3-5/16             | 4-5/8                | 118265                        | 11.61    | 118295                       | 12.56    |
| Q    | 0.332              | 3-7/16             | 4-3/4                | 118266                        | 11.99    | 118296                       | 13.29    |
| R    | 0.339              | 3-7/16             | 4-3/4                | 118267                        | 12.46    | 118297                       | 13.98    |
| S    | 0.348              | 3-1/2              | 4-7/8                | 118268                        | 12.84    | 118298                       | 14.38    |
| T    | 0.358              | 3-1/2              | 4-7/8                | 118269                        | 13.68    | 118299                       | 14.95    |
| U    | 0.368              | 3-5/8              | 5                    | 118270                        | 14.97    | 118300                       | 16.39    |
| V    | 0.377              | 3-5/8              | 5                    | 118271                        | 15.51    | 118301                       | 16.78    |
| W    | 0.386              | 3-3/4              | 5-1/8                | 118272                        | 16.46    | 118302                       | 17.87    |
| X    | 0.397              | 3-3/4              | 5-1/8                | 118273                        | 17.21    | 118303                       | 18.86    |
| Y    | 0.404              | 3-7/8              | 5-1/4                | 118274                        | 18.03    | 118304                       | 19.96    |
| Z    | 0.413              | 3-7/8              | 5-1/4                | 118275                        | 18.33    | 118305                       | 20.40    |



## Black & Gold Jobber Length Drills

- Black & Gold finish extends tool life
- 135° split point penetrates faster and prevents bit "walk"



| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 60         | 0.0400             | 11/16              | 1-5/8                | 105495   | 4.04     |
| 59         | 0.0410             | 11/16              | 1-5/8                | 105494   | 4.04     |
| 58         | 0.0420             | 11/16              | 1-5/8                | 105493   | 4.04     |
| 57         | 0.0430             | 3/4                | 1-3/4                | 105492   | 4.04     |
| 56         | 0.0465             | 3/4                | 1-3/4                | 105491   | 4.04     |
| 55         | 0.0520             | 7/8                | 1-7/8                | 105490   | 4.04     |
| 54         | 0.0540             | 7/8                | 1-7/8                | 105489   | 4.04     |
| 53         | 0.0595             | 7/8                | 1-7/8                | 105488   | 4.04     |
| 1/16       | 0.0625             | 7/8                | 1-7/8                | 105381   | 1.06     |
| 52         | 0.0635             | 7/8                | 1-7/8                | 105487   | 4.04     |
| 51         | 0.0670             | 1                  | 2                    | 105486   | 4.04     |
| 50         | 0.0700             | 1                  | 2                    | 105485   | 3.89     |
| 49         | 0.0730             | 1                  | 2                    | 105484   | 3.89     |
| 48         | 0.0760             | 1                  | 2                    | 105483   | 3.89     |
| 5/64       | 0.0781             | 1                  | 2                    | 105382   | 1.06     |
| 47         | 0.0785             | 1                  | 2                    | 105482   | 3.89     |
| 46         | 0.0810             | 1-1/8              | 2-1/8                | 105481   | 3.89     |
| 45         | 0.0820             | 1-1/8              | 2-1/8                | 105480   | 3.89     |
| 44         | 0.0860             | 1-1/8              | 2-1/8                | 105479   | 3.89     |
| 43         | 0.0890             | 1-1/4              | 2-1/4                | 105478   | 3.89     |
| 42         | 0.0935             | 1-1/4              | 2-1/4                | 105477   | 3.89     |
| 3/32       | 0.0938             | 1-1/4              | 2-1/4                | 105383   | 1.26     |
| 41         | 0.0960             | 1-3/8              | 2-3/8                | 105476   | 3.89     |
| 40         | 0.0980             | 1-3/8              | 2-3/8                | 105475   | 3.89     |
| 39         | 0.0995             | 1-3/8              | 2-3/8                | 105474   | 3.91     |
| 38         | 0.1015             | 1-7/16             | 2-1/2                | 105473   | 3.91     |
| 37         | 0.1040             | 1-7/16             | 2-1/2                | 105472   | 3.92     |
| 36         | 0.1065             | 1-7/16             | 2-1/2                | 105471   | 3.92     |
| 7/64       | 0.1094             | 1-1/2              | 2-5/8                | 105384   | 1.28     |
| 35         | 0.1100             | 1-1/2              | 2-5/8                | 105470   | 3.92     |
| 34         | 0.1110             | 1-1/2              | 2-5/8                | 105469   | 3.90     |
| 33         | 0.1130             | 1-1/2              | 2-5/8                | 105468   | 3.90     |
| 32         | 0.1160             | 1-5/8              | 2-3/4                | 105467   | 3.92     |
| 31         | 0.1200             | 1-5/8              | 2-3/4                | 105466   | 3.92     |
| 1/8        | 0.1250             | 1-5/8              | 2-3/4                | 105385   | 1.53     |
| 30         | 0.1285             | 1-5/8              | 2-3/4                | 105465   | 3.91     |
| 29         | 0.1360             | 1-3/4              | 2-7/8                | 105464   | 3.91     |
| 28         | 0.1405             | 1-3/4              | 2-7/8                | 105463   | 3.91     |
| 9/64       | 0.1406             | 1-3/4              | 2-7/8                | 105386   | 1.45     |
| 27         | 0.1440             | 1-7/8              | 3                    | 105462   | 4.37     |
| 26         | 0.1470             | 1-7/8              | 3                    | 105461   | 4.37     |
| 25         | 0.1495             | 1-7/8              | 3                    | 105460   | 4.37     |
| 24         | 0.1520             | 2                  | 3-1/8                | 105459   | 4.33     |
| 23         | 0.1540             | 2                  | 3-1/8                | 105458   | 4.33     |
| 5/32       | 0.1562             | 2                  | 3-1/8                | 105387   | 1.54     |
| 22         | 0.1570             | 2                  | 3-1/8                | 105457   | 4.35     |
| 21         | 0.1590             | 2-1/8              | 3-1/4                | 105456   | 4.35     |
| 20         | 0.1610             | 2-1/8              | 3-1/4                | 105455   | 4.49     |
| 19         | 0.1660             | 2-1/8              | 3-1/4                | 105454   | 4.78     |
| 18         | 0.1695             | 2-1/8              | 3-1/4                | 105453   | 4.78     |
| 11/64      | 0.1719             | 2-1/8              | 3-1/4                | 105388   | 1.61     |
| 17         | 0.1730             | 2-3/16             | 3-3/8                | 105452   | 5.63     |
| 16         | 0.1770             | 2-3/16             | 3-3/8                | 105451   | 5.63     |
| 15         | 0.1800             | 2-3/16             | 3-3/8                | 105450   | 5.63     |
| 14         | 0.1820             | 2-3/16             | 3-3/8                | 105449   | 5.63     |
| 13         | 0.1850             | 2-5/16             | 3-1/2                | 105448   | 5.63     |
| 3/16       | 0.1875             | 2-5/16             | 3-1/2                | 105389   | 2.06     |
| 12         | 0.1890             | 2-5/16             | 3-1/2                | 105447   | 5.66     |
| 11         | 0.1910             | 2-5/16             | 3-1/2                | 105446   | 5.66     |
| 10         | 0.1935             | 2-7/16             | 3-5/8                | 105445   | 6.36     |
| 9          | 0.1960             | 2-7/16             | 3-5/8                | 105444   | 6.34     |
| 8          | 0.1991             | 2-7/16             | 3-5/8                | 105443   | 6.34     |
| 7          | 0.2010             | 2-7/16             | 3-5/8                | 105442   | 6.34     |
| 13/64      | 0.2031             | 2-7/16             | 3-5/8                | 105390   | 2.13     |

| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 6          | 0.2040             | 2-1/2              | 3-3/4                | 105441   | 7.08     |
| 5          | 0.2055             | 2-1/2              | 3-3/4                | 105440   | 7.08     |
| 4          | 0.2090             | 2-1/2              | 3-3/4                | 105439   | 7.08     |
| 3          | 0.2130             | 2-1/2              | 3-3/4                | 105438   | 7.08     |
| 7/32       | 0.2188             | 2-1/2              | 3-3/4                | 105391   | 2.34     |
| 2          | 0.2210             | 2-5/8              | 3-7/8                | 105437   | 7.51     |
| 1          | 0.2280             | 2-5/8              | 3-7/8                | 105436   | 7.51     |
| A          | 0.2340             | 2-5/8              | 3-7/8                | 105410   | 7.23     |
| 15/64      | 0.2344             | 2-5/8              | 3-7/8                | 105392   | 2.62     |
| B          | 0.2380             | 2-3/4              | 4                    | 105411   | 7.51     |
| C          | 0.2420             | 2-3/4              | 4                    | 105412   | 7.51     |
| D          | 0.2460             | 2-3/4              | 4                    | 105413   | 7.93     |
| 1/4        | 0.2500             | 2-3/4              | 4                    | 105393   | 2.91     |
| E          | 0.2500             | 2-3/4              | 4                    | 105414   | 7.99     |
| F          | 0.2570             | 2-7/8              | 4-1/8                | 105415   | 10.59    |
| G          | 0.2610             | 2-7/8              | 4-1/8                | 105416   | 10.85    |
| 17/64      | 0.2656             | 2-7/8              | 4-1/8                | 105394   | 3.46     |
| H          | 0.2660             | 2-7/8              | 4-1/8                | 105417   | 10.44    |
| I          | 0.2720             | 2-7/8              | 4-1/8                | 105418   | 10.85    |
| J          | 0.2770             | 2-7/8              | 4-1/8                | 105419   | 11.59    |
| K          | 0.2810             | 2-15/16            | 4-1/4                | 105420   | 11.69    |
| 9/32       | 0.2812             | 2-15/16            | 4-1/4                | 105395   | 3.72     |
| L          | 0.2900             | 2-15/16            | 4-1/4                | 105421   | 12.16    |
| M          | 0.2950             | 3-1/16             | 4-3/8                | 105422   | 13.05    |
| 19/64      | 0.2969             | 3-1/16             | 4-3/8                | 105396   | 3.90     |
| N          | 0.3020             | 3-1/16             | 4-3/8                | 105423   | 13.32    |
| 5/16       | 0.3125             | 3-3/16             | 4-1/2                | 105397   | 4.18     |
| O          | 0.3160             | 3-3/16             | 4-1/2                | 105424   | 14.49    |
| P          | 0.3230             | 3-5/16             | 4-5/8                | 105425   | 15.75    |
| 21/64      | 0.3281             | 3-5/16             | 4-5/8                | 105398   | 4.71     |
| Q          | 0.3320             | 3-7/16             | 4-3/4                | 105426   | 16.22    |
| R          | 0.3390             | 3-7/16             | 4-3/4                | 105427   | 16.60    |
| 11/32      | 0.3438             | 3-7/16             | 4-3/4                | 105399   | 5.71     |
| S          | 0.3480             | 3-1/2              | 4-7/8                | 105428   | 17.50    |
| T          | 0.3580             | 3-1/2              | 4-7/8                | 105429   | 18.50    |
| 23/64      | 0.3594             | 3-1/2              | 4-7/8                | 105400   | 5.83     |
| U          | 0.3680             | 3-5/8              | 5                    | 105430   | 19.95    |
| 3/8        | 0.3750             | 3-5/8              | 5                    | 105401   | 6.58     |
| V          | 0.3770             | 3-5/8              | 5                    | 105431   | 20.69    |
| W          | 0.3860             | 3-3/4              | 5-1/8                | 105432   | 21.98    |
| 25/64      | 0.3906             | 3-3/4              | 5-1/8                | 105402   | 6.43     |
| X          | 0.3970             | 3-3/4              | 5-1/8                | 105433   | 23.13    |
| Y          | 0.4040             | 3-7/8              | 5-1/4                | 105434   | 24.47    |
| 13/32      | 0.4062             | 3-7/8              | 5-1/4                | 105403   | 7.13     |
| Z          | 0.4130             | 3-7/8              | 5-1/4                | 105435   | 25.05    |
| 27/64      | 0.4219             | 3-15/16            | 5-3/8                | 105404   | 8.05     |
| 7/16       | 0.4375             | 4-1/16             | 5-1/2                | 105405   | 8.23     |
| 29/64      | 0.4531             | 4-3/16             | 5-5/8                | 105406   | 8.37     |
| 15/32      | 0.4688             | 4-5/16             | 5-3/4                | 105407   | 9.10     |
| 31/64      | 0.4844             | 4-3/8              | 5-7/8                | 105408   | 10.30    |
| 1/2        | 0.5000             | 4-1/2              | 6                    | 105409   | 10.96    |

Drilling & Holemaking



## Slow Spiral HSS Drills

Used in shallow hole drilling of aluminum and magnesium alloys and die cast parts.



### Fractional Sizes

| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 1/64       | 0.0156             | 3/16               | 3/4                  | 143200   | 9.25     |
| 1/32       | 0.0312             | 1/2                | 1-3/8                | 143201   | 5.98     |
| 3/64       | 0.0469             | 3/4                | 1-3/4                | 143202   | 5.83     |
| 1/16       | 0.0625             | 7/8                | 1-7/8                | 143203   | 5.50     |
| 5/64       | 0.0781             | 1                  | 2                    | 143204   | 5.59     |
| 3/32       | 0.0938             | 1-1/4              | 2-1/4                | 143205   | 4.95     |
| 7/64       | 0.1094             | 1-1/2              | 2-5/8                | 143206   | 5.07     |
| 1/8        | 0.1250             | 1-5/8              | 2-3/4                | 143207   | 5.07     |
| 9/64       | 0.1406             | 1-3/4              | 2-7/8                | 143208   | 6.02     |
| 5/32       | 0.1562             | 2                  | 3-1/8                | 143209   | 6.41     |
| 11/64      | 0.1719             | 2-1/8              | 3-1/4                | 143210   | 6.89     |
| 3/16       | 0.1875             | 2-5/16             | 3-1/2                | 143211   | 7.33     |
| 13/64      | 0.2031             | 2-7/16             | 3-5/8                | 143212   | 6.84     |
| 7/32       | 0.2188             | 2-1/2              | 3-3/4                | 143213   | 9.78     |
| 15/64      | 0.2344             | 2-5/8              | 3-7/8                | 143214   | 11.18    |
| 1/4        | 0.2500             | 2-3/4              | 4                    | 143215   | 9.44     |
| 17/64      | 0.2656             | 2-7/8              | 4-1/8                | 143216   | 14.94    |
| 9/32       | 0.2812             | 2-15/16            | 4-1/4                | 143217   | 15.27    |
| 19/64      | 0.2969             | 3-1/16             | 4-3/8                | 143218   | 16.34    |
| 5/16       | 0.3125             | 3-3/16             | 4-1/2                | 143219   | 16.34    |
| 21/64      | 0.3281             | 3-5/16             | 4-5/8                | 143220   | 20.62    |
| 11/32      | 0.3438             | 3-7/16             | 4-3/4                | 143221   | 20.62    |
| 23/64      | 0.3594             | 3-1/2              | 4-7/8                | 143222   | 28.34    |
| 3/8        | 0.3750             | 3-5/8              | 5                    | 143223   | 21.73    |
| 25/64      | 0.3906             | 3-3/4              | 5-1/8                | 143224   | 25.58    |
| 13/32      | 0.4062             | 3-7/8              | 5-1/4                | 143225   | 25.83    |
| 27/64      | 0.4219             | 3-15/16            | 5-3/8                | 143226   | 29.20    |
| 7/16       | 0.4375             | 4-1/16             | 5-1/2                | 143227   | 29.79    |
| 29/64      | 0.4531             | 4-3/16             | 5-5/8                | 143228   | 31.85    |
| 15/32      | 0.4688             | 4-5/16             | 5-3/4                | 143229   | 34.31    |
| 31/64      | 0.4844             | 4-3/8              | 5-7/8                | 143230   | 42.74    |
| 1/2        | 0.5000             | 4-1/2              | 6                    | 143231   | 35.22    |

### Letter Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| A    | 0.2340             | 2-5/8              | 3-7/8                | 143232   | 11.56    |
| B    | 0.2380             | 2-3/4              | 4                    | 143233   | 11.56    |
| C    | 0.2420             | 2-3/4              | 4                    | 143234   | 11.56    |
| D    | 0.2460             | 2-3/4              | 4                    | 143235   | 11.56    |
| E    | 0.2500             | 2-3/4              | 4                    | 143236   | 9.44     |
| F    | 0.2570             | 2-7/8              | 4-1/8                | 143237   | 16.19    |
| G    | 0.2610             | 2-7/8              | 4-1/8                | 143238   | 16.96    |
| H    | 0.2660             | 2-7/8              | 4-1/8                | 143239   | 17.50    |
| I    | 0.2720             | 2-7/8              | 4-1/8                | 143240   | 20.29    |
| J    | 0.2770             | 2-7/8              | 4-1/8                | 143241   | 20.29    |
| K    | 0.2810             | 2-15/16            | 4-1/4                | 143242   | 20.29    |
| L    | 0.2900             | 2-15/16            | 4-1/4                | 143243   | 21.30    |
| M    | 0.2950             | 3-1/16             | 4-3/8                | 143244   | 21.30    |
| N    | 0.3020             | 3-1/16             | 4-3/8                | 143245   | 22.07    |
| O    | 0.3160             | 3-3/16             | 4-1/2                | 143246   | 24.00    |
| P    | 0.3230             | 3-5/16             | 4-5/8                | 143247   | 24.00    |
| Q    | 0.3320             | 3-7/16             | 4-3/4                | 143248   | 24.00    |
| R    | 0.3390             | 3-7/16             | 4-3/4                | 143249   | 24.92    |
| S    | 0.3480             | 3-1/2              | 4-7/8                | 143250   | 27.41    |
| T    | 0.3580             | 3-1/2              | 4-7/8                | 143251   | 27.41    |
| U    | 0.3680             | 3-5/8              | 5                    | 143252   | 27.41    |
| V    | 0.3770             | 3-5/8              | 5                    | 143253   | 28.86    |
| W    | 0.3860             | 3-3/4              | 5-1/8                | 143254   | 32.62    |
| X    | 0.3970             | 3-3/4              | 5-1/8                | 143255   | 32.62    |
| Y    | 0.4040             | 3-7/8              | 5-1/4                | 143256   | 36.81    |
| Z    | 0.4130             | 3-7/8              | 5-1/4                | 143257   | 36.81    |

## Wire Gauge Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 1    | 0.2280             | 2-5/8              | 3-7/8                | 143258   | 11.66    |
| 2    | 0.2210             | 2-5/8              | 3-7/8                | 143259   | 11.66    |
| 3    | 0.2130             | 2-1/2              | 3-3/4                | 143260   | 11.66    |
| 4    | 0.2090             | 2-1/2              | 3-3/4                | 143261   | 11.33    |
| 5    | 0.2055             | 2-1/2              | 3-3/4                | 143262   | 11.33    |
| 6    | 0.2040             | 2-1/2              | 3-3/4                | 143263   | 11.33    |
| 7    | 0.2010             | 2-7/16             | 3-5/8                | 143264   | 10.27    |
| 8    | 0.1990             | 2-7/16             | 3-5/8                | 143265   | 10.27    |
| 9    | 0.1960             | 2-7/16             | 3-5/8                | 143266   | 10.27    |
| 10   | 0.1935             | 2-7/16             | 3-5/8                | 143267   | 10.27    |
| 11   | 0.1910             | 2-5/16             | 3-1/2                | 143268   | 10.27    |
| 12   | 0.1890             | 2-5/16             | 3-1/2                | 143269   | 10.27    |
| 13   | 0.1850             | 2-5/16             | 3-1/2                | 143270   | 9.25     |
| 14   | 0.1820             | 2-3/16             | 3-3/8                | 143271   | 9.25     |
| 15   | 0.1800             | 2-3/16             | 3-3/8                | 143272   | 9.25     |
| 16   | 0.1770             | 2-3/16             | 3-3/8                | 143273   | 9.25     |
| 17   | 0.1730             | 2-3/16             | 3-3/8                | 143274   | 9.25     |
| 18   | 0.1695             | 2-1/8              | 3-1/4                | 143275   | 9.25     |
| 19   | 0.1660             | 2-1/8              | 3-1/4                | 143276   | 7.66     |
| 20   | 0.1610             | 2-1/8              | 3-1/4                | 143277   | 7.66     |
| 21   | 0.1590             | 2-1/8              | 3-1/4                | 143278   | 7.66     |
| 22   | 0.1570             | 2                  | 3-1/8                | 143279   | 7.66     |
| 23   | 0.1540             | 2                  | 3-1/8                | 143281   | 7.23     |
| 24   | 0.1520             | 2                  | 3-1/8                | 143282   | 7.23     |
| 25   | 0.1495             | 1-7/8              | 3                    | 143283   | 7.23     |
| 26   | 0.1470             | 1-7/8              | 3                    | 143284   | 7.23     |
| 27   | 0.1440             | 1-7/8              | 3                    | 143285   | 7.23     |
| 28   | 0.1405             | 1-3/4              | 2-7/8                | 143286   | 6.02     |
| 29   | 0.1360             | 1-3/4              | 2-7/8                | 143287   | 5.59     |
| 30   | 0.1285             | 1-5/8              | 2-3/4                | 143288   | 5.59     |
| 31   | 0.1200             | 1-5/8              | 2-3/4                | 143289   | 5.59     |
| 32   | 0.1160             | 1-5/8              | 2-3/4                | 143290   | 5.59     |
| 33   | 0.1130             | 1-1/2              | 2-5/8                | 143291   | 5.59     |
| 34   | 0.1110             | 1-1/2              | 2-5/8                | 143292   | 5.59     |
| 35   | 0.1100             | 1-1/2              | 2-5/8                | 143293   | 5.59     |
| 36   | 0.1065             | 1-7/16             | 2-1/2                | 143294   | 5.59     |
| 37   | 0.1040             | 1-7/16             | 2-1/2                | 143295   | 5.59     |
| 38   | 0.1015             | 1-7/16             | 2-1/2                | 143296   | 5.59     |
| 39   | 0.0995             | 1-3/8              | 2-3/8                | 143297   | 5.59     |
| 40   | 0.0980             | 1-3/8              | 2-3/8                | 143298   | 5.59     |
| 41   | 0.0960             | 1-3/8              | 2-3/8                | 143299   | 5.59     |
| 42   | 0.0935             | 1-1/4              | 2-1/4                | 143300   | 5.59     |
| 43   | 0.0890             | 1-1/4              | 2-1/4                | 143301   | 5.59     |
| 44   | 0.0860             | 1-1/8              | 2-1/8                | 143302   | 5.59     |
| 45   | 0.0820             | 1-1/8              | 2-1/8                | 143303   | 5.59     |
| 46   | 0.0810             | 1-1/8              | 2-1/8                | 143304   | 5.59     |
| 47   | 0.0785             | 1                  | 2                    | 143305   | 5.59     |
| 48   | 0.0760             | 1                  | 2                    | 143306   | 5.59     |
| 49   | 0.0730             | 1                  | 2                    | 143307   | 5.59     |
| 50   | 0.0700             | 1                  | 2                    | 143308   | 5.59     |
| 51   | 0.0670             | 1                  | 2                    | 143309   | 5.59     |
| 52   | 0.0635             | 7/8                | 1-7/8                | 143310   | 5.59     |
| 53   | 0.0595             | 7/8                | 1-7/8                | 143311   | 5.59     |
| 54   | 0.0550             | 7/8                | 1-7/8                | 143312   | 5.59     |
| 55   | 0.0520             | 7/8                | 1-7/8                | 143313   | 5.59     |
| 56   | 0.0465             | 3/4                | 1-3/4                | 143314   | 5.88     |
| 57   | 0.0430             | 3/4                | 1-3/4                | 143315   | 5.88     |
| 58   | 0.0420             | 11/16              | 1-5/8                | 143316   | 5.88     |
| 59   | 0.0410             | 11/16              | 1-5/8                | 143317   | 5.88     |
| 60   | 0.0400             | 11/16              | 1-5/8                | 143318   | 5.88     |
| 61   | 0.0390             | 11/16              | 1-5/8                | 143319   | 7.33     |
| 62   | 0.0380             | 5/8                | 1-1/2                | 143320   | 7.33     |
| 63   | 0.0370             | 5/8                | 1-1/2                | 143321   | 7.33     |
| 64   | 0.0360             | 5/8                | 1-1/2                | 143322   | 7.33     |
| 65   | 0.0350             | 5/8                | 1-1/2                | 143323   | 7.33     |
| 66   | 0.0330             | 1/2                | 1-3/8                | 143324   | 7.33     |
| 67   | 0.0320             | 1/2                | 1-3/8                | 143325   | 7.33     |
| 68   | 0.0310             | 1/2                | 1-3/8                | 143326   | 7.33     |
| 69   | 0.0292             | 1/2                | 1-3/8                | 143327   | 7.72     |
| 70   | 0.0280             | 3/8                | 1-1/4                | 143328   | 7.72     |
| 71   | 0.0260             | 3/8                | 1-1/4                | 143329   | 9.44     |
| 72   | 0.0250             | 5/16               | 1-1/8                | 143330   | 9.44     |
| 73   | 0.0240             | 5/16               | 1-1/8                | 143331   | 9.44     |
| 74   | 0.0225             | 1/4                | 1                    | 143332   | 9.44     |
| 75   | 0.0210             | 1/4                | 1                    | 143333   | 9.44     |
| 76   | 0.0200             | 3/16               | 7/8                  | 143334   | 9.44     |
| 77   | 0.0180             | 3/16               | 7/8                  | 143335   | 9.44     |
| 78   | 0.0160             | 3/16               | 7/8                  | 143336   | 9.44     |
| 79   | 0.0145             | 1/8                | 3/4                  | 143337   | 10.99    |
| 80   | 0.0135             | 1/8                | 3/4                  | 143338   | 10.99    |

## Fast Spiral HSS Drills

These drills are designed primarily for drilling in non-ferrous materials such as Aluminum, Zinc die cast, and some plastics. They are successfully used in mild steel deep holes where chip packing occurs with standard helix drills.



### Fractional Sizes

| Size  | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------|--------------------|--------------------|----------------------|----------|----------|
| 1/64  | 0.0156             | 3/16               | 3/4                  | 117700   | 6.02     |
| 1/32  | 0.0312             | 1/2                | 1-3/8                | 117701   | 4.82     |
| 3/64  | 0.0469             | 3/4                | 1-3/4                | 117702   | 3.85     |
| 1/16  | 0.0625             | 7/8                | 1-7/8                | 117703   | 3.96     |
| 5/64  | 0.0781             | 1                  | 2                    | 117704   | 3.96     |
| 3/32  | 0.0938             | 1-1/4              | 2-1/4                | 117705   | 3.96     |
| 7/64  | 0.1094             | 1-1/2              | 2-5/8                | 117706   | 3.96     |
| 1/8   | 0.1250             | 1-5/8              | 2-3/4                | 117707   | 3.76     |
| 9/64  | 0.1406             | 1-3/4              | 2-7/8                | 117708   | 4.10     |
| 5/32  | 0.1562             | 2                  | 3-1/8                | 117709   | 3.85     |
| 11/64 | 0.1719             | 2-1/8              | 3-1/4                | 117710   | 5.07     |
| 3/16  | 0.1875             | 2-5/16             | 3-1/2                | 117711   | 5.68     |
| 13/64 | 0.2031             | 2-7/16             | 3-5/8                | 117712   | 6.27     |
| 7/32  | 0.2188             | 2-1/2              | 3-3/4                | 117713   | 7.04     |
| 15/64 | 0.2344             | 2-5/8              | 3-7/8                | 117714   | 7.57     |
| 1/4   | 0.2500             | 2-3/4              | 4                    | 117715   | 7.72     |
| 17/64 | 0.2656             | 2-7/8              | 4-1/8                | 117716   | 9.69     |
| 9/32  | 0.2812             | 2-15/16            | 4-1/4                | 117717   | 10.46    |
| 19/64 | 0.2969             | 3-1/16             | 4-3/8                | 117718   | 10.99    |
| 5/16  | 0.3125             | 3-3/16             | 4-1/2                | 117719   | 11.61    |
| 21/64 | 0.3281             | 3-5/16             | 4-5/8                | 117720   | 14.40    |
| 11/32 | 0.3438             | 3-7/16             | 4-3/4                | 117721   | 15.75    |
| 23/64 | 0.3594             | 3-1/2              | 4-7/8                | 117722   | 18.89    |
| 3/8   | 0.3750             | 3-5/8              | 5                    | 117723   | 18.89    |
| 25/64 | 0.3906             | 3-3/4              | 5-1/8                | 117724   | 21.98    |
| 13/32 | 0.4062             | 3-7/8              | 5-1/4                | 117725   | 21.98    |
| 27/64 | 0.4219             | 3-15/16            | 5-3/8                | 117726   | 23.66    |
| 7/16  | 0.4375             | 4-1/16             | 5-1/2                | 117727   | 24.52    |
| 29/64 | 0.4531             | 4-3/16             | 5-5/8                | 117728   | 25.54    |
| 15/32 | 0.4688             | 4-5/16             | 5-3/4                | 117729   | 27.46    |
| 31/64 | 0.4844             | 4-3/8              | 5-7/8                | 117730   | 28.86    |
| 1/2   | 0.5000             | 4-1/2              | 6                    | 117731   | 29.54    |

### Letter Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| A    | 0.2340             | 2-5/8              | 3-7/8                | 117732   | 9.54     |
| B    | 0.2380             | 2-3/4              | 4                    | 117733   | 9.54     |
| C    | 0.2420             | 2-3/4              | 4                    | 117734   | 9.54     |
| D    | 0.2460             | 2-3/4              | 4                    | 117735   | 9.54     |
| E    | 0.2500             | 2-3/4              | 4                    | 117736   | 7.72     |
| F    | 0.2570             | 2-7/8              | 4-1/8                | 117737   | 9.78     |
| G    | 0.2610             | 2-7/8              | 4-1/8                | 117738   | 11.18    |
| H    | 0.2660             | 2-7/8              | 4-1/8                | 117739   | 11.18    |
| I    | 0.2720             | 2-7/8              | 4-1/8                | 117740   | 11.18    |
| J    | 0.2770             | 2-7/8              | 4-1/8                | 117741   | 11.95    |
| K    | 0.2810             | 2-15/16            | 4-1/4                | 117742   | 13.40    |
| L    | 0.2900             | 2-15/16            | 4-1/4                | 117743   | 13.40    |
| M    | 0.2950             | 3-1/16             | 4-3/8                | 117744   | 14.50    |
| N    | 0.3020             | 3-1/16             | 4-3/8                | 117745   | 14.50    |
| O    | 0.3160             | 3-3/16             | 4-1/2                | 117746   | 14.50    |
| P    | 0.3230             | 3-5/16             | 4-5/8                | 117747   | 15.90    |
| Q    | 0.3320             | 3-7/16             | 4-3/4                | 117748   | 16.48    |
| R    | 0.3390             | 3-7/16             | 4-3/4                | 117749   | 16.82    |
| S    | 0.3480             | 3-1/2              | 4-7/8                | 117750   | 18.36    |
| T    | 0.3580             | 3-1/2              | 4-7/8                | 117751   | 19.67    |
| U    | 0.3680             | 3-5/8              | 5                    | 117752   | 19.67    |
| V    | 0.3770             | 3-5/8              | 5                    | 117753   | 20.58    |
| W    | 0.3860             | 3-3/4              | 5-1/8                | 117754   | 20.58    |
| X    | 0.3970             | 3-3/4              | 5-1/8                | 117755   | 23.27    |
| Y    | 0.4040             | 3-7/8              | 5-1/4                | 117756   | 25.01    |
| Z    | 0.4130             | 3-7/8              | 5-1/4                | 117757   | 26.74    |

## Wire Gauge Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 1    | 0.2280             | 2-5/8              | 3-7/8                | 117758   | 8.23     |
| 2    | 0.2210             | 2-5/8              | 3-7/8                | 117759   | 8.23     |
| 3    | 0.2130             | 2-1/2              | 3-3/4                | 117760   | 7.72     |
| 4    | 0.2090             | 2-1/2              | 3-3/4                | 117761   | 7.72     |
| 5    | 0.2055             | 2-1/2              | 3-3/4                | 117762   | 7.72     |
| 6    | 0.2040             | 2-1/2              | 3-3/4                | 117763   | 7.72     |
| 7    | 0.2010             | 2-7/16             | 3-5/8                | 117764   | 6.36     |
| 8    | 0.1990             | 2-7/16             | 3-5/8                | 117765   | 6.36     |
| 9    | 0.1960             | 2-7/16             | 3-5/8                | 117766   | 6.36     |
| 10   | 0.1935             | 2-7/16             | 3-5/8                | 117767   | 6.36     |
| 11   | 0.1910             | 2-5/16             | 3-1/2                | 117768   | 6.36     |
| 12   | 0.1890             | 2-5/16             | 3-1/2                | 117769   | 6.36     |
| 13   | 0.1850             | 2-5/16             | 3-1/2                | 117770   | 5.97     |
| 14   | 0.1820             | 2-3/16             | 3-3/8                | 117771   | 5.97     |
| 15   | 0.1800             | 2-3/16             | 3-3/8                | 117772   | 5.97     |
| 16   | 0.1770             | 2-3/16             | 3-3/8                | 117773   | 5.97     |
| 17   | 0.1730             | 2-3/16             | 3-3/8                | 117774   | 5.97     |
| 18   | 0.1695             | 2-1/8              | 3-1/4                | 117775   | 5.11     |
| 19   | 0.1660             | 2-1/8              | 3-1/4                | 117776   | 5.11     |
| 20   | 0.1610             | 2-1/8              | 3-1/4                | 117777   | 5.11     |
| 21   | 0.1590             | 2-1/8              | 3-1/4                | 117778   | 4.73     |
| 22   | 0.1570             | 2                  | 3-1/8                | 117779   | 4.73     |
| 23   | 0.1540             | 2                  | 3-1/8                | 117780   | 4.39     |
| 24   | 0.1520             | 2                  | 3-1/8                | 117781   | 4.39     |
| 25   | 0.1495             | 1-7/8              | 3                    | 117782   | 4.39     |
| 26   | 0.1470             | 1-7/8              | 3                    | 117783   | 4.39     |
| 27   | 0.1440             | 1-7/8              | 3                    | 117784   | 4.39     |
| 28   | 0.1405             | 1-3/4              | 2-7/8                | 117785   | 4.10     |
| 29   | 0.1360             | 1-3/4              | 2-7/8                | 117786   | 4.10     |
| 30   | 0.1285             | 1-5/8              | 2-3/4                | 117787   | 4.10     |
| 31   | 0.1200             | 1-5/8              | 2-3/4                | 117788   | 4.10     |
| 32   | 0.1160             | 1-5/8              | 2-3/4                | 117789   | 4.10     |
| 33   | 0.1130             | 1-1/2              | 2-5/8                | 117790   | 4.10     |
| 34   | 0.1110             | 1-1/2              | 2-5/8                | 117791   | 4.10     |
| 35   | 0.1100             | 1-1/2              | 2-5/8                | 117792   | 4.10     |
| 36   | 0.1065             | 1-7/16             | 2-1/2                | 117793   | 4.10     |
| 37   | 0.1040             | 1-7/16             | 2-1/2                | 117794   | 4.10     |
| 38   | 0.1015             | 1-7/16             | 2-1/2                | 117795   | 4.10     |
| 39   | 0.0995             | 1-3/8              | 2-3/8                | 117796   | 4.10     |
| 40   | 0.0980             | 1-3/8              | 2-3/8                | 117797   | 3.96     |
| 41   | 0.0960             | 1-3/8              | 2-3/8                | 117798   | 3.76     |
| 42   | 0.0935             | 1-1/4              | 2-1/4                | 117799   | 3.76     |
| 43   | 0.0890             | 1-1/4              | 2-1/4                | 117800   | 3.76     |
| 44   | 0.0860             | 1-1/8              | 2-1/8                | 117801   | 3.96     |
| 45   | 0.0820             | 1-1/8              | 2-1/8                | 117802   | 3.96     |
| 46   | 0.0810             | 1-1/8              | 2-1/8                | 117803   | 3.96     |
| 47   | 0.0785             | 1                  | 2                    | 117804   | 3.96     |
| 48   | 0.0760             | 1                  | 2                    | 117805   | 3.96     |
| 49   | 0.0730             | 1                  | 2                    | 117806   | 3.96     |
| 50   | 0.0700             | 1                  | 2                    | 117807   | 3.96     |
| 51   | 0.0670             | 1                  | 2                    | 117808   | 3.96     |
| 52   | 0.0635             | 7/8                | 1-7/8                | 117809   | 3.96     |
| 53   | 0.0595             | 7/8                | 1-7/8                | 117810   | 3.76     |
| 54   | 0.0550             | 7/8                | 1-7/8                | 117811   | 3.76     |
| 55   | 0.0520             | 7/8                | 1-7/8                | 117812   | 3.76     |
| 56   | 0.0465             | 3/4                | 1-3/4                | 117813   | 3.76     |
| 57   | 0.0430             | 3/4                | 1-3/4                | 117814   | 3.76     |
| 58   | 0.0420             | 11/16              | 1-5/8                | 117815   | 3.76     |
| 59   | 0.0410             | 11/16              | 1-5/8                | 117816   | 3.76     |
| 60   | 0.0400             | 11/16              | 1-5/8                | 117817   | 3.76     |
| 61   | 0.0390             | 11/16              | 1-5/8                | 117818   | 4.78     |
| 62   | 0.0380             | 5/8                | 1-1/2                | 117819   | 4.78     |
| 63   | 0.0370             | 5/8                | 1-1/2                | 117820   | 4.78     |
| 64   | 0.0360             | 5/8                | 1-1/2                | 117821   | 4.78     |
| 65   | 0.0350             | 5/8                | 1-1/2                | 117822   | 4.78     |
| 66   | 0.0330             | 1/2                | 1-3/8                | 117823   | 4.78     |
| 67   | 0.0320             | 1/2                | 1-3/8                | 117824   | 4.78     |
| 68   | 0.0310             | 1/2                | 1-3/8                | 117825   | 4.78     |
| 69   | 0.0292             | 1/2                | 1-3/8                | 117826   | 4.78     |
| 70   | 0.0280             | 3/8                | 1-1/4                | 117827   | 4.78     |
| 71   | 0.0260             | 3/8                | 1-1/4                | 117828   | 5.88     |
| 72   | 0.0250             | 5/16               | 1-1/8                | 117829   | 5.54     |
| 73   | 0.0240             | 5/16               | 1-1/8                | 117830   | 5.54     |
| 74   | 0.0225             | 1/4                | 1                    | 117831   | 5.54     |
| 75   | 0.0210             | 1/4                | 1                    | 117832   | 6.02     |
| 76   | 0.0200             | 3/16               | 7/8                  | 117833   | 6.02     |
| 77   | 0.0180             | 3/16               | 7/8                  | 117834   | 6.55     |
| 78   | 0.0160             | 3/16               | 7/8                  | 117835   | 6.55     |
| 79   | 0.0145             | 1/8                | 3/4                  | 117836   | 7.33     |
| 80   | 0.0135             | 1/8                | 3/4                  | 117837   | 7.33     |

## General Purpose Jobber Drills — Metric



- General purpose
- Heavy duty
- Super Cobalt



| Size (mm) | Decimal Equivalent | Flute Length | Overall Length | HSS 118° Point Code No. | Price \$ | Cobalt 135° Point Code No. | Price \$ |
|-----------|--------------------|--------------|----------------|-------------------------|----------|----------------------------|----------|
| 0.15      | 0.0059             | 3/64         | 3/4            | 143340                  | 18.69    | -                          | -        |
| 0.16      | 0.0063             | 3/64         | 3/4            | 143341                  | 12.03    | -                          | -        |
| 0.17      | 0.0067             | 1/16         | 3/4            | 143342                  | 10.96    | -                          | -        |
| 0.18      | 0.0071             | 1/16         | 3/4            | 143343                  | 10.96    | -                          | -        |
| 0.19      | 0.0075             | 1/16         | 3/4            | 143344                  | 13.45    | -                          | -        |
| 0.20      | 0.0079             | 1/16         | 3/4            | 143345                  | 8.39     | -                          | -        |
| 0.22      | 0.0087             | 1/16         | 3/4            | 143346                  | 8.70     | -                          | -        |
| 0.25      | 0.0098             | 5/64         | 3/4            | 143347                  | 6.88     | -                          | -        |
| 0.26      | 0.0102             | 5/64         | 3/4            | 143348                  | 6.88     | -                          | -        |
| 0.27      | 0.0106             | 5/64         | 3/4            | 143349                  | 6.22     | -                          | -        |
| 0.28      | 0.0110             | 5/64         | 3/4            | 143350                  | 6.22     | -                          | -        |
| 0.29      | 0.0114             | 5/64         | 3/4            | 143351                  | 9.59     | -                          | -        |
| 0.30      | 0.0118             | 3/32         | 3/4            | 144001                  | 5.95     | -                          | -        |
| 0.32      | 0.0126             | 3/32         | 3/4            | 144002                  | 9.59     | -                          | -        |
| 0.35      | 0.0138             | 1/8          | 3/4            | 144003                  | 3.96     | -                          | -        |
| 0.38      | 0.0150             | 3/16         | 3/4            | 144004                  | 3.78     | -                          | -        |
| 0.40      | 0.0158             | 3/16         | 7/8            | 144005                  | 6.45     | -                          | -        |
| 0.42      | 0.0165             | 3/16         | 7/8            | 144006                  | 6.45     | -                          | -        |
| 0.44      | 0.0173             | 3/16         | 7/8            | 143352                  | 6.45     | -                          | -        |
| 0.45      | 0.0177             | 3/16         | 7/8            | 144007                  | 6.45     | -                          | -        |
| 0.48      | 0.0189             | 3/16         | 7/8            | 144008                  | 9.59     | -                          | -        |
| 0.50      | 0.0197             | 3/16         | 7/8            | 144009                  | 9.59     | -                          | -        |
| 0.55      | 0.0217             | 1/4          | 1              | 144011                  | 5.83     | -                          | -        |
| 0.58      | 0.0228             | 5/16         | 1-1/8          | 144012                  | 4.06     | -                          | -        |
| 0.60      | 0.0236             | 5/16         | 1-1/8          | 144013                  | 5.83     | -                          | -        |
| 0.62      | 0.0244             | 5/16         | 1-1/8          | 144014                  | 3.65     | -                          | -        |
| 0.65      | 0.0256             | 3/8          | 1-1/4          | 144015                  | 5.83     | -                          | -        |
| 0.68      | 0.0267             | 3/8          | 1-1/4          | 144016                  | 4.06     | -                          | -        |
| 0.70      | 0.0276             | 3/8          | 1-1/4          | 144017                  | 4.63     | -                          | -        |
| 0.72      | 0.0283             | 3/8          | 1-1/4          | 144018                  | 4.06     | -                          | -        |
| 0.75      | 0.0296             | 1/2          | 1-3/8          | 144019                  | 4.15     | -                          | -        |
| 0.78      | 0.0308             | 1/2          | 1-3/8          | 144020                  | 3.23     | -                          | -        |
| 0.80      | 0.0315             | 1/2          | 1-3/8          | 144021                  | 4.15     | -                          | -        |
| 0.82      | 0.0322             | 1/2          | 1-3/8          | 144022                  | 3.23     | -                          | -        |
| 0.85      | 0.0335             | 5/8          | 1-1/2          | 144023                  | 4.15     | -                          | -        |
| 0.88      | 0.0346             | 5/8          | 1-1/2          | 144024                  | 2.90     | -                          | -        |
| 0.90      | 0.0355             | 5/8          | 1-1/2          | 144025                  | 4.15     | -                          | -        |
| 0.92      | 0.0362             | 5/8          | 1-1/2          | 144026                  | 2.90     | -                          | -        |
| 0.95      | 0.0374             | 5/8          | 1-1/2          | 144027                  | 4.15     | -                          | -        |
| 1.00      | 0.0394             | 11/16        | 1-5/8          | 144029                  | 4.15     | 143354                     | 6.99     |
| 1.05      | 0.0413             | 11/16        | 1-5/8          | 144030                  | 4.15     | -                          | -        |
| 1.10      | 0.0433             | 3/4          | 1-3/4          | 144031                  | 4.39     | 143355                     | 7.31     |
| 1.15      | 0.0453             | 3/4          | 1-3/4          | 144032                  | 4.39     | 143356                     | 7.28     |
| 1.20      | 0.0472             | 7/8          | 1-7/8          | 144033                  | 4.39     | 143357                     | 7.28     |
| 1.25      | 0.0492             | 7/8          | 1-7/8          | 144034                  | 4.39     | -                          | -        |
| 1.30      | 0.0512             | 7/8          | 1-7/8          | 144035                  | 4.39     | -                          | -        |
| 1.35      | 0.0531             | 7/8          | 1-7/8          | 144036                  | 4.39     | -                          | -        |
| 1.40      | 0.0551             | 7/8          | 1-7/8          | 144037                  | 4.39     | -                          | -        |
| 1.45      | 0.0571             | 7/8          | 1-7/8          | -                       | -        | 143358                     | 7.28     |
| 1.50      | 0.0591             | 7/8          | 1-7/8          | 144038                  | 3.54     | 143359                     | 7.28     |
| 1.55      | 0.0610             | 7/8          | 1-7/8          | 144039                  | 4.39     | -                          | -        |
| 1.60      | 0.0630             | 7/8          | 1-7/8          | 144040                  | 4.39     | -                          | -        |
| 1.65      | 0.0650             | 1            | 2              | 144041                  | 4.39     | 143360                     | 7.28     |
| 1.70      | 0.0669             | 1            | 2              | 144042                  | 4.39     | -                          | -        |
| 1.75      | 0.0689             | 1            | 2              | 144043                  | 4.39     | -                          | -        |
| 1.80      | 0.0709             | 1            | 2              | 144044                  | 4.39     | 143361                     | 7.28     |
| 1.85      | 0.0728             | 1            | 2              | 144045                  | 4.82     | 143362                     | 7.28     |
| 1.90      | 0.0748             | 1            | 2              | -                       | -        | 143363                     | 7.28     |
| 1.95      | 0.0768             | 1            | 2              | -                       | -        | 143364                     | 7.28     |
| 2.00      | 0.0787             | 1            | 2-1/8          | 144046                  | 3.66     | 143365                     | 6.56     |
| 2.05      | 0.0807             | 1-1/8        | 2-1/8          | 144047                  | 5.20     | -                          | -        |
| 2.10      | 0.0827             | 1-1/8        | 2-1/8          | 144048                  | 4.39     | 143366                     | 7.28     |
| 2.15      | 0.0846             | 1-1/8        | 2-1/8          | 144049                  | 4.39     | 143367                     | 7.28     |
| 2.20      | 0.0866             | 1-1/4        | 2-1/4          | 144050                  | 4.39     | 143368                     | 7.28     |
| 2.25      | 0.0886             | 1-1/4        | 2-1/4          | 144051                  | 4.39     | -                          | -        |
| 2.30      | 0.0906             | 1-1/4        | 2-1/4          | 144052                  | 4.39     | -                          | -        |
| 2.35      | 0.0925             | 1-1/4        | 2-1/4          | 144053                  | 4.39     | 143369                     | 7.28     |
| 2.40      | 0.0945             | 1-3/8        | 2-3/8          | 144054                  | 4.39     | 143370                     | 7.28     |

| Size (mm) | Decimal Equivalent (in.) | Flute Length | Overall Length | HSS 118° Point Code No. | Price \$ | Cobalt 135° Point Code No. | Price \$ |
|-----------|--------------------------|--------------|----------------|-------------------------|----------|----------------------------|----------|
| 2.45      | 0.0965                   | 1-3/8        | 2-3/8          | 144055                  | 5.20     | -                          | -        |
| 2.50      | 0.0984                   | 1-3/8        | 2-3/8          | 144056                  | 4.39     | 143371                     | 6.65     |
| 2.60      | 0.1024                   | 1-7/16       | 2-1/2          | 144058                  | 4.39     | 143372                     | 7.28     |
| 2.65      | 0.1043                   | 1-7/16       | 2-1/2          | 144059                  | 2.10     | -                          | -        |
| 2.70      | 0.1063                   | 1-7/16       | 2-1/2          | 144060                  | 4.39     | 143373                     | 7.28     |
| 2.75      | 0.1083                   | 1-1/2        | 2-5/8          | 144061                  | 5.20     | -                          | -        |
| 2.80      | 0.1102                   | 1-1/2        | 2-5/8          | 144062                  | 5.20     | 143374                     | 8.09     |
| 2.85      | 0.1122                   | 1-1/2        | 2-5/8          | 144063                  | 2.10     | -                          | -        |
| 2.90      | 0.1142                   | 1-5/8        | 2-3/4          | 144064                  | 5.20     | 143375                     | 8.09     |
| 2.95      | 0.1161                   | 1-5/8        | 2-3/4          | 144065                  | 2.10     | -                          | -        |
| 3.00      | 0.1181                   | 1-5/8        | 2-3/4          | 144066                  | 4.05     | 143376                     | 7.72     |
| 3.10      | 0.1220                   | 1-5/8        | 2-3/4          | 144067                  | 5.20     | 143377                     | 8.09     |
| 3.15      | 0.1240                   | 1-5/8        | 2-3/4          | 144068                  | 2.51     | -                          | -        |
| 3.20      | 0.1260                   | 1-5/8        | 2-3/4          | 144069                  | 4.58     | 143378                     | 8.09     |
| 3.25      | 0.1280                   | 1-5/8        | 2-3/4          | 143353                  | 5.20     | -                          | -        |
| 3.30      | 0.1299                   | 1-3/4        | 2-7/8          | 144070                  | 4.58     | 143379                     | 8.09     |
| 3.40      | 0.1339                   | 1-3/4        | 2-7/8          | 144071                  | 4.78     | 143380                     | 8.09     |
| 3.50      | 0.1378                   | 1-3/4        | 2-7/8          | 144072                  | 4.15     | 143381                     | 8.09     |
| 3.55      | 0.1397                   | 1-3/4        | 2-7/8          | 144073                  | 3.65     | -                          | -        |
| 3.60      | 0.1417                   | 1-7/8        | 3              | 144074                  | 5.20     | 143382                     | 9.78     |
| 3.70      | 0.1457                   | 1-7/8        | 3              | 144075                  | 5.20     | -                          | -        |
| 3.75      | 0.1476                   | 1-7/8        | 3              | 144076                  | 5.54     | -                          | -        |
| 3.80      | 0.1496                   | 1-7/8        | 3              | 144077                  | 5.54     | 143383                     | 9.78     |
| 3.90      | 0.1535                   | 2            | 3-1/8          | 144078                  | 6.50     | -                          | -        |
| 4.00      | 0.1575                   | 2-1/8        | 3-1/4          | 144079                  | 4.58     | 143389                     | 9.78     |
| 4.10      | 0.1614                   | 2-1/8        | 3-1/4          | 144080                  | 5.54     | -                          | -        |
| 4.20      | 0.1654                   | 2-1/8        | 3-1/4          | 144081                  | 5.54     | 143390                     | 9.78     |
| 4.25      | 0.1673                   | 2-1/8        | 3-1/4          | 143384                  | 5.93     | -                          | -        |
| 4.30      | 0.1693                   | 2-1/8        | 3-1/4          | 144082                  | 6.02     | -                          | -        |
| 4.40      | 0.1732                   | 2-3/16       | 3-3/8          | 144083                  | 6.45     | 143391                     | 11.02    |
| 4.50      | 0.1772                   | 2-3/16       | 3-3/8          | 144084                  | 5.54     | 143392                     | 9.78     |
| 4.60      | 0.1811                   | 2-3/16       | 3-3/8          | 144085                  | 6.45     | 143393                     | 11.02    |
| 4.70      | 0.1850                   | 2-5/16       | 3-1/2          | 144086                  | 6.89     | -                          | -        |
| 4.75      | 0.1870                   | 2-5/16       | 3-1/2          | 143385                  | 6.89     | -                          | -        |
| 4.80      | 0.1890                   | 2-5/16       | 3-1/2          | 144087                  | 6.89     | 143394                     | 12.72    |
| 4.90      | 0.1929                   | 2-7/16       | 3-5/8          | 144088                  | 6.89     | -                          | -        |
| 5.00      | 0.1968                   | 2-7/16       | 3-5/8          | 144089                  | 6.02     | 143395                     | 12.72    |
| 5.10      | 0.2008                   | 2-7/16       | 3-5/8          | 144090                  | 7.72     | -                          | -        |
| 5.20      | 0.2047                   | 2-1/2        | 3-3/4          | 144091                  | 7.72     | 143396                     | 14.98    |
| 5.25      | 0.2067                   | 2-1/2        | 3-3/4          | 144092                  | 7.72     | -                          | -        |
| 5.30      | 0.2087                   | 2-1/2        | 3-3/4          | 144093                  | 7.72     | 143397                     | 15.61    |
| 5.40      | 0.2126                   | 2-1/2        | 3-3/4          | 144094                  | 7.72     | -                          | -        |
| 5.50      | 0.2165                   | 2-1/2        | 3-3/4          | 144095                  | 7.72     | 143398                     | 13.11    |
| 5.60      | 0.2205                   | 2-5/8        | 3-7/8          | 144096                  | 7.90     | 143399                     | 15.61    |
| 5.70      | 0.2244                   | 2-5/8        | 3-7/8          | 144097                  | 7.90     | 143400                     | 15.61    |
| 5.75      | 0.2264                   | 2-5/8        | 3-7/8          | 144098                  | 8.04     | -                          | -        |
| 5.80      | 0.2283                   | 2-5/8        | 3-7/8          | 144099                  | 8.04     | 143401                     | 15.61    |
| 5.90      | 0.2323                   | 2-5/8        | 3-7/8          | 144100                  | 8.04     | -                          | -        |
| 6.00      | 0.2362                   | 2-3/4        | 4              | 144101                  | 7.18     | 143402                     | 14.16    |
| 6.10      | 0.2402                   | 2-3/4        | 4              | 144102                  | 8.53     | -                          | -        |
| 6.20      | 0.2441                   | 2-3/4        | 4              | 144103                  | 8.53     | -                          | -        |
| 6.25      | 0.2461                   | 2-3/4        | 4              | 144104                  | 9.35     | -                          | -        |
| 6.30      | 0.2480                   | 2-3/4        | 4              | 144105                  | 9.35     | -                          | -        |
| 6.40      | 0.2520                   | 2-7/8        | 4-1/8          | 144106                  | 9.35     | 143403                     | 17.69    |
| 6.50      | 0.2559                   | 2-7/8        | 4-1/8          | 144107                  | 8.53     | 143404                     | 17.69    |
| 6.60      | 0.2598                   | 2-7/8        | 4-1/8          | 144108                  | 9.35     | -                          | -        |
| 6.70      | 0.2638                   | 2-7/8        | 4-1/8          | 144109                  | 9.35     | -                          | -        |
| 6.75      | 0.2657                   | 2-7/8        | 4-1/8          | 143386                  | 9.83     | -                          | -        |
| 6.80      | 0.2677                   | 2-7/8        | 4-1/8          | 144110                  | 9.83     | -                          | -        |
| 6.90      | 0.2717                   | 2-7/8        | 4-1/8          | 144111                  | 11.23    | -                          | -        |
| 7.00      | 0.2756                   | 2-7/8        | 4-1/8          | 144112                  | 9.35     | 143405                     | 17.69    |
| 7.10      | 0.2795                   | 2-15/16      | 4-1/4          | 144113                  | 11.23    | -                          | -        |
| 7.20      | 0.2835                   | 2-15/16      | 4-1/4          | 144114                  | 11.23    | -                          | -        |
| 7.25      | 0.2854                   | 2-15/16      | 4-1/4          | 144115                  | 12.09    | -                          | -        |
| 7.30      | 0.2874                   | 2-15/16      | 4-1/4          | 144116                  | 12.09    | -                          | -        |
| 7.40      | 0.2913                   | 3-1/16       | 4-3/8          | 144117                  | 12.09    | -                          | -        |
| 7.50      | 0.2953                   | 3-1/16       | 4-3/8          | 144118                  | 11.66    | 143406                     | 21.00    |
| 7.60      | 0.2992                   | 3-1/16       | 4-3/8          | 144119                  | 13.54    | -                          | -        |
| 7.70      | 0.3031                   | 3-3/16       | 4-1/2          | 144120                  | 13.54    | 143407                     | 27.90    |
| 7.75      | 0.3051                   | 3-3/16       | 4-1/2          | 143387                  | 13.54    | -                          | -        |
| 7.80      | 0.3071                   | 3-3/16       | 4-1/2          | 144121                  | 13.54    | 143408                     | 27.90    |
| 7.90      | 0.3110                   | 3-3/16       | 4-1/2          | 144122                  | 13.54    | 143409                     | 27.90    |
| 8.00      | 0.3150                   | 3-3/16       | 4-1/2          | 144123                  | 13.20    | 143410                     | 22.60    |
| 8.10      | 0.3189                   | 3-5/16       | 4-5/8          | -                       | -        | 143411                     | 27.07    |
| 8.20      | 0.3228                   | 3-5/16       | 4-5/8          | 144124                  | 14.79    | -                          | -        |
| 8.25      | 0.3248                   | 3-5/16       | 4-5/8          | 144125                  | 16.87    | -                          | -        |
| 8.30      | 0.3268                   | 3-5/16       | 4-5/8          | 144126                  | 16.87    | -                          | -        |

| Size (mm) | Decimal Equivalent (in.) | Flute Length | Overall Length | HSS 118° Point Code No. | Price \$ | Cobalt 135° Point Code No. | Price \$ |
|-----------|--------------------------|--------------|----------------|-------------------------|----------|----------------------------|----------|
| 8.40      | 0.3307                   | 3-7/16       | 4-3/4          | 144127                  | 17.06    | -                          | -        |
| 8.50      | 0.3346                   | 3-7/16       | 4-3/4          | 144128                  | 14.79    | 143412                     | 26.65    |
| 8.60      | 0.3386                   | 3-7/16       | 4-3/4          | 144129                  | 17.06    | 143413                     | 32.05    |
| 8.70      | 0.3425                   | 3-7/16       | 4-3/4          | 144130                  | 17.06    | -                          | -        |
| 8.75      | 0.3445                   | 3-1/2        | 4-7/8          | 143388                  | 20.62    | -                          | -        |
| 8.80      | 0.3465                   | 3-1/2        | 4-7/8          | 144131                  | 17.69    | -                          | -        |
| 8.90      | 0.3504                   | 3-1/2        | 4-7/8          | 144132                  | 17.69    | -                          | -        |
| 9.00      | 0.3543                   | 3-1/2        | 4-7/8          | 144133                  | 17.69    | 143414                     | 29.54    |
| 9.10      | 0.3583                   | 3-1/2        | 4-7/8          | 144134                  | 18.74    | -                          | -        |
| 9.20      | 0.3622                   | 3-5/8        | 5              | 144135                  | 18.74    | -                          | -        |
| 9.25      | 0.3642                   | 3-5/8        | 5              | 144136                  | 13.47    | -                          | -        |
| 9.30      | 0.3661                   | 3-5/8        | 5              | 144137                  | 19.38    | -                          | -        |
| 9.40      | 0.3701                   | 3-5/8        | 5              | 144138                  | 19.38    | -                          | -        |
| 9.50      | 0.3740                   | 3-5/8        | 5              | 144139                  | 17.68    | 143415                     | 32.05    |
| 9.60      | 0.3780                   | 3-3/4        | 5-1/8          | 144140                  | 21.25    | -                          | -        |
| 9.70      | 0.3819                   | 3-3/4        | 5-1/8          | 144141                  | 21.25    | -                          | -        |
| 9.75      | 0.3839                   | 3-3/4        | 5-1/8          | 143615                  | 21.25    | -                          | -        |
| 9.80      | 0.3858                   | 3-3/4        | 5-1/8          | 144142                  | 21.25    | 143416                     | 44.53    |
| 10.00     | 0.3937                   | 3-3/4        | 5-1/8          | 144143                  | 21.87    | 143417                     | 37.05    |
| 10.10     | 0.3976                   | 3-7/8        | 5-1/4          | 144144                  | 19.55    | -                          | -        |
| 10.20     | 0.4016                   | 3-7/8        | 5-1/4          | 144145                  | 22.27    | -                          | -        |
| 10.25     | 0.4035                   | 3-7/8        | 5-1/4          | 144146                  | 19.70    | -                          | -        |
| 10.30     | 0.4055                   | 3-7/8        | 5-1/4          | 144147                  | 18.26    | -                          | -        |
| 10.40     | 0.4094                   | 3-15/16      | 5-3/8          | 144148                  | 21.51    | -                          | -        |
| 10.50     | 0.4134                   | 3-15/16      | 5-3/8          | 144149                  | 21.78    | 143418                     | 42.90    |
| 10.60     | 0.4173                   | 3-15/16      | 5-3/8          | 144150                  | 21.92    | -                          | -        |
| 10.70     | 0.4213                   | 3-15/16      | 5-1/2          | 144151                  | 21.92    | -                          | -        |
| 10.80     | 0.4252                   | 4-1/16       | 5-1/2          | 144152                  | 27.90    | -                          | -        |
| 10.90     | 0.4370                   | 4-1/16       | 5-1/2          | 144153                  | 18.89    | -                          | -        |
| 11.00     | 0.4331                   | 4-1/16       | 5-1/2          | 144154                  | 23.32    | 143419                     | 44.76    |
| 11.10     | 0.4370                   | 4-1/16       | 5-1/2          | 144155                  | 18.47    | -                          | -        |
| 11.20     | 0.4409                   | 4-3/16       | 5-5/8          | 144156                  | 28.91    | -                          | -        |
| 11.25     | 0.4429                   | 4-3/16       | 5-5/8          | 143616                  | 33.10    | -                          | -        |
| 11.30     | 0.4449                   | 4-3/16       | 5-5/8          | 144157                  | 24.11    | -                          | -        |
| 11.40     | 0.4488                   | 4-3/16       | 5-5/8          | 144158                  | 24.11    | -                          | -        |
| 11.50     | 0.4528                   | 4-3/16       | 5-5/8          | 144159                  | 26.02    | 143420                     | 55.37    |
| 11.60     | 0.4567                   | 4-3/16       | 5-5/8          | 144160                  | 26.25    | -                          | -        |
| 11.70     | 0.4606                   | 4-3/16       | 5-5/8          | 144161                  | 26.25    | -                          | -        |
| 11.80     | 0.4646                   | 4-3/8        | 5-7/8          | 144162                  | 30.69    | -                          | -        |
| 11.90     | 0.4685                   | 4-3/8        | 5-7/8          | 144163                  | 26.25    | -                          | -        |
| 12.00     | 0.4724                   | 4-3/8        | 5-7/8          | 144164                  | 28.91    | 143421                     | 57.25    |
| 12.10     | 0.4764                   | 4-3/8        | 5-7/8          | 144165                  | 26.32    | -                          | -        |
| 12.20     | 0.4803                   | 4-3/8        | 5-7/8          | 144166                  | 31.13    | -                          | -        |
| 12.25     | 0.4823                   | 4-3/8        | 5-7/8          | 144167                  | 23.08    | -                          | -        |
| 12.30     | 0.4843                   | 4-1/2        | 5-7/8          | 144168                  | 26.32    | -                          | -        |
| 12.40     | 0.4882                   | 4-1/2        | 6              | 144169                  | 26.32    | -                          | -        |
| 12.50     | 0.4921                   | 4-1/2        | 6              | 144170                  | 30.78    | 143422                     | 59.31    |
| 12.60     | 0.4961                   | 4-1/2        | 6              | 144171                  | 26.32    | -                          | -        |
| 12.70     | 0.5000                   | 4-1/2        | 6              | 144172                  | 23.10    | -                          | -        |
| 12.75     | 0.5020                   | 4-1/2        | 6              | 143617                  | 58.70    | -                          | -        |
| 12.80     | 0.5039                   | 4-1/2        | 6              | 144173                  | 30.67    | -                          | -        |
| 12.90     | 0.5070                   | 4-1/2        | 6              | 144174                  | 30.67    | -                          | -        |
| 13.00     | 0.5118                   | 4-1/2        | 6              | 144175                  | 54.01    | -                          | -        |
| 13.10     | 0.5157                   | 4-1/2        | 6              | 144176                  | 39.43    | -                          | -        |
| 13.20     | 0.5197                   | 4-1/2        | 6              | 144177                  | 28.77    | -                          | -        |
| 13.30     | 0.5236                   | 4-1/2        | 6              | 144178                  | 39.43    | -                          | -        |
| 13.40     | 0.5376                   | 4-13/16      | 6-5/8          | 144179                  | 28.77    | -                          | -        |
| 13.50     | 0.5315                   | 4-13/16      | 6-5/8          | 144180                  | 62.64    | -                          | -        |
| 13.60     | 0.5354                   | 4-13/16      | 6-5/8          | 144190                  | 39.42    | -                          | -        |
| 13.70     | 0.5394                   | 4-13/16      | 6-5/8          | 144191                  | 39.43    | -                          | -        |
| 13.75     | 0.5413                   | 4-13/16      | 6-5/8          | 144192                  | 33.12    | -                          | -        |
| 13.80     | 0.5433                   | 4-13/16      | 6-5/8          | 144193                  | 64.95    | -                          | -        |
| 13.90     | 0.5472                   | 4-13/16      | 6-5/8          | 144194                  | 42.99    | -                          | -        |
| 14.00     | 0.5512                   | 4-13/16      | 6-5/8          | 144195                  | 64.95    | -                          | -        |
| 14.25     | 0.5610                   | 4-13/16      | 6-5/8          | 144196                  | 33.12    | -                          | -        |
| 14.50     | 0.5709                   | 4-13/16      | 6-5/8          | 143618                  | 69.34    | -                          | -        |
| 14.75     | 0.5709                   | 5-3/16       | 7-1/8          | 144197                  | 55.92    | -                          | -        |
| 15.50     | 0.6102                   | 5-3/16       | 7-1/8          | 144198                  | 81.58    | -                          | -        |
| 15.75     | 0.6201                   | 5-5/16       | 7-1/8          | 144199                  | 48.87    | -                          | -        |
| 16.00     | 0.6299                   | 5-3/16       | 7-1/8          | 144200                  | 86.59    | -                          | -        |
| 16.25     | 0.6398                   | 5-3/16       | 7-1/8          | 144201                  | 47.87    | -                          | -        |
| 16.50     | 0.6490                   | 5-3/16       | 7-1/8          | 144202                  | 97.43    | -                          | -        |
| 17.00     | 0.6693                   | 5-5/8        | 7-5/8          | 144204                  | 100.58   | -                          | -        |
| 17.25     | 0.6791                   | 5-5/8        | 7-5/8          | 144205                  | 53.16    | -                          | -        |

| Size (mm) | Decimal Equivalent (in.) | Flute Length | Overall Length | HSS 118° Point Code No. | Price \$ | Cobalt 135° Point Code No. | Price \$ |
|-----------|--------------------------|--------------|----------------|-------------------------|----------|----------------------------|----------|
| 17.50     | 0.6890                   | 5-5/8        | 7-5/8          | 144206                  | 103.88   | -                          | -        |
| 17.75     | 0.6988                   | 5-5/8        | 7-5/8          | 144207                  | 68.75    | -                          | -        |
| 18.00     | 0.7087                   | 5-5/8        | 7-5/8          | 144208                  | 70.06    | -                          | -        |
| 18.25     | 0.7185                   | 5-5/8        | 7-5/8          | 144209                  | 64.64    | -                          | -        |
| 18.50     | 0.7283                   | 5-5/8        | 7-5/8          | 144210                  | 74.26    | -                          | -        |
| 18.75     | 0.7382                   | 5-5/8        | 7-5/8          | 144211                  | 72.18    | -                          | -        |
| 19.00     | 0.7480                   | 5-5/8        | 7-5/8          | 144212                  | 76.60    | -                          | -        |
| 19.25     | 0.7579                   | 5-5/8        | 7-5/8          | 144213                  | 79.98    | -                          | -        |
| 19.50     | 0.7677                   | 5-5/8        | 7-5/8          | 144214                  | 85.39    | -                          | -        |
| 19.75     | 0.7776                   | 5-5/8        | 7-5/8          | 144215                  | 75.10    | -                          | -        |
| 20.00     | 0.7874                   | 5-5/8        | 7-5/8          | 144216                  | 82.17    | -                          | -        |

### Left Hand HSS Drills



### Fractional Sizes

| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 1/64       | 0.0156             | 3/16               | 3/4                  | 143425   | 16.77    |
| 1/32       | 0.0312             | 1/2                | 1-3/8                | 143426   | 12.63    |
| 3/64       | 0.0469             | 3/4                | 1-3/4                | 143427   | 7.90     |
| 1/16       | 0.0625             | 7/8                | 1-7/8                | 143428   | 7.90     |
| 5/64       | 0.0781             | 1                  | 2                    | 143429   | 8.38     |
| 3/32       | 0.0938             | 1-1/4              | 2-1/4                | 143430   | 8.38     |
| 7/64       | 0.1094             | 1-1/2              | 2-5/8                | 143431   | 8.38     |
| 1/8        | 0.1250             | 1-5/8              | 2-3/4                | 143432   | 8.38     |
| 9/64       | 0.1406             | 1-3/4              | 2-7/8                | 143433   | 8.38     |
| 5/32       | 0.1562             | 2                  | 3-1/8                | 143434   | 9.01     |
| 11/64      | 0.1719             | 2-1/8              | 3-1/4                | 143435   | 9.78     |
| 3/16       | 0.1875             | 2-5/16             | 3-1/2                | 143436   | 9.93     |
| 13/64      | 0.2031             | 2-7/16             | 3-5/8                | 143437   | 10.85    |
| 7/32       | 0.2188             | 2-1/2              | 3-3/4                | 143438   | 11.47    |
| 15/64      | 0.2344             | 2-5/8              | 3-7/8                | 143439   | 14.98    |
| 1/4        | 0.2500             | 2-3/4              | 4                    | 143440   | 14.49    |
| 17/64      | 0.2656             | 2-7/8              | 4-1/8                | 143441   | 16.05    |
| 9/32       | 0.2812             | 2-15/16            | 4-1/4                | 143442   | 16.48    |
| 19/64      | 0.2969             | 3-1/16             | 4-3/8                | 143443   | 18.31    |
| 5/16       | 0.3125             | 3-3/16             | 4-1/2                | 143444   | 19.85    |
| 21/64      | 0.3281             | 3-5/16             | 4-5/8                | 143445   | 21.39    |
| 11/32      | 0.3438             | 3-7/16             | 4-3/4                | 143446   | 22.70    |
| 23/64      | 0.3594             | 3-1/2              | 4-7/8                | 143447   | 27.41    |
| 3/8        | 0.3750             | 3-5/8              | 5                    | 143448   | 27.75    |
| 25/64      | 0.3906             | 3-3/4              | 5-1/8                | 143449   | 31.51    |
| 13/32      | 0.4062             | 3-7/8              | 5-1/4                | 143450   | 34.07    |
| 27/64      | 0.4219             | 3-15/16            | 5-3/8                | 143451   | 36.96    |
| 7/16       | 0.4375             | 4-1/16             | 5-1/2                | 143452   | 37.24    |
| 29/64      | 0.4531             | 4-3/16             | 5-5/8                | 143453   | 44.04    |
| 15/32      | 0.4688             | 4-5/16             | 5-3/4                | 143454   | 45.16    |
| 31/64      | 0.4844             | 4-3/8              | 5-7/8                | 143455   | 49.44    |
| 1/2        | 0.5000             | 4-1/2              | 6                    | 143456   | 50.35    |

## Left Hand HSS Drills — Cont'd

### Letter Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| A    | 0.2340             | 2-5/8              | 3-7/8                | 143457   | 20.15    |
| B    | 0.2380             | 2-3/4              | 4                    | 143458   | 20.15    |
| C    | 0.2420             | 2-3/4              | 4                    | 143459   | 20.15    |
| D    | 0.2460             | 2-3/4              | 4                    | 143460   | 20.15    |
| E    | 0.2500             | 2-3/4              | 4                    | 143461   | 14.47    |
| F    | 0.2570             | 2-7/8              | 4-1/8                | 143462   | 22.32    |
| G    | 0.2610             | 2-7/8              | 4-1/8                | 143463   | 22.32    |
| H    | 0.2660             | 2-7/8              | 4-1/8                | 143464   | 22.32    |
| I    | 0.2720             | 2-7/8              | 4-1/8                | 143465   | 22.32    |
| J    | 0.2770             | 2-7/8              | 4-1/8                | 143466   | 22.32    |
| K    | 0.2810             | 2-15/16            | 4-1/4                | 143467   | 22.32    |
| L    | 0.2900             | 2-15/16            | 4-1/4                | 143468   | 25.25    |
| M    | 0.2950             | 3-1/16             | 4-3/8                | 143469   | 25.25    |
| N    | 0.3020             | 3-1/16             | 4-3/8                | 143470   | 25.25    |
| O    | 0.3160             | 3-3/16             | 4-1/2                | 143471   | 29.00    |
| P    | 0.3230             | 3-5/16             | 4-5/8                | 143472   | 32.05    |
| Q    | 0.3320             | 3-7/16             | 4-3/4                | 143473   | 32.05    |
| R    | 0.3390             | 3-7/16             | 4-3/4                | 143474   | 32.05    |
| S    | 0.3480             | 3-1/2              | 4-7/8                | 143475   | 38.94    |
| T    | 0.3580             | 3-1/2              | 4-7/8                | 143476   | 38.94    |
| U    | 0.3680             | 3-5/8              | 5                    | 143477   | 38.94    |
| V    | 0.3770             | 3-5/8              | 5                    | 143478   | 42.60    |
| W    | 0.3860             | 3-3/4              | 5-1/8                | 143479   | 42.60    |
| X    | 0.3970             | 3-3/4              | 5-1/8                | 143480   | 42.60    |
| Y    | 0.4040             | 3-7/8              | 5-1/4                | 143481   | 45.35    |
| Z    | 0.4130             | 3-7/8              | 5-1/4                | 143482   | 50.06    |

### Wire Gauge Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 1    | 0.2280             | 2-5/8              | 3-7/8                | 143483   | 16.77    |
| 2    | 0.2210             | 2-5/8              | 3-7/8                | 143484   | 16.77    |
| 3    | 0.2130             | 2-1/2              | 3-3/4                | 143485   | 15.08    |
| 4    | 0.2090             | 2-1/2              | 3-3/4                | 143486   | 15.08    |
| 5    | 0.2055             | 2-1/2              | 3-3/4                | 143487   | 15.08    |
| 6    | 0.2040             | 2-1/2              | 3-3/4                | 143488   | 15.08    |
| 7    | 0.2010             | 2-7/16             | 3-5/8                | 143489   | 14.02    |
| 8    | 0.1990             | 2-7/16             | 3-5/8                | 143490   | 14.02    |
| 9    | 0.1960             | 2-7/16             | 3-5/8                | 143491   | 14.02    |
| 10   | 0.1935             | 2-7/16             | 3-5/8                | 143492   | 14.02    |
| 11   | 0.1910             | 2-5/16             | 3-1/2                | 143493   | 14.02    |
| 12   | 0.1890             | 2-5/16             | 3-1/2                | 143494   | 14.02    |
| 13   | 0.1850             | 2-5/16             | 3-1/2                | 143495   | 13.59    |
| 14   | 0.1820             | 2-3/16             | 3-3/8                | 143496   | 13.59    |
| 15   | 0.1800             | 2-3/16             | 3-3/8                | 143497   | 13.59    |
| 16   | 0.1770             | 2-3/16             | 3-3/8                | 143498   | 13.59    |
| 17   | 0.1730             | 2-3/16             | 3-3/8                | 143499   | 13.59    |
| 18   | 0.1695             | 2-1/8              | 3-1/4                | 143500   | 12.82    |
| 19   | 0.1660             | 2-1/8              | 3-1/4                | 143501   | 12.82    |
| 20   | 0.1610             | 2-1/8              | 3-1/4                | 143502   | 11.52    |
| 21   | 0.1590             | 2-1/8              | 3-1/4                | 143503   | 11.52    |
| 22   | 0.1570             | 2                  | 3-1/8                | 143504   | 11.52    |
| 23   | 0.1540             | 2                  | 3-1/8                | 143505   | 11.52    |
| 24   | 0.1520             | 2                  | 3-1/8                | 143506   | 11.52    |
| 25   | 0.1495             | 1-7/8              | 3                    | 143507   | 9.93     |
| 26   | 0.1470             | 1-7/8              | 3                    | 143508   | 9.93     |
| 27   | 0.1440             | 1-7/8              | 3                    | 143509   | 9.93     |
| 28   | 0.1405             | 1-3/4              | 2-7/8                | 143510   | 9.93     |
| 29   | 0.1360             | 1-3/4              | 2-7/8                | 143511   | 9.93     |

### Wire Gauge Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 30   | 0.1285             | 1-5/8              | 2-3/4                | 143512   | 9.93     |
| 31   | 0.1200             | 1-5/8              | 2-3/4                | 143513   | 9.93     |
| 32   | 0.1160             | 1-5/8              | 2-3/4                | 143514   | 9.93     |
| 33   | 0.1130             | 1-1/2              | 2-5/8                | 143515   | 9.93     |
| 34   | 0.1110             | 1-1/2              | 2-5/8                | 143516   | 9.93     |
| 35   | 0.1100             | 1-1/2              | 2-5/8                | 143517   | 9.93     |
| 36   | 0.1065             | 1-7/16             | 2-1/2                | 143518   | 9.44     |
| 37   | 0.1040             | 1-7/16             | 2-1/2                | 143519   | 9.44     |
| 39   | 0.0995             | 1-3/8              | 2-3/8                | 143521   | 9.44     |
| 40   | 0.0980             | 1-3/8              | 2-3/8                | 143522   | 9.44     |
| 41   | 0.0960             | 1-3/8              | 2-3/8                | 143523   | 9.44     |
| 42   | 0.0935             | 1-1/4              | 2-1/4                | 143524   | 9.44     |
| 43   | 0.0890             | 1-1/4              | 2-1/4                | 143525   | 9.44     |
| 44   | 0.0860             | 1-1/8              | 2-1/8                | 143526   | 9.44     |
| 45   | 0.0820             | 1-1/8              | 2-1/8                | 143527   | 9.44     |
| 46   | 0.0810             | 1-1/8              | 2-1/8                | 143528   | 9.44     |
| 47   | 0.0785             | 1                  | 2                    | 143529   | 9.44     |
| 48   | 0.0760             | 1                  | 2                    | 143530   | 9.44     |
| 49   | 0.0730             | 1                  | 2                    | 143531   | 9.44     |
| 50   | 0.0700             | 1                  | 2                    | 143532   | 9.44     |
| 51   | 0.0670             | 1                  | 2                    | 143533   | 9.44     |
| 52   | 0.0635             | 7/8                | 1-7/8                | 143534   | 9.44     |
| 53   | 0.0595             | 7/8                | 1-7/8                | 143535   | 9.93     |
| 54   | 0.0550             | 7/8                | 1-7/8                | 143536   | 9.93     |
| 55   | 0.0520             | 7/8                | 1-7/8                | 143537   | 9.93     |
| 56   | 0.0465             | 3/4                | 1-3/4                | 143538   | 9.93     |
| 57   | 0.0430             | 3/4                | 1-3/4                | 143539   | 9.93     |
| 58   | 0.0420             | 11/16              | 1-5/8                | 143540   | 9.93     |
| 59   | 0.0410             | 11/16              | 1-5/8                | 143541   | 9.93     |
| 60   | 0.0400             | 11/16              | 1-5/8                | 143543   | 9.93     |
| 61   | 0.0390             | 11/16              | 1-5/8                | 143544   | 11.09    |
| 62   | 0.0380             | 5/8                | 1-1/2                | 143545   | 15.27    |
| 63   | 0.0370             | 5/8                | 1-1/2                | 143546   | 15.27    |
| 64   | 0.0360             | 5/8                | 1-1/2                | 143547   | 15.27    |
| 65   | 0.0350             | 5/8                | 1-1/2                | 143548   | 15.27    |
| 66   | 0.0330             | 1/2                | 1-3/8                | 143549   | 15.27    |
| 67   | 0.0320             | 1/2                | 1-3/8                | 143550   | 15.27    |
| 68   | 0.0310             | 1/2                | 1-3/8                | 143551   | 15.27    |
| 69   | 0.0292             | 1/2                | 1-3/8                | 143552   | 17.25    |
| 70   | 0.0280             | 3/8                | 1-1/4                | 143553   | 17.25    |
| 71   | 0.0260             | 3/8                | 1-1/4                | 143554   | 17.25    |
| 72   | 0.0250             | 5/16               | 1-1/8                | 143555   | 17.25    |
| 73   | 0.0240             | 5/16               | 1-1/8                | 143556   | 17.25    |
| 74   | 0.0225             | 1/4                | 1                    | 143557   | 17.25    |
| 75   | 0.0210             | 1/4                | 1                    | 143558   | 17.25    |
| 76   | 0.0200             | 3/16               | 7/8                  | 143559   | 17.25    |
| 77   | 0.0180             | 3/16               | 7/8                  | 143560   | 17.25    |
| 78   | 0.0160             | 3/16               | 7/8                  | 143561   | 17.25    |
| 79   | 0.0145             | 1/8                | 3/4                  | 143562   | 19.76    |
| 80   | 0.0135             | 1/8                | 3/4                  | 143563   | 19.76    |

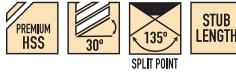
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## Premium HSS Stub Drills



These Premium HSS drills can be used in a variety of applications. Their surface treatment increases abrasion resistance, which reduces the amount of chip welding and improves chip flow.



| Size  | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------|--------------------|--------------------|----------------------|----------|----------|
| 60    | 0.0400             | 1/2                | 1-3/8                | 128399   | 3.48     |
| 59    | 0.0410             | 1/2                | 1-3/8                | 128398   | 3.48     |
| 58    | 0.0420             | 1/2                | 1-3/8                | 128397   | 3.48     |
| 57    | 0.0430             | 1/2                | 1-3/8                | 128396   | 3.48     |
| 56    | 0.0465             | 1/2                | 1-3/8                | 128395   | 3.48     |
| 55    | 0.0520             | 5/8                | 1-5/8                | 128394   | 3.48     |
| 54    | 0.0540             | 5/8                | 1-5/8                | 128393   | 3.48     |
| 53    | 0.0595             | 5/8                | 1-5/8                | 128392   | 3.48     |
| 1/16  | 0.0625             | 5/8                | 1-5/8                | 128310   | 3.47     |
| 52    | 0.0635             | 11-16              | 1-11/16              | 128391   | 3.48     |
| 51    | 0.0670             | 11-16              | 1-11/16              | 128390   | 3.48     |
| 50    | 0.0700             | 11/16              | 1-11/16              | 128389   | 3.48     |
| 49    | 0.0730             | 11/16              | 1-11/16              | 128388   | 3.48     |
| 48    | 0.0760             | 11/16              | 1-11/16              | 128387   | 3.48     |
| 5/64  | 0.0781             | 11/16              | 1-11/16              | 128311   | 3.47     |
| 47    | 0.0785             | 11/16              | 1-11/16              | 128386   | 3.48     |
| 46    | 0.0810             | 3/4                | 1-3/4                | 128385   | 3.48     |
| 45    | 0.0820             | 3/4                | 1-3/4                | 128384   | 3.48     |
| 44    | 0.0860             | 3/4                | 1-3/4                | 128383   | 3.48     |
| 43    | 0.0890             | 3/4                | 1-3/4                | 128382   | 3.48     |
| 42    | 0.0935             | 3/4                | 1-3/4                | 128381   | 3.48     |
| 3/32  | 0.0938             | 3/4                | 1-3/4                | 128312   | 3.47     |
| 41    | 0.0960             | 13/16              | 1-13/16              | 128380   | 3.48     |
| 40    | 0.0980             | 13/16              | 1-13/16              | 128379   | 3.20     |
| 39    | 0.0995             | 13/16              | 1-13/16              | 128378   | 3.20     |
| 38    | 0.1015             | 13/16              | 1-13/16              | 128377   | 3.20     |
| 37    | 0.1040             | 13/16              | 1-13/16              | 128376   | 3.20     |
| 36    | 0.1065             | 13/16              | 1-13/16              | 128375   | 3.20     |
| 7/64  | 0.1094             | 13/16              | 1-13/16              | 128313   | 3.47     |
| 35    | 0.1100             | 7/8                | 1-7/8                | 128374   | 3.20     |
| 34    | 0.1110             | 7/8                | 1-7/8                | 128373   | 3.20     |
| 33    | 0.1130             | 7/8                | 1-7/8                | 128372   | 3.20     |
| 32    | 0.1160             | 7/8                | 1-7/8                | 128371   | 3.20     |
| 31    | 0.1200             | 7/8                | 1-7/8                | 128370   | 3.20     |
| 1/8   | 0.1250             | 7/8                | 1-7/8                | 128314   | 3.47     |
| 30    | 0.1285             | 15/16              | 1-15/16              | 128369   | 3.20     |
| 29    | 0.1360             | 15/16              | 1-15/16              | 128368   | 3.20     |
| 28    | 0.1405             | 15/16              | 1-15/16              | 128367   | 3.20     |
| 9/64  | 0.1406             | 15/16              | 1-15/16              | 128315   | 3.64     |
| 27    | 0.1440             | 1                  | 2-1/16               | 128366   | 3.48     |
| 26    | 0.1470             | 1                  | 2-1/16               | 128365   | 3.48     |
| 25    | 0.1495             | 1                  | 2-1/16               | 128364   | 3.48     |
| 24    | 0.1520             | 1                  | 2-1/16               | 128363   | 3.48     |
| 23    | 0.1540             | 1                  | 2-1/16               | 128362   | 3.48     |
| 5/32  | 0.1562             | 1                  | 2-1/16               | 128316   | 3.92     |
| 22    | 0.1570             | 1-1/16             | 2-1/8                | 128361   | 3.48     |
| 21    | 0.1590             | 1-1/16             | 2-1/8                | 128360   | 3.48     |
| 20    | 0.1610             | 1-1/16             | 2-1/8                | 128359   | 3.61     |
| 19    | 0.1660             | 1-1/16             | 2-1/8                | 128358   | 3.61     |
| 18    | 0.1695             | 1-1/16             | 2-1/8                | 128357   | 3.61     |
| 11/64 | 0.1719             | 1-1/16             | 2-1/8                | 128317   | 4.04     |
| 17    | 0.1730             | 1-1/8              | 2-3/16               | 128356   | 4.04     |
| 16    | 0.1770             | 1-1/8              | 2-3/16               | 128355   | 4.04     |
| 15    | 0.1800             | 1-1/8              | 2-3/16               | 128354   | 4.04     |
| 14    | 0.1820             | 1-1/8              | 2-3/16               | 128353   | 4.04     |
| 13    | 0.1850             | 1-1/8              | 2-3/16               | 128352   | 4.04     |
| 3/16  | 0.1875             | 1-1/8              | 2-3/16               | 128318   | 4.31     |
| 12    | 0.1890             | 1-3/16             | 2-1/4                | 128351   | 4.04     |
| 11    | 0.1910             | 1-3/16             | 2-1/4                | 128350   | 4.04     |
| 10    | 0.1935             | 1-3/16             | 2-1/4                | 128349   | 4.04     |
| 9     | 0.1960             | 1-3/16             | 2-1/4                | 128348   | 4.04     |
| 8     | 0.1991             | 1-3/16             | 2-1/4                | 128347   | 4.04     |
| 7     | 0.2010             | 1-3/16             | 2-1/4                | 128346   | 4.04     |
| 13/64 | 0.2031             | 1-3/16             | 2-1/4                | 128319   | 5.08     |
| 6     | 0.2040             | 1-1/4              | 2-3/8                | 128345   | 5.05     |
| 5     | 0.2055             | 1-1/4              | 2-3/8                | 128344   | 5.05     |
| 4     | 0.2090             | 1-1/4              | 2-3/8                | 128343   | 5.05     |
| 3     | 0.2130             | 1-1/4              | 2-3/8                | 128342   | 5.05     |

| Size  | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------|--------------------|--------------------|----------------------|----------|----------|
| 7/32  | 0.2188             | 1-1/4              | 2-3/8                | 128320   | 5.05     |
| 2     | 0.2210             | 1-5/16             | 2-7/16               | 128341   | 5.48     |
| 1     | 0.2280             | 1-5/16             | 2-7/16               | 128340   | 5.48     |
| A     | 0.2340             | 1-5/16             | 2-7/16               | 128410   | 4.79     |
| 15/64 | 0.2344             | 1-5/16             | 2-7/16               | 128321   | 5.05     |
| B     | 0.2380             | 1-3/8              | 2-1/2                | 128411   | 5.05     |
| C     | 0.2420             | 1-3/8              | 2-1/2                | 128412   | 5.05     |
| D     | 0.2460             | 1-3/8              | 2-1/2                | 128413   | 5.06     |
| 1/4   | 0.2500             | 1-3/8              | 2-1/2                | 128322   | 5.25     |
| E     | 0.2500             | 1-3/8              | 2-1/2                | 128414   | 5.06     |
| F     | 0.2570             | 1-7/16             | 2-5/8                | 128415   | 6.49     |
| G     | 0.2610             | 1-7/16             | 2-5/8                | 128416   | 7.24     |
| 17/64 | 0.2656             | 1-7/16             | 2-5/8                | 128323   | 7.08     |
| H     | 0.2660             | 1-1/2              | 2-11/16              | 128417   | 7.22     |
| I     | 0.2720             | 1-1/2              | 2-11/16              | 128418   | 7.51     |
| J     | 0.2770             | 1-1/2              | 2-11/16              | 128419   | 7.52     |
| K     | 0.2810             | 1-1/2              | 2-11/16              | 128420   | 7.65     |
| 9/32  | 0.2812             | 1-1/2              | 2-11/16              | 128324   | 7.22     |
| L     | 0.2900             | 1-9/16             | 2-3/4                | 128421   | 7.98     |
| M     | 0.2950             | 1-9/16             | 2-3/4                | 128422   | 8.10     |
| 19/64 | 0.2969             | 1-9/16             | 2-3/4                | 128325   | 7.93     |
| N     | 0.3020             | 1-5/8              | 2-13/16              | 128423   | 8.40     |
| 5/16  | 0.3125             | 1-5/8              | 2-13/16              | 128326   | 8.08     |
| O     | 0.3160             | 1-11/16            | 2-15/16              | 128424   | 9.57     |
| P     | 0.3230             | 1-11/16            | 2-15/16              | 128425   | 9.68     |
| 21/64 | 0.3281             | 1-11/16            | 2-15/16              | 128327   | 9.25     |
| Q     | 0.3320             | 1-11/16            | 2-15/16              | 128426   | 10.00    |
| R     | 0.3390             | 1-11/16            | 2-15/16              | 128427   | 10.42    |
| 11/32 | 0.3438             | 1-11/16            | 2-15/16              | 128328   | 9.27     |
| S     | 0.3480             | 1-3/4              | 3-1/16               | 128428   | 10.59    |
| T     | 0.3580             | 1-3/4              | 3-1/16               | 128429   | 10.85    |
| 23/64 | 0.3594             | 1-3/4              | 3-1/16               | 128329   | 10.42    |
| U     | 0.3680             | 1-13/16            | 3-1/8                | 128430   | 11.69    |
| 3/8   | 0.3750             | 1-13/16            | 3-1/8                | 128330   | 10.56    |
| V     | 0.3770             | 1-7/8              | 3-1/4                | 128431   | 12.45    |
| W     | 0.3860             | 1-7/8              | 3-1/4                | 128432   | 12.90    |
| 25/64 | 0.3906             | 1-7/8              | 3-1/4                | 128331   | 12.02    |
| X     | 0.3970             | 1-15/16            | 3-5/16               | 128434   | 14.05    |
| Y     | 0.4040             | 1-15/16            | 3-5/16               | 128435   | 14.18    |
| 13/32 | 0.4062             | 1-15/16            | 3-5/16               | 128332   | 12.90    |
| Z     | 0.4130             | 2                  | 3-3/8                | 128436   | 14.63    |
| 27/64 | 0.4219             | 2                  | 3-3/8                | 128333   | 13.76    |
| 7/16  | 0.4375             | 2-1/16             | 3-7/16               | 128334   | 14.46    |
| 29/64 | 0.4531             | 2-1/8              | 3-9/16               | 128335   | 16.05    |
| 15/32 | 0.4688             | 2-1/8              | 3-5/8                | 128336   | 17.35    |
| 31/64 | 0.4844             | 2-3/16             | 3-11/16              | 128337   | 17.95    |
| 1/2   | 0.5000             | 2-1/4              | 3-3/4                | 128338   | 18.51    |

## Stub Drills HSS



- 135° heavy duty split point



## Fractional Sizes

| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 1/16       | 0.0625             | 5/8                | 1-5/8                | 118310   | 3.08     |
| 5/64       | 0.0781             | 11/16              | 1-11/16              | 118311   | 3.08     |
| 3/32       | 0.0938             | 3/4                | 1-3/4                | 118312   | 3.08     |
| 7/64       | 0.1094             | 13/16              | 1-13/16              | 118313   | 3.08     |
| 1/8        | 0.1250             | 7/8                | 1-7/8                | 118314   | 3.08     |
| 9/64       | 0.1406             | 15/16              | 1-15/16              | 118315   | 3.35     |
| 5/32       | 0.1562             | 1                  | 2-1/16               | 118316   | 3.51     |
| 11/64      | 0.1719             | 1-1/16             | 2-1/8                | 118317   | 3.78     |
| 3/16       | 0.1875             | 1-1/8              | 2-3/16               | 118318   | 3.93     |
| 13/64      | 0.2031             | 1-3/16             | 2-1/4                | 118319   | 4.61     |
| 7/32       | 0.2188             | 1-1/4              | 2-3/8                | 118320   | 4.62     |
| 15/64      | 0.2344             | 1-5/16             | 2-7/16               | 118321   | 4.91     |
| 1/4        | 0.2500             | 1-3/8              | 2-1/2                | 118322   | 4.89     |

## Stub Drills HSS — Cont'd

- 135° heavy duty split point



| Size (in.) | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|--------------------|--------------------|----------------------|----------|----------|
| 17/64      | 0.2656             | 1-7/16             | 2-5/8                | 118323   | 6.18     |
| 9/32       | 0.2812             | 1-1/2              | 2-11/16              | 118324   | 6.83     |
| 19/64      | 0.2969             | 1-9/16             | 2-3/4                | 118325   | 7.26     |
| 5/16       | 0.3125             | 1-5/8              | 2-13/16              | 118326   | 7.71     |
| 21/64      | 0.3281             | 1-11/16            | 2-15/16              | 118327   | 8.54     |
| 11/32      | 0.3438             | 1-11/16            | 3                    | 118328   | 8.50     |
| 23/64      | 0.3594             | 1-3/4              | 3-1/16               | 118329   | 9.64     |
| 3/8        | 0.3750             | 1-13/16            | 3-1/8                | 118330   | 9.80     |
| 25/64      | 0.3906             | 1-7/8              | 3-1/4                | 118331   | 11.16    |
| 13/32      | 0.4062             | 1-15/16            | 3-5/16               | 118332   | 11.99    |
| 27/64      | 0.4219             | 2                  | 3-3/8                | 118333   | 12.56    |
| 7/16       | 0.4375             | 2-1/16             | 3-7/16               | 118334   | 13.29    |
| 29/64      | 0.4531             | 2-1/8              | 3-9/16               | 118335   | 14.83    |
| 15/32      | 0.4688             | 2-1/8              | 3-5/8                | 118336   | 16.05    |
| 31/64      | 0.4844             | 2-3/16             | 3-11/16              | 118337   | 16.79    |
| 1/2        | 0.5000             | 2-1/4              | 3-3/4                | 118338   | 17.20    |

## Wire Gauge Sizes

| Size | Decimal Equivalent | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|--------------------|----------------------|----------|----------|
| 1    | 0.2280             | 1-5/16             | 2-7/16               | 118340   | 5.43     |
| 2    | 0.2210             | 1-5/16             | 2-7/16               | 118341   | 5.43     |
| 3    | 0.2130             | 1-1/4              | 2-3/8                | 118342   | 5.06     |
| 4    | 0.2090             | 1-1/4              | 2-3/8                | 118343   | 5.06     |
| 5    | 0.2055             | 1-1/4              | 2-3/8                | 118344   | 5.06     |
| 6    | 0.2040             | 1-1/4              | 2-3/8                | 118345   | 5.06     |
| 7    | 0.2010             | 1-3/16             | 2-1/4                | 118346   | 4.17     |
| 8    | 0.1990             | 1-3/16             | 2-1/4                | 118347   | 4.17     |
| 9    | 0.1960             | 1-3/16             | 2-1/4                | 118348   | 4.17     |
| 10   | 0.1935             | 1-3/16             | 2-1/4                | 118349   | 4.17     |
| 11   | 0.1910             | 1-3/16             | 2-1/4                | 118350   | 4.17     |
| 12   | 0.1890             | 1-3/16             | 2-1/4                | 118351   | 4.17     |
| 13   | 0.1850             | 1-1/8              | 2-3/16               | 118352   | 4.17     |
| 14   | 0.1820             | 1-1/8              | 2-3/16               | 118353   | 4.17     |
| 15   | 0.1800             | 1-1/8              | 2-3/16               | 118354   | 4.17     |
| 16   | 0.1770             | 1-1/8              | 2-3/16               | 118355   | 4.17     |
| 17   | 0.1730             | 1-1/8              | 2-3/16               | 118356   | 4.17     |
| 18   | 0.1695             | 1-1/16             | 2-1/8                | 118357   | 3.76     |
| 19   | 0.1660             | 1-1/16             | 2-1/8                | 118358   | 3.76     |
| 20   | 0.1610             | 1-1/16             | 2-1/8                | 118359   | 3.76     |
| 21   | 0.1590             | 1-1/16             | 2-1/8                | 118360   | 3.51     |
| 22   | 0.1570             | 1-1/16             | 2-1/8                | 118361   | 3.51     |
| 23   | 0.1540             | 1                  | 2-1/16               | 118362   | 3.51     |
| 24   | 0.1520             | 1                  | 2-1/16               | 118363   | 3.51     |
| 25   | 0.1495             | 1                  | 2-1/16               | 118364   | 3.51     |
| 26   | 0.1470             | 1                  | 2-1/16               | 118365   | 3.51     |
| 27   | 0.1440             | 1                  | 2-1/16               | 118366   | 3.51     |
| 28   | 0.1405             | 15/16              | 1-15/16              | 118367   | 3.09     |
| 29   | 0.1360             | 15/16              | 1-15/16              | 118368   | 3.09     |
| 30   | 0.1285             | 15/16              | 1-15/16              | 118369   | 3.09     |
| 31   | 0.1200             | 7/8                | 1-7/8                | 118370   | 3.09     |
| 32   | 0.1160             | 7/8                | 1-7/8                | 118371   | 3.09     |
| 33   | 0.1130             | 7/8                | 1-7/8                | 118372   | 3.09     |
| 34   | 0.1110             | 7/8                | 1-7/8                | 118373   | 3.09     |
| 35   | 0.1100             | 7/8                | 1-7/8                | 118374   | 3.09     |
| 36   | 0.1065             | 13/16              | 1-13/16              | 118375   | 3.09     |
| 37   | 0.1040             | 13/16              | 1-13/16              | 118376   | 3.09     |
| 38   | 0.1015             | 13/16              | 1-13/16              | 118377   | 3.09     |
| 39   | 0.0995             | 13/16              | 1-13/16              | 118378   | 3.09     |
| 40   | 0.0980             | 13/16              | 1-13/16              | 118379   | 3.09     |

## Prentice Drills



- 1/2" shank
- 3" cutting length
- 6" overall length



Available in: HSS, HSS w/3 Flats & HSCO

| Size (in.) | Decimal Equiv. | General Purpose Code No. | HSS Price \$ | General Purpose With 3 Flats Code No. | HSS Price \$ | HSCO Cobalt Code No. | Price \$ |
|------------|----------------|--------------------------|--------------|---------------------------------------|--------------|----------------------|----------|
| 33/64      | 0.5156         | 118400                   | 43.51        | 118457                                | 61.92        | 118501               | 97.01    |
| 17/32      | 0.5312         | 118401                   | 45.44        | 118458                                | 63.51        | 118502               | 97.01    |
| 35/64      | 0.5469         | 118402                   | 45.93        | 118459                                | 65.82        | 118503               | 100.33   |
| 9/16       | 0.5625         | 118403                   | 45.93        | 118460                                | 64.04        | 118504               | 100.33   |
| 37/64      | 0.5781         | 118404                   | 49.35        | 118461                                | 70.69        | 118505               | 107.41   |
| 19/32      | 0.5937         | 118405                   | 49.35        | 118462                                | 68.81        | 118506               | 107.41   |
| 39/64      | 0.6094         | 118406                   | 51.71        | 118463                                | 70.21        | 118507               | 114.20   |
| 5/8        | 0.6250         | 118407                   | 51.71        | 118464                                | 70.21        | 118508               | 114.20   |
| 41/64      | 0.6406         | 118408                   | 55.18        | 118465                                | 73.68        | 118509               | 128.13   |
| 21/32      | 0.6562         | 118409                   | 55.18        | 118466                                | 73.68        | 118510               | 128.13   |
| 43/64      | 0.6719         | 118410                   | 57.29        | 118467                                | 76.04        | 118511               | 135.22   |
| 11/16      | 0.6875         | 118411                   | 57.29        | 118468                                | 76.04        | 118512               | 135.22   |
| 45/64      | 0.7031         | 118412                   | 58.07        | 118469                                | 76.56        | 118513               | 144.56   |
| 23/32      | 0.7187         | 118413                   | 58.07        | 118470                                | 76.56        | 118514               | 144.56   |
| 47/64      | 0.7344         | 118414                   | 63.22        | 118471                                | 81.72        | 118515               | 144.56   |
| 3/4        | 0.7500         | 118415                   | 63.22        | 118472                                | 81.72        | 118516               | 144.56   |
| 49/64      | 0.7656         | 118416                   | 67.51        | 118473                                | 86.02        | 118517               | 163.40   |
| 25/32      | 0.7812         | 118417                   | 67.51        | 118474                                | 86.02        | 118518               | 163.40   |
| 51/64      | 0.7969         | 118418                   | 79.12        | 118475                                | 97.63        | 118519               | 171.11   |
| 13/16      | 0.8125         | 118419                   | 73.25        | 118476                                | 91.75        | 118520               | 171.11   |
| 53/64      | 0.8281         | 118420                   | 81.92        | 118477                                | 100.42       | 118521               | 186.29   |
| 27/32      | 0.8437         | 118421                   | 75.94        | 118478                                | 94.44        | 118522               | 186.29   |
| 55/64      | 0.8594         | 118422                   | 85.00        | 118479                                | 107.26       | 118523               | 186.29   |
| 7/8        | 0.8750         | 118423                   | 75.94        | 118480                                | 94.44        | 118524               | 184.12   |
| 57/64      | 0.8906         | 118424                   | 88.76        | 118481                                | 107.26       | 118525               | 196.22   |
| 29/32      | 0.9062         | 118425                   | 84.80        | 118482                                | 103.32       | 118526               | 196.22   |
| 59/64      | 0.9219         | 118426                   | 94.98        | 118483                                | 113.49       | 118527               | 196.22   |
| 15/16      | 0.9375         | 118427                   | 94.98        | 118484                                | 113.49       | 118528               | 196.22   |
| 61/64      | 0.9531         | 118428                   | 100.38       | 118485                                | 118.87       | 118529               | 219.01   |
| 31/32      | 0.9687         | 118429                   | 90.35        | 118486                                | 113.49       | 118530               | 219.01   |
| 63/64      | 0.9844         | 118430                   | 100.58       | 118487                                | 119.07       | 118531               | 238.03   |
| 1          | 1.0000         | 118431                   | 98.29        | 118488                                | 116.99       | 118532               | 238.03   |
| 1-1/32     | 1.0312         | 118432                   | 133.96       | 118489                                | 152.46       | 118533               | 304.68   |
| 1-1/16     | 1.0625         | 118433                   | 114.34       | 118490                                | 132.85       | 118534               | 328.83   |
| 1-3/32     | 1.0937         | 118434                   | 133.96       | 118491                                | 152.46       | 118538               | 351.53   |
| 1-1/8      | 1.1250         | 118435                   | 134.69       | 118492                                | 153.19       | 118540               | 374.08   |
| 1-5/32     | 1.1562         | 118436                   | 148.94       | 118493                                | 167.45       | 118542               | 392.39   |
| 1-3/16     | 1.1875         | 118437                   | 149.18       | 118494                                | 167.69       | 118544               | 410.30   |
| 1-7/32     | 1.2187         | 118438                   | 163.89       | 118495                                | 182.39       | 118546               | 432.37   |
| 1-1/4      | 1.2500         | 118439                   | 163.89       | 118496                                | 182.39       | 118548               | 454.44   |
| 1-9/32     | 1.2812         | -                        | -            | -                                     | -            | 118550               | 641.70   |
| 1-5/16     | 1.3125         | 118441                   | 245.18       | 118497                                | 263.67       | 118552               | 641.70   |
| 1-11/32    | 1.3438         | -                        | -            | -                                     | -            | 118554               | 651.05   |
| 1-3/8      | 1.3750         | 118443                   | 245.18       | 118498                                | 263.67       | 118556               | 651.05   |
| 1-13/32    | 1.4062         | -                        | -            | -                                     | -            | 118558               | 703.52   |
| 1-7/16     | 1.4375         | 118445                   | 287.49       | 118499                                | 307.00       | 118560               | 703.52   |
| 1-15/32    | 1.4688         | -                        | -            | -                                     | -            | 118562               | 717.55   |
| 1-1/2      | 1.5000         | 118447                   | 322.52       | 118500                                | 341.01       | 118564               | 717.55   |

## Prentice Drills HSS

- 1/2" shank
- 3" cutting length
- 6" overall length
- Flatted shank

**QUALITY  
IMPORT**



| Size (in.) | Decimal Equivalent (in.) | STM HSS Code No. | Price \$ |
|------------|--------------------------|------------------|----------|
| 33/64      | 0.5156                   | 107500           | 15.29    |
| 17/32      | 0.5312                   | 107502           | 15.15    |
| 35/64      | 0.5469                   | 107504           | 15.29    |
| 9/16       | 0.5625                   | 107506           | 17.50    |
| 37/64      | 0.5781                   | 107508           | 18.38    |
| 19/32      | 0.5937                   | 107510           | 16.26    |
| 39/64      | 0.6094                   | 107512           | 17.90    |
| 5/8        | 0.6250                   | 107514           | 17.94    |
| 41/64      | 0.6406                   | 107516           | 20.97    |
| 21/32      | 0.6562                   | 107518           | 19.91    |
| 43/64      | 0.6719                   | 107520           | 18.99    |
| 11/16      | 0.6875                   | 107522           | 19.38    |
| 45/64      | 0.7031                   | 107524           | 21.43    |
| 23/32      | 0.7187                   | 107526           | 21.30    |
| 47/64      | 0.7344                   | 107528           | 22.51    |
| 3/4        | 0.7500                   | 107530           | 23.52    |
| 49/64      | 0.7656                   | 107532           | 24.75    |
| 25/32      | 0.7812                   | 107534           | 23.45    |
| 51/64      | 0.7969                   | 107536           | 25.32    |
| 13/16      | 0.8125                   | 107538           | 23.01    |
| 53/64      | 0.8281                   | 107540           | 27.48    |
| 27/32      | 0.8437                   | 107542           | 29.04    |
| 55/64      | 0.8594                   | 107544           | 27.89    |
| 7/8        | 0.8750                   | 107546           | 30.18    |
| 57/64      | 0.8906                   | 107548           | 30.79    |
| 29/32      | 0.9062                   | 107550           | 31.41    |
| 59/64      | 0.9219                   | 107552           | 31.43    |
| 15/16      | 0.9375                   | 107554           | 32.22    |
| 61/64      | 0.9531                   | 107556           | 35.79    |
| 31/32      | 0.9687                   | 107558           | 38.14    |
| 63/64      | 0.9844                   | 107560           | 37.89    |
| 1          | 1.0000                   | 107562           | 37.61    |
| 1-1/64     | 1.0156                   | 107564           | 43.82    |
| 1-1/32     | 1.0312                   | 107566           | 52.20    |
| 1-3/64     | 1.0469                   | 107568           | 44.95    |
| 1-1/16     | 1.0625                   | 107570           | 46.14    |
| 1-5/64     | 1.0781                   | 107572           | 57.65    |
| 1-3/32     | 1.0937                   | 107574           | 46.86    |
| 1-7/64     | 1.1094                   | 107576           | 50.75    |
| 1-1/8      | 1.1250                   | 107578           | 50.73    |
| 1-9/64     | 1.1406                   | 107580           | 79.39    |
| 1-5/32     | 1.1562                   | 107582           | 53.73    |
| 1-11/64    | 1.1719                   | 107584           | 53.63    |
| 1-3/16     | 1.1875                   | 107586           | 65.88    |
| 1-13/64    | 1.2031                   | 107588           | 70.29    |
| 1-7/32     | 1.2187                   | 107590           | 76.67    |
| 1-15/64    | 1.2344                   | 107592           | 73.84    |
| 1-1/4      | 1.2500                   | 107594           | 74.67    |
| 1-17/64    | 1.2656                   | 107596           | 68.37    |
| 1-9/32     | 1.2812                   | 107598           | 75.13    |
| 1-19/64    | 1.2969                   | 107600           | 82.74    |
| 1-5/16     | 1.3125                   | 107602           | 85.89    |
| 1-21/64    | 1.3281                   | 107604           | 91.76    |
| 1-11/32    | 1.3437                   | 107606           | 101.66   |
| 1-23/64    | 1.3594                   | 107608           | 117.85   |
| 1-3/8      | 1.3750                   | 107610           | 99.98    |
| 1-25/64    | 1.3906                   | 107612           | 112.71   |
| 1-13/32    | 1.4062                   | 107614           | 117.63   |
| 1-27/64    | 1.4219                   | 107616           | 260.24   |
| 1-7/16     | 1.4375                   | 107618           | 122.93   |
| 1-29/64    | 1.4531                   | 107620           | 120.42   |
| 1-15/32    | 1.4687                   | 107622           | 124.19   |
| 1-31/64    | 1.4844                   | 107624           | 133.18   |
| 1-1/2      | 1.5000                   | 107626           | 134.98   |

## Taper Length Drills

Taper length drills are designed for general purpose drilling where longer length is required.



### Fractional Sizes

| Size (in.) | Decimal Equiv. (in.) | Flute Length | Overall Length | HSS Code No. | Price \$ | Cobalt 135° Split Point Code No. | Price \$ |
|------------|----------------------|--------------|----------------|--------------|----------|----------------------------------|----------|
| 1/64       | 0.0156               | 5/16         | 1-1/2          | 116792       | 16.53    | -                                | -        |
| 1/32       | 0.0312               | 3/4          | 2              | 116793       | 13.07    | -                                | -        |
| 3/64       | 0.0469               | 1-1/8        | 2-1/4          | 116794       | 6.27     | 115001                           | 17.59    |
| 1/16       | 0.0625               | 1-3/4        | 3              | 116795       | 6.48     | 115002                           | 15.46    |
| 5/64       | 0.0781               | 2            | 3-3/4          | 116796       | 8.23     | 115003                           | 20.04    |
| 3/32       | 0.0938               | 2-1/4        | 4-1/4          | 116797       | 9.17     | 115004                           | 20.97    |
| 7/64       | 0.1094               | 2-1/2        | 4-5/8          | 116798       | 11.31    | 115005                           | 26.89    |
| 1/8        | 0.1250               | 2-3/4        | 5-1/8          | 116799       | 11.67    | 115006                           | 26.60    |
| 9/64       | 0.1406               | 3            | 5-3/8          | 116800       | 15.46    | 115007                           | 32.67    |
| 5/32       | 0.1562               | 3            | 5-3/8          | 116801       | 14.02    | 115008                           | 35.37    |
| 11/64      | 0.1719               | 3-3/8        | 5-3/4          | 116802       | 16.53    | 115009                           | 35.37    |
| 3/16       | 0.1875               | 3-3/8        | 5-3/4          | 116803       | 14.02    | 115010                           | 35.37    |
| 13/64      | 0.2031               | 3-5/8        | 6              | 116804       | 18.93    | 115011                           | 40.91    |
| 7/32       | 0.2188               | 3-5/8        | 6              | 116805       | 20.04    | 115012                           | 40.91    |
| 15/64      | 0.2344               | 3-3/4        | 6-1/8          | 116806       | 20.04    | 115013                           | 42.70    |
| 1/4        | 0.2500               | 3-3/4        | 6-1/8          | 116807       | 16.53    | 115014                           | 40.47    |
| 17/64      | 0.2656               | 3-7/8        | 6-1/4          | 116808       | 20.98    | 115015                           | 52.85    |
| 9/32       | 0.2812               | 3-7/8        | 6-1/4          | 116809       | 20.04    | 115016                           | 49.96    |
| 19/64      | 0.2969               | 4            | 6-3/8          | 116810       | 23.10    | 115017                           | 52.85    |
| 5/16       | 0.3125               | 4            | 6-3/8          | 116811       | 20.04    | 115018                           | 49.96    |
| 21/64      | 0.3281               | 4-1/8        | 6-1/2          | 116812       | 23.48    | 115019                           | 60.81    |
| 11/32      | 0.3438               | 4-1/8        | 6-1/2          | 116813       | 23.10    | 115020                           | 58.59    |
| 23/64      | 0.3594               | 4-1/4        | 6-3/4          | 116814       | 26.98    | 115021                           | 72.08    |
| 3/8        | 0.3750               | 4-1/4        | 6-3/4          | 116815       | 26.98    | 115022                           | 66.35    |
| 25/64      | 0.3906               | 4-3/8        | 7              | 116816       | 28.66    | 115023                           | 74.55    |
| 13/32      | 0.4062               | 4-3/8        | 7              | 116817       | 28.24    | 115024                           | 69.53    |
| 27/64      | 0.4219               | 4-5/8        | 7-1/4          | 116818       | 30.54    | 115025                           | 80.72    |
| 7/16       | 0.4375               | 4-5/8        | 7-1/4          | 116819       | 31.04    | 115026                           | 70.89    |
| 29/64      | 0.4531               | 4-3/4        | 7-1/2          | 116820       | 34.42    | 115027                           | 91.56    |
| 15/32      | 0.4688               | 4-3/4        | 7-1/2          | 116821       | 36.55    | 115028                           | 92.04    |
| 31/64      | 0.4844               | 4-3/4        | 7-3/4          | 116822       | 40.01    | 115029                           | 101.42   |
| 1/2        | 0.5000               | 4-3/4        | 7-3/4          | 116823       | 38.18    | 115030                           | 94.58    |
| 33/64      | 0.5156               | 4-3/4        | 8              | 116824       | 58.10    | 115031                           | 161.08   |
| 17/32      | 0.5312               | 4-3/4        | 8              | 116825       | 56.53    | 115032                           | 155.35   |
| 35/64      | 0.5469               | 4-7/8        | 8-1/4          | 116826       | 64.57    | 115033                           | 174.10   |
| 9/16       | 0.5625               | 4-7/8        | 8-1/4          | 116827       | 59.56    | 115034                           | 167.83   |
| 37/64      | 0.5781               | 4-7/8        | 8-3/4          | 116828       | 69.60    | 115035                           | 202.81   |
| 19/32      | 0.5938               | 4-7/8        | 8-3/4          | 116829       | 69.60    | 115036                           | 196.22   |
| 39/64      | 0.6094               | 4-7/8        | 8-3/4          | 116830       | 73.26    | 115037                           | 202.34   |
| 5/8        | 0.6250               | 4-7/8        | 8-3/4          | 116831       | 69.60    | 115038                           | 196.22   |
| 41/64      | 0.6406               | 5-1/8        | 9              | 116832       | 82.39    | 115039                           | 229.56   |
| 21/32      | 0.6562               | 5-1/8        | 9              | 116833       | 79.76    | 115040                           | 236.65   |
| 43/64      | 0.6719               | 5-3/8        | 9-1/4          | 116834       | 93.48    | 115041                           | 262.39   |
| 11/16      | 0.6875               | 5-3/8        | 9-1/4          | 116835       | 89.81    | 115042                           | 263.19   |
| 45/64      | 0.7031               | 5-5/8        | 9-1/2          | 116836       | 99.68    | 115043                           | 288.39   |
| 23/32      | 0.7188               | 5-5/8        | 9-1/2          | 116837       | 98.04    | 115044                           | 298.61   |
| 47/64      | 0.7344               | 5-7/8        | 9-3/4          | 116838       | 108.99   | 115045                           | 303.63   |
| 3/4        | 0.7500               | 5-7/8        | 9-3/4          | 116839       | 103.76   | 115046                           | 316.29   |
| 49/64      | 0.7656               | 6            | 9-7/8          | 116840       | 114.60   | 115047                           | 329.55   |
| 25/32      | 0.7812               | 6            | 9-7/8          | 116841       | 114.60   | 115048                           | 344.72   |
| 51/64      | 0.7969               | 6-1/8        | 10             | 116842       | 123.36   | 115049                           | 371.09   |
| 13/16      | 0.8125               | 6-1/8        | 10             | 116843       | 121.26   | 115050                           | 349.46   |
| 53/64      | 0.8281               | 6-1/8        | 10             | 116844       | 127.82   | 115051                           | 377.11   |
| 27/32      | 0.8438               | 6-1/8        | 10             | 116845       | 127.82   | 115052                           | 382.70   |
| 55/64      | 0.8594               | 6-1/8        | 10             | 116846       | 134.19   | 115053                           | 388.97   |
| 7/8        | 0.8750               | 6-1/8        | 10             | 116847       | 132.75   | 115054                           | 388.97   |
| 57/64      | 0.8906               | 6-1/8        | 10             | 116848       | 139.70   | 115055                           | 398.12   |
| 29/32      | 0.9062               | 6-1/8        | 10             | 116849       | 139.70   | 115056                           | 420.82   |
| 59/64      | 0.9219               | 6-1/8        | 10-3/4         | 116850       | 153.09   | 115057                           | 440.14   |
| 15/16      | 0.9375               | 6-1/8        | 10-3/4         | 116851       | 151.81   | 115058                           | 440.14   |
| 61/64      | 0.9531               | 6-3/8        | 11             | 116852       | 167.49   | 115059                           | 486.58   |
| 31/32      | 0.9688               | 6-3/8        | 11             | 116853       | 167.49   | 115060                           | 486.58   |
| 63/64      | 0.9844               | 6-3/8        | 11             | 116854       | 176.20   | 115061                           | 495.46   |
| 1          | 1.0000               | 6-3/8        | 11             | 116855       | 174.73   | 115062                           | 495.46   |



## Taper Length Drills

- General purpose



### Wire Gauge Sizes

| Size | Decimal Equiv. | Flute Length | Overall Length | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|------|----------------|--------------|----------------|--------------|----------|-----------------|----------|
| 1    | 0.2280         | 3-3/4        | 6-1/8          | 115065       | 21.20    | 115145          | 52.52    |
| 2    | 0.2210         | 3-3/4        | 6-1/8          | 115066       | 21.20    | 115146          | 52.52    |
| 3    | 0.2130         | 3-5/8        | 6              | 115067       | 21.20    | 115147          | 52.52    |
| 4    | 0.2090         | 3-5/8        | 6              | 115068       | 20.10    | 115148          | 52.52    |
| 5    | 0.2055         | 3-5/8        | 6              | 115069       | 21.20    | 115149          | 52.52    |
| 6    | 0.2040         | 3-5/8        | 6              | 115070       | 21.20    | 115150          | 52.52    |
| 7    | 0.2010         | 3-5/8        | 6              | 115071       | 20.15    | 115151          | 49.11    |
| 8    | 0.1990         | 3-5/8        | 6              | 115072       | 20.15    | 115152          | 48.24    |
| 9    | 0.1960         | 3-5/8        | 6              | 115073       | 20.15    | 115153          | 48.24    |
| 10   | 0.1935         | 3-5/8        | 6              | 115074       | 20.15    | 115154          | 48.24    |
| 11   | 0.1910         | 3-5/8        | 6              | 115075       | 20.15    | 115155          | 48.24    |
| 12   | 0.1890         | 3-5/8        | 6              | 115076       | 20.15    | 115156          | 48.24    |
| 13   | 0.1850         | 3-3/8        | 5-3/4          | 115077       | 19.08    | 115157          | 48.24    |
| 14   | 0.1820         | 3-3/8        | 5-3/4          | 115078       | 19.08    | 115158          | 48.24    |
| 15   | 0.1800         | 3-3/8        | 5-3/4          | 115079       | 19.08    | 115159          | 48.24    |
| 16   | 0.1770         | 3-3/8        | 5-3/4          | 115080       | 19.08    | 115160          | 45.10    |
| 17   | 0.1730         | 3-3/8        | 5-3/4          | 115081       | 19.08    | 115161          | 45.10    |
| 18   | 0.1695         | 3-3/8        | 5-3/4          | 115082       | 19.08    | 115162          | 45.10    |
| 19   | 0.1660         | 3-3/8        | 5-3/4          | 115083       | 19.08    | 115163          | 45.10    |
| 20   | 0.1610         | 3-3/8        | 5-3/4          | 115084       | 19.08    | 115164          | 45.10    |
| 21   | 0.1590         | 3-3/8        | 5-3/4          | 115085       | 19.08    | 115165          | 45.10    |
| 22   | 0.1570         | 3-3/8        | 5-3/4          | 115086       | 19.08    | 115166          | 45.10    |
| 23   | 0.1540         | 3            | 5-3/8          | 115087       | 19.08    | 115167          | 45.10    |
| 24   | 0.1520         | 3            | 5-3/8          | 115088       | 19.08    | 115168          | 45.10    |
| 25   | 0.1495         | 3            | 5-3/8          | 115089       | 18.06    | 115169          | 45.10    |
| 26   | 0.1470         | 3            | 5-3/8          | 115090       | 18.06    | 115170          | 45.10    |
| 27   | 0.1440         | 3            | 5-3/8          | 115091       | 18.06    | 115171          | 45.10    |
| 28   | 0.1405         | 3            | 5-3/8          | 115092       | 18.06    | 115172          | 43.12    |
| 29   | 0.1360         | 3            | 5-3/8          | 115093       | 18.06    | 115173          | 43.12    |
| 30   | 0.1285         | 3            | 5-3/8          | 115094       | 18.26    | 115174          | 43.12    |
| 31   | 0.1200         | 2-3/4        | 5-1/8          | 115095       | 18.26    | 115175          | 43.12    |
| 32   | 0.1160         | 2-3/4        | 5-1/8          | 115096       | 18.26    | 115176          | 43.12    |
| 33   | 0.1130         | 2-3/4        | 5-1/8          | 115097       | 18.26    | 115177          | 43.12    |
| 34   | 0.1110         | 2-3/4        | 5-1/8          | 115098       | 18.26    | 115178          | 43.12    |
| 35   | 0.1100         | 2-3/4        | 5-1/8          | 115099       | 18.26    | 115179          | 43.12    |
| 36   | 0.1065         | 2-1/2        | 4-5/8          | 115100       | 14.64    | 115180          | 39.50    |
| 37   | 0.1040         | 2-1/2        | 4-5/8          | 115101       | 14.64    | 115181          | 39.50    |
| 38   | 0.1015         | 2-1/2        | 4-5/8          | 115102       | 14.64    | 115182          | 39.50    |
| 39   | 0.0995         | 2-1/2        | 4-5/8          | 115103       | 14.64    | 115183          | 39.50    |
| 40   | 0.0980         | 2-1/2        | 4-5/8          | 115104       | 14.64    | 115184          | 36.96    |
| 41   | 0.0960         | 2-1/2        | 4-5/8          | 115105       | 14.64    | -               | -        |
| 42   | 0.0935         | 2-1/4        | 4-1/4          | 115106       | 11.47    | -               | -        |
| 43   | 0.0890         | 2-1/4        | 4-1/4          | 115107       | 11.47    | -               | -        |
| 44   | 0.0860         | 2-1/4        | 4-1/4          | 115108       | 11.47    | -               | -        |
| 45   | 0.0820         | 2-1/4        | 4-1/4          | 115109       | 11.47    | -               | -        |
| 46   | 0.0810         | 2-1/4        | 4-1/4          | 115110       | 11.47    | -               | -        |
| 47   | 0.0785         | 2-1/4        | 4-1/4          | 115111       | 11.47    | -               | -        |
| 48   | 0.0760         | 2            | 3-3/4          | 115112       | 12.47    | -               | -        |
| 49   | 0.0730         | 2            | 3-3/4          | 115113       | 12.47    | -               | -        |
| 50   | 0.0700         | 2            | 3-3/4          | 115114       | 12.47    | -               | -        |
| 51   | 0.0670         | 2            | 3-3/4          | 115115       | 12.47    | -               | -        |
| 52   | 0.0635         | 2            | 3-3/4          | 115116       | 12.47    | -               | -        |
| 53   | 0.0595         | 1-3/4        | 3              | 115117       | 12.47    | -               | -        |
| 54   | 0.0550         | 1-3/4        | 3              | 115118       | 12.47    | -               | -        |
| 55   | 0.0520         | 1-3/4        | 3              | 115119       | 12.47    | -               | -        |
| 56   | 0.0465         | 1-1/8        | 2-1/4          | 115120       | 12.47    | -               | -        |
| 57   | 0.0430         | 1-1/8        | 2-1/4          | 115121       | 12.47    | -               | -        |
| 58   | 0.0420         | 1-1/8        | 2-1/4          | 115122       | 12.47    | -               | -        |
| 59   | 0.0410         | 1-1/8        | 2-1/4          | 115123       | 12.47    | -               | -        |
| 60   | 0.0400         | 1-1/8        | 2-1/4          | 115124       | 12.47    | -               | -        |
| 61   | 0.0390         | 1-1/8        | 2-1/4          | 115125       | 12.47    | -               | -        |
| 62   | 0.0380         | 3/4          | 2              | 115126       | 12.47    | -               | -        |
| 63   | 0.0370         | 3/4          | 2              | 115127       | 12.47    | -               | -        |
| 64   | 0.0360         | 3/4          | 2              | 115128       | 12.47    | -               | -        |

| Size | Decimal Equiv. | Flute Length | Overall Length | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|------|----------------|--------------|----------------|--------------|----------|-----------------|----------|
| 65   | 0.0350         | 3/4          | 2              | 115129       | 12.47    | -               | -        |
| 66   | 0.0330         | 3/4          | 2              | 115130       | 12.47    | -               | -        |
| 67   | 0.0320         | 3/4          | 2              | 115131       | 12.47    | -               | -        |
| 68   | 0.0310         | 3/4          | 2              | 115132       | 12.47    | -               | -        |
| 69   | 0.0292         | 3/4          | 2              | 115133       | 12.47    | -               | -        |
| 70   | 0.0280         | 3/4          | 2              | 115134       | 12.47    | -               | -        |
| 71   | 0.0260         | 3/4          | 2              | 115135       | 12.47    | -               | -        |
| 72   | 0.0250         | 5/16         | 1-1/2          | 115136       | 12.47    | -               | -        |
| 73   | 0.0240         | 5/16         | 1-1/2          | 115137       | 12.47    | -               | -        |
| 74   | 0.0225         | 5/16         | 1-1/2          | 115138       | 12.47    | -               | -        |
| 75   | 0.0210         | 5/16         | 1-1/2          | 115139       | 12.47    | -               | -        |
| 76   | 0.0200         | 5/16         | 1-1/2          | 115140       | 12.97    | -               | -        |
| 77   | 0.0180         | 5/16         | 1-1/2          | 115141       | 12.97    | -               | -        |
| 78   | 0.0160         | 5/16         | 1-1/2          | 115142       | 12.97    | -               | -        |
| 79   | 0.0145         | 5/16         | 1-1/2          | 115143       | 12.97    | -               | -        |
| 80   | 0.0135         | 5/16         | 1-1/2          | 115144       | 12.97    | -               | -        |

### Letter Sizes

| Size | Decimal Equiv. | Flute Length | Overall Length | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|------|----------------|--------------|----------------|--------------|----------|-----------------|----------|
| A    | 0.2340         | 3-3/4        | 6-1/8          | 115185       | 23.66    | 117842          | 60.81    |
| B    | 0.2380         | 3-3/4        | 6-1/8          | 115186       | 23.66    | 117843          | 60.81    |
| C    | 0.2420         | 3-3/4        | 6-1/8          | 115187       | 23.66    | 117844          | 63.70    |
| D    | 0.2460         | 3-3/4        | 6-1/8          | 115188       | 23.66    | 117845          | 63.70    |
| E    | 0.2500         | 3-3/4        | 6-1/8          | 115189       | 13.20    | 117846          | 40.47    |
| F    | 0.2570         | 3-7/8        | 6-1/4          | 115190       | 25.01    | 117847          | 76.33    |
| G    | 0.2610         | 3-7/8        | 6-1/4          | 115191       | 27.46    | 117848          | 76.33    |
| H    | 0.2660         | 3-7/8        | 6-1/4          | 115192       | 27.46    | 117849          | 76.33    |
| I    | 0.2720         | 3-7/8        | 6-1/4          | 115193       | 27.46    | 117850          | 79.61    |
| J    | 0.2770         | 3-7/8        | 6-1/4          | 115194       | 27.46    | 117851          | 79.61    |
| K    | 0.2810         | 3-7/8        | 6-1/4          | 115195       | 27.46    | 117852          | 79.61    |
| L    | 0.2900         | 4            | 6-3/8          | 115196       | 27.46    | 117853          | 83.61    |
| M    | 0.2950         | 4            | 6-3/8          | 115197       | 27.75    | 117854          | 83.61    |
| N    | 0.3020         | 4            | 6-3/8          | 115198       | 27.75    | 117855          | 85.39    |
| O    | 0.3160         | 4-1/8        | 6-1/2          | 115199       | 27.75    | 117856          | 85.39    |
| P    | 0.3230         | 4-1/8        | 6-1/2          | 115200       | 27.75    | 117857          | 88.23    |
| Q    | 0.3320         | 4-1/8        | 6-1/2          | 115201       | 27.75    | 117858          | 88.23    |
| R    | 0.3390         | 4-1/8        | 6-1/2          | 115202       | 30.07    | 117859          | 90.69    |
| S    | 0.3480         | 4-1/4        | 6-3/4          | 115203       | 34.16    | 117860          | 99.56    |
| T    | 0.3580         | 4-1/4        | 6-3/4          | 115204       | 34.16    | 117861          | 106.16   |
| U    | 0.3680         | 4-1/4        | 6-3/4          | 115205       | 36.91    | 117862          | 111.69   |
| V    | 0.3770         | 4-3/8        | 7              | 115206       | 38.35    | 117863          | 111.69   |
| W    | 0.3860         | 4-3/8        | 7              | 115207       | 38.35    | 117864          | 111.69   |
| X    | 0.3970         | 4-3/8        | 7              | 115208       | 38.35    | 117865          | 111.69   |
| Y    | 0.4040         | 4-3/8        | 7              | 115209       | 41.06    | 117866          | 121.68   |
| Z    | 0.4130         | 4-5/8        | 7-1/4          | 115210       | 44.33    | 117867          | 121.68   |

### Metric - HSS

| Size (mm) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-----------|----------------------|--------------------|----------------------|--------------|----------|
| 1.00      | 0.0394               | 1-1/8              | 2-1/4                | 115211       | 11.23    |
| 1.05      | 0.0413               | 1-1/8              | 2-1/4                | 115212       | 15.61    |
| 1.10      | 0.0433               | 1-1/8              | 2-1/4                | 115213       | 15.66    |
| 1.15      | 0.0453               | 1-1/8              | 2-1/4                | 115214       | 15.61    |
| 1.20      | 0.0472               | 1-3/4              | 3                    | 115215       | 12.92    |
| 1.25      | 0.0492               | 1-3/4              | 3                    | 115216       | 12.92    |
| 1.30      | 0.0512               | 1-3/4              | 3                    | 115217       | 12.92    |
| 1.35      | 0.0531               | 1-3/4              | 3                    | 115218       | 15.61    |
| 1.40      | 0.0551               | 1-3/4              | 3                    | 115219       | 12.92    |
| 1.45      | 0.0571               | 1-3/4              | 3                    | 115220       | 17.69    |
| 1.50      | 0.0591               | 1-3/4              | 3                    | 115221       | 12.92    |
| 1.55      | 0.0610               | 1-3/4              | 3                    | 115222       | 17.69    |
| 1.60      | 0.0630               | 2                  | 3-3/4                | 115223       | 15.61    |
| 1.65      | 0.0650               | 2                  | 3-3/4                | 115224       | 17.69    |
| 1.70      | 0.0669               | 2                  | 3-3/4                | 115225       | 15.61    |
| 1.75      | 0.0689               | 2                  | 3-3/4                | 115226       | 17.69    |
| 1.80      | 0.0709               | 2                  | 3-3/4                | 115227       | 15.61    |
| 1.85      | 0.0728               | 2                  | 3-3/4                | 115228       | 17.69    |
| 1.90      | 0.0748               | 2                  | 3-3/4                | 115229       | 15.61    |
| 1.95      | 0.0768               | 2                  | 3-3/4                | 115230       | 17.69    |
| 2.00      | 0.0787               | 2-1/4              | 4-1/4                | 115231       | 16.43    |
| 2.05      | 0.0807               | 2-1/4              | 4-1/4                | 115232       | 20.83    |



| Size (mm) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-----------|----------------------|--------------------|----------------------|--------------|----------|
| 2.10      | 0.0827               | 2-1/4              | 4-1/4                | 115233       | 17.69    |
| 2.15      | 0.0846               | 2-1/4              | 4-1/4                | 115234       | 19.76    |
| 2.20      | 0.0866               | 2-1/4              | 4-1/4                | 115235       | 17.69    |
| 2.25      | 0.0886               | 2-1/4              | 4-1/4                | 115236       | 20.83    |
| 2.30      | 0.0906               | 2-1/4              | 4-1/4                | 115237       | 17.69    |
| 2.35      | 0.0925               | 2-1/4              | 4-1/4                | 115238       | 24.58    |
| 2.40      | 0.0945               | 2-1/2              | 4-5/8                | 115239       | 22.70    |
| 2.45      | 0.0965               | 2-1/2              | 4-5/8                | 115240       | 24.58    |
| 2.50      | 0.0984               | 2-1/2              | 4-5/8                | 115241       | 22.70    |
| 2.60      | 0.1024               | 2-1/2              | 4-5/8                | 115242       | 24.96    |
| 2.70      | 0.1063               | 2-1/2              | 4-5/8                | 115243       | 24.96    |
| 2.80      | 0.1102               | 2-3/4              | 5-1/8                | 115244       | 24.96    |
| 2.90      | 0.1142               | 2-3/4              | 5-1/8                | 115245       | 24.96    |
| 3.00      | 0.1181               | 2-3/4              | 5-1/8                | 115246       | 21.00    |
| 3.10      | 0.1220               | 2-3/4              | 5-1/8                | 115247       | 23.32    |
| 3.20      | 0.1260               | 3                  | 5-3/8                | 115248       | 25.92    |
| 3.30      | 0.1299               | 3                  | 5-3/8                | 115249       | 25.92    |
| 3.40      | 0.1339               | 3                  | 5-3/8                | 115250       | 27.90    |
| 3.50      | 0.1378               | 3                  | 5-3/8                | 115251       | 25.92    |
| 3.60      | 0.1417               | 3                  | 5-3/8                | 115252       | 28.91    |
| 3.70      | 0.1457               | 3                  | 5-3/8                | 115253       | 28.91    |
| 3.80      | 0.1496               | 3                  | 5-3/8                | 115254       | 28.91    |
| 3.90      | 0.1535               | 3                  | 5-3/8                | 115255       | 30.17    |
| 4.00      | 0.1575               | 3-3/8              | 5-3/4                | 115256       | 25.92    |
| 4.10      | 0.1614               | 3-3/8              | 5-3/4                | 115257       | 30.17    |
| 4.20      | 0.1654               | 3-3/8              | 5-3/4                | 115258       | 25.92    |
| 4.30      | 0.1693               | 3-3/8              | 5-3/4                | 115259       | 30.17    |
| 4.40      | 0.1732               | 3-3/8              | 5-3/4                | 115260       | 30.17    |
| 4.50      | 0.1772               | 3-3/8              | 5-3/4                | 115261       | 25.92    |
| 4.60      | 0.1811               | 3-3/8              | 5-3/4                | 115262       | 29.16    |
| 4.70      | 0.1850               | 3-3/8              | 5-3/4                | 115263       | 37.49    |
| 4.80      | 0.1890               | 3-5/8              | 6                    | 115264       | 32.48    |
| 4.90      | 0.1929               | 3-5/8              | 6                    | 115265       | 32.48    |
| 5.00      | 0.1968               | 3-5/8              | 6                    | 115266       | 30.17    |
| 5.10      | 0.2008               | 3-5/8              | 6                    | 115267       | 37.49    |
| 5.20      | 0.2047               | 3-5/8              | 6                    | 115268       | 37.49    |
| 5.30      | 0.2087               | 3-5/8              | 6                    | 115269       | 37.49    |
| 5.40      | 0.2126               | 3-5/8              | 6                    | 115270       | 37.49    |
| 5.50      | 0.2165               | 3-5/8              | 6                    | 115271       | 30.17    |
| 5.60      | 0.2205               | 3-3/4              | 6-1/8                | 115272       | 34.26    |
| 5.70      | 0.2244               | 3-3/4              | 6-1/8                | 115273       | 34.26    |
| 5.80      | 0.2283               | 3-3/4              | 6-1/8                | 115274       | 37.49    |
| 5.90      | 0.2323               | 3-3/4              | 6-1/8                | 115275       | 37.53    |
| 6.00      | 0.2362               | 3-3/4              | 6-1/8                | 115276       | 30.17    |
| 6.10      | 0.2402               | 3-3/4              | 6-1/8                | 115277       | 45.78    |
| 6.20      | 0.2441               | 3-3/4              | 6-1/8                | 115278       | 45.78    |
| 6.30      | 0.2480               | 3-3/4              | 6-1/8                | 115279       | 45.78    |
| 6.40      | 0.2520               | 3-7/8              | 6-1/4                | 115280       | 37.49    |
| 6.50      | 0.2559               | 3-7/8              | 6-1/4                | 115281       | 37.49    |
| 6.80      | 0.2677               | 3-7/8              | 6-1/4                | 115282       | 39.57    |
| 7.00      | 0.2756               | 3-7/8              | 6-1/4                | 115283       | 39.57    |
| 7.20      | 0.2835               | 4                  | 6-3/8                | 115284       | 40.38    |
| 7.50      | 0.2953               | 4                  | 6-3/8                | 115285       | 40.38    |
| 7.80      | 0.3071               | 4                  | 6-3/8                | 115286       | 43.70    |
| 8.00      | 0.3150               | 4-1/8              | 6-1/2                | 115287       | 45.30    |
| 8.20      | 0.3228               | 4-1/8              | 6-1/2                | 115288       | 49.15    |
| 8.50      | 0.3346               | 4-1/8              | 6-1/2                | 115289       | 49.15    |
| 8.80      | 0.3465               | 4-1/4              | 6-3/4                | 115290       | 58.65    |
| 9.00      | 0.3543               | 4-1/4              | 6-3/4                | 115291       | 52.05    |
| 9.20      | 0.3622               | 4-1/4              | 6-3/4                | 115292       | 57.25    |
| 9.50      | 0.3740               | 4-1/4              | 6-3/4                | 115293       | 57.25    |
| 9.80      | 0.3858               | 4-3/8              | 7                    | 115294       | 60.38    |
| 10.00     | 0.3937               | 4-3/8              | 7                    | 115295       | 57.25    |
| 10.20     | 0.4016               | 4-3/8              | 7                    | 115296       | 60.38    |
| 10.50     | 0.4134               | 4-5/8              | 7-1/4                | 115297       | 60.38    |
| 10.80     | 0.4252               | 4-5/8              | 7-1/4                | 115298       | 69.72    |
| 11.00     | 0.4331               | 4-5/8              | 7-1/4                | 115299       | 60.38    |
| 11.20     | 0.4409               | 4-3/4              | 7-1/2                | 115300       | 60.38    |
| 11.50     | 0.4528               | 4-3/4              | 7-1/2                | 115301       | 69.72    |
| 11.80     | 0.4646               | 4-3/4              | 7-1/2                | 115302       | 83.17    |
| 12.00     | 0.4724               | 4-3/4              | 7-3/4                | 115303       | 72.86    |
| 12.20     | 0.4803               | 4-3/4              | 7-3/4                | 115304       | 85.34    |
| 12.50     | 0.4921               | 4-3/4              | 7-3/4                | 115305       | 72.86    |
| 12.80     | 0.5039               | 4-3/4              | 8                    | 115306       | 110.35   |

| Size (mm) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-----------|----------------------|--------------------|----------------------|--------------|----------|
| 13.00     | 0.5118               | 4-3/4              | 8                    | 115307       | 102.01   |
| 13.20     | 0.5197               | 4-3/4              | 8                    | 115308       | 141.58   |
| 13.50     | 0.5315               | 4-3/4              | 8                    | 115309       | 118.64   |
| 13.80     | 0.5433               | 4-7/8              | 8-1/4                | 115310       | 141.58   |
| 14.00     | 0.5512               | 4-7/8              | 8-1/4                | 115311       | 118.64   |
| 14.25     | 0.5610               | 4-7/8              | 8-1/4                | 115312       | 156.13   |
| 14.50     | 0.5709               | 4-7/8              | 8-3/4                | 115313       | 141.58   |
| 14.75     | 0.5807               | 4-7/8              | 8-3/4                | 115314       | 156.13   |
| 15.00     | 0.5906               | 4-7/8              | 8-3/4                | 115315       | 143.64   |
| 15.25     | 0.6004               | 4-7/8              | 8-3/4                | 115316       | 170.69   |
| 15.50     | 0.6102               | 4-7/8              | 8-3/4                | 115317       | 147.79   |
| 15.75     | 0.6201               | 4-7/8              | 8-3/4                | 115318       | 170.69   |
| 16.00     | 0.6299               | 5-1/8              | 9                    | 115319       | 165.47   |
| 16.25     | 0.6398               | 5-1/8              | 9                    | 115320       | 185.28   |
| 16.50     | 0.6496               | 5-1/8              | 9                    | 115321       | 170.69   |
| 16.75     | 0.6594               | 5-3/8              | 9-1/4                | 115322       | 206.09   |
| 17.00     | 0.6693               | 5-3/8              | 9-1/4                | 115323       | 196.17   |
| 17.25     | 0.6791               | 5-3/8              | 9-1/4                | 115324       | 214.43   |
| 17.50     | 0.6890               | 5-5/8              | 9-1/2                | 115325       | 206.09   |
| 17.75     | 0.6988               | 5-5/8              | 9-1/2                | 115326       | 239.39   |
| 18.00     | 0.7087               | 5-5/8              | 9-1/2                | 115327       | 214.43   |
| 18.50     | 0.7283               | 5-7/8              | 9-3/4                | 115328       | 239.39   |
| 19.00     | 0.7480               | 5-7/8              | 9-3/4                | 115329       | 243.54   |
| 19.20     | 0.7559               | 6                  | 9-7/8                | 115330       | 68.57    |
| 19.50     | 0.7677               | 6                  | 9-7/8                | 115331       | 253.94   |
| 20.00     | 0.7874               | 6-1/8              | 10                   | 115332       | 268.55   |
| 20.50     | 0.8071               | 6-1/8              | 10                   | 115333       | 281.02   |
| 21.00     | 0.8268               | 6-1/8              | 10                   | 115334       | 287.29   |
| 21.50     | 0.8465               | 6-1/8              | 10                   | 115335       | 301.84   |
| 22.00     | 0.8661               | 6-1/8              | 10                   | 115336       | 301.84   |
| 22.50     | 0.8858               | 6-1/8              | 10                   | 115337       | 310.18   |
| 23.00     | 0.9055               | 6-1/8              | 10                   | 115338       | 316.40   |
| 23.50     | 0.9252               | 6-1/8              | 10-3/4               | 115339       | 343.47   |
| 24.00     | 0.9449               | 6-3/8              | 11                   | 115340       | 374.69   |
| 24.50     | 0.9646               | 6-3/8              | 11                   | 115341       | 395.52   |
| 25.00     | 0.9843               | 6-3/8              | 11                   | 115342       | 395.52   |
| 25.50     | 1.0039               | 6-1/2              | 11-1/8               | 115343       | 462.11   |
| 26.00     | 1.0236               | 6-1/2              | 11-1/8               | 115344       | 478.78   |
| 26.50     | 1.0433               | 6-5/8              | 11-1/4               | 115345       | 499.60   |
| 27.00     | 1.0630               | 6-5/8              | 11-1/4               | 115346       | 520.41   |
| 27.50     | 1.0827               | 6-7/8              | 11-1/2               | 115347       | 541.23   |
| 28.00     | 1.1024               | 7-1/8              | 11-3/4               | 115348       | 562.06   |
| 28.50     | 1.1220               | 7-1/8              | 11-3/4               | 115349       | 572.45   |
| 29.00     | 1.1417               | 7-1/4              | 11-7/8               | 115350       | 603.69   |
| 29.50     | 1.1614               | 7-3/8              | 12                   | 115351       | 622.43   |
| 30.00     | 1.1811               | 7-3/8              | 12                   | 115352       | 645.32   |
| 30.50     | 1.2008               | 7-1/2              | 12-1/8               | 115353       | 666.14   |
| 31.00     | 1.2205               | 7-7/8              | 12-1/2               | 115354       | 682.81   |
| 31.50     | 1.2402               | 7-7/8              | 12-1/2               | 115355       | 749.40   |
| 32.00     | 1.2598               | 8-1/2              | 14-1/8               | 115356       | 811.85   |
| 32.50     | 1.2795               | 8-1/2              | 14-1/8               | 115357       | 832.67   |
| 33.00     | 1.2992               | 8-5/8              | 14-1/4               | 115358       | 863.90   |
| 33.50     | 1.3189               | 8-3/4              | 14-3/8               | 115359       | 884.71   |
| 34.00     | 1.3386               | 8-3/4              | 14-3/8               | 115360       | 901.38   |
| 34.50     | 1.3583               | 8-7/8              | 14-1/2               | 115361       | 924.27   |
| 35.00     | 1.3780               | 9                  | 14-5/8               | 115362       | 936.75   |
| 35.50     | 1.3976               | 9                  | 14-5/8               | 115363       | 957.57   |
| 36.00     | 1.4173               | 9-1/8              | 14-3/4               | 115364       | 999.21   |
| 36.50     | 1.4370               | 9-1/8              | 14-3/4               | 115365       | 1,030.43 |
| 37.00     | 1.4567               | 9-1/4              | 14-7/8               | 115366       | 1,063.73 |
| 37.50     | 1.4764               | 9-3/8              | 15                   | 115367       | 1,134.51 |
| 38.00     | 1.4961               | 9-3/8              | 15                   | 115368       | 1,184.47 |

## Aircraft Extension Drills

- 6" and 12" Overall Length
- Split Point
- Sizes smaller than 1/16" are not split point



| Size  | Decimal Equiv. | Flute Length (in.) | HSS 6" O.A.L. Code No. | Price \$ | HSS 12" O.A.L. Code No. | Price \$ | Cobalt 6" O.A.L. Code No. | Price \$ | Cobalt 12" O.A.L. Code No. | Price \$ |
|-------|----------------|--------------------|------------------------|----------|-------------------------|----------|---------------------------|----------|----------------------------|----------|
| 60    | 0.0400         | 11/16              | 117300                 | 17.68    | 117405                  | 27.95    | 117521                    | 35.37    | -                          | -        |
| 59    | 0.0410         | 11/16              | 117301                 | 17.68    | 117406                  | 27.95    | -                         | -        | -                          | -        |
| 58    | 0.0420         | 11/16              | 117302                 | 17.59    | 117407                  | 27.95    | -                         | -        | -                          | -        |
| 57    | 0.0430         | 3/4                | 117303                 | 17.68    | 117408                  | 25.97    | -                         | -        | -                          | -        |
| 56    | 0.0465         | 3/4                | 117304                 | 14.50    | 117409                  | 25.97    | 117522                    | 35.37    | -                          | -        |
| 3/64  | 0.0469         | 3/4                | 117305                 | 13.88    | 117410                  | 27.51    | -                         | -        | -                          | -        |
| 55    | 0.0520         | 7/8                | 117306                 | 14.50    | 117411                  | 25.97    | 115605                    | 35.37    | -                          | -        |
| 54    | 0.0550         | 7/8                | 117307                 | 14.50    | 117412                  | 25.97    | -                         | -        | -                          | -        |
| 53    | 0.0595         | 7/8                | 117308                 | 7.57     | 117413                  | 25.97    | 117523                    | 35.37    | -                          | -        |
| 1/16  | 0.0625         | 7/8                | 117309                 | 7.57     | 117414                  | 22.32    | 117524                    | 16.57    | 117582                     | 52.00    |
| 52    | 0.0635         | 7/8                | 117310                 | 8.53     | 117415                  | 24.53    | 115608                    | 18.79    | 115683                     | 52.00    |
| 51    | 0.0670         | 1                  | 117311                 | 8.53     | 117416                  | 24.53    | 115609                    | 18.79    | 115684                     | 52.00    |
| 50    | 0.0700         | 1                  | 117312                 | 7.72     | 117417                  | 26.26    | 117525                    | 18.79    | 117583                     | 52.00    |
| 49    | 0.0730         | 1                  | 117313                 | 8.53     | 117418                  | 26.26    | 115611                    | 18.79    | 115686                     | 52.00    |
| 48    | 0.0760         | 1                  | 117314                 | 8.53     | 117419                  | 26.26    | 115612                    | 18.79    | 115687                     | 52.00    |
| 5/64  | 0.0781         | 1                  | 117315                 | 7.57     | 117420                  | 22.32    | 117526                    | 16.57    | 117584                     | 52.00    |
| 47    | 0.0785         | 1                  | 117316                 | 8.53     | 117421                  | 26.26    | 115614                    | 18.79    | 115689                     | 52.00    |
| 46    | 0.0810         | 1-1/8              | 117317                 | 8.53     | 117422                  | 26.26    | 115615                    | 18.79    | 115690                     | 52.00    |
| 45    | 0.0820         | 1-1/8              | 117318                 | 8.53     | 117423                  | 26.26    | 115616                    | 18.79    | 115691                     | 52.00    |
| 44    | 0.0860         | 1-1/8              | 117319                 | 8.53     | 117424                  | 26.26    | 117527                    | 18.79    | 115692                     | 52.00    |
| 43    | 0.0890         | 1-1/4              | 117320                 | 8.53     | 117425                  | 26.26    | 117528                    | 18.79    | 115693                     | 52.00    |
| 42    | 0.0935         | 1-1/4              | 117321                 | 6.80     | 117426                  | 24.53    | 115619                    | 15.03    | 115694                     | 52.00    |
| 3/32  | 0.0938         | 1-1/4              | 117322                 | 6.41     | 117427                  | 23.13    | 117529                    | 14.35    | 117585                     | 37.25    |
| 41    | 0.0960         | 1-3/8              | 117323                 | 6.80     | 117428                  | 24.53    | 117530                    | 15.03    | 115696                     | 52.00    |
| 40    | 0.0980         | 1-3/8              | 117324                 | 6.41     | 117429                  | 20.10    | 117531                    | 14.16    | 117586                     | 37.39    |
| 39    | 0.0995         | 1-3/8              | 117325                 | 7.86     | 117430                  | 24.47    | 115623                    | 15.03    | 115698                     | 46.46    |
| 38    | 0.1015         | 1-7/16             | 117326                 | 7.86     | 117431                  | 24.47    | 115624                    | 15.03    | 115699                     | 46.46    |
| 37    | 0.1040         | 1-7/16             | 117327                 | 7.86     | 117432                  | 24.47    | 115625                    | 15.03    | 115700                     | 46.46    |
| 36    | 0.1065         | 1-7/16             | 117328                 | 7.86     | 117433                  | 24.47    | 117532                    | 15.03    | 115701                     | 46.46    |
| 7/64  | 0.1094         | 1-1/2              | 117329                 | 6.41     | 117434                  | 23.13    | 117533                    | 14.35    | 117587                     | 37.25    |
| 35    | 0.1100         | 1-1/2              | 117330                 | 7.86     | 117435                  | 24.47    | 117534                    | 15.46    | 115703                     | 46.46    |
| 34    | 0.1110         | 1-1/2              | 117331                 | 8.13     | 117436                  | 24.47    | 117535                    | 15.46    | 115704                     | 46.46    |
| 33    | 0.1130         | 1-1/2              | 117332                 | 8.09     | 117437                  | 24.47    | 117536                    | 15.46    | 115705                     | 46.46    |
| 32    | 0.1160         | 1-5/8              | 117333                 | 8.09     | 117438                  | 24.51    | 117537                    | 15.46    | 115706                     | 46.46    |
| 31    | 0.1200         | 1-5/8              | 117334                 | 8.09     | 117439                  | 20.10    | 117538                    | 15.46    | 115707                     | 46.46    |
| 1/8   | 0.1250         | 1-5/8              | 117335                 | 6.41     | 117440                  | 18.31    | 117539                    | 12.82    | 117588                     | 37.25    |
| 30    | 0.1285         | 1-5/8              | 117336                 | 6.41     | 117441                  | 20.10    | 117540                    | 14.35    | 117589                     | 37.39    |
| 29    | 0.1360         | 1-3/4              | 117337                 | 8.04     | 117442                  | 22.55    | 117541                    | 17.46    | 115710                     | 38.51    |
| 28    | 0.1405         | 1-3/4              | 117338                 | 8.04     | 117443                  | 22.55    | 117542                    | 19.90    | 115711                     | 46.46    |
| 9/64  | 0.1406         | 1-3/4              | 117339                 | 7.80     | 117444                  | 19.28    | 117543                    | 17.49    | 117590                     | 39.13    |
| 27    | 0.1440         | 1-7/8              | 117340                 | 8.04     | 117445                  | 22.55    | 117544                    | 19.90    | 115713                     | 46.55    |
| 26    | 0.1470         | 1-7/8              | 117341                 | 8.67     | 117446                  | 24.47    | 117545                    | 19.90    | 115714                     | 46.46    |
| 25    | 0.1495         | 1-7/8              | 117342                 | 8.67     | 117447                  | 24.47    | 117546                    | 19.90    | 115715                     | 46.46    |
| 24    | 0.1520         | 2                  | 117343                 | 8.67     | 117448                  | 24.47    | 117547                    | 19.90    | 115716                     | 46.46    |
| 23    | 0.1540         | 2                  | 117344                 | 8.67     | 117449                  | 24.47    | 117548                    | 19.90    | 115717                     | 46.46    |
| 5/32  | 0.1562         | 2                  | 117345                 | 7.80     | 117450                  | 19.28    | 117549                    | 16.05    | 117591                     | 39.13    |
| 22    | 0.1570         | 2                  | 117346                 | 8.67     | 117451                  | 24.47    | 117550                    | 19.90    | 115719                     | 46.46    |
| 21    | 0.1590         | 2-1/8              | 117347                 | 8.09     | 117452                  | 18.06    | 117551                    | 17.40    | 117592                     | 38.51    |
| 20    | 0.1610         | 2-1/8              | 117348                 | 8.09     | 117453                  | 18.06    | 117552                    | 17.40    | 117593                     | 38.60    |
| 19    | 0.1660         | 2-1/8              | 117349                 | 8.91     | 117454                  | 24.33    | 117553                    | 21.00    | 117594                     | 46.46    |
| 18    | 0.1695         | 2-1/8              | 117350                 | 9.39     | 117455                  | 24.33    | 117554                    | 21.00    | 115723                     | 46.46    |
| 11/64 | 0.1719         | 2-1/8              | 117351                 | 8.33     | 117456                  | 21.00    | 117555                    | 17.25    | 117595                     | 40.72    |
| 17    | 0.1730         | 2-3/16             | 117352                 | 9.39     | 117457                  | 24.33    | 117556                    | 21.00    | 115725                     | 46.46    |
| 16    | 0.1770         | 2-3/16             | 117353                 | 9.39     | 117458                  | 24.33    | 117557                    | 21.00    | 115726                     | 46.46    |
| 15    | 0.1800         | 2-3/16             | 117354                 | 9.39     | 117459                  | 24.33    | 117558                    | 21.00    | 115727                     | 46.46    |
| 14    | 0.1820         | 2-3/16             | 117355                 | 9.39     | 117460                  | 24.33    | 117559                    | 21.00    | 115728                     | 46.46    |
| 13    | 0.1850         | 2-5/16             | 117356                 | 9.39     | 117461                  | 22.46    | 117560                    | 22.12    | 115729                     | 46.46    |
| 3/16  | 0.1875         | 2-5/16             | 117357                 | 8.33     | 117462                  | 21.00    | 117561                    | 17.25    | 117596                     | 40.72    |
| 12    | 0.1890         | 2-5/16             | 117358                 | 9.39     | 117463                  | 24.33    | 117562                    | 22.12    | 115731                     | 46.46    |
| 11    | 0.1910         | 2-5/16             | 117359                 | 9.39     | 117464                  | 24.33    | 117563                    | 20.24    | 115732                     | 46.46    |
| 10    | 0.1935         | 2-7/16             | 117360                 | 10.08    | 117465                  | 21.73    | 117564                    | 20.24    | 117597                     | 40.72    |
| 9     | 0.1960         | 2-7/16             | 117361                 | 10.55    | 117466                  | 24.33    | 117565                    | 24.33    | 115734                     | 55.33    |
| 8     | 0.1990         | 2-7/16             | 117362                 | 10.55    | 117467                  | 24.33    | 117566                    | 25.44    | 115735                     | 55.33    |
| 7     | 0.2010         | 2-7/16             | 117363                 | 10.55    | 117468                  | 24.33    | 117567                    | 25.44    | 115736                     | 55.33    |
| 13/64 | 0.2031         | 2-7/16             | 117364                 | 10.17    | 117469                  | 23.52    | 117568                    | 21.15    | 117598                     | 49.44    |
| 6     | 0.2040         | 2-1/2              | 117365                 | 11.28    | 117470                  | 26.74    | 117569                    | 25.44    | 115738                     | 55.33    |
| 5     | 0.2055         | 2-1/2              | 117366                 | 11.28    | 117471                  | 26.74    | 117570                    | 25.44    | 115739                     | 55.33    |

| Size  | Decimal Equiv. | Flute Length (in.) | HSS 6" O.A.L. Code No. | Price \$ | HSS 12" O.A.L. Code No. | Price \$ | Cobalt 6" O.A.L. Code No. | Price \$ | Cobalt 12" O.A.L. Code No. | Price \$ |
|-------|----------------|--------------------|------------------------|----------|-------------------------|----------|---------------------------|----------|----------------------------|----------|
| 4     | 0.2090         | 2-1/2              | 117367                 | 11.28    | 117472                  | 28.18    | 117571                    | 25.44    | 115740                     | 55.33    |
| 3     | 0.2130         | 2-1/2              | 117368                 | 11.28    | 117473                  | 28.18    | 117572                    | 25.44    | 115741                     | 51.66    |
| 7/32  | 0.2188         | 2-1/2              | 117369                 | 10.17    | 117474                  | 23.52    | 117573                    | 22.02    | 117599                     | 49.44    |
| 2     | 0.2210         | 2-5/8              | 117370                 | 11.75    | 117475                  | 28.18    | 117574                    | 25.44    | 115743                     | 51.66    |
| 1     | 0.2280         | 2-5/8              | 117371                 | 11.75    | 117476                  | 28.18    | 117575                    | 25.44    | 117600                     | 51.66    |
| A     | 0.2340         | 2-5/8              | 117372                 | 18.65    | 117477                  | 41.59    | -                         | -        | -                          | -        |
| 15/64 | 0.2344         | 2-5/8              | 117373                 | 11.02    | 117478                  | 25.30    | 117576                    | 24.67    | 117601                     | 51.75    |
| B     | 0.2380         | 2-3/4              | 117374                 | 18.65    | 117479                  | 41.59    | -                         | -        | -                          | -        |
| C     | 0.2420         | 2-3/4              | 117375                 | 18.65    | 117480                  | 41.59    | 117577                    | 32.92    | -                          | -        |
| D     | 0.2460         | 2-3/4              | 117376                 | 18.65    | 117481                  | 41.59    | 117578                    | 32.92    | -                          | -        |
| 1/4   | 0.2500         | 2-3/4              | 117377                 | 10.55    | 117482                  | 23.62    | 117579                    | 26.46    | 117602                     | 51.75    |
| E     | 0.2500         | 2-3/4              | 117378                 | 16.00    | 117483                  | 35.75    | 117580                    | 26.07    | 117603                     | 29.26    |
| F     | 0.2570         | 2-7/8              | 117379                 | 18.16    | 117484                  | 39.75    | 117581                    | 43.70    | -                          | -        |
| G     | 0.2610         | 2-7/8              | 117380                 | 30.02    | 117485                  | 41.59    | -                         | -        | -                          | -        |
| 17/64 | 0.2656         | 2-7/8              | 117381                 | 23.52    | 117486                  | 31.22    | 115676                    | 57.49    | 115748                     | 71.13    |
| H     | 0.2660         | 2-7/8              | 117382                 | 32.14    | 117487                  | 45.39    | -                         | -        | -                          | -        |
| I     | 0.2720         | 2-7/8              | 117383                 | 32.14    | 117488                  | 42.11    | -                         | -        | -                          | -        |
| J     | 0.2770         | 2-7/8              | 117384                 | 32.14    | 117489                  | 45.39    | -                         | -        | -                          | -        |
| K     | 0.2810         | 2-5/16             | 117385                 | 32.14    | 117490                  | 48.67    | 115677                    | 66.35    | -                          | -        |
| 9/32  | 0.2812         | 2-5/16             | 117386                 | 24.33    | 117491                  | 31.22    | 115678                    | 62.82    | 117604                     | 83.99    |
| L     | 0.2900         | 2-5/16             | 117387                 | 38.94    | 117492                  | 59.99    | -                         | -        | -                          | -        |
| M     | 0.2950         | 3-1/16             | 117388                 | 38.94    | 117493                  | 59.99    | -                         | -        | -                          | -        |
| 19/64 | 0.2969         | 3-1/16             | 117389                 | 27.03    | 117494                  | 35.42    | 115679                    | 73.48    | 117605                     | 89.44    |
| N     | 0.3020         | 3-1/16             | 117390                 | 43.80    | 117495                  | 63.27    | -                         | -        | -                          | -        |
| 5/16  | 0.3125         | 3-3/16             | 117391                 | 29.35    | 117496                  | 38.46    | 115680                    | 77.91    | 117606                     | 93.24    |
| O     | 0.3160         | 3-3/16             | 117392                 | 47.03    | 117497                  | 68.14    | -                         | -        | -                          | -        |
| P     | 0.3230         | 3-5/16             | 115463                 | 47.03    | 117498                  | 68.14    | -                         | -        | -                          | -        |
| 21/64 | 0.3281         | 3-5/16             | 117393                 | 31.71    | 117499                  | 40.86    | -                         | -        | 115752                     | 97.86    |
| Q     | 0.3320         | 3-7/16             | 115465                 | 47.03    | 117500                  | 71.37    | -                         | -        | -                          | -        |
| R     | 0.3390         | 3-7/16             | 115466                 | 51.91    | 117501                  | 73.82    | -                         | -        | -                          | -        |
| 11/32 | 0.3438         | 3-7/16             | 117394                 | 31.51    | 117502                  | 40.86    | -                         | -        | 117607                     | 97.57    |
| S     | 0.3480         | 3-1/2              | 115468                 | 55.13    | 117503                  | 77.88    | -                         | -        | -                          | -        |
| T     | 0.3580         | 3-1/2              | 115469                 | 55.13    | 117504                  | 77.88    | -                         | -        | -                          | -        |
| 23/64 | 0.3594         | 3-1/2              | 117395                 | 35.37    | 117505                  | 45.39    | 115681                    | 86.79    | 117608                     | 117.57   |
| U     | 0.3680         | 3-5/8              | 115471                 | 55.13    | 117506                  | 77.88    | -                         | -        | -                          | -        |
| 3/8   | 0.3750         | 3-5/8              | 117396                 | 36.05    | 117507                  | 47.03    | -                         | -        | 117609                     | 117.57   |
| V     | 0.3770         | 3-5/8              | 115473                 | 59.99    | 117508                  | 82.74    | -                         | -        | -                          | -        |
| W     | 0.3860         | 3-3/4              | 115474                 | 59.99    | 117509                  | 82.74    | -                         | -        | -                          | -        |
| 25/64 | 0.3906         | 3-3/4              | 117397                 | 42.41    | 117510                  | 51.61    | -                         | -        | -                          | -        |
| X     | 0.3970         | 3-3/4              | 115476                 | 59.99    | 117511                  | 85.96    | -                         | -        | 115756                     | 140.90   |
| Y     | 0.4040         | 3-7/8              | 115477                 | 59.99    | 117512                  | 85.96    | -                         | -        | -                          | -        |
| 13/32 | 0.4062         | 3-7/8              | 117398                 | 42.41    | 117513                  | 53.15    | -                         | -        | 117610                     | 126.50   |
| Z     | 0.4130         | 3-7/8              | 115479                 | 68.14    | 117514                  | 92.47    | -                         | -        | -                          | -        |
| 27/64 | 0.4219         | 3-15/16            | 117399                 | 46.54    | 117515                  | 55.13    | -                         | -        | -                          | -        |
| 7/16  | 0.4375         | 4-1/16             | 117400                 | 46.54    | 117516                  | 55.13    | -                         | -        | 117611                     | 138.25   |
| 29/64 | 0.4531         | 4-3/16             | 117401                 | 51.07    | 117517                  | 61.83    | -                         | -        | 115759                     | 138.25   |
| 15/32 | 0.4688         | 4-5/16             | 117402                 | 53.05    | 117518                  | 66.73    | -                         | -        | 115760                     | 142.68   |
| 31/64 | 0.4844         | 4-3/8              | 117403                 | 53.54    | 117519                  | 67.94    | -                         | -        | 115761                     | 142.68   |
| 1/2   | 0.5000         | 4-1/2              | 117404                 | 54.64    | 117520                  | 67.94    | -                         | -        | 117612                     | 146.19   |



Did you know?  
 You can extend the life  
 of your drills with our  
 STM Drill Sharpeners.

See Page I5



## 6" Extra Length Drills HSS



- 4" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 1/16       | 0.0625         | 116888       | 22.60    |
| 5/64       | 0.0781         | 116889       | 26.48    |
| 3/32       | 0.0938         | 116890       | 20.21    |
| 7/64       | 0.1094         | 116891       | 22.03    |
| 1/8        | 0.1250         | 116892       | 22.03    |
| 9/64       | 0.1406         | 116893       | 28.10    |
| 5/32       | 0.1562         | 116894       | 28.10    |
| 11/64      | 0.1719         | 116895       | 31.34    |
| 3/16       | 0.1875         | 116896       | 31.34    |

## 8" Extra Length Drills HSS



- 5-1/2" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 1/16       | 0.0625         | 116887       | 16.90    |
| 3/32       | 0.0938         | 116897       | 31.24    |
| 7/64       | 0.1094         | 116898       | 31.24    |
| 1/8        | 0.1250         | 116899       | 32.75    |
| 9/64       | 0.1406         | 116900       | 33.06    |
| 5/32       | 0.1562         | 116901       | 33.06    |
| 11/64      | 0.1719         | 116902       | 34.25    |
| 3/16       | 0.1875         | 116903       | 34.25    |
| 13/64      | 0.2031         | 116904       | 35.18    |
| 7/32       | 0.2188         | 116905       | 35.18    |
| 15/64      | 0.2344         | 116906       | 35.18    |
| 1/4        | 0.2500         | 116907       | 36.06    |
| 17/64      | 0.2656         | 116908       | 40.50    |
| 9/32       | 0.2812         | 116909       | 40.50    |
| 19/64      | 0.2969         | 116910       | 41.89    |
| 5/16       | 0.3125         | 116911       | 42.26    |
| 21/64      | 0.3281         | 116912       | 43.57    |
| 11/32      | 0.3438         | 116913       | 43.88    |
| 23/64      | 0.3594         | 116914       | 48.54    |
| 3/8        | 0.3750         | 116915       | 49.54    |
| 25/64      | 0.3906         | 116916       | 53.87    |
| 13/32      | 0.4062         | 116917       | 53.87    |
| 27/64      | 0.4219         | 116918       | 57.16    |
| 7/16       | 0.4219         | 116919       | 57.16    |
| 29/64      | 0.4531         | 116920       | 65.67    |
| 15/32      | 0.4688         | 116923       | 65.67    |
| 1/2        | 0.5000         | 116924       | 67.49    |

## 9" Extra Length Drills HSS



- 6-1/2" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 27/64      | 0.4219         | 116978       | 58.80    |
| 7/16       | 0.4375         | 116921       | 58.80    |
| 29/64      | 0.4531         | 116922       | 67.76    |
| 31/64      | 0.4844         | 116980       | 70.00    |
| 1/2        | 0.5000         | 116982       | 69.41    |

## 10" Extra Length Drills HSS



- 7-1/2" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 1/8        | 0.1250         | 116983       | 34.98    |
| 9/64       | 0.1406         | 116926       | 34.98    |
| 5/32       | 0.1562         | 116927       | 34.98    |
| 11/64      | 0.1719         | 116928       | 36.54    |
| 3/16       | 0.1875         | 116929       | 36.54    |
| 13/64      | 0.2031         | 116930       | 36.54    |
| 7/32       | 0.2188         | 116931       | 36.54    |
| 15/64      | 0.2344         | 116932       | 36.54    |
| 1/4        | 0.2500         | 116933       | 38.30    |
| 17/64      | 0.2656         | 116934       | 43.12    |
| 9/32       | 0.2812         | 116935       | 43.12    |
| 19/64      | 0.2969         | 116936       | 34.98    |
| 5/16       | 0.3125         | 116937       | 45.12    |
| 21/64      | 0.3281         | 116938       | 54.01    |
| 11/32      | 0.3438         | 116939       | 46.87    |
| 23/64      | 0.3594         | 116940       | 51.34    |
| 3/8        | 0.3750         | 116941       | 52.48    |
| 25/64      | 0.3906         | 116942       | 57.64    |
| 13/32      | 0.4062         | 116943       | 57.64    |
| 27/64      | 0.4219         | 116944       | 60.24    |
| 7/16       | 0.4375         | 116945       | 60.24    |
| 29/64      | 0.4531         | 116946       | 69.83    |
| 15/32      | 0.4688         | 116947       | 69.83    |
| 31/64      | 0.4844         | 116948       | 71.96    |
| 1/2        | 0.5000         | 116949       | 71.64    |

## 12" Extra Length Drills HSS



- 9" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 7/64       | 0.1094         | 116984       | 41.97    |
| 1/8        | 0.1250         | 116950       | 39.26    |
| 9/64       | 0.1406         | 116951       | 41.26    |
| 5/32       | 0.1562         | 116952       | 41.26    |
| 11/64      | 0.1719         | 116953       | 43.88    |
| 3/16       | 0.1875         | 116954       | 43.88    |
| 13/64      | 0.2031         | 116955       | 43.88    |
| 7/32       | 0.2188         | 116956       | 46.97    |
| 15/64      | 0.2344         | 116957       | 46.97    |
| 1/4        | 0.2500         | 116958       | 46.97    |
| 17/64      | 0.2656         | 116959       | 49.17    |
| 9/32       | 0.2812         | 116960       | 49.17    |
| 19/64      | 0.2969         | 116961       | 53.46    |
| 5/16       | 0.3125         | 116962       | 53.46    |
| 21/64      | 0.3281         | 116963       | 58.02    |
| 11/32      | 0.3438         | 116964       | 58.02    |
| 23/64      | 0.3594         | 116965       | 62.05    |
| 3/8        | 0.3750         | 116966       | 62.05    |
| 25/64      | 0.3906         | 116967       | 68.45    |
| 13/32      | 0.4062         | 116968       | 68.45    |
| 27/64      | 0.4219         | 116969       | 71.44    |
| 7/16       | 0.4375         | 116970       | 71.44    |
| 29/64      | 0.4531         | 116971       | 84.22    |
| 15/32      | 0.4688         | 116972       | 84.22    |
| 31/64      | 0.4844         | 116973       | 88.84    |
| 1/2        | 0.5000         | 116974       | 88.84    |
| 33/64      | 0.5156         | 116985       | 112.00   |
| 17/32      | 0.5312         | 116976       | 115.27   |
| 35/64      | 0.5469         | 116986       | 131.59   |
| 9/16       | 0.5625         | 116987       | 131.59   |
| 37/64      | 0.5781         | 116988       | 140.02   |
| 19/32      | 0.5938         | 116989       | 140.02   |
| 39/64      | 0.6094         | 116981       | 136.85   |
| 5/8        | 0.6250         | 116990       | 147.74   |
| 41/64      | 0.6406         | 116991       | 179.41   |
| 21/32      | 0.6562         | 116992       | 179.41   |
| 43/64      | 0.6719         | 116993       | 191.55   |
| 11/16      | 0.6875         | 116994       | 193.43   |
| 45/64      | 0.7031         | 116995       | 200.56   |
| 23/32      | 0.7188         | 116996       | 200.56   |
| 3/4        | 0.7500         | 116997       | 216.91   |
| 25/32      | 0.7812         | 116998       | 238.00   |
| 13/16      | 0.8125         | 116999       | 256.37   |
| 7/8        | 0.8750         | 117000       | 307.73   |

## 18" Extra Length Drills HSS



- 12" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 3/16       | 0.1875         | 117027       | 89.32    |
| 13/64      | 0.2031         | 117028       | 89.32    |
| 7/32       | 0.2188         | 117029       | 91.66    |
| 15/64      | 0.2344         | 117030       | 91.66    |
| 1/4        | 0.2500         | 117031       | 89.32    |
| 17/64      | 0.2656         | 117032       | 97.32    |
| 9/32       | 0.2812         | 117033       | 97.32    |
| 19/64      | 0.2969         | 117034       | 102.99   |
| 5/16       | 0.3125         | 117035       | 102.99   |
| 21/64      | 0.3281         | 117036       | 105.39   |
| 11/32      | 0.3438         | 117037       | 105.39   |
| 23/64      | 0.3594         | 117038       | 107.79   |
| 3/8        | 0.3750         | 117039       | 107.79   |
| 25/64      | 0.3906         | 117040       | 113.22   |
| 13/32      | 0.4062         | 117041       | 113.22   |
| 27/64      | 0.4219         | 117043       | 119.54   |
| 7/16       | 0.4375         | 117045       | 119.54   |
| 29/64      | 0.4531         | 117046       | 139.70   |
| 15/32      | 0.4688         | 117047       | 139.70   |
| 31/64      | 0.4844         | 117048       | 145.33   |
| 1/2        | 0.5000         | 117049       | 145.33   |
| 17/32      | 0.5312         | 117051       | 219.29   |
| 35/64      | 0.5469         | 117052       | 220.29   |
| 9/16       | 0.5625         | 117053       | 229.78   |
| 19/32      | 0.5938         | 117054       | 240.48   |
| 5/8        | 0.625          | 117055       | 251.80   |
| 21/32      | 0.6562         | 117056       | 262.05   |
| 11/16      | 0.6875         | 117057       | 302.01   |
| 23/32      | 0.7031         | 117059       | 308.48   |
| 3/4        | 0.7500         | 117060       | 325.01   |
| 25/32      | 0.7812         | 117061       | 332.08   |
| 13/16      | 0.8125         | 117062       | 353.43   |
| 7/8        | 0.8750         | 117064       | 384.56   |
| 1          | 1.000          | 117065       | 446.01   |

## 24" Extra Length Drills HSS



- 18" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 3/8        | 0.3750         | 117066       | 220.65   |
| 7/16       | 0.4375         | 117067       | 183.81   |
| 1/2        | 0.5000         | 117068       | 223.12   |
| 9/16       | 0.5625         | 117069       | 340.67   |
| 5/8        | 0.625          | 117070       | 372.90   |
| 3/4        | 0.7500         | 117071       | 481.30   |
| 7/8        | 0.8750         | 117072       | 569.49   |
| 1          | 1.000          | 117073       | 660.72   |

## 48" Extra Length Drills HSS



- 5-1/2" flute length
- Fractional sizes



| Size (in.) | Decimal Equiv. | HSS Code No. | Price \$ |
|------------|----------------|--------------|----------|
| 1/4        | 0.2500         | 117074       | 172.80   |
| 5/16       | 0.3125         | 117075       | 185.28   |
| 3/8        | 0.3750         | 117076       | 206.09   |
| 1/2        | 0.5000         | 117078       | 258.14   |

## Taper Shank Drills HSS



- General purpose



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1/16       | 0.0625               | 1-1/4              | 4-5/8                | 1               | 114000       | 38.16    |
| 5/64       | 0.0781               | 1-3/8              | 4-3/4                | 1               | 114001       | 38.16    |
| 1/8        | 0.1250               | 1-7/8              | 5-1/8                | 1               | 114002       | 32.72    |
| 9/64       | 0.1406               | 2-1/8              | 5-3/8                | 1               | 114003       | 32.72    |
| 5/32       | 0.1562               | 2-1/8              | 5-3/8                | 1               | 114004       | 32.72    |
| 11/64      | 0.1719               | 2-1/2              | 5-3/4                | 1               | 114005       | 32.72    |
| 3/16       | 0.1875               | 2-1/2              | 5-3/4                | 1               | 114006       | 28.61    |
| 13/64      | 0.2031               | 2-3/4              | 6                    | 1               | 114007       | 32.72    |
| 7/32       | 0.2188               | 2-3/4              | 6                    | 1               | 114008       | 32.72    |
| 15/64      | 0.2344               | 2-7/8              | 6-1/8                | 1               | 114009       | 32.72    |
| 1/4        | 0.2500               | 2-7/8              | 6-1/8                | 1               | 114010       | 32.72    |
| 17/64      | 0.2656               | 3                  | 6-1/4                | 1               | 114011       | 33.69    |
| 9/32       | 0.2812               | 3                  | 6-1/4                | 1               | 114012       | 33.69    |
| 19/64      | 0.2969               | 3-1/8              | 6-3/8                | 1               | 114013       | 33.69    |
| 5/16       | 0.3125               | 3-1/8              | 6-3/8                | 1               | 114014       | 33.69    |
| 21/64      | 0.3281               | 3-1/4              | 6-1/2                | 1               | 114015       | 44.91    |
| 11/32      | 0.3438               | 3-1/4              | 6-1/2                | 1               | 114016       | 44.91    |
| 23/64      | 0.3594               | 3-1/2              | 6-3/4                | 1               | 114017       | 44.91    |
| 3/8        | 0.3750               | 3-1/2              | 6-3/4                | 1               | 114018       | 44.91    |
| 25/64      | 0.3906               | 3-5/8              | 7                    | 1               | 114019       | 47.42    |
| 13/32      | 0.4062               | 3-5/8              | 7                    | 1               | 114020       | 47.70    |
| 27/64      | 0.4219               | 3-7/8              | 7-1/4                | 1               | 114022       | 49.15    |
| 7/16       | 0.4375               | 3-7/8              | 7-1/4                | 1               | 114023       | 49.15    |
| 29/64      | 0.4531               | 4-1/8              | 7-1/2                | 1               | 114024       | 51.31    |
| 15/32      | 0.4688               | 4-1/8              | 7-1/2                | 1               | 114025       | 57.97    |
| 31/64      | 0.4844               | 4-3/8              | 8-1/4                | 2               | 114026       | 45.16    |
| 1/2        | 0.5000               | 4-3/8              | 8-1/4                | 2               | 114027       | 51.61    |
| 33/64      | 0.5156               | 4-5/8              | 8-1/2                | 2               | 114028       | 59.52    |
| 17/32      | 0.5312               | 4-5/8              | 8-1/2                | 2               | 114029       | 59.51    |
| 35/64      | 0.5469               | 4-7/8              | 8-3/4                | 2               | 114030       | 63.79    |
| 9/16       | 0.5625               | 4-7/8              | 8-3/4                | 2               | 114031       | 59.51    |
| 37/64      | 0.5781               | 4-7/8              | 8-3/4                | 2               | 114032       | 68.14    |
| 19/32      | 0.5938               | 4-7/8              | 8-3/4                | 2               | 114033       | 66.94    |
| 39/64      | 0.6094               | 4-7/8              | 8-3/4                | 2               | 114034       | 66.94    |
| 5/8        | 0.6250               | 4-7/8              | 8-3/4                | 2               | 114035       | 66.94    |
| 41/64      | 0.6406               | 5-1/8              | 9                    | 2               | 114036       | 73.73    |
| 21/32      | 0.6562               | 5-1/8              | 9                    | 2               | 114037       | 73.73    |
| 43/64      | 0.6719               | 5-3/8              | 9-1/4                | 2               | 114038       | 79.12    |
| 11/16      | 0.6875               | 5-3/8              | 9-1/4                | 2               | 114039       | 74.64    |
| 45/64      | 0.7031               | 5-5/8              | 9-1/2                | 2               | 114040       | 82.40    |
| 23/32      | 0.7188               | 5-5/8              | 9-1/2                | 2               | 114041       | 82.40    |
| 47/64      | 0.7344               | 5-7/8              | 9-3/4                | 2               | 114042       | 87.51    |
| 3/4        | 0.7500               | 5-7/8              | 9-3/4                | 2               | 114043       | 83.37    |
| 49/64      | 0.7656               | 6                  | 9-7/8                | 2               | 114044       | 105.24   |
| 25/32      | 0.7812               | 6                  | 9-7/8                | 2               | 114045       | 109.29   |
| 51/64      | 0.7969               | 6-1/8              | 10-3/4               | 3               | 114046       | 115.22   |
| 13/16      | 0.8125               | 6-1/8              | 10-3/4               | 3               | 114047       | 111.80   |
| 53/64      | 0.8281               | 6-1/8              | 10-3/4               | 3               | 114048       | 124.23   |
| 27/32      | 0.8438               | 6-1/8              | 10-3/4               | 3               | 114049       | 124.23   |
| 55/64      | 0.8594               | 6-1/8              | 10-3/4               | 3               | 114050       | 129.19   |
| 7/8        | 0.8750               | 6-1/8              | 10-3/4               | 3               | 114051       | 121.68   |
| 57/64      | 0.8906               | 6-1/8              | 10-3/4               | 3               | 114052       | 132.36   |
| 29/32      | 0.9062               | 6-1/8              | 10-3/4               | 3               | 114053       | 130.82   |
| 59/64      | 0.9219               | 6-1/8              | 10-3/4               | 3               | 114054       | 134.59   |
| 15/16      | 0.9375               | 6-1/8              | 10-3/4               | 3               | 114055       | 134.59   |
| 61/64      | 0.9531               | 6-3/8              | 11                   | 3               | 114056       | 144.90   |
| 31/32      | 0.9688               | 6-3/8              | 11                   | 3               | 114057       | 144.90   |
| 63/64      | 0.9844               | 6-3/8              | 11                   | 3               | 114058       | 148.03   |
| 1          | 1.0000               | 6-3/8              | 11                   | 3               | 114059       | 135.88   |
| 1-1/64     | 1.0156               | 6-1/2              | 11-1/8               | 3               | 114060       | 159.69   |
| 1-1/32     | 1.0312               | 6-1/2              | 11-1/8               | 3               | 114061       | 165.38   |
| 1-3/64     | 1.0469               | 6-5/8              | 11-1/4               | 3               | 114062       | 179.20   |
| 1-1/16     | 1.0625               | 6-5/8              | 11-1/4               | 3               | 114063       | 168.85   |
| 1-5/64     | 1.0781               | 6-7/8              | 12-1/2               | 4               | 114064       | 193.52   |
| 1-3/32     | 1.0938               | 6-7/8              | 12-1/2               | 4               | 114065       | 193.52   |
| 1-7/64     | 1.1094               | 7-1/8              | 12-3/4               | 4               | 114067       | 201.23   |
| 1-1/8      | 1.1250               | 7-1/8              | 12-3/4               | 4               | 114068       | 197.62   |

## Taper Shank Drills HSS — Cont'd

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1-9/64     | 1.1406               | 7-1/4              | 12-7/8               | 4               | 114069       | 213.27   |
| 1-5/32     | 1.1562               | 7-1/4              | 12-7/8               | 4               | 114070       | 213.27   |
| 1-11/64    | 1.1719               | 7-3/8              | 13                   | 4               | 114071       | 215.63   |
| 1-3/16     | 1.1875               | 7-3/8              | 13                   | 4               | 114072       | 215.63   |
| 1-13/64    | 1.2031               | 7-1/2              | 13-1/8               | 4               | 114073       | 230.77   |
| 1-7/32     | 1.2188               | 7-1/2              | 13-1/8               | 4               | 114074       | 230.77   |
| 1-15/64    | 1.2344               | 7-7/8              | 13-1/2               | 4               | 114075       | 251.68   |
| 1-1/4      | 1.2500               | 7-7/8              | 13-1/2               | 4               | 114076       | 244.03   |
| 1-17/64    | 1.2656               | 8-1/2              | 14-1/8               | 4               | 114077       | 290.18   |
| 1-9/32     | 1.2812               | 8-1/2              | 14-1/8               | 4               | 114078       | 297.70   |
| 1-19/64    | 1.2969               | 8-5/8              | 14-1/4               | 4               | 114079       | 308.93   |
| 1-5/16     | 1.3125               | 8-5/8              | 14-1/4               | 4               | 114080       | 297.70   |
| 1-21/64    | 1.3281               | 8-3/4              | 14-3/8               | 4               | 114081       | 319.39   |
| 1-11/32    | 1.3438               | 8-3/4              | 14-3/8               | 4               | 114082       | 319.39   |
| 1-23/64    | 1.3594               | 8-7/8              | 14-1/2               | 4               | 114083       | 326.32   |
| 1-3/8      | 1.3750               | 8-7/8              | 14-1/2               | 4               | 114084       | 326.32   |
| 1-25/64    | 1.3906               | 9                  | 14-5/8               | 4               | 114085       | 335.28   |
| 1-13/32    | 1.4062               | 9                  | 14-5/8               | 4               | 114086       | 335.28   |
| 1-27/64    | 1.4219               | 9-1/8              | 14-3/4               | 4               | 114087       | 347.23   |
| 1-7/16     | 1.4375               | 9-1/8              | 14-3/4               | 4               | 114088       | 347.23   |
| 1-29/64    | 1.4531               | 9-1/4              | 14-7/8               | 4               | 114089       | 363.67   |
| 1-15/32    | 1.4688               | 9-1/4              | 14-7/8               | 4               | 114090       | 363.67   |
| 1-31/64    | 1.4844               | 9-3/8              | 15                   | 4               | 114091       | 374.76   |
| 1-1/2      | 1.5000               | 9-3/8              | 15                   | 4               | 114092       | 374.76   |
| 1-33/64    | 1.5156               | 9-3/8              | 16-3/8               | 5               | 114093       | 608.01   |
| 1-17/32    | 1.5312               | 9-3/8              | 16-3/8               | 5               | 114094       | 482.40   |
| 1-35/64    | 1.5469               | 9-5/8              | 16-5/8               | 5               | 114095       | 639.43   |
| 1-9/16     | 1.5625               | 9-5/8              | 16-5/8               | 5               | 114096       | 482.40   |
| 1-37/64    | 1.5781               | 9-7/8              | 16-7/8               | 5               | 114097       | 639.43   |
| 1-19/32    | 1.5938               | 9-7/8              | 16-7/8               | 5               | 114098       | 482.40   |
| 1-39/64    | 1.6094               | 10                 | 17                   | 5               | 114099       | 656.40   |
| 1-5/8      | 1.6250               | 10                 | 17                   | 5               | 114100       | 496.13   |
| 1-41/64    | 1.6406               | 10-1/8             | 17-1/8               | 5               | 114101       | 687.42   |
| 1-21/32    | 1.6562               | 10-1/8             | 17-1/8               | 5               | 114102       | 526.68   |
| 1-43/64    | 1.6719               | 10-1/8             | 17-1/8               | 5               | 114103       | 748.38   |
| 1-11/16    | 1.6875               | 10-1/8             | 17-1/8               | 5               | 114104       | 794.02   |
| 1-45/64    | 1.7031               | 10-1/8             | 17-1/8               | 5               | 114105       | 748.38   |
| 1-23/32    | 1.7188               | 10-1/8             | 17-1/8               | 5               | 114106       | 572.45   |
| 1-47/64    | 1.7344               | 10-1/8             | 17-1/8               | 5               | 114107       | 779.47   |
| 1-3/4      | 1.7500               | 10-1/8             | 17-1/8               | 5               | 114108       | 572.45   |
| 1-25/32    | 1.7812               | 10-1/8             | 17-1/8               | 5               | 114109       | 603.01   |
| 1-13/16    | 1.8125               | 10-1/8             | 17-1/8               | 5               | 114110       | 639.91   |
| 1-27/32    | 1.8438               | 10-1/8             | 17-1/8               | 5               | 114111       | 639.91   |
| 1-7/8      | 1.8750               | 10-3/8             | 17-3/8               | 5               | 114112       | 639.91   |
| 1-29/32    | 1.9062               | 10-3/8             | 17-3/8               | 5               | 114113       | 664.07   |
| 1-15/16    | 1.9375               | 10-3/8             | 17-3/8               | 5               | 114114       | 686.95   |
| 1-31/32    | 1.9688               | 10-3/8             | 17-3/8               | 5               | 114115       | 711.38   |
| 2          | 2.0000               | 10-3/8             | 17-3/8               | 5               | 114116       | 711.38   |
| 2-1/32     | 2.0312               | 10-3/8             | 17-3/8               | 5               | 114117       | 1,126.95 |
| 2-1/16     | 2.0625               | 10-1/4             | 17-3/8               | 5               | 114118       | 1,062.47 |
| 2-3/32     | 2.0938               | 10-1/4             | 17-3/8               | 5               | 114119       | 1,210.20 |
| 2-1/8      | 2.1250               | 10-1/4             | 17-3/8               | 5               | 114120       | 1,084.10 |
| 2-5/32     | 2.1562               | 10-1/4             | 17-3/8               | 5               | 114121       | 1,236.52 |
| 2-3/16     | 2.1875               | 10-1/4             | 17-3/8               | 5               | 114122       | 1,112.05 |
| 2-7/32     | 2.2188               | 10-1/8             | 17-3/8               | 5               | 114123       | 1,236.52 |
| 2-1/4      | 2.2500               | 10-1/8             | 17-3/8               | 5               | 114124       | 1,143.90 |
| 2-9/32     | 2.2812               | 10-1/8             | 17-3/8               | 5               | 114125       | 1,359.55 |
| 2-5/16     | 2.3125               | 10-1/8             | 17-3/8               | 5               | 114126       | 1,301.39 |
| 2-11/32    | 2.3438               | 10-1/8             | 17-3/8               | 5               | 114127       | 1,603.07 |
| 2-3/8      | 2.3750               | 10-1/8             | 17-3/8               | 5               | 114128       | 1,405.65 |
| 2-13/32    | 2.4062               | 11-1/4             | 18-3/4               | 5               | 114129       | 1,680.13 |
| 2-7/16     | 2.4375               | 11-1/4             | 18-3/4               | 5               | 114130       | 1,511.86 |
| 2-15/32    | 2.4688               | 11-1/4             | 18-3/4               | 5               | 114131       | 1,680.13 |
| 2-1/2      | 2.5000               | 11-1/4             | 18-3/4               | 5               | 114132       | 1,511.86 |
| 2-17/32    | 2.5312               | 11-7/8             | 19-1/2               | 5               | 114133       | 1,874.81 |
| 2-9/16     | 2.5625               | 11-7/8             | 19-1/2               | 5               | 114134       | 1,802.28 |
| 2-5/8      | 2.6250               | 11-7/8             | 19-1/2               | 5               | 114135       | 1,802.47 |
| 2-11/16    | 2.6875               | 12-3/4             | 20-3/8               | 5               | 114136       | 1,984.67 |
| 2-23/32    | 2.7188               | 12-3/4             | 20-3/8               | 5               | 114137       | 2,171.54 |
| 2-3/4      | 2.7500               | 12-3/4             | 20-3/8               | 5               | 114138       | 2,060.85 |
| 2-13/16    | 2.8125               | 13-3/8             | 21-1/8               | 5               | 114139       | 2,171.54 |
| 2-27/32    | 2.8438               | 13-3/8             | 21-1/8               | 5               | 114140       | 2,568.07 |
| 2-7/8      | 2.8750               | 13-3/8             | 21-1/8               | 5               | 114141       | 2,423.56 |

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 2-15/16    | 2.9375               | 14                 | 21-3/4               | 5               | 114142       | 2,568.07 |
| 3          | 3.0000               | 14                 | 21-3/4               | 5               | 114143       | 2,656.39 |
| 3-1/16     | 3.0625               | 14-5/8             | 24-1/2               | 6               | 114144       | 3,314.15 |
| 3-1/8      | 3.1250               | 14-5/8             | 24-1/2               | 6               | 114145       | 3,511.08 |
| 3-3/16     | 3.1875               | 14-5/8             | 24-1/2               | 6               | 114146       | 3,779.78 |
| 3-1/4      | 3.2500               | 15-1/2             | 25-1/2               | 6               | 114147       | 3,779.77 |
| 3-5/16     | 3.3125               | 15-1/2             | 25-1/2               | 6               | 114148       | 4,178.95 |
| 3-3/8      | 3.3750               | 15-1/2             | 25-1/2               | 6               | 114149       | 4,468.22 |
| 3-7/16     | 3.4375               | 15-1/2             | 25-1/2               | 6               | 114150       | 5,621.56 |
| 3-1/2      | 3.5000               | 16-3/8             | 26-1/2               | 6               | 114151       | 5,621.56 |
| 3-5/8      | 3.6250               | 16-3/8             | 26-1/2               | 6               | 114152       | 5,823.80 |
| 3-3/4      | 3.7500               | 16-3/8             | 26-1/2               | 6               | 114153       | 7,136.66 |
| 3-7/8      | 3.8750               | 16-3/8             | 26-1/2               | 6               | 114154       | 8,228.13 |
| 4          | 4.0000               | 17-1/2             | 27-1/2               | 6               | 114155       | 8,991.41 |

## HSCO Taper Shank Drills



- Heavy duty



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSCO Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|---------------|----------|
| 1/2        | 0.5000               | 4-3/8              | 8-1/4                | 2               | 106302        | 135.31   |
| 33/64      | 0.5156               | 4-5/8              | 8-1/2                | 2               | 106304        | 156.13   |
| 17/32      | 0.5312               | 4-5/8              | 8-1/2                | 2               | 106306        | 156.13   |
| 35/64      | 0.5469               | 4-7/8              | 8-3/4                | 2               | 106308        | 164.46   |
| 9/16       | 0.5625               | 4-7/8              | 8-3/4                | 2               | 106310        | 156.13   |
| 37/64      | 0.5781               | 4-7/8              | 8-3/4                | 2               | 106312        | 168.60   |
| 19/32      | 0.5938               | 4-7/8              | 8-3/4                | 2               | 106314        | 164.46   |
| 39/64      | 0.6094               | 4-7/8              | 8-3/4                | 2               | 106316        | 191.49   |
| 5/8        | 0.625                | 4-7/8              | 8-3/4                | 2               | 106318        | 229.52   |
| 41/64      | 0.6406               | 5-1/8              | 9-3/4                | 3               | 106320        | 218.57   |
| 21/32      | 0.6562               | 5-1/8              | 9-3/4                | 3               | 106322        | 201.90   |
| 43/64      | 0.6719               | 5-3/8              | 10                   | 3               | 106324        | 228.98   |
| 11/16      | 0.6875               | 5-3/8              | 10                   | 3               | 106326        | 218.57   |
| 45/64      | 0.7031               | 5-5/8              | 10-1/4               | 3               | 106328        | 245.66   |
| 23/32      | 0.7188               | 5-5/8              | 10-1/4               | 3               | 106330        | 228.98   |
| 47/64      | 0.7344               | 5-7/8              | 10-1/2               | 3               | 106332        | 253.94   |
| 3/4        | 0.750                | 5-7/8              | 10-1/2               | 3               | 106334        | 253.94   |
| 49/64      | 0.7656               | 6                  | 10-5/8               | 3               | 106336        | 270.62   |
| 25/32      | 0.7812               | 6                  | 10-5/8               | 3               | 106338        | 270.62   |
| 51/64      | 0.7969               | 6-1/8              | 10-3/4               | 3               | 106340        | 287.29   |
| 13/16      | 0.8125               | 6-1/8              | 10-3/4               | 3               | 106342        | 287.28   |
| 53/64      | 0.8281               | 6-1/8              | 10-3/4               | 3               | 106344        | 351.81   |
| 27/32      | 0.8438               | 6-1/8              | 10-3/4               | 3               | 106346        | 328.92   |
| 55/64      | 0.8594               | 6-1/8              | 10-3/4               | 3               | 106348        | 351.81   |
| 7/8        | 0.875                | 6-1/8              | 10-3/4               | 3               | 106350        | 328.92   |
| 57/64      | 0.8906               | 6-1/8              | 10-3/4               | 3               | 106352        | 391.37   |
| 29/32      | 0.9062               | 6-1/8              | 10-3/4               | 3               | 106354        | 391.37   |
| 59/64      | 0.9219               | 6-1/8              | 10-3/4               | 3               | 106356        | 405.93   |
| 15/16      | 0.9375               | 6-1/8              | 10-3/4               | 3               | 106358        | 343.27   |
| 61/64      | 0.9531               | 6-3/8              | 11                   | 3               | 106360        | 388.57   |
| 31/32      | 0.9688               | 6-3/8              | 11                   | 3               | 106362        | 388.57   |
| 63/64      | 0.9844               | 6-3/8              | 11                   | 3               | 106364        | 388.57   |
| 1          | 1.000                | 6-3/8              | 11                   | 3               | 106366        | 388.57   |
| 1-1/64     | 1.0156               | 6-1/2              | 12-1/8               | 4               | 106367        | 510.88   |
| 1-1/32     | 1.0312               | 6-1/2              | 12-1/8               | 4               | 106368        | 510.88   |
| 1-3/64     | 1.0469               | 6-5/8              | 12-1/4               | 4               | 106369        | 464.42   |
| 1-1/16     | 1.0625               | 6-5/8              | 12-1/4               | 4               | 106370        | 464.42   |
| 1-1/8      | 1.125                | 7-1/8              | 12-3/4               | 4               | 106374        | 543.84   |
| 1-5/32     | 1.1562               | 7-1/4              | 12-7/8               | 4               | 106376        | 633.89   |
| 1-3/16     | 1.1875               | 7-3/8              | 13                   | 4               | 106378        | 633.95   |
| 1-7/32     | 1.2188               | 7-1/2              | 13-1/8               | 4               | 106380        | 665.75   |
| 1-1/4      | 1.250                | 7-7/8              | 13-1/2               | 5               | 106382        | 722.33   |
| 1-5/16     | 1.3125               | 8-5/8              | 15/7/8               | 5               | 106386        | 846.25   |
| 1-3/8      | 1.375                | 8-7/8              | 15-7/8               | 5               | 106390        | 907.84   |
| 1-7/16     | 1.4375               | 9-1/8              | 16-1/8               | 5               | 106394        | 1,070.56 |
| 1-1/2      | 1.500                | 9-3/8              | 16-3/8               | 5               | 106398        | 1,059.58 |
| 1-5/8      | 1.625                | 10                 | 17                   | 5               | 106406        | 1,373.90 |
| 1-3/4      | 1.750                | 10-1/8             | 17-1/8               | 5               | 106414        | 1,706.97 |

## Taper Shank Drills – Shank Larger Than Standard



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 3/8        | 0.3750               | 3-1/2              | 7-3/8                | 2               | 114156       | 59.56    |
| 25/64      | 0.3906               | 3-5/8              | 7-1/2                | 2               | 114157       | 61.54    |
| 13/32      | 0.4062               | 3-5/8              | 7-1/2                | 2               | 114158       | 61.54    |
| 27/64      | 0.4219               | 3-7/8              | 7-3/4                | 2               | 114159       | 63.51    |
| 7/16       | 0.4375               | 3-7/8              | 7-3/4                | 2               | 114160       | 63.51    |
| 29/64      | 0.4531               | 4-1/8              | 8                    | 2               | 114161       | 76.18    |
| 15/32      | 0.4688               | 4-1/8              | 8                    | 2               | 114162       | 76.18    |
| 41/64      | 0.6406               | 5-1/8              | 9-3/4                | 3               | 114163       | 100.90   |
| 21/32      | 0.6562               | 5-1/8              | 9-3/4                | 3               | 114164       | 100.90   |
| 43/64      | 0.6719               | 5-3/8              | 10                   | 3               | 114165       | 108.27   |
| 11/16      | 0.6875               | 5-3/8              | 10                   | 3               | 114166       | 106.01   |
| 45/64      | 0.7031               | 5-5/8              | 10-1/4               | 3               | 114167       | 117.19   |
| 23/32      | 0.7188               | 5-5/8              | 10-1/4               | 3               | 114168       | 117.19   |
| 47/64      | 0.7344               | 5-7/8              | 10-1/2               | 3               | 114169       | 126.83   |
| 3/4        | 0.7500               | 5-7/8              | 10-1/2               | 3               | 114170       | 119.07   |
| 49/64      | 0.7656               | 6                  | 10-5/8               | 3               | 114171       | 140.99   |
| 25/32      | 0.7812               | 6                  | 10-5/8               | 3               | 114172       | 142.97   |
| 1          | 1.0000               | 6-3/8              | 12                   | 4               | 114173       | 190.67   |
| 1-1/32     | 1.0312               | 6-1/2              | 12-1/8               | 4               | 114174       | 214.92   |
| 1-1/16     | 1.0625               | 6-5/8              | 12-1/4               | 4               | 114175       | 224.56   |

## Taper Shank Drills – Shank Smaller Than Standard



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 31/64      | 0.4844               | 4-3/8              | 7-3/4                | 1               | 114176       | 60.53    |
| 1/2        | 0.5000               | 4-3/8              | 7-3/4                | 1               | 114177       | 52.82    |
| 33/64      | 0.5156               | 4-5/8              | 8                    | 1               | 114178       | 66.40    |
| 17/32      | 0.5312               | 4-5/8              | 8                    | 1               | 114179       | 66.40    |
| 35/64      | 0.5469               | 4-7/8              | 8-1/4                | 1               | 114180       | 70.93    |
| 9/16       | 0.5625               | 4-7/8              | 8-1/4                | 1               | 114181       | 66.55    |
| 37/64      | 0.5781               | 4-7/8              | 8-1/4                | 1               | 114182       | 75.17    |
| 51/64      | 0.7969               | 6-1/8              | 10                   | 2               | 114183       | 141.67   |
| 13/16      | 0.8125               | 6-1/8              | 10                   | 2               | 114184       | 131.26   |
| 53/64      | 0.8281               | 6-1/8              | 10                   | 2               | 114185       | 151.88   |
| 27/32      | 0.8438               | 6-1/8              | 10                   | 2               | 114186       | 151.88   |
| 55/64      | 0.8594               | 6-1/8              | 10                   | 2               | 114187       | 160.27   |
| 7/8        | 0.8750               | 6-1/8              | 10                   | 2               | 114188       | 160.27   |
| 57/64      | 0.8906               | 6-1/8              | 10                   | 2               | 114189       | 171.74   |
| 29/32      | 0.9062               | 6-1/8              | 10                   | 2               | 114190       | 171.74   |
| 1          | 1.0000               | 6-1/4              | 10-1/8               | 2               | 114191       | 186.24   |
| 1-5/64     | 1.0781               | 6-7/8              | 11-1/2               | 3               | 114192       | 251.88   |
| 1-3/32     | 1.0938               | 6-7/8              | 11-1/2               | 3               | 114193       | 251.88   |
| 1-7/64     | 1.1094               | 7-1/8              | 11-3/4               | 3               | 114194       | 259.54   |
| 1-1/8      | 1.1250               | 7-1/8              | 11-3/4               | 3               | 114195       | 258.04   |
| 1-9/64     | 1.1406               | 7-1/4              | 11-7/8               | 3               | 114196       | 288.53   |
| 1-5/32     | 1.1562               | 7-1/4              | 11-7/8               | 3               | 114197       | 288.53   |
| 1-11/64    | 1.1719               | 7-3/8              | 12                   | 3               | 114198       | 280.88   |
| 1-3/16     | 1.1875               | 7-3/8              | 12                   | 3               | 114199       | 280.88   |
| 1-13/64    | 1.2031               | 7-1/2              | 12-1/8               | 3               | 114200       | 318.75   |
| 1-7/32     | 1.2188               | 7-1/2              | 12-1/8               | 3               | 114201       | 318.75   |
| 1-15/64    | 1.2344               | 7-7/8              | 12-1/2               | 3               | 114202       | 318.75   |
| 1-1/4      | 1.2500               | 7-7/8              | 12-1/2               | 3               | 114203       | 303.77   |
| 1-5/16     | 1.3125               | 8-5/8              | 13-1/4               | 3               | 114204       | 420.57   |
| 1-3/8      | 1.3750               | 8-7/8              | 13-1/2               | 3               | 114205       | 451.41   |
| 1-7/16     | 1.4375               | 9-1/8              | 13-3/4               | 3               | 114206       | 471.02   |
| 1-1/2      | 1.5000               | 9-3/8              | 14                   | 3               | 114207       | 513.53   |
| 1-33/64    | 1.5156               | 9-3/8              | 15                   | 4               | 114208       | 608.01   |
| 1-17/32    | 1.5312               | 9-3/8              | 15                   | 4               | 114209       | 554.15   |
| 1-35/64    | 1.5469               | 9-5/8              | 15-1/4               | 4               | 114210       | 639.43   |
| 1-9/16     | 1.5625               | 9-5/8              | 15-1/4               | 4               | 114211       | 554.15   |
| 1-37/64    | 1.5781               | 9-7/8              | 15-1/2               | 4               | 114212       | 639.43   |

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1-19/32    | 1.5938               | 9-7/8              | 15-1/2               | 4               | 114213       | 559.68   |
| 1-39/64    | 1.6094               | 10                 | 15-5/8               | 4               | 114214       | 656.40   |
| 1-5/8      | 1.6250               | 10                 | 15-5/8               | 4               | 114215       | 578.67   |
| 1-41/64    | 1.6406               | 10-1/8             | 15-3/4               | 4               | 114216       | 687.42   |
| 1-21/32    | 1.6562               | 10-1/8             | 15-3/4               | 4               | 114217       | 626.81   |
| 1-43/64    | 1.6719               | 10-1/8             | 15-3/4               | 4               | 114218       | 748.38   |
| 1-11/16    | 1.6875               | 10-1/8             | 15-3/4               | 4               | 114219       | 635.97   |
| 1-45/64    | 1.7031               | 10-1/8             | 15-3/4               | 4               | 114220       | 748.38   |
| 1-23/32    | 1.7188               | 10-1/8             | 15-3/4               | 4               | 114221       | 701.26   |
| 1-47/64    | 1.7344               | 10-3/8             | 16-1/4               | 4               | 114222       | 779.47   |
| 1-3/4      | 1.7500               | 10-3/8             | 16-1/4               | 4               | 114223       | 709.83   |
| 1-25/32    | 1.7812               | 10-3/8             | 16-1/4               | 4               | 114224       | 715.97   |
| 1-13/16    | 1.8125               | 10-3/8             | 16-1/4               | 4               | 114225       | 760.25   |
| 1-27/32    | 1.8438               | 10-3/8             | 16-1/4               | 4               | 114226       | 809.14   |
| 1-7/8      | 1.8750               | 10-1/2             | 16-1/2               | 4               | 114227       | 809.14   |
| 1-57/64    | 1.8906               | 10-1/2             | 16-1/2               | 4               | 114228       | 900.66   |
| 1-29/32    | 1.9062               | 10-1/2             | 16-1/2               | 4               | 114229       | 832.67   |
| 1-15/16    | 1.9375               | 10-5/8             | 16-5/8               | 4               | 114230       | 884.67   |
| 1-31/32    | 1.9688               | 10-5/8             | 16-5/8               | 4               | 114231       | 1,033.46 |
| 2          | 2.0000               | 10-5/8             | 16-5/8               | 4               | 114232       | 866.59   |
| 2-1/32     | 2.0312               | 10-3/8             | 16-1/4               | 4               | 114233       | 1,129.67 |
| 2-1/16     | 2.0625               | 10-1/4             | 16-1/4               | 4               | 114234       | 1,126.95 |
| 2-3/32     | 2.0938               | 10-1/4             | 16-1/4               | 4               | 114235       | 1,210.20 |
| 2-1/8      | 2.1250               | 10-1/4             | 16-1/4               | 4               | 114236       | 1,210.20 |
| 2-5/32     | 2.1562               | 10-1/4             | 16-1/4               | 4               | 114237       | 1,236.52 |
| 2-3/16     | 2.1875               | 10-1/4             | 16-1/4               | 4               | 114238       | 1,236.52 |
| 2-7/32     | 2.2188               | 10-1/8             | 16-1/4               | 4               | 114239       | 1,236.52 |
| 2-1/4      | 2.2500               | 10-1/8             | 16-1/8               | 4               | 114240       | 1,236.52 |
| 2-5/16     | 2.3125               | 10-1/8             | 16-1/8               | 4               | 114241       | 1,359.55 |
| 2-3/8      | 2.3750               | 10-1/8             | 16-1/8               | 4               | 114242       | 1,603.07 |
| 2-7/16     | 2.4375               | 11-1/4             | 17-1/4               | 4               | 114243       | 1,680.13 |
| 2-1/2      | 2.5000               | 11-1/4             | 17-1/4               | 4               | 114244       | 1,680.13 |
| 2-5/8      | 2.6250               | 11-7/8             | 18                   | 4               | 114245       | 1,802.28 |
| 2-3/4      | 2.7500               | 12-3/4             | 19-1/8               | 4               | 114246       | 2,122.20 |
| 3-1/16     | 3.0625               | 14-1/4             | 22                   | 5               | 114247       | 3,314.15 |
| 3-1/8      | 3.1250               | 14-1/4             | 22                   | 5               | 114248       | 3,511.08 |
| 3-3/16     | 3.1875               | 14-1/4             | 22                   | 5               | 114249       | 3,779.78 |
| 3-1/4      | 3.2500               | 15-1/4             | 23                   | 5               | 114250       | 3,788.88 |
| 3-5/16     | 3.3125               | 15-1/4             | 23                   | 5               | 114251       | 4,178.95 |
| 3-3/8      | 3.3750               | 15-1/4             | 23                   | 5               | 114252       | 4,468.22 |
| 3-7/16     | 3.4375               | 15-1/4             | 23                   | 5               | 114253       | 5,621.56 |
| 3-1/2      | 3.5000               | 16-1/4             | 24                   | 5               | 114254       | 5,621.56 |
| 3-5/8      | 3.6250               | 16-1/4             | 24                   | 5               | 114255       | 5,823.80 |

## Taper Shank Drills HSS — Letter Sizes



Furnished with #1 morse taper shank.



| Size | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------|----------------------|--------------------|----------------------|--------------|----------|
| A    | 0.2340               | 2-7/8              | 6-1/8                | 114256       | 41.78    |
| B    | 0.2380               | 2-7/8              | 6-1/8                | 114257       | 41.78    |
| C    | 0.2420               | 2-7/8              | 6-1/8                | 114258       | 41.78    |
| D    | 0.2460               | 2-7/8              | 6-1/8                | 114259       | 37.05    |
| E    | 0.2500               | 2-7/8              | 6-1/8                | 114260       | 32.72    |
| F    | 0.2570               | 3                  | 6-1/4                | 114261       | 36.76    |
| G    | 0.2610               | 3                  | 6-1/4                | 114262       | 43.80    |
| H    | 0.2660               | 3                  | 6-1/4                | 114263       | 43.80    |
| I    | 0.2720               | 3                  | 6-1/4                | 114264       | 43.80    |
| J    | 0.2770               | 3                  | 6-1/4                | 114265       | 40.43    |
| K    | 0.2810               | 3                  | 6-1/4                | 114266       | 45.98    |
| L    | 0.2900               | 3-1/8              | 6-3/8                | 114267       | 45.98    |
| M    | 0.2950               | 3-1/8              | 6-3/8                | 114268       | 45.98    |
| N    | 0.3020               | 3-1/8              | 6-3/8                | 114269       | 45.98    |
| O    | 0.3160               | 3-1/4              | 6-1/2                | 114270       | 54.55    |
| P    | 0.3230               | 3-1/4              | 6-1/2                | 114271       | 54.55    |
| Q    | 0.3320               | 3-1/4              | 6-1/2                | 114272       | 57.25    |
| R    | 0.3390               | 3-1/4              | 6-1/2                | 114273       | 62.93    |
| S    | 0.3480               | 3-1/2              | 6-3/4                | 114274       | 65.92    |
| T    | 0.3580               | 3-1/2              | 6-3/4                | 114275       | 65.92    |
| U    | 0.3680               | 3-1/2              | 6-3/4                | 114276       | 65.92    |
| V    | 0.3770               | 3-5/8              | 7                    | 114277       | 69.66    |
| W    | 0.3860               | 3-5/8              | 7                    | 114278       | 69.49    |
| X    | 0.3970               | 3-5/8              | 7                    | 114279       | 71.66    |
| Y    | 0.4040               | 3-5/8              | 7                    | 114280       | 71.66    |
| Z    | 0.4130               | 3-7/8              | 7-1/4                | 114281       | 74.88    |



## Taper Shank Drills HSS – Wire Gauge Sizes



Furnished with #1 morse taper shank, flute length and overall length are approximately the same as corresponding fractional.



| Size | Decimal Equiv. | HSS Code No. | Price \$ |
|------|----------------|--------------|----------|
| 1    | 0.2280         | 114282       | 40.29    |
| 2    | 0.2210         | 114283       | 40.29    |
| 3    | 0.2130         | 114284       | 40.29    |
| 4    | 0.2090         | 114285       | 40.29    |
| 5    | 0.2055         | 114286       | 40.29    |
| 6    | 0.2040         | 114287       | 40.29    |
| 7    | 0.2010         | 114288       | 38.46    |
| 8    | 0.1990         | 114289       | 38.46    |
| 9    | 0.1960         | 114290       | 38.46    |
| 10   | 0.1935         | 114291       | 38.46    |
| 11   | 0.1910         | 114292       | 38.46    |
| 12   | 0.1890         | 114293       | 38.46    |
| 13   | 0.1850         | 114294       | 38.46    |
| 14   | 0.1820         | 114295       | 38.46    |
| 15   | 0.1800         | 114296       | 38.46    |
| 16   | 0.1770         | 114297       | 38.46    |
| 17   | 0.1730         | 114298       | 38.46    |
| 18   | 0.1695         | 114299       | 38.46    |
| 19   | 0.1660         | 114300       | 38.46    |
| 20   | 0.1610         | 114301       | 36.09    |
| 21   | 0.1590         | 114302       | 36.09    |
| 22   | 0.1570         | 114303       | 36.09    |
| 23   | 0.1540         | 114304       | 36.09    |
| 24   | 0.1520         | 114305       | 36.09    |
| 25   | 0.1495         | 114306       | 36.09    |
| 26   | 0.1470         | 114307       | 36.09    |
| 27   | 0.1440         | 114308       | 36.09    |
| 28   | 0.1405         | 114309       | 36.09    |
| 29   | 0.1360         | 114310       | 36.09    |
| 30   | 0.1285         | 114311       | 36.09    |
| 31   | 0.1200         | 114312       | 36.09    |
| 37   | 0.1040         | 114313       | 36.09    |
| 39   | 0.0995         | 114314       | 36.09    |
| 40   | 0.0980         | 114315       | 36.09    |
| 44   | 0.0860         | 114316       | 36.09    |
| 47   | 0.0785         | 114317       | 36.09    |

## Taper Shank Drills HSS — Metric



Flute length and overall length are approximately the same as corresponding fractional.



| Size (mm) | Decimal Equiv. (in.) | Flute Length | Overall Length | Morse Taper No. | HSS Code No. | Price \$ |
|-----------|----------------------|--------------|----------------|-----------------|--------------|----------|
| 3.00      | 0.1181               | 1-7/8        | 5-1/8          | 1               | 114318       | 34.36    |
| 3.20      | 0.1260               | 1-7/8        | 5-1/8          | 1               | 114319       | 35.86    |
| 3.50      | 0.1378               | 2-1/8        | 5-3/8          | 1               | 114320       | 35.86    |
| 3.80      | 0.1496               | 2-1/8        | 5-3/8          | 1               | 114321       | 35.86    |
| 4.00      | 0.1575               | 2-1/8        | 5-3/8          | 1               | 114322       | 35.86    |
| 4.20      | 0.1654               | 2-1/2        | 5-3/4          | 1               | 114323       | 35.86    |
| 4.50      | 0.1772               | 2-1/2        | 5-3/4          | 1               | 114324       | 30.40    |
| 4.80      | 0.1890               | 2-1/2        | 5-3/4          | 1               | 114325       | 30.40    |
| 5.00      | 0.1969               | 2-3/4        | 6              | 1               | 114326       | 30.40    |
| 5.20      | 0.2047               | 2-3/4        | 6              | 1               | 114327       | 30.40    |
| 5.50      | 0.2165               | 2-3/4        | 6              | 1               | 114328       | 30.40    |
| 5.80      | 0.2283               | 2-7/8        | 6-1/8          | 1               | 114329       | 30.40    |
| 6.00      | 0.2362               | 2-7/8        | 6-1/8          | 1               | 114330       | 30.40    |
| 6.20      | 0.2441               | 2-7/8        | 6-1/8          | 1               | 114331       | 30.40    |
| 6.50      | 0.2559               | 3            | 6-1/4          | 1               | 114332       | 30.40    |
| 6.80      | 0.2677               | 3            | 6-1/4          | 1               | 114333       | 34.36    |
| 7.00      | 0.2756               | 3            | 6-1/4          | 1               | 114334       | 34.36    |
| 7.20      | 0.2835               | 3-1/8        | 6-3/8          | 1               | 114335       | 36.76    |
| 7.50      | 0.2953               | 3-1/8        | 6-3/8          | 1               | 114336       | 36.76    |
| 7.80      | 0.3071               | 3-1/8        | 6-3/8          | 1               | 114337       | 41.78    |
| 8.00      | 0.3150               | 3-1/4        | 6-1/2          | 1               | 114338       | 49.58    |
| 8.20      | 0.3228               | 3-1/4        | 6-1/2          | 1               | 114339       | 52.53    |
| 8.50      | 0.3346               | 3-1/4        | 6-1/2          | 1               | 114340       | 52.53    |
| 8.80      | 0.3465               | 3-1/2        | 6-3/4          | 1               | 114341       | 59.94    |
| 9.00      | 0.3543               | 3-1/4        | 6-1/2          | 1               | 114342       | 59.94    |
| 9.20      | 0.3622               | 3-1/4        | 6-1/2          | 1               | 114343       | 59.94    |
| 9.50      | 0.3740               | 3-1/4        | 6-1/2          | 1               | 114344       | 63.75    |
| 9.80      | 0.3858               | 3-5/8        | 7              | 1               | 114345       | 63.75    |
| 10.00     | 0.3937               | 3-5/8        | 7              | 1               | 114346       | 65.14    |
| 10.20     | 0.4016               | 3-5/8        | 7              | 1               | 114347       | 65.14    |
| 10.50     | 0.4134               | 3-7/8        | 7-1/4          | 1               | 114348       | 67.94    |
| 10.80     | 0.4252               | 3-7/8        | 7-1/4          | 1               | 114349       | 67.94    |

| Size (mm) | Decimal Equiv. (in.) | Flute Length | Overall Length | Morse Taper No. | HSS Code No. | Price \$ |
|-----------|----------------------|--------------|----------------|-----------------|--------------|----------|
| 11.00     | 0.4331               | 3-7/8        | 7-1/4          | 1               | 114350       | 67.94    |
| 11.20     | 0.4409               | 4-1/8        | 7-1/2          | 1               | 114351       | 72.52    |
| 11.50     | 0.4528               | 4-1/8        | 7-1/2          | 1               | 114352       | 72.52    |
| 11.80     | 0.4646               | 4-1/8        | 7-1/2          | 1               | 114353       | 72.52    |
| 12.00     | 0.4724               | 4-3/8        | 8-1/4          | 2               | 114354       | 72.52    |
| 12.20     | 0.4803               | 4-3/8        | 8-1/4          | 2               | 114355       | 87.18    |
| 12.50     | 0.4921               | 4-3/8        | 8-1/4          | 2               | 114356       | 87.18    |
| 12.80     | 0.5039               | 4-5/8        | 8-1/2          | 2               | 114357       | 87.18    |
| 13.00     | 0.5118               | 4-5/8        | 8-1/2          | 2               | 114358       | 87.18    |
| 13.20     | 0.5197               | 4-5/8        | 8-1/2          | 2               | 114359       | 97.72    |
| 13.50     | 0.5315               | 4-5/8        | 8-1/2          | 2               | 114360       | 97.72    |
| 13.80     | 0.5433               | 4-7/8        | 8-3/4          | 2               | 114361       | 97.72    |
| 14.00     | 0.5512               | 4-7/8        | 8-3/4          | 2               | 114362       | 97.72    |
| 14.25     | 0.5610               | 4-7/8        | 8-3/4          | 2               | 114363       | 106.11   |
| 14.50     | 0.5709               | 4-7/8        | 8-3/4          | 2               | 114364       | 106.11   |
| 14.75     | 0.5807               | 4-7/8        | 8-3/4          | 2               | 114365       | 106.11   |
| 15.00     | 0.5906               | 4-7/8        | 8-3/4          | 2               | 114366       | 106.11   |
| 15.25     | 0.6004               | 4-7/8        | 8-3/4          | 2               | 114367       | 111.12   |
| 15.50     | 0.6102               | 4-7/8        | 8-3/4          | 2               | 114368       | 111.12   |
| 15.75     | 0.6201               | 4-7/8        | 8-3/4          | 2               | 114369       | 116.04   |
| 16.00     | 0.6299               | 5-1/8        | 9              | 2               | 114370       | 116.04   |
| 16.25     | 0.6398               | 5-1/8        | 9              | 2               | 114371       | 116.04   |
| 16.50     | 0.6496               | 5-1/8        | 9              | 2               | 114372       | 119.71   |
| 16.75     | 0.6594               | 5-3/8        | 9-1/4          | 2               | 114373       | 119.71   |
| 17.00     | 0.6693               | 5-3/8        | 9-1/4          | 2               | 114374       | 119.71   |
| 17.25     | 0.6791               | 5-3/8        | 9-1/4          | 2               | 114375       | 129.76   |
| 17.50     | 0.6890               | 5-5/8        | 9-1/2          | 2               | 114376       | 130.64   |
| 18.00     | 0.7087               | 5-5/8        | 9-1/2          | 2               | 114377       | 130.64   |
| 18.50     | 0.7283               | 5-5/8        | 9-1/2          | 2               | 114378       | 139.11   |
| 19.00     | 0.7480               | 5-7/8        | 9-3/4          | 2               | 114379       | 139.11   |
| 19.50     | 0.7677               | 6            | 9-7/8          | 2               | 114380       | 174.33   |
| 20.00     | 0.7874               | 6            | 9-7/8          | 3               | 114381       | 174.33   |
| 20.50     | 0.8071               | 6-1/8        | 10-3/4         | 3               | 114382       | 188.32   |
| 21.00     | 0.8268               | 6-1/8        | 10-3/4         | 3               | 114383       | 188.32   |
| 21.50     | 0.8465               | 6-1/8        | 10-3/4         | 3               | 114384       | 202.34   |
| 22.00     | 0.8661               | 6-1/8        | 10-3/4         | 3               | 114385       | 202.34   |
| 22.50     | 0.8858               | 6-1/8        | 10-3/4         | 3               | 114386       | 209.32   |
| 23.00     | 0.9055               | 6-1/8        | 10-3/4         | 3               | 114387       | 209.32   |
| 23.50     | 0.9252               | 6-1/8        | 10-3/4         | 3               | 114388       | 215.30   |
| 24.00     | 0.9449               | 6-3/8        | 11             | 3               | 114389       | 215.30   |
| 24.50     | 0.9646               | 6-3/8        | 11             | 3               | 114390       | 215.30   |
| 25.00     | 0.9843               | 6-3/8        | 11             | 3               | 114391       | 224.70   |
| 25.50     | 1.0039               | 6-1/2        | 11-1/8         | 3               | 114392       | 236.70   |
| 26.00     | 1.0236               | 6-1/2        | 11-1/8         | 3               | 114393       | 236.70   |
| 26.50     | 1.0433               | 6-5/8        | 11-1/4         | 3               | 114394       | 287.24   |
| 27.00     | 1.0630               | 6-5/8        | 11-1/4         | 3               | 114395       | 287.24   |
| 27.50     | 1.0827               | 6-7/8        | 12-1/2         | 4               | 114396       | 297.80   |
| 28.00     | 1.1024               | 7-1/8        | 12-3/4         | 4               | 114397       | 297.80   |
| 28.50     | 1.1220               | 7-1/8        | 12-3/4         | 4               | 114398       | 320.92   |
| 29.00     | 1.1417               | 7-1/4        | 12-7/8         | 4               | 114399       | 329.31   |
| 29.50     | 1.1614               | 7-3/8        | 13             | 4               | 114400       | 336.72   |
| 30.00     | 1.1811               | 7-3/8        | 13             | 4               | 114401       | 336.72   |
| 30.50     | 1.2008               | 7-1/2        | 13-1/8         | 4               | 114402       | 366.46   |
| 31.00     | 1.2205               | 7-7/8        | 13-1/2         | 4               | 114403       | 366.46   |
| 31.50     | 1.2402               | 7-7/8        | 13-1/2         | 4               | 114404       | 420.05   |
| 32.00     | 1.2598               | 8-1/2        | 14-1/8         | 4               | 114405       | 420.05   |
| 32.50     | 1.2795               | 8-1/2        | 14-1/8         | 4               | 114406       | 474.35   |
| 33.00     | 1.2992               | 8-5/8        | 14-1/4         | 4               | 114407       | 482.01   |
| 33.50     | 1.3189               | 8-3/4        | 14-3/8         | 4               | 114408       | 495.46   |
| 34.00     | 1.3386               | 8-3/4        | 14-3/8         | 4               | 114409       | 495.46   |
| 34.50     | 1.3583               | 8-7/8        | 14-1/2         | 4               | 114410       | 534.39   |
| 35.00     | 1.3780               | 9            | 14-5/8         | 4               | 114411       | 534.39   |
| 35.50     | 1.3976               | 9            | 14-5/8         | 4               | 114412       | 564.99   |
| 36.00     | 1.4173               | 9-1/8        | 14-3/4         | 4               | 114413       | 564.99   |
| 36.50     | 1.4370               | 9-1/8        | 14-3/4         | 4               | 114414       | 603.64   |
| 37.00     | 1.4567               | 9-1/4        | 14-7/8         | 4               | 114415       | 603.64   |
| 37.50     | 1.4764               | 9-3/8        | 15             | 4               | 114416       | 626.76   |
| 38.00     | 1.4961               | 9-3/8        | 15             | 4               | 114417       | 626.76   |
| 39.00     | 1.5354               | 9-5/8        | 16-5/8         | 5               | 114418       | 786.41   |
| 40.00     | 1.5748               | 9-7/8        | 16-7/8         | 5               | 114419       | 786.41   |
| 41.00     | 1.6142               | 10           | 17             | 5               | 114420       | 786.41   |
| 42.00     | 1.6535               | 10-1/8       | 17-1/8         | 5               | 114421       | 901.62   |
| 43.00     | 1.6929               | 10-1/8       | 17-1/8         | 5               | 114422       | 901.62   |
| 44.00     | 1.7323               | 10-1/8       | 17-1/8         | 5               | 114423       | 1,054.12 |
| 45.00     | 1.7717               | 10-1/8       | 17-1/8         | 5               | 114424       | 1,054.12 |
| 46.00     | 1.8110               | 10-1/8       | 17-1/8         | 5               | 114425       | 1,206.02 |
| 47.00     | 1.8504               | 10-3/8       | 17-3/8         | 5               | 114426       | 1,145.11 |
| 48.00     | 1.8898               | 10-3/8       | 17-3/8         | 5               | 114427       | 1,176.53 |
| 49.00     | 1.9291               | 10-3/8       | 17-3/8         | 5               | 114428       | 1,176.53 |
| 50.00     | 1.9685               | 10-3/8       | 17-3/8         | 5               | 114429       | 1,176.53 |
| 51.00     | 2.0079               | 10-3/8       | 17-3/8         | 5               | 114430       | 1,373.90 |
| 57.00     | 2.2441               | 10-3/8       | 17-3/8         | 5               | 114431       | 1,738.00 |
| 59.00     | 2.3228               | 10-3/8       | 17-3/8         | 5               | 114432       | 1,866.47 |
| 65.00     | 2.5591               | 11-7/8       | 19-1/2         | 5               | 114433       | 2,644.78 |
| 66.00     | 2.5984               | 11-7/8       | 19-1/2         | 5               | 114434       | 2,768.48 |
| 69.00     | 2.7165               | 12-3/4       | 20-3/8         | 5               | 114435       | 3,325.36 |
| 70.00     | 2.7559               | 13-3/8       | 21-1/8         | 5               | 114436       | 3,513.92 |
| 72.00     | 2.8346               | 13-3/8       | 21-1/8         | 5               | 114437       | 3,650.38 |

## Taper Shank Drills HSS – Titanium Coated



| Size (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS TIN Coated Code No. | Price \$ |
|------------|--------------------|----------------------|-----------------|-------------------------|----------|
| 5/16       | 3-1/8              | 6-3/8                | 1               | 114438                  | 103.03   |
| 3/8        | 3-1/2              | 6-3/4                | 1               | 114439                  | 107.60   |
| 7/16       | 3-7/8              | 7-1/4                | 1               | 114440                  | 117.33   |
| 1/2        | 4-3/8              | 8-1/4                | 2               | 114441                  | 138.54   |
| 33/64      | 4-5/8              | 8-1/2                | 2               | 114442                  | 165.43   |
| 17/32      | 4-5/8              | 8-1/2                | 2               | 114443                  | 153.43   |
| 9/16       | 4-7/8              | 8-3/4                | 2               | 114444                  | 170.05   |
| 19/32      | 4-7/8              | 8-3/4                | 2               | 114445                  | 183.07   |
| 5/8        | 4-7/8              | 8-3/4                | 2               | 114446                  | 185.47   |
| 21/32      | 5-1/8              | 9                    | 2               | 114447                  | 206.09   |
| 11/16      | 5-3/8              | 9-1/4                | 2               | 114448                  | 212.99   |
| 23/32      | 5-5/8              | 9-1/2                | 2               | 114449                  | 206.09   |
| 3/4        | 5-7/8              | 9-3/4                | 2               | 114450                  | 250.18   |
| 25/32      | 6                  | 9-7/8                | 2               | 114451                  | 297.70   |
| 13/16      | 6-1/8              | 10-3/4               | 3               | 114452                  | 311.42   |
| 27/32      | 6-1/8              | 10-3/4               | 3               | 114453                  | 334.32   |
| 7/8        | 6-1/8              | 10-3/4               | 3               | 114454                  | 343.47   |
| 29/32      | 6-1/8              | 10-3/4               | 3               | 114455                  | 366.36   |
| 15/16      | 6-1/8              | 10-3/4               | 3               | 114456                  | 348.90   |
| 31/32      | 6-3/8              | 11                   | 3               | 114457                  | 377.83   |
| 63/64      | 6-3/8              | 11                   | 3               | 114458                  | 416.72   |
| 1          | 6-3/8              | 11                   | 3               | 114459                  | 384.72   |
| 1-1/32     | 6-1/2              | 11-1/8               | 3               | 114460                  | 423.61   |
| 1-1/16     | 6-5/8              | 11-1/4               | 3               | 114461                  | 439.66   |
| 1-3/32     | 6-7/8              | 12-1/2               | 4               | 114462                  | 522.10   |
| 1-1/8      | 7-1/8              | 12-3/4               | 4               | 114463                  | 542.69   |
| 1-5/32     | 7-1/4              | 12-7/8               | 4               | 114464                  | 572.45   |
| 1-3/16     | 7-3/8              | 13                   | 4               | 114465                  | 595.35   |
| 1-7/32     | 7-1/2              | 13-1/8               | 4               | 114466                  | 641.18   |
| 1-1/4      | 7-7/8              | 13-1/2               | 4               | 114467                  | 664.07   |
| 1-5/16     | 8-5/8              | 14-1/4               | 4               | 114468                  | 838.09   |
| 1-3/8      | 8-7/8              | 14-1/2               | 4               | 114469                  | 893.04   |
| 1-1/2      | 9-3/8              | 15                   | 4               | 114470                  | 1,030.43 |

## HSS Taper Shank Drills



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1/2        | 0.5000               | 4-3/8              | 8-1/4                | 2               | 106002       | 14.94    |
| 33/64      | 0.5156               | 4-5/8              | 8-1/2                | 2               | 106004       | 15.57    |
| 17/32      | 0.5312               | 4-5/8              | 8-1/2                | 2               | 106006       | 15.55    |
| 35/64      | 0.5469               | 4-7/8              | 8-3/4                | 2               | 106008       | 15.56    |
| 9/16       | 0.5625               | 4-7/8              | 8-3/4                | 2               | 106010       | 18.62    |
| 37/64      | 0.5781               | 4-7/8              | 8-3/4                | 2               | 106012       | 18.57    |
| 19/32      | 0.5938               | 4-7/8              | 8-3/4                | 2               | 106014       | 18.09    |
| 39/64      | 0.6094               | 4-7/8              | 8-3/4                | 2               | 106016       | 15.82    |
| 5/8        | 0.6250               | 4-7/8              | 8-3/4                | 2               | 106018       | 19.70    |
| 41/64      | 0.6406               | 5-1/8              | 9                    | 2               | 106020       | 18.57    |
| 21/32      | 0.6562               | 5-1/8              | 9                    | 2               | 106022       | 22.06    |
| 43/64      | 0.6719               | 5-3/8              | 9-1/4                | 2               | 106024       | 22.32    |
| 11/16      | 0.6875               | 5-3/8              | 9-1/4                | 2               | 106026       | 22.28    |
| 45/64      | 0.7031               | 5-5/8              | 9-1/2                | 2               | 106028       | 22.28    |
| 23/32      | 0.7188               | 5-5/8              | 9-1/2                | 2               | 106030       | 22.32    |
| 47/64      | 0.7344               | 5-7/8              | 9-3/4                | 2               | 106032       | 24.81    |
| 3/4        | 0.7500               | 5-7/8              | 9-3/4                | 2               | 106034       | 25.32    |
| 49/64      | 0.7656               | 6                  | 9-7/8                | 2               | 106036       | 29.55    |
| 25/32      | 0.7812               | 6                  | 9-7/8                | 2               | 106038       | 29.56    |
| 51/64      | 0.7969               | 6-1/8              | 10-3/4               | 3               | 106040       | 29.64    |
| 13/16      | 0.8125               | 6-1/8              | 10-3/4               | 3               | 106042       | 29.68    |
| 53/64      | 0.8281               | 6-1/8              | 10-3/4               | 3               | 106044       | 34.16    |
| 27/32      | 0.8438               | 6-1/8              | 10-3/4               | 3               | 106046       | 32.30    |
| 55/64      | 0.8594               | 6-1/8              | 10-3/4               | 3               | 106048       | 34.65    |
| 7/8        | 0.8750               | 6-1/8              | 10-3/4               | 3               | 106050       | 32.30    |
| 57/64      | 0.8906               | 6-1/8              | 10-3/4               | 3               | 106052       | 37.73    |
| 29/32      | 0.9062               | 6-1/8              | 10-3/4               | 3               | 106054       | 39.75    |
| 59/64      | 0.9219               | 6-1/8              | 10-3/4               | 3               | 106056       | 44.87    |
| 15/16      | 0.9375               | 6-1/8              | 10-3/4               | 3               | 106058       | 46.25    |
| 61/64      | 0.9531               | 6-3/8              | 11                   | 3               | 106060       | 46.24    |
| 31/32      | 0.9688               | 6-3/8              | 11                   | 3               | 106062       | 44.83    |
| 63/64      | 0.9844               | 6-3/8              | 11                   | 3               | 106064       | 44.96    |
| 1          | 1.0000               | 6-3/8              | 11                   | 3               | 106066       | 45.24    |

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1-1/64     | 1.0156               | 6-1/2              | 11-1/8               | 3               | 106067       | 53.86    |
| 1-1/32     | 1.0312               | 6-1/2              | 11-1/8               | 3               | 106068       | 60.84    |
| 1-3/64     | 1.0469               | 6-5/8              | 11-1/4               | 3               | 106069       | 58.43    |
| 1-1/16     | 1.0625               | 6-5/8              | 11-1/4               | 3               | 106070       | 59.67    |
| 1-5/64     | 1.0781               | 6-7/8              | 12-1/2               | 4               | 106071       | 60.84    |
| 1-3/32     | 1.0938               | 6-7/8              | 12-1/2               | 4               | 106072       | 56.46    |
| 1-7/64     | 1.1094               | 7-1/8              | 12-3/4               | 4               | 106073       | 60.84    |
| 1-1/8      | 1.1250               | 7-1/8              | 12-3/4               | 4               | 106074       | 70.42    |
| 1-9/64     | 1.1406               | 7-1/4              | 12-7/8               | 4               | 106075       | 69.54    |
| 1-5/32     | 1.1562               | 7-1/4              | 12-7/8               | 4               | 106076       | 77.15    |
| 1-11/64    | 1.1719               | 7-3/8              | 13                   | 4               | 106077       | 72.88    |
| 1-3/16     | 1.1875               | 7-3/8              | 13                   | 4               | 106078       | 80.70    |
| 1-13/64    | 1.2031               | 7-1/2              | 13-1/8               | 4               | 106079       | 85.88    |
| 1-7/32     | 1.2188               | 7-1/2              | 13-1/8               | 4               | 106080       | 89.74    |
| 1-15/64    | 1.2344               | 7-7/8              | 13-1/2               | 4               | 106081       | 100.32   |
| 1-1/4      | 1.2500               | 7-7/8              | 13-1/2               | 4               | 106082       | 111.29   |
| 1-17/64    | 1.2656               | 8-1/2              | 14-1/8               | 4               | 106083       | 107.80   |
| 1-9/32     | 1.2812               | 8-1/2              | 14-1/8               | 4               | 106084       | 111.31   |
| 1-19/64    | 1.2969               | 8-5/8              | 14-1/4               | 4               | 106085       | 117.29   |
| 1-5/16     | 1.3125               | 8-5/8              | 14-1/4               | 4               | 106086       | 122.14   |
| 1-21/64    | 1.3281               | 8-3/4              | 14-3/8               | 4               | 106087       | 121.64   |
| 1-11/32    | 1.3438               | 8-3/4              | 14-3/8               | 4               | 106088       | 124.83   |
| 1-23/64    | 1.3594               | 8-7/8              | 14-1/2               | 4               | 106089       | 100.55   |
| 1-3/8      | 1.3750               | 8-7/8              | 14-1/2               | 4               | 106090       | 128.69   |
| 1-25/64    | 1.3906               | 9                  | 14-5/8               | 4               | 106091       | 139.78   |
| 1-13/32    | 1.4062               | 9                  | 14-5/8               | 4               | 106092       | 147.01   |
| 1-27/64    | 1.4219               | 9-1/8              | 14-3/4               | 4               | 106093       | 146.30   |
| 1-7/16     | 1.4375               | 9-1/8              | 14-3/4               | 4               | 106094       | 150.00   |
| 1-29/64    | 1.4531               | 9-1/4              | 14-7/8               | 4               | 106095       | 155.53   |
| 1-15/32    | 1.4688               | 9-1/4              | 14-7/8               | 4               | 106096       | 159.88   |
| 1-31/64    | 1.4844               | 9-3/8              | 15                   | 4               | 106097       | 168.11   |
| 1-1/2      | 1.5000               | 9-3/8              | 15                   | 4               | 106098       | 175.94   |
| 1-33/64    | 1.5156               | 9-3/8              | 16-3/8               | 5               | 106099       | 180.82   |
| 1-17/32    | 1.5312               | 9-3/8              | 16-3/8               | 5               | 106100       | 180.82   |
| 1-35/64    | 1.5469               | 9-5/8              | 16-5/8               | 5               | 106101       | 125.49   |
| 1-9/16     | 1.5625               | 9-5/8              | 16-5/8               | 5               | 106102       | 184.76   |
| 1-37/64    | 1.5781               | 9-7/8              | 16-7/8               | 5               | 106103       | 182.43   |
| 1-19/32    | 1.5938               | 9-7/8              | 16-7/8               | 5               | 106104       | 182.43   |
| 1-39/64    | 1.6094               | 10                 | 17                   | 5               | 106105       | 182.45   |
| 1-5/8      | 1.6250               | 10                 | 17                   | 5               | 106106       | 184.65   |
| 1-41/64    | 1.6406               | 10-1/8             | 17-1/8               | 5               | 106107       | 184.67   |
| 1-21/32    | 1.6562               | 10-1/8             | 17-1/8               | 5               | 106108       | 191.39   |
| 1-43/64    | 1.6719               | 10-1/8             | 17-1/8               | 5               | 106109       | 198.75   |
| 1-11/16    | 1.6875               | 10-1/8             | 17-1/8               | 5               | 106110       | 198.77   |
| 1-45/64    | 1.7031               | 10-1/8             | 17-1/8               | 5               | 106111       | 205.82   |
| 1-23/32    | 1.7188               | 10-1/8             | 17-1/8               | 5               | 106112       | 220.29   |
| 1-47/64    | 1.7344               | 10-1/8             | 17-1/8               | 5               | 106113       | 216.65   |
| 1-3/4      | 1.7500               | 10-1/8             | 17-1/8               | 5               | 106114       | 216.71   |
| 1-25/32    | 1.7812               | 10-1/8             | 17-1/8               | 5               | 106116       | 251.21   |
| 1-13/16    | 1.8125               | 10-1/8             | 17-1/8               | 5               | 106118       | 378.66   |
| 1-27/32    | 1.8438               | 10-1/8             | 17-1/8               | 5               | 106120       | 397.03   |
| 1-7/8      | 1.8750               | 10-3/8             | 17-3/8               | 5               | 106122       | 282.26   |
| 1-29/32    | 1.9062               | 10-3/8             | 17-3/8               | 5               | 106124       | 282.23   |
| 1-15/16    | 1.9375               | 10-3/8             | 17-3/8               | 5               | 106126       | 282.26   |
| 1-31/32    | 1.9688               | 10-3/8             | 17-3/8               | 5               | 106128       | 292.36   |
| 2          | 2.0000               | 10-3/8             | 17-3/8               | 5               | 106130       | 318.51   |
| 2-1/32     | 2.0313               | 10-3/8             | 17-3/8               | 5               | 106131       | 337.70   |
| 2-1/16     | 2.0625               | 10-1/4             | 17-3/8               | 5               | 106132       | 340.54   |
| 2-3/32     | 2.0938               | 10-1/4             | 17-3/8               | 5               | 106133       | 340.53   |
| 2-1/8      | 2.1250               | 10-1/4             | 17-3/8               | 5               | 106134       | 368.46   |
| 2-5/32     | 2.1562               | 10-1/4             | 17-3/8               | 5               | 106135       | 267.93   |
| 2-3/16     | 2.1875               | 10-1/4             | 17-3/8               | 5               | 106136       | 387.79   |
| 2-7/32     | 2.2188               | 10-1/8             | 17-3/8               | 5               | 106137       | 403.23   |
| 2-1/4      | 2.2500               | 10-1/8             | 17-3/8               | 5               | 106138       | 411.11   |
| 2-5/16     | 2.3125               | 10-1/8             | 17-3/8               | 5               | 106140       | 443.52   |
| 2-3/8      | 2.3750               | 10-1/8             | 17-3/8               | 5               | 106142       | 491.48   |
| 2-7/16     | 2.4375               | 11-1/4             | 18-3/4               | 5               | 106144       | 601.84   |
| 2-1/2      | 2.5000               | 11-1/4             | 18-3/4               | 5               | 106146       | 658.76   |
| 2-9/16     | 2.5625               | 11-7/8             | 19-1/2               | 5               | 106148       | 697.80   |
| 2-5/8      | 2.6250               | 11-7/8             | 19-1/2               | 5               | 106150       | 750.88   |
| 2-11/16    | 2.6875               | 12-3/4             | 20-3/8               | 5               | 106152       | 538.42   |
| 2-3/4      | 2.7500               | 12-3/4             | 20-3/8               | 5               | 106154       | 760.82   |
| 2-13/16    | 2.8125               | 13-3/8             | 21-1/8               | 5               | 106156       | 571.55   |
| 2-7/8      | 2.8750               | 14                 | 21-3/4               | 5               | 106158       | 881.08   |
| 2-15/16    | 2.9375               | 14                 | 21-3/4               | 5               | 106160       | 870.62   |
| 3          | 3.0000               | 14                 | 21-3/4               | 5               | 106162       | 1,735.14 |
| 3-1/16     | 3.0625               | 14-5/8             | 24-1/2               | 6               | 106164       | 1,856.62 |
| 3-1/8      | 3.1250               | 14-5/8             | 24-1/2               | 6               | 106166       | 2,757.11 |
| 3-3/16     | 3.1875               | 14-5/8             | 24-1/2               | 6               | 106168       | 2,124.98 |
| 3-1/4      | 3.2500               | 15-1/2             | 25-1/2               | 6               | 106170       | 3,296.33 |
| 3-5/16     | 3.3125               | 15-1/2             | 25-1/2               | 6               | 106172       | 3,415.97 |
| 3-3/8      | 3.3750               | 15-1/2             | 25-1/2               | 6               | 106174       | 3,535.76 |
| 3-7/16     | 3.4375               | 15-1/2             | 25-1/2               | 6               | 106176       | 2,687.26 |
| 3-1/2      | 3.5000               | 16-3/8             | 26-1/2               | 6               | 106178       | 3,595.75 |
| 3-5/8      | 3.6250               | 16-3/8             | 26-1/2               | 6               | 106180       | 4,674.28 |
| 3-3/4      | 3.7500               | 16-3/8             | 26-1/2               | 6               | 106182       | 5,273.58 |
| 3-7/8      | 3.8750               | 16-3/8             | 26-1/2               | 6               | 106184       | 5,513.34 |
| 4          | 4.0000               | 17-1/2             | 27-1/2               | 6               | 106186       | 5,039.43 |

Drilling & Holemaking

## Extra Length Taper Shank Drills HSS — 8"-12" Overall Length



• Taper shank



| Size  | Decimal Equiv. | Morse Taper No. | Flute Length | 8" O.A.L. Code No. | Price \$ | Flute Length | 10" O.A.L. Code No. | Price \$ | Flute Length | 12" O.A.L. Code No. | Price \$ |
|-------|----------------|-----------------|--------------|--------------------|----------|--------------|---------------------|----------|--------------|---------------------|----------|
| 1/8   | 0.1250         | 1               | 5            | 114471             | 110.92   | -            | -                   | -        | 9            | 114512              | 158.43   |
| 9/64  | 0.1406         | 1               | 5            | 114472             | 116.33   | -            | -                   | -        | -            | -                   | -        |
| 5/32  | 0.1562         | 1               | 5            | 114473             | 116.33   | 7            | 114489              | 133.72   | -            | -                   | -        |
| 11/64 | 0.1719         | 1               | 5            | 114474             | 116.33   | 7            | 114490              | 136.46   | 9            | 114513              | 160.75   |
| 3/16  | 0.1875         | 1               | 5            | 114475             | 116.33   | -            | -                   | -        | 9            | 114514              | 160.75   |
| 13/64 | 0.2031         | 1               | 5            | 114476             | 116.33   | 7            | 114491              | 140.95   | 9            | 114515              | 164.42   |
| 7/32  | 0.2188         | 1               | 5            | 114477             | 116.33   | 7            | 114492              | 140.95   | 9            | 114516              | 164.42   |
| 15/64 | 0.2344         | 1               | 5            | 114478             | 116.33   | 7            | 114493              | 140.95   | 9            | 114517              | 164.42   |
| 1/4   | 0.2500         | 1               | 5            | 114479             | 116.33   | 7            | 114494              | 140.95   | 9            | 114518              | 164.42   |
| 17/64 | 0.2656         | 1               | 5            | 114480             | 126.00   | -            | -                   | -        | 9            | 114519              | 179.99   |
| 9/32  | 0.2812         | 1               | 5            | 114481             | 126.00   | 7            | 114495              | 153.82   | 9            | 114520              | 179.99   |
| 19/64 | 0.2969         | 1               | 5            | 114482             | 125.95   | 7            | 114496              | 154.13   | 9            | 114521              | 179.99   |
| 5/16  | 0.3125         | 1               | 5            | 114483             | 125.95   | -            | -                   | -        | 9            | 114522              | 179.99   |
| 21/64 | 0.3281         | 1               | 5            | 114484             | 141.62   | 7            | 114497              | 166.59   | 9            | 114523              | 196.01   |
| 11/32 | 0.3438         | 1               | 5            | 114485             | 141.62   | -            | -                   | -        | 9            | 114524              | 196.01   |
| 23/64 | 0.3594         | 1               | 5            | 114486             | 145.62   | 7            | 114498              | 171.25   | 9            | 114525              | 201.52   |
| 3/8   | 0.3750         | 1               | 5            | 114487             | 145.62   | 7            | 114499              | 171.25   | 9            | 114526              | 201.52   |
| 25/64 | 0.3906         | 1               | -            | -                  | -        | -            | -                   | -        | 9            | 114527              | 211.59   |
| 13/32 | 0.4062         | 1               | -            | -                  | -        | -            | -                   | -        | 9            | 114528              | 211.59   |
| 27/64 | 0.4219         | 1               | -            | -                  | -        | -            | -                   | -        | 9            | 114529              | 218.91   |
| 7/16  | 0.4375         | 1               | -            | -                  | -        | 7            | 114500              | 182.44   | 9            | 114530              | 218.91   |
| 29/64 | 0.4531         | 1               | -            | -                  | -        | 7            | 114501              | 200.31   | 9            | 114531              | 235.68   |
| 15/32 | 0.4688         | 1               | 5            | 114488             | 160.27   | 7            | 114502              | 193.07   | 9            | 114532              | 227.15   |
| 31/64 | 0.4844         | 2               | -            | -                  | -        | 6            | 114503              | 221.08   | 8            | 114533              | 260.10   |
| 1/2   | 0.5000         | 2               | -            | -                  | -        | 6            | 114504              | 213.33   | 8            | 114534              | 250.95   |
| 33/64 | 0.5156         | 2               | -            | -                  | -        | 6            | 114505              | 221.08   | 8            | 114535              | 260.10   |
| 17/32 | 0.5312         | 2               | -            | -                  | -        | 6            | 114506              | 213.33   | 8            | 114536              | 251.88   |
| 35/64 | 0.5469         | 2               | -            | -                  | -        | 6            | 114507              | 216.36   | 8            | 114537              | 263.77   |
| 9/16  | 0.5625         | 2               | -            | -                  | -        | 6            | 114508              | 216.36   | 8            | 114538              | 267.34   |
| 37/64 | 0.5781         | 2               | -            | -                  | -        | 6            | 114509              | 227.15   | 8            | 114539              | 267.34   |
| 19/32 | 0.5938         | 2               | -            | -                  | -        | 6            | 114510              | 219.15   | 8            | 114540              | 257.84   |
| 39/64 | 0.6094         | 2               | -            | -                  | -        | 6            | 114511              | 233.57   | 8            | 114541              | 285.12   |
| 5/8   | 0.6250         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114542              | 274.77   |
| 41/64 | 0.6406         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114543              | 294.04   |
| 21/32 | 0.6562         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114544              | 294.04   |
| 43/64 | 0.6719         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114545              | 320.58   |
| 11/16 | 0.6875         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114546              | 320.58   |
| 45/64 | 0.7031         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114547              | 341.64   |
| 23/32 | 0.7188         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114548              | 341.64   |
| 47/64 | 0.7344         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114549              | 355.29   |
| 3/4   | 0.7500         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114550              | 355.29   |
| 49/64 | 0.7656         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114551              | 375.18   |
| 25/32 | 0.7812         | 2               | -            | -                  | -        | -            | -                   | -        | 8            | 114552              | 375.18   |
| 51/64 | 0.7969         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114553              | 395.95   |
| 13/16 | 0.8125         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114554              | 395.95   |
| 53/64 | 0.8281         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114555              | 395.95   |
| 27/32 | 0.8438         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114556              | 395.95   |
| 55/64 | 0.8594         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114557              | 395.95   |
| 7/8   | 0.8750         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114558              | 395.95   |
| 57/64 | 0.8906         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114559              | 435.27   |
| 29/32 | 0.9062         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114560              | 435.27   |
| 59/64 | 0.9219         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114561              | 449.53   |
| 15/16 | 0.9375         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114562              | 449.53   |
| 61/64 | 0.9531         | 3               | -            | -                  | -        | -            | -                   | -        | -            | -                   | -        |
| 31/32 | 0.9688         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114563              | 470.97   |
| 63/64 | 0.9844         | 3               | -            | -                  | -        | -            | -                   | -        | -            | -                   | -        |
| 1     | 1.0000         | 3               | -            | -                  | -        | -            | -                   | -        | 7            | 114564              | 474.45   |

## Knock-Out Drill Drifts

**QUALITY IMPORT**



| M.T. Size | Overall Length (in.) | Thickness (in.) | Width At Hole | Code No. | Price \$ |
|-----------|----------------------|-----------------|---------------|----------|----------|
| 1         | 4-1/2                | 13/64           | 11/16         | 106201   | 18.78    |
| 2         | 5-1/4                | 1/4             | 13/16         | 106202   | 21.86    |
| 3         | 6                    | 5/16            | 1-1/16        | 106203   | 21.85    |
| 4         | 7                    | 15/32           | 1-1/8         | 106204   | 28.09    |

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# Extra Length Taper Shank Drills HSS — 14"-18" Overall Length



| Size    | Decimal Equiv. | Morse Taper No. | Flute Length | 14" O.A.L. HSS Code No. | Price \$ | Flute Length | 15" O.A.L. HSS Code No. | Price \$ | Flute Length | 18" O.A.L. HSS Code No. | Price \$ |
|---------|----------------|-----------------|--------------|-------------------------|----------|--------------|-------------------------|----------|--------------|-------------------------|----------|
| 3/16    | 0.1875         | 1               | -            | -                       | -        | 12           | 114588                  | 214.34   | -            | -                       | -        |
| 13/64   | 0.2031         | 1               | -            | -                       | -        | 12           | 114589                  | 214.34   | -            | -                       | -        |
| 7/32    | 0.2188         | 1               | -            | -                       | -        | 12           | 114590                  | 214.34   | -            | -                       | -        |
| 15/64   | 0.2344         | 1               | -            | -                       | -        | 12           | 114591                  | 214.34   | -            | -                       | -        |
| 1/4     | 0.2500         | 1               | -            | -                       | -        | 12           | 114592                  | 214.34   | 15           | 114651                  | 279.34   |
| 17/64   | 0.2656         | 1               | -            | -                       | -        | 12           | 114593                  | 226.24   | 15           | 114652                  | 283.92   |
| 9/32    | 0.2812         | 1               | -            | -                       | -        | 12           | 114594                  | 226.24   | 15           | 114653                  | 283.92   |
| 19/64   | 0.2969         | 1               | -            | -                       | -        | 12           | 114595                  | 238.14   | 15           | 114654                  | 291.30   |
| 5/16    | 0.3125         | 1               | -            | -                       | -        | 12           | 114596                  | 238.14   | 15           | 114655                  | 291.30   |
| 21/64   | 0.3281         | 1               | -            | -                       | -        | 12           | 114597                  | 250.05   | 15           | 114656                  | 302.27   |
| 11/32   | 0.3438         | 1               | -            | -                       | -        | 12           | 114598                  | 250.05   | 15           | 114657                  | 302.27   |
| 23/64   | 0.3594         | 1               | -            | -                       | -        | 12           | 114599                  | 278.62   | 15           | 114658                  | 316.01   |
| 3/8     | 0.3750         | 1               | -            | -                       | -        | 12           | 114600                  | 278.62   | 15           | 114659                  | 316.01   |
| 25/64   | 0.3906         | 1               | -            | -                       | -        | 12           | 114601                  | 278.62   | 15           | 114660                  | 316.01   |
| 13/32   | 0.4062         | 1               | -            | -                       | -        | 12           | 114602                  | 278.62   | 15           | 114661                  | 316.01   |
| 27/64   | 0.4219         | 1               | -            | -                       | -        | 12           | 114603                  | 278.62   | 15           | 114662                  | 316.01   |
| 7/16    | 0.4375         | 1               | -            | -                       | -        | 12           | 114604                  | 278.62   | 15           | 114663                  | 316.01   |
| 29/64   | 0.4531         | 1               | 11           | 114565                  | 255.53   | 12           | 114605                  | 285.74   | 15           | 114664                  | 316.01   |
| 15/32   | 0.4688         | 1               | 11           | 114566                  | 255.53   | -            | -                       | -        | 15           | 114665                  | 316.01   |
| 31/64   | 0.4844         | 2               | 10           | 114567                  | 259.40   | 11           | 114606                  | 289.89   | 14           | 114666                  | 316.01   |
| 1/2     | 0.5000         | 2               | 10           | 114568                  | 259.40   | 11           | 114607                  | 289.89   | 14           | 114667                  | 316.01   |
| 33/64   | 0.5156         | 2               | 10           | 114569                  | 261.94   | 11           | 114608                  | 289.89   | 14           | 114668                  | 316.01   |
| 17/32   | 0.5312         | 2               | -            | -                       | -        | 11           | 114609                  | 289.89   | 14           | 114669                  | 316.01   |
| 35/64   | 0.5469         | 2               | 10           | 114570                  | 284.89   | 11           | 114610                  | 294.04   | 14           | 114670                  | 320.58   |
| 9/16    | 0.5625         | 2               | 10           | 114571                  | 284.89   | 11           | 114611                  | 294.04   | 14           | 114671                  | 320.58   |
| 37/64   | 0.5781         | 2               | 10           | 114572                  | 284.89   | 11           | 114612                  | 298.13   | 14           | 114672                  | 324.25   |
| 19/32   | 0.5938         | 2               | -            | -                       | -        | 11           | 114613                  | 298.13   | 14           | 114673                  | 324.25   |
| 39/64   | 0.6094         | 2               | 10           | 114573                  | 300.45   | 11           | 114614                  | 318.18   | 14           | 114674                  | 347.57   |
| 5/8     | 0.6250         | 2               | 10           | 114574                  | 300.45   | 11           | 114615                  | 318.18   | 14           | 114675                  | 347.57   |
| 41/64   | 0.6406         | 2               | 10           | 114575                  | 321.94   | 11           | 114616                  | 340.73   | 14           | 114676                  | 373.25   |
| 21/32   | 0.6562         | 2               | 10           | 114576                  | 321.94   | 11           | 114617                  | 340.73   | 14           | 114677                  | 373.25   |
| 43/64   | 0.6719         | 2               | -            | -                       | -        | 11           | 114618                  | 373.35   | 14           | 114678                  | 409.15   |
| 11/16   | 0.6875         | 2               | -            | -                       | -        | 11           | 114619                  | 373.35   | 14           | 114679                  | 409.15   |
| 45/64   | 0.7031         | 2               | 10           | 114577                  | 352.62   | 11           | 114620                  | 386.08   | 14           | 114680                  | 440.29   |
| 23/32   | 0.7188         | 2               | 10           | 114578                  | 352.62   | 11           | 114621                  | 386.08   | 14           | 114681                  | 440.29   |
| 47/64   | 0.7344         | 2               | 10           | 114579                  | 382.84   | 11           | 114622                  | 413.73   | 14           | 114682                  | 454.21   |
| 3/4     | 0.7500         | 2               | 10           | 114580                  | 382.84   | 11           | 114623                  | 413.73   | 14           | 114683                  | 454.21   |
| 49/64   | 0.7656         | 2               | 10           | 114581                  | 401.20   | 11           | 114624                  | 436.42   | 14           | 114684                  | 478.69   |
| 25/32   | 0.7812         | 2               | 10           | 114582                  | 401.20   | 11           | 114625                  | 436.42   | 14           | 114685                  | 478.69   |
| 51/64   | 0.7969         | 3               | -            | -                       | -        | 10           | 114626                  | 436.42   | 13           | 114686                  | 478.69   |
| 13/16   | 0.8125         | 3               | -            | -                       | -        | 10           | 114627                  | 436.42   | 14           | 114687                  | 604.37   |
| 53/64   | 0.8281         | 3               | -            | -                       | -        | 10           | 114628                  | 436.42   | 13           | 114688                  | 630.86   |
| 27/32   | 0.8438         | 3               | 9            | 114583                  | 415.81   | 10           | 114629                  | 436.42   | 13           | 114689                  | 630.86   |
| 55/64   | 0.8594         | 3               | -            | -                       | -        | 10           | 114630                  | 436.42   | 13           | 114690                  | 653.42   |
| 7/8     | 0.8750         | 3               | 9            | 114584                  | 461.63   | 10           | 114631                  | 436.42   | 13           | 114691                  | 825.03   |
| 57/64   | 0.8906         | 3               | 9            | 114585                  | 461.63   | 10           | 114632                  | 491.41   | 13           | 114692                  | 676.30   |
| 29/32   | 0.9062         | 3               | -            | -                       | -        | 10           | 114633                  | 491.41   | 13           | 114693                  | 676.30   |
| 59/64   | 0.9219         | 3               | -            | -                       | -        | 10           | 114634                  | 491.41   | 13           | 114694                  | 687.62   |
| 15/16   | 0.9375         | 3               | -            | -                       | -        | 10           | 114635                  | 516.56   | 13           | 114695                  | 687.62   |
| 61/64   | 0.9531         | 3               | -            | -                       | -        | 10           | 114636                  | 524.18   | 13           | 114696                  | 699.00   |
| 31/32   | 0.9688         | 3               | 9            | 114586                  | 501.92   | 10           | 114637                  | 524.18   | 13           | 114697                  | 699.00   |
| 63/64   | 0.9844         | 3               | 9            | 114587                  | 501.92   | 10           | 114638                  | 530.78   | 13           | 114698                  | 738.70   |
| 1       | 1.0000         | 3               | -            | -                       | -        | 10           | 114639                  | 530.78   | 13           | 114699                  | 738.70   |
| 1-1/32  | 1.0312         | 3               | -            | -                       | -        | 10           | 114640                  | 533.33   | 13           | 114700                  | 634.57   |
| 1-3/64  | 1.0469         | 3               | -            | -                       | -        | 10           | 114641                  | 543.16   | 13           | 114701                  | 801.20   |
| 1-1/16  | 1.0625         | 3               | -            | -                       | -        | 10           | 114642                  | 533.33   | 13           | 114702                  | 801.20   |
| 1-5/64  | 1.0781         | 4               | -            | -                       | -        | 9            | 114643                  | 571.55   | 12           | 114703                  | 809.53   |
| 1-3/32  | 1.0938         | 4               | -            | -                       | -        | 10           | 114644                  | 571.55   | 12           | 114704                  | 809.53   |
| 1-1/8   | 1.1250         | 4               | -            | -                       | -        | 10           | 114645                  | 571.55   | 12           | 114705                  | 809.53   |
| 1-5/32  | 1.1562         | 4               | -            | -                       | -        | 10           | 114646                  | 582.96   | 12           | 114706                  | 900.33   |
| 1-11/64 | 1.1719         | 4               | -            | -                       | -        | 10           | 114647                  | 589.42   | 12           | 114707                  | 904.20   |
| 1-3/16  | 1.1875         | 4               | -            | -                       | -        | 10           | 114648                  | 589.42   | 12           | 114708                  | 902.05   |
| 1-7/32  | 1.2188         | 4               | -            | -                       | -        | 9            | 114649                  | 625.13   | 12           | 114709                  | 947.16   |
| 1-15/64 | 1.2344         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114710                  | 947.16   |
| 1-1/4   | 1.2500         | 4               | -            | -                       | -        | 9            | 114650                  | 625.13   | 12           | 114711                  | 947.16   |
| 1-9/32  | 1.2813         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114712                  | 1,072.06 |
| 1-5/16  | 1.3125         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114713                  | 1,072.06 |
| 1-11/32 | 1.3438         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114714                  | 1,201.01 |
| 1-23/64 | 1.3594         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114715                  | 1,201.01 |
| 1-3/8   | 1.3750         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114716                  | 1,201.01 |
| 1-13/32 | 1.4062         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114717                  | 1,237.44 |
| 1-7/16  | 1.4375         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114718                  | 1,237.44 |
| 1-15/32 | 1.4688         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114719                  | 1,341.52 |
| 1-1/2   | 1.5000         | 4               | -            | -                       | -        | -            | -                       | -        | 12           | 114720                  | 1,341.52 |
| 1-9/16  | 1.5625         | 5               | -            | -                       | -        | -            | -                       | -        | 10           | 114721                  | 1,183.37 |
| 1-5/8   | 1.6250         | 5               | -            | -                       | -        | -            | -                       | -        | 10           | 114722                  | 1,593.63 |
| 1-11/16 | 1.6875         | 5               | -            | -                       | -        | -            | -                       | -        | 10           | 114723                  | 1,700.03 |
| 1-3/4   | 1.7500         | 5               | -            | -                       | -        | -            | -                       | -        | 10           | 114724                  | 1,908.20 |
| 1-7/8   | 1.8750         | 5               | -            | -                       | -        | -            | -                       | -        | 10           | 114725                  | 2,307.19 |

Drilling & Holemaking

## Extra Length Taper Shank Drills HSS — 20"-36" Overall Length



• Taper shank



| Size    | Decimal Equiv. | Morse Taper No. | Flute Length | 20" O.A.L. Code No. | Price \$ | Flute Length | 24" O.A.L. HSS Code No. | Price \$ | Flute Length | 30" O.A.L. HSS Code No. | Price \$ | Flute Length | 36" O.A.L. HSS Code No. | Price \$ |
|---------|----------------|-----------------|--------------|---------------------|----------|--------------|-------------------------|----------|--------------|-------------------------|----------|--------------|-------------------------|----------|
| 3/8     | 0.3750         | 1               | -            | -                   | -        | 21           | 114747                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 25/64   | 0.3906         | 1               | -            | -                   | -        | 21           | 114748                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 13/32   | 0.4062         | 1               | -            | -                   | -        | 21           | 114749                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 27/64   | 0.4219         | 1               | -            | -                   | -        | 21           | 114750                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 7/16    | 0.4375         | 1               | -            | -                   | -        | 21           | 114751                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 29/64   | 0.4531         | 1               | -            | -                   | -        | 21           | 114752                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 15/32   | 0.4688         | 1               | -            | -                   | -        | 21           | 114753                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 31/64   | 0.4844         | 2               | -            | -                   | -        | 21           | 114754                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 1/2     | 0.5000         | 2               | -            | -                   | -        | 20           | 114755                  | 443.32   | -            | -                       | -        | -            | -                       | -        |
| 33/64   | 0.5156         | 2               | 16           | 114726              | 403.04   | 20           | 114756                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 17/32   | 0.5312         | 2               | -            | -                   | -        | 20           | 114757                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 35/64   | 0.5469         | 2               | -            | -                   | -        | 20           | 114758                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 9/16    | 0.5625         | 2               | -            | -                   | -        | 20           | 114759                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 37/64   | 0.5781         | 2               | -            | -                   | -        | 20           | 114760                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 19/32   | 0.5938         | 2               | -            | -                   | -        | 20           | 114761                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 39/64   | 0.6094         | 2               | -            | -                   | -        | 20           | 114762                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 5/8     | 0.6250         | 2               | -            | -                   | -        | 20           | 114763                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 41/64   | 0.6406         | 2               | -            | -                   | -        | 20           | 114764                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 21/32   | 0.6562         | 2               | 16           | 114727              | 492.77   | 20           | 114765                  | 460.62   | -            | -                       | -        | -            | -                       | -        |
| 43/64   | 0.6719         | 2               | -            | -                   | -        | 20           | 114766                  | 486.88   | -            | -                       | -        | -            | -                       | -        |
| 11/16   | 0.6875         | 2               | -            | -                   | -        | 20           | 114767                  | 486.88   | -            | -                       | -        | -            | -                       | -        |
| 45/64   | 0.7031         | 2               | -            | -                   | -        | 20           | 114768                  | 503.22   | -            | -                       | -        | -            | -                       | -        |
| 23/32   | 0.7188         | 2               | -            | -                   | -        | 20           | 114769                  | 503.22   | -            | -                       | -        | -            | -                       | -        |
| 47/64   | 0.7344         | 2               | -            | -                   | -        | 20           | 114770                  | 531.65   | -            | -                       | -        | -            | -                       | -        |
| 3/4     | 0.7500         | 2               | -            | -                   | -        | 20           | 114771                  | 531.65   | 26           | 114832                  | 730.89   | -            | -                       | -        |
| 49/64   | 0.7656         | 2               | -            | -                   | -        | 20           | 114772                  | 548.66   | -            | -                       | -        | -            | -                       | -        |
| 25/32   | 0.7812         | 2               | -            | -                   | -        | 20           | 114773                  | 548.66   | -            | -                       | -        | -            | -                       | -        |
| 51/64   | 0.7969         | 3               | -            | -                   | -        | 19           | 114774                  | 577.66   | -            | -                       | -        | -            | -                       | -        |
| 13/16   | 0.8125         | 3               | 15           | 114728              | 529.42   | 19           | 114775                  | 577.66   | 25           | 114833                  | 861.00   | -            | -                       | -        |
| 53/64   | 0.8281         | 3               | -            | -                   | -        | 19           | 114776                  | 664.87   | -            | -                       | -        | -            | -                       | -        |
| 27/32   | 0.8438         | 3               | 15           | 114729              | 547.73   | 19           | 114777                  | 664.87   | -            | -                       | -        | -            | -                       | -        |
| 55/64   | 0.8594         | 3               | -            | -                   | -        | 19           | 114778                  | 695.14   | -            | -                       | -        | -            | -                       | -        |
| 7/8     | 0.8750         | 3               | 15           | 114730              | 586.19   | 19           | 114779                  | 695.14   | 25           | 114834                  | 1,067.99 | -            | -                       | -        |
| 57/64   | 0.8906         | 3               | -            | -                   | -        | 19           | 114780                  | 695.14   | -            | -                       | -        | -            | -                       | -        |
| 29/32   | 0.9062         | 3               | 15           | 114731              | 595.35   | 19           | 114781                  | 695.14   | -            | -                       | -        | -            | -                       | -        |
| 59/64   | 0.9219         | 3               | -            | -                   | -        | 19           | 114782                  | 724.01   | -            | -                       | -        | -            | -                       | -        |
| 15/16   | 0.9375         | 3               | 15           | 114732              | 595.35   | 19           | 114783                  | 725.74   | 25           | 114835                  | 786.60   | -            | -                       | -        |
| 61/64   | 0.9531         | 3               | -            | -                   | -        | 19           | 114784                  | 797.92   | -            | -                       | -        | -            | -                       | -        |
| 31/32   | 0.9688         | 3               | 15           | 114733              | 639.34   | 19           | 114785                  | 797.92   | -            | -                       | -        | -            | -                       | -        |
| 63/64   | 0.9844         | 3               | -            | -                   | -        | 19           | 114786                  | 812.58   | -            | -                       | -        | -            | -                       | -        |
| 1       | 1.0000         | 3               | -            | -                   | -        | 19           | 114787                  | 812.58   | 25           | 114836                  | 1,176.05 | -            | -                       | -        |
| 1-1/32  | 1.0312         | 3               | -            | -                   | -        | 19           | 114788                  | 833.44   | -            | -                       | -        | -            | -                       | -        |
| 1-3/64  | 1.0469         | 3               | -            | -                   | -        | 19           | 114789                  | 833.44   | -            | -                       | -        | -            | -                       | -        |
| 1-1/16  | 1.0625         | 3               | 15           | 114734              | 694.28   | 18           | 114790                  | 833.44   | 25           | 114837                  | 1,176.05 | -            | -                       | -        |
| 1-5/64  | 1.0781         | 4               | -            | -                   | -        | 18           | 114791                  | 915.84   | -            | -                       | -        | -            | -                       | -        |
| 1-3/32  | 1.0938         | 4               | 14           | 114735              | 730.89   | 18           | 114792                  | 915.84   | -            | -                       | -        | -            | -                       | -        |
| 1-1/8   | 1.1250         | 4               | 14           | 114736              | 730.89   | 18           | 114793                  | 915.84   | 24           | 114838                  | 1,342.77 | -            | -                       | -        |
| 1-5/32  | 1.1562         | 4               | 14           | 114737              | 851.80   | 18           | 114794                  | 985.37   | -            | -                       | -        | -            | -                       | -        |
| 1-11/64 | 1.1719         | 4               | -            | -                   | -        | 18           | 114795                  | 1,022.38 | -            | -                       | -        | -            | -                       | -        |
| 1-3/16  | 1.1875         | 4               | 14           | 114738              | 851.80   | 18           | 114796                  | 1,022.38 | 24           | 114839                  | 1,463.67 | -            | -                       | -        |
| 1-7/32  | 1.2188         | 4               | 14           | 114739              | 851.80   | 18           | 114797                  | 1,034.18 | -            | -                       | -        | -            | -                       | -        |
| 1-15/64 | 1.2344         | 4               | -            | -                   | -        | 18           | 114798                  | 1,034.18 | -            | -                       | -        | -            | -                       | -        |
| 1-1/4   | 1.2500         | 4               | 14           | 114740              | 851.80   | 18           | 114799                  | 1,034.18 | 24           | 114840                  | 1,584.57 | -            | -                       | -        |
| 1-9/32  | 1.2813         | 4               | -            | -                   | -        | 18           | 114800                  | 1,171.04 | -            | -                       | -        | -            | -                       | -        |
| 1-5/16  | 1.3125         | 4               | -            | -                   | -        | 18           | 114801                  | 1,171.04 | 24           | 114841                  | 1,798.91 | -            | -                       | -        |
| 1-11/32 | 1.3438         | 4               | 14           | 114741              | 1,075.29 | -            | -                       | -        | -            | -                       | -        | -            | -                       | -        |
| 1-23/64 | 1.3594         | 4               | -            | -                   | -        | 18           | 114802                  | 1,312.92 | -            | -                       | -        | -            | -                       | -        |
| 1-3/8   | 1.3750         | 4               | 14           | 114742              | 1,075.29 | 18           | 114803                  | 1,309.76 | 24           | 114842                  | 1,958.26 | -            | -                       | -        |
| 1-13/32 | 1.4062         | 4               | 14           | 114743              | 1,144.92 | 18           | 114804                  | 1,354.14 | -            | -                       | -        | -            | -                       | -        |
| 1-7/16  | 1.4375         | 4               | 14           | 114744              | 1,144.92 | 18           | 114805                  | 1,354.14 | 24           | 114843                  | 2,015.07 | -            | -                       | -        |
| 1-15/32 | 1.4688         | 4               | -            | -                   | -        | 18           | 114806                  | 1,478.43 | -            | -                       | -        | -            | -                       | -        |
| 1-1/2   | 1.5000         | 4               | -            | -                   | -        | 18           | 114807                  | 1,474.90 | 24           | 114844                  | 2,196.40 | 29           | 114865                  | 3,375.25 |
| 1-9/16  | 1.5625         | 5               | -            | -                   | -        | 17           | 114808                  | 1,635.15 | -            | -                       | -        | -            | -                       | -        |
| 1-5/8   | 1.6250         | 5               | -            | -                   | -        | 17           | 114809                  | 1,631.21 | 23           | 114845                  | 2,452.90 | -            | -                       | -        |
| 1-11/16 | 1.6875         | 5               | -            | -                   | -        | 17           | 114810                  | 1,857.88 | -            | -                       | -        | -            | -                       | -        |
| 1-3/4   | 1.7500         | 5               | -            | -                   | -        | 17           | 114811                  | 2,077.53 | 23           | 114846                  | 2,711.19 | 29           | 114866                  | 4,165.22 |
| 1-25/32 | 1.7812         | 5               | 13           | 114745              | 1,923.47 | -            | -                       | -        | -            | -                       | -        | -            | -                       | -        |
| 1-7/8   | 1.8750         | 5               | -            | -                   | -        | 17           | 114812                  | 2,551.06 | 23           | 114847                  | 3,035.38 | -            | -                       | -        |
| 1-15/16 | 1.9375         | 5               | -            | -                   | -        | 17           | 114813                  | 779.95   | -            | -                       | -        | -            | -                       | -        |

| Size    | Decimal Equiv. | Morse Taper No. | Flute Length | 20" O.A.L. HSS Code No. | Price \$ | Flute Length | 24" O.A.L. HSS Code No. | Price \$ | Flute Length | 30" O.A.L. HSS Code No. | Price \$  | Flute Length | 36" O.A.L. HSS Code No. | Price \$  |
|---------|----------------|-----------------|--------------|-------------------------|----------|--------------|-------------------------|----------|--------------|-------------------------|-----------|--------------|-------------------------|-----------|
| 2       | 2.0000         | 5               | -            | -                       | -        | 17           | 114814                  | 3,038.70 | 23           | 114848                  | 3,453.06  | 29           | 114867                  | 5,575.74  |
| 2-1/16  | 2.0625         | 5               | -            | -                       | -        | 17           | 114815                  | 3,274.49 | 23           | 114849                  | 3,810.27  | -            | -                       | -         |
| 2-1/8   | 2.1250         | 5               | -            | -                       | -        | 17           | 114816                  | 3,274.49 | 23           | 114850                  | 3,810.27  | 29           | 114868                  | 6,510.04  |
| 2-3/16  | 2.1875         | 5               | -            | -                       | -        | 17           | 114817                  | 3,598.89 | -            | -                       | -         | -            | -                       | -         |
| 2-7/32  | 2.2188         | 5               | 13           | 114746                  | 1,807.00 | 17           | 114818                  | 3,920.19 | -            | -                       | -         | -            | -                       | -         |
| 2-1/4   | 2.2500         | 5               | -            | -                       | -        | 17           | 114819                  | 3,598.89 | 23           | 114851                  | 4,088.75  | 29           | 114869                  | 4,522.42  |
| 2-5/16  | 2.3125         | 5               | -            | -                       | -        | 17           | 114820                  | 3,923.32 | 23           | 114852                  | 4,460.59  | -            | -                       | -         |
| 2-3/8   | 2.3750         | 5               | -            | -                       | -        | 17           | 114821                  | 3,923.32 | 23           | 114853                  | 4,460.59  | 29           | 114870                  | 7,803.75  |
| 2-7/16  | 2.4375         | 5               | -            | -                       | -        | 17           | 114822                  | 4,187.29 | 23           | 114854                  | 4,761.04  | -            | -                       | -         |
| 2-1/2   | 2.5000         | 5               | -            | -                       | -        | 17           | 114823                  | 4,187.29 | 23           | 114855                  | 4,761.04  | 29           | 114871                  | 7,803.75  |
| 2-9/16  | 2.5625         | 5               | -            | -                       | -        | 17           | 114824                  | 4,451.25 | 23           | 114856                  | 2,361.15  | -            | -                       | -         |
| 2-5/8   | 2.6250         | 5               | -            | -                       | -        | 17           | 114825                  | 4,451.25 | 23           | 114857                  | 5,054.11  | 29           | 114872                  | 8,847.91  |
| 2-11/16 | 2.6875         | 5               | -            | -                       | -        | 17           | 114826                  | 4,820.02 | -            | -                       | -         | -            | -                       | -         |
| 2-3/4   | 2.7500         | 5               | -            | -                       | -        | 17           | 114827                  | 4,820.02 | 23           | 114858                  | 5,475.46  | 29           | 114873                  | 10,320.26 |
| 2-13/16 | 2.8125         | 5               | -            | -                       | -        | 17           | 114828                  | 5,188.76 | -            | -                       | -         | -            | -                       | -         |
| 2-7/8   | 2.8750         | 5               | -            | -                       | -        | 17           | 114829                  | 5,188.76 | 23           | 114859                  | 5,786.89  | -            | -                       | -         |
| 2-15/16 | 2.9375         | 5               | -            | -                       | -        | 17           | 114830                  | 5,928.27 | -            | -                       | -         | -            | -                       | -         |
| 3       | 3.0000         | 5               | -            | -                       | -        | 17           | 114831                  | 5,928.27 | 23           | 114860                  | 6,741.28  | 29           | 114874                  | 12,605.56 |
| 3-1/8   | 3.1250         | 5               | -            | -                       | -        | -            | -                       | -        | 23           | 114861                  | 7,657.22  | 29           | 114875                  | 12,605.56 |
| 3-1/4   | 3.2500         | 5               | -            | -                       | -        | -            | -                       | -        | 23           | 114862                  | 6,804.16  | 29           | 114876                  | 10,733.60 |
| 3-3/8   | 3.3750         | 5               | -            | -                       | -        | -            | -                       | -        | 23           | 114863                  | 12,394.41 | 29           | 114877                  | 15,694.91 |
| 3-1/2   | 3.5000         | 5               | -            | -                       | -        | -            | -                       | -        | 23           | 114864                  | 15,827.32 | 29           | 114878                  | 18,848.21 |

## Oil Hole Drills HSS — Straight Shank

These drills are designed with oil holes the length of the land section of the drill to deliver a high pressure oil flow to the cutting edges. The resulting coolant flow flushes chips out of the hole to reduce heat and chip packing problems common to deep hole drilling applications. Surface speeds may be increased 30% or more over standard drill styles.



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|--------------|----------|
| 15/64      | 0.2344               | 3-3/8              | 5-3/4                | 114879       | 768.67   |
| 15/64      | 0.2344               | 5-1/8              | 7-1/2                | 114880       | 374.11   |
| 1/4        | 0.2500               | 3-3/4              | 6-1/8                | 114881       | 770.53   |
| 9/32       | 0.2812               | 4                  | 6-3/8                | 114882       | 768.67   |
| 19/64      | 0.2969               | 4                  | 6-3/8                | 114883       | 768.67   |
| 5/16       | 0.3125               | 4                  | 6-3/8                | 114884       | 768.67   |
| 21/64      | 0.3281               | 4-1/8              | 6-1/2                | 114885       | 768.67   |
| 11/32      | 0.3438               | 4-1/8              | 6-1/2                | 114886       | 768.67   |
| 23/64      | 0.3594               | 4-1/4              | 6-3/4                | 114887       | 768.67   |
| 3/8        | 0.3750               | 4-1/4              | 6-3/4                | 114888       | 765.11   |
| 25/64      | 0.3906               | 4-3/8              | 7                    | 114889       | 779.43   |
| 13/32      | 0.4062               | 4-3/8              | 7                    | 114890       | 779.43   |
| 27/64      | 0.4219               | 4-5/8              | 7-1/4                | 114891       | 807.90   |
| 7/16       | 0.4375               | 4-5/8              | 7-1/4                | 114892       | 807.90   |
| 29/64      | 0.4531               | 4-7/8              | 7-1/2                | 114893       | 824.91   |
| 15/32      | 0.4688               | 4-7/8              | 7-1/2                | 114894       | 824.91   |
| 31/64      | 0.4844               | 5                  | 7-3/4                | 114895       | 835.41   |
| 1/2        | 0.5000               | 5                  | 7-3/4                | 114896       | 835.41   |
| 33/64      | 0.5156               | 5-1/4              | 8                    | 114897       | 849.72   |
| 17/32      | 0.5312               | 5-1/4              | 8                    | 114898       | 847.70   |
| 35/64      | 0.5469               | 5-3/8              | 8-1/4                | 114899       | 867.60   |
| 9/16       | 0.5625               | 5-3/8              | 8-1/4                | 114900       | 867.60   |
| 37/64      | 0.5781               | 5-5/8              | 8-1/2                | 114901       | 877.29   |
| 19/32      | 0.5938               | 5-5/8              | 8-1/2                | 114902       | 877.29   |
| 39/64      | 0.6094               | 5-3/4              | 8-3/4                | 114903       | 919.75   |
| 5/8        | 0.6250               | 5-3/4              | 8-3/4                | 114904       | 919.75   |
| 41/64      | 0.6406               | 5-7/8              | 9                    | 114905       | 919.75   |
| 21/32      | 0.6562               | 5-7/8              | 9                    | 114906       | 919.75   |
| 43/64      | 0.6719               | 6                  | 9-1/4                | 114907       | 940.56   |
| 11/16      | 0.6875               | 6                  | 9-1/4                | 114908       | 940.56   |
| 45/64      | 0.7031               | 6-3/16             | 9-1/2                | 114909       | 967.37   |
| 23/32      | 0.7188               | 6-3/16             | 9-1/2                | 114910       | 965.04   |
| 47/64      | 0.7344               | 6-3/8              | 9-3/4                | 114911       | 1,031.83 |
| 3/4        | 0.7500               | 6-3/8              | 9-3/4                | 114912       | 1,031.83 |
| 49/64      | 0.7656               | 6-1/2              | 9-7/8                | 114913       | 1,049.55 |
| 25/32      | 0.7812               | 6-1/2              | 9-7/8                | 114914       | 1,049.55 |
| 51/64      | 0.7969               | 6-5/8              | 10                   | 114915       | 1,074.13 |
| 13/16      | 0.8125               | 6-5/8              | 10                   | 114916       | 1,074.13 |
| 53/64      | 0.8281               | 6-3/4              | 10-1/4               | 114917       | 1,095.37 |
| 27/32      | 0.8438               | 6-3/8              | 10-1/4               | 114918       | 1,095.37 |
| 55/64      | 0.8594               | 7                  | 10-1/2               | 114919       | 1,185.83 |
| 7/8        | 0.8750               | 7                  | 10-1/2               | 114920       | 1,185.83 |
| 57/64      | 0.8906               | 7                  | 10-5/8               | 114921       | 1,270.49 |

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|--------------|----------|
| 29/32      | 0.9062               | 7                  | 10-5/8               | 114922       | 1,270.49 |
| 59/64      | 0.9219               | 7                  | 10-3/4               | 114923       | 1,358.34 |
| 15/16      | 0.9375               | 7                  | 10-3/4               | 114924       | 1,358.34 |
| 61/64      | 0.9531               | 7-1/8              | 10-7/8               | 114925       | 1,424.69 |
| 31/32      | 0.9688               | 7-1/8              | 10-7/8               | 114926       | 1,424.69 |
| 63/64      | 0.9844               | 7-3/16             | 11                   | 114927       | 1,495.38 |
| 1          | 1.0000               | 7-3/16             | 11                   | 114928       | 1,495.38 |
| 1-1/64     | 1.0156               | 7-5/16             | 11-1/8               | 114929       | 1,579.08 |
| 1-1/32     | 1.0312               | 7-5/16             | 11-1/8               | 114930       | 1,579.08 |
| 1-3/64     | 1.0469               | 7-3/8              | 11-1/4               | 114931       | 1,642.98 |
| 1-1/16     | 1.0625               | 7-3/8              | 11-1/4               | 114932       | 1,642.98 |
| 1-5/64     | 1.0781               | 7-5/8              | 11-1/2               | 114933       | 1,709.33 |
| 1-3/32     | 1.0938               | 7-5/8              | 11-1/2               | 114934       | 1,709.33 |
| 1-7/64     | 1.1094               | 7-7/8              | 11-3/4               | 114935       | 1,796.70 |
| 1-1/8      | 1.1250               | 7-7/8              | 11-3/4               | 114936       | 1,796.70 |
| 1-9/64     | 1.1406               | 8                  | 11-7/8               | 114937       | 1,884.82 |
| 1-5/32     | 1.1562               | 8                  | 11-7/8               | 114938       | 1,884.82 |
| 1-11/64    | 1.1719               | 8-1/8              | 12                   | 114939       | 1,972.63 |
| 1-3/16     | 1.1875               | 8-1/8              | 12                   | 114940       | 1,972.63 |
| 1-13/64    | 1.2031               | 8-1/8              | 12-1/8               | 114941       | 2,060.08 |
| 1-7/32     | 1.2188               | 8-1/8              | 12-1/8               | 114942       | 2,060.08 |
| 1-15/64    | 1.2344               | 8-1/2              | 12-1/2               | 114943       | 2,144.55 |
| 1-1/4      | 1.2500               | 8-1/2              | 12-1/2               | 114944       | 2,144.55 |
| 1-17/64    | 1.2656               | 9-1/4              | 14-1/8               | 114945       | 2,282.60 |
| 1-9/32     | 1.2812               | 9-1/4              | 14-1/8               | 114946       | 2,282.60 |
| 1-19/64    | 1.2969               | 9-1/4              | 14-1/4               | 114947       | 2,379.51 |
| 1-5/16     | 1.3125               | 9-1/4              | 14-1/4               | 114948       | 2,379.51 |
| 1-21/64    | 1.3281               | 9-1/2              | 14-3/8               | 114949       | 2,532.79 |
| 1-11/32    | 1.3438               | 9-1/2              | 14-3/8               | 114950       | 2,532.79 |
| 1-23/64    | 1.3594               | 9-1/2              | 14-1/2               | 114951       | 2,671.23 |
| 1-3/8      | 1.3750               | 9-1/2              | 14-1/2               | 114952       | 2,671.23 |
| 1-13/32    | 1.4062               | 9-1/2              | 14-5/8               | 114953       | 2,990.32 |
| 1-7/16     | 1.4375               | 9-1/8              | 14-3/4               | 114954       | 2,990.32 |
| 1-15/32    | 1.4688               | 9-1/8              | 14-7/8               | 114955       | 3,235.59 |
| 1-1/2      | 1.5000               | 9-5/8              | 15                   | 114956       | 3,235.59 |
| 1-9/16     | 1.5625               | 9-5/8              | 15-1/4               | 114957       | 3,586.78 |
| 1-5/8      | 1.6250               | 9-7/8              | 15-5/8               | 114958       | 3,882.03 |
| 1-11/16    | 1.6875               | 10                 | 15-3/4               | 114959       | 4,409.81 |
| 1-3/4      | 1.7500               | 10-1/2             | 16-1/4               | 114960       | 4,658.41 |
| 1-13/16    | 1.8125               | 10-1/2             | 16-1/4               | 114961       | 4,696.47 |
| 1-7/8      | 1.8750               | 10-3/4             | 16-1/2               | 114962       | 5,164.75 |
| 1-15/16    | 1.9375               | 10-3/4             | 16-5/8               | 114963       | 5,546.83 |
| 2          | 2.0000               | 10-3/4             | 16-5/8               | 114964       | 5,825.44 |

## Coolant Inducer Socket

For use with taper shank oil hole drills.



| Morse Taper Hole and Shank Size | Overall Length | Code No. | Price \$ |
|---------------------------------|----------------|----------|----------|
| 2                               | 6-7/8          | 114965   | 545.76   |
| 3                               | 8-1/2          | 114966   | 667.15   |
| 4                               | 10-1/2         | 114967   | 1,483.53 |
| 5                               | 13-3/4         | 114968   | 2,856.14 |

## Oil Hole Drills HSS — Taper Shank

Oil Hole Drills feature coolant passages throughout the length of the body. These allow a coolant (air, oil or vapour mist) to reach the cutting edges. The resulting flow cools and lubricates the cutting edges and also aids in the extraction of chips.

- Standard length



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 3/8        | 0.3750               | 3-1/2              | 7-5/8                | 2               | 114969       | 1,229.72 |
| 25/64      | 0.3906               | 3-5/8              | 8                    | 2               | 114970       | 1,229.72 |
| 13/32      | 0.4062               | 3-5/8              | 8                    | 2               | 114971       | 1,229.72 |
| 27/64      | 0.4219               | 3-7/8              | 8-1/8                | 2               | 114972       | 1,229.72 |
| 7/16       | 0.4375               | 3-7/8              | 8-3/8                | 2               | 114973       | 1,229.72 |
| 29/64      | 0.4531               | 4-1/8              | 8-3/4                | 2               | 114974       | 1,229.72 |
| 15/32      | 0.4688               | 4-1/8              | 8-3/4                | 3               | 114975       | 1,152.63 |
| 31/64      | 0.4844               | 4-3/8              | 9                    | 3               | 114976       | 1,152.63 |
| 1/2        | 0.5000               | 4-3/8              | 9                    | 3               | 114977       | 1,155.37 |
| 33/64      | 0.5156               | 4-5/8              | 9-1/4                | 3               | 114978       | 1,152.63 |
| 17/32      | 0.5312               | 4-5/8              | 9-1/4                | 3               | 114979       | 1,152.63 |
| 35/64      | 0.5469               | 4-7/8              | 9-1/2                | 3               | 114980       | 1,152.63 |
| 9/16       | 0.5625               | 4-7/8              | 9-1/2                | 3               | 114981       | 1,031.39 |
| 37/64      | 0.5781               | 4-7/8              | 9-1/2                | 3               | 114982       | 1,152.63 |
| 19/32      | 0.5938               | 4-7/8              | 9-1/2                | 3               | 114983       | 1,031.39 |
| 39/64      | 0.6094               | 4-7/8              | 9-1/2                | 3               | 114984       | 1,031.39 |
| 5/8        | 0.6250               | 4-7/8              | 9-1/2                | 3               | 114985       | 1,031.39 |
| 41/64      | 0.6406               | 5-1/8              | 9-3/4                | 3               | 114986       | 1,031.39 |
| 21/32      | 0.6562               | 5-1/8              | 9-3/4                | 3               | 114987       | 1,033.07 |
| 43/64      | 0.6719               | 5-3/8              | 10                   | 3               | 114988       | 1,047.49 |
| 11/16      | 0.6875               | 5-3/8              | 10                   | 3               | 114989       | 1,047.49 |
| 45/64      | 0.7031               | 5-5/8              | 10-1/4               | 3               | 114990       | 1,061.89 |
| 23/32      | 0.7188               | 5-5/8              | 10-1/4               | 3               | 114991       | 1,061.89 |
| 47/64      | 0.7344               | 5-7/8              | 10-1/2               | 3               | 114992       | 1,061.89 |
| 3/4        | 0.7500               | 5-7/8              | 10-1/2               | 3               | 114993       | 1,061.89 |
| 49/64      | 0.7656               | 6                  | 10-5/8               | 3               | 114994       | 1,072.31 |
| 25/32      | 0.7812               | 6                  | 10-5/8               | 3               | 114995       | 1,072.31 |
| 51/64      | 0.7969               | 6-1/8              | 10-3/4               | 3               | 114996       | 1,072.31 |
| 13/16      | 0.8125               | 6-1/8              | 10-3/4               | 3               | 114997       | 1,072.31 |
| 53/64      | 0.8281               | 6-1/8              | 10-3/4               | 3               | 114998       | 1,166.90 |
| 27/32      | 0.8438               | 6-1/8              | 10-3/4               | 3               | 114999       | 1,166.90 |
| 55/64      | 0.8594               | 6-1/8              | 10-3/4               | 3               | 115800       | 1,166.90 |
| 7/8        | 0.8750               | 6-1/8              | 10-3/4               | 3               | 115801       | 1,166.90 |
| 57/64      | 0.8906               | 6-1/8              | 10-3/4               | 3               | 115802       | 1,170.41 |
| 29/32      | 0.9062               | 6-1/8              | 10-3/4               | 3               | 115803       | 1,170.41 |
| 59/64      | 0.9219               | 6-1/8              | 10-3/4               | 3               | 115804       | 1,170.41 |
| 15/16      | 0.9375               | 6-1/8              | 10-3/4               | 3               | 115805       | 1,170.41 |
| 61/64      | 0.9531               | 6-3/8              | 11                   | 3               | 115806       | 1,380.02 |
| 31/32      | 0.9688               | 6-3/8              | 11                   | 3               | 115807       | 1,380.02 |
| 63/64      | 0.9844               | 6-3/8              | 11                   | 3               | 115808       | 1,380.02 |
| 1          | 1.0000               | 6-3/8              | 11                   | 3               | 115809       | 1,380.02 |
| 1-1/64     | 1.0156               | 6-1/2              | 11-1/8               | 3               | 115810       | 1,494.94 |
| 1-1/32     | 1.0312               | 6-1/2              | 11-1/8               | 3               | 115811       | 1,494.94 |
| 1-3/64     | 1.0469               | 6-5/8              | 11-1/4               | 3               | 115812       | 1,494.94 |
| 1-1/16     | 1.0625               | 6-5/8              | 11-1/4               | 3               | 115813       | 1,494.94 |
| 1-5/64     | 1.0781               | 6-7/8              | 12-1/2               | 4               | 115814       | 1,765.90 |

| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|-----------------|--------------|----------|
| 1-3/32     | 1.0938               | 6-7/8              | 12-1/2               | 4               | 115815       | 1,765.90 |
| 1-7/64     | 1.1094               | 7-1/8              | 12-3/4               | 4               | 115816       | 1,931.47 |
| 1-1/8      | 1.1250               | 7-1/8              | 12-3/4               | 4               | 115817       | 1,931.47 |
| 1-9/64     | 1.1406               | 7-1/4              | 12-7/8               | 4               | 115818       | 1,931.47 |
| 1-5/32     | 1.1562               | 7-1/4              | 12-7/8               | 4               | 115819       | 1,931.47 |
| 1-11/64    | 1.1719               | 7-3/8              | 13                   | 4               | 115820       | 1,943.38 |
| 1-3/16     | 1.1875               | 7-3/8              | 13                   | 4               | 115821       | 1,943.38 |
| 1-13/64    | 1.2031               | 7-1/2              | 13-1/8               | 4               | 115822       | 2,211.44 |
| 1-7/32     | 1.2188               | 7-1/2              | 13-1/8               | 4               | 115823       | 2,211.44 |
| 1-15/64    | 1.2344               | 7-7/8              | 13-1/2               | 4               | 115824       | 2,211.44 |
| 1-1/4      | 1.2500               | 7-7/8              | 13-1/2               | 4               | 115825       | 2,211.44 |
| 1-17/64    | 1.2656               | 8-1/2              | 14-1/8               | 4               | 115826       | 2,688.15 |
| 1-9/32     | 1.2812               | 8-1/2              | 14-1/8               | 4               | 115827       | 2,688.15 |
| 1-19/64    | 1.2969               | 8-5/8              | 14-1/4               | 4               | 115828       | 2,892.17 |
| 1-5/16     | 1.3125               | 8-5/8              | 14-1/4               | 4               | 115829       | 2,892.17 |
| 1-21/64    | 1.3281               | 8-3/4              | 14-3/8               | 4               | 115830       | 2,892.17 |
| 1-11/32    | 1.3438               | 8-3/4              | 14-3/8               | 4               | 115831       | 2,892.17 |
| 1-23/64    | 1.3594               | 8-7/8              | 14-1/2               | 4               | 115832       | 3,201.38 |
| 1-3/8      | 1.3750               | 8-7/8              | 14-1/2               | 4               | 115833       | 3,201.38 |
| 1-13/32    | 1.4062               | 9                  | 14-5/8               | 4               | 115834       | 3,201.38 |
| 1-7/16     | 1.4375               | 9-1/8              | 14-3/4               | 4               | 115835       | 3,201.38 |
| 1-15/32    | 1.4688               | 9-1/4              | 14-7/8               | 4               | 115836       | 3,341.85 |
| 1-1/2      | 1.5000               | 9-3/8              | 15                   | 4               | 115837       | 3,341.85 |
| 1-9/16     | 1.5625               | 9-5/8              | 15-1/4               | 4               | 115838       | 3,500.77 |
| 1-5/8      | 1.6250               | 10                 | 15-5/8               | 4               | 115839       | 3,765.02 |
| 1-11/16    | 1.6875               | 10-1/8             | 15-3/4               | 4               | 115840       | 4,425.62 |
| 1-3/4      | 1.7500               | 10-1/8             | 16                   | 4               | 115841       | 4,557.70 |
| 1-13/16    | 1.8125               | 10-1/8             | 17-1/8               | 5               | 115842       | 4,755.74 |
| 1-7/8      | 1.8750               | 10-3/8             | 17-3/8               | 5               | 115843       | 5,020.10 |
| 1-15/16    | 1.9375               | 10-3/8             | 17-3/8               | 5               | 115844       | 5,317.27 |
| 2          | 2.0000               | 10-3/8             | 17-3/8               | 5               | 115845       | 5,449.39 |

## Extra Length Oil Hole Drills

\* Shank larger than standard



| Size (in.) | Decimal Equiv. | Morse Taper No. | 10-1/2" OAL HSS 6" Fl. Code No. | Price \$ | 12-1/2" OAL HSS 8" Fl. Code No. | Price \$ | 14-1/2" OAL HSS 10" Fl. Code No. | Price \$ |
|------------|----------------|-----------------|---------------------------------|----------|---------------------------------|----------|----------------------------------|----------|
| 31/64      | 0.4844         | 3               | 115846                          | 1,265.14 | -                               | -        | -                                | -        |
| 1/2        | 0.5000         | 3               | 115847                          | 1,265.14 | 115850                          | 1,375.35 | 115870                           | 1,636.38 |
| 33/64      | 0.5156         | 3               | 115848                          | 1,265.14 | 115851                          | 1,375.35 | 115871                           | 1,636.38 |
| 17/32      | 0.5312         | 3               | 115849                          | 1,265.14 | 115852                          | 1,375.35 | 115872                           | 1,636.38 |
| 9/16       | 0.5625         | 3               | -                               | -        | 115853                          | 1,375.35 | 115873                           | 1,636.38 |
| 19/32      | 0.5938         | 3               | -                               | -        | 115854                          | 1,375.35 | 115874                           | 1,636.38 |
| 5/8        | 0.6250         | 3               | -                               | -        | 115855                          | 1,375.35 | 115875                           | 1,636.38 |
| 41/64      | 0.6406         | 3               | -                               | -        | 115856                          | 1,375.35 | 115876                           | 1,636.38 |
| 21/32      | 0.6562         | 3               | -                               | -        | 115857                          | 1,375.35 | 115877                           | 1,636.38 |
| 11/16      | 0.6875         | 3               | -                               | -        | 115858                          | 1,375.35 | 115878                           | 1,636.38 |
| 23/32      | 0.7188         | 3               | -                               | -        | 115859                          | 1,375.35 | 115879                           | 1,636.38 |
| 47/64      | 0.7344         | 3               | -                               | -        | 115860                          | 1,375.35 | 115880                           | 1,636.38 |
| 3/4        | 0.7500         | 3               | -                               | -        | 115861                          | 1,375.35 | 115881                           | 1,636.38 |
| 49/64      | 0.7656         | 3               | -                               | -        | 115862                          | 1,443.91 | 115882                           | 1,700.85 |
| 25/32      | 0.7812         | 3               | -                               | -        | 115863                          | 1,444.21 | 115883                           | 1,698.15 |
| 13/16      | 0.8125         | 3               | -                               | -        | 115864                          | 1,444.21 | 115884                           | 1,698.15 |
| 27/32      | 0.8438         | 3               | -                               | -        | 115865                          | 1,480.98 | 115885                           | 1,746.77 |
| 7/8        | 0.8750         | 3               | -                               | -        | 115866                          | 1,499.92 | 115886                           | 1,746.77 |
| 29/32      | 0.9062         | 3               | -                               | -        | 115867                          | 1,499.92 | 115887                           | 1,779.35 |
| 15/16      | 0.9375         | 3               | -                               | -        | 115868                          | 1,499.92 | 115888                           | 1,779.35 |
| 31/32      | 0.9688         | 3               | -                               | -        | 115869                          | 1,579.61 | 115889                           | 1,846.66 |
| 63/64      | 0.9844         | 3               | -                               | -        | 115890                          | 1,717.18 | 115893                           | 1,999.66 |
| 1          | 1.0000         | 3               | -                               | -        | 115891                          | 1,717.18 | 115894                           | 1,999.66 |
| 1-1/32     | 1.0312         | 3               | -                               | -        | 115892                          | 1,779.78 | 115895                           | 2,067.60 |
| 1-1/16     | 1.0625         | 3               | -                               | -        | -                               | -        | -                                | 2,067.60 |
| 1-1/8*     | 1.1250         | 4               | -                               | -        | -                               | -        | -                                | 2,593.37 |
| 1-3/16*    | 1.1875         | 4               | -                               | -        | -                               | -        | -                                | 2,781.97 |
| 1-1/4*     | 1.2500         | 4               | -                               | -        | -                               | -        | -                                | 3,085.44 |

## Taper Shank Core Drills HSS

- Used to open out existing pre-drilled holes
- 4-flute



| Size (in.) | Morse Taper No. | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------------|-----------------|--------------------|----------------------|--------------|----------|
| 13/32      | 1               | 3-5/8              | 7                    | 106500       | 128.29   |
| 7/16       | 1               | 3-7/8              | 7-1/4                | 106501       | 134.67   |
| 15/32      | 1               | 4-1/8              | 7-1/4                | 106502       | 64.08    |
| 31/64      | 2               | 4-3/8              | 8-1/4                | 106503       | 93.28    |
| 1/2        | 2               | 4-3/8              | 8-1/4                | 106504       | 162.43   |
| 33/64      | 2               | 4-5/8              | 8-1/2                | 106505       | 103.43   |
| 17/32      | 2               | 4-5/8              | 8-1/2                | 106506       | 180.01   |
| 9/16       | 2               | 4-7/8              | 8-3/4                | 106507       | 196.59   |
| 19/32      | 2               | 4-7/8              | 8-3/4                | 106508       | 177.47   |
| 39/64      | 2               | 4-7/8              | 8-3/4                | 106509       | 143.59   |
| 5/8        | 2               | 4-7/8              | 8-3/4                | 106510       | 214.15   |
| 41/64      | 2               | 5-1/8              | 9                    | 106511       | 136.14   |
| 21/32      | 2               | 5-1/8              | 9                    | 106512       | 236.83   |
| 11/16      | 2               | 5-3/8              | 9-1/2                | 106513       | 254.27   |
| 45/64      | 2               | 5-5/8              | 9-1/2                | 106514       | 227.05   |
| 23/32      | 2               | 5-5/8              | 9-1/2                | 106515       | 277.94   |
| 47/64      | 2               | 5-5/8              | 9-1/2                | 106516       | 169.69   |
| 3/4        | 2               | 5-7/8              | 9-3/4                | 106517       | 295.22   |
| 49/64      | 2               | 6                  | 9-7/8                | 106518       | 257.89   |
| 25/32      | 2               | 6                  | 9-7/8                | 106519       | 306.11   |
| 51/64      | 3               | 6-1/8              | 10-3/4               | 106520       | 272.50   |
| 13/16      | 3               | 6-1/8              | 10-3/4               | 106521       | 351.89   |
| 27/32      | 3               | 6-1/8              | 10-3/4               | 106522       | 273.75   |
| 55/64      | 3               | 6-1/8              | 10-3/4               | 106523       | 287.09   |
| 7/8        | 3               | 6-1/8              | 10-3/4               | 106524       | 422.39   |
| 29/32      | 3               | 6-1/8              | 10-3/4               | 106525       | 193.96   |
| 59/64      | 3               | 6-1/8              | 10-3/4               | 106526       | 246.12   |
| 15/16      | 3               | 6-1/8              | 10-3/4               | 106527       | 428.02   |
| 61/64      | 3               | 6-3/8              | 11                   | 106528       | 224.32   |
| 31/32      | 3               | 6-3/8              | 11                   | 106529       | 468.26   |
| 63/64      | 3               | 6-3/8              | 11                   | 106530       | 497.17   |
| 1          | 3               | 6-3/8              | 11                   | 106532       | 521.53   |
| 1-1/32     | 3               | 6-1/2              | 11-1/8               | 106533       | 365.34   |
| 1-3/64     | 3               | 6-5/8              | 11-1/4               | 106534       | 447.66   |
| 1-1/16     | 3               | 6-5/8              | 11-1/4               | 106535       | 405.59   |
| 1-5/64     | 4               | 6-7/8              | 12-1/2               | 106536       | 482.16   |
| 1-3/32     | 4               | 6-7/8              | 12-1/2               | 106537       | 612.53   |
| 1-1/8      | 4               | 7-1/8              | 12-3/4               | 106538       | 705.59   |
| 1-5/32     | 4               | 7-1/4              | 12-7/8               | 106539       | 692.58   |
| 1-11/64    | 4               | 7-3/8              | 13                   | 106540       | 418.29   |
| 1-3/16     | 4               | 7-3/8              | 13                   | 106541       | 727.30   |
| 1-13/64    | 4               | 7-1/2              | 13-1/8               | 106542       | 631.94   |
| 1-7/32     | 4               | 7-1/2              | 13-1/8               | 106543       | 767.84   |
| 1-15/64    | 4               | 7-1/8              | 13-1/2               | 106544       | 685.13   |
| 1-1/4      | 4               | 7-1/8              | 13-1/2               | 106545       | 842.36   |
| 1-17/64    | 4               | 8-1/2              | 14-1/8               | 106546       | 615.39   |
| 1-9/32     | 4               | 8-1/2              | 14-1/8               | 106547       | 963.98   |
| 1-5/16     | 4               | 8-5/8              | 14-1/4               | 106548       | 625.27   |
| 1-11/32    | 4               | 8-3/4              | 14-3/8               | 106549       | 500.37   |
| 1-3/8      | 4               | 8-7/8              | 14-1/2               | 106550       | 683.49   |
| 1-13/32    | 4               | 9                  | 14-5/8               | 106551       | 518.52   |
| 1-7/16     | 4               | 9-1/8              | 14-3/4               | 106552       | 1,188.74 |
| 1-15/32    | 4               | 9-1/4              | 14-7/8               | 106553       | 771.76   |
| 1-1/2      | 4               | 9-3/8              | 15                   | 106554       | 1,292.75 |
| 1-17/32    | 5               | 9-3/8              | 16-3/8               | 106555       | 1,441.82 |
| 1-35/64    | 5               | 9-5/8              | 16-5/8               | 106556       | 694.33   |
| 1-9/16     | 5               | 9-5/8              | 16-5/8               | 106557       | 1,522.61 |
| 1-37/64    | 5               | 9-7/8              | 16-7/8               | 106558       | 731.24   |
| 1-19/32    | 5               | 9-7/8              | 16-7/8               | 106559       | 1,604.39 |
| 1-39/64    | 5               | 10                 | 17                   | 106560       | 955.85   |
| 1-5/8      | 5               | 10                 | 17                   | 106561       | 1,661.07 |
| 1-21/32    | 5               | 10-1/8             | 17-1/8               | 106562       | 1,724.41 |
| 1-11/16    | 5               | 10-1/8             | 17-1/8               | 106563       | 1,787.89 |
| 1-23/32    | 5               | 10-1/8             | 17-1/8               | 106564       | 1,846.30 |
| 1-3/4      | 5               | 10-1/8             | 17-1/8               | 106565       | 1,903.25 |
| 1-25/32    | 5               | 10-1/8             | 17-1/8               | 106566       | 1,971.98 |
| 1-13/16    | 5               | 10-1/8             | 17-1/8               | 106567       | 971.97   |
| 1-27/32    | 5               | 10-1/8             | 17-1/8               | 106568       | 2,088.48 |

| Size (in.) | Morse Taper No. | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------------|-----------------|--------------------|----------------------|--------------|----------|
| 1-7/8      | 5               | 10-3/8             | 17-3/8               | 106569       | 2,204.00 |
| 1-29/32    | 5               | 10-3/8             | 17-3/8               | 106570       | 2,283.61 |
| 1-15/16    | 5               | 10-3/8             | 17-3/8               | 106571       | 2,353.79 |
| 1-31/32    | 5               | 10-3/8             | 17-3/8               | 106572       | 2,428.33 |
| 2          | 5               | 10-3/8             | 17-3/8               | 106573       | 2,497.48 |
| 2-1/32     | 5               | 10-3/8             | 17-3/8               | 106574       | 2,566.19 |
| 2-1/16     | 5               | 10-1/4             | 17-3/8               | 106575       | 2,642.18 |
| 2-1/8      | 5               | 10-1/4             | 17-3/8               | 106576       | 2,779.76 |
| 2-3/16     | 5               | 10-1/4             | 17-3/8               | 106577       | 2,912.41 |
| 2-1/4      | 5               | 10-1/8             | 17-3/8               | 106578       | 3,056.53 |
| 2-5/16     | 5               | 10-1/8             | 17-3/8               | 106579       | 2,575.05 |
| 2-3/8      | 5               | 10-1/8             | 17-3/8               | 106580       | 2,575.05 |
| 2-7/16     | 5               | 11-1/4             | 18-3/4               | 106581       | 4,123.08 |
| 2-1/2      | 5               | 11-1/4             | 18-3/4               | 106582       | 4,265.76 |
| 2-9/16     | 5               | 11-7/8             | 19-1/2               | 106583       | 3,764.30 |
| 2-5/8      | 5               | 11-7/8             | 18-3/4               | 106584       | 4,957.04 |
| 2-11/16    | 5               | 12-3/4             | 20-3/8               | 106585       | 5,475.27 |
| 2-3/4      | 5               | 12-3/4             | 20-3/8               | 106586       | 5,763.81 |
| 2-13/16    | 5               | 13-3/8             | 21-1/8               | 106587       | 6,282.92 |
| 2-7/8      | 5               | 13-3/8             | 21-1/8               | 106588       | 6,628.11 |
| 2-15/16    | 5               | 14                 | 21-3/4               | 106589       | 3,365.84 |
| 3          | 5               | 14                 | 21-3/4               | 106590       | 3,586.41 |

## Carbide Tipped Drills



Designed for drilling abrasive and non-ferrous materials such as castings, hard rubber, and copper alloys. **They are NOT recommended for drilling steel or other ferrous materials.**



- High speed steel bodies

## Fractional Sizes



| Size (in.) | Decimal Equiv. | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------|----------------|--------------------|----------------------|----------|----------|
| 1/8        | 0.1250         | 1-5/8              | 2-3/4                | 115900   | 35.42    |
| 9/64       | 0.1406         | 1-3/4              | 2-7/8                | 115901   | 37.49    |
| 5/32       | 0.1562         | 2                  | 3-1/8                | 115902   | 37.49    |
| 11/64      | 0.1719         | 2-1/8              | 3-1/4                | 115903   | 40.04    |
| 3/16       | 0.1875         | 2-5/16             | 3-1/2                | 115904   | 60.38    |
| 13/64      | 0.2031         | 2-7/16             | 3-5/8                | 115905   | 43.66    |
| 7/32       | 0.2188         | 2-1/2              | 3-3/4                | 115906   | 43.66    |
| 15/64      | 0.2344         | 2-5/8              | 3-7/8                | 115907   | 48.09    |
| 1/4        | 0.2500         | 2-3/4              | 4                    | 115908   | 47.12    |
| 17/64      | 0.2656         | 2-7/8              | 4-1/8                | 115909   | 56.62    |
| 9/32       | 0.2812         | 2-15/16            | 4-1/4                | 115910   | 55.56    |
| 19/64      | 0.2969         | 3-1/16             | 4-3/8                | 115911   | 61.20    |
| 5/16       | 0.3125         | 3-3/16             | 4-1/2                | 115912   | 60.08    |
| 21/64      | 0.3281         | 3-5/16             | 4-5/8                | 115913   | 65.01    |
| 11/32      | 0.3438         | 3-7/16             | 4-3/4                | 115914   | 63.79    |
| 23/64      | 0.3594         | 3-1/2              | 4-7/8                | 115915   | 69.15    |
| 3/8        | 0.3750         | 3-5/8              | 5                    | 115916   | 67.80    |
| 25/64      | 0.3906         | 3-3/4              | 5-1/8                | 115917   | 75.22    |
| 13/32      | 0.4062         | 3-7/8              | 5-1/4                | 115918   | 73.92    |
| 27/64      | 0.4219         | 3-15/16            | 5-3/8                | 115919   | 81.58    |
| 7/16       | 0.4375         | 4-1/16             | 5-1/2                | 115920   | 80.09    |
| 29/64      | 0.4531         | 4-3/16             | 5-5/8                | 115921   | 91.70    |
| 15/32      | 0.4688         | 4-5/16             | 5-3/4                | 115922   | 90.07    |
| 31/64      | 0.4844         | 4-3/8              | 5-7/8                | 115923   | 102.64   |
| 1/2        | 0.5000         | 4-1/2              | 6                    | 115924   | 100.71   |
| 33/64      | 0.5156         | 4-13/16            | 6-5/8                | 115925   | 154.58   |
| 17/32      | 0.5312         | 4-13/16            | 6-5/8                | 115926   | 154.58   |
| 35/64      | 0.5469         | 4-13/16            | 6-5/8                | 115927   | 156.27   |
| 9/16       | 0.5625         | 4-13/16            | 6-5/8                | 115928   | 156.27   |
| 37/64      | 0.5781         | 4-13/16            | 6-5/8                | 115929   | 172.41   |
| 19/32      | 0.5938         | 5-3/16             | 7-1/8                | 115930   | 167.35   |
| 39/64      | 0.6094         | 5-3/16             | 7-1/8                | 115931   | 197.96   |
| 5/8        | 0.6250         | 5-3/16             | 7-1/8                | 115932   | 189.51   |
| 41/64      | 0.6406         | 5-3/16             | 7-1/8                | 115933   | 218.72   |
| 21/32      | 0.6562         | 5-3/16             | 7-1/8                | 115934   | 192.65   |
| 43/64      | 0.6719         | 5-5/8              | 7-5/8                | 115935   | 251.00   |
| 11/16      | 0.6875         | 5-5/8              | 7-5/8                | 115936   | 196.51   |



## Carbide Tipped Drills — Cont'd



### Letter Sizes

| Size | Decimal Equiv. | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|----------------|--------------------|----------------------|----------|----------|
| A    | 0.2340         | 2-5/8              | 3-7/8                | 115937   | 51.32    |
| B    | 0.2380         | 2-3/4              | 4                    | 115938   | 51.32    |
| C    | 0.2420         | 2-3/4              | 4                    | 115939   | 51.32    |
| D    | 0.2460         | 2-3/4              | 4                    | 115940   | 51.32    |
| E    | 0.2500         | 2-3/4              | 4                    | 115941   | 49.01    |
| F    | 0.2570         | 2-7/8              | 4-1/8                | 115942   | 58.07    |
| G    | 0.2610         | 2-7/8              | 4-1/8                | 115943   | 58.92    |
| H    | 0.2660         | 2-7/8              | 4-1/8                | 115944   | 58.92    |
| I    | 0.2720         | 2-7/8              | 4-1/8                | 115945   | 58.92    |
| J    | 0.2770         | 2-7/8              | 4-1/8                | 115946   | 58.24    |
| K    | 0.2810         | 2-15/16            | 4-1/4                | 115947   | 58.12    |
| L    | 0.2900         | 2-15/16            | 4-1/4                | 115948   | 58.12    |
| M    | 0.2950         | 3-1/16             | 4-3/8                | 115949   | 61.39    |
| N    | 0.3020         | 3-1/16             | 4-3/8                | 115950   | 61.39    |
| O    | 0.3160         | 3-3/16             | 4-1/2                | 115951   | 61.39    |
| P    | 0.3230         | 3-5/16             | 4-5/8                | 115952   | 65.40    |
| Q    | 0.3320         | 3-7/16             | 4-3/4                | 115953   | 65.40    |
| R    | 0.3390         | 3-7/16             | 4-3/4                | 115954   | 67.99    |
| S    | 0.3480         | 3-1/2              | 4-7/8                | 115955   | 69.38    |
| T    | 0.3580         | 3-1/2              | 4-7/8                | 115956   | 69.38    |
| U    | 0.3680         | 3-5/8              | 5                    | 115957   | 69.38    |
| V    | 0.3770         | 3-5/8              | 5                    | 115958   | 70.83    |
| W    | 0.3860         | 3-3/4              | 5-1/8                | 115959   | 77.24    |
| X    | 0.3970         | 3-3/4              | 5-1/8                | 115960   | 77.24    |
| Y    | 0.4040         | 3-7/8              | 5-1/4                | 115961   | 77.24    |
| Z    | 0.4130         | 3-7/8              | 5-1/4                | 115962   | 88.95    |

### Wire Gauge Sizes

| Size | Decimal Equiv. | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|----------------|--------------------|----------------------|----------|----------|
| 1    | 0.2280         | 2-5/8              | 3-7/8                | 115963   | 44.67    |
| 2    | 0.2210         | 2-5/8              | 3-7/8                | 115964   | 44.67    |
| 3    | 0.2130         | 2-1/2              | 3-3/4                | 115965   | 42.36    |
| 4    | 0.2090         | 2-1/2              | 3-3/4                | 115966   | 42.36    |
| 5    | 0.2055         | 2-1/2              | 3-3/4                | 115967   | 42.36    |
| 6    | 0.2040         | 2-1/2              | 3-3/4                | 115968   | 42.36    |
| 7    | 0.2010         | 2-7/16             | 3-5/8                | 115969   | 42.36    |
| 8    | 0.1990         | 2-7/16             | 3-5/8                | 115970   | 42.36    |
| 9    | 0.1960         | 2-7/16             | 3-5/8                | 115971   | 42.36    |
| 10   | 0.1935         | 2-7/16             | 3-5/8                | 115972   | 42.36    |
| 11   | 0.1910         | 2-5/16             | 3-1/2                | 115973   | 42.36    |
| 12   | 0.1890         | 2-5/16             | 3-1/2                | 115974   | 42.36    |
| 13   | 0.1850         | 2-5/16             | 3-1/2                | 115975   | 40.04    |
| 14   | 0.1820         | 2-3/16             | 3-3/8                | 115976   | 40.04    |
| 15   | 0.1800         | 2-3/16             | 3-3/8                | 115977   | 40.04    |
| 16   | 0.1770         | 2-3/16             | 3-3/8                | 115978   | 40.04    |
| 17   | 0.1730         | 2-3/16             | 3-3/8                | 115979   | 40.04    |
| 18   | 0.1695         | 2-1/8              | 3-1/4                | 115980   | 40.04    |
| 19   | 0.1660         | 2-1/8              | 3-1/4                | 115981   | 40.04    |
| 20   | 0.1610         | 2-1/8              | 3-1/4                | 115982   | 40.04    |
| 21   | 0.1590         | 2-1/8              | 3-1/4                | 115983   | 40.04    |
| 22   | 0.1570         | 2                  | 3-1/8                | 115984   | 40.04    |
| 23   | 0.1540         | 2                  | 3-1/8                | 115985   | 37.87    |
| 24   | 0.1520         | 2                  | 3-1/8                | 115986   | 37.87    |
| 25   | 0.1495         | 1-7/8              | 3                    | 115987   | 37.87    |
| 26   | 0.1470         | 1-7/8              | 3                    | 115988   | 37.87    |
| 27   | 0.1440         | 1-7/8              | 3                    | 115989   | 37.87    |
| 28   | 0.1405         | 1-3/4              | 2-7/8                | 115990   | 37.15    |
| 29   | 0.1360         | 1-3/4              | 2-7/8                | 115991   | 36.04    |
| 30   | 0.1285         | 1-5/8              | 2-3/4                | 115992   | 36.04    |
| 31   | 0.1200         | 1-5/8              | 2-3/4                | 115993   | 36.04    |
| 32   | 0.1160         | 1-5/8              | 2-3/4                | 115994   | 36.04    |

## Carbide Tipped Drills — Taper Length



- High Speed Steel bodies



| Size   | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------|--------------------|----------------------|----------|----------|
| 1/8    | 2-3/4              | 5-1/8                | 115995   | 66.40    |
| 9/64   | 3                  | 5-3/8                | 115996   | 66.40    |
| 5/32   | 3                  | 5-3/8                | 115997   | 69.97    |
| 11/64  | 3-3/8              | 5-3/4                | 115998   | 71.17    |
| 3/16   | 3-3/8              | 5-3/4                | 115999   | 71.17    |
| 5 mm   | 3-1/2              | 6-1/4                | 116000   | 75.65    |
| 13/64  | 3-5/8              | 6                    | 116001   | 75.26    |
| 7/32   | 3-5/8              | 6                    | 116002   | 75.26    |
| 15/64  | 3-3/4              | 6-1/8                | 116003   | 86.59    |
| "C"    | 3-1/2              | 6-1/4                | 116004   | 87.07    |
| 6.3 mm | 3-1/2              | 6-1/4                | 116005   | 95.51    |
| 1/4    | 3-3/4              | 6-1/8                | 116006   | 85.00    |
| "F"    | 3-1/2              | 6-1/4                | 116007   | 89.34    |
| 17/64  | 3-7/8              | 6-1/4                | 116008   | 97.15    |
| 9/32   | 3-7/8              | 6-1/4                | 116009   | 95.36    |
| 19/64  | 4                  | 6-3/8                | 116010   | 104.85   |
| 5/16   | 4                  | 6-3/8                | 116011   | 102.93   |
| "O"    | 3-1/2              | 6-1/4                | 116012   | 131.75   |
| 21/64  | 4-1/8              | 6-1/2                | 116013   | 115.46   |
| 11/32  | 4-1/8              | 6-1/2                | 116014   | 113.38   |
| 23/64  | 4-1/4              | 6-3/4                | 116015   | 126.68   |
| 9.4 mm | 4                  | 7                    | 116016   | 124.57   |
| 3/8    | 4-1/4              | 6-3/4                | 116017   | 124.37   |
| 25/64  | 4-3/8              | 7                    | 116018   | 139.49   |
| 13/32  | 4-3/8              | 7                    | 116019   | 137.00   |
| 27/64  | 4-5/8              | 7-1/4                | 116020   | 160.61   |
| 7/16   | 4-5/8              | 7-1/4                | 116021   | 157.67   |
| 29/64  | 4-3/4              | 7-1/2                | 116022   | 170.57   |
| 15/32  | 4-3/4              | 7-1/2                | 116023   | 167.45   |
| 12 mm  | 5-1/2              | 7-1/4                | 116024   | 183.26   |
| 31/64  | 4-3/4              | 7-3/4                | 116025   | 185.81   |
| 1/2    | 4-3/4              | 7-3/4                | 116026   | 182.44   |
| 33/64  | 4-3/4              | 8                    | 116027   | 239.39   |
| 17/32  | 4-3/4              | 8                    | 116028   | 236.17   |
| 35/64  | 4-7/8              | 8-1/4                | 116029   | 247.34   |
| 9/16   | 4-7/8              | 8-1/4                | 116030   | 238.48   |
| 37/64  | 4-7/8              | 8-1/4                | 116031   | 261.03   |
| 19/32  | 4-7/8              | 8-1/4                | 116032   | 256.46   |
| 39/64  | 4-7/8              | 8-3/4                | 116033   | 301.38   |
| 5/8    | 4-7/8              | 8-3/4                | 116034   | 289.99   |
| 41/64  | 5-1/8              | 8-3/4                | 116035   | 311.96   |
| 21/32  | 5-1/8              | 9                    | 116036   | 300.78   |
| 43/64  | 5-3/8              | 9                    | 116037   | 317.30   |
| 11/16  | 5-3/8              | 9-1/4                | 116038   | 305.99   |
| 45/64  | 5-5/8              | 9-1/4                | 116039   | 320.83   |
| 23/32  | 5-5/8              | 9-1/2                | 116040   | 312.64   |
| 47/64  | 5-7/8              | 9-1/2                | 116041   | 326.13   |
| 3/4    | 5-7/8              | 9-3/4                | 116042   | 319.53   |
| 49/64  | 6                  | 9-3/4                | 116043   | 359.32   |
| 25/32  | 6                  | 9-7/8                | 116044   | 345.87   |
| 51/64  | 6-1/8              | 9-7/8                | 116045   | 360.88   |
| 13/16  | 6-1/8              | 10                   | 116046   | 347.57   |
| 53/64  | 6-1/8              | 10                   | 116047   | 360.88   |
| 27/32  | 6-1/8              | 10                   | 116048   | 347.57   |
| 55/64  | 6-1/8              | 10                   | 116049   | 381.12   |
| 7/8    | 6-1/8              | 10                   | 116050   | 383.81   |
| 57/64  | 6-1/8              | 10                   | 116051   | 397.49   |
| 29/32  | 6-1/8              | 10                   | 116052   | 443.17   |
| 59/64  | 6-1/8              | 10-3/4               | 116053   | 397.19   |
| 15/16  | 6-1/8              | 10-3/4               | 116054   | 404.09   |
| 61/64  | 6-3/8              | 11                   | 116055   | 417.00   |
| 31/32  | 6-3/8              | 11                   | 116056   | 471.03   |
| 63/64  | 6-3/8              | 11                   | 116057   | 427.46   |
| 1      | 6-3/8              | 11                   | 116058   | 436.04   |

## Carbide Tipped Drills — Taper Shank

- High Speed Steel bodies



| Size (in.) | Flute Length (in.) | Overall Length (in.) | Morse Taper No. | Code No. | Price \$ |
|------------|--------------------|----------------------|-----------------|----------|----------|
| 1/4        | 2-7/8              | 6-1/8                | 1               | 116059   | 137.33   |
| 17/64      | 3                  | 6-1/4                | 1               | 116060   | 142.77   |
| 9/32       | 3                  | 6-1/4                | 1               | 116061   | 140.17   |
| 19/64      | 3-1/8              | 6-3/8                | 1               | 116062   | 142.77   |
| 5/16       | 3-1/8              | 6-3/8                | 1               | 116063   | 140.17   |
| 21/64      | 3-1/4              | 6-1/2                | 1               | 116064   | 181.42   |
| 11/32      | 3-1/4              | 6-1/2                | 1               | 116065   | 178.15   |
| 23/64      | 3-1/2              | 6-3/4                | 1               | 116066   | 181.42   |
| 3/8        | 3-1/2              | 6-3/4                | 1               | 116067   | 178.15   |
| 25/64      | 3-5/8              | 7                    | 1               | 116068   | 210.57   |
| 13/32      | 3-5/8              | 7                    | 1               | 116069   | 206.72   |
| 27/64      | 3-7/8              | 7-1/4                | 1               | 116070   | 210.57   |
| 7/16       | 3-7/8              | 7-1/4                | 1               | 116071   | 206.72   |
| 29/64      | 4-1/8              | 7-1/2                | 1               | 116072   | 254.62   |
| 15/32      | 4-1/8              | 7-1/2                | 1               | 116073   | 250.00   |
| 31/64      | 4-3/8              | 8-1/4                | 2               | 116074   | 254.62   |
| 1/2        | 4-3/8              | 8-1/4                | 2               | 116075   | 262.48   |
| 33/64      | 4-5/8              | 8-1/2                | 2               | 116076   | 285.03   |
| 17/32      | 4-5/8              | 8-1/2                | 2               | 116077   | 274.86   |
| 35/64      | 4-7/8              | 8-3/4                | 2               | 116078   | 288.92   |
| 9/16       | 4-7/8              | 8-3/4                | 2               | 116079   | 278.62   |
| 37/64      | 4-7/8              | 8-3/4                | 2               | 116080   | 302.37   |
| 19/32      | 4-7/8              | 8-3/4                | 2               | 116081   | 291.63   |
| 39/64      | 4-7/8              | 8-3/4                | 2               | 116082   | 344.15   |
| 5/8        | 4-7/8              | 8-3/4                | 2               | 116083   | 331.82   |
| 41/64      | 5-1/8              | 9                    | 2               | 116084   | 364.87   |
| 21/32      | 5-1/8              | 9                    | 2               | 116085   | 351.81   |
| 43/64      | 5-3/8              | 9-1/4                | 2               | 116086   | 353.50   |
| 11/16      | 5-3/8              | 9-1/4                | 2               | 116087   | 340.87   |
| 45/64      | 5-5/8              | 9-1/2                | 2               | 116088   | 363.04   |
| 23/32      | 5-5/8              | 9-1/2                | 2               | 116089   | 350.12   |
| 47/64      | 5-7/8              | 9-3/4                | 2               | 116090   | 370.56   |
| 3/4        | 5-7/8              | 9-3/4                | 2               | 116091   | 357.35   |
| 49/64      | 6                  | 9-7/8                | 2               | 116092   | 387.23   |
| 25/32      | 6-1/8              | 9-7/8                | 2               | 116093   | 391.08   |
| 51/64      | 6-1/8              | 10-3/4               | 3               | 116094   | 399.95   |
| 13/16      | 6-1/8              | 10-3/4               | 3               | 116095   | 424.33   |
| 53/64      | 6-1/8              | 10-3/4               | 3               | 116096   | 456.62   |
| 27/32      | 6-1/8              | 10-3/4               | 3               | 116097   | 454.54   |
| 55/64      | 6-1/8              | 10-3/4               | 3               | 116098   | 430.40   |
| 7/8        | 6-1/8              | 10-3/4               | 3               | 116099   | 430.40   |
| 57/64      | 6-1/8              | 10-3/4               | 3               | 116100   | 441.63   |
| 29/32      | 6-1/8              | 10-3/4               | 3               | 116101   | 441.63   |
| 59/64      | 6-1/8              | 10-3/4               | 3               | 116102   | 461.05   |
| 15/16      | 6-1/8              | 10-3/4               | 3               | 116103   | 461.05   |
| 61/64      | 6-3/8              | 11                   | 3               | 116104   | 494.78   |
| 31/32      | 6-3/8              | 11                   | 3               | 116105   | 487.74   |
| 63/64      | 6-3/8              | 11                   | 3               | 116106   | 494.78   |
| 1          | 6-3/8              | 11                   | 3               | 116107   | 479.88   |
| 1-1/32     | 6-1/2              | 11-1/8               | 3               | 116108   | 593.28   |
| 1-1/16     | 6-5/8              | 11-1/4               | 4               | 116109   | 601.09   |
| 1-3/32     | 6-7/8              | 12-1/2               | 4               | 116110   | 650.52   |
| 1-1/8      | 7-1/8              | 12-3/4               | 4               | 116111   | 666.67   |
| 1-5/32     | 7-1/4              | 12-7/8               | 4               | 116112   | 754.60   |
| 1-3/16     | 7-3/8              | 13                   | 4               | 116113   | 762.41   |
| 1-7/32     | 7-1/2              | 13-1/8               | 4               | 116114   | 806.65   |
| 1-1/4      | 7-7/8              | 13-1/2               | 4               | 116115   | 817.05   |

## Die Drills — Carbide Tipped

Negative angle cutting edge for extra strength and for drilling hardened steel.

\* Solid carbide



| Size  | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------|--------------------|----------------------|----------|----------|
| 1/16* | -                  | 1-1/2                | 116116   | 44.48    |
| 5/64* | -                  | 1-1/2                | 116117   | 44.48    |
| 3/32* | -                  | 2                    | 116118   | 50.35    |
| 7/64* | -                  | 2                    | 116119   | 50.35    |
| 1/8*  | -                  | 2                    | 116120   | 50.35    |
| 9/64* | -                  | 2                    | 116121   | 53.78    |
| 5/32* | -                  | 2                    | 116122   | 62.07    |
| 11/64 | 1-1/2              | 3-1/2                | 116123   | 93.63    |
| 3/16  | 1-1/2              | 3-1/2                | 116124   | 93.63    |
| 13/64 | 1-3/4              | 3-3/4                | 116125   | 96.57    |
| 7/32  | 1-3/4              | 3-3/4                | 116126   | 96.57    |
| 15/64 | 2                  | 4                    | 116127   | 100.04   |
| 1/4   | 2                  | 4                    | 116128   | 100.04   |
| 17/64 | 2-1/4              | 4-1/4                | 116129   | 105.67   |
| 9/32  | 2-1/4              | 4-1/4                | 116130   | 105.67   |
| 19/64 | 2-1/2              | 4-1/2                | 116131   | 110.49   |
| 5/16  | 2-1/2              | 4-1/2                | 116132   | 110.49   |
| 21/64 | 2-3/4              | 4-3/4                | 116133   | 119.07   |
| 11/32 | 2-3/4              | 4-3/4                | 116134   | 119.07   |
| 23/64 | 3                  | 5                    | 116135   | 126.78   |
| 3/8   | 3                  | 5                    | 116136   | 126.78   |
| 25/64 | 3                  | 5-1/4                | 116137   | 147.84   |
| 13/32 | 3                  | 5-1/4                | 116138   | 147.89   |
| 27/64 | 3                  | 5-1/2                | 116139   | 171.79   |
| 7/16  | 3                  | 5-1/2                | 116140   | 171.79   |
| 29/64 | 3-1/4              | 5-3/4                | 116141   | 188.84   |
| 15/32 | 3-1/4              | 5-3/4                | 116142   | 188.84   |
| 31/64 | 3-1/2              | 6                    | 116143   | 221.37   |
| 1/2   | 3-1/2              | 6                    | 116144   | 221.37   |
| 17/32 | 3-1/2              | 6                    | 116145   | 267.29   |
| 9/16  | 3-1/2              | 6                    | 116146   | 267.29   |
| 19/32 | 4                  | 7                    | 116147   | 291.67   |
| 5/8   | 4                  | 7                    | 116148   | 291.67   |
| 21/32 | 4-1/2              | 7-1/2                | 116149   | 307.24   |
| 11/16 | 4-1/2              | 7-1/2                | 116150   | 315.86   |
| 23/32 | 4-3/4              | 8                    | 116151   | 337.20   |
| 3/4   | 4-3/4              | 8                    | 116152   | 340.14   |
| 13/16 | 4-3/4              | 8                    | 116153   | 585.46   |
| 7/8   | 4-3/4              | 8                    | 116154   | 608.89   |
| 15/16 | 4-3/4              | 8                    | 116155   | 674.47   |
| 1     | 4-3/4              | 8                    | 116156   | 700.19   |

## RC65 Straight Flute Drills — Carbide Tipped



For drilling and centre drilling heat treated high speed steel up to 65HRC. The special point design provides a free cutting action that minimizes heat and produces a smooth finish.



| Size (in.) | Flute Length (in.) | Overall Length (in.) | Approx. RPM | Code No. | Price \$ |
|------------|--------------------|----------------------|-------------|----------|----------|
| 1/8        | 1/2                | 3                    | 2000        | 116157   | 151.83   |
| 5/32       | 1/2                | 3                    | 1800        | 116158   | 164.07   |
| 3/16       | 3/4                | 3-1/4                | 1600        | 116159   | 142.53   |
| 7/32       | 1-1/4              | 3-1/4                | 1400        | 116160   | 145.08   |
| 1/4        | 1-1/2              | 3-1/2                | 1200        | 116161   | 151.83   |
| 5/16       | 1-3/4              | 3-3/4                | 1000        | 116162   | 159.93   |
| 3/8        | 2                  | 4                    | 800         | 116163   | 172.36   |
| 7/16       | 2-1/4              | 4-1/2                | 800         | 116164   | 230.67   |
| 1/2        | 2-1/2              | 5                    | 700         | 116165   | 278.96   |
| 5/8        | 2-1/2              | 5                    | 700         | 116166   | 350.22   |

## Carbide Tipped Stub Drills

- Carbide tipped



| Size | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|--------------------|----------------------|----------|----------|
| 1/8  | 7/8                | 1-7/8                | 116167   | 57.39    |
| 9/64 | 15/16              | 1-15/16              | 116168   | 62.07    |
| 5/32 | 1                  | 2-1/16               | 116169   | 65.01    |
| 3/16 | 1-1/8              | 2-3/16               | 116170   | 69.67    |
| 7/32 | 1-1/4              | 2-3/8                | 116171   | 70.16    |
| 1/4  | 1-3/8              | 2-1/2                | 116172   | 74.93    |
| 9/32 | 1-1/2              | 2-11/16              | 116173   | 90.16    |
| 5/16 | 1-5/8              | 2-13/16              | 116174   | 99.56    |
| 3/8  | 3-1/8              | 3-1/8                | 116175   | 110.68   |
| 7/16 | 3-7/16             | 3-7/16               | 116176   | 129.96   |
| 1/2  | 2-1/4              | 3-3/4                | 116177   | 163.83   |

## Carbide Tipped Masonry Drills

- Straight shank
- Rotary



### 4" O.A.L.

| Size (in.)     | Shank Size (in.) | Code No. | Price \$ |
|----------------|------------------|----------|----------|
| 1/8 (3" OAL)   | 1/8              | 116178   | 8.58     |
| 5/32 (3" OAL)  | 5/32             | 116179   | 9.01     |
| 11/64 (3" OAL) | 11/64            | 116180   | 9.01     |
| 3/16           | 3/16             | 116181   | 9.21     |
| 7/32           | 7/32             | 116182   | 9.44     |
| 1/4            | 1/4              | 116183   | 9.64     |
| 9/32           | 1/4              | 116184   | 9.88     |
| 5/16           | 1/4              | 116185   | 10.03    |
| 3/8            | 1/4              | 116186   | 10.85    |
| 1/2            | 1/4              | 116187   | 12.53    |

### 6" O.A.L.

| Size (in.) | Shank Size (in.) | Code No. | Price \$ |
|------------|------------------|----------|----------|
| 1/8        | 1/8              | 116188   | 9.01     |
| 3/16       | 3/16             | 116189   | 9.25     |
| 1/4        | 1/4              | 116190   | 9.64     |
| 9/32       | 1/4              | 116191   | 10.75    |
| 5/16       | 1/4              | 116192   | 11.18    |
| 3/8        | 1/4              | 116193   | 11.03    |
| 7/16       | 1/4              | 116194   | 12.29    |
| 7/16       | 3/8              | 116195   | 12.29    |
| 1/2        | 1/4              | 116196   | 13.31    |
| 1/2        | 3/8              | 116197   | 13.31    |
| 9/16       | 3/8              | 116198   | 18.45    |
| 9/16       | 1/2              | 116199   | 18.45    |
| 5/8        | 1/2              | 116200   | 32.53    |
| 11/16      | 1/2              | 116201   | 35.52    |
| 3/4        | 1/2              | 116202   | 25.35    |
| 7/8        | 1/2              | 116203   | 32.24    |
| 1          | 1/2              | 116204   | 39.50    |
| 1-1/8      | 1/2              | 116205   | 56.66    |
| 1-1/4      | 1/2              | 116206   | 73.87    |
| 1-3/8      | 1/2              | 116207   | 99.60    |
| 1-1/2      | 1/2              | 116208   | 102.21   |

### 12" O.A.L.

| Size (in.) | Shank Size (in.) | Code No. | Price \$ |
|------------|------------------|----------|----------|
| 1/8        | 1/8              | 116209   | 21.30    |
| 3/16       | 3/16             | 116210   | 21.93    |
| 1/4        | 1/4              | 116211   | 22.26    |
| 5/16       | 1/4              | 116212   | 23.62    |
| 3/8        | 1/4              | 116213   | 40.33    |
| 7/16       | 3/8              | 116214   | 48.14    |
| 1/2        | 3/8              | 116215   | 32.44    |
| 9/16       | 1/2              | 116216   | 36.91    |
| 5/8        | 1/2              | 116217   | 40.80    |
| 11/16      | 1/2              | 116218   | 47.90    |
| 3/4        | 1/2              | 116219   | 48.97    |
| 7/8        | 1/2              | 116220   | 58.21    |
| 1          | 1/2              | 116221   | 66.98    |
| 1-1/8      | 1/2              | 116222   | 84.14    |

## 18" O.A.L.

| Size (in.) | Shank Size (in.) | Code No. | Price \$ |
|------------|------------------|----------|----------|
| 1/4        | 1/4              | 116223   | 38.07    |
| 3/16       | 3/16             | 116224   | 40.18    |
| 5/16       | 1/4              | 116225   | 42.94    |
| 3/8        | 5/16             | 116226   | 45.78    |
| 7/16       | 3/8              | 116227   | 54.99    |
| 1/2        | 3/8              | 116228   | 56.27    |
| 9/16       | 1/2              | 116229   | 56.27    |
| 5/8        | 1/2              | 116230   | 43.36    |
| 11/16      | 1/2              | 116231   | 80.13    |
| 3/4        | 1/2              | 116232   | 82.06    |
| 7/8        | 1/2              | 116233   | 99.22    |
| 1          | 1/2              | 116234   | 112.57   |
| 1-1/8      | 1/2              | 116235   | 160.27   |
| 1-1/4      | 1/2              | 116236   | 169.81   |
| 1-1/2      | 1/2              | 116237   | 219.44   |

## Solid Carbide Centre Drills



| Catalog No. | Body Diameter (in.) | Drill Diameter (in.) | Overall Length (in.) | Code No. | Price \$ |
|-------------|---------------------|----------------------|----------------------|----------|----------|
| 1           | 1/8                 | 3/64                 | 1-1/4                | 170700   | 35.55    |
| 2           | 3/16                | 5/64                 | 1-7/8                | 170702   | 55.13    |
| 3           | 1/4                 | 7/64                 | 2                    | 170704   | 65.77    |
| 4           | 5/16                | 1/8                  | 2-1/8                | 170706   | 89.46    |
| 5           | 7/16                | 3/16                 | 2-3/4                | 170708   | 135.76   |
| 6           | 1/2                 | 7/32                 | 3                    | 170710   | 185.21   |

## 60° Carbide and HSS Combined Drill & Countersinks



- For centering and spot drilling applications when high accuracy is necessary
- Use carbide for highly abrasive or tough materials in production runs



| Size | Drill Dia. (in.) | Body Dia. (in.) | HSS    | HSS Code No. | Price \$ | Carbide | Carbide Code No. | Price \$ |
|------|------------------|-----------------|--------|--------------|----------|---------|------------------|----------|
| 00   | 0.025            | 1/8             | HS00CD | 121810       | 25.12    | C00CD   | 121830           | 56.70    |
| 0    | 0.031            | 1/8             | HS0CD  | 121812       | 23.44    | C0CD    | 121832           | 47.38    |
| 1    | 3/64             | 1/8             | HS1CD  | 121814       | 16.39    | C1CD    | 121834           | 41.04    |
| 2    | 5/64             | 3/16            | HS2CD  | 121816       | 17.10    | C2CD    | 121836           | 64.23    |
| 3    | 7/64             | 1/4             | HS3CD  | 121818       | 17.83    | C3CD    | 121838           | 59.81    |
| 4    | 1/8              | 5/16            | HS4CD  | 121820       | 18.42    | C4CD    | 121840           | 82.90    |
| 5    | 3/16             | 7/16            | HS5CD  | 121822       | 29.18    | C5CD    | 121842           | 147.25   |
| 6    | 7/32             | 1/2             | HS6CD  | 121824       | 43.90    | C6CD    | 121844           | 200.84   |
| 7    | 1/4              | 5/8             | HS7CD  | 121826       | 77.03    | C7CD    | 121846           | 236.18   |
| 8    | 5/16             | 3/4             | HS8CD  | 121828       | 100.96   | C8CD    | 121848           | 480.86   |

## Combined Drills & Countersinks — Regular Length



- Plain type
- 60° point



| Size             | Body Dia. (in.) | Drill Dia. (in.) | Drill Length (in.) | Overall Length (in.) | Bell Dia. | Code No. | Price \$ |
|------------------|-----------------|------------------|--------------------|----------------------|-----------|----------|----------|
| 2                | 3/16            | 5/64             | 5/64               | 1-7/8                | -         | 125281   | 5.57     |
| 3                | 1/4             | 7/64             | 7/64               | 2                    | -         | 125282   | 5.57     |
| 4                | 5/16            | 1/8              | 1/8                | 2-1/8                | -         | 125283   | 5.57     |
| 5                | 7/16            | 3/16             | 3/16               | 2-3/4                | -         | 125284   | 14.14    |
| 6                | 1/2             | 7/32             | 7/32               | 3                    | -         | 125285   | 21.46    |
| 7                | 5/8             | 1/4              | 1/4                | 3-1/4                | -         | 125286   | 36.60    |
| 8                | 3/4             | 5/16             | 5/16               | 3-1/2                | -         | 125287   | 38.57    |
| <b>Bell Type</b> |                 |                  |                    |                      |           |          |          |
| 11               | 1/8             | 3/64             | 3/64               | 1-1/4                | -         | 125291   | 8.58     |
| 12               | 3/16            | 1/16             | 1/16               | 1-7/8                | 0.150     | 125292   | 13.13    |
| 13               | 1/4             | 3/32             | 3/32               | 2                    | 0.200     | 125293   | 13.14    |
| 14               | 5/16            | 7/64             | 7/64               | 2-1/8                | 0.250     | 125294   | 13.13    |
| 15               | 7/16            | 5/32             | 5/32               | 2-3/4                | 0.350     | 125295   | 23.65    |
| 16               | 1/2             | 3/16             | 3/16               | 3                    | 0.400     | 125296   | 34.16    |
| 17               | 5/8             | 7/32             | 7/32               | 3-1/4                | 0.500     | 125297   | 44.72    |

## Combined Drills & Countersinks — Long Series

**QUALITY  
IMPORT**

- Right hand
- 60° point



| Size  | Body Dia. (in.) | Drill Dia. (in.) | Drill Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-------|-----------------|------------------|--------------------|----------------------|--------------|----------|
| 1     | 1/8             | 3/64             | 3/64               | 3                    | 125351       | 26.60    |
| 1     | 1/8             | 3/64             | 3/64               | 4                    | 125352       | 26.55    |
| 1     | 1/8             | 3/64             | 3/64               | 5                    | 125353       | 30.38    |
| 1     | 1/8             | 3/64             | 3/64               | 6                    | 125354       | 49.04    |
| 2     | 3/16            | 5/64             | 5/64               | 4                    | 125355       | 32.34    |
| 2     | 3/16            | 5/64             | 5/64               | 5                    | 125356       | 37.71    |
| 2     | 3/16            | 5/64             | 5/64               | 6                    | 125357       | 47.85    |
| 3     | 1/4             | 7/64             | 7/64               | 4                    | 125358       | 39.57    |
| 3     | 1/4             | 7/64             | 7/64               | 5                    | 125359       | 43.55    |
| 3     | 1/4             | 7/64             | 7/64               | 6                    | 125360       | 49.19    |
| 4     | 5/16            | 1/8              | 1/8                | 4                    | 125361       | 36.93    |
| 4     | 5/16            | 1/8              | 1/8                | 5                    | 125362       | 46.24    |
| 4     | 5/16            | 1/8              | 1/8                | 6                    | 125363       | 53.68    |
| 4-1/2 | 3/8             | 9/64             | 9/64               | 4                    | 125364       | 40.48    |
| 4-1/2 | 3/8             | 9/64             | 9/64               | 5                    | 125365       | 47.08    |
| 4-1/2 | 3/8             | 9/64             | 9/64               | 6                    | 125366       | 56.18    |
| 5     | 7/16            | 3/16             | 3/16               | 4                    | 125367       | 44.04    |
| 5     | 7/16            | 3/16             | 3/16               | 5                    | 125368       | 47.85    |
| 5     | 7/16            | 3/16             | 3/16               | 6                    | 125369       | 58.39    |
| 6     | 1/2             | 7/32             | 7/32               | 5                    | 125370       | 66.79    |
| 6     | 1/2             | 7/32             | 7/32               | 6                    | 125371       | 64.90    |
| 7     | 5/8             | 1/4              | 1/4                | 5                    | 125372       | 70.45    |
| 7     | 5/8             | 1/4              | 1/4                | 6                    | 125373       | 124.75   |
| 8     | 3/4             | 5/16             | 5/16               | 6                    | 125374       | 137.08   |

## Combined Drills & Countersinks — Plain Type

**STM  
PREMIUM**

- 60° countersink



| Size | Body Dia. (in.) | Drill Dia./Length (in.) | O.A.L. (in.) | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ | Solid Carbide Code No. | Price \$ |
|------|-----------------|-------------------------|--------------|--------------|----------|-----------------|----------|------------------------|----------|
| 1    | 1/8             | 3/64                    | 1-1/4        | 116238       | 8.58     | 116248          | 31.22    | 116256                 | 48.58    |
| 2    | 3/16            | 5/64                    | 1-7/8        | 116239       | 8.58     | 116249          | 31.85    | 116257                 | 76.09    |
| 3    | 1/4             | 7/64                    | 2            | 116240       | 8.67     | 116250          | 33.39    | 116258                 | 100.65   |
| 4    | 5/16            | 1/8                     | 2-1/8        | 116241       | 8.92     | 116251          | 34.26    | 116259                 | 138.23   |
| 5    | 7/16            | 3/16                    | 2-3/4        | 116242       | 13.31    | 116252          | 63.75    | 116260                 | 209.67   |
| 6    | 1/2             | 7/32                    | 3            | 116243       | 19.95    | 116253          | 85.77    | 116261                 | 306.17   |
| 7    | 5/8             | 1/4                     | 3-1/4        | 116244       | 28.91    | 116254          | 87.74    | -                      | -        |
| 8    | 3/4             | 5/16                    | 3-1/2        | 116245       | 40.25    | 116255          | 158.19   | -                      | -        |
| 9    | 7/8             | 11/32                   | 3-5/8        | 116246       | 75.56    | -               | -        | -                      | -        |
| 10   | 1               | 3/8                     | 3-3/4        | 116247       | 98.79    | -               | -        | -                      | -        |

## Combined Drills & Countersinks — Bell Type

**STM  
PREMIUM**

- 60° countersink



| Size | Body Dia. (in.) | Drill Dia./Length (in.) | O.A.L. (in.) | Bell Dia. | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|------|-----------------|-------------------------|--------------|-----------|--------------|----------|-----------------|----------|
| 11   | 1/8             | 3/64                    | 1-1/4        | 0.1000    | 116262       | 12.97    | 116272          | 27.47    |
| 12   | 3/16            | 1/16                    | 1-7/8        | 0.1500    | 116263       | 12.97    | 116273          | 28.91    |
| 13   | 1/4             | 3/32                    | 2            | 0.2000    | 116264       | 13.59    | 116274          | 35.42    |
| 14   | 5/16            | 7/64                    | 2-1/8        | 0.2500    | 116265       | 13.59    | 116275          | 34.69    |
| 15   | 7/16            | 5/32                    | 2-3/4        | 0.3500    | 116266       | 22.12    | 116276          | 50.59    |
| 16   | 1/2             | 3/16                    | 3            | 0.4000    | 116267       | 29.78    | 116277          | 56.67    |
| 17   | 5/8             | 7/32                    | 3-1/4        | 0.5000    | 116268       | 41.97    | 116278          | 83.84    |
| 18   | 3/4             | 1/4                     | 3-1/2        | 0.6000    | 116269       | 58.02    | 116279          | 105.24   |
| 20   | 1               | 3/8                     | 3-3/4        | 0.8000    | 116271       | 111.46   | -               | -        |

## Combined Drills & Countersinks — Long Series

**STM  
PREMIUM**



| Size  | Body Dia. (in.) | Drill Dia. (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-------|-----------------|------------------|----------------------|--------------|----------|
| 1     | 1/8             | 3/64             | 3                    | 116280       | 26.02    |
| 1     | 1/8             | 3/64             | 4                    | 116281       | 29.79    |
| 1     | 1/8             | 3/64             | 5                    | 116282       | 44.82    |
| 1     | 1/8             | 3/64             | 6                    | 116283       | 59.26    |
| 2     | 3/16            | 5/64             | 4                    | 116284       | 35.56    |
| 2     | 3/16            | 5/64             | 5                    | 116285       | 45.78    |
| 2     | 3/16            | 5/64             | 6                    | 116286       | 59.31    |
| 3     | 1/4             | 7/64             | 4                    | 116287       | 37.53    |
| 3     | 1/4             | 7/64             | 5                    | 116288       | 49.35    |
| 3     | 1/4             | 7/64             | 6                    | 116289       | 59.85    |
| 4     | 5/16            | 1/8              | 4                    | 116290       | 41.63    |
| 4     | 5/16            | 1/8              | 5                    | 116291       | 53.34    |
| 4     | 5/16            | 1/8              | 6                    | 116292       | 61.39    |
| 4-1/2 | 3/8             | 9/64             | 4                    | 116294       | 46.74    |
| 4-1/2 | 3/8             | 9/64             | 5                    | 116295       | 55.33    |
| 4-1/2 | 3/8             | 9/64             | 6                    | 116296       | 81.77    |
| 5     | 7/16            | 3/16             | 4                    | 116297       | 54.64    |
| 5     | 7/16            | 3/16             | 5                    | 116298       | 63.31    |
| 5     | 7/16            | 3/16             | 6                    | 116299       | 71.13    |
| 6     | 1/2             | 7/32             | 5                    | 116300       | 68.53    |
| 6     | 1/2             | 7/32             | 6                    | 116301       | 86.45    |
| 7     | 5/8             | 1/4              | 6                    | 116302       | 152.90   |
| 8     | 3/4             | 5/16             | 6                    | 116305       | 164.80   |

## 60° HSS Combined Drill & Countersinks

**SOWA**

- 60° countersink



| Size       | Body Dia.       | Drill Dia. | Drill Length | Overall Length | Code No. | Price \$ |
|------------|-----------------|------------|--------------|----------------|----------|----------|
| #000       | 1/8"            | 0.020"     | 0.5-0.8mm    | 31mm           | 121907   | 14.30    |
| #00        | 1/8"            | 0.025"     | 0.7-1.0mm    | 31mm           | 121908   | 13.50    |
| #0         | 1/8"            | 1/32"      | 0.9-1.2mm    | 31mm           | 121910   | 12.10    |
| 1          | 1/8"            | 3/64"      | 1.4-1.7mm    | 31mm           | 121911   | 10.85    |
| 2          | 3/16"           | 5/64"      | 2.4-2.7mm    | 47mm           | 121912   | 11.32    |
| 3          | 1/4"            | 7/64"      | 3.3-3.9mm    | 50mm           | 121913   | 11.94    |
| 4          | 5/16"           | 1/8"       | 3.8-4.4mm    | 54mm           | 121914   | 13.09    |
| 4-1/2      | 3/8"            | 9/64"      | 4.3-4.9mm    | 63mm           | 121919   | 18.00    |
| 5          | 7/16"           | 3/16"      | 5.9-6.5mm    | 70mm           | 121915   | 21.90    |
| 6          | 1/2"            | 7/32"      | 6.9-7.5mm    | 76mm           | 121916   | 29.01    |
| 7          | 5/8"            | 1/4"       | 8.0-8.6mm    | 82mm           | 121917   | 48.62    |
| 8          | 3/4"            | 5/16"      | 10.0-10.6mm  | 89mm           | 121918   | 87.36    |
| <b>Set</b> | <b>Contents</b> |            |              |                |          |          |
| 5pcs       | #1 - 5          |            |              |                | 121920   | 68.06    |

## 60° Combined Drill & Countersinks - Long Series

**SOWA**



- 60° countersink



| Size | Body Dia. | Drill Dia. | Drill Length | Overall Length | Code No. | Price \$ |
|------|-----------|------------|--------------|----------------|----------|----------|
| 1    | 1/8"      | 3/64"      | 1.4-1.7mm    | 4"             | 121931   | 26.29    |
| 2    | 3/16"     | 5/64"      | 2.4-2.7mm    | 4"             | 121932   | 29.75    |
| 3    | 1/4"      | 7/64"      | 3.3-3.9mm    | 4"             | 121933   | 30.80    |
| 4    | 5/16"     | 1/8"       | 3.8-4.4mm    | 4"             | 121934   | 33.08    |
| 5    | 7/16"     | 3/16"      | 5.9-6.5mm    | 4"             | 121935   | 45.50    |

## 60° HSS Combined Drill & Countersinks TiN Coated



- 60° countersink



| Size  | Body Dia. | Drill Dia. | Drill Length | Overall Length | Code No. | Price \$ |
|-------|-----------|------------|--------------|----------------|----------|----------|
| 1     | 1/8"      | 3/64"      | 1.4-1.7mm    | 31mm           | 121921   | 20.13    |
| 2     | 3/16"     | 5/64"      | 2.4-2.7mm    | 47mm           | 121922   | 22.51    |
| 3     | 1/4"      | 7/64"      | 3.3-3.9mm    | 50mm           | 121923   | 25.44    |
| 4     | 5/16"     | 1/8"       | 3.8-4.4mm    | 54mm           | 121924   | 29.44    |
| 4-1/2 | 3/8"      | 9/64"      | 4.3-4.9mm    | 63mm           | 121929   | 37.90    |
| 5     | 7/16"     | 3/16"      | 5.9-6.5mm    | 70mm           | 121925   | 42.59    |
| 6     | 1/2"      | 7/32"      | 6.9-7.5mm    | 76mm           | 121926   | 50.51    |
| 7     | 5/8"      | 1/4"       | 8.0-8.6mm    | 82mm           | 121927   | 77.79    |
| 8     | 3/4"      | 5/16"      | 10.0-10.6mm  | 89mm           | 121928   | 119.78   |

## Combined Drills & Countersinks HSS — Metric Sizes



- Plain type
- 60° countersink



| Size (mm) | Drill Diameter (in.) | Body Diameter (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-----------|----------------------|---------------------|----------------------|--------------|----------|
| 0.50 *    | 0.0197               | 1/8                 | 13/16                | 116306       | 28.23    |
| 0.80 *    | 0.0315               | 1/8                 | 13/16                | 116307       | 20.83    |
| 1.00      | 0.0394               | 1/8                 | 1-1/4                | 116308       | 20.83    |
| 1.25      | 0.0492               | 1/8                 | 1-1/4                | 116309       | 20.83    |
| 1.60      | 0.0630               | 5/32                | 1-5/16               | 116310       | 19.76    |
| 2.00      | 0.0787               | 0.1969              | 1-9/16               | 116311       | 22.07    |
| 2.50      | 0.0984               | 1/4                 | 1-3/4                | 116312       | 24.96    |
| 3.15      | 0.1240               | 0.3150              | 2                    | 116313       | 30.60    |
| 4.00      | 0.1575               | 0.3937              | 2-1/4                | 116314       | 52.24    |
| 5.00      | 0.1969               | 0.4921              | 2-1/2                | 116315       | 72.23    |
| 6.30      | 0.2480               | 0.6299              | 2-3/4                | 116316       | 105.77   |
| 8.00      | 0.3150               | 0.7874              | 3-1/8                | 116317       | 164.46   |

\* Single end

## Missile & Aircraft Series HSS



| Size | Body Dia. (in.) | Drill Dia. (in.) | Drill Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------|-----------------|------------------|--------------------|----------------------|--------------|----------|
| 000  | 1/8             | 0.020            | 0.02               | 1-1/4                | 116318       | 10.22    |
| 00   | 1/8             | 0.025            | 0.025              | 1-1/4                | 116319       | 10.22    |
| 0    | 1/8             | 1/32             | 1/32               | 1-1/4                | 116320       | 10.22    |

## Carbide Tipped Combined Drills & Countersinks



These drills are used for centre drilling hardened high speed steel in the range up to 65HRC.

- 60° countersink



| Size | Body Diameter (in.) | Drill Diameter (in.) | Overall Length (in.) | Code No. | Price \$ |
|------|---------------------|----------------------|----------------------|----------|----------|
| 4-1  | 5/16                | 3/32                 | 2-1/8                | 116321   | 190.87   |
| 4-2  | 5/16                | 1/8                  | 2-1/8                | 116322   | 173.52   |
| 6-1  | 1/2                 | 7/32                 | 3                    | 116323   | 243.82   |
| 6-2  | 1/2                 | 9/32                 | 3                    | 116324   | 243.82   |

## Spotting & Centering Drills HSS



To provide greater rigidity, these drills are made with short overall and flute lengths.



| Size (in.) | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | Right Hand Code No. | Price \$ | Left Hand Code No. | Price \$ |
|------------|----------------------|--------------------|----------------------|---------------------|----------|--------------------|----------|
| 3/8        | 0.3750               | 1                  | 2                    | 116325              | 20.38    | 116336             | 37.78    |
| 7/16       | 0.4375               | 1                  | 2                    | 116326              | 39.96    | 116337             | 51.27    |
| 1/2        | 0.5000               | 1                  | 2                    | 116327              | 35.81    | 116338             | 55.03    |
| 5/8        | 0.6250               | 1-1/8              | 2-1/4                | 116328              | 56.81    | 116339             | 85.86    |
| 3/4        | 0.7500               | 1-1/8              | 2-1/4                | 116329              | 80.96    | 116340             | 119.71   |
| 7/8        | 0.8750               | 1-1/4              | 2-1/2                | 116330              | 116.38   | 116341             | 169.14   |
| 1          | 1.0000               | 1-1/4              | 2-1/2                | 116331              | 130.73   | 116342             | 181.52   |
| 1-1/4      | 1.2500               | 2                  | 4                    | 116332              | 260.21   | 116343             | 400.13   |
| 1-1/2      | 1.5000               | 2-1/2              | 5                    | 116333              | 405.93   | 116344             | 546.44   |
| 1-3/4      | 1.7500               | 2-3/4              | 5-1/2                | 116334              | 614.09   | 116345             | 837.87   |
| 2          | 2.000                | 3                  | 6                    | 116335              | 728.59   | -                  | -        |

## NC/CNC Spotting Drills HSS



These drills are used for perfect alignment of the follow-on tool.

- Standard length
- Right hand cut



| Size (in.) | Decimal Equiv. (in.) | Overall Length (in.) | 90° Flute Length | HSS Code No. | Price \$ | 120° Flute Length | HSS Code No. | Price \$ |
|------------|----------------------|----------------------|------------------|--------------|----------|-------------------|--------------|----------|
| 1/4        | 0.2500               | 2-1/2                | 3/4              | 116346       | 42.55    | 21/32             | 116352       | 43.08    |
| 3/8        | 0.3750               | 3-1/8                | 1-1/8            | 116347       | 45.82    | 1                 | 116353       | 46.35    |
| 1/2        | 0.5000               | 3-3/4                | 1-3/8            | 116348       | 58.63    | 1-3/16            | 116354       | 59.36    |
| 5/8        | 0.6250               | 4-3/8                | 1-5/8            | 116349       | 77.59    | 1-15/32           | 116355       | 76.90    |
| 3/4        | 0.7500               | 5                    | 1-7/8            | 116350       | 97.86    | 1-3/4             | 116356       | 98.88    |
| 1          | 1.0000               | 6                    | 2-1/4            | 116351       | 165.18   | 2-3/32            | 116357       | 166.97   |

## Centre Drills HSS



These drills are used for starting and centering screw machine operations. Their short flute and overall length increase rigidity while minimizing runout.



| Size  | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|-------|----------------------|--------------------|----------------------|--------------|----------|
| #56   | 0.0465               | 3/8                | 1-3/16               | 116358       | 4.39     |
| 1/16  | 0.0625               | 3/8                | 1-3/16               | 116359       | 4.39     |
| 5/64  | 0.0781               | 3/4                | 1-1/4                | 116360       | 4.39     |
| 3/32  | 0.0938               | 3/4                | 1-1/4                | 116361       | 4.78     |
| #41   | 0.0960               | 3/4                | 1-1/4                | 116362       | 7.23     |
| #40   | 0.0980               | 3/4                | 1-1/4                | 116363       | 4.78     |
| 7/64  | 0.1094               | 3/4                | 1-1/4                | 116364       | 4.78     |
| 1/8   | 0.1250               | 3/4                | 1-1/4                | 116365       | 4.05     |
| #30   | 0.1285               | 3/4                | 1-1/4                | 116366       | 4.24     |
| 9/64  | 0.1406               | 3/4                | 1-1/4                | 116367       | 6.31     |
| 5/32  | 0.1562               | 1                  | 1-1/2                | 116368       | 8.27     |
| #21   | 0.1590               | 1                  | 1-1/2                | 116369       | 7.04     |
| #20   | 0.1610               | 1                  | 1-1/2                | 116370       | 7.04     |
| 11/64 | 0.1719               | 1                  | 1-1/2                | 116371       | 7.04     |
| 3/16  | 0.1875               | 1                  | 1-1/2                | 116372       | 7.04     |
| 13/64 | 0.2031               | 1                  | 1-1/2                | 116373       | 7.04     |
| #5    | 0.2055               | 1                  | 1-1/2                | 116374       | 7.04     |
| 7/32  | 0.2188               | 1                  | 1-1/2                | 116375       | 7.04     |
| 1/4   | 0.2500               | 1                  | 1-1/2                | 116376       | 7.86     |
| 9/32  | 0.2812               | 1                  | 1-1/2                | 116377       | 10.94    |
| 5/16  | 0.3125               | 1                  | 1-1/2                | 116378       | 12.97    |
| 29/64 | 0.4531               | 1                  | 1-1/2                | 116379       | 31.71    |

## Spotting & Centering Drills HSS



| Dia. (in.) | Overall Length (in.) | Flute Length (in.) | HSS Code No. | Price \$ |
|------------|----------------------|--------------------|--------------|----------|
| 7/16       | 2                    | 1                  | 144312       | 32.55    |
| 5/8        | 2-1/4                | 1-1/8              | 144314       | 37.49    |
| 3/4        | 2-1/4                | 1-1/8              | 144315       | 56.80    |
| 7/8        | 2-1/2                | 1-1/4              | 144316       | 131.05   |
| 1          | 2-1/2                | 1-1/4              | 144317       | 174.21   |
| 1-1/4      | 4                    | 2                  | 144318       | 258.48   |
| 1-1/2      | 5                    | 2-1/2              | 144319       | 381.37   |

## 90° HSS Stub NC Spot Drills



| Dia. (in.) | Overall Length (in.) | Flute Length (in.) | Overall Length | Code No. | Price \$ |
|------------|----------------------|--------------------|----------------|----------|----------|
| 1/8        | 1-1/4                | 0.380              | 32mm           | 121939   | 14.57    |
| 3/16       | 1-3/8                | 0.500              | 35mm           | 121940   | 17.16    |
| 1/4        | 1-1/2                | 0.640              | 38mm           | 121941   | 16.62    |
| 5/16       | 1-1/2                | 0.640              | 38mm           | 121942   | 20.51    |
| 3/8        | 2                    | 1                  | 51mm           | 121943   | 23.86    |
| 7/16       | 2                    | 1                  | 51mm           | 121944   | 32.62    |
| 1/2        | 2                    | 1                  | 51mm           | 121945   | 35.36    |
| 5/8        | 2-1/4                | 1-1/8              | 57mm           | 121946   | 65.32    |
| 3/4        | 2-1/4                | 1-1/8              | 57mm           | 121947   | 81.46    |
| 7/8        | 2-1/2                | 1-1/4              | 64mm           | 121948   | 113.60   |
| 1          | 2-1/2                | 1-1/4              | 64mm           | 121949   | 138.01   |

## 118° HSS Stub NC Spot Drills



| Dia. (in.) | Overall Length (in.) | Flute Length (in.) | Overall Length | Code No. | Price \$ |
|------------|----------------------|--------------------|----------------|----------|----------|
| 1/8        | 1-1/4                | 0.380              | 32mm           | 121950   | 13.77    |
| 3/16       | 1-3/8                | 0.500              | 35mm           | 121951   | 15.13    |
| 1/4        | 1-1/2                | 0.640              | 38mm           | 121952   | 15.71    |
| 5/16       | 1-1/2                | 0.640              | 38mm           | 121953   | 19.34    |
| 3/8        | 2                    | 1                  | 51mm           | 121954   | 22.34    |
| 7/16       | 2                    | 1                  | 51mm           | 121956   | 28.00    |
| 1/2        | 2                    | 1                  | 51mm           | 121957   | 38.85    |
| 5/8        | 2-1/4                | 1-1/8              | 57mm           | 121958   | 57.70    |
| 3/4        | 2-1/4                | 1-1/8              | 57mm           | 121959   | 76.83    |
| 7/8        | 2-1/2                | 1-1/4              | 64mm           | 121960   | 97.65    |
| 1          | 2-1/2                | 1-1/4              | 64mm           | 121961   | 118.59   |

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## Vent Drills HSS

These drills are used for the tire mould industry.



| Size | Decimal Equiv. (in.) | Flute Length (in.) | Overall Length (in.) | HSS Code No. | Price \$ |
|------|----------------------|--------------------|----------------------|--------------|----------|
| 74   | 0.0225               | 1                  | 2                    | 116380       | 15.42    |
| 74   | 0.0225               | 1                  | 3                    | 116381       | 16.48    |
| 73   | 0.0240               | 5/8                | 1-1/2                | 116382       | 15.03    |
| 69   | 0.0292               | 2                  | 3                    | 116383       | 17.35    |
| 68   | 0.0320               | 2                  | 6                    | 116384       | 26.02    |
| 60   | 0.0400               | 3                  | 4                    | 116385       | 18.79    |
| 58   | 0.0420               | 3                  | 4                    | 116386       | 18.80    |
| 57   | 0.0430               | 4                  | 6                    | 116387       | 27.46    |
| 57   | 0.0430               | 2                  | 3                    | 116388       | 16.19    |
| 57   | 0.0430               | 3                  | 4                    | 116389       | 18.79    |
| 3/64 | 0.0469               | 2                  | 3                    | 116390       | 16.52    |
| 55   | 0.0520               | 2-1/4              | 3                    | 116391       | 17.06    |
| 55   | 0.0520               | 2-1/2              | 4-1/2                | 116392       | 15.03    |
| 55   | 0.0520               | 3                  | 4                    | 116393       | 19.52    |
| 55   | 0.0520               | 3-1/2              | 6-1/4                | 116394       | 28.91    |
| 54   | 0.0550               | 4                  | 6                    | 116395       | 27.46    |
| 1/16 | 0.0625               | 2-1/2              | 3-1/2                | 116396       | 17.92    |
| 1/16 | 0.0625               | 3                  | 4                    | 116397       | 19.52    |
| 1/16 | 0.0625               | 4                  | 5                    | 116398       | 24.57    |
| 1/16 | 0.0625               | 4                  | 6                    | 116400       | 28.63    |
| 52   | 0.0635               | 4                  | 5                    | 116401       | 24.57    |
| 50   | 0.0700               | 3                  | 4                    | 116402       | 20.83    |
| 50   | 0.0700               | 3                  | 5                    | 116403       | 26.02    |
| 50   | 0.0700               | 4                  | 6                    | 116404       | 29.64    |

## Drill & Reamer Blanks HSS



Made from hardened (63-65 HRC) high speed steel and ground, can be used as punches, gauges, pins or ground for special tools.



### Drill Blanks

- to 1/2" + 0.0000" / - 0.0003", to 1" + 0.0000" / - 0.0005"

### Reamer Blanks

- + 0.0002" / - 0.0000"

## Fractional Sizes



| Size  | Decimal Equiv. (in.) | Overall Length (in.) | Drill Blank Code No. | Price \$ | Reamer Blank Code No. | Price \$ |
|-------|----------------------|----------------------|----------------------|----------|-----------------------|----------|
| 1/64  | 0.0156               | 3/4                  | 116405               | 4.29     | 116670                | 5.83     |
| 1/32  | 0.0312               | 1-3/8                | 116406               | 4.29     | 116671                | 5.83     |
| 3/64  | 0.0469               | 1-3/4                | 116407               | 4.63     | 116672                | 6.36     |
| 1/16  | 0.0625               | 1-7/8                | 116408               | 4.48     | 116673                | 6.16     |
| 5/64  | 0.0781               | 2                    | 116409               | 4.78     | 116674                | 6.55     |
| 3/32  | 0.0938               | 2-1/4                | 116410               | 4.63     | 116675                | 6.36     |
| 7/64  | 0.1094               | 2-5/8                | 116411               | 4.78     | 116676                | 6.55     |
| 1/8   | 0.1250               | 2-3/4                | 116412               | 4.53     | 116677                | 6.22     |
| 9/64  | 0.1406               | 2-7/8                | 116413               | 4.78     | 116678                | 6.55     |
| 5/32  | 0.1562               | 3-1/8                | 116414               | 5.25     | 116679                | 7.18     |
| 11/64 | 0.1719               | 3-1/4                | 116415               | 5.25     | 116680                | 7.18     |
| 3/16  | 0.1875               | 3-1/2                | 116416               | 5.88     | 116681                | 8.04     |
| 13/64 | 0.2031               | 3-5/8                | 116417               | 7.70     | 116682                | 10.51    |
| 7/32  | 0.2188               | 3-3/4                | 116418               | 7.77     | 116683                | 10.55    |
| 15/64 | 0.2344               | 3-7/8                | 116419               | 8.72     | 116684                | 11.85    |
| 1/4   | 0.2500               | 4                    | 116420               | 9.01     | 116685                | 12.24    |
| 17/64 | 0.2656               | 4-1/8                | 116421               | 10.22    | 116686                | 13.93    |
| 9/32  | 0.2812               | 4-1/4                | 116422               | 10.99    | 116687                | 15.03    |
| 19/64 | 0.2969               | 4-3/8                | 116423               | 12.24    | 116688                | 16.67    |
| 5/16  | 0.3125               | 4-1/2                | 116424               | 12.00    | 116689                | 16.34    |
| 21/64 | 0.3281               | 4-5/8                | 116425               | 13.88    | 116690                | 18.89    |
| 11/32 | 0.3438               | 4-3/4                | 116426               | 14.89    | 116691                | 20.29    |
| 23/64 | 0.3594               | 4-7/8                | 116427               | 16.73    | 116692                | 22.80    |
| 3/8   | 0.3750               | 5                    | 116428               | 17.54    | 116693                | 23.90    |
| 25/64 | 0.3906               | 5-1/8                | 116429               | 19.08    | 116694                | 26.07    |
| 13/32 | 0.4062               | 5-1/4                | 116430               | 20.67    | 116695                | 28.18    |
| 27/64 | 0.4219               | 5-3/8                | 116431               | 23.18    | 116696                | 31.61    |
| 7/16  | 0.4375               | 5-1/2                | 116432               | 25.49    | 116697                | 34.79    |
| 29/64 | 0.4531               | 5-5/8                | 116433               | 26.90    | 116698                | 36.67    |

## Drill & Reamer Blanks HSS — Cont'd

### Fractional Sizes

| Size  | Decimal Equiv. (in.) | Overall Length (in.) | Drill Blank Code No. | Price \$ | Reamer Blank Code No. | Price \$ |
|-------|----------------------|----------------------|----------------------|----------|-----------------------|----------|
| 15/32 | 0.4688               | 5-3/4                | 116434               | 27.33    | 116699                | 37.25    |
| 31/64 | 0.4844               | 5-7/8                | 116435               | 31.07    | 116700                | 42.26    |
| 1/2   | 0.5000               | 6                    | 116436               | 31.22    | 116701                | 42.60    |
| 33/64 | 0.5156               | 6                    | 116437               | 54.64    | -                     | -        |
| 17/32 | 0.5312               | 6                    | 116438               | 57.29    | -                     | -        |
| 35/64 | 0.5469               | 6                    | 116439               | 54.64    | -                     | -        |
| 9/16  | 0.5625               | 6                    | 116440               | 59.70    | -                     | -        |
| 37/64 | 0.5781               | 6                    | 116441               | 68.43    | -                     | -        |
| 19/32 | 0.5938               | 6                    | 116442               | 68.43    | -                     | -        |
| 39/64 | 0.6094               | 6                    | 116443               | 67.17    | -                     | -        |
| 5/8   | 0.6250               | 6                    | 116444               | 67.17    | -                     | -        |
| 41/64 | 0.6406               | 6                    | 116445               | 79.17    | -                     | -        |
| 21/32 | 0.6562               | 6                    | 116446               | 79.17    | -                     | -        |
| 43/64 | 0.6719               | 6                    | 116447               | 86.74    | -                     | -        |
| 11/16 | 0.6875               | 6                    | 116448               | 86.74    | -                     | -        |
| 45/64 | 0.7031               | 6                    | 116449               | 86.74    | -                     | -        |
| 23/32 | 0.7188               | 6                    | 116450               | 86.74    | -                     | -        |
| 47/64 | 0.7344               | 6                    | 116451               | 89.92    | -                     | -        |
| 3/4   | 0.7500               | 6                    | 116452               | 89.92    | -                     | -        |
| 49/64 | 0.7656               | 6                    | 116453               | 98.11    | -                     | -        |
| 25/32 | 0.7812               | 6                    | 116454               | 98.11    | -                     | -        |
| 51/64 | 0.7969               | 6                    | 116455               | 104.52   | -                     | -        |
| 13/16 | 0.8125               | 6                    | 116456               | 104.52   | -                     | -        |
| 53/64 | 0.8281               | 6                    | 116457               | 115.94   | -                     | -        |
| 27/32 | 0.8438               | 6                    | 116458               | 115.94   | -                     | -        |
| 55/64 | 0.8594               | 6                    | 116459               | 123.07   | -                     | -        |
| 7/8   | 0.8750               | 6                    | 116460               | 123.07   | -                     | -        |
| 57/64 | 0.8906               | 6                    | 116461               | 133.86   | -                     | -        |
| 29/32 | 0.9062               | 6                    | 116462               | 133.86   | -                     | -        |
| 59/64 | 0.9219               | 6                    | 116463               | 142.10   | -                     | -        |
| 15/16 | 0.9375               | 6                    | 116464               | 142.10   | -                     | -        |
| 61/64 | 0.9531               | 6                    | 116465               | 147.80   | -                     | -        |
| 31/32 | 0.9688               | 6                    | 116466               | 147.80   | -                     | -        |
| 63/64 | 0.9844               | 6                    | 116467               | 155.69   | -                     | -        |
| 1     | 1.0000               | 6                    | 116468               | 155.69   | -                     | -        |

### Letter Sizes

| Size | Decimal Equiv. (in.) | Overall Length (in.) | Drill Blank Code No. | Price \$ | Reamer Blank Code No. | Price \$ |
|------|----------------------|----------------------|----------------------|----------|-----------------------|----------|
| A    | 0.2340               | 3-7/8                | 116469               | 9.10     | 116495                | 12.43    |
| B    | 0.2380               | 4                    | 116470               | 9.10     | 116496                | 12.43    |
| C    | 0.2420               | 4                    | 116471               | 9.10     | 116497                | 12.43    |
| D    | 0.2460               | 4                    | 116472               | 9.10     | 116498                | 12.43    |
| E    | 0.2500               | 4                    | 116473               | 9.01     | 116499                | 12.24    |
| F    | 0.2570               | 4-1/8                | 116474               | 10.12    | 116500                | 13.83    |
| G    | 0.2610               | 4-1/8                | 116475               | 10.12    | 116501                | 13.83    |
| H    | 0.2660               | 4-1/8                | 116476               | 10.12    | 116502                | 13.83    |
| I    | 0.2720               | 4-1/8                | 116477               | 10.89    | 116503                | 14.89    |
| J    | 0.2770               | 4-1/8                | 116478               | 10.89    | 116504                | 14.89    |
| K    | 0.2810               | 4-1/4                | 116479               | 11.31    | 116505                | 15.37    |
| L    | 0.2900               | 4-1/4                | 116480               | 11.28    | 116506                | 15.37    |
| M    | 0.2950               | 4-3/8                | 116481               | 12.58    | 116507                | 17.16    |
| N    | 0.3020               | 4-3/8                | 116482               | 12.58    | 116508                | 17.16    |
| O    | 0.3160               | 4-1/2                | 116483               | 12.43    | 116509                | 16.96    |
| P    | 0.3230               | 4-5/8                | 116484               | 13.40    | 116510                | 18.26    |
| Q    | 0.3320               | 4-3/4                | 116485               | 13.40    | 116511                | 18.26    |
| R    | 0.3390               | 4-3/4                | 116486               | 15.17    | 116512                | 20.67    |
| S    | 0.3480               | 4-7/8                | 116487               | 17.30    | 116513                | 23.57    |
| T    | 0.3580               | 4-7/8                | 116488               | 17.30    | 116514                | 23.57    |
| U    | 0.3680               | 5                    | 116489               | 18.31    | 116515                | 25.01    |
| V    | 0.3770               | 5                    | 116490               | 18.31    | 116516                | 25.01    |
| W    | 0.3860               | 5-1/8                | 116491               | 19.90    | 116517                | 27.12    |
| X    | 0.3970               | 5-1/8                | 116492               | 19.90    | 116518                | 27.12    |
| Y    | 0.4040               | 5-1/4                | 116493               | 21.48    | 116519                | 29.30    |
| Z    | 0.4130               | 5-1/4                | 116494               | 21.48    | 116520                | 29.30    |

### Wire Gauge Sizes

| Size | Decimal Equiv. (in.) | Overall Length (in.) | Drill Blank Code No. | Price \$ | Reamer Blank Code No. | Price \$ |
|------|----------------------|----------------------|----------------------|----------|-----------------------|----------|
| 1    | 0.2280               | 3-7/8                | 116521               | 7.43     | 116601                | 10.12    |
| 2    | 0.2210               | 3-7/8                | 116522               | 7.43     | 116602                | 10.12    |
| 3    | 0.2130               | 3-3/4                | 116523               | 7.43     | 116603                | 10.12    |
| 4    | 0.2090               | 3-3/4                | 116524               | 7.43     | 116604                | 10.12    |
| 5    | 0.2055               | 3-3/4                | 116525               | 7.43     | 116605                | 10.12    |
| 6    | 0.2040               | 3-3/4                | 116526               | 7.13     | 116606                | 9.68     |
| 7    | 0.2010               | 3-5/8                | 116527               | 7.13     | 116607                | 9.68     |

| Size | Decimal Equiv. (in.) | Overall Length (in.) | Drill Blank Code No. | Price \$ | Reamer Blank Code No. | Price \$ |
|------|----------------------|----------------------|----------------------|----------|-----------------------|----------|
| 8    | 0.1990               | 3-5/8                | 116528               | 7.13     | 116608                | 9.68     |
| 9    | 0.1960               | 3-5/8                | 116529               | 7.13     | 116609                | 9.68     |
| 10   | 0.1935               | 3-5/8                | 116530               | 7.13     | 116610                | 9.68     |
| 11   | 0.1910               | 3-1/2                | 116531               | 5.63     | 116611                | 7.72     |
| 12   | 0.1890               | 3-1/2                | 116532               | 5.63     | 116612                | 7.72     |
| 13   | 0.1850               | 3-1/2                | 116533               | 5.63     | 116613                | 7.72     |
| 14   | 0.1820               | 3-3/8                | 116534               | 5.63     | 116614                | 7.72     |
| 15   | 0.1800               | 3-3/8                | 116535               | 5.63     | 116615                | 7.72     |
| 16   | 0.1770               | 3-3/8                | 116536               | 5.00     | 116616                | 6.84     |
| 17   | 0.1730               | 3-3/8                | 116537               | 5.00     | 116617                | 6.84     |
| 18   | 0.1695               | 3-1/4                | 116538               | 5.00     | 116618                | 6.84     |
| 19   | 0.1660               | 3-1/4                | 116539               | 5.00     | 116619                | 6.84     |
| 20   | 0.1610               | 3-1/4                | 116540               | 5.00     | 116620                | 6.84     |
| 21   | 0.1590               | 3-1/4                | 116541               | 5.00     | 116621                | 6.84     |
| 22   | 0.1570               | 3-1/8                | 116542               | 5.00     | 116622                | 6.84     |
| 23   | 0.1540               | 3-1/8                | 116543               | 5.00     | 116623                | 6.84     |
| 24   | 0.1520               | 3-1/8                | 116544               | 5.00     | 116624                | 6.84     |
| 25   | 0.1495               | 3                    | 116545               | 5.00     | 116625                | 6.84     |
| 26   | 0.1470               | 3                    | 116546               | 4.49     | 116626                | 6.07     |
| 27   | 0.1440               | 3                    | 116547               | 4.49     | 116627                | 6.07     |
| 28   | 0.1405               | 2-7/8                | 116548               | 4.49     | 116628                | 6.07     |
| 29   | 0.1360               | 2-7/8                | 116549               | 4.49     | 116629                | 6.07     |
| 30   | 0.1285               | 2-3/4                | 116550               | 4.49     | 116630                | 6.07     |
| 31   | 0.1200               | 2-3/4                | 116551               | 4.49     | 116631                | 6.07     |
| 32   | 0.1160               | 2-3/4                | 116552               | 4.49     | 116632                | 6.07     |
| 33   | 0.1130               | 2-5/8                | 116553               | 4.49     | 116633                | 6.07     |
| 34   | 0.1110               | 2-5/8                | 116554               | 4.49     | 116634                | 6.07     |
| 35   | 0.1100               | 2-5/8                | 116555               | 4.49     | 116635                | 6.07     |
| 36   | 0.1065               | 2-1/2                | 116556               | 4.49     | 116636                | 6.07     |
| 37   | 0.1040               | 2-1/2                | 116557               | 4.49     | 116637                | 6.07     |
| 38   | 0.1015               | 2-1/2                | 116558               | 4.49     | 116638                | 6.07     |
| 39   | 0.0995               | 2-3/8                | 116559               | 4.49     | 116639                | 6.07     |
| 40   | 0.0980               | 2-3/8                | 116560               | 4.49     | 116640                | 6.07     |
| 41   | 0.0960               | 2-3/8                | 116561               | 5.68     | 116641                | 7.77     |
| 42   | 0.0935               | 2-1/4                | 116562               | 5.68     | 116642                | 7.77     |
| 43   | 0.0890               | 2-1/4                | 116563               | 5.68     | 116643                | 7.77     |
| 44   | 0.0860               | 2-1/8                | 116564               | 5.68     | 116644                | 7.77     |
| 45   | 0.0820               | 2-1/8                | 116565               | 5.68     | 116645                | 7.77     |
| 46   | 0.0810               | 2-1/8                | 116566               | 5.68     | 116646                | 7.77     |
| 47   | 0.0785               | 2                    | 116567               | 5.68     | 116647                | 7.77     |
| 48   | 0.0760               | 2                    | 116568               | 5.68     | 116648                | 7.77     |
| 49   | 0.0730               | 2                    | 116569               | 5.68     | 116649                | 7.77     |
| 50   | 0.0700               | 2                    | 116570               | 5.68     | 116650                | 7.77     |
| 51   | 0.0670               | 2                    | 116571               | 5.68     | 116651                | 7.77     |
| 52   | 0.0635               | 1-7/8                | 116572               | 5.68     | 116652                | 7.77     |
| 53   | 0.0595               | 1-7/8                | 116573               | 5.68     | 116653                | 7.77     |
| 54   | 0.0550               | 1-7/8                | 116574               | 5.68     | 116654                | 7.77     |
| 55   | 0.0520               | 1-7/8                | 116575               | 5.68     | 116655                | 7.77     |
| 56   | 0.0465               | 1-3/4                | 116576               | 5.68     | 116656                | 7.77     |
| 57   | 0.0430               | 1-3/4                | 116577               | 5.68     | 116657                | 7.77     |
| 58   | 0.0420               | 1-5/8                | 116578               | 5.68     | 116658                | 7.77     |
| 59   | 0.0410               | 1-5/8                | 116579               | 5.68     | 116659                | 7.77     |
| 60   | 0.0400               | 1-5/8                | 116580               | 5.68     | 116660                | 7.77     |
| 61   | 0.0390               | 1-5/8                | 116581               | 5.68     | -                     | -        |
| 62   | 0.0380               | 1-1/2                | 116582               | 5.68     | -                     | -        |
| 63   | 0.0370               | 1-1/2                | 116583               | 5.68     | -                     | -        |
| 64   | 0.0360               | 1-1/2                | 116584               | 5.68     | -                     | -        |
| 65   | 0.0350               | 1-1/2                | 116585               | 5.68     | -                     | -        |
| 66   | 0.0330               | 1-3/8                | 116586               | 5.68     | -                     | -        |
| 67   | 0.0320               | 1-3/8                | 116587               | 5.68     | -                     | -        |
| 68   | 0.0310               | 1-3/8                | 116588               | 5.68     | -                     | -        |
| 69   | 0.0292               | 1-3/8                | 116589               | 5.68     | -                     | -        |
| 70   | 0.0280               | 1-1/4                | 116590               | 5.68     | -                     | -        |
| 71   | 0.0260               | 1-1/4                | 116591               | 5.68     | -                     | -        |
| 72   | 0.0250               | 1-1/8                | 116592               | 5.68     | -                     | -        |
| 73   | 0.0240               | 1-1/8                | 116593               | 5.68     | -                     | -        |
| 74   | 0.0225               | 1                    | 116594               | 5.68     | -                     | -        |
| 75   | 0.0210               | 1                    | 116595               | 5.68     | -                     | -        |
| 76   | 0.0200               | 7/8                  | 116596               | 5.68     | -                     | -        |
| 77   | 0.0180               | 7/8                  | 116597               | 5.68     | -                     | -        |
| 78   | 0.0160               | 7/8                  | 116598               | 5.68     | -                     | -        |
| 79   | 0.0145               | 3/4                  | 116599               | 5.68     | -                     | -        |
| 80   | 0.0135               | 3/4                  | 116600               | 5.68     | -                     | -        |

# HSS (M4) Spade Drill



For general purpose applications in a variety of materials and for drilling in applications where added toughness is required such as unstable set ups on manual machines or cross hole drilling.



Speeds & Feeds ▶ P. B52-53

| Series Min. to Max                     | Diameter    |               | TiN Coated Code No. | Price \$ | TiAlN Coated Code No. | Price \$ |
|--|-------------|---------------|---------------------|----------|-----------------------|----------|
|  | Inch Metric | Decimal (in.) |                     |          |                       |          |
| 1<br>0.690" to 0.960" (5/32")<br>Thick | 45/64"      | 0.7031        | 162360              | 57.44    | 162500                | 62.54    |
|  | 18mm        | 0.7087        | 162361              | 52.07    | 162501                | 62.54    |
|  | 23/32"      | 0.7188        | 162362              | 54.12    | 162502                | 62.54    |
|  | 18.50mm     | 0.7283        | 162363              | 52.07    | 162503                | 62.54    |
|  | 47/64"      | 0.7344        | 162364              | 54.12    | 162504                | 62.54    |
|  | 19mm        | 0.7480        | 162365              | 54.12    | 162505                | 62.54    |
|  | 3/4"        | 0.7500        | 162366              | 54.12    | 162506                | 64.98    |
|  | 49/64"      | 0.7656        | 162368              | 54.12    | 162508                | 62.54    |
|  | 19.50mm     | 0.7677        | 162369              | 52.07    | 162509                | 62.54    |
|  | 25/32"      | 0.7813        | 162370              | 54.12    | 162510                | 62.54    |
|  | 20.00mm     | 0.7874        | 162371              | 54.12    | 162511                | 64.98    |
|  | 51/64"      | 0.7969        | 162373              | 54.12    | 162513                | 62.54    |
|  | 20.50mm     | 0.8071        | 162375              | 54.12    | 162515                | 64.98    |
|  | 13/16"      | 0.8125        | 162372              | 54.12    | 162512                | 64.98    |
|  | 21mm        | 0.8268        | 162377              | 54.12    | 162517                | 80.66    |
|  | 27/32"      | 0.8438        | 162374              | 54.12    | 162514                | 62.54    |
|  | 55/64"      | 0.8594        | 162379              | 52.07    | 162519                | 62.54    |
|  | 22mm        | 0.8661        | 162381              | 52.07    | 162521                | 64.98    |
|  | 7/8"        | 0.8750        | 162376              | 54.12    | 162516                | 64.98    |
|  | 23mm        | 0.9055        | 162385              | 54.12    | 162525                | 62.54    |
| 29/32"                                 | 0.9063      | 162378        | 54.12               | 162518   | 64.98                 |          |
| 59/64"                                 | 0.9219      | 162380        | 54.12               | 162520   | 62.54                 |          |
| 15/16"                                 | 0.9375      | 162382        | 54.12               | 162522   | 64.98                 |          |
| 24mm                                   | 0.9449      | 162387        | 54.12               | 162527   | 64.98                 |          |
| 31/32"                                 | 0.9688      | 162384        | 63.74               | 162524   | 76.31                 |          |
| 63/64"                                 | 0.9843      | 162386        | 63.74               | 162526   | 73.46                 |          |
| 1"                                     | 1.0000      | 162388        | 63.74               | 162528   | 76.31                 |          |
| 1-1/64"                                | 1.0156      | 162390        | 63.74               | 162530   | 73.46                 |          |
| 26mm                                   | 1.0236      | 162391        | 67.64               | 162531   | 73.46                 |          |
| 1-1/32"                                | 1.0313      | 162392        | 63.74               | 162532   | 76.31                 |          |
| 1-3/64"                                | 1.0469      | 162393        | 61.37               | 162533   | 73.46                 |          |
| 1-1/16"                                | 1.0625      | 162394        | 63.74               | 162534   | 76.31                 |          |
| 27mm                                   | 1.0630      | 162395        | 61.37               | 162535   | 73.46                 |          |
| 1-3/32"                                | 1.0938      | 162396        | 63.74               | 162536   | 76.31                 |          |
| 28mm                                   | 1.1024      | 162397        | 67.64               | 162537   | 73.46                 |          |
| 1-7/64"                                | 1.1094      | 162399        | 63.74               | 162539   | 73.46                 |          |
| 1-1/8"                                 | 1.1250      | 162398        | 63.74               | 162538   | 76.31                 |          |
| 29mm                                   | 1.1417      | 162403        | 63.74               | 162541   | 79.18                 |          |
| 1-5/32"                                | 1.1563      | 162400        | 63.74               | 162540   | 73.46                 |          |
| 30mm                                   | 1.1811      | 162404        | 61.37               | 162543   | 80.98                 |          |
| 1-3/16"                                | 1.1875      | 162401        | 63.74               | 162542   | 76.31                 |          |
| 1-7/32"                                | 1.2188      | 162402        | 63.74               | 162544   | 76.31                 |          |
| 31mm                                   | 1.2205      | 162405        | 66.15               | 162545   | 73.46                 |          |
| 1-1/4"                                 | 1.2500      | 162406        | 63.74               | 162546   | 76.31                 |          |
| 32mm                                   | 1.2598      | 162407        | 63.74               | 162547   | 73.46                 |          |
| 1-9/32"                                | 1.2813      | 162408        | 63.74               | 162548   | 76.31                 |          |
| 33mm                                   | 1.2992      | 162409        | 66.15               | 162549   | 76.31                 |          |
| 1-5/16"                                | 1.3125      | 162410        | 63.74               | 162550   | 76.31                 |          |
| 34mm                                   | 1.3386      | 162411        | 63.74               | 162551   | 73.46                 |          |
| 1-11/32"                               | 1.3438      | 162412        | 63.74               | 162552   | 76.31                 |          |
| 1-3/8"                                 | 1.3750      | 162414        | 63.74               | 162554   | 76.31                 |          |
| 35mm                                   | 1.3780      | 162415        | 61.37               | 162555   | 73.46                 |          |
| 1-13/32"                               | 1.4063      | 162416        | 79.11               | 162558   | 91.60                 |          |
| 36mm                                   | 1.4173      | 162417        | 76.13               | 162559   | 91.60                 |          |
| 1-7/16"                                | 1.4375      | 162418        | 79.11               | 162560   | 95.18                 |          |
| 37mm                                   | 1.4567      | 162419        | 79.11               | 162561   | 95.09                 |          |
| 1-15/32"                               | 1.4688      | 162420        | 79.11               | 162562   | 95.18                 |          |
| 38mm                                   | 1.4961      | 162421        | 79.11               | 162563   | 95.18                 |          |
| 1-1/2"                                 | 1.5000      | 162422        | 79.11               | 162564   | 95.18                 |          |
| 1-17/32"                               | 1.5313      | 162424        | 79.11               | 162566   | 91.60                 |          |
| 39mm                                   | 1.5354      | 162425        | 79.11               | 162567   | 91.60                 |          |
| 1-9/16"                                | 1.5625      | 162426        | 79.11               | 162568   | 95.18                 |          |

| Series Min. to Max                     | Diameter    |               | TiN Coated Code No. | Price \$ | TiAlN Coated Code No. | Price \$ |
|--|-------------|---------------|---------------------|----------|-----------------------|----------|
|  | Inch Metric | Decimal (in.) |                     |          |                       |          |
| 3<br>1.353" to 1.882" (1/4")<br>Thick  | 40mm        | 1.5748        | 162427              | 76.13    | 162569                | 91.60    |
|  | 1-19/32"    | 1.5938        | 162428              | 76.13    | 162570                | 100.98   |
|  | 41mm        | 1.6142        | 162429              | 95.29    | 162571                | 91.60    |
|  | 1-5/8"      | 1.6250        | 162430              | 79.11    | 162572                | 95.18    |
|  | 42mm        | 1.6535        | 162431              | 76.13    | 162573                | 91.60    |
|  | 1-21/32"    | 1.6563        | 162432              | 79.11    | 162574                | 91.60    |
|  | 1-11/16"    | 1.6875        | 162434              | 79.11    | 162576                | 95.18    |
|  | 43mm        | 1.6929        | 162435              | 76.13    | 162577                | 95.18    |
|  | 1-23/32"    | 1.7188        | 162436              | 79.11    | 162578                | 95.18    |
|  | 44mm        | 1.7323        | 162437              | 79.11    | 162579                | 91.60    |
|  | 1-3/4"      | 1.7500        | 162438              | 79.11    | 162580                | 95.18    |
|  | 45mm        | 1.7717        | 162439              | 76.13    | 162581                | 91.60    |
|  | 1-25/32"    | 1.7813        | 162440              | 76.13    | 162582                | 95.18    |
|  | 46mm        | 1.8110        | 162441              | 76.13    | 162583                | 91.60    |
|  | 1-13/16"    | 1.8125        | 162442              | 79.11    | 162584                | 91.60    |
|  | 1-27/32"    | 1.8438        | 162444              | 76.13    | 162586                | 91.60    |
|  | 47mm        | 1.8504        | 162445              | 76.13    | 162587                | 91.60    |
|  | 1-7/8"      | 1.8750        | 162446              | 79.11    | 162588                | 95.18    |
|  | 1-29/32"    | 1.9063        | 162448              | 90.31    | 162590                | 112.55   |
|  | 1-15/16"    | 1.9375        | 162450              | 93.82    | 162592                | 141.39   |
| 1-31/32"                               | 1.9688      | 162452        | 93.82               | 162594   | 112.55                |          |
| 2"                                     | 2.0000      | 162454        | 93.82               | 162596   | 112.55                |          |
| 2-1/32"                                | 2.0313      | 162456        | 93.82               | 162598   | 108.33                |          |
| 2-3/64"                                | 2.0472      | 162458        | 90.31               | 162600   | 108.33                |          |
| 2-1/16"                                | 2.0625      | 162460        | 93.82               | 162602   | 108.33                |          |
| 2-3/32"                                | 2.0938      | 162462        | 97.34               | 162604   | 108.33                |          |
| 2-1/8"                                 | 2.1250      | 162464        | 93.82               | 162606   | 112.55                |          |
| 2-5/32"                                | 2.1563      | 162466        | 93.82               | 162608   | 108.33                |          |
| 2-3/16"                                | 2.1875      | 162468        | 93.82               | 162610   | 108.33                |          |
| 2-7/32"                                | 2.2188      | 162470        | 90.31               | 162612   | 112.55                |          |
| 2-1/4"                                 | 2.2500      | 162472        | 93.82               | 162614   | 112.55                |          |
| 2-9/32"                                | 2.2813      | 162474        | 90.31               | 162616   | 108.33                |          |
| 2-5/16"                                | 2.3125      | 162476        | 99.53               | 162618   | 108.33                |          |
| 2-11/32"                               | 2.3438      | 162478        | 90.31               | 162620   | 108.33                |          |
| 2-3/8"                                 | 2.3750      | 162480        | 93.82               | 162622   | 112.55                |          |
| 2-13/32"                               | 2.4063      | 162482        | 90.31               | 162624   | 108.33                |          |
| 2-7/16"                                | 2.4375      | 162484        | 93.82               | 162626   | 112.55                |          |
| 2-15/32"                               | 2.4688      | 162486        | 99.53               | 162628   | 112.55                |          |
| 2-1/2"                                 | 2.5000      | 162488        | 93.82               | 162630   | 112.55                |          |
| 2-17/32"                               | 2.5313      | 162490        | 93.82               | 162632   | 112.55                |          |
| 2-9/16"                                | 2.5625      | 162492        | 93.82               | 162634   | 112.55                |          |
| 2-1/2"                                 | 2.5000      | 162900        | 136.25              |          |                       |          |
| 2-5/8"                                 | 2.6250      | 162912        | 136.25              |          |                       |          |
| 2-3/4"                                 | 2.7500      | 162922        | 136.25              |          |                       |          |
| 2-25/32"                               | 2.7813      | 162926        | 136.25              |          |                       |          |
| 2-13/16"                               | 2.8125      | 162928        | 136.25              |          |                       |          |
| 2-27/32"                               | 2.8438      | 162932        | 131.12              |          |                       |          |
| 2-7/8"                                 | 2.8750      | 162934        | 136.25              |          |                       |          |
| 2-29/32"                               | 2.9063      | 162936        | 90.31               |          |                       |          |
| 2-15/16"                               | 2.9375      | 162940        | 136.25              |          |                       |          |
| 2-31/32"                               | 2.9688      | 162942        | 136.25              |          |                       |          |
| 3"                                     | 3.0000      | 162946        | 136.25              |          |                       |          |
| 6<br>3.001" to 3.507" (7/16")<br>Thick | 3-1/16"     | 3.0625        | 162950              | 157.59   |                       |          |
| 3-1/8"                                 | 3.1250      | 162956        | 157.59              |          |                       |          |
| 3-1/4"                                 | 3.2500      | 162968        | 157.59              |          |                       |          |
| 3-3/8"                                 | 3.3750      | 162978        | 157.59              |          |                       |          |
| 3-7/16"                                | 3.4375      | 162984        | 157.59              |          |                       |          |
| 3-1/2"                                 | 3.5000      | 162990        | 157.59              |          |                       |          |
| 7<br>3.455" to 4.0" (7/16")<br>Thick   | 3-9/16"     | 3.5625        | 162991              | 181.45   |                       |          |
| 3-5/8"                                 | 3.6250      | 163002        | 181.45              |          |                       |          |
| 3-3/4"                                 | 3.7500      | 163012        | 188.52              |          |                       |          |
| 3-7/8"                                 | 3.8750      | 163024        | 188.52              |          |                       |          |
| 4"                                     | 4.0000      | 163034        | 188.52              |          |                       |          |

Drilling & Holemaking



## Super HSCO (T15) Spade Drill



For drilling in high alloy materials and exotic materials, T15 may also be used in general purpose applications where increased speeds and enhanced wear resistance is required.



Speeds & Feeds > P. B52-53

| Series Min. to Max                     | Diameter    |               | TiN Coated Code No. | Price \$ | TiAlN Coated Code No. | Price \$ |
|--|-------------|---------------|---------------------|----------|-----------------------|----------|
|  | Inch Metric | Decimal (in.) |                     |          |                       |          |
| Y<br>0.374" to 0.436" (3/32")<br>Thick | 9.50mm      | 0.3740        | 161999              | 53.30    | 162179                | 58.12    |
|  | 3/8"        | 0.3750        | 162000              | 50.23    | 162180                | 60.39    |
|  | 9.80mm      | 0.3860        | 162001              | 48.35    | 162181                | 60.39    |
|  | 25/64"      | 0.3906        | 162002              | 50.23    | 162182                | 58.12    |
|  | 10mm        | 0.3937        | 162003              | 48.35    | 162183                | 58.12    |
|  | 10.20mm     | 0.4016        | 162005              | 48.35    | 162185                | 58.12    |
|  | 13/32"      | 0.4063        | 162004              | 50.23    | 162184                | 60.39    |
|  | 10.50mm     | 0.4134        | 162007              | 48.35    | 162187                | 64.08    |
|  | 27/64"      | 0.4219        | 162006              | 50.23    | 162186                | 60.39    |
|  | 10.80mm     | 0.4252        | 162009              | 48.35    | 162189                | 58.12    |
|  | 11mm        | 0.4331        | 162650              | 48.35    | 162720                | 58.12    |
|  | 7/16"       | 0.4375        | 162008              | 50.23    | 162188                | 60.39    |
| Z<br>0.437" to 0.510" (3/32")<br>Thick | 11.50mm     | 0.4528        | 162011              | 48.35    | 162191                | 58.12    |
|  | 29/64"      | 0.4531        | 162010              | 50.23    | 162190                | 60.39    |
|  | 15/32"      | 0.4688        | 162012              | 50.23    | 162192                | 60.39    |
|  | 12mm        | 0.4724        | 162652              | 50.23    | 162722                | 58.12    |
|  | 31/64"      | 0.4844        | 162014              | 50.23    | 162194                | 60.39    |
|  | 12.50mm     | 0.4921        | 162654              | 48.35    | 162724                | 58.12    |
|  | 1/2"        | 0.5000        | 162016              | 50.23    | 162196                | 60.39    |
|  | 13mm        | 0.5118        | 162656              | 54.12    | 162726                | 64.98    |
|  | 33/64"      | 0.5156        | 162018              | 54.12    | 162198                | 64.98    |
|  | 17/32"      | 0.5313        | 162020              | 54.12    | 162200                | 64.98    |
|  | 13.50mm     | 0.5315        | 162019              | 54.12    | 162203                | 64.98    |
|  | 35/64"      | 0.5469        | 162021              | 54.12    | 162201                | 64.98    |
| O<br>0.511" to 0.695" (1/8")<br>Thick  | 14mm        | 0.5512        | 162658              | 54.12    | 162728                | 64.98    |
|  | 9/16"       | 0.5625        | 162022              | 54.12    | 162204                | 64.98    |
|  | 14.50mm     | 0.5709        | 162660              | 57.44    | 162730                | 64.98    |
|  | 37/64"      | 0.5781        | 162024              | 54.12    | 162206                | 64.98    |
|  | 15mm        | 0.5906        | 162662              | 52.07    | 162732                | 64.98    |
|  | 19/32"      | 0.5938        | 162026              | 54.12    | 162208                | 64.98    |
|  | 39/64"      | 0.6094        | 162027              | 54.12    | 162209                | 64.98    |
|  | 15.50mm     | 0.6102        | 162664              | 52.07    | 162734                | 64.98    |
|  | 5/8"        | 0.6250        | 162028              | 54.12    | 162210                | 64.98    |
|  | 16mm        | 0.6299        | 162666              | 57.44    | 162736                | 64.98    |
|  | 41/64"      | 0.6406        | 162029              | 54.12    | 162211                | 64.98    |
|  | 16.50mm     | 0.6496        | 162668              | 54.12    | 162738                | 62.54    |
| 1<br>0.690" to 0.960" (5/32")<br>Thick | 21/32"      | 0.6563        | 162030              | 54.12    | 162212                | 64.98    |
|  | 17mm        | 0.6693        | 162670              | 56.20    | 162740                | 64.98    |
|  | 43/64"      | 0.6719        | 162031              | 54.12    | 162213                | 64.98    |
|  | 11/16"      | 0.6875        | 162032              | 54.12    | 162214                | 64.98    |
|  | 17.50mm     | 0.6890        | 162033              | 54.12    | 162215                | 64.98    |
|  | 45/64"      | 0.7031        | 162036              | 60.98    | 162218                | 72.18    |
|  | 18mm        | 0.7087        | 162672              | 64.70    | 162742                | 72.18    |
|  | 23/32"      | 0.7188        | 162038              | 60.98    | 162220                | 72.18    |
|  | 18.50mm     | 0.7283        | 162674              | 58.70    | 162744                | 69.52    |
|  | 47/64"      | 0.7344        | 162040              | 60.98    | 162222                | 72.18    |
|  | 19mm        | 0.7480        | 162676              | 58.70    | 162746                | 72.18    |
|  | 3/4"        | 0.7500        | 162042              | 60.98    | 162224                | 72.18    |
| 1<br>0.690" to 0.960" (5/32")<br>Thick | 49/64"      | 0.7656        | 162044              | 60.98    | 162226                | 72.18    |
|  | 19.50mm     | 0.7677        | 162045              | 60.98    | 162227                | 69.52    |
|  | 25/32"      | 0.7813        | 162046              | 60.98    | 162228                | 72.18    |
|  | 20mm        | 0.7874        | 162678              | 60.98    | 162748                | 72.18    |
|  | 51/64"      | 0.7969        | 162047              | 60.98    | 162229                | 72.18    |
|  | 20.50mm     | 0.8071        | 162680              | 60.98    | 162750                | 69.52    |
|  | 13/16"      | 0.8125        | 162048              | 60.98    | 162230                | 72.18    |
|  | 21mm        | 0.8268        | 162682              | 60.98    | 162752                | 72.18    |
|  | 27/32"      | 0.8438        | 162050              | 60.98    | 162232                | 72.18    |
|  | 55/64"      | 0.8594        | 162051              | 63.29    | 162233                | 72.18    |
|  | 22mm        | 0.8661        | 162684              | 60.98    | 162754                | 72.18    |
|  | 7/8"        | 0.8750        | 162052              | 60.98    | 162234                | 72.18    |
| 1<br>0.690" to 0.960" (5/32")<br>Thick | 57/64"      | 0.8906        | 162053              | 60.98    | 162235                | 72.18    |
|  | 23mm        | 0.9055        | 162055              | 58.70    | 162237                | 72.18    |
|  | 29/32"      | 0.9063        | 162054              | 60.98    | 162236                | 72.18    |
|  | 59/64"      | 0.9219        | 162056              | 60.98    | 162238                | 72.18    |
|  | 15/16"      | 0.9375        | 162058              | 58.70    | 162240                | 72.18    |
|  | 24mm        | 0.9449        | 162686              | 60.98    | 162756                | 72.18    |

| Series Min. to Max                      | Diameter                              |               | TiN Coated Code No. | Price \$ | TiAlN Coated Code No. | Price \$ |
|---|---------------------------------------|---------------|---------------------|----------|-----------------------|----------|
|   | Inch Metric                           | Decimal (in.) |                     |          |                       |          |
| 2<br>0.961" to 1.380" (3/16")<br>Thick  | 31/32"                                | 0.9688        | 162062              | 71.76    | 162244                | 85.11    |
|   | 63/64"                                | 0.9843        | 162064              | 71.76    | 162246                | 85.11    |
|   | 1"                                    | 1.0000        | 162066              | 71.76    | 162248                | 85.11    |
|   | 1-1/64"                               | 1.0156        | 162068              | 71.76    | 162250                | 85.11    |
|   | 26mm                                  | 1.0236        | 162688              | 71.76    | 162758                | 85.11    |
|   | 1-1/32"                               | 1.0313        | 162070              | 71.76    | 162252                | 85.11    |
|   | 1-3/64"                               | 1.0469        | 162071              | 71.76    | 162253                | 85.11    |
|   | 1-1/16"                               | 1.0625        | 162072              | 71.76    | 162254                | 85.11    |
|   | 27mm                                  | 1.0630        | 162073              | 71.76    | 162255                | 85.11    |
|   | 1-3/32"                               | 1.0938        | 162074              | 71.76    | 162256                | 85.11    |
|   | 28mm                                  | 1.1024        | 162690              | 71.76    | 162760                | 85.11    |
|   | 2<br>1.380" to 1.882" (1/4")<br>Thick | 1-7/64"       | 1.1094              | 162075   | 71.76                 | 162257   |
| 1-1/8"                                  |                                       | 1.1250        | 162076              | 71.76    | 162258                | 85.11    |
| 29mm                                    |                                       | 1.1417        | 162692              | 71.76    | 162762                | 85.11    |
| 1-5/32"                                 |                                       | 1.1563        | 162078              | 71.76    | 162260                | 85.11    |
| 30mm                                    |                                       | 1.1811        | 162694              | 71.76    | 162764                | 85.11    |
| 1-3/16"                                 |                                       | 1.1875        | 162080              | 71.76    | 162262                | 90.29    |
| 1-7/32"                                 |                                       | 1.2188        | 162082              | 71.76    | 162264                | 85.11    |
| 31mm                                    |                                       | 1.2205        | 162083              | 71.76    | 162265                | 85.11    |
| 1-1/4"                                  |                                       | 1.2500        | 162084              | 71.76    | 162266                | 85.11    |
| 32mm                                    |                                       | 1.2598        | 162696              | 71.76    | 162766                | 85.11    |
| 1-9/32"                                 |                                       | 1.2813        | 162086              | 71.76    | 162268                | 85.11    |
| 33mm                                    |                                       | 1.2992        | 162698              | 71.76    | 162768                | 85.11    |
| 3<br>1.882" to 2.570" (5/16")<br>Thick  | 1-5/16"                               | 1.3125        | 162088              | 71.76    | 162270                | 85.11    |
|   | 34mm                                  | 1.3386        | 162700              | 71.76    | 162770                | 85.11    |
|   | 1-11/32"                              | 1.3438        | 162090              | 71.76    | 162272                | 85.11    |
|   | 1-3/8"                                | 1.3750        | 162092              | 71.76    | 162274                | 85.11    |
|   | 35mm                                  | 1.3780        | 162702              | 76.14    | 162772                | 105.54   |
|   | 1-13/32"                              | 1.4063        | 162094              | 91.06    | 162276                | 109.32   |
|   | 36mm                                  | 1.4173        | 162704              | 91.06    | 162274                | 109.32   |
|   | 1-7/16"                               | 1.4375        | 162096              | 91.06    | 162278                | 109.32   |
|   | 37mm                                  | 1.4567        | 162097              | 87.64    | 162279                | 109.32   |
|   | 1-15/32"                              | 1.4688        | 162098              | 91.06    | 162280                | 109.32   |
|   | 38mm                                  | 1.4961        | 162099              | 87.64    | 162281                | 105.19   |
|   | 1-1/2"                                | 1.5000        | 162100              | 91.06    | 162282                | 109.32   |
| 3<br>2.570" to 3.150" (1/2")<br>Thick   | 1-17/32"                              | 1.5313        | 162102              | 91.06    | 162284                | 109.32   |
|   | 39mm                                  | 1.5354        | 162103              | 87.64    | 162285                | 124.05   |
|   | 1-9/16"                               | 1.5625        | 162104              | 91.06    | 162286                | 109.32   |
|   | 40mm                                  | 1.5748        | 162706              | 91.06    | 162776                | 109.32   |
|   | 1-19/32"                              | 1.5938        | 162106              | 91.06    | 162288                | 109.32   |
|   | 41mm                                  | 1.6142        | 162107              | 87.64    | 162289                | 105.19   |
|   | 1-5/8"                                | 1.6250        | 162108              | 91.06    | 162290                | 109.32   |
|   | 42mm                                  | 1.6535        | 162109              | 87.64    | 162291                | 109.32   |
|   | 1-21/32"                              | 1.6563        | 162110              | 91.06    | 162292                | 109.32   |
|   | 1-11/16"                              | 1.6875        | 162112              | 91.06    | 162294                | 109.32   |
|   | 43mm                                  | 1.6929        | 162113              | 87.64    | 162295                | 124.05   |
|   | 1-23/32"                              | 1.7188        | 162114              | 91.06    | 162296                | 109.32   |
| 4<br>3.150" to 3.937" (1 1/8")<br>Thick | 44mm                                  | 1.7323        | 162708              | 91.06    | 162778                | 109.32   |
|   | 1-3/4"                                | 1.7500        | 162116              | 91.06    | 162298                | 109.32   |
|   | 45mm                                  | 1.7717        | 162710              | 91.06    | 162780                | 109.32   |
|   | 1-25/32"                              | 1.7813        | 162118              | 91.06    | 162300                | 109.32   |
|   | 46mm                                  | 1.8110        | 162119              | 91.06    | 162301                | 105.19   |
|   | 1-13/16"                              | 1.8125        | 162120              | 91.06    | 162302                | 109.32   |
|   | 1-27/32"                              | 1.8438        | 162122              | 91.06    | 162304                | 109.32   |
|   | 47mm                                  | 1.8504        | 162123              | 87.64    | 162305                | 105.19   |
|   | 1-7/8"                                | 1.8750        | 162124              | 91.06    | 162306                | 109.32   |
|   | 1-29/32"                              | 1.9063        | 162126              | 115.33   | 162308                | 138.06   |
|   | 1-15/16"                              | 1.9375        | 162128              | 115.33   | 162310                | 138.06   |
|   | 1-31/32"                              | 1.9688        | 162130              | 115.33   | 162312                | 138.06   |
| 4<br>3.937" to 4.725" (1 1/4")<br>Thick | 2"                                    | 2.0000        | 162132              | 115.33   | 162314                | 138.06   |
|   | 2-1/32"                               | 2.0313        | 162134              | 111.01   | 162316                | 138.06   |
|   | 2-3/64"                               | 2.0472        | 162135              | 115.33   | 162317                | 138.06   |
|   | 2-1/16"                               | 2.0625        | 162136              | 115.33   | 162318                | 138.06   |
|   | 2-3/32"                               | 2.0938        | 162138              | 90.31    | 162320                | 138.06   |
|   | 2-1/8"                                | 2.1250        | 162140              | 115.33   | 162322                | 138.06   |
|   | 2-5/32"                               | 2.1563        | 162142              | 111.01   | 162324                | 138.06   |
|   | 2-3/16"                               | 2.1875        | 162144              | 115.33   | 162326                | 138.06   |
|   | 2-7/32"                               | 2.2188        | 162146              | 115.33   | 162328                | 138.06   |
|   | 2-1/4"                                | 2.2500        | 162148              | 115.33   | 162330                | 138.06   |
|   | 2-9/32"                               | 2.2813        | 162150              | 115.33   | 162332                | 138.06   |
|   | 2-5/16"                               | 2.3125        | 162152              | 115.33   | 162334                | 138.06   |
| 4<br>4.725" to 5.513" (1 1/2")<br>Thick | 2-11/32"                              | 2.3438        | 162154              | 111.01   | 162336                | 146.49   |
|   | 2-3/8"                                | 2.3750        | 162156              | 115.33   | 162338                | 138.06   |
|   | 2-13/32"                              | 2.4063        | 162158              | 97.37    | 162340                | 146.49   |
|   | 2-7/16"                               | 2.4375        | 162160              | 115.33   | 162342                | 138.06   |
|   | 2-15/32"                              | 2.4688        | 162162              | 122.34   | 162344                | 138.06   |
|   | 2-1/2"                                | 2.5000        | 162164              | 115.33   | 162346                | 138.06   |
|   | 2-17/32"                              | 2.5313        | 162166              | 115.33   | 162348                | 138.06   |
|   | 2-9/16"                               | 2.5625        | 162168              | 115.33   | 162350                | 138.06   |

## Short Length Straight Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Dia. | Shank Length | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|------------|--------------|----------|----------|----------|
| Y      | 3/8" – 27/64"      | 1-1/4"           | 2-1/32"      | 2-1/8"                | 4-13/32"       | 3/4"       | 2-3/8"       | 1/8"     | 162801   | 321.32   |
| Z      | 7/16" – 1/2"       | 1-1/4"           | 2-1/32"      | 2-1/8"                | 4-13/32"       | 3/4"       | 2-3/8"       | 1/8"     | 162803   | 321.32   |
| 0      | 33/64" – 11/16"    | 1-3/8"           | 2-3/16"      | 2-19/64"              | 4-9/16"        | 3/4"       | 2-3/8"       | 1/8"     | 162805   | 308.44   |
| 0.5    | 39/64" – 11/16"    | 1-3/8"           | 2-3/16"      | 2-19/64"              | 4-9/16"        | 3/4"       | 2-3/8"       | 1/8"     | 162807   | 302.04   |
| 1      | 45/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"               | 6-7/8"         | 3/4"       | 3"           | 1/8"     | 162822   | 320.14   |
| 1      | 45/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"               | 6-7/8"         | 1"         | 3"           | 1/8"     | 162809   | 320.14   |
| 1.5    | 55/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"               | 6-7/8"         | 3/4"       | 3"           | 1/8"     | 162808   | 361.53   |
| 1.5    | 55/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"               | 6-7/8"         | 1"         | 3"           | 1/8"     | 162811   | 322.86   |
| 2      | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 4-41/64"              | 8"             | 1"         | 3-1/2"       | 1/8"     | 162824   | 346.02   |
| 2      | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 4-41/64"              | 8"             | 1-1/4"     | 3-1/2"       | 1/8"     | 162812   | 361.53   |
| 2.5    | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 4-41/64"              | 8"             | 1"         | 3-1/2"       | 1/8"     | 162813   | 407.25   |
| 2.5    | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 4-41/64"              | 8"             | 1-1/4"     | 3-1/2"       | 1/8"     | 162815   | 407.25   |
| 3      | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 6-3/16"               | 10"            | 1-1/4"     | 4"           | 1/4"     | 162826   | 393.16   |
| 3      | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 6-3/16"               | 10"            | 1-1/2"     | 4"           | 1-4"     | 162817   | 408.80   |
| 4      | 1-29/32" – 2-9/16" | 5-1/8"           | 6-1/2"       | 6-3/16"               | 10-1/2"        | 1-1/2"     | 4"           | 1/4"     | 162828   | 474.47   |
| 4      | 1-29/32" – 2-9/16" | 5-1/8"           | 6-1/2"       | 6-3/16"               | 10-1/2"        | 1-3/4"     | 4"           | 1/4"     | 162819   | 500.80   |
| 5-6    | 2-1/2" – 3-1/2"    | 6-3/4"           | 8-1/2"       | 8-3/4"                | 12-1/2"        | 2"         | 4"           | 1/2"     | 163050   | 921.06   |

## Intermediate Length Straight Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Dia. | Shank Length | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|------------|--------------|----------|----------|----------|
| 1      | 45/64" – 15/16"    | 4-5/8"           | 5-7/8"       | 6-1/64"               | 8-7/8"         | 1"         | 3"           | 1/8"     | 162833   | 365.53   |
| 1.5    | 55/64" – 15/16"    | 4-5/8"           | 5-7/8"       | 6-1/64"               | 8-7/8"         | 1"         | 3"           | 1/8"     | 162834   | 503.33   |
| 2      | 31/32" – 1-3/8"    | 5-3/8"           | 6-1/2"       | 6-41/64"              | 10"            | 1-1/4"     | 3-1/2"       | 1/8"     | 162835   | 398.75   |
| 2.5    | 1-3/16" – 1-3/8"   | 5-3/8"           | 6-1/2"       | 6-41/64"              | 10"            | 1-1/4"     | 3-1/2"       | 1/8"     | 162837   | 465.76   |
| 3      | 1-13/32" – 1-7/8"  | 6-1/2"           | 7-3/4"       | 7-15/16"              | 11-3/4"        | 1-1/2"     | 4"           | 1/4"     | 162839   | 595.86   |

## Standard Length Straight Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Dia. | Shank Length | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|------------|--------------|----------|----------|----------|
| Y      | 3/8" – 27/64"      | 2-3/8"           | 3-5/32"      | 3-1/4"                | 5-17/32"       | 3/4"       | 2-3/8"       | 1/8"     | 162800   | 315.39   |
| Z      | 7/16" – 1/2"       | 2-3/8"           | 3-5/32"      | 3-1/4"                | 5-17/32"       | 3/4"       | 2-3/8"       | 1/8"     | 162802   | 309.67   |
| 0      | 33/64" – 11/16"    | 2-1/2"           | 3-5/16"      | 3-27/64"              | 5-11/16"       | 3/4"       | 2-3/8"       | 1/8"     | 162804   | 309.69   |
| 0.5    | 39/64" – 11/16"    | 2-1/2"           | 3-5/16"      | 3-27/64"              | 5-11/16"       | 3/4"       | 2-3/8"       | 1/8"     | 162820   | 330.22   |
| 1      | 45/64" – 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"               | 10-7/8"        | 3/4"       | 3"           | 1/8"     | 162806   | 346.03   |
| 1      | 45/64" – 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"               | 10-7/8"        | 1"         | 3"           | 1/8"     | 162821   | 346.06   |
| 1.5    | 55/64" – 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"               | 10-7/8"        | 1"         | 3"           | 1/8"     | 162825   | 390.28   |
| 2      | 31/32" – 1-3/8"    | 7-3/8"           | 8-1/2"       | 8-41/64"              | 12"            | 1"         | 3-1/2"       | 1/8"     | 162810   | 390.28   |
| 2      | 31/32" – 1-3/8"    | 7-3/8"           | 8-1/2"       | 8-41/64"              | 12"            | 1-1/4"     | 3-1/2"       | 1/8"     | 162827   | 371.90   |
| 2.5    | 1-3/16" – 1-3/8"   | 7-3/8"           | 8-1/2"       | 8-41/64"              | 12"            | 1"         | 3-1/2"       | 1/8"     | 162829   | 430.94   |
| 2.5    | 1-3/16" – 1-3/8"   | 7-3/8"           | 8-1/2"       | 8-41/64"              | 12"            | 1-1/4"     | 3-1/2"       | 1/8"     | 162830   | 430.94   |
| 3      | 1-13/32" – 1-7/8"  | 8-1/4"           | 9-1/2"       | 9-11/16"              | 13-1/2"        | 1-1/4"     | 4"           | 1/4"     | 162814   | 457.55   |
| 3      | 1-13/32" – 1-7/8"  | 8-1/4"           | 9-1/2"       | 9-11/16"              | 13-1/2"        | 1-1/2"     | 4"           | 1/4"     | 162831   | 436.37   |
| 4      | 1-29/32" – 2-9/16" | 9-1/8"           | 10-1/2"      | 10-11/16"             | 14-1/2"        | 1-1/2"     | 4"           | 1/4"     | 162818   | 753.05   |
| 4      | 1-29/32" – 2-9/16" | 9-1/8"           | 10-1/2"      | 10-11/16"             | 14-1/2"        | 1-3/4"     | 4"           | 1/4"     | 162832   | 526.26   |
| 5-6    | 2-1/2" – 3-1/2"    | 10-3/4"          | 12-1/2"      | 12-3/4"               | 16-1/2"        | 2"         | 4"           | 1/2"     | 163054   | 861.91   |

## Short Length Taper Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Taper | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|-------------|----------|----------|----------|
| Y      | 3/8" – 27/64"      | 1-1/4"           | 2-1/32"      | 3-15/32"              | 6-5/16"        | #2          | 1/16"    | 162917   | 323.09   |
| Z      | 7/16" – 1/2"       | 1-1/4"           | 2-1/32"      | 3-15/32"              | 6-5/16"        | #2          | 1/16"    | 162901   | 303.70   |
| 0      | 33/64" – 11/16"    | 1-3/8"           | 2-3/16"      | 3-41/64"              | 6-15/32"       | #2          | 1/16"    | 162902   | 429.99   |
| 0.5    | 39/64" – 11/16"    | 1-3/8"           | 2-3/16"      | 3-41/64"              | 6-15/32"       | #2          | 1/16"    | 162903   | 295.10   |
| 1      | 45/64" – 15/16"    | 2-3/4"           | 3-7/8"       | 5-39/64"              | 9-5/32"        | #3          | 1/8"     | 162904   | 356.39   |
| 1      | 45/64" – 15/16"    | 2-3/4"           | 3-7/8"       | 5-43/64"              | 10-5/32"       | #4          | 1/8"     | 162905   | 361.53   |
| 1.5    | 55/64" – 15/16"    | 2-3/4"           | 3-7/8"       | 5-39/64"              | 9-5/32"        | #3          | 1/8"     | 162906   | 340.93   |
| 1.5    | 55/64" – 15/16"    | 2-3/4"           | 3-7/8"       | 5-43/64"              | 10-5/32"       | #4          | 1/8"     | 162907   | 350.48   |
| 2      | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 6-15/64"              | 9-25/32"       | #3          | 1/8"     | 162908   | 392.46   |
| 2      | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 6-19/64"              | 10-25/32"      | #4          | 1/8"     | 162909   | 407.25   |
| 2.5    | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 6-15/64"              | 9-25/32"       | #3          | 1/8"     | 162910   | 373.97   |
| 2.5    | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 6-37/64"              | 11-1/16"       | #4          | 1/4"     | 162911   | 435.54   |
| 3      | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 8-1/8"                | 13-9/16"       | #4          | 1/4"     | 162918   | 436.18   |
| 3      | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 8-1/8"                | 13-13/16"      | #5          | 1/4"     | 162913   | 434.74   |
| 4      | 1-29/32" – 2-9/16" | 5-1/8"           | 6-1/2"       | 8-5/8"                | 14-5/16"       | #5          | 1/4"     | 162914   | 517.54   |
| 5-6    | 2-1/2" – 3-1/2"    | 6-3/4"           | 8-1/2"       | 11-5/16"              | 16-15/16"      | #5          | 1/2"     | 162915   | 784.43   |

## Intermediate Length Taper Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Taper | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|-------------|----------|----------|----------|
| 1      | 45/64" – 15/16"    | 4-3/4"           | 5-7/8"       | 7-39/64"              | 11-5/32"       | #3          | 1/8"     | 162841   | 377.48   |
| 2      | 31/32" – 1-3/8"    | 5-3/8"           | 6-1/2"       | 8-19/64"              | 12-25/32"      | #4          | 1/8"     | 162845   | 437.42   |
| 2.5    | 1-3/16" – 1-3/8"   | 5-3/8"           | 6-1/2"       | 8-37/64"              | 13-1/16"       | #4          | 1/4"     | 162846   | 398.91   |
| 3      | 1-13/32" – 1-7/8"  | 6-1/2"           | 7-3/4"       | 9-7/8"                | 14-5/16"       | #4          | 1/4"     | 162847   | 473.83   |

## Standard Length Taper Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Taper | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|-------------|----------|----------|----------|
| Y      | 3/8" – 27/64"      | 2-3/8"           | 3-5/32"      | 4-19/32"              | 7-7/16"        | #2          | 1/16"    | 162864   | 295.10   |
| Z      | 7/16" – 1/2"       | 2-3/8"           | 3-5/32"      | 4-19/32"              | 7-7/16"        | #2          | 1/16"    | 162866   | 439.66   |
| 0      | 33/64" – 11/16"    | 2-1/2"           | 3-5/16"      | 4-49/64"              | 7-19/32"       | #2          | 1/16"    | 162868   | 327.90   |
| 0.5    | 39/64" – 11/16"    | 2-1/2"           | 3-5/16"      | 4-49/64"              | 7-19/32"       | #2          | 1/16"    | 162869   | 439.66   |
| 1      | 45/64" – 15/16"    | 6-3/4"           | 7-7/8"       | 9-39/64"              | 13-5/32"       | #3          | 1/8"     | 162870   | 381.30   |
| 1      | 45/64" – 15/16"    | 6-3/4"           | 7-7/8"       | 9-43/64"              | 14-5/32"       | #4          | 1/8"     | 162871   | 393.76   |
| 1.5    | 55/64" – 15/16"    | 6-3/4"           | 7-7/8"       | 9-39/64"              | 13-5/32"       | #3          | 1/8"     | 162872   | 380.35   |
| 1.5    | 55/64" – 15/16"    | 6-3/4"           | 7-7/8"       | 9-43/64"              | 14-5/32"       | #4          | 1/8"     | 162873   | 554.03   |
| 2      | 31-32" – 1-3/8"    | 7-3/8"           | 8-1/2"       | 10-15/64"             | 13-25/32"      | #3          | 1/8"     | 162874   | 421.21   |
| 2      | 31/32" – 1-3/8"    | 7-3/8"           | 8-1/2"       | 10-19/64"             | 14-25/32"      | #4          | 1/8"     | 162875   | 433.64   |
| 2.5    | 1-3/16" – 1-3/8"   | 7-3/8"           | 8-1/2"       | 10-15/64"             | 13-25/32"      | #3          | 1/8"     | 162876   | 442.70   |
| 2.5    | 1-3/16" – 1-3/8"   | 7-3/8"           | 8-1/2"       | 10-37/64"             | 15-1/16"       | #4          | 1/4"     | 162877   | 462.10   |
| 3      | 1-13/32" – 1-7/8"  | 8-1/4"           | 9-1/2"       | 11-1/8"               | 16-1/16"       | #4          | 1/4"     | 162878   | 481.02   |
| 3      | 1-13/32" – 1-7/8"  | 8-1/4"           | 9-1/2"       | 11-5/8"               | 17-5/16"       | #5          | 1/4"     | 162881   | 512.12   |
| 4      | 1-29/32" – 2-9/16" | 9-1/8"           | 10-1/2"      | 12-5/8"               | 17-1/16"       | #4          | 1/4"     | 162879   | 548.67   |
| 4      | 1-29/32" – 2-9/16" | 9-1/8"           | 10-1/2"      | 12-5/8"               | 18-5/16"       | #5          | 1/4"     | 162883   | 552.71   |
| 5-6    | 2-1/2" – 3-1/2"    | 10-3/4"          | 12-1/2"      | 15-5/16"              | 20-15/16"      | #5          | 1/2"     | 163058   | 915.44   |

## Extended Length Taper Shank Holder — Straight Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Taper | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|-------------|----------|----------|----------|
| 0      | 33/64" – 11/16"    | 4-1/2"           | 5-5/16"      | 6-49/64"              | 9-13/32"       | #2          | 1/16"    | 162836   | 348.67   |
| 1      | 45/64" – 15/16"    | 10-3/4"          | 11-7/8"      | 13-39/64"             | 17-5/32"       | #3          | 1/8"     | 162838   | 400.42   |
| 2      | 31/32" – 1-3/8"    | 11-3/8"          | 12-1/2"      | 14-15/64"             | 18-25/32"      | #4          | 1/8"     | 162840   | 515.32   |
| 3      | 1-13/32" – 1-7/8"  | 13-3/4"          | 15"          | 17-1/8"               | 21-9/16"       | #4          | 1/4"     | 162842   | 591.59   |
| 4      | 1-29/32" – 2-9/16" | 16-5/8"          | 18"          | 20-1/8"               | 25-13/16"      | #5          | 1/4"     | 162844   | 747.84   |

## Standard Length Taper Shank Holder — Helical Flute



| Series | Drill Insert Range | Max. Drill Depth | Flute Length | Top of Drill to Shank | Overall Length | Shank Taper | Pipe Tap | Code No. | Price \$ |
|--------|--------------------|------------------|--------------|-----------------------|----------------|-------------|----------|----------|----------|
| Y      | 3/8" – 27/64"      | 2-3/8"           | 3-5/32"      | 4-19/32"              | 7-7/16"        | #2          | 1/16"    | 162850   | 254.63   |
| Z      | 7/16" – 1/2"       | 2-3/8"           | 3-5/32"      | 4-19/32"              | 7-7/16"        | #2          | 1/16"    | 162852   | 326.38   |
| 0      | 33/64" – 11/16"    | 2-1/2"           | 3-5/16"      | 4-49/64"              | 7-19/32"       | #2          | 1/16"    | 162854   | 326.38   |
| 1      | 45/64" – 15/16"    | 6-3/4"           | 7-7/8"       | 9-39/64"              | 13-5/32"       | #3          | 1/8"     | 162856   | 388.35   |
| 2      | 31/32" – 1-3/8"    | 7-3/8"           | 8-1/2"       | 10-15/64"             | 13-25/32"      | #3          | 1/8"     | 162860   | 440.07   |

## Coolant Adapters



| M.T. | Description | Pipe Thread | Thread for Driving Rod | Code No. | Price \$ |
|------|-------------|-------------|------------------------|----------|----------|
| 2    | SCA-2       | 1/8"        | 5/16-NC                | 163100   | 80.24    |
| 3    | SCA-3       | 1/8"        | 5/16-NC                | 163102   | 85.21    |
| 4    | SCA-4       | 1/4"        | 3/8-NC                 | 163104   | 111.00   |
| 5    | SCA-5       | 1/4"        | 3/8-NC                 | 163106   | 127.50   |

## Torx Screws



| Series | Torx Size   | Code No. | Price \$ |
|--------|-------------|----------|----------|
| Y, Z   | T-7         | 162880   | 7.49     |
| Y, Z   | M2 x 0.4    | 162891   | 6.04     |
| 0      | T-8         | 162882   | 6.29     |
| 0.5    | M2.5 x 0.45 | 162893   | 6.04     |
| 1-1.5  | T-9         | 162884   | 6.29     |
| 1.5    | M3 x 0.5    | 162895   | 6.04     |
| 2-2.5  | T-15        | 162886   | 6.29     |
| 3-4    | T-20        | 162888   | 6.29     |
| 5-8    | T-25        | 162890   | 6.29     |

## Seal Repair Kits



| M.T. | Description | Code No. | Price \$ |
|------|-------------|----------|----------|
| 2    | CA-2        | 163110   | 8.24     |
| 3    | CA-3        | 163112   | 5.58     |
| 4    | CA-4        | 163114   | 6.71     |
| 5    | CA-5        | 163116   | 16.10    |

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## Recommended Blade Selection, Speeds & Feeds



### When To Use M-4:

- Loose machines
- Manual machines
- Cross hole drilling

### When To Use T15:

- On CNC machines
- When M-4 life needs to be extended
- Abrasive drilling

| Material                             | Material Rockwell Hardness (HRC) | Rec. Blade HSS-M4 ⊖HSCO-T15 | TiN SFM Surface Footage  | TiAlN SFM Surface Footage | 3/8" to 1/2"                     | Feed (IPR) 33/64" to 11/16"      | 45/64" to 15/16"                 | 31/32" to 1-3/8"                 | 1-13/32" to 1-7/8"               | 1-29/32" to 2-9/16"              | 2-19/32" to 4-1/2"               |
|--------------------------------------|----------------------------------|-----------------------------|--------------------------|---------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| <b>Free Machining Steel</b>          | -                                | -                           | -                        | 280                       | 0.007                            | 0.010                            | 0.013                            | 0.016                            | 0.020                            | 0.023                            | 0.028                            |
| 1118, 1215, 12L14, etc.              | < 12<br>12-25                    | -<br>-                      | -<br>-                   | 260<br>240                | 0.007<br>0.007                   | 0.010<br>0.010                   | 0.013<br>0.013                   | 0.016<br>0.016                   | 0.020<br>0.020                   | 0.023<br>0.023                   | 0.028<br>0.028                   |
| <b>Low &amp; Medium Carbon Steel</b> | < 7                              | -                           | 160                      | 240                       | 0.006                            | 0.009                            | 0.012                            | 0.015                            | 0.019                            | 0.023                            | 0.027                            |
| 1018, 1040, 12L14, etc.              | 7-20<br>20-29<br>29-35           | -<br>-<br>⊖                 | 150<br>140<br>130        | 225<br>210<br>195         | 0.005<br>0.005<br>0.004          | 0.0098<br>0.0098<br>0.007        | 0.010<br>0.010<br>0.009          | 0.014<br>0.014<br>0.012          | 0.018<br>0.018<br>0.016          | 0.021<br>0.021<br>0.019          | 0.024<br>0.024<br>0.022          |
| <b>Alloy Steel</b>                   | < 7                              | -                           | 150                      | 210                       | 0.006                            | 0.008                            | 0.010                            | 0.014                            | 0.017                            | 0.019                            | 0.022                            |
| 4140, 5140, 8640, etc.               | 7-20<br>20-29<br>29-35<br>35-40  | -<br>-<br>⊖<br>⊖            | 140<br>130<br>120<br>110 | 195<br>180<br>170<br>155  | 0.005<br>0.005<br>0.004<br>0.003 | 0.008<br>0.007<br>0.006<br>0.006 | 0.010<br>0.010<br>0.009<br>0.009 | 0.014<br>0.014<br>0.012<br>0.012 | 0.017<br>0.017<br>0.015<br>0.015 | 0.019<br>0.019<br>0.017<br>0.017 | 0.022<br>0.022<br>0.020<br>0.020 |
| <b>High Strength Alloy Steel</b>     | 20-32                            | ⊖                           | 80                       | 110                       | 0.005                            | 0.007                            | 0.009                            | 0.010                            | 0.014                            | 0.017                            | 0.020                            |
| 4340, 4330V, 300M, etc.              | 32-37<br>37-43                   | ⊖<br>-                      | 60<br>50                 | 85<br>70                  | 0.004<br>0.003                   | 0.007<br>0.006                   | 0.009<br>0.008                   | 0.010<br>0.009                   | 0.014<br>0.012                   | 0.017<br>0.015                   | 0.020<br>0.018                   |
| <b>Structural Steel</b>              | -                                | -                           | 140                      | 200                       | 0.006                            | 0.010                            | 0.012                            | 0.014                            | 0.018                            | 0.021                            | 0.026                            |
| A36, A285, A516, etc.                | 12-25<br>37-43                   | -<br>⊖                      | 120<br>100               | 170<br>140                | 0.005<br>0.004                   | 0.009<br>0.008                   | 0.010<br>0.009                   | 0.012<br>0.010                   | 0.016<br>0.014                   | 0.019<br>0.017                   | 0.024<br>0.020                   |
| <b>High Temp. Alloy</b>              | < 18                             | ⊖                           | 30                       | 40                        | 0.003                            | 0.006                            | 0.007                            | 0.008                            | 0.010                            | 0.012                            | 0.015                            |
| Hastelloy B, Inconel 600, etc.       | 18-32                            | ⊖                           | 25                       | 35                        | 0.003                            | 0.006                            | 0.007                            | 0.008                            | 0.010                            | 0.012                            | 0.015                            |
| <b>Stainless Steel</b>               | < 7                              | -                           | 75                       | 105                       | 0.006                            | 0.008                            | 0.009                            | 0.011                            | 0.014                            | 0.016                            | 0.020                            |
| 303, 416, 420, 17-4 PH, etc.         | 7-29                             | -                           | 60                       | 90                        | 0.005                            | 0.007                            | 0.008                            | 0.010                            | 0.012                            | 0.014                            | 0.018                            |
| <b>Tool Steel</b>                    | < 12                             | ⊖                           | 80                       | 110                       | 0.004                            | 0.006                            | 0.008                            | 0.010                            | 0.012                            | 0.015                            | 0.017                            |
| H-13, H021, AD4, O-2, S-3, etc.      | 12-25                            | ⊖                           | 60                       | 90                        | 0.004                            | 0.006                            | 0.008                            | 0.010                            | 0.012                            | 0.015                            | 0.017                            |
| <b>Aluminum</b>                      | < 6                              | -                           | 600                      | 850                       | 0.008                            | 0.013                            | 0.016                            | 0.020                            | 0.022                            | 0.025                            | 0.025                            |
| -                                    | -                                | -                           | 300                      | 450                       | 0.008                            | 0.013                            | 0.016                            | 0.018                            | 0.022                            | 0.025                            | 0.025                            |
| <b>Cast Iron</b>                     | -                                | -                           | 170                      | 250                       | 0.007                            | 0.012                            | 0.016                            | 0.020                            | 0.024                            | 0.027                            | 0.030                            |
| Gray, Ductile, Nodular               | <12<br>12-18<br>18-26<br>26-32   | -<br>-<br>⊖<br>⊖            | 150<br>130<br>110<br>90  | 225<br>195<br>165<br>135  | 0.006<br>0.006<br>0.005<br>0.004 | 0.011<br>0.009<br>0.007<br>0.006 | 0.014<br>0.012<br>0.009<br>0.007 | 0.018<br>0.016<br>0.012<br>0.009 | 0.022<br>0.018<br>0.014<br>0.012 | 0.025<br>0.021<br>0.017<br>0.014 | 0.028<br>0.024<br>0.020<br>0.016 |

Note: The speeds and feeds listed above are considered a general starting point for all applications. Factors such as material, material hardness, coolant pressure, hole diameter and length to diameter ratio should also be considered when making these recommendations. Speed and feed reductions are recommended when using extended length holders.

## Throw-Away Drill Inserts — Coolant Pressure

| Material   | Material Hardness (BHN) | High Speed Steel (TiN, TiAlN)<br>Coolant Pressure (PSI)<br>Coolant Volumetric Flow Rate (GPM) |                        |                        |                    |                     |                    |                    |
|--|-------------------------|---|------------------------|------------------------|--------------------|---------------------|--------------------|--------------------|
|  |                         | 3/8"  | 33/64"                 | 23/32"                 | 1"                 | 1/4"                | 2"                 | 3"                 |
|  |                         | 1/2"  | 11/16"                 | 1"                     | 1-1/4"             | 1"                  | 3"                 | 4"                 |
| <b>Free Machining Steel</b><br>1118, 1215, 12L14, etc.           | 100 - 250               | 175 - 185<br>2.5 - 2.6  | 100 - 120<br>2.8 - 3.0 | 105 - 140<br>4.4 - 5.2 | 80 - 115<br>7 - 8  | 75 - 100<br>12 - 14 | 40 - 50<br>30 - 33 | 65 - 90<br>38 - 44 |
| <b>Low Carbon Steel</b><br>1010, 1020, 1025, 1522, etc.          | 85 - 275                | 165 - 170<br>2.4 - 2.5  | 75 - 90<br>2.4 - 2.6   | 75 - 95<br>3.7 - 4.2   | 60 - 80<br>6 - 7   | 55 - 75<br>11 - 12  | 30 - 40<br>26 - 30 | 50 - 65<br>33 - 38 |
| <b>Medium Carbon Steel</b><br>1030, 1040, 1050, 1527, 1140, 1151 | 125 - 325               | 160 - 165<br>2.3 - 2.4  | 70 - 85<br>2.3 - 2.6   | 70 - 90<br>3.6 - 4.1   | 55 - 70<br>5 - 6   | 50 - 70<br>10 - 12  | 30 - 40<br>26 - 30 | 50 - 65<br>33 - 38 |
| <b>Alloy Steel</b><br>4140, 5140, 8640, etc.                     | 125 - 375               | 160 - 165<br>2.3 - 2.5  | 66 - 75<br>2.2 - 2.4   | 65 - 80<br>3.5 - 3.9   | 50 - 70<br>5 - 6   | 45 - 60<br>10 - 11  | 30 - 35<br>26 - 28 | 40 - 50<br>30 - 33 |
| <b>High Strength Alloy</b>                                       | 225 - 400               | 150 - 155<br>2.3 - 2.4  | 55 - 60<br>2.1 - 2.2   | 45 - 50<br>2.90 - 3.1  | 25 - 30<br>4 - 5   | 25 - 30<br>7 - 8    | 20 - 25<br>21 - 23 | 25 - 30<br>23 - 26 |
| <b>Structural Steel</b>  | 100 - 350               | 160 - 165<br>2.3 - 2.4  | 75 - 85<br>2.4 - 2.6   | 65 - 80<br>3.5 - 3.9   | 40 - 55<br>5 - 6   | 40 - 50<br>9 - 10   | 25 - 30<br>23 - 26 | 40 - 50<br>33 - 33 |
| <b>High Temp. Alloy</b><br>Hastelloy B, Inconel 600, etc.        | 140 - 310               | 150 - 155<br>2.3 - 2.4  | 60 - 65<br>2.2 - 2.3   | 50 - 55<br>3.1 - 3.2   | 30 - 35<br>4 - 5   | 25 - 30<br>7 - 8    | 25 - 30<br>23 - 26 | -<br>-             |
| <b>Stainless Steel</b><br>301, 316, 330, 17-4Ph, etc.            | 135 - 275               | 165 - 170<br>2.4 - 2.5  | 70 - 85<br>2.3 - 2.6   | 65 - 75<br>3.5 - 3.7   | 40 - 55<br>5 - 6   | 40 - 50<br>9 - 10   | 25 - 30<br>23 - 26 | 35 - 45<br>28 - 31 |
| <b>Tool Steel</b><br>H-13, H-21, A-4, O-2, S-3, etc              | 150 - 250               | 150 - 155<br>2.3 - 2.4  | 55 - 60<br>2.1 - 2.2   | 45 - 50<br>2.9 - 3.1   | 25 - 30<br>4 - 5   | 25 - 30<br>7 - 8    | 20 - 25<br>21 - 23 | 25 - 30<br>23 - 26 |
| <b>Aluminum</b>  | 30 - 180                | 190 - 210<br>2.6 - 2.7  | 140 - 180<br>3.3 - 3.7 | 150 - 200<br>5.3 - 6.1 | 115 - 160<br>8 - 9 | 90 - 125<br>14 - 16 | 40 - 50<br>30 - 33 | 60 - 80<br>36 - 42 |
| <b>Cast Iron</b>   | 120 - 320               | 155 - 160<br>2.3 - 2.4  | 60 - 65<br>2.2 - 2.3   | 50 - 60<br>3.1 - 3.3   | 30 - 40<br>4 - 4   | 30 - 36<br>8 - 9    | 25 - 30<br>23 - 26 | 30 - 35<br>26 - 28 |

## Throw-Away Drill Inserts Spade Drill Horsepower Consumption Rate

### Metal Removal Rates (MRR)

Example: 1.50 dia. drill @ 6.412 IPM

### Volume of Cylinder Method: $D^2 \times 0.785 \times L$

D = Hole Diameter

L = Length in IPM

0.785 is Constant

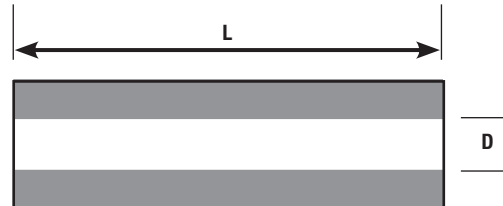
Material Drilled 4140 250 BHN:

Cutting Data: 180 SFM (458 R.P.M.) x 0.014 Feed per Rev.

458rpm x 0.014 = 6.412 IPM (L)

$D^2 (1.5)^2 \times 0.785 \times L (6.412) = 5 \text{ C.U. In./Min (MRR)}$

**MRR of 5 x 1.4 Energy Value = 7HP**



## Metal Removal Rates (MRR)

- Cubic inches of metal removal per unit of horsepower
- Unit horsepower (HPu) is the amount of power to remove a volume of metal in a period of time
- HPu = power to cut 1 cubic inch per minute – found in tables

### AVERAGE UNIT HORSEPOWER VALUES OF ENERGY PER UNIT VOLUME

| Material         | BHN       | HPu [HP/(in <sup>3</sup> )min.] |
|------------------|-----------|---------------------------------|
| Carbon Steels    | 150 - 200 | 1.0                             |
|                  | 200 - 250 | 1.4                             |
|                  | 250 - 350 | 1.6                             |
| Leaded Steels    | 150 - 175 | 0.7                             |
| Cast Irons       | 125 - 190 | 0.5                             |
|                  | 190 - 250 | 1.6                             |
| Stainless Steels | 135 - 275 | 1.5                             |
| Aluminum Alloys  | 50 - 100  | 0.3                             |
| Magnesium Alloys | 40 - 90   | 0.2                             |
| Copper           | 125 - 140 | 0.7                             |
| Copper Alloys    | 100 - 150 | 0.7                             |

## Single Flute Countersinks HSS — 60°, 82°, 90°, 100°, 120°

- Radial relief generated in the first 90 degrees behind the cutting edge, ensures smooth, chatter-free cutting without overfeeding and makes the tool self-centering
- Steam black oxide surface treatment enhances tool life and prevents galling
- The best style countersink for use in hand held applications
- 100% CNC manufactured to tighter than industry standard tolerances



| Body Dia. (in.) | Shank Dia. (in.) | 60°          | 60° HSS Code No. | Price \$ | 82°          | 82° HSS Code No. | Price \$ | 90°          | 90° HSS Code No. | Price \$ |
|-----------------|------------------|--------------|------------------|----------|--------------|------------------|----------|--------------|------------------|----------|
| 1/8             | 1/8              | HS1-1/8-60   | 121560           | 20.10    | HS1-1/8-82   | 121571           | 18.31    | HS1-1/8-90   | 121582           | 20.10    |
| 3/16            | 3/16             | HS1-3/16-60  | 121561           | 20.21    | HS1-3/16-82  | 121572           | 20.21    | HS1-3/16-90  | 121583           | 18.54    |
| 1/4             | 1/4              | HS1-1/4-60   | 121562           | 21.77    | HS1-1/4-82   | 121573           | 21.18    | HS1-1/4-90   | 121584           | 22.84    |
| 3/8             | 1/4              | HS1-3/8-60   | 121563           | 28.83    | HS1-3/8-82   | 121574           | 28.36    | HS1-3/8-90   | 121585           | 30.39    |
| 1/2             | 1/4              | HS1-1/2-60   | 121564           | 32.89    | HS1-1/2-82   | 121575           | 34.82    | HS1-1/2-90   | 121586           | 34.82    |
| 5/8             | 3/8              | HS1-5/8-60   | 121565           | 48.09    | HS1-5/8-82   | 121576           | 48.32    | HS1-5/8-90   | 121587           | 50.85    |
| 3/4             | 1/2              | HS1-3/4-60   | 121566           | 68.55    | HS1-3/4-82   | 121577           | 69.37    | HS1-3/4-90   | 121588           | 69.37    |
| 1               | 1/2              | HS1-1-60     | 121567           | 102.76   | HS1-1-82     | 121578           | 107.65   | HS1-1-90     | 121589           | 107.65   |
| 1-1/4           | 1/2              | HS1-1-1/4-60 | 121568           | 181.83   | HS1-1-1/4-82 | 121579           | 184.10   | HS1-1-1/4-90 | 121590           | 184.10   |
| 1-1/2           | 3/4              | HS1-1-1/2-60 | 121569           | 248.80   | HS1-1-1/2-82 | 121580           | 241.03   | HS1-1-1/2-90 | 121591           | 243.19   |
| 2               | 3/4              | HS1-2-60     | 121570           | 470.69   | HS1-2-82     | 121581           | 471.41   | HS1-2-90     | 121592           | 470.69   |

| Body Dia. (in.) | Shank Dia. (in.) | 100°         | 100° HSS Code No. | Price \$ | 120°         | 120° HSS Code No. | Price \$ |
|-----------------|------------------|--------------|-------------------|----------|--------------|-------------------|----------|
| 1/8             | 1/8              | HS1-1/8-100  | 121593            | 18.42    | HS1-1/8-120  | 121601            | 18.42    |
| 3/16            | 3/16             | HS1-3/16-100 | 121594            | 19.38    | HS1-3/16-120 | 121602            | 19.38    |
| 1/4             | 1/4              | HS1-1/4-100  | 121595            | 20.34    | HS1-1/4-120  | 121603            | 22.84    |
| 3/8             | 1/4              | HS1-3/8-100  | 121596            | 27.14    | HS1-3/8-120  | 121604            | 28.83    |
| 1/2             | 1/4              | HS1-1/2-100  | 121597            | 32.89    | HS1-1/2-120  | 121605            | 35.06    |
| 5/8             | 3/8              | HS1-5/8-100  | 121598            | 45.71    | HS1-5/8-120  | 121606            | 46.17    |
| 3/4             | 1/2              | HS1-3/4-100  | 121599            | 66.27    | HS1-3/4-120  | 121607            | 65.67    |
| 1               | 1/2              | HS1-1-100    | 121600            | 103.11   | HS1-1-120    | 121608            | 105.73   |

## Chatterfree HSS Countersinks



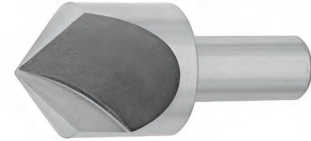
| Size | Range       | Shank Dia. | 82° HSS Code No. | Price \$ | 90° HSS Code No. | Price \$ |
|------|-------------|------------|------------------|----------|------------------|----------|
| 0    | 1/16-15/64  | 1/4        | 121003           | 29.49    | 121002           | 29.50    |
| 1    | 5/32-13/32  | 1/4        | 121005           | 31.53    | 121004           | 31.54    |
| 2    | 3/16-17/32  | 1/4        | 121010           | 36.23    | 121009           | 36.23    |
| 3    | 5/16-25/32  | 1/2        | 121015           | 63.26    | 121014           | 63.26    |
| 4    | 9/16-1-1/16 | 1/2        | 121020           | 111.30   | 121019           | 115.31   |
| 5    | 5/8-1-15/32 | 1/2        | 121025           | 217.07   | 121024           | 254.00   |
| 6    | 3/4-1-3/4   | 5/8        | 121030           | 340.48   | 121031           | 397.37   |



We've taken the guesswork out of your tap selection!

See Chapter C

## Single Flute Countersinks HSS — 60°, 82°, 90°, 100°



| Flute Dia. (in.)   | Shank Dia. (in.) | Shank Length (in.)   | Overall Length (in.) | 60° HSS Code No. | Price \$ | 82° HSS Code No. | Price \$ | 90° HSS Code No. | Price \$ | 100° HSS Code No. | Price \$ |
|--------------------|------------------|--|----------------------|------------------|----------|------------------|----------|------------------|----------|-------------------|----------|
| 3/16               | 3/16             | 3/4  | 1-1/2                | 120739           | 18.40    | 120753           | 18.40    | 120767           | 18.40    | -                 | -        |
| 1/4                | 1/4              | 3/4  | 2                    | 120740           | 18.39    | 120754           | 18.39    | 120768           | 18.39    | 120782            | 18.39    |
| 5/16               | 1/4              | 1  | 2                    | 120741           | 20.73    | 120755           | 21.07    | 120769           | 20.73    | 120783            | 17.01    |
| 3/8                | 1/4              | 1  | 2                    | 120742           | 26.28    | 120756           | 26.28    | 120770           | 26.28    | 120784            | 26.28    |
| 1/2                | 1/4              | 1  | 2                    | 120743           | 31.53    | -                | -        | 120771           | 31.53    | 120785            | 24.70    |
| 5/8                | 3/8              | 1-1/8  | 2                    | 120744           | 47.30    | 120758           | 47.30    | 120772           | 47.30    | 120786            | 37.21    |
| 5/8                | 1/2              | 1-1/8  | 2-3/4                | 120745           | 47.30    | 120759           | 47.30    | 120773           | 47.30    | 120787            | 39.68    |
| 3/4                | 3/8              | 1-5/16   | 2-3/4                | 120746           | 31.32    | 120760           | 52.55    | 120774           | 52.55    | 120788            | 41.69    |
| 3/4                | 1/2              | 1-5/16   | 2-3/4                | 120747           | 52.55    | 120761           | 52.55    | 120775           | 52.55    | 120789            | 74.80    |
| 7/8                | 1/2              | 1-5/16   | 2-3/4                | 120748           | 86.75    | 120762           | 84.09    | 120776           | 84.09    | -                 | -        |
| 1                  | 1/2              | 1-5/16   | 2-3/4                | 120749           | 92.02    | 120763           | 92.02    | 120777           | 92.02    | 120791            | 92.02    |
| 1-1/4              | 3/4              | 1-5/8  | 3-3/8                | 120750           | 82.11    | 120764           | 149.77   | 120778           | 149.77   | -                 | -        |
| 1-1/2              | 3/4              | 1-5/8  | 3-1/2                | 120751           | 207.58   | 120765           | 207.58   | 120779           | 210.20   | 120793            | 165.77   |
| 2                  | 3/4              | 1-5/8  | 3-3/4                | -                | -        | 120766           | 344.21   | 120780           | 344.21   | 120794            | 543.14   |
| <b>Sets</b>        |                  |  |                      |                  |          |                  |          |                  |          |                   |          |
| 5pc set contains:  |                  | 1/4, 3/8, 1/2, 3/4, 1  |                      | 120855           | 228.60   | 120858           | 228.60   | 120860           | 228.60   | 120862            | 300.81   |
| 9pc set contains:  |                  | 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1                  |                      | 120857           | 401.98   | 120850           | 401.98   | 120852           | 401.98   | 120863            | 320.35   |
| 12pc set contains: |                  | 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2, 2 |                      | 120840           | 879.87   | 120859           | 1,100.97 | 120861           | 879.87   | 120864            | 879.87   |

## Single Flute TiN Coated Premium Cobalt Countersinks — 60°, 82°, 90°, 100°, 120°

- Excellent for countersinking abrasive, high-strength, heat resistant, exotic and other difficult to machine materials
- TiN coated for higher surface hardness and better lubricity to enhance productivity and longer tool life



| Body Dia. (in.) | Shank Dia. (in.) | 60°            | 60° Code No. | Price \$ | 82°            | 82° Code No. | Price \$ | 90°            | 90° Code No. | Price \$ |
|-----------------|------------------|----------------|--------------|----------|----------------|--------------|----------|----------------|--------------|----------|
| 1/8             | 1/8              | HSP1-1/8-60T   | 121609       | 26.43    | HSP1-1/8-82T   | 121618       | 27.98    | HSP1-1/8-90T   | 121627       | 27.98    |
| 3/16            | 3/16             | HSP1-3/16-60T  | 121610       | 29.79    | HSP1-3/16-82T  | 121619       | 31.83    | HSP1-3/16-90T  | 121628       | 31.83    |
| 1/4             | 1/4              | HSP1-1/4-60T   | 121611       | 30.75    | HSP1-1/4-82T   | 121620       | 30.75    | HSP1-1/4-90T   | 121629       | 31.93    |
| 3/8             | 1/4              | HSP1-3/8-60T   | 121612       | 40.78    | HSP1-3/8-82T   | 121621       | 38.88    | HSP1-3/8-90T   | 121630       | 38.88    |
| 1/2             | 3/8              | HSP1-1/2-60T   | 121613       | 55.74    | HSP1-1/2-82T   | 121622       | 55.15    | HSP1-1/2-90T   | 121631       | 55.15    |
| 5/8             | 3/8              | HSP1-5/8-60T   | 121614       | 78.59    | HSP1-5/8-82T   | 121623       | 78.48    | HSP1-5/8-90T   | 121632       | 78.48    |
| 3/4             | 1/2              | HSP1-3/4-60T   | 121615       | 115.08   | HSP1-3/4-82T   | 121624       | 118.65   | HSP1-3/4-90T   | 121633       | 118.65   |
| 1               | 1/2              | HSP1-1-60T     | 121616       | 164.72   | HSP1-1-82      | 121625       | 165.68   | HSP1-1-90T     | 121634       | 158.97   |
| 1-1/4           | 1/2              | HSP1-1-1/4-60T | 121617       | 256.71   | HSP1-1-1/4-82T | 121626       | 254.06   | HSP1-1-1/4-90T | 121635       | 256.71   |

| Body Dia. (in.) | Shank Dia. (in.) | 100°            | 100° Code No. | Price \$ | 120°            | 120° Code No. | Price \$ |
|-----------------|------------------|-----------------|---------------|----------|-----------------|---------------|----------|
| 1/8             | 1/8              | HSP1-1/8-100T   | 121636        | 29.79    | HSP1-1/8-120T   | 121645        | 29.79    |
| 3/16            | 3/16             | HSP1-3/16-100T  | 121637        | 29.79    | HSP1-3/16-120T  | 121646        | 29.79    |
| 1/4             | 1/4              | HSP1-1/4-100T   | 121638        | 30.27    | HSP1-1/4-120T   | 121647        | 30.39    |
| 3/8             | 1/4              | HSP1-3/8-100T   | 121639        | 40.06    | HSP1-3/8-120T   | 121648        | 38.88    |
| 1/2             | 3/8              | HSP1-1/2-100T   | 121640        | 58.02    | HSP1-1/2-120T   | 121649        | 55.74    |
| 5/8             | 3/8              | HSP1-5/8-100T   | 121641        | 78.59    | HSP1-5/8-120T   | 121650        | 76.21    |
| 3/4             | 1/2              | HSP1-3/4-100T   | 121642        | 118.30   | HSP1-3/4-120T   | 121651        | 115.08   |
| 1               | 1/2              | HSP1-1-100T     | 121643        | 160.54   | HSP1-1-120T     | 121652        | 160.54   |
| 1-1/4           | 1/2              | HSP1-1-1/4-100T | 121644        | 235.29   | HSP1-1-1/4-120T | 121653        | 250.84   |



## Carbide Single Flute Countersinks — 60°, 82°, 90°, 100°



- For highly abrasive and hard to machine materials
- For production applications in cast iron, alloy steel, or glass reinforced plastics
- Long running carbide eliminates the high cost of tool changes in production situations
- Rigid set-up a must – not suited for hand held applications
- Tools 3/8" and over have solid carbide heads on hardened steel shanks



| Body Dia. (in.) | Shank Dia. (in.) | Single Flute 60° | 60° Code No. | Price \$ | Single Flute 82° | 82° Code No. | Price \$ | Single Flute 90° | 90° Code No. | Price \$ | Single Flute 100° | 100° Code No. | Price \$ |
|-----------------|------------------|------------------|--------------|----------|------------------|--------------|----------|------------------|--------------|----------|-------------------|---------------|----------|
| 1/8             | 1/8              | C1-1/8-60        | 121740       | 30.39    | C1-1/8-82        | 121756       | 31.11    | C1-1/8-90        | 121772       | 29.07    | C1-1/8-100        | 121788        | 31.11    |
| 3/16            | 3/16             | C1-3/16-60       | 121741       | 36.00    | C1-3/16-82       | 121757       | 36.00    | C1-3/16-90       | 121773       | 38.63    | C1-3/16-100       | 121789        | 37.92    |
| 1/4             | 1/4              | C1-1/4-60        | 121742       | 47.48    | C1-1/4-82        | 121758       | 45.46    | C1-1/4-90        | 121774       | 52.39    | C1-1/4-100        | 121790        | 47.01    |
| 3/8             | 1/4              | C1-3/8-60        | 121743       | 88.99    | C1-3/8-82        | 121759       | 85.42    | C1-3/8-90        | 121775       | 86.24    | C1-3/8-100        | 121791        | 88.99    |
| 1/2             | 3/8              | C1-1/2-60        | 121744       | 130.27   | C1-1/2-82        | 121760       | 125.48   | C1-1/2-90        | 121776       | 130.27   | C1-1/2-100        | 121792        | 130.27   |
| 5/8             | 1/2              | C1-5/8-60        | 121745       | 168.30   | C1-5/8-82        | 121761       | 168.30   | C1-5/8-90        | 121777       | 164.11   | C1-5/8-100        | 121793        | 162.21   |
| 3/4             | 1/2              | C1-3/4-60        | 121746       | 232.42   | C1-3/4-82        | 121762       | 246.41   | C1-3/4-90        | 121778       | 227.03   | C1-3/4-100        | 121794        | 232.42   |
| 1               | 1/2              | C1-1-60          | 121747       | 384.10   | C1-1-82          | 121763       | 375.84   | C1-1-90          | 121779       | 384.10   | C1-1-100          | 121795        | 372.49   |

## Single Flute Double End HSS and Carbide Countersinks — 60°, 82°, 90°, 100°, 120°



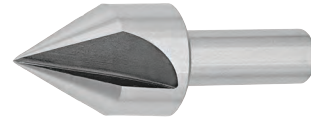
- Two cutting ends give you twice the tool life of a single end tool



| Body Dia. (in.) | Overall Length (in.) | Material Grade | 60°          | 60° Code No. | Price \$ | 82°          | 82° Code No. | Price \$ | 90°          | 90° Code No. | Price \$ |
|-----------------|----------------------|----------------|--------------|--------------|----------|--------------|--------------|----------|--------------|--------------|----------|
| 1/8             | 1-1/2                | HSS            | DHS1-1/8-60  | 121655       | 33.73    | DHS1-1/8-82  | 121671       | 31.93    | DHS1-1/8-90  | 121687       | 31.93    |
|                 |                      | Carbide        | DC1-1/8-60   | 121656       | 52.74    | DC1-1/8-82   | 121672       | 52.74    | DC1-1/8-90   | 121688       | 50.24    |
| 3/16            | 2                    | HSS            | DHS1-3/16-60 | 121657       | 36.11    | DHS1-3/16-82 | 121673       | 36.96    | DHS1-3/16-90 | 121689       | 35.29    |
|                 |                      | Carbide        | DC1-3/16-60  | 121658       | 73.33    | DC1-3/16-82  | 121674       | 66.39    | DC1-3/16-90  | 121690       | 63.40    |
| 1/4             | 2                    | HSS            | DHS1-1/4-60  | 121659       | 38.28    | DHS1-1/4-82  | 121675       | 38.28    | DHS1-1/4-90  | 121691       | 36.00    |
|                 |                      | Carbide        | DC1-1/4-60   | 121660       | 93.65    | DC1-1/4-82   | 121676       | 84.92    | DC1-1/4-90   | 121692       | 89.95    |
| 5/16            | 2-1/2                | HSS            | DHS1-5/16-60 | 121661       | 40.56    | DHS1-5/16-82 | 121677       | 42.82    | DHS1-5/16-90 | 121693       | 41.63    |
|                 |                      | Carbide        | DC1-5/16-60  | 121662       | 151.79   | DC1-5/16-82  | 121678       | 133.37   | DC1-5/16-90  | 121694       | 126.81   |
| 3/8             | 2-1/2                | HSS            | DHS1-3/8-60  | 121663       | 47.97    | DHS1-3/8-82  | 121679       | 47.97    | DHS1-3/8-90  | 121695       | 45.93    |
|                 |                      | Carbide        | DC1-3/8-60   | 121664       | 160.77   | DC1-3/8-82   | 121680       | 159.56   | DC1-3/8-90   | 121696       | 159.56   |
| 1/2             | 3                    | HSS            | DHS1-1/2-60  | 121665       | 61.37    | DHS1-1/2-82  | 121681       | 58.63    | DHS1-1/2-90  | 121697       | 64.71    |
|                 |                      | Carbide        | DC1-1/2-60   | 121666       | 219.62   | DC1-1/2-82   | 121682       | 203.23   | DC1-1/2-90   | 121698       | 219.62   |
| 5/8             | 3-1/2                | HSS            | DHS1-5/8-60  | 121667       | 88.05    | DHS1-5/8-82  | 121683       | 88.05    | DHS1-5/8-90  | 121699       | 82.78    |
|                 |                      | Carbide        | DC1-5/8-60   | 121668       | 289.00   | DC1-5/8-82   | 121684       | 289.00   | DC1-5/8-90   | 121700       | 289.00   |
| 3/4             | 4                    | HSS            | DHS1-3/4-60  | 121669       | 128.11   | DHS1-3/4-82  | 121685       | 128.11   | DHS1-3/4-90  | 121701       | 121.06   |
|                 |                      | Carbide        | DC1-3/4-60   | 121670       | 409.91   | DC1-3/4-82   | 121686       | 409.91   | DC1-3/4-90   | -            | -        |

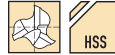
| Body Dia. (in.) | Overall Length (in.) | Material Grade | 100°          | 100° Code No. | Price \$ | 120°          | 120° Code No. | Price \$ |
|-----------------|----------------------|----------------|---------------|---------------|----------|---------------|---------------|----------|
| 1/8             | 1-1/2                | HSS            | DHS1-1/8-100  | 121703        | 32.78    | DHS1-1/8-120  | 121719        | 31.93    |
|                 |                      | Carbide        | DC1-1/8-100   | 121704        | 50.24    | DC1-1/8-120   | 121720        | 49.52    |
| 3/16            | 2                    | HSS            | DHS1-3/16-100 | 121705        | 35.06    | DHS1-3/16-120 | 121721        | 36.96    |
|                 |                      | Carbide        | DC1-3/16-100  | 121706        | 62.33    | DC1-3/16-120  | 121722        | 63.99    |
| 1/4             | 2                    | HSS            | DHS1-1/4-100  | 121707        | 38.28    | DHS1-1/4-120  | 121723        | 36.11    |
|                 |                      | Carbide        | DC1-1/4-100   | 121708        | 82.06    | DC1-1/4-120   | 121724        | 80.02    |
| 5/16            | 2-1/2                | HSS            | DHS1-5/16-100 | 121709        | 42.82    | DHS1-5/16-120 | 121725        | 42.82    |
|                 |                      | Carbide        | DC1-5/16-100  | 121710        | 126.81   | DC1-5/16-120  | 121726        | 126.81   |
| 3/8             | 2-1/2                | HSS            | DHS1-3/8-100  | 121711        | 47.97    | DHS1-3/8-120  | 121727        | 47.97    |
|                 |                      | Carbide        | DC1-3/8-100   | 121712        | 172.01   | DC1-3/8-120   | 121728        | 151.56   |
| 1/2             | 3                    | HSS            | DHS1-1/2-100  | 121713        | 64.71    | DHS1-1/2-120  | 121729        | 59.09    |
|                 |                      | Carbide        | DC1-1/2-100   | 121714        | 212.57   | DC1-1/2-120   | 121730        | 219.62   |
| 5/8             | 3-1/2                | HSS            | DHS1-5/8-100  | 121715        | 82.78    | DHS1-5/8-120  | 121731        | 82.78    |
|                 |                      | Carbide        | DC1-5/8-100   | 121716        | 289.00   | DC1-5/8-120   | 121732        | 289.00   |
| 3/4             | 4                    | HSS            | DHS1-3/4-100  | 121717        | 121.06   | DHS1-3/4-120  | 121733        | 128.11   |
|                 |                      | Carbide        | DC1-3/4-100   | 121718        | 409.91   | DC1-3/4-120   | 121734        | 409.91   |

### 3-Flute Countersinks HSS — 60°, 82°, 90°, 100°



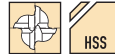
| Flute Dia. (in.) | Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | 60° HSS Code No. | Price \$ | 82° HSS Code No. | Price \$ | 90° HSS Code No. | Price \$ | 100° HSS Code No. | Price \$ |
|------------------|------------------|--------------------|----------------------|------------------|----------|------------------|----------|------------------|----------|-------------------|----------|
| 1/4              | 3/16             | 3/4                | 1-1/2                | 120795           | 21.02    | 120804           | 21.02    | 120813           | 21.02    | 120822            | 20.40    |
| 3/8              | 1/4              | 7/8                | 1-3/4                | 120796           | 28.90    | 120805           | 28.90    | 120814           | 28.90    | 120823            | 28.90    |
| 1/2              | 3/8              | 1                  | 2                    | 120797           | 36.84    | 120806           | 36.84    | 120815           | 35.02    | 120824            | 36.84    |
| 5/8              | 3/8              | 1                  | 2-1/4                | 120798           | 55.18    | 120807           | 55.18    | 120816           | 55.18    | 120825            | 55.18    |
| 3/4              | 1/2              | 1-1/4              | 2-5/8                | 120799           | 60.47    | 120808           | 60.47    | 120817           | 60.47    | 120826            | 60.47    |
| 1                | 1/2              | 1-1/4              | 2-3/4                | 120800           | 107.73   | 120809           | 107.73   | 120818           | 107.73   | 120827            | 104.95   |
| 1-1/4            | 3/4              | 1-1/4              | 3                    | 120801           | 173.42   | 120976           | 155.90   | 120819           | 173.42   | 120828            | 179.86   |
| 1-1/2            | 3/4              | 1-1/4              | 3                    | 120802           | 239.11   | 120811           | 239.11   | 120820           | 239.11   | 120829            | 238.35   |
| 2                | 3/4              | 1-1/4              | 3-1/4                | 120803           | 394.15   | 120812           | 394.15   | 120821           | 394.15   | 120830            | 313.81   |

### 3-Flute Countersinks HSS



| Flute Dia. (in.) | Shank Dia. (in.) | Overall Length (in.) | 82° HSS Code No. | Price \$ | 90° HSS Code No. | Price \$ |
|------------------|------------------|----------------------|------------------|----------|------------------|----------|
| 1/4              | 1/4              | 1-3/4                | 121038           | 45.42    | 121050           | 47.01    |
| 3/8              | 1/4              | 1-7/8                | 121040           | 56.53    | 121052           | 56.53    |
| 1/2              | 3/8              | 2-1/8                | 121042           | 64.10    | 121054           | 64.10    |
| 3/4              | 1/2              | 2-7/16               | 121044           | 127.04   | 121056           | 127.06   |
| 1                | 1/2              | 2-5/8                | 121046           | 141.64   | 121058           | 141.64   |

### 4-Flute Machine Countersinks HSS



| Flute Dia. (in.) | Shank Dia. (in.) | Shank Length (in.) | Overall Length (in.) | 60° Code No. | Price \$ | 82° Code No. | Price \$ | 90° Code No. | Price \$ |
|------------------|------------------|--------------------|----------------------|--------------|----------|--------------|----------|--------------|----------|
| 1/2              | 1/2              | 2-1/4              | 3-7/8                | 120831       | 89.34    | 120950       | 89.34    | 120845       | 89.34    |
| 5/8              | 1/2              | 2-1/4              | 4                    | 120832       | 102.48   | 120955       | 102.48   | -            | -        |
| 3/4              | 1/2              | 2-1/4              | 4-1/8                | 120833       | 128.75   | 120960       | 131.38   | 120847       | 128.75   |
| 7/8              | 1/2              | 2-1/4              | 4-1/4                | 120834       | 141.93   | 120965       | 120.23   | 120848       | 141.93   |
| 1                | 1/2              | 2-1/4              | 4-3/8                | 120835       | 157.66   | 120970       | 157.66   | 120849       | 157.66   |
| 1-1/4            | 1/2              | 2-1/4              | 5                    | 120836       | 241.74   | 120975       | 239.11   | 120851       | 239.11   |
| 1-1/2            | 1/2              | 2-1/4              | 5-3/8                | 120837       | 291.67   | 120980       | 294.30   | 120853       | 294.30   |

### 3-Flute 82° Countersinks HSS



| Dia. (in.) | Shank Dia. (in.) | Code No. | Price \$ |
|------------|------------------|----------|----------|
| 1/2        | 1/2              | 120951   | 28.81    |
| 5/8        | 1/2              | 120956   | 45.48    |
| 3/4        | 1/2              | 120961   | 50.98    |
| 1          | 1/2              | 120971   | 163.41   |
| 1-1/4      | 3/4              | 120976   | 155.90   |
| 1-1/2      | 3/4              | 120981   | 326.53   |



GS Tooling  
Drill Chucks

High precision with  
premium tolerance  
for improved life.

See Pages G70-71

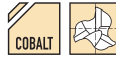
## 90° Cobalt 3-Flute Countersinks



- M35 Cobalt
- Wide flutes provide good chip evacuation
- Positive cut
- Constant profile aids regrinding of the tool
- Self-centering of the cutting mill (three bearing points) virtually eliminates vibration



121865

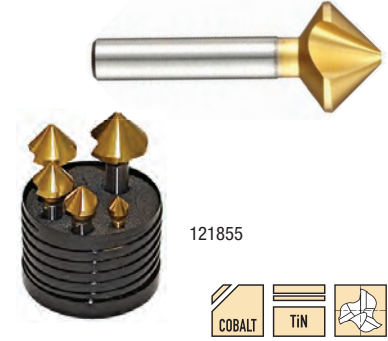


| Diameter       | Overall Length | Shank Diameter | Code No. | Price \$ |
|----------------|----------------|----------------|----------|----------|
| <b>Inch</b>    |                |                |          |          |
| 1/4"           | 45mm           | 1/4"           | 121899   | 38.85    |
| 5/16"          | 45mm           | 1/4"           | 121900   | 44.75    |
| 3/8"           | 50mm           | 1/4"           | 121901   | 50.87    |
| 1/2"           | 50mm           | 1/4"           | 121902   | 61.33    |
| 5/8"           | 60mm           | 3/8"           | 121903   | 73.03    |
| 3/4"           | 60mm           | 3/8"           | 121904   | 85.32    |
| 1"             | 70mm           | 3/8"           | 121905   | 94.36    |
| <b>7pc Set</b> |                |                | 121866   | 458.15   |
| <b>Metric</b>  |                |                |          |          |
| 6.3mm          | 45mm           | 5mm            | 121894   | 44.75    |
| 10.4mm         | 50mm           | 6mm            | 121895   | 60.17    |
| 16.5mm         | 60mm           | 10mm           | 121896   | 84.49    |
| 20.5mm         | 63mm           | 10mm           | 121897   | 99.41    |
| 25.0mm         | 67mm           | 10mm           | 121898   | 121.12   |
| <b>5pc Set</b> |                |                | 121865   | 405.50   |

## 90° Cobalt 3-Flute Countersinks - TiN Coated



- M35 Cobalt - TiN coated
- Wide flutes provide good chip evacuation
- Positive cut
- Constant profile aids regrinding of the tool
- Self-centering of the cutting mill (three bearing points) virtually eliminates vibration



121855



| Diameter       | Overall Length | Shank Diameter | Code No. | Price \$ |
|----------------|----------------|----------------|----------|----------|
| <b>Inch</b>    |                |                |          |          |
| 1/4"           | 45mm           | 1/4"           | 121857   | 50.87    |
| 5/16"          | 45mm           | 1/4"           | 121858   | 59.05    |
| 3/8"           | 50mm           | 1/4"           | 121859   | 64.97    |
| 1/2"           | 50mm           | 1/4"           | 121862   | 79.21    |
| 5/8"           | 60mm           | 3/8"           | 121863   | 93.39    |
| 3/4"           | 60mm           | 3/8"           | 121864   | 102.95   |
| 1"             | 70mm           | 3/8"           | 121867   | 127.77   |
| <b>7pc Set</b> |                |                | 121856   | 565.99   |
| <b>Metric</b>  |                |                |          |          |
| 10.4mm         | 50mm           | 6mm            | 121850   | 73.03    |
| 16.5mm         | 60mm           | 10mm           | 121851   | 105.59   |
| 20.5mm         | 63mm           | 10mm           | 121852   | 121.68   |
| 25.0mm         | 67mm           | 10mm           | 121853   | 145.27   |
| 31.0mm         | 71mm           | 12mm           | 121854   | 201.38   |
| <b>5pc Set</b> |                |                | 121855   | 628.50   |

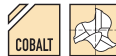
## 82° Cobalt 3-Flute Countersinks



- M35 Cobalt
- Wide flutes provide good chip evacuation
- Positive cut
- Constant profile aids regrinding of the tool
- Self-centering of the cutting mill (three bearing points) virtually eliminates vibration



121860

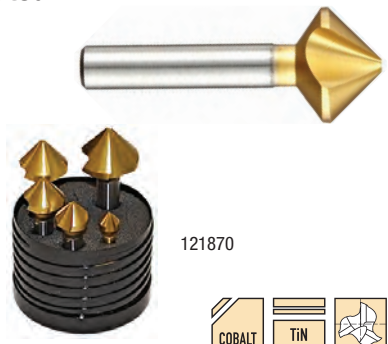


| Diameter       | Overall Length | Shank Diameter | Code No. | Price \$ |
|----------------|----------------|----------------|----------|----------|
| <b>Inch</b>    |                |                |          |          |
| 1/4"           | 45mm           | 1/4"           | 121875   | 38.85    |
| 5/16"          | 45mm           | 1/4"           | 121876   | 44.75    |
| 3/8"           | 50mm           | 1/4"           | 121877   | 49.51    |
| 1/2"           | 50mm           | 1/4"           | 121878   | 57.41    |
| 5/8"           | 60mm           | 3/8"           | 121879   | 71.14    |
| 3/4"           | 60mm           | 3/8"           | 121880   | 85.32    |
| 1"             | 70mm           | 3/8"           | 121881   | 94.36    |
| <b>7pc Set</b> |                |                | 121861   | 445.69   |
| <b>Metric</b>  |                |                |          |          |
| 6.3mm          | 45mm           | 5mm            | 121868   | 44.75    |
| 10.4mm         | 50mm           | 6mm            | 121869   | 58.51    |
| 16.5mm         | 61mm           | 10mm           | 121872   | 84.49    |
| 20.5mm         | 64mm           | 10mm           | 121873   | 96.69    |
| 25.0mm         | 68mm           | 10mm           | 121874   | 121.12   |
| <b>5pc Set</b> |                |                | 121860   | 369.38   |

## 82° Cobalt 3-Flute Countersinks - TiN Coated



- M35 Cobalt - TiN coated
- Wide flutes provide good chip evacuation
- Positive cut
- Constant profile aids regrinding of the tool
- Self-centering of the cutting mill (three bearing points) virtually eliminates vibration



121870



| Diameter       | Overall Length | Shank Diameter | Code No. | Price \$ |
|----------------|----------------|----------------|----------|----------|
| <b>Inch</b>    |                |                |          |          |
| 1/4"           | 45mm           | 1/4"           | 121887   | 43.71    |
| 5/16"          | 45mm           | 1/4"           | 121888   | 50.75    |
| 3/8"           | 50mm           | 1/4"           | 121889   | 55.88    |
| 1/2"           | 50mm           | 1/4"           | 121890   | 68.06    |
| 5/8"           | 60mm           | 3/8"           | 121891   | 80.24    |
| 3/4"           | 60mm           | 3/8"           | 121892   | 92.41    |
| 1"             | 70mm           | 3/8"           | 121893   | 109.83   |
| <b>7pc Set</b> |                |                | 121871   | 499.96   |
| <b>Metric</b>  |                |                |          |          |
| 10.4mm         | 50mm           | 6mm            | 121882   | 73.03    |
| 16.5mm         | 61mm           | 10mm           | 121883   | 105.59   |
| 20.5mm         | 64mm           | 10mm           | 121884   | 110.86   |
| 25.0mm         | 68mm           | 10mm           | 121885   | 141.34   |
| 31.0mm         | 73mm           | 12mm           | 121886   | 188.58   |
| <b>5pc Set</b> |                |                | 121870   | 611.37   |

## 6-Flute Countersinks HSS — 60°, 82°, 90°, 100°, 110°, 120°

- Flutes are staggered to ensure smoother, chatter-free cutting action
- Steam black oxide surface treatment enhances tool life and prevents galling
- 100% CNC manufactured to tighter than industry standard tolerances



| Body Dia. (in.) | Shank Dia. (in.) | 60°          | 60° HSS Code No. | Price \$ | 82°          | 82° HSS Code No. | Price \$ | 90°          | 90° HSS Code No. | Price \$ |
|-----------------|------------------|--------------|------------------|----------|--------------|------------------|----------|--------------|------------------|----------|
| 1/8             | 1/8              | HS6-1/8-60   | 121200           | 22.00    | HS6-1/8-82   | 121230           | 22.00    | HS6-1/8-90   | 121260           | 22.00    |
| 3/16            | 3/16             | HS6-3/16-60  | 121202           | 21.05    | HS6-3/16-82  | 121232           | 22.62    | HS6-3/16-90  | 121262           | 20.94    |
| 1/4             | 1/4              | HS6-1/4-60   | 121204           | 23.09    | HS6-1/4-82   | 121234           | 22.37    | HS6-1/4-90   | 121264           | 22.37    |
| 5/16            | 1/4              | HS6-5/16-60  | 121206           | 25.60    | HS6-5/16-82  | 121236           | 24.05    | HS6-5/16-90  | 121266           | 25.60    |
| 3/8             | 1/4              | HS6-3/8-60   | 121208           | 28.47    | HS6-3/8-82   | 121238           | 28.23    | HS6-3/8-90   | 121268           | 26.68    |
| 1/2             | 3/8              | HS6-1/2-60   | 121210           | 35.64    | HS6-1/2-82   | 121240           | 35.64    | HS6-1/2-90   | 121270           | 33.61    |
| 5/8             | 3/8              | HS6-5/8-60   | 121212           | 54.19    | HS6-5/8-82   | 121242           | 51.56    | HS6-5/8-90   | 121272           | 51.31    |
| 3/4             | 1/2              | HS6-3/4-60   | 121214           | 71.53    | HS6-3/4-82   | 121244           | 71.53    | HS6-3/4-90   | 121274           | 67.82    |
| 7/8             | 1/2              | HS6-7/8-60   | 121216           | 95.93    | HS6-7/8-82   | 121246           | 100.37   | HS6-7/8-90   | 121276           | 94.98    |
| 1               | 1/2              | HS6-1-60     | 121218           | 116.39   | HS6-1-82     | 121248           | 116.39   | HS6-1-90     | 121278           | 116.39   |
| 1-1/4           | 1/2              | HS6-1-1/4-60 | 121220           | 164.48   | HS6-1-1/4-82 | 121250           | 164.48   | HS6-1-1/4-90 | 121280           | 164.48   |
| 1-1/2           | 3/4              | HS6-1-1/2-60 | 121222           | 251.44   | HS6-1-1/2-82 | 121252           | 254.78   | HS6-1-1/2-90 | 121282           | 243.42   |
| 2               | 3/4              | HS6-2-60     | 121224           | 432.78   | HS6-2-82     | 121254           | 452.87   | HS6-2-90     | 121284           | 445.93   |
| 2-1/2           | 3/4              | HS6-2-1/2-60 | 121226           | 1,237.81 | HS6-2-1/2-82 | 121256           | 1,197.85 | HS6-2-1/2-90 | 121286           | 1,197.85 |
| 3               | 3/4              | HS6-3-60     | 121228           | 1,398.58 | HS6-3-82     | 121258           | 1,398.58 | HS6-3-90     | 121288           | 1,514.96 |

| Body Dia. (in.) | Shank Dia. (in.) | 100°          | 100° HSS Code No. | Price \$ | 110°          | 110° HSS Code No. | Price \$ | 120°          | 120° HSS Code No. | Price \$ |
|-----------------|------------------|---------------|-------------------|----------|---------------|-------------------|----------|---------------|-------------------|----------|
| 1/8             | 1/8              | HS6-1/8-100   | 121261            | 20.34    | HS6-1/8-110   | 121292            | 22.00    | HS6-1/8-120   | 121318            | 22.00    |
| 3/16            | 3/16             | HS6-3/16-100  | 121263            | 20.94    | HS6-3/16-110  | 121294            | 20.94    | HS6-3/16-120  | 121320            | 20.94    |
| 1/4             | 1/4              | HS6-1/4-100   | 121265            | 23.09    | HS6-1/4-110   | 121296            | 21.41    | HS6-1/4-120   | 121322            | 23.09    |
| 5/16            | 1/4              | HS6-5/16-100  | 121267            | 26.90    | HS6-5/16-110  | 121298            | 23.68    | HS6-5/16-120  | 121324            | 24.65    |
| 3/8             | 1/4              | HS6-3/8-100   | 121269            | 26.68    | HS6-3/8-110   | 121300            | 26.90    | HS6-3/8-120   | 121326            | 28.23    |
| 1/2             | 3/8              | HS6-1/2-100   | 121271            | 35.64    | HS6-1/2-110   | 121302            | 33.61    | HS6-1/2-120   | 121328            | 35.77    |
| 5/8             | 3/8              | HS6-5/8-100   | 121273            | 51.31    | HS6-5/8-110   | 121304            | 51.31    | HS6-5/8-120   | 121330            | 51.31    |
| 3/4             | 1/2              | HS6-3/4-100   | 121275            | 70.81    | HS6-3/4-110   | 121306            | 66.63    | HS6-3/4-120   | 121332            | 71.53    |
| 7/8             | 1/2              | HS6-7/8-100   | 121277            | 98.69    | HS6-7/8-110   | 121308            | 93.19    | HS6-7/8-120   | 121334            | 98.69    |
| 1               | 1/2              | HS6-1-100     | 121279            | 111.13   | HS6-1-110     | 121310            | 107.90   | HS6-1-120     | 121336            | 111.13   |
| 1-1/4           | 1/2              | HS6-1-1/4-100 | 121281            | 162.68   | HS6-1-1/4-110 | 121312            | 152.63   | HS6-1-1/4-120 | 121338            | 158.61   |
| 1-1/2           | 3/4              | HS6-1-1/2-100 | 121283            | 251.44   | HS6-1-1/2-110 | 121314            | 236.14   | HS6-1-1/2-120 | 121340            | 245.81   |
| 2               | 3/4              | HS6-2-100     | 121285            | 445.93   | HS6-2-110     | 121316            | 419.27   | HS6-2-120     | 121342            | 445.93   |

## 6-Flute HSS Chatterless Countersinks



| Flute Dia. (in.) | Shank Dia. (in.) | 60° Code No. | Price \$ | 82° Code No. | Price \$ | 90° Code No. | Price \$ |
|------------------|------------------|--------------|----------|--------------|----------|--------------|----------|
| 3/16             | 3/16             | 120700       | 23.65    | 120713       | 23.65    | 120726       | 25.89    |
| 1/4              | 1/4              | 120701       | 23.70    | 120714       | 23.70    | 120727       | 23.70    |
| 5/16             | 1/4              | 120702       | 28.90    | 120715       | 28.90    | 120728       | 28.90    |
| 3/8              | 1/4              | 120703       | 34.21    | 120716       | 34.21    | 120729       | 34.21    |
| 1/2              | 1/4              | 120704       | 42.04    | 120717       | 42.04    | 120730       | 42.04    |
| 5/8              | 1/2              | 120705       | 63.06    | 120718       | 63.06    | 120731       | 63.06    |
| 3/4              | -                | 120706       | 81.46    | 120719       | 81.46    | 120732       | 81.46    |
| 7/8              | 1/2              | 120707       | 107.78   | 120720       | 107.78   | 120733       | 107.78   |
| 1                | -                | 120708       | 128.80   | 120721       | 128.80   | 120734       | 128.80   |
| 1-1/4            | 3/4              | 120709       | 189.19   | 120722       | 189.19   | 120735       | 189.19   |
| 1-1/2            | 3/4              | 120710       | 260.08   | 120723       | 257.45   | 120736       | 260.08   |
| 1-3/4            | 1                | 120711       | 268.19   | -            | -        | 120737       | 336.34   |
| 2                | 1                | 120712       | 401.98   | 120725       | 401.98   | 120738       | 407.23   |

## 6-Flute TiN Coated Premium Cobalt Countersinks — 60°, 82°, 90°, 100°, 110°, 120°



- Excellent for countersinking abrasive, high-strength, heat resistant, exotic and other difficult to machine materials
- TiN coated for higher surface hardness and better lubricity to enhance productivity and longer tool life



| Body Dia. (in.) | Shank Dia. (in.) | 60°           | 60° Code No. | Price \$ | 82°           | 82° Code No. | Price \$ | 90°           | 90° Code No. | Price \$ |
|-----------------|------------------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|
| 1/8             | 1/8              | HSP-1/8-60T   | 121350       | 30.75    | HSP-1/8-82T   | 121372       | 31.69    | HSP-1/8-90T   | 121394       | 31.69    |
| 3/16            | 3/16             | HSP-3/16-60T  | 121352       | 33.26    | HSP-3/16-82T  | 121374       | 33.26    | HSP-3/16-90T  | 121396       | 33.26    |
| 1/4             | 1/4              | HSP-1/4-60T   | 121354       | 35.64    | HSP-1/4-82T   | 121376       | 35.64    | HSP-1/4-90T   | 121398       | 35.64    |
| 5/16            | 1/4              | HSP-5/16-60T  | 121356       | 41.39    | HSP-5/16-82T  | 121378       | 41.39    | HSP-5/16-90T  | 121400       | 39.24    |
| 3/8             | 1/4              | HSP-3/8-60T   | 121358       | 43.30    | HSP-3/8-82T   | 121380       | 44.99    | HSP-3/8-90T   | 121402       | 44.99    |
| 1/2             | 3/8              | HSP-1/2-60T   | 121360       | 58.84    | HSP-1/2-82T   | 121382       | 58.25    | HSP-1/2-90T   | 121404       | 58.25    |
| 5/8             | 3/8              | HSP-5/8-60T   | 121362       | 82.90    | HSP-5/8-82T   | 121384       | 85.52    | HSP-5/8-90T   | 121406       | 82.18    |
| 3/4             | 1/2              | HSP-3/4-60T   | 121364       | 124.15   | HSP-3/4-82T   | 121386       | 124.64   | HSP-3/4-90T   | 121408       | 124.64   |
| 7/8             | 1/2              | HSP-7/8-60T   | 121366       | 152.03   | HSP-7/8-82T   | 121388       | 152.03   | HSP-7/8-90T   | 121410       | 152.03   |
| 1               | 1/2              | HSP-1-60T     | 121368       | 167.22   | HSP-1-82T     | 121390       | 172.48   | HSP-1-90T     | 121412       | 167.22   |
| 1-1/4           | 1/2              | HSP-1-1/4-60T | 121370       | 270.81   | HSP-1-1/4-82T | 121392       | 276.68   | HSP-1-1/4-90T | 121414       | 270.81   |

| Body Dia. (in.) | Shank Dia. (in.) | 100°         | 100° Code No. | Price \$ | 110°         | 110° Code No. | Price \$ | 120°         | 120° Code No. | Price \$ |
|-----------------|------------------|--------------|---------------|----------|--------------|---------------|----------|--------------|---------------|----------|
| 1/8             | 1/8              | HSP-1/8-100  | 121416        | 29.66    | HSP-1/8-110  | 121436        | 29.66    | HSP-1/8-120  | 121456        | 30.75    |
| 3/16            | 3/16             | HSP-3/16-100 | 121418        | 33.26    | HSP-3/16-110 | 121438        | 31.21    | HSP-3/16-120 | 121458        | 35.06    |
| 1/4             | 1/4              | HSP-1/4-100  | 121420        | 35.64    | HSP-1/4-110  | 121440        | 33.37    | HSP-1/4-120  | 121460        | 33.37    |
| 5/16            | 1/4              | HSP-5/16-100 | 121422        | 41.39    | HSP-5/16-110 | 121442        | 39.24    | HSP-5/16-120 | 121462        | 39.24    |
| 3/8             | 1/4              | HSP-3/8-100  | 121424        | 42.95    | HSP-3/8-110  | 121444        | 42.82    | HSP-3/8-120  | 121464        | 45.21    |
| 1/2             | 3/8              | HSP-1/2-100  | 121426        | 61.12    | HSP-1/2-110  | 121446        | 61.12    | HSP-1/2-120  | 121466        | 61.12    |
| 5/8             | 3/8              | HSP-5/8-100  | 121428        | 82.90    | HSP-5/8-110  | 121448        | 83.01    | HSP-5/8-120  | 121468        | 85.52    |
| 3/4             | 1/2              | HSP-3/4-100  | 121430        | 124.15   | HSP-3/4-110  | 121450        | 115.66   | HSP-3/4-120  | 121470        | 124.15   |
| 7/8             | 1/2              | HSP-7/8-100  | 121432        | 141.98   | HSP-7/8-110  | 121452        | 141.98   | HSP-7/8-120  | 121472        | 136.47   |
| 1               | 1/2              | HSP-1-100    | 121434        | 167.22   | HSP-1-110    | 121454        | 159.93   | HSP-1-120    | 121474        | 167.22   |

## 6-Flute Carbide Countersinks



For use on hardened steel up to 60HRC, high temperature alloys and other tough jobs.



| Cutting Dia. (in.) | Shank Dia. (in.) | Included Angle | Code No. | Price \$ |
|--------------------|------------------|----------------|----------|----------|
| 1/4                | 1/4              | 60°            | 172920   | 44.85    |
| 1/4                | 1/4              | 82°            | 172921   | 44.85    |
| 1/4                | 1/4              | 90°            | 172922   | 44.85    |
| 3/8                | 1/4              | 60°            | 172923   | 73.75    |
| 3/8                | 1/4              | 82°            | 172924   | 73.75    |
| 3/8                | 1/4              | 90°            | 172925   | 73.75    |
| 1/2                | 1/4              | 60°            | 172926   | 98.06    |
| 1/2                | 1/4              | 82°            | 172927   | 129.47   |
| 1/2                | 1/4              | 90°            | 172928   | 98.06    |
| 5/8                | 3/8              | 60°            | 172929   | 138.29   |
| 5/8                | 3/8              | 82°            | 172930   | 138.29   |
| 5/8                | 3/8              | 90°            | 172931   | 138.29   |
| 3/4                | 3/8              | 60°            | 172932   | 202.38   |
| 3/4                | 3/8              | 82°            | 172933   | 202.38   |
| 3/4                | 3/8              | 90°            | 172934   | 202.38   |
| 1                  | 1/2              | 60°            | 172935   | 278.78   |
| 1                  | 1/2              | 82°            | 172936   | 278.78   |
| 1                  | 1/2              | 90°            | 172937   | 278.78   |

## Multi-Flute Carbide Countersinks



For use on hardened steel up to 60HRC to countersink or chamfer.



| Cutting Dia. (in.) | Shank Dia. (in.) | Included Angle | Code No. | Price \$ |
|--------------------|------------------|----------------|----------|----------|
| 1/4                | 1/4              | 60°            | 172900   | 41.72    |
| 1/4                | 1/4              | 82°            | 172901   | 41.72    |
| 1/4                | 1/4              | 90°            | 172902   | 41.72    |
| 3/8                | 1/4              | 60°            | 172903   | 46.54    |
| 3/8                | 1/4              | 82°            | 172904   | 46.54    |
| 3/8                | 1/4              | 90°            | 172905   | 46.54    |
| 1/2                | 1/4              | 60°            | 172906   | 66.25    |
| 1/2                | 1/4              | 82°            | 172907   | 66.25    |
| 1/2                | 1/4              | 90°            | 172908   | 66.25    |
| 5/8                | 3/8              | 60°            | 172909   | 91.04    |
| 5/8                | 3/8              | 82°            | 172910   | 91.04    |
| 5/8                | 3/8              | 90°            | 172911   | 91.04    |
| 3/4                | 3/8              | 60°            | 172912   | 122.35   |
| 3/4                | 3/8              | 82°            | 172913   | 122.35   |
| 3/4                | 3/8              | 90°            | 172914   | 122.35   |
| 1                  | 1/2              | 60°            | 172915   | 195.36   |
| 1                  | 1/2              | 82°            | 172916   | 195.36   |
| 1                  | 1/2              | 90°            | 172917   | 195.36   |

## Carbide 6-Flute Countersinks — 60°, 82°, 90°, 100°



| Body Dia. (in.) | Shank Dia. (in.) | 60°        | 60° Code No. | Price \$ | 82°        | 82° Code No. | Price \$ | 90°        | 90° Code No. | Price \$ | 100°        | 100° Code No. | Price \$ |
|-----------------|------------------|------------|--------------|----------|------------|--------------|----------|------------|--------------|----------|-------------|---------------|----------|
| 1/8             | 1/8              | C6-1/8-60  | 121748       | 32.65    | C6-1/8-82  | 121764       | 32.30    | C6-1/8-90  | 121780       | 30.98    | C6-1/8-100  | 121796        | 32.30    |
| 3/16            | 3/16             | C6-3/16-60 | 121749       | 38.63    | C6-3/16-82 | 121765       | 40.06    | C6-3/16-90 | 121781       | 38.63    | C6-3/16-100 | 121797        | 37.92    |
| 1/4             | 1/4              | C6-1/4-60  | 121750       | 49.52    | C6-1/4-82  | 121766       | 49.99    | C6-1/4-90  | 121782       | 49.99    | C6-1/4-100  | 121798        | 47.38    |
| 3/8             | 1/4              | C6-3/8-60  | 121751       | 90.66    | C6-3/8-82  | 121767       | 93.65    | C6-3/8-90  | 121783       | 93.65    | C6-3/8-100  | 121799        | 93.65    |
| 1/2             | 3/8              | C6-1/2-60  | 121752       | 134.79   | C6-1/2-82  | 121768       | 143.79   | C6-1/2-90  | 121784       | 142.46   | C6-1/2-100  | 121800        | 134.79   |
| 5/8             | 1/2              | C6-5/8-60  | 121753       | 173.45   | C6-5/8-82  | 121769       | 192.23   | C6-5/8-90  | 121785       | 175.61   | C6-5/8-100  | 121801        | 175.61   |
| 3/4             | 1/2              | C6-3/4-60  | 121754       | 244.62   | C6-3/4-82  | 121770       | 238.87   | C6-3/4-90  | 121786       | 259.33   | C6-3/4-100  | 121802        | 244.62   |
| 1               | 1/2              | C6-1-60    | 121755       | 372.49   | C6-1-82    | 121771       | 401.92   | C6-1-90    | 121787       | 372.49   | C6-1-100    | 121803        | 372.49   |

## 6-Flute Double End HSS and Carbide Countersinks — 60°, 82°, 90°, 100°, 120°

- Two cutting ends give you twice the tool life of a single end tool



| Body Dia. (in.) | Overall Length (in.) | Material Grade | 60°         | 60° Code No. | Price \$ | 82°         | 82° Code No. | Price \$ | 90°         | 90° Code No. | Price \$ |
|-----------------|----------------------|----------------|-------------|--------------|----------|-------------|--------------|----------|-------------|--------------|----------|
| 1/8             | 1-1/2                | HSS            | DHS-1/8-60  | 121476       | 33.26    | DHS-1/8-82  | 121492       | 35.41    | DHS-1/8-90  | 121508       | 33.49    |
|                 |                      | Carbide        | DC-1/8-60   | 121477       | 52.03    | DC-1/8-82   | 121493       | 55.27    | DC-1/8-90   | 121509       | 58.38    |
| 3/16            | 2                    | HSS            | DHS-3/16-60 | 121478       | 38.88    | DHS-3/16-82 | 121494       | 36.96    | DHS-3/16-90 | 121510       | 38.76    |
|                 |                      | Carbide        | DC-3/16-60  | 121479       | 77.03    | DC-3/16-82  | 121495       | 69.62    | DC-3/16-90  | 121511       | 66.63    |
| 1/4             | 2                    | HSS            | DHS-1/4-60  | 121480       | 38.28    | DHS-1/4-82  | 121496       | 42.34    | DHS-1/4-90  | 121512       | 38.28    |
|                 |                      | Carbide        | DC-1/4-60   | 121481       | 90.43    | DC-1/4-82   | 121497       | 86.24    | DC-1/4-90   | 121513       | 94.51    |
| 5/16            | 2-1/2                | HSS            | DHS-5/16-60 | 121482       | 44.74    | DHS-5/16-82 | 121498       | 45.21    | DHS-5/16-90 | 121514       | 47.38    |
|                 |                      | Carbide        | DC-5/16-60  | 121483       | 136.24   | DC-5/16-82  | 121499       | 132.77   | DC-5/16-90  | 121515       | 136.24   |
| 3/8             | 2-1/2                | HSS            | DHS-3/8-60  | 121484       | 52.98    | DHS-3/8-82  | 121500       | 50.48    | DHS-3/8-90  | 121516       | 47.74    |
|                 |                      | Carbide        | DC-3/8-60   | 121485       | 167.47   | DC-3/8-82   | 121501       | 167.47   | DC-3/8-90   | 121517       | 163.16   |
| 1/2             | 3                    | HSS            | DHS-1/2-60  | 121486       | 64.35    | DHS-1/2-82  | 121502       | 64.35    | DHS-1/2-90  | 121518       | 64.35    |
|                 |                      | Carbide        | DC-1/2-60   | 121487       | 230.63   | DC-1/2-82   | 121503       | 230.63   | DC-1/2-90   | 121519       | 225.35   |
| 5/8             | 3-1/2                | HSS            | DHS-5/8-60  | 121488       | 86.95    | DHS-5/8-82  | 121504       | 89.48    | DHS-5/8-90  | 121520       | 92.35    |
|                 |                      | Carbide        | DC-5/8-60   | 121489       | 303.23   | DC-5/8-82   | 121505       | 303.23   | DC-5/8-90   | 121521       | 327.51   |
| 3/4             | 4                    | HSS            | DHS-3/4-60  | 121490       | 134.58   | DHS-3/4-82  | 121506       | 134.58   | DHS-3/4-90  | 121522       | 127.16   |
|                 |                      | Carbide        | DC-3/4-60   | 121491       | 430.39   | DC-3/4-82   | 121507       | 430.39   | DC-3/4-90   | 121523       | 430.39   |

| Body Dia. (in.) | Overall Length (in.) | Material Grade | 100°         | 100° Code No. | Price \$ | 120°         | 120° Code No. | Price \$ |
|-----------------|----------------------|----------------|--------------|---------------|----------|--------------|---------------|----------|
| 1/8             | 1-1/2                | HSS            | DHS-1/8-100  | 121524        | 33.26    | DHS-1/8-120  | 121540        | 34.57    |
|                 |                      | Carbide        | DC-1/8-100   | 121525        | 52.03    | DC-1/8-120   | 121541        | 52.03    |
| 3/16            | 2                    | HSS            | DHS-3/16-100 | 121526        | 37.92    | DHS-3/16-120 | 121542        | 38.88    |
|                 |                      | Carbide        | DC-3/16-100  | 121527        | 69.62    | DC-3/16-120  | 121543        | 65.67    |
| 1/4             | 2                    | HSS            | DHS-1/4-100  | 121528        | 40.06    | DHS-1/4-120  | 121544        | 40.06    |
|                 |                      | Carbide        | DC-1/4-100   | 121529        | 88.99    | DC-1/4-120   | 121545        | 86.24    |
| 5/16            | 2-1/2                | HSS            | DHS-5/16-100 | 121530        | 42.95    | DHS-5/16-120 | 121546        | 44.74    |
|                 |                      | Carbide        | DC-5/16-100  | 121531        | 139.96   | DC-5/16-120  | 121547        | 136.24   |
| 3/8             | 2-1/2                | HSS            | DHS-3/8-100  | 121532        | 47.74    | DHS-3/8-120  | 121548        | 50.48    |
|                 |                      | Carbide        | DC-3/8-100   | 121533        | 168.54   | DC-3/8-120   | 121549        | 155.39   |
| 1/2             | 3                    | HSS            | DHS-1/2-100  | 121534        | 64.35    | DHS-1/2-120  | 121550        | 64.35    |
|                 |                      | Carbide        | DC-1/2-100   | 121535        | 228.23   | DC-1/2-120   | 121551        | 230.63   |
| 5/8             | 3-1/2                | HSS            | DHS-5/8-100  | 121536        | 86.95    | DHS-5/8-120  | 121552        | 89.72    |
|                 |                      | Carbide        | DC-5/8-100   | 121537        | 303.23   | DC-5/8-120   | 121553        | 303.23   |
| 3/4             | 4                    | HSS            | DHS-3/4-100  | 121538        | 127.16   | DHS-3/4-120  | 121554        | 134.58   |
|                 |                      | Carbide        | DC-3/4-100   | 121539        | 430.39   | DC-3/4-120   | 121555        | 430.39   |

## HSS Chucking Reamers

This high quality tool is designed for most standard reaming needs. Available in straight or spiral flutes.

Spiral Flute



Straight Flute



| Dia.   | Decimal Equiv. (in.) | No. of Flutes | Flute Length (in.) | Overall Length ASA | Shank Dia. (in.) | Straight Flute Code No. | Price \$ | R.H. Spiral Code No. | Price \$ | L.H. Spiral Code No. | Price \$ |
|--------|----------------------|---------------|--------------------|--------------------|------------------|-------------------------|----------|----------------------|----------|----------------------|----------|
| 1/8    | 0.1250               | 4             | 7/8                | 3-1/2              | 0.1190           | 111107                  | 40.97    | 111105               | 41.74    | 128680               | 47.49    |
| 0.1260 | 0.1260               | 4             | 7/8                | 3-1/2              | 0.1190           | 111402                  | 40.97    | 128682               | 46.86    | 128683               | 51.22    |
| #30    | 0.1285               | 4             | 7/8                | 3-1/2              | 0.1190           | 128684                  | 40.97    | 128685               | 46.86    | 128686               | 51.22    |
| #29    | 0.1360               | 4             | 1                  | 4                  | 0.1275           | 128687                  | 48.13    | 128688               | 55.10    | 128689               | 63.19    |
| #28    | 0.1405               | 4             | 1                  | 4                  | 0.1350           | 128690                  | 48.13    | 128691               | 55.10    | 128692               | 63.19    |
| 9/64   | 0.1406               | 4             | 1                  | 4                  | 0.1350           | 111112                  | 48.13    | 111110               | 55.10    | -                    | -        |
| #27    | 0.1440               | 4             | 1                  | 4                  | 0.1350           | 128693                  | 48.13    | 128694               | 55.10    | 128695               | 63.19    |
| #26    | 0.1470               | 4             | 1                  | 4                  | 0.1430           | 128696                  | 48.13    | 128697               | 55.10    | 128698               | 63.19    |
| #25    | 0.1495               | 4             | 1                  | 4                  | 0.1430           | 128699                  | 48.13    | 128700               | 55.10    | 128702               | 63.19    |
| #24    | 0.1520               | 4             | 1                  | 4                  | 0.1460           | 128701                  | 48.13    | 128703               | 55.10    | 128704               | 63.19    |
| #23    | 0.1540               | 4             | 1                  | 4                  | 0.1460           | 128705                  | 48.13    | 128706               | 55.10    | 128707               | 63.19    |
| 5/32   | 0.1562               | 4             | 1                  | 4                  | 0.1510           | 111117                  | 48.13    | 111115               | 55.10    | 128708               | 63.19    |
| #22    | 0.1570               | 6             | 1                  | 4                  | 0.1510           | 128709                  | 48.13    | 128710               | 55.10    | 128711               | 63.19    |
| #21    | 0.1590               | 6             | 1-1/8              | 4-1/2              | 0.1530           | 128712                  | 51.63    | 128713               | 59.25    | 128714               | 67.97    |
| #20    | 0.1610               | 6             | 1-1/8              | 4-1/2              | 0.1530           | 128715                  | 51.63    | 128716               | 59.25    | 128717               | 67.97    |
| #19    | 0.1660               | 6             | 1-1/8              | 4-1/2              | 0.1595           | 128718                  | 51.63    | 128719               | 59.25    | 128720               | 67.97    |
| #18    | 0.1695               | 6             | 1-1/8              | 4-1/2              | 0.1595           | 128721                  | 51.63    | 128722               | 59.25    | 128723               | 67.97    |
| 11/64  | 0.1719               | 6             | 1-1/8              | 4-1/2              | 0.1645           | 111122                  | 51.63    | 111120               | 59.25    | 128724               | 67.97    |
| #17    | 0.1730               | 6             | 1-1/8              | 4-1/2              | 0.1645           | 128725                  | 51.63    | 128726               | 59.25    | 128727               | 67.97    |
| #16    | 0.1770               | 6             | 1-1/8              | 4-1/2              | 0.1704           | 128728                  | 51.63    | 128729               | 59.25    | 128730               | 67.97    |
| #15    | 0.1800               | 6             | 1-1/8              | 4-1/2              | 0.1755           | 128731                  | 51.63    | 128732               | 59.25    | 128733               | 67.97    |
| #14    | 0.1820               | 6             | 1-1/8              | 4-1/2              | 0.1755           | 128734                  | 51.63    | 128735               | 59.25    | 128736               | 67.97    |
| #13    | 0.1850               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 128737                  | 51.63    | 128738               | 59.25    | 128739               | 67.97    |
| 0.1855 | 0.1855               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 128740                  | 81.15    | 128741               | 93.04    | -                    | -        |
| 0.1865 | 0.1865               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 111404                  | 51.63    | 128744               | 59.25    | 128745               | 67.97    |
| 0.1870 | 0.1870               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 128746                  | 81.15    | 128747               | 93.04    | -                    | -        |
| 3/16   | 0.1875               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 111127                  | 51.63    | 111125               | 59.25    | 128749               | 67.97    |
| 0.1885 | 0.1885               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 111406                  | 51.63    | 128751               | 59.25    | 128752               | 67.97    |
| #12    | 0.1890               | 6             | 1-1/8              | 4-1/2              | 0.1805           | 128753                  | 51.63    | 128754               | 59.25    | 128755               | 67.97    |
| #11    | 0.1910               | 6             | 1-1/4              | 5                  | 0.1860           | 128756                  | 58.08    | 128757               | 66.18    | 128758               | 75.59    |
| #10    | 0.1935               | 6             | 1-1/4              | 5                  | 0.1860           | 128759                  | 58.08    | 128760               | 66.18    | 128761               | 75.59    |
| #9     | 0.1960               | 6             | 1-1/4              | 5                  | 0.1895           | 128762                  | 58.08    | 128763               | 66.18    | 128764               | 75.59    |
| #8     | 0.1990               | 6             | 1-1/4              | 5                  | 0.1895           | 128765                  | 58.08    | 128766               | 66.18    | 128767               | 75.59    |
| #7     | 0.2010               | 6             | 1-1/4              | 5                  | 0.1945           | 128768                  | 58.08    | 128769               | 66.18    | 128770               | 75.59    |
| 13/64  | 0.2031               | 6             | 1-1/4              | 5                  | 0.1945           | 111132                  | 58.08    | 111130               | 66.18    | 128771               | 75.59    |
| #6     | 0.2040               | 6             | 1-1/4              | 5                  | 0.1945           | 128772                  | 58.08    | 128773               | 66.18    | 128774               | 75.59    |
| #5     | 0.2055               | 6             | 1-1/4              | 5                  | 0.2016           | 128775                  | 58.08    | 128776               | 66.18    | 128777               | 75.59    |
| #4     | 0.2090               | 6             | 1-1/4              | 5                  | 0.2016           | 128778                  | 58.08    | 128779               | 66.18    | 128780               | 75.59    |
| #3     | 0.2130               | 6             | 1-1/4              | 5                  | 0.2075           | 128781                  | 58.08    | 128782               | 66.18    | 128783               | 75.59    |
| 7/32   | 0.2188               | 6             | 1-1/4              | 5                  | 0.2075           | 111137                  | 58.08    | 111135               | 66.18    | 128784               | 75.59    |
| #2     | 0.2210               | 6             | 1-1/2              | 6                  | 0.2173           | 128785                  | 59.57    | 128786               | 68.44    | 128787               | 78.16    |
| #1     | 0.2280               | 6             | 1-1/2              | 6                  | 0.2173           | 128788                  | 59.57    | 128789               | 68.44    | 128790               | 78.16    |
| A      | 0.2340               | 6             | 1-1/2              | 6                  | 0.2265           | 128791                  | 59.57    | 128792               | 68.44    | 128793               | 78.16    |
| 15/64  | 0.2344               | 6             | 1-1/2              | 6                  | 0.2265           | 111142                  | 59.57    | 111140               | 68.44    | 128794               | 78.16    |
| B      | 0.2380               | 6             | 1-1/2              | 6                  | 0.2329           | 128795                  | 62.62    | 128796               | 68.44    | 128797               | 78.16    |
| C      | 0.2420               | 6             | 1-1/2              | 6                  | 0.2329           | 128798                  | 62.62    | 128799               | 68.44    | 128800               | 78.16    |
| D      | 0.2460               | 6             | 1-1/2              | 6                  | 0.2329           | 128801                  | 62.62    | 128802               | 68.44    | 128803               | 78.16    |
| 0.2480 | 0.2480               | 6             | 1-1/2              | 6                  | 0.2405           | 128804                  | 81.15    | 128805               | 93.04    | -                    | -        |
| 0.2490 | 0.2490               | 6             | 1-1/2              | 6                  | 0.2405           | 111408                  | 55.88    | 128808               | 65.04    | 128809               | 77.90    |
| 0.2495 | 0.2495               | 6             | 1-1/2              | 6                  | 0.2405           | 128810                  | 81.15    | 128811               | 93.04    | -                    | -        |
| 1/4 E  | 0.2500               | 6             | 1-1/2              | 6                  | 0.2405           | 111147                  | 51.46    | 111145               | 68.44    | 128813               | 66.18    |
| 0.2510 | 0.2510               | 6             | 1-1/2              | 6                  | 0.2405           | 111410                  | 55.88    | 128815               | 68.44    | 128816               | 81.96    |
| F      | 0.2570               | 6             | 1-1/2              | 6                  | 0.2485           | 128817                  | 62.62    | 128818               | 68.44    | 128819               | 81.96    |
| G      | 0.2610               | 6             | 1-1/2              | 6                  | 0.2485           | 128820                  | 62.62    | 128821               | 68.44    | 128822               | 81.96    |
| 17/64  | 0.2656               | 6             | 1-1/2              | 6                  | 0.2485           | 111152                  | 69.17    | 111150               | 77.01    | 128823               | 85.11    |
| H      | 0.2660               | 6             | 1-1/2              | 6                  | 0.2485           | 128824                  | 69.17    | 128825               | 77.01    | 128826               | 85.11    |
| I      | 0.2720               | 6             | 1-1/2              | 6                  | 0.2485           | 128827                  | 69.17    | 128828               | 77.01    | 128829               | 85.11    |
| J      | 0.2770               | 6             | 1-1/2              | 6                  | 0.2485           | 128830                  | 69.17    | 128831               | 77.01    | 128832               | 85.11    |
| K      | 0.2810               | 6             | 1-1/2              | 6                  | 0.2485           | 128833                  | 69.17    | 128834               | 77.01    | 128835               | 80.90    |
| 9/32   | 0.2812               | 6             | 1-1/2              | 6                  | 0.2485           | 111157                  | 69.17    | 111155               | 77.01    | 128836               | 85.11    |
| L      | 0.2900               | 6             | 1-1/2              | 6                  | 0.2792           | 128837                  | 69.97    | 128838               | 77.01    | 128839               | 85.11    |
| M      | 0.2950               | 6             | 1-1/2              | 6                  | 0.2792           | 128840                  | 69.97    | 128841               | 115.25   | 128842               | 112.51   |
| 19/64  | 0.2969               | 6             | 1-1/2              | 6                  | 0.2792           | 111162                  | 69.97    | 111160               | 77.01    | 128843               | 85.11    |
| N      | 0.3020               | 6             | 1-1/2              | 6                  | 0.2792           | 128844                  | 69.97    | 128845               | 77.01    | 128846               | 85.11    |
| 0.3105 | 0.3105               | 6             | 1-1/2              | 6                  | 0.2792           | 128847                  | 101.39   | 128848               | 115.25   | -                    | -        |
| 0.3115 | 0.3115               | 6             | 1-1/2              | 6                  | 0.2792           | 111412                  | 66.18    | 128851               | 183.74   | 128852               | 85.11    |
| 0.3120 | 0.3120               | 6             | 1-1/2              | 6                  | 0.2792           | 128853                  | 101.39   | 128854               | 115.25   | -                    | -        |

| Dia.   | Decimal Equiv. (in.) | No. of Flutes | Flute Length (in.) | Overall Length ASA | Shank Dia. (in.) | Straight Flute Code No. | Price \$ | R.H. Spiral Code No. | Price \$ | L.H. Spiral Code No. | Price \$ |
|--------|----------------------|---------------|--------------------|--------------------|------------------|-------------------------|----------|----------------------|----------|----------------------|----------|
| 5/16   | 0.3125               | 6             | 1-1/2              | 6                  | 0.2792           | 111167                  | 62.91    | 111165               | 69.36    | 128856               | 78.74    |
| 0.3135 | 0.3135               | 6             | 1-1/2              | 6                  | 0.2792           | 111414                  | 66.18    | 128858               | 68.75    | 128859               | 80.90    |
| O      | 0.3160               | 6             | 1-1/2              | 6                  | 0.2792           | -                       | -        | 128861               | 77.17    | 128862               | 88.28    |
| P      | 0.3230               | 6             | 1-1/2              | 6                  | 0.2792           | 128863                  | 74.92    | 128864               | 80.00    | 128865               | 92.69    |
| 21/64  | 0.3281               | 6             | 1-1/2              | 6                  | 0.2792           | 111172                  | 74.92    | 111170               | 81.96    | 128866               | 92.69    |
| Q      | 0.3320               | 6             | 1-1/2              | 6                  | 0.2792           | 128867                  | 71.17    | 128868               | 77.90    | 128869               | 88.07    |
| R      | 0.3390               | 6             | 1-1/2              | 6                  | 0.2792           | 128870                  | 74.92    | 128871               | 81.96    | 128872               | 92.69    |
| 11/32  | 0.3438               | 6             | 1-1/2              | 6                  | 0.2792           | 111177                  | 74.92    | 111175               | 81.96    | 128873               | 92.69    |
| S      | 0.3480               | 6             | 1-3/4              | 7                  | 0.3105           | 128874                  | 74.92    | 128875               | 81.96    | 128876               | 92.69    |
| T      | 0.3580               | 6             | 1-3/4              | 7                  | 0.3105           | 128877                  | 74.92    | 128878               | 81.96    | 128879               | 92.69    |
| 23/64  | 0.3594               | 6             | 1-3/4              | 7                  | 0.3105           | 111182                  | 73.32    | 111180               | 81.96    | 128880               | 92.69    |
| U      | 0.3680               | 6             | 1-3/4              | 7                  | 0.3105           | 128881                  | 71.15    | 128882               | 77.90    | 128883               | 88.07    |
| 0.3730 | 0.3730               | 6             | 1-3/4              | 7                  | 0.3105           | 128884                  | 113.28   | -                    | -        | -                    | -        |
| 0.3740 | 0.3740               | 6             | 1-3/4              | 7                  | 0.3105           | 111416                  | 71.59    | 128888               | 81.96    | 128889               | 89.73    |
| 3/8    | 0.3750               | 6             | 1-3/4              | 7                  | 0.3105           | 111187                  | 67.46    | 111185               | 74.92    | 128893               | 85.11    |
| 0.3760 | 0.3760               | 6             | 1-3/4              | 7                  | 0.3105           | 111418                  | 71.59    | 128895               | 81.96    | 128896               | 89.73    |
| V      | 0.3770               | 6             | 1-3/4              | 7                  | 0.3105           | 128897                  | 81.77    | 128898               | 89.73    | 128899               | 100.66   |
| W      | 0.3860               | 6             | 1-3/4              | 7                  | 0.3105           | 128900                  | 81.77    | 128901               | 89.73    | 128902               | 100.66   |
| 25/64  | 0.3906               | 6             | 1-3/4              | 7                  | 0.3105           | 111192                  | 85.39    | 111190               | 89.73    | -                    | -        |
| X      | 0.3970               | 6             | 1-3/4              | 7                  | 0.3105           | 128903                  | 81.77    | 128904               | 89.73    | 128905               | 100.66   |
| Y      | 0.4040               | 6             | 1-3/4              | 7                  | 0.3105           | 128906                  | 84.87    | 128907               | 93.51    | 128908               | 107.04   |
| 13/32  | 0.4062               | 6             | 1-3/4              | 7                  | 0.3105           | 111197                  | 79.73    | 111195               | 93.51    | 128909               | 107.04   |
| Z      | 0.4130               | 6             | 1-3/4              | 7                  | 0.3730           | 128910                  | 84.87    | 128911               | 93.51    | 128912               | 107.04   |
| 27/64  | 0.4219               | 6             | 1-3/4              | 7                  | 0.3730           | 111202                  | 84.87    | 111200               | 93.51    | 128913               | 107.04   |
| 0.4355 | 0.4355               | 6             | 1-3/4              | 7                  | 0.3730           | 128914                  | 121.92   | 128915               | 130.68   | -                    | -        |
| 0.4365 | 0.4365               | 6             | 1-3/4              | 7                  | 0.3730           | 111420                  | 84.87    | 128918               | 89.52    | 128919               | 107.04   |
| 0.4370 | 0.4370               | 6             | 1-3/4              | 7                  | 0.3730           | 128917                  | 121.92   | 128923               | 130.68   | -                    | -        |
| 7/16   | 0.4375               | 6             | 1-3/4              | 7                  | 0.3730           | 111207                  | 78.74    | 111205               | 88.28    | 128925               | 100.66   |
| 0.4385 | 0.4385               | 6             | 1-3/4              | 7                  | 0.3730           | 111422                  | 84.87    | 128926               | 93.51    | 128927               | 107.04   |
| 29/64  | 0.4531               | 6             | 1-3/4              | 7                  | 0.3730           | 111212                  | 93.04    | 111210               | 101.95   | 128928               | 115.79   |
| 15/32  | 0.4688               | 6             | 1-3/4              | 7                  | 0.3730           | 111217                  | 93.04    | 111215               | 101.95   | 128929               | 115.79   |
| 31/64  | 0.4844               | 6             | 2                  | 8                  | 0.4355           | 111222                  | 93.04    | 111220               | 101.95   | 128930               | 115.79   |
| 0.4980 | 0.4980               | 6             | 2                  | 8                  | 0.4355           | -                       | -        | 128931               | 141.60   | -                    | -        |
| 0.4990 | 0.4990               | 6             | 2                  | 8                  | 0.4355           | 111424                  | 87.71    | 128934               | 96.77    | 128935               | 110.28   |
| 0.4995 | 0.4995               | 6             | 2                  | 8                  | 0.4355           | 128936                  | 129.07   | 128937               | 141.60   | -                    | -        |
| 1/2    | 0.5000               | 6             | 2                  | 8                  | 0.4355           | 111227                  | 87.71    | 111225               | 101.95   | 128939               | 108.82   |
| 0.5010 | 0.5010               | 6             | 2                  | 8                  | 0.4355           | 111426                  | 87.71    | 128940               | 96.77    | 128941               | 110.28   |
| 33/64  | 0.5156               | 6             | 2                  | 8                  | 0.4355           | 111232                  | 113.52   | 111230               | 138.44   | -                    | -        |
| 17/32  | 0.5312               | 6             | 2                  | 8                  | 0.4355           | 111237                  | 113.52   | 111235               | 120.65   | 128942               | 132.29   |
| 35/64  | 0.5469               | 6             | 2                  | 8                  | 0.4355           | 111242                  | 113.52   | 111240               | 144.82   | -                    | -        |
| 9/16   | 0.5625               | 6             | 2                  | 8                  | 0.4355           | 111247                  | 113.52   | 111245               | 122.75   | 128943               | 131.42   |
| 37/64  | 0.5781               | 6             | 2                  | 8                  | 0.4355           | 111252                  | 113.52   | 111250               | 141.60   | -                    | -        |
| 19/32  | 0.5938               | 6             | 2                  | 8                  | 0.4355           | 111257                  | 113.52   | 111255               | 125.91   | 128944               | 132.29   |
| 39/64  | 0.6094               | 6             | 2                  | 8                  | 0.4355           | 111262                  | 129.07   | 111260               | 188.76   | -                    | -        |
| 5/8    | 0.6250               | 8             | 2-1/4              | 9                  | 0.5620           | 111267                  | 129.07   | 111265               | 141.60   | 128945               | 146.27   |
| 41/64  | 0.6406               | 6             | 2-1/4              | 9                  | 0.5620           | 111272                  | 129.07   | 111270               | 174.53   | -                    | -        |
| 21/32  | 0.6562               | 8             | 2-1/4              | 9                  | 0.5620           | 111277                  | 138.44   | 111275               | 150.98   | 128946               | 163.24   |
| 11/16  | 0.6875               | 8             | 2-1/4              | 9                  | 0.5620           | 111282                  | 146.27   | 111280               | 160.53   | 128947               | 173.07   |
| 23/32  | 0.7188               | 8             | 2-1/4              | 9                  | 0.5620           | 111287                  | 155.93   | 111285               | 179.24   | 128948               | 193.57   |
| 3/4    | 0.7500               | 8             | 2-1/2              | 9-1/2              | 0.6245           | 111292                  | 181.01   | 111290               | 179.24   | 128949               | 193.57   |
| 25/32  | 0.7812               | 10            | 2-1/2              | 9-1/2              | 0.6245           | 111297                  | 181.01   | 111295               | 194.99   | 128950               | 213.04   |
| 13/16  | 0.8125               | 10            | 2-1/2              | 9-1/2              | 0.6245           | 111302                  | 188.49   | 111300               | 198.32   | 128951               | 213.04   |
| 27/32  | 0.8438               | 10            | 2-1/2              | 9-1/2              | 0.6245           | 111307                  | 217.01   | 111305               | 232.92   | 128952               | 248.65   |
| 7/8    | 0.8750               | 10            | 2-5/8              | 10                 | 0.7495           | 111312                  | 217.01   | 111310               | 240.55   | 128953               | 270.56   |
| 29/32  | 0.9062               | 10            | 2-5/8              | 10                 | 0.7495           | 111317                  | 236.89   | 111315               | 264.18   | 128954               | 364.69   |
| 15/16  | 0.9375               | 10            | 2-5/8              | 10                 | 0.7495           | 111322                  | 240.55   | 111320               | 264.18   | 128955               | 281.02   |
| 31/32  | 0.9688               | 10            | 2-5/8              | 10                 | 0.7495           | 111327                  | 254.81   | 111325               | 289.43   | 128956               | 311.36   |
| 1      | 1.0000               | 10            | 2-3/4              | 10-1/2             | 0.8745           | 111332                  | 259.45   | 111330               | 275.67   | 128957               | 296.64   |
| 1-1/16 | 1.0625               | 12            | 2-3/4              | 10-1/2             | 0.8745           | 111337                  | 283.11   | 111335               | 326.10   | 128958               | 346.00   |
| 1-1/8  | 1.1250               | 12            | 2-7/8              | 11                 | 0.8745           | 111342                  | 298.98   | 111340               | 339.76   | 128959               | 369.29   |
| 1-3/16 | 1.1875               | 12            | 2-7/8              | 11                 | 0.9995           | 111347                  | 361.69   | 111345               | 396.32   | 128960               | 430.72   |
| 1-1/4  | 1.2500               | 12            | 3                  | 11-1/2             | 0.9995           | 111352                  | 376.27   | 111350               | 427.56   | 128961               | 459.03   |
| 1-5/16 | 1.3125               | 12            | 3                  | 11-1/2             | 0.9995           | 111357                  | 440.11   | 111355               | 502.99   | 128962               | 534.29   |
| 1-3/8  | 1.3750               | 12            | 3-1/4              | 12                 | 0.9995           | 111362                  | 461.21   | 111360               | 531.37   | 128963               | 562.68   |
| 1-7/16 | 1.4375               | 12            | 3-1/4              | 12                 | 1.2495           | 111367                  | 493.58   | 111365               | 565.85   | 128964               | 617.13   |
| 1-1/2  | 1.5000               | 12            | 3-1/2              | 12-1/2             | 1.2495           | 111372                  | 559.43   | 111370               | 584.30   | 128965               | 647.48   |

| Diameter Tolerances: |  | D/P – Dowel pin reamers made to minus tolerance. All other reamers made to a plus tolerance. |                    |
|----------------------|--|--|--------------------|
| Through 1/2"         |  | 1/2" Through 5/8"  | 5/8" Through 1"    |
| +0.0002 +0.005 mm    |  | +0.0002" +0.005 mm   | +0.0005" +0.012 mm |
| -0.0000" - 0.0 mm    |  | -0.0000" -0.000 mm   | +0.001" +0.0025 mm |

This tolerance table applies unless otherwise indicated throughout the catalogue



## Decimal Chucking Reamers HSS

This high quality tool is designed for most standard reaming needs.

- Straight Flute



| Flute Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------------|--------------------|----------------------|----------|----------|
| 0.1230           | 7/8                | 3-1/2                | 111500   | 34.07    |
| 0.1245           | 7/8                | 3-1/2                | 111501   | 34.07    |
| 0.1255           | 7/8                | 3-1/2                | 111503   | 36.73    |
| 0.1265           | 7/8                | 3-1/2                | 111504   | 34.07    |
| 0.1270           | 7/8                | 3-1/2                | 111505   | 32.17    |
| 0.1280           | 7/8                | 3-1/2                | 111506   | 34.07    |
| 0.1290           | 7/8                | 3-1/2                | 111507   | 34.07    |
| 0.1295           | 7/8                | 3-1/2                | 111508   | 31.82    |
| 0.1300           | 1                  | 4                    | 111509   | 34.07    |
| 0.1370           | 1                  | 4                    | 111510   | 40.28    |
| 0.1375           | 1                  | 4                    | 111511   | 38.93    |
| 0.1380           | 1                  | 4                    | 111512   | 38.93    |
| 0.1400           | 1                  | 4                    | 111513   | 41.37    |
| 0.1410           | 1                  | 4                    | 111514   | 43.35    |
| 0.1415           | 1                  | 4                    | 111515   | 38.93    |
| 0.1420           | 1                  | 4                    | 111516   | 38.93    |
| 0.1520           | 1                  | 4                    | 111517   | 36.26    |
| 0.1560           | 1                  | 4                    | 111518   | 40.28    |
| 0.1580           | 1-1/8              | 4-1/2                | 111519   | 43.33    |
| 0.1670           | 1-1/8              | 4-1/2                | 111520   | 43.33    |
| 0.1720           | 1-1/8              | 4-1/2                | 111521   | 40.36    |
| 0.1740           | 1-1/8              | 4-1/2                | 111522   | 41.98    |
| 0.1750           | 1-1/8              | 4-1/2                | 111523   | 39.19    |
| 0.1760           | 1-1/8              | 4-1/2                | 111524   | 41.98    |
| 0.1770           | 1-1/8              | 4-1/2                | 111525   | 43.33    |
| 0.1810           | 1-1/8              | 4-1/2                | 111526   | 40.36    |
| 0.1820           | 1-1/8              | 4-1/2                | 111527   | 39.19    |
| 0.1840           | 1-1/8              | 4-1/2                | 111528   | 43.29    |
| 0.1845           | 1-1/8              | 4-1/2                | 111529   | 43.29    |
| 0.1850           | 1-1/8              | 4-1/2                | 111530   | 46.56    |
| 0.1855           | 1-1/8              | 4-1/2                | 111531   | 43.29    |
| 0.1860           | 1-1/8              | 4-1/2                | 111532   | 43.46    |
| 0.1870           | 1-1/8              | 4-1/2                | 111533   | 50.22    |
| 0.1875           | 1-1/8              | 4-1/2                | 111534   | 46.56    |
| 0.1880           | 1-1/8              | 4-1/2                | 111535   | 46.56    |
| 0.1895           | 1-1/8              | 4-1/2                | 111536   | 49.79    |
| 0.1900           | 1-1/8              | 4-1/2                | 111537   | 49.79    |
| 0.1905           | 1-1/8              | 4-1/2                | 111538   | 48.42    |
| 0.1910           | 1-1/4              | 5                    | 111539   | 49.79    |
| 0.1915           | 1-1/4              | 5                    | 111540   | 47.03    |
| 0.1920           | 1-1/4              | 5                    | 111541   | 49.79    |
| 0.1930           | 1-1/4              | 5                    | 111542   | 49.79    |
| 0.1940           | 1-1/4              | 5                    | 111543   | 49.79    |
| 0.1950           | 1-1/4              | 5                    | 111544   | 49.79    |
| 0.1960           | 1-1/4              | 5                    | 111545   | 49.79    |
| 0.1970           | 1-1/4              | 5                    | 111546   | 49.79    |
| 0.1980           | 1-1/4              | 5                    | 111547   | 49.79    |
| 0.1990           | 1-1/4              | 5                    | 111548   | 49.79    |
| 0.2000           | 1-1/4              | 5                    | 111549   | 49.79    |
| 0.2020           | 1-1/4              | 5                    | 111550   | 47.36    |
| 0.2024           | 1-1/4              | 5                    | 111551   | 48.42    |
| 0.2030           | 1-1/4              | 5                    | 111552   | 49.79    |
| 0.2050           | 1-1/4              | 5                    | 111553   | 49.79    |
| 0.2060           | 1-1/4              | 5                    | 111554   | 49.79    |
| 0.2070           | 1-1/4              | 5                    | 111555   | 50.42    |
| 0.2080           | 1-1/4              | 5                    | 111556   | 47.36    |
| 0.2090           | 1-1/4              | 5                    | 111557   | 45.27    |
| 0.2100           | 1-1/4              | 5                    | 111558   | 45.27    |
| 0.2110           | 1-1/4              | 5                    | 111559   | 49.79    |
| 0.2120           | 1-1/4              | 5                    | 111560   | 24.59    |
| 0.2140           | 1-1/4              | 5                    | 111561   | 49.79    |
| 0.2150           | 1-1/4              | 5                    | 111562   | 49.79    |
| 0.2155           | 1-1/4              | 5                    | 111563   | 51.03    |
| 0.2160           | 1-1/4              | 5                    | 111564   | 49.79    |
| 0.2170           | 1-1/4              | 5                    | 111565   | 49.79    |
| 0.2180           | 1-1/4              | 5                    | 111566   | 49.79    |
| 0.2190           | 1-1/4              | 5                    | 111567   | 49.79    |
| 0.2200           | 1-1/4              | 5                    | 111568   | 49.79    |
| 0.2211           | 1-1/4              | 5                    | 111569   | 43.96    |
| 0.2270           | 1-1/2              | 6                    | 111570   | 47.36    |
| 0.2300           | 1-1/2              | 6                    | 111571   | 52.33    |
| 0.2310           | 1-1/2              | 6                    | 111572   | 52.33    |
| 0.2320           | 1-1/2              | 6                    | 111573   | 50.26    |

| Flute Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------------|--------------------|----------------------|----------|----------|
| 0.2340           | 1-1/2              | 6                    | 111574   | 50.26    |
| 0.2350           | 1-1/2              | 6                    | 111575   | 52.33    |
| 0.2360           | 1-1/2              | 6                    | 111576   | 52.33    |
| 0.2370           | 1-1/2              | 6                    | 111577   | 52.33    |
| 0.2380           | 1-1/2              | 6                    | 111578   | 52.33    |
| 0.2390           | 1-1/2              | 6                    | 111579   | 52.33    |
| 0.2400           | 1-1/2              | 6                    | 111580   | 56.55    |
| 0.2410           | 1-1/2              | 6                    | 111581   | 52.33    |
| 0.2420           | 1-1/2              | 6                    | 111582   | 50.26    |
| 0.2430           | 1-1/2              | 6                    | 111583   | 50.26    |
| 0.2440           | 1-1/2              | 6                    | 111584   | 50.26    |
| 0.2450           | 1-1/2              | 6                    | 111585   | 52.33    |
| 0.2460           | 1-1/2              | 6                    | 111586   | 53.22    |
| 0.2470           | 1-1/2              | 6                    | 111587   | 52.33    |
| 0.2475           | 1-1/2              | 6                    | 111588   | 53.22    |
| 0.2480           | 1-1/2              | 6                    | 111589   | 52.33    |
| 0.2485           | 1-1/2              | 6                    | 111590   | 52.33    |
| 0.2495           | 1-1/2              | 6                    | 111591   | 50.90    |
| 0.2505           | 1-1/2              | 6                    | 111592   | 52.33    |
| 0.2515           | 1-1/2              | 6                    | 111593   | 52.33    |
| 0.2520           | 1-1/2              | 6                    | 111594   | 52.33    |
| 0.2530           | 1-1/2              | 6                    | 111595   | 52.33    |
| 0.2540           | 1-1/2              | 6                    | 111596   | 52.33    |
| 0.2550           | 1-1/2              | 6                    | 111597   | 53.59    |
| 0.2560           | 1-1/2              | 6                    | 111598   | 52.33    |
| 0.2570           | 1-1/2              | 6                    | 111599   | 55.18    |
| 0.2580           | 1-1/2              | 6                    | 111600   | 52.33    |
| 0.2590           | 1-1/2              | 6                    | 111601   | 47.11    |
| 0.2600           | 1-1/2              | 6                    | 111602   | 52.33    |
| 0.2650           | 1-1/2              | 6                    | 111603   | 55.52    |
| 0.2690           | 1-1/2              | 6                    | 111604   | 55.52    |
| 0.2710           | 1-1/2              | 6                    | 111605   | 53.71    |
| 0.2760           | 1-1/2              | 6                    | 111606   | 55.52    |
| 0.2770           | 1-1/2              | 6                    | 111607   | 55.52    |
| 0.2800           | 1-1/2              | 6                    | 111608   | 55.52    |
| 0.2820           | 1-1/2              | 6                    | 111609   | 55.41    |
| 0.2830           | 1-1/2              | 6                    | 111610   | 53.61    |
| 0.2840           | 1-1/2              | 6                    | 111611   | 53.61    |
| 0.2860           | 1-1/2              | 6                    | 111612   | 53.61    |
| 0.2870           | 1-1/2              | 6                    | 111613   | 55.52    |
| 0.2890           | 1-1/2              | 6                    | 111614   | 51.69    |
| 0.2900           | 1-1/2              | 6                    | 111615   | 53.61    |
| 0.2920           | 1-1/2              | 6                    | 111616   | 55.52    |
| 0.2930           | 1-1/2              | 6                    | 111617   | 53.61    |
| 0.2940           | 1-1/2              | 6                    | 111618   | 53.61    |
| 0.2960           | 1-1/2              | 6                    | 111619   | 53.61    |
| 0.2980           | 1-1/2              | 6                    | 111620   | 50.19    |
| 0.2990           | 1-1/2              | 6                    | 111621   | 50.19    |
| 0.3030           | 1-1/2              | 6                    | 111622   | 53.61    |
| 0.3050           | 1-1/2              | 6                    | 111623   | 55.52    |
| 0.3070           | 1-1/2              | 6                    | 111625   | 53.71    |
| 0.3090           | 1-1/2              | 6                    | 111626   | 55.52    |
| 0.3100           | 1-1/2              | 6                    | 111627   | 55.52    |
| 0.3105           | 1-1/2              | 6                    | 111628   | 53.61    |
| 0.3110           | 1-1/2              | 6                    | 111629   | 55.52    |
| 0.3120           | 1-1/2              | 6                    | 111630   | 55.52    |
| 0.3130           | 1-1/2              | 6                    | 111631   | 55.52    |
| 0.3140           | 1-1/2              | 6                    | 111632   | 55.52    |
| 0.3145           | 1-1/2              | 6                    | 111633   | 55.52    |
| 0.3150           | 1-1/2              | 6                    | 111634   | 55.52    |
| 0.3160           | 1-1/2              | 6                    | 111635   | 58.80    |
| 0.3165           | 1-1/2              | 6                    | 111636   | 60.12    |
| 0.3170           | 1-1/2              | 6                    | 111637   | 58.80    |
| 0.3180           | 1-1/2              | 6                    | 111638   | 58.80    |
| 0.3190           | 1-1/2              | 6                    | 111639   | 58.09    |
| 0.3200           | 1-1/2              | 6                    | 111640   | 58.80    |
| 0.3220           | 1-1/2              | 6                    | 111641   | 58.80    |
| 0.3240           | 1-1/2              | 6                    | 111642   | 63.06    |
| 0.3250           | 1-1/2              | 6                    | 111643   | 61.22    |
| 0.3270           | 1-1/2              | 6                    | 111644   | 53.57    |
| 0.3290           | 1-1/2              | 6                    | 111646   | 113.28   |
| 0.3300           | 1-1/2              | 6                    | 111647   | 53.57    |
| 0.3370           | 1-1/2              | 6                    | 111649   | 53.57    |
| 0.3440           | 1-1/2              | 6                    | 111650   | 58.80    |
| 0.3590           | 1-3/4              | 7                    | 111653   | 67.96    |
| 0.3690           | 1-3/4              | 7                    | 111654   | 64.87    |

| Flute Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------------|--------------------|----------------------|----------|----------|
| 0.3730           | 1-3/4              | 7                    | 111655   | 64.87    |
| 0.3745           | 1-3/4              | 7                    | 111656   | 64.87    |
| 0.3755           | 1-3/4              | 7                    | 111657   | 64.87    |
| 0.3765           | 1-3/4              | 7                    | 111658   | 64.87    |
| 0.3770           | 1-3/4              | 7                    | 111659   | 64.87    |
| 0.3790           | 1-3/4              | 7                    | 111660   | 64.87    |
| 0.3800           | 1-3/4              | 7                    | 111661   | 64.87    |
| 0.3860           | 1-3/4              | 7                    | 111662   | 64.12    |
| 0.3880           | 1-3/4              | 7                    | 111663   | 64.87    |
| 0.4000           | 1-3/4              | 7                    | 111664   | 64.87    |
| 0.4070           | 1-3/4              | 7                    | 111665   | 64.87    |
| 0.4300           | 1-3/4              | 7                    | 111666   | 64.87    |
| 0.4355           | 1-3/4              | 7                    | 111668   | 64.87    |
| 0.4370           | 1-3/4              | 7                    | 111669   | 70.09    |
| 0.4390           | 1-3/4              | 7                    | 111670   | 64.08    |
| 0.4410           | 1-3/4              | 7                    | 111671   | 70.75    |
| 0.4420           | 1-3/4              | 7                    | 111672   | 71.02    |
| 0.4430           | 1-3/4              | 7                    | 111673   | 70.75    |
| 0.4440           | 1-3/4              | 7                    | 111674   | 70.75    |
| 0.4480           | 1-3/4              | 7                    | 111675   | 66.36    |
| 0.4490           | 1-3/4              | 7                    | 111676   | 70.75    |
| 0.4550           | 1-3/4              | 7                    | 111677   | 70.75    |
| 0.4560           | 1-3/4              | 7                    | 111678   | 70.75    |
| 0.4820           | 1-3/4              | 7                    | 111679   | 85.27    |
| 0.4900           | 2                  | 8                    | 111680   | 85.27    |
| 0.4970           | 2                  | 8                    | 111681   | 85.27    |
| 0.4980           | 2                  | 8                    | 111682   | 86.00    |
| 0.4995           | 2                  | 8                    | 111683   | 89.07    |
| 0.5015           | 2                  | 8                    | 111684   | 95.05    |
| 0.5020           | 2                  | 8                    | 111685   | 95.05    |
| 0.5030           | 2                  | 8                    | 111686   | 91.99    |
| 0.5040           | 2                  | 8                    | 111687   | 91.99    |
| 0.5050           | 2                  | 8                    | 111688   | 91.99    |
| 0.5240           | 2                  | 8                    | 111689   | 92.72    |
| 0.5250           | 2                  | 8                    | 111690   | 91.82    |
| 0.5260           | 2                  | 8                    | 111691   | 91.99    |
| 0.5300           | 2                  | 8                    | 111692   | 91.99    |
| 0.5500           | 2                  | 8                    | 111693   | 95.05    |
| 0.5580           | 2                  | 8                    | 111694   | 86.45    |
| 0.5615           | 2                  | 8                    | 111696   | 91.99    |
| 0.5690           | 2                  | 8                    | 111697   | 92.49    |
| 0.5740           | 2                  | 8                    | -        | -        |
| 0.5840           | 2                  | 8                    | 111699   | 99.09    |
| 0.5850           | 2                  | 8                    | 111700   | 93.09    |
| 0.5860           | 2                  | 8                    | 111701   | 99.09    |
| 0.5880           | 2                  | 8                    | 111702   | 99.62    |
| 0.6050           | 2                  | 8                    | 111703   | 106.79   |
| 0.6220           | 2-1/4              | 9                    | 111704   | 107.25   |
| 0.6240           | 2-1/4              | 9                    | 111705   | 107.25   |
| 0.6250           | 2-1/4              | 9                    | 111706   | 119.50   |
| 0.6255           | 2-1/4              | 9                    | 111707   | 107.25   |
| 0.6260           | 2-1/4              | 9                    | 111708   | 107.25   |
| 0.6300           | 2-1/4              | 9                    | 111709   | 107.25   |
| 0.7480           | 2-1/4              | 9                    | 111710   | 142.52   |
| 0.7490           | 2-1/4              | 9                    | 111711   | 144.02   |
| 0.7510           | 2-1/2              | 9-1/2                | 111712   | 149.17   |
| 0.7580           | 2-1/2              | 9-1/2                | 111713   | 158.91   |

### Dowel Pin Reamers HSS

- Straight flute



| Flute Dia. (in.) | Flute Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|------------------|--------------------|----------------------|----------|----------|
| 0.1240           | 7/8                | 3-1/2                | 111400   | 40.97    |
| 0.1260           | 7/8                | 3-1/2                | 111402   | 40.97    |
| 0.1865           | 1-1/8              | 4-1/2                | 111404   | 51.63    |
| 0.1885           | 1-1/8              | 4-1/2                | 111406   | 51.63    |
| 0.2490           | 1-1/2              | 6                    | 111408   | 55.88    |
| 0.2510           | 1-1/2              | 6                    | 111410   | 55.88    |
| 0.3115           | 1-1/2              | 6                    | 111412   | 66.18    |
| 0.3135           | 1-1/2              | 6                    | 111414   | 66.18    |
| 0.3740           | 1-3/4              | 7                    | 111416   | 71.59    |
| 0.3760           | 1-3/4              | 7                    | 111418   | 71.59    |
| 0.4365           | 1-3/4              | 7                    | 111420   | 84.87    |
| 0.4385           | 1-3/4              | 7                    | 111422   | 84.87    |
| 0.4990           | 2                  | 8                    | 111424   | 87.71    |
| 0.5010           | 2                  | 8                    | 111426   | 87.71    |



## GS Tooling Collet Chucks & Collets

Unmatched precision and performance, at a price point you'll love!

See Pages G18-43



## Chucking Reamers HSS

**QUALITY  
IMPORT**

For general purpose reaming of almost any metal, in drill presses, turret lathes or screw machines.

- Cutting ends are ground with a 45° chamfer for easy hole entry
- Built for machine use, with shorter, deeper flutes than hand reamers
- Right Hand Spiral
- Right Hand Cut
- H7 Tolerance



### Straight Flute

- Used for general purpose reaming

### Spiral Flute

- Cut with smoother, chatter-free action than straight flute reamers
- Used on more difficult-to-ream materials and holes with irregularities such as keyways
- Easy to guide in the work

| Flute Dia. (in.) | Decimal Equiv. (in.) | Flute Length | Overall Length | Spiral Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|------------------|----------------------|--------------|----------------|-----------------------|----------|-------------------------|----------|
| 1/8              | 0.1250               | 7/8          | 3-1/2          | 110105                | 23.83    | 110107                  | 17.81    |
| 9/64             | 0.1460               | 1            | 4              | 110110                | 36.97    | 110112                  | 27.54    |
| 5/32             | 0.1562               | 1            | 4              | 110115                | 36.97    | 110117                  | 25.02    |
| 11/64            | 0.1719               | 1-1/8        | 4-1/2          | 110120                | 29.87    | 110122                  | 27.54    |
| 3/16             | 0.1875               | 1-1/8        | 4-1/2          | 110125                | 29.87    | 110127                  | 25.02    |
| 13/64            | 0.2031               | 1-1/4        | 5              | 110130                | 42.49    | 110132                  | 32.87    |
| 7/32             | 0.2187               | 1-1/4        | 5              | 110135                | 33.59    | 110137                  | 32.00    |
| 15/64            | 0.2344               | 1-1/2        | 6              | 110140                | 42.49    | 110142                  | 32.87    |
| 1/4              | 0.2500               | 1-1/2        | 6              | 110145                | 32.25    | 110147                  | 28.99    |
| 17/64            | 0.2656               | 1-1/2        | 6              | 110150                | 38.27    | 110152                  | 36.91    |
| 9/32             | 0.2812               | 1-1/2        | 6              | 110155                | 47.52    | 110157                  | 36.91    |
| 19/64            | 0.2969               | 1-1/2        | 6              | 110160                | 47.52    | 110162                  | 24.27    |
| 5/16             | 0.3125               | 1-1/2        | 6              | 110165                | 35.78    | 110167                  | 34.50    |
| 21/64            | 0.3281               | 1-1/2        | 6              | 110170                | 53.19    | 110172                  | 41.83    |
| 11/32            | 0.3437               | 1-1/2        | 6              | 110175                | 42.70    | 110177                  | 41.83    |
| 23/64            | 0.3594               | 1-3/4        | 7              | 110180                | 53.19    | 110182                  | 41.83    |
| 3/8              | 0.3750               | 1-3/4        | 7              | 110185                | 42.01    | 110187                  | 36.91    |
| 25/64            | 0.3906               | 1-3/4        | 7              | 110190                | 48.39    | 110192                  | 43.74    |
| 13/32            | 0.4062               | 1-3/4        | 7              | 110195                | 57.01    | 110197                  | 45.20    |
| 27/64            | 0.4219               | 1-3/4        | 7              | 110200                | 59.27    | 110202                  | 47.62    |
| 7/16             | 0.4375               | 1-3/4        | 7              | 110205                | 47.28    | 110207                  | 43.65    |
| 29/64            | 0.4531               | 1-3/4        | 7              | 110210                | 66.37    | 110212                  | 53.21    |
| 15/32            | 0.4687               | 1-3/4        | 7              | 110215                | 53.61    | 110217                  | 51.56    |
| 31/64            | 0.4844               | 2            | 8              | 110220                | 63.41    | 110222                  | 53.21    |
| 1/2              | 0.5000               | 2            | 8              | 110225                | 48.62    | 110227                  | 47.62    |
| 33/64            | 0.5156               | 2            | 8              | 110230                | 75.15    | 110232                  | 70.27    |
| 17/32            | 0.5312               | 2            | 8              | 110235                | 63.84    | 110237                  | 58.80    |
| 35/64            | 0.5469               | 2            | 8              | 110240                | 97.65    | 110242                  | 73.65    |
| 9/16             | 0.5625               | 2            | 8              | 110245                | 65.18    | 110247                  | 57.37    |
| 37/64            | 0.5781               | 2            | 8              | 110250                | 107.83   | 110252                  | 83.19    |
| 19/32            | 0.5937               | 2            | 8              | 110255                | 89.14    | 110257                  | 67.16    |
| 39/64            | 0.6094               | 2            | 8              | 110260                | 89.49    | 110262                  | 82.71    |
| 5/8              | 0.6250               | 2-1/4        | 9              | 110265                | 69.10    | 110267                  | 67.16    |
| 41/64            | 0.6406               | 2-1/4        | 9              | 110270                | 130.57   | 110272                  | 92.83    |
| 21/32            | 0.6562               | 2-1/4        | 9              | 110275                | 80.97    | 110277                  | 77.03    |
| 11/16            | 0.6875               | 2-1/4        | 9              | 110280                | 80.97    | 110282                  | 76.15    |
| 23/32            | 0.7187               | 2-1/4        | 9              | 110285                | 113.34   | 110287                  | 88.09    |
| 3/4              | 0.7500               | 2-1/2        | 9-1/2          | 110290                | 90.07    | 110292                  | 84.81    |
| 25/32            | 0.7812               | 2-1/2        | 9-1/2          | 110295                | 103.11   | 110297                  | 98.90    |
| 13/16            | 0.8125               | 2-1/2        | 9-1/2          | 110300                | 103.11   | 110302                  | 98.90    |
| 27/32            | 0.8437               | 2-1/2        | 9-1/2          | 110305                | 142.66   | 110307                  | 112.11   |
| 7/8              | 0.8750               | 2-5/8        | 10             | 110310                | 116.02   | 110312                  | 110.06   |
| 29/32            | 0.9062               | 2-5/8        | 10             | 110315                | 158.27   | 110317                  | 185.29   |
| 15/16            | 0.9375               | 2-5/8        | 10             | 110320                | 128.74   | 110322                  | 123.49   |
| 31/32            | 0.9687               | 2-5/8        | 10             | 110325                | 179.09   | 110327                  | 138.99   |
| 1                | 1.0000               | 2-3/4        | 10-1/2         | 110330                | 145.51   | 110332                  | 136.40   |
| 1-1/16           | 1.0625               | 2-3/4        | 10-1/2         | 110335                | 167.16   | 110337                  | 160.25   |
| 1-1/8            | 1.1250               | 2-7/8        | 11             | 110340                | 184.12   | 110342                  | 171.22   |
| 1-3/16           | 1.1875               | 2-7/8        | 11             | 110345                | 202.32   | 110347                  | 193.11   |
| 1-1/4            | 1.2500               | 3            | 11-1/2         | 110350                | 224.71   | 110352                  | 212.29   |
| 1-5/16           | 1.3150               | 3            | 11-1/2         | 110355                | 303.85   | 110357                  | 245.93   |
| 1-3/8            | 1.3750               | 3-1/4        | 12             | 110360                | 332.92   | 110362                  | 254.81   |
| 1-7/16           | 1.4375               | 3-1/4        | 12             | 110365                | 360.21   | 110367                  | 304.68   |
| 1-1/2            | 1.5000               | 3-1/2        | 12-1/2         | 110370                | 313.94   | 110372                  | 298.32   |

## Standard Metric Reamers HSS

**QUALITY  
IMPORT**

- 129 Series Made in USA



| Dia. (mm) | Decimal Equiv. (in.) | Flutes | Flute Length (in.) | Overall Length (in.) | Shank Dia. (in.) | Straight Code No. | Price \$ | Spiral Code No. | Price \$ |
|-----------|----------------------|--------|--------------------|----------------------|------------------|-------------------|----------|-----------------|----------|
| 1.00      | 0.0394               | 4      | 1/2                | 2-1/2                | 0.0390           | 129261            | 48.13    | -               | -        |
| 1.50      | 0.0591               | 4      | 1/2                | 2-1/2                | 0.0585           | 129263            | 48.13    | 129264          | 55.10    |
| 2.00      | 0.0787               | 4      | 3/4                | 3                    | 0.0771           | 129265            | 38.58    | 129266          | 44.75    |
| 2.50      | 0.0984               | 4      | 7/8                | 3-1/2                | 0.0928           | 143050            | 17.96    | 129267          | 44.75    |
| 3.00      | 0.1181               | 4      | 7/8                | 3-1/2                | 0.1120           | 143051            | 17.88    | 129268          | 46.86    |
| 3.50      | 0.1378               | 4      | 1                  | 4                    | 0.1350           | 143053            | 25.05    | 129269          | 55.10    |
| 4.00      | 0.1575               | 6      | 1-1/8              | 4-1/2                | 0.1530           | 143054            | 25.05    | 129270          | 55.10    |
| 4.50      | 0.1772               | 6      | 1-1/8              | 4-1/2                | 0.1755           | 143055            | 33.18    | 129271          | 59.25    |
| 5.00      | 0.1969               | 6      | 1-1/4              | 5                    | 0.1895           | 143056            | 33.18    | 129272          | 66.18    |
| 5.50      | 0.2165               | 6      | 1-1/4              | 5                    | 0.2075           | 129273            | 58.08    | 129274          | 66.18    |
| 6.00      | 0.2362               | 6      | 1-1/2              | 6                    | 0.2329           | 143057            | 35.21    | 129275          | 68.44    |
| 6.50      | 0.2559               | 6      | 1-1/2              | 6                    | 0.2485           | 129276            | 62.62    | 129277          | 68.44    |
| 7.00      | 0.2756               | 6      | 1-1/2              | 6                    | 0.2485           | 143058            | 37.13    | 129278          | 77.01    |
| 7.50      | 0.2953               | 6      | 1-1/2              | 6                    | 0.2792           | 129279            | 69.97    | 129280          | 77.01    |
| 8.00      | 0.3150               | 6      | 1-1/2              | 6                    | 0.2792           | 143059            | 37.13    | 129281          | 77.17    |
| 8.50      | 0.3346               | 6      | 1-1/2              | 6                    | 0.2792           | 129282            | 74.92    | 129283          | 81.96    |
| 9.00      | 0.3543               | 6      | 1-3/4              | 7                    | 0.3105           | 143060            | 42.11    | 129284          | 81.96    |
| 9.50      | 0.3740               | 6      | 1-3/4              | 7                    | 0.3105           | 129285            | 73.32    | 129286          | 77.90    |
| 10.00     | 0.3937               | 6      | 1-3/4              | 7                    | 0.3105           | 143061            | 43.92    | 129287          | 89.73    |
| 10.50     | 0.4134               | 6      | 1-3/4              | 7                    | 0.3730           | 129288            | 84.87    | 129289          | 93.51    |
| 11.00     | 0.4331               | 6      | 1-3/4              | 7                    | 0.3730           | 143062            | 46.71    | 129290          | 93.51    |
| 11.50     | 0.4528               | 6      | 1-3/4              | 7                    | 0.3730           | 129291            | 93.04    | 129292          | 101.95   |
| 12.00     | 0.4724               | 6      | 2                  | 8                    | 0.4355           | 143063            | 51.97    | 129293          | 101.95   |
| 12.50     | 0.4921               | 6      | 2                  | 8                    | 0.4355           | 129294            | 93.04    | 129295          | 101.95   |
| 13.00     | 0.5118               | 6      | 2                  | 8                    | 0.4355           | 143064            | 57.14    | 129296          | 138.44   |
| 13.50     | 0.5315               | 6      | 2                  | 8                    | 0.4355           | 129297            | 107.88   | 129298          | 138.44   |
| 14.00     | 0.5512               | 6      | 2                  | 8                    | 0.4355           | 143065            | 65.59    | 129299          | 154.16   |
| 14.50     | 0.5709               | 6      | 2                  | 8                    | 0.4355           | 129300            | 113.52   | 129301          | 119.08   |
| 15.00     | 0.5906               | 6      | 2                  | 8                    | 0.4355           | 143066            | 69.50    | 129302          | 141.60   |
| 15.50     | 0.6102               | 8      | 2-1/4              | 9                    | 0.5620           | 129303            | 129.07   | 129304          | 170.07   |
| 16.00     | 0.6299               | 8      | 2-1/4              | 9                    | 0.5620           | 143067            | 77.46    | 129305          | 174.53   |
| 16.50     | 0.6496               | 8      | 2-1/4              | 9                    | 0.5620           | 129306            | 129.07   | 129307          | 174.53   |
| 17.00     | 0.6693               | 8      | 2-1/4              | 9                    | 0.5620           | 143068            | 87.59    | 129308          | 191.93   |
| 17.50     | 0.6890               | 8      | 2-1/4              | 9                    | 0.5620           | 129309            | 254.86   | 129310          | 257.69   |
| 18.00     | 0.7087               | 8      | 2-1/4              | 9                    | 0.5620           | 143069            | 89.89    | 129311          | 201.32   |
| 18.50     | 0.7283               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 129312            | 181.01   | 129313          | 223.40   |
| 19.00     | 0.7480               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 143070            | 99.56    | 129314          | 228.17   |
| 19.50     | 0.7677               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 129315            | 181.01   | 129316          | 228.17   |
| 20.00     | 0.7874               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 143071            | 114.41   | 129317          | 240.55   |
| 20.50     | 0.8071               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 129318            | 188.49   | 129319          | 240.55   |
| 21.00     | 0.8268               | 8      | 2-1/2              | 9-1/2                | 0.6245           | 143072            | 269.35   | 129320          | 248.12   |
| 21.50     | 0.8465               | 8      | 2-5/8              | 10                   | 0.7495           | 129321            | 217.01   | 129322          | 283.11   |
| 22.00     | 0.8661               | 8      | 2-5/8              | 10                   | 0.7495           | 143073            | 136.35   | 129323          | 283.11   |
| 22.50     | 0.8858               | 8      | 2-5/8              | 10                   | 0.7495           | 129324            | 223.40   | 129325          | 287.72   |
| 23.00     | 0.9055               | 8      | 2-5/8              | 10                   | 0.7495           | 143074            | 302.89   | 129326          | 287.72   |
| 23.50     | 0.9252               | 8      | 2-5/8              | 10                   | 0.7495           | 129327            | 240.55   | 129328          | 311.36   |
| 24.00     | 0.9449               | 8      | 2-5/8              | 10                   | 0.7495           | 143075            | 152.60   | 129329          | 311.36   |
| 24.50     | 0.9646               | 8      | 2-5/8              | 10                   | 0.7495           | 129330            | 240.55   | 129331          | 311.36   |
| 25.00     | 0.9843               | 8      | 2-3/4              | 10-1/2               | 0.8745           | 129332            | 254.81   | 129333          | 328.32   |
| 25.50     | 1.0039               | 10     | 2-3/4              | 10-1/2               | 0.8745           | 129334            | 269.54   | 129335          | 364.69   |

## Taper Shank Chucking Reamers HSS — Fractional

Designed and applied similar to straight shank reamers manufactured with American National Standard taper shanks.

- Right hand cut



HSS

| Dia.   | Decimal Equiv. | Flute Length | Overall Length | Morse Taper No. | No. of Flutes | Straight Flute Code No. | Price \$ | R.H. Spiral Code No. | Price \$ |
|--------|----------------|--------------|----------------|-----------------|---------------|-------------------------|----------|----------------------|----------|
| 1/4    | 0.2500         | 1-1/2        | 6              | 1               | 6             | 129431                  | 83.14    | 129464               | 100.66   |
| 9/32   | 0.2812         | 1-1/2        | 6              | 1               | 6             | 129432                  | 86.89    | 129465               | 98.88    |
| 5/16   | 0.3125         | 1-1/2        | 6              | 1               | 6             | 129433                  | 86.89    | 129466               | 98.88    |
| 11/32  | 0.3438         | 1-1/2        | 6              | 1               | 6             | 129434                  | 95.88    | 129467               | 104.87   |
| 3/8    | 0.3750         | 1-3/4        | 7              | 1               | 6             | 129435                  | 100.40   | 129468               | 107.88   |
| 13/32  | 0.4062         | 1-3/4        | 7              | 1               | 6             | 129436                  | 104.31   | 129469               | 113.87   |
| 7/16   | 0.4375         | 1-3/4        | 7              | 1               | 6             | 129437                  | 104.31   | 129470               | 115.40   |
| 15/32  | 0.4688         | 1-3/4        | 7              | 1               | 6             | 129438                  | 107.11   | 129471               | 124.04   |
| 1/2    | 0.5000         | 2            | 8              | 1               | 6             | 129439                  | 114.43   | 129472               | 126.30   |
| 17/32  | 0.5312         | 2            | 8              | 1               | 6             | 129440                  | 126.61   | 129473               | 134.27   |
| 9/16   | 0.5625         | 2            | 8              | 1               | 8             | 129441                  | 139.70   | 129474               | 140.83   |
| 19/32  | 0.5938         | 2            | 8              | 1               | 8             | 129442                  | 138.91   | 129475               | 148.01   |
| 5/8    | 0.6250         | 2-1/4        | 9              | 2               | 8             | 129443                  | 157.01   | 129476               | 153.58   |
| 21/32  | 0.6562         | 2-1/4        | 9              | 2               | 8             | 129444                  | 153.38   | 129477               | 158.81   |
| 11/16  | 0.6875         | 2-1/4        | 9              | 2               | 8             | 129445                  | 160.94   | 129478               | 162.09   |
| 23/32  | 0.7188         | 2-1/4        | 9              | 2               | 8             | 129446                  | 163.61   | 129479               | 178.60   |
| 3/4    | 0.7500         | 2-1/2        | 9-1/2          | 2               | 8             | 129447                  | 171.81   | 129480               | 187.67   |
| 25/32  | 0.7812         | 2-1/2        | 9-1/2          | 2               | 10            | 129448                  | 191.77   | 129481               | 204.31   |
| 13/16  | 0.8125         | 2-1/2        | 9-1/2          | 2               | 10            | 129449                  | 191.77   | 129482               | 204.31   |
| 27/32  | 0.8438         | 2-1/2        | 9-1/2          | 2               | 10            | 129450                  | 207.03   | 129483               | 224.73   |
| 7/8    | 0.8750         | 2-5/8        | 10             | 2               | 10            | 129451                  | 226.99   | 129484               | 224.73   |
| 29/32  | 0.9062         | 2-5/8        | 10             | 2               | 10            | 129452                  | 235.52   | 129485               | 253.79   |
| 15/16  | 0.9375         | 2-5/8        | 10             | 3               | 10            | 129453                  | 235.52   | 129486               | 116.75   |
| 31/32  | 0.9687         | 2-5/8        | 10             | 3               | 10            | 129454                  | 255.88   | 129487               | 272.11   |
| 1      | 1.0000         | 2-3/4        | 10-1/2         | 3               | 10            | 129455                  | 262.78   | 129488               | 285.48   |
| 1-1/16 | 1.0625         | 2-3/4        | 10-1/2         | 3               | 12            | 129456                  | 289.43   | 129489               | 302.92   |
| 1-1/8  | 1.1250         | 2-7/8        | 11             | 3               | 12            | 129457                  | 311.36   | 129490               | 348.01   |
| 1-3/16 | 1.1875         | 2-7/8        | 11             | 3               | 12            | 129458                  | 343.12   | 129491               | 376.98   |
| 1-1/4  | 1.2500         | 3            | 11-1/2         | 4               | 12            | 129459                  | 408.69   | 129492               | 439.30   |
| 1-5/16 | 1.3125         | 3            | 11-1/2         | 4               | 12            | 129460                  | 440.11   | 129493               | 448.55   |
| 1-3/8  | 1.3750         | 3-1/4        | 12             | 4               | 12            | 129461                  | 465.19   | 129494               | 476.70   |
| 1-7/16 | 1.4375         | 3-1/4        | 12             | 4               | 12            | 129462                  | 476.43   | 129495               | 538.17   |
| 1-1/2  | 1.5000         | 3-1/2        | 12-1/2         | 4               | 12            | 129463                  | 534.29   | 129496               | 571.55   |

## Taper Shank Chucking Reamers HSS

- Straight flute
- Spiral flute



QUALITY IMPORT

HSS

| Flute Dia. (in.) | Flute Length (in.) | Overall Length (in.) | M.T. Shank | Spiral Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|------------------|--------------------|----------------------|------------|-----------------------|----------|-------------------------|----------|
| 1/4              | 1-1/2              | 6                    | 1          | 110405                | 74.21    | 110407                  | 47.41    |
| 9/32             | 1-1/2              | 6                    | 1          | 110410                | 77.83    | 110412                  | 51.47    |
| 5/16             | 1-1/2              | 6                    | 1          | 110415                | 74.21    | 110417                  | 49.24    |
| 11/32            | 1-1/2              | 6                    | 1          | 110420                | 80.94    | 110422                  | 54.27    |
| 3/8              | 1-3/4              | 7                    | 1          | 110425                | 59.83    | 110427                  | 55.61    |
| 13/32            | 1-3/4              | 7                    | 1          | 110430                | 102.86   | 110432                  | 73.82    |
| 7/16             | 1-3/4              | 7                    | 1          | 110435                | 82.23    | 110437                  | 73.82    |
| 15/32            | 1-3/4              | 7                    | 1          | 110440                | 107.61   | 110442                  | 82.97    |
| 1/2              | 2                  | 8                    | 1          | 110445                | 118.73   | 110447                  | 62.17    |
| 17/32            | 2                  | 8                    | 1          | 110450                | 104.65   | 110452                  | 95.60    |
| 9/16             | 2                  | 8                    | 1          | 110455                | 139.18   | 110457                  | 95.60    |
| 19/32            | 2                  | 8                    | 1          | 110460                | 130.07   | 110462                  | 105.35   |
| 5/8              | 2-1/4              | 9                    | 2          | 110465                | 90.47    | 110467                  | 76.04    |
| 21/32            | 2-1/4              | 9                    | 2          | 110470                | 121.14   | 110472                  | 111.72   |
| 11/16            | 2-1/4              | 9                    | 2          | 110475                | 122.54   | 110477                  | 111.72   |
| 23/32            | 2-1/4              | 9                    | 2          | 110480                | 137.48   | 110482                  | 126.98   |
| 3/4              | 2-1/2              | 9-1/2                | 2          | 110485                | 111.05   | 110487                  | 92.35    |
| 25/32            | 2-1/2              | 9-1/2                | 2          | 110490                | 127.69   | 110492                  | 107.49   |
| 13/16            | 2-1/2              | 9-1/2                | 2          | 110495                | 157.39   | 110497                  | 142.69   |
| 27/32            | 2-1/2              | 9-1/2                | 2          | 110500                | 179.76   | 110502                  | 165.06   |
| 7/8              | 2-5/8              | 10                   | 2          | 110505                | 146.19   | 110507                  | 120.97   |
| 29/32            | 2-5/8              | 10                   | 2          | 110510                | 196.46   | 110512                  | 178.16   |
| 15/16            | 2-5/8              | 10                   | 3          | 110515                | 196.46   | 110517                  | 133.43   |
| 31/32            | 2-5/8              | 10                   | 3          | 110520                | 220.87   | 110522                  | 215.60   |
| 1                | 2-3/4              | 10-1/2               | 3          | 110525                | 177.79   | 110527                  | 151.33   |
| 1-1/16           | 2-3/4              | 10-1/2               | 3          | 110530                | 202.29   | 110532                  | 170.21   |
| 1-1/8            | 2-7/8              | 11                   | 3          | 110535                | 223.37   | 110537                  | 183.93   |
| 1-3/16           | 2-7/8              | 11                   | 3          | 110540                | 345.08   | 110542                  | 269.59   |
| 1-1/4            | 3                  | 11-1/2               | 4          | 110545                | 267.02   | 110547                  | 223.08   |
| 1-5/16           | 3                  | 11-1/2               | 4          | -                     | -        | 110552                  | 339.01   |
| 1-3/8            | 3-1/4              | 12                   | 4          | 110555                | 316.62   | 110557                  | 263.57   |
| 1-7/16           | 3-1/4              | 12                   | 4          | 110560                | 465.96   | 110562                  | 383.86   |
| 1-1/2            | 3-1/2              | 12-1/2               | 4          | 110565                | 450.51   | 110567                  | 305.14   |

Diameter Tolerances:

D/P – Dowel pin reamers made to minus tolerance. All other reamers made to a plus tolerance

Through 1/2"

1/2" Through 5/8"

5/8" Through 1"

+0.0002 +0.005 mm

+0.0002" +0.005 mm

+0.0005" +0.012 mm

-0.0000" - 0.0 mm

-0.0000" -0.000 mm

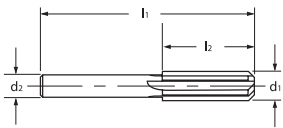
+0.001" +0.0025 mm

This tolerance table applies unless otherwise indicated throughout the catalogue

## Solid Carbide Chucking Reamers



- Solid carbide
- Straight flute
- Fractional, wire and letter sizes



| (d <sub>1</sub> ) Reamer Dia. | Decimal Equiv. | (l <sub>2</sub> ) Flute Length | (l <sub>1</sub> ) Overall Length | (d <sub>2</sub> ) Shank Dia. | Code No. | Price \$ |
|-------------------------------|----------------|--------------------------------|----------------------------------|------------------------------|----------|----------|
| 56                            | 0.0465         | 3/8                            | 1-1/2                            | 0.0410                       | 170941   | 74.34    |
| 3/64                          | 0.0469         | 3/8                            | 1-1/2                            | 0.0410                       | 170942   | 74.34    |
| 55                            | 0.0520         | 3/8                            | 1-1/2                            | 0.0520                       | 170943   | 74.34    |
| 54                            | 0.0550         | 3/8                            | 1-1/2                            | 0.0520                       | 170944   | 69.63    |
| 53                            | 0.0595         | 3/8                            | 1-1/2                            | 0.0520                       | 170945   | 74.34    |
| 1/16                          | 0.0625         | 3/8                            | 1-1/2                            | 0.0520                       | 170800   | 78.35    |
| 52                            | 0.0635         | 3/8                            | 1-1/2                            | 0.0520                       | 170946   | 78.35    |
| 51                            | 0.0670         | 1/2                            | 1-3/4                            | 0.0625                       | 170947   | 78.35    |
| 50                            | 0.0700         | 1/2                            | 1-3/4                            | 0.0625                       | 170948   | 55.61    |
| 49                            | 0.0730         | 1/2                            | 1-3/4                            | 0.0625                       | 170949   | 78.35    |
| 48                            | 0.0760         | 1/2                            | 1-3/4                            | 0.0625                       | 170950   | 78.35    |
| 5/64                          | 0.0781         | 1/2                            | 1-3/4                            | 0.0625                       | 170951   | 78.35    |
| 47                            | 0.0785         | 1/2                            | 1-3/4                            | 0.0625                       | 170952   | 78.35    |
| 46                            | 0.0810         | 1/2                            | 2                                | 0.0781                       | 170953   | 79.67    |
| 45                            | 0.0820         | 1/2                            | 2                                | 0.0781                       | 170954   | 79.67    |
| 44                            | 0.0860         | 1/2                            | 2                                | 0.0781                       | 170955   | 79.67    |
| 43                            | 0.0890         | 1/2                            | 2                                | 0.0781                       | 170956   | 79.67    |
| 42                            | 0.0935         | 1/2                            | 2                                | 0.0781                       | 170957   | 79.67    |
| 3/32                          | 0.0938         | 1/2                            | 2                                | 0.0781                       | 170802   | 79.67    |
| 41                            | 0.0960         | 5/8                            | 2-1/4                            | 0.0938                       | 170958   | 80.40    |
| 40                            | 0.0980         | 5/8                            | 2-1/4                            | 0.0938                       | 170959   | 80.40    |
| 39                            | 0.0995         | 5/8                            | 2-1/4                            | 0.0938                       | 170960   | 80.40    |
| 38                            | 0.1015         | 5/8                            | 2-1/4                            | 0.0938                       | 170961   | 80.40    |
| 37                            | 0.1040         | 5/8                            | 2-1/4                            | 0.0938                       | 170962   | 80.40    |
| 36                            | 0.1065         | 5/8                            | 2-1/4                            | 0.0938                       | 170963   | 80.40    |
| 7/64                          | 0.1094         | 5/8                            | 2-1/4                            | 0.0938                       | 170964   | 80.40    |
| 35                            | 0.1100         | 5/8                            | 2-1/4                            | 0.0938                       | 170965   | 80.40    |
| 34                            | 0.1110         | 5/8                            | 2-1/4                            | 0.0938                       | 170966   | 80.40    |
| 33                            | 0.1130         | 5/8                            | 2-1/4                            | 0.0938                       | 170967   | 80.40    |
| 32                            | 0.1160         | 5/8                            | 2-1/4                            | 0.1094                       | 170968   | 82.45    |
| 31                            | 0.1200         | 5/8                            | 2-1/4                            | 0.1094                       | 170969   | 82.45    |
| 1/8                           | 0.1250         | 5/8                            | 2-1/4                            | 0.1094                       | 170804   | 82.45    |
| 30                            | 0.1285         | 5/8                            | 2-1/4                            | 0.1094                       | 170970   | 82.45    |
| 29                            | 0.1360         | 3/4                            | 2-1/2                            | 0.1250                       | 170971   | 87.05    |
| 28                            | 0.1405         | 3/4                            | 2-1/2                            | 0.1250                       | 170972   | 87.05    |
| 9/64                          | 0.1406         | 3/4                            | 2-1/2                            | 0.1250                       | 170973   | 87.05    |
| 27                            | 0.1440         | 3/4                            | 2-1/2                            | 0.1250                       | 170974   | 87.05    |
| 26                            | 0.1470         | 3/4                            | 2-1/2                            | 0.1406                       | 170975   | 87.05    |
| 25                            | 0.1495         | 3/4                            | 2-1/2                            | 0.1406                       | 170976   | 87.05    |
| 24                            | 0.1520         | 3/4                            | 2-1/2                            | 0.1406                       | 170977   | 87.05    |
| 23                            | 0.1540         | 3/4                            | 2-1/2                            | 0.1406                       | 170978   | 87.05    |
| 5/32                          | 0.1562         | 3/4                            | 2-1/2                            | 0.1406                       | 170806   | 87.05    |
| 22                            | 0.1570         | 3/4                            | 2-1/2                            | 0.1406                       | 170979   | 87.05    |
| 21                            | 0.1590         | 3/4                            | 2-1/2                            | 0.1406                       | 170980   | 87.05    |
| 20                            | 0.1610         | 7/8                            | 2-3/4                            | 0.1562                       | 170981   | 95.38    |
| 19                            | 0.1660         | 7/8                            | 2-3/4                            | 0.1562                       | 170982   | 95.38    |
| 18                            | 0.1695         | 7/8                            | 2-3/4                            | 0.1562                       | 170983   | 95.38    |
| 11/64                         | 0.1719         | 7/8                            | 2-3/4                            | 0.1562                       | 170984   | 95.38    |
| 17                            | 0.1730         | 7/8                            | 2-3/4                            | 0.1562                       | 170985   | 95.38    |
| 16                            | 0.1770         | 7/8                            | 2-3/4                            | 0.1719                       | 170986   | 102.53   |
| 15                            | 0.1800         | 7/8                            | 2-3/4                            | 0.1719                       | 170987   | 102.53   |
| 14                            | 0.1820         | 7/8                            | 2-3/4                            | 0.1719                       | 170988   | 102.53   |
| 13                            | 0.1850         | 7/8                            | 2-3/4                            | 0.1719                       | 170989   | 96.11    |
| 3/16                          | 0.1875         | 7/8                            | 2-3/4                            | 0.1719                       | 170808   | 102.53   |
| 12                            | 0.1890         | 7/8                            | 2-3/4                            | 0.1719                       | 170990   | 102.53   |
| 11                            | 0.1910         | 7/8                            | 2-3/4                            | 0.1875                       | 170991   | 102.53   |
| 10                            | 0.1935         | 7/8                            | 2-3/4                            | 0.1875                       | 170992   | 102.53   |
| 9                             | 0.1960         | 1                              | 3                                | 0.1875                       | 170993   | 114.01   |
| 8                             | 0.1990         | 1                              | 3                                | 0.1875                       | 170994   | 114.01   |
| 7                             | 0.2010         | 1                              | 3                                | 0.1875                       | 170995   | 114.01   |
| 13/64                         | 0.2031         | 1                              | 3                                | 0.1875                       | 170996   | 114.01   |
| 6                             | 0.2040         | 1                              | 3                                | 0.1875                       | 170997   | 114.01   |
| 5                             | 0.2055         | 1                              | 3                                | 0.1875                       | 170998   | 114.01   |
| 4                             | 0.2090         | 1                              | 3                                | 0.1875                       | 170999   | 114.01   |
| 3                             | 0.2130         | 1                              | 3                                | 0.1875                       | 171000   | 114.01   |

| (d <sub>1</sub> ) Reamer Dia. | Decimal Equiv. | (l <sub>2</sub> ) Flute Length | (l <sub>1</sub> ) Overall Length | (d <sub>2</sub> ) Shank Dia. | Code No. | Price \$ |
|-------------------------------|----------------|--------------------------------|----------------------------------|------------------------------|----------|----------|
| 7/32                          | 0.2188         | 1                              | 3                                | 0.1875                       | 171001   | 114.01   |
| 2                             | 0.2210         | 1                              | 3                                | 0.1875                       | 171002   | 118.95   |
| 1                             | 0.2280         | 1                              | 3                                | 0.2188                       | 171003   | 118.95   |
| A                             | 0.2340         | 1                              | 3                                | 0.2188                       | 171004   | 118.95   |
| 15/64                         | 0.2344         | 1                              | 3                                | 0.2188                       | 171005   | 118.95   |
| B                             | 0.2380         | 1                              | 3                                | 0.2188                       | 171006   | 127.55   |
| C                             | 0.2420         | 1                              | 3                                | 0.2188                       | 171007   | 127.55   |
| D                             | 0.2460         | 1                              | 3                                | 0.2188                       | 171008   | 127.55   |
| 1/4                           | 0.2500         | 1                              | 3                                | 0.2188                       | 170810   | 127.55   |
| E                             | 0.2500         | 1-1/8                          | 3-1/4                            | 0.2188                       | 171009   | 136.49   |
| F                             | 0.2570         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171010   | 136.49   |
| G                             | 0.2610         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171011   | 136.49   |
| 17/64                         | 0.2656         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171012   | 136.49   |
| H                             | 0.2660         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171013   | 136.49   |
| I                             | 0.2720         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171014   | 136.49   |
| J                             | 0.2770         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171015   | 136.49   |
| K                             | 0.2810         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171016   | 136.49   |
| 9/32                          | 0.2812         | 1-1/8                          | 3-1/4                            | 0.2500                       | 171017   | 136.49   |
| L                             | 0.2900         | 1-1/8                          | 3-1/4                            | 0.2812                       | 171018   | 142.05   |
| M                             | 0.2950         | 1-1/8                          | 3-1/4                            | 0.2812                       | 171019   | 142.05   |
| 19/64                         | 0.2969         | 1-1/8                          | 3-1/4                            | 0.2812                       | 171020   | 142.05   |
| N                             | 0.3030         | 1-1/8                          | 3-1/4                            | 0.2812                       | 171021   | 144.45   |
| 5/16                          | 0.3125         | 1-1/8                          | 3-1/4                            | 0.2812                       | 170812   | 144.45   |
| O                             | 0.3160         | 1-1/8                          | 3-1/4                            | 0.3125                       | 171022   | 158.61   |
| P                             | 0.3230         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171023   | 176.38   |
| 21/64                         | 0.3281         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171024   | 176.38   |
| Q                             | 0.3320         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171025   | 176.38   |
| R                             | 0.3390         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171026   | 176.38   |
| 11/32                         | 0.3438         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171028   | 176.38   |
| S                             | 0.3480         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171029   | 189.93   |
| T                             | 0.3580         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171030   | 189.93   |
| 23/64                         | 0.3594         | 1-1/4                          | 3-1/2                            | 0.3125                       | 171031   | 189.93   |
| U                             | 0.3680         | 1-1/4                          | 3-1/2                            | 0.3594                       | 171032   | 198.52   |
| 3/8                           | 0.3750         | 1-1/4                          | 3-1/2                            | 0.3594                       | 170814   | 186.30   |
| V                             | 0.3770         | 1-1/4                          | 3-1/2                            | 0.3594                       | 171033   | 198.52   |
| W                             | 0.3860         | 1-1/4                          | 3-1/2                            | 0.3594                       | 171034   | 198.52   |
| 25/64                         | 0.3906         | 1-1/4                          | 3-1/2                            | 0.3750                       | 171035   | 222.09   |
| X                             | 0.3970         | 1-1/4                          | 3-1/2                            | 0.3750                       | 171036   | 222.09   |
| Y                             | 0.4040         | 1-1/4                          | 3-1/2                            | 0.3750                       | 171037   | 241.18   |
| 13/32                         | 0.4062         | 1-1/4                          | 3-1/2                            | 0.3750                       | 171038   | 241.18   |
| Z                             | 0.4130         | 1-1/4                          | 3-1/2                            | 0.3750                       | 171039   | 241.18   |
| 27/64                         | 0.4219         | 1-3/8                          | 3-3/4                            | 0.3750                       | 171040   | 269.97   |
| 7/16                          | 0.4375         | 1-3/8                          | 3-3/4                            | 0.3750                       | 171041   | 269.97   |
| 29/64                         | 0.4531         | 1-3/8                          | 3-3/4                            | 0.4375                       | 171042   | 320.13   |
| 15/32                         | 0.4688         | 1-3/8                          | 3-3/4                            | 0.4375                       | 171043   | 320.13   |
| 31/64                         | 0.4844         | 1-1/2                          | 4                                | 0.4375                       | 171044   | 359.66   |
| 1/2                           | 0.5000         | 1-1/2                          | 4                                | 0.4375                       | 170816   | 359.66   |

### Diameter Tolerances:

| d <sub>1</sub> | d <sub>1</sub>  | d <sub>2</sub> | No. of Flutes |
|----------------|-----------------|----------------|---------------|
| 0.0465-0.2500  | +0.0001/+0.0004 | +0.000/-0.001  | 4             |
| 0.2570-0.5000  | +0.0001/+0.0005 | +0.000/-0.001  | 6             |

## Taper Pin Reamers HSS



- Straight flute
- Spiral flute
- Taper 1/4" per foot



| Size | Small End Dia. | Large End Dia. | Flute Length | Overall Length | Straight Flute Code No. | Price \$ | Spiral Flute Code No. | Price \$ |
|------|----------------|----------------|--------------|----------------|-------------------------|----------|-----------------------|----------|
| 3/0  | 0.1029         | 0.1302         | 1-5/16       | 2-5/16         | 109505                  | 52.55    | 109605                | 55.03    |
| 2/0  | 0.1137         | 0.1462         | 1-9/16       | 2-9/16         | 109510                  | 47.54    | 109610                | 50.07    |
| 0    | 0.1287         | 0.1638         | 1-11/16      | 2-15/16        | 109515                  | 42.57    | 109615                | 42.98    |
| 1    | 0.1447         | 0.1798         | 1-11/16      | 2-15/16        | 109520                  | 47.54    | 109620                | 50.07    |
| 2    | 0.1605         | 0.2008         | 1-15/16      | 3-3/16         | 109525                  | 38.76    | 109625                | 54.26    |
| 3    | 0.1813         | 0.2294         | 2-5/16       | 3-11/16        | 109530                  | 47.54    | 109630                | 50.07    |
| 4    | 0.2071         | 0.2604         | 2-9/16       | 4-1/16         | 109535                  | 52.55    | 109635                | 46.98    |
| 5    | 0.2409         | 0.2994         | 2-13/16      | 4-5/16         | 109540                  | 58.64    | 109640                | 60.05    |
| 6    | 0.2773         | 0.3540         | 3-11/16      | 5-7/16         | 109545                  | 72.58    | 109645                | 77.57    |
| 7    | 0.3297         | 0.4220         | 4-7/16       | 6-5/16         | 109550                  | 92.56    | 109650                | 100.14   |
| 8    | 0.3971         | 0.5050         | 5-3/16       | 7-3/16         | 109555                  | 135.08   | 109655                | 145.17   |
| 9    | 0.4805         | 0.6066         | 6-1/16       | 8-5/16         | 109560                  | 172.67   | 109660                | 152.88   |
| 10   | 0.5799         | 0.7216         | 6-13/16      | 9-5/16         | 109565                  | 203.62   | 109665                | 214.74   |

## Taper Bridge Reamers HSS

- Straight flute
- Spiral flute



| Full Dia. | Approx. Point Dia. | Flute Length | Overall Length | Taper No. | Spiral Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|-----------|--------------------|--------------|----------------|-----------|-----------------------|----------|-------------------------|----------|
| 5/16      | 11/64              | 4-3/8        | 8-1/4          | 2         | 109303                | 112.36   | 109431                  | 99.67    |
| 13/32     | 7/32               | 4-3/8        | 8-1/4          | 2         | 109304                | 90.86    | 109432                  | 69.31    |
| 7/16      | 17/64              | 4-3/8        | 8-1/4          | 2         | 109305                | 112.36   | 109433                  | 117.39   |
| 15/32     | 9/32               | 5-1/8        | 9              | 2         | 109307                | 104.83   | 109434                  | 77.45    |
| 1/2       | 5/16               | 5-1/8        | 9              | 2         | 109310                | 96.41    | 109435                  | 131.63   |
| 17/32     | 11/32              | 5-1/8        | 9              | 2         | 109312                | 140.03   | 109436                  | 143.25   |
| 9/16      | 3/8                | 5-1/8        | 9              | 2         | 109315                | 104.63   | 109437                  | 143.25   |
| 5/8       | 25/64              | 6-1/8        | 10             | 2         | 109320                | 118.42   | 109438                  | 165.34   |
| 11/16     | 13/32              | 7-1/8        | 11-3/4         | 3         | 109325                | 174.85   | 109439                  | 198.46   |
| 3/4       | 15/32              | 7-3/8        | 12             | 3         | 109330                | 260.48   | 109440                  | 213.67   |
| 13/16     | 35/64              | 7-3/8        | 12             | 3         | 109335                | 235.80   | 109441                  | 232.36   |
| 7/8       | 39/64              | 7-3/8        | 12             | 3         | 109340                | 294.60   | 109442                  | 259.01   |
| 15/16     | 43/64              | 7-3/8        | 12             | 3         | 109345                | 390.68   | 109443                  | 265.15   |
| 1         | 47/64              | 7-3/8        | 12             | 3         | 109350                | 370.33   | 109444                  | 293.91   |
| 1-1/16    | 13/16              | 7-3/8        | 12             | 3         | 109355                | 407.60   | 109445                  | 323.71   |
| 1-1/8     | 55/64              | 7-3/8        | 12             | 3         | 109360                | 569.44   | 109446                  | 360.17   |
| 1-3/16    | 59/64              | 7-3/8        | 12             | 3         | 109365                | 485.42   | 109447                  | 400.56   |
| 1-1/4     | 63/64              | 7-3/8        | 13             | 4         | 109370                | 699.98   | 109448                  | 422.60   |
| 1-5/16    | 1-1/16             | 7-3/8        | 13             | 4         | 109375                | 817.73   | 109449                  | 485.24   |
| 1-3/8     | 1-1/8              | 7-3/8        | 13             | 4         | 109380                | 904.45   | 109450                  | 525.50   |
| 1-7/16    | 1-1/8              | 7-3/8        | 13             | 4         | 109385                | 1,019.82 | -                       | -        |
| 1-1/2     | 1-1/4              | 7-3/8        | 13             | 4         | 109390                | 847.73   | 109452                  | 639.13   |
| 1-9/16    | 1-1/4              | 7-3/8        | 13             | 4         | 109395                | 1,198.85 | -                       | -        |
| 1-5/8     | 1-1/4              | 7-3/8        | 13             | 4         | 109400                | 1,159.15 | 109454                  | 888.86   |
| 1-11/16   | 1-3/8              | 7-3/8        | 13             | 4         | 109405                | 950.94   | -                       | -        |
| 1-3/4     | 1-7/16             | 7-3/8        | 13             | 4         | 109410                | 1,079.94 | -                       | -        |
| 1-13/16   | 1-7/16             | 7-3/8        | 13             | 4         | 109415                | 1,356.09 | -                       | -        |
| 1-7/8     | 1-1/2              | 7-3/8        | 13             | 4         | 109420                | 1,452.56 | -                       | -        |
| 1-15/16   | 1-1/2              | 7-3/8        | 13             | 4         | 109425                | 1,268.48 | -                       | -        |
| 2         | 1-3/4              | 7-3/8        | 13             | 4         | 109430                | 1,790.23 | -                       | -        |

## Taper Pin Reamers HSS — Hand

Used to ream holes into which standard taper pins will fit.

- Taper 1/4" per foot
- Ideally used in the attachment of gears, pulleys to shafts
- Straight and left hand spiral flutes are intended for hand reaming

- Recommended that the drilled hole be a few thousandths smaller than the small diameter of the finished reamed hole
- Straight flutes
- Straight shank
- Left hand spiral
- Right hand cut



| Size No. | Small End Dia. | Large End Dia. | Flute Length | Overall Length | Shank Dia. | No. of Flutes | Straight Flute Code No. | Price \$ | L.H. Spiral Flute Code No. | Price \$ |
|----------|----------------|----------------|--------------|----------------|------------|---------------|-------------------------|----------|----------------------------|----------|
| 7/0      | 0.0497         | 0.0666         | 13/16        | 1-13/16        | 5/64       | 4             | 129560                  | 121.20   | 129577                     | 125.10   |
| 6/0      | 0.0611         | 0.0806         | 15/16        | 1-15/16        | 3/32       | 4             | 129561                  | 121.20   | 129578                     | 125.10   |
| 5/0      | 0.0719         | 0.0966         | 1-3/16       | 2-3/16         | 7/64       | 4             | 129562                  | 114.16   | 129579                     | 122.66   |
| 4/0      | 0.0869         | 0.1142         | 1-5/16       | 2-5/16         | 1/8        | 4             | 129563                  | 114.16   | 129580                     | 122.66   |
| 3/0      | 0.1029         | 0.1302         | 1-5/16       | 2-5/16         | 9/64       | 4             | 129564                  | 114.16   | 129581                     | 122.66   |
| 2/0      | 0.1137         | 0.1462         | 1-9/16       | 2-9/16         | 5/32       | 4             | 129565                  | 114.16   | 129582                     | 122.66   |
| 0        | 0.1287         | 0.1638         | 1-11/16      | 2-15/16        | 11/64      | 6             | 129566                  | 92.88    | 129583                     | 98.88    |
| 1        | 0.1447         | 0.1798         | 1-11/16      | 2-15/16        | 3/16       | 6             | 129567                  | 88.42    | 129584                     | 98.88    |
| 2        | 0.1605         | 0.2008         | 1-15/16      | 3-3/16         | 13/64      | 6             | 129568                  | 88.42    | 129585                     | 98.88    |
| 3        | 0.1813         | 0.2294         | 2-5/16       | 3-11/16        | 15/64      | 6             | 129569                  | 93.04    | 129586                     | 98.88    |
| 4        | 0.2071         | 0.2604         | 2-9/16       | 4-1/16         | 17/64      | 6             | 129570                  | 98.12    | 129587                     | 106.83   |
| 5        | 0.2409         | 0.2994         | 2-13/16      | 4-5/16         | 5/16       | 6             | 129571                  | 108.13   | 129588                     | 120.67   |
| 6        | 0.2773         | 0.3540         | 3-11/16      | 5-7/16         | 23/64      | 6             | 129572                  | 127.38   | 129589                     | 141.33   |
| 7        | 0.3297         | 0.4220         | 4-7/16       | 6-5/16         | 13/32      | 6             | 129573                  | 175.65   | 129590                     | 179.59   |
| 8        | 0.3971         | 0.5050         | 5-3/16       | 7-3/16         | 7/16       | 6             | 129574                  | 215.74   | 129591                     | 248.65   |
| 9        | 0.4805         | 0.6066         | 6-1/16       | 8-5/16         | 9/16       | 8             | 129575                  | 261.01   | 129592                     | 275.47   |
| 10       | 0.5799         | 0.7216         | 6-13/16      | 9-5/16         | 5/8        | 8             | 129576                  | 274.20   | 129593                     | 307.16   |

## Taper Pin Reamers HSS — Helical Flute



Designed for machine reaming of taper pin holes, helical flutes reduce chip packing thereby reducing breakage.

- Taper 1/4" per foot
- Straight shank



| Size No. | Small End Dia. | Large End Dia. | Flute Length | Overall Length | Shank Dia. | No. of Flutes | Code No. | Price \$ |
|----------|----------------|----------------|--------------|----------------|------------|---------------|----------|----------|
| 7/0      | 0.0497         | 0.0666         | 13/16        | 1-13/16        | 5/64       | 2             | 129597   | 127.68   |
| 6/0      | 0.0611         | 0.0806         | 15/16        | 1-15/16        | 3/32       | 2             | 129598   | 127.68   |
| 5/0      | 0.0719         | 0.0966         | 1-3/16       | 2-3/16         | 7/64       | 3             | 129599   | 127.68   |
| 4/0      | 0.0869         | 0.1142         | 1-5/16       | 2-5/16         | 1/8        | 3             | 129600   | 127.68   |
| 3/0      | 0.1029         | 0.1302         | 1-5/16       | 2-5/16         | 9/64       | 3             | 129601   | 127.68   |
| 2/0      | 0.1137         | 0.1462         | 1-9/16       | 2-9/16         | 5/32       | 3             | 129602   | 127.68   |
| 0        | 0.1287         | 0.1638         | 1-11/16      | 2-15/16        | 11/64      | 3             | 129603   | 102.75   |
| 1        | 0.1447         | 0.1798         | 1-11/16      | 2-15/16        | 3/16       | 3             | 129604   | 102.75   |
| 2        | 0.1605         | 0.2008         | 1-15/16      | 3-3/16         | 13/64      | 3             | 129605   | 109.14   |
| 3        | 0.1813         | 0.2294         | 2-5/16       | 3-11/16        | 15/64      | 3             | 129606   | 119.29   |
| 4        | 0.2071         | 0.2604         | 2-9/16       | 4-1/16         | 17/64      | 3             | 129607   | 139.26   |
| 5        | 0.2409         | 0.2994         | 2-13/16      | 4-5/16         | 5/16       | 3             | 129608   | 143.83   |
| 6        | 0.2773         | 0.3540         | 3-11/16      | 5-7/16         | 23/64      | 3             | 129609   | 174.84   |
| 7        | 0.3297         | 0.4220         | 4-7/16       | 6-5/16         | 13/32      | 3             | 129610   | 213.70   |
| 8        | 0.3971         | 0.5050         | 5-3/16       | 7-3/16         | 7/16       | 3             | 129611   | 248.61   |
| 9        | 0.4805         | 0.6066         | 6-1/16       | 8-5/16         | 9/16       | 4             | 129612   | 268.20   |
| 10       | 0.5799         | 0.7216         | 6-13/16      | 9-5/16         | 5/8        | 4             | 129613   | 336.36   |

## Taper Shank Jobber Reamers HSS



| Dia.   | Decimal Equiv. | Flute Length | Overall Length | Morse Taper No. | No. of Flutes | Code No. | Price \$ |
|--------|----------------|--------------|----------------|-----------------|---------------|----------|----------|
| 1/4    | 0.2500         | 2            | 5-3/16         | 1               | 6             | 129530   | 163.69   |
| 9/32   | 0.2812         | 2            | 5-3/16         | 1               | 6             | 129531   | 163.69   |
| 5/16   | 0.3125         | 2-1/4        | 5-1/2          | 1               | 6             | 129532   | 164.66   |
| 11/32  | 0.3438         | 2-1/4        | 5-1/2          | 1               | 6             | 129533   | 187.29   |
| 3/8    | 0.3750         | 2-1/2        | 5-13/16        | 1               | 6             | 129534   | 200.34   |
| 13/32  | 0.4062         | 2-1/2        | 5-13/16        | 1               | 6             | 129535   | 212.31   |
| 7/16   | 0.4375         | 2-3/4        | 6-1/8          | 1               | 6             | 129536   | 217.49   |
| 15/32  | 0.4688         | 2-3/4        | 6-1/8          | 1               | 6             | 129537   | 228.17   |
| 1/2    | 0.5000         | 3            | 6-7/16         | 1               | 6             | 129538   | 234.68   |
| 17/32  | 0.5312         | 3            | 6-7/16         | 1               | 6             | 129539   | 245.93   |
| 9/16   | 0.5625         | 3-1/4        | 6-3/4          | 1               | 8             | 129540   | 264.55   |
| 19/32  | 0.5938         | 3-1/4        | 6-3/4          | 1               | 8             | 129541   | 270.72   |
| 5/8    | 0.6250         | 3-1/2        | 7-9/16         | 2               | 8             | 129542   | 280.87   |
| 21/32  | 0.6562         | 3-1/2        | 7-9/16         | 2               | 8             | 129543   | 288.00   |
| 11/16  | 0.6875         | 3-7/8        | 8              | 2               | 8             | 129544   | 299.50   |
| 23/32  | 0.7188         | 3-7/8        | 8              | 2               | 8             | 129545   | 311.92   |
| 3/4    | 0.7500         | 4-3/16       | 8-3/8          | 2               | 8             | 129546   | 328.32   |
| 13/16  | 0.8125         | 4-9/16       | 8-13/16        | 2               | 10            | 129547   | 358.80   |
| 7/8    | 0.8750         | 4-7/8        | 9-3/16         | 2               | 10            | 129548   | 395.34   |
| 15/16  | 0.9375         | 5-1/8        | 10             | 3               | 10            | 129549   | 439.83   |
| 1      | 1.0000         | 5-7/16       | 10-3/8         | 3               | 10            | 129550   | 452.73   |
| 1-1/16 | 1.0625         | 5-5/8        | 10-5/8         | 3               | 12            | 129551   | 547.15   |
| 1-1/8  | 1.1250         | 5-13/16      | 10-7/8         | 3               | 12            | 129552   | 581.54   |
| 1-3/16 | 1.1875         | 6            | 11-1/8         | 3               | 12            | 129553   | 615.61   |
| 1-1/4  | 1.2500         | 6-1/8        | 12-9/16        | 4               | 12            | 129554   | 678.23   |
| 1-5/16 | 1.3125         | 6-1/4        | 12-11/16       | 4               | 12            | 129555   | 895.92   |
| 1-3/8  | 1.3750         | 6-5/16       | 12-13/16       | 4               | 12            | 129556   | 1,100.12 |
| 1-7/16 | 1.4375         | 6-7/16       | 13             | 4               | 12            | 129557   | 1,288.43 |
| 1-1/2  | 1.5000         | 6-1/2        | 13-1/8         | 4               | 12            | 129558   | 1,508.60 |

## Jobber Reamers HSS



- Taper Shank
- Straight Flute



| Flute Dia. | Decimal Equiv. | Flute Length | Overall Length | Morse Taper | Code No. | Price \$ |
|------------|----------------|--------------|----------------|-------------|----------|----------|
| 1/4        | 0.2500         | 2            | 5-3/16         | 1           | 110580   | 78.05    |
| 9/32       | 0.2812         | 2            | 5-3/16         | 1           | 110582   | 84.44    |
| 5/16       | 0.3125         | 2-1/4        | 5-1/2          | 1           | 110584   | 81.37    |
| 11/32      | 0.3438         | 2-1/4        | 5-1/2          | 1           | 110586   | 84.44    |
| 3/8        | 0.3750         | 2-1/2        | 5-13/16        | 1           | 110588   | 147.03   |
| 13/32      | 0.4062         | 2-1/2        | 5-13/16        | 1           | 110590   | 101.35   |
| 15/32      | 0.4688         | 2-3/4        | 6-1/8          | 1           | 110605   | 101.35   |
| 1/2        | 0.5000         | 3            | 6-7/16         | 1           | 110610   | 110.74   |
| 17/32      | 0.5313         | 3            | 6-7/16         | 1           | 110615   | 95.67    |
| 9/16       | 0.5625         | 3-1/4        | 6-3/4          | 1           | 110620   | 160.27   |
| 19/32      | 0.5938         | 3-1/4        | 6-3/4          | 1           | 110625   | 124.62   |
| 5/8        | 0.6250         | 3-1/2        | 7-9/16         | 2           | 110630   | 167.02   |
| 21/32      | 0.6562         | 3-1/2        | 7-9/16         | 2           | 110635   | 194.67   |
| 11/16      | 0.6875         | 3-7/8        | 8              | 2           | 110640   | 205.67   |
| 23/32      | 0.7188         | 3-7/8        | 8              | 2           | 110645   | 205.67   |
| 3/4        | 0.7500         | 4-3/16       | 8-3/8          | 2           | 110650   | 194.63   |
| 13/16      | 0.8125         | 4-9/16       | 8-13/16        | 2           | 110655   | 165.70   |
| 7/8        | 0.8750         | 4-7/8        | 9-3/16         | 2           | 110660   | 244.64   |
| 15/16      | 0.9375         | 5-1/8        | 10             | 3           | 110665   | 290.23   |
| 1          | 1.0005         | 5-7/16       | 10-3/8         | 3           | 110670   | 279.77   |
| 1-1/8      | 1.1250         | 5-13/16      | 10-7/8         | 3           | 110680   | 253.75   |
| 1-3/16     | 1.1875         | 6            | 11-1/8         | 3           | 110685   | 406.56   |
| 1-5/16     | 1.3125         | 6-1/4        | 12-11/16       | 4           | 110695   | 488.02   |
| 1-3/8      | 1.3750         | 6-5/16       | 12-13/16       | 4           | 110700   | 527.21   |
| 1-7/16     | 1.4375         | 6-7/16       | 13             | 4           | 110705   | 392.27   |
| 1-1/2      | 1.5000         | 6-1/2        | 13-1/8         | 4           | 110710   | 426.05   |

## Taper Pipe Reamers HSS



- 3/4 in/ft, right-hand cut
- Straight flute
- Spiral flute



| Size  | Large End Dia. | Small End Dia. | Flute Length | Overall Length | Straight Flute Code No. | Price \$ | Spiral Flute Code No. | Price \$ |
|-------|----------------|----------------|--------------|----------------|-------------------------|----------|-----------------------|----------|
| 1/16  | 0.291          | 0.245          | 3/4          | 2              | 109666                  | 46.03    | 109678                | 58.35    |
| 1/8   | 0.362          | 0.316          | 3/4          | 2-1/8          | 109667                  | 49.10    | 109679                | 58.35    |
| 1/4   | 0.472          | 0.406          | 1-1/16       | 2-7/16         | 109668                  | 70.71    | 109680                | 82.90    |
| 3/8   | 0.606          | 0.540          | 1-1/16       | 2-9/16         | 109669                  | 98.29    | 109681                | 119.62   |
| 1/2   | 0.751          | 0.665          | 1-3/8        | 3-1/8          | 109670                  | 128.82   | 109682                | 156.21   |
| 3/4   | 0.962          | 0.876          | 1-3/8        | 3-1/4          | 109671                  | 183.80   | 109683                | 100.24   |
| 1     | 1.212          | 1.103          | 1-3/4        | 3-3/4          | 109672                  | 223.31   | 109684                | 266.10   |
| 1-1/4 | 1.553          | 1.444          | 1-3/4        | 4              | 109673                  | 363.81   | 109685                | 428.15   |
| 1-1/2 | 1.793          | 1.684          | 1-3/4        | 4-1/4          | 109674                  | 547.29   | 109686                | 610.44   |
| 2     | 1.268          | 2.159          | 1-3/4        | 4-1/2          | 109675                  | 739.08   | 109687                | 805.76   |

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## Hand Reamers HSS

- Helical and straight flute



**QUALITY  
IMPORT**

| Flute Dia. | Overall Length | Flute Length | Helical Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|------------|----------------|--------------|------------------------|----------|-------------------------|----------|
| 1/8        | 3              | 1-1/2        | 109700                 | 71.84    | 109800                  | 71.80    |
| 5/32       | 3-1/4          | 1-5/8        | 109702                 | 77.01    | 109802                  | 74.97    |
| 3/16       | 3-1/2          | 1-3/4        | 109704                 | 84.38    | 109804                  | 79.27    |
| 7/32       | 3-3/4          | 1-7/8        | 109706                 | 83.97    | 109806                  | 77.45    |
| 1/4        | 4              | 2            | 109708                 | 84.38    | 109808                  | 79.25    |
| 9/32       | 4-1/4          | 2-1/8        | 109710                 | 111.17   | 109810                  | 83.97    |
| 5/16       | 4-1/2          | 2-1/4        | 109712                 | 91.69    | 109812                  | 84.38    |
| 11/32      | 4-3/4          | 2-3/8        | 109714                 | 107.65   | 109814                  | 95.16    |
| 3/8        | 5              | 2-1/2        | 109716                 | 109.00   | 109816                  | 96.60    |
| 13/32      | 5-1/4          | 2-5/8        | 109718                 | 118.83   | 109818                  | 101.41   |
| 7/16       | 5-1/2          | 2-3/4        | 109720                 | 118.88   | 109820                  | 101.41   |
| 15/32      | 5-3/4          | 2-7/8        | 109722                 | 80.79    | 109822                  | 118.83   |
| 31/64      | 6              | 3            | 109724                 | 99.17    | 109824                  | 118.83   |
| 1/2        | 6              | 3            | 109726                 | 131.19   | 109826                  | 118.88   |
| 17/32      | 6-1/4          | 3-1/8        | 109728                 | 165.32   | 109828                  | 132.79   |
| 9/16       | 6-1/2          | 3-1/4        | 109730                 | 150.99   | 109830                  | 133.64   |
| 19/32      | 6-3/4          | 3-3/8        | 109732                 | 160.25   | 109832                  | 141.51   |
| 5/8        | 7              | 3-1/2        | 109734                 | 160.74   | 109834                  | 155.62   |
| 21/32      | 7-3/8          | 3-11/16      | 109736                 | 202.29   | 109836                  | 153.72   |
| 11/16      | 7-3/4          | 3-7/8        | 109738                 | 172.91   | -                       | -        |
| 23/32      | 8-1/8          | 4-1/16       | 109740                 | 184.51   | 109840                  | 166.49   |
| 3/4        | 8-3/8          | 4-3/16       | 109742                 | 187.93   | 109842                  | 170.53   |
| 25/32      | 8-3/4          | 4-3/8        | 109744                 | 197.15   | 109844                  | 178.72   |
| 13/16      | 9-1/8          | 4-9/16       | 109746                 | 316.20   | 109846                  | 178.72   |
| 27/32      | 9-3/8          | 4-11/16      | 109748                 | 215.32   | 109848                  | 197.15   |
| 7/8        | 9-3/4          | 4-7/8        | 109750                 | 217.66   | 109850                  | 197.96   |
| 29/32      | 10             | 5            | 109752                 | 245.83   | 109852                  | 224.23   |
| 15/16      | 10-1/4         | 5-1/8        | 109754                 | 245.83   | 109854                  | 221.85   |
| 31/32      | 10-5/8         | 5-5/16       | 109756                 | 218.62   | 109856                  | 240.43   |
| 1          | 10-7/8         | 5-7/16       | 109758                 | 272.05   | 109858                  | 242.36   |
| 1-1/16     | 11-1/4         | 5-5/8        | 109760                 | 297.70   | 109860                  | 267.46   |
| 1-1/8      | 11-5/8         | 5-13/16      | 109762                 | 323.78   | 109862                  | 390.30   |
| 1-3/16     | 12             | 6            | 109764                 | 363.35   | 109864                  | 331.99   |
| 1-1/4      | 12-1/4         | 6-1/8        | 109766                 | 407.80   | 109866                  | 365.73   |
| 1-5/16     | 12-1/2         | 6-1/4        | 109768                 | 440.23   | 109868                  | 405.65   |
| 1-3/8      | 12-5/8         | 6-5/16       | 109770                 | 480.02   | 109870                  | 430.19   |
| 1-7/16     | 12-7/8         | 6-7/16       | -                      | -        | 109872                  | 473.50   |
| 1-1/2      | 13             | 6-1/2        | 109774                 | 565.61   | 109874                  | 512.87   |

## Shell Reamer Arbors

- Straight shank
- Taper shank



**QUALITY  
IMPORT**

| Size | Reamer Range  | O.A.L. | Straight Shank Dia. | Straight Shank Code No. | Price \$ | Taper Shank M.T. | Taper Shank Code No. | Price \$ |
|------|---------------|--------|---------------------|-------------------------|----------|------------------|----------------------|----------|
| 4    | 21/32-25/32   | 9      | 1/2                 | 400380                  | 186.61   | 2                | 400360               | 228.45   |
| 5    | 13/16-1-1/32  | 9-1/2  | 5/8                 | 400382                  | 205.92   | 2                | 400362               | 244.53   |
| 6    | 1-1/16-1-9/32 | 10     | 3/4                 | 400384                  | 231.67   | 3                | 400364               | 276.70   |
| 7    | 1-5/16-1-5/8  | 11     | 7/8                 | 400386                  | 250.96   | 3                | 400366               | 296.01   |
| 8    | 1-11/16-2     | 12     | 1-1/8               | 400388                  | 279.92   | 4                | 400368               | 334.61   |
| 9    | 2-1/16-2-1/2  | 13     | 1-3/8               | 400390                  | 328.18   | 4                | 400370               | 395.75   |
| 10   | 2-9/16-3      | 14     | 1-5/8               | 400392                  | 530.88   | 5                | 400372               | 582.36   |
| 11   | 3-1/16-3-1/2  | 15     | 2                   | 400394                  | 687.72   | 5                | 400374               | 756.12   |
| 12   | 3-9/16-4      | 16     | 2-1/8               | 400396                  | 746.19   | 5                | 400376               | 587.19   |

## Shell Reamers HSS

- Straight flute
- Spiral flute



**QUALITY  
IMPORT**

| Flute Dia. | Overall Length | Hole Dia. | Fits Arbor No. | Straight Flute Code No. | Price \$ | Spiral Flute Code No. | Price \$ |
|------------|----------------|-----------|----------------|-------------------------|----------|-----------------------|----------|
| 3/4        | 2-1/4          | 3/8       | 4              | 108005                  | 177.47   | -                     | -        |
| 13/16      | 2-1/2          | 1/2       | 5              | 108010                  | 189.56   | 109010                | 200.80   |
| 7/8        | 2-1/2          | 1/2       | 5              | 108015                  | 165.87   | 109015                | 200.83   |
| 15/16      | 2-1/2          | 1/2       | 5              | 108020                  | 203.10   | 109020                | 203.37   |
| 1          | 2-1/2          | 1/2       | 5              | 108025                  | 222.81   | 109025                | 223.02   |
| 1-1/16     | 2-3/4          | 5/8       | 6              | 108030                  | 199.47   | 109030                | 234.01   |
| 1-1/8      | 2-3/4          | 5/8       | 6              | 108035                  | 182.77   | 109035                | 204.11   |
| 1-3/16     | 2-3/4          | 5/8       | 6              | 108040                  | 185.59   | 109040                | 230.17   |
| 1-1/4      | 2-3/4          | 5/8       | 6              | 108045                  | 258.22   | 109045                | 209.31   |
| 1-5/16     | 3              | 3/4       | 7              | 108050                  | 276.30   | 109050                | 258.19   |
| 1-3/8      | 3              | 3/4       | 7              | 108055                  | 235.55   | 109055                | 233.10   |
| 1-7/16     | 3              | 3/4       | 7              | 108060                  | 285.04   | 109060                | 274.46   |
| 1-1/2      | 3              | 3/4       | 7              | 108065                  | 245.41   | 109065                | 275.11   |
| 1-9/16     | 3              | 3/4       | 7              | 108070                  | 257.79   | 109070                | 268.02   |
| 1-5/8      | 3              | 3/4       | 7              | 108075                  | 275.18   | 109075                | 272.74   |
| 1-11/16    | 3-1/2          | 1         | 8              | 108080                  | 329.66   | 109080                | 295.03   |
| 1-3/4      | 3-1/2          | 1         | 8              | 108085                  | 324.72   | 109085                | 322.24   |
| 1-13/16    | 3-1/2          | 1         | 8              | 108090                  | 384.26   | 109090                | 339.11   |
| 1-7/8      | 3-1/2          | 1         | 8              | 108095                  | 394.12   | 109095                | 362.64   |
| 1-15/16    | 3-1/2          | 1         | 8              | 108100                  | 413.94   | 109100                | 389.24   |
| 2          | 3-1/2          | 1         | 8              | 108105                  | 418.94   | 109105                | 413.99   |
| 2-1/16     | 3-3/4          | 1-1/4     | 9              | 108110                  | 441.20   | 109110                | 525.54   |
| 2-1/8      | 3-3/4          | 1-1/4     | 9              | 108115                  | 466.03   | 109115                | 530.53   |
| 2-3/16     | 3-3/4          | 1-1/4     | 9              | 108120                  | 565.17   | 109120                | 582.55   |
| 2-1/4      | 3-3/4          | 1-1/4     | 9              | 108125                  | 513.16   | 109125                | 585.03   |
| 2-5/16     | 3-3/4          | 1-1/4     | 9              | 108130                  | 619.74   | 109130                | 614.86   |
| 2-3/8      | 3-3/4          | 1-1/4     | 9              | 108135                  | 555.28   | 109135                | 637.08   |
| 2-7/16     | 3-3/4          | 1-1/4     | 9              | 108140                  | 669.32   | 109140                | 659.34   |
| 2-1/2      | 3-3/4          | 1-1/4     | 9              | 108145                  | 580.07   | 109145                | 597.40   |
| 2-9/16     | 4              | 1-1/2     | 10             | 108150                  | 634.56   | 109150                | 743.29   |
| 2-5/8      | 4              | 1-1/2     | 10             | 108155                  | 746.24   | 109155                | 767.02   |
| 2-11/16    | 4              | 1-1/2     | 10             | 108160                  | 809.11   | 109160                | 800.68   |
| 2-3/4      | 4              | 1-1/2     | 10             | 108165                  | 867.57   | 109165                | 859.03   |
| 2-13/16    | 4              | 1-1/2     | 10             | 108170                  | 933.91   | 109170                | 900.02   |
| 2-7/8      | 4              | 1-1/2     | 10             | 108175                  | 989.55   | 109175                | 954.39   |
| 2-15/16    | 4              | 1-1/2     | 10             | 108180                  | 1,081.30 | 109180                | 1,005.18 |
| 3          | 4              | 1-1/2     | 10             | 108185                  | 897.37   | 109185                | 915.31   |
| 3-1/16     | 4-1/2          | 1-3/4     | 11             | 108190                  | 974.18   | 109190                | 945.83   |
| 3-1/8      | 4-1/2          | 1-3/4     | 11             | 108195                  | 978.90   | 109195                | 1,166.14 |
| 3-3/16     | 4-1/2          | 1-3/4     | 11             | 108200                  | 1,060.91 | 109200                | 1,233.92 |
| 3-1/4      | 4-1/2          | 1-3/4     | 11             | 108205                  | 1,114.10 | 109205                | 1,266.45 |
| 3-5/16     | 4-1/2          | 1-3/4     | 11             | 108210                  | 1,356.84 | 109210                | 1,338.53 |
| 3-3/8      | 4-1/2          | 1-3/4     | 11             | 108215                  | 1,417.70 | 109215                | 1,399.12 |
| 3-7/16     | 4-1/2          | 1-3/4     | 11             | 108220                  | 1,227.23 | -                     | -        |
| 3-1/2      | 4-1/2          | 1-3/4     | 11             | 108225                  | 1,279.09 | 109225                | 1,247.28 |
| 3-9/16     | 5              | 2         | 12             | 108230                  | 1,577.68 | 109230                | 1,514.32 |
| 3-5/8      | 5              | 2         | 12             | 108235                  | 1,653.36 | 109235                | 1,634.92 |
| 3-11/16    | 5              | 2         | 12             | 108240                  | 1,707.40 | 109240                | 1,463.74 |
| 3-3/4      | 5              | 2         | 12             | 108245                  | 1,808.54 | 109245                | 1,789.93 |
| 3-13/16    | 5              | 2         | 12             | 108250                  | 1,874.20 | 109250                | 1,850.80 |
| 3-7/8      | 5              | 2         | 12             | 108255                  | 1,700.58 | 109255                | 1,940.02 |
| 3-15/16    | 5              | 2         | 12             | 108260                  | 2,069.75 | 109260                | 2,047.96 |
| 4          | 5              | 2         | 12             | 108265                  | 1,825.38 | 109265                | 2,110.49 |



## Brown & Sharpe Taper Reamers HSS



### Finishing

For final finishing of Brown and Sharpe standard taper holes. Used for removing nicks or burrs in machine spindles.

- Straight shank
- Straight flute



| Size | Small End Dia. | Large End Dia. | Shank Dia. | Flute Length | Overall Length | Code No. | Price \$ |
|------|----------------|----------------|------------|--------------|----------------|----------|----------|
| 1    | 0.1974         | 0.3176         | 9/32       | 2-7/8        | 4-3/4          | 129637   | 221.73   |
| 2    | 0.2474         | 0.3781         | 11/32      | 3-1/8        | 5-1/8          | 129638   | 261.01   |
| 3    | 0.3099         | 0.4510         | 13/32      | 3-3/8        | 5-1/2          | 129639   | 266.68   |
| 4    | 0.3474         | 0.5017         | 7/16       | 3-11/16      | 5-7/8          | 129640   | 277.33   |
| 5    | 0.4474         | 0.6145         | 9/16       | 4            | 6-3/8          | 129641   | 292.74   |
| 6    | 0.4974         | 0.6808         | 5/8        | 4-3/8        | 6-7/8          | 129642   | 314.00   |
| 7    | 0.5974         | 0.8011         | 3/4        | 4-7/8        | 7-1/2          | 129643   | 330.51   |
| 8    | 0.7474         | 0.9770         | 13/16      | 5-1/2        | 8-1/8          | 129644   | 448.67   |
| 9    | 0.8974         | 1.1530         | 1          | 6-1/8        | 8-7/8          | 129645   | 584.30   |
| 10   | 1.0420         | 1.3376         | 1-1/8      | 6-7/8        | 9-3/4          | 129646   | 734.11   |

## Taper Pipe Reamers HSS



Used prior to tapping with American Standard taper pipe taps.

- Straight shank
- Left hand spiral
- Right hand cut
- Taper 3/4" per foot



| Size  | Large End Dia. | Small End Dia. | Flute Length | Shank Dia. | Square Size | Overall Length | Code No. | Price \$ |
|-------|----------------|----------------|--------------|------------|-------------|----------------|----------|----------|
| 1/8   | 0.362          | 0.316          | 3/4          | 0.4375     | 0.328       | 2-1/8          | 129647   | 163.69   |
| 1/4   | 0.472          | 0.406          | 1-1/16       | 0.5625     | 0.421       | 2-7/16         | 129648   | 182.62   |
| 3/8   | 0.606          | 0.540          | 1-1/16       | 0.7000     | 0.531       | 2-9/16         | 129649   | 201.32   |
| 1/2   | 0.751          | 0.665          | 1-3/8        | 0.6875     | 0.515       | 3-1/8          | 129650   | 248.65   |
| 3/4   | 0.962          | 0.876          | 1-3/8        | 0.9063     | 0.679       | 3-1/4          | 129651   | 352.14   |
| 1     | 1.212          | 1.103          | 1-3/4        | 1.1250     | 0.843       | 3-3/4          | 129652   | 528.06   |
| 1-1/4 | 1.553          | 1.444          | 1-3/4        | 1.3125     | 0.984       | 4              | 129653   | 647.93   |
| 1-1/2 | 1.793          | 1.684          | 1-3/4        | 1.5000     | 1.125       | 4-1/4          | 129654   | 818.55   |
| 2     | 2.268          | 2.159          | 1-3/4        | 1.8750     | 1.406       | 4-1/2          | 129655   | 1,363.36 |

## Morse Taper Reamers HSS



### Finishing

Straight shank, straight flute reamers. Used for final finishing or for removing burrs and nicks in machine spindles, reaming morse taper sockets.

- Straight or taper shank
- Straight flute



| Flute/Shank Taper | End Dia. | Small End Dia. | Large Shank Dia. | Flute Length | O.A.L. | Straight Shank Code No. | Price \$ | Taper Shank Code No. | Price \$ |
|-------------------|----------|----------------|------------------|--------------|--------|-------------------------|----------|----------------------|----------|
| 0                 | 0.2503   | 0.3674         | 5/16             | 2-1/4        | 3-3/4  | 129656                  | 173.79   | 129662               | 263.68   |
| 1                 | 0.3674   | 0.5170         | 7/16             | 3            | 5      | 129657                  | 221.73   | 129663               | 293.64   |
| 2                 | 0.5696   | 0.7444         | 5/8              | 3-1/2        | 6      | 129658                  | 266.68   | 129664               | 344.59   |
| 3                 | 0.7748   | 0.9881         | 7/8              | 4-1/4        | 7-1/4  | 129659                  | 386.54   | 129665               | 479.42   |
| 4                 | 1.0167   | 1.2893         | 1-1/8            | 5-1/4        | 8-1/2  | 129660                  | 391.17   | 129666               | 785.77   |
| 5                 | 1.4717   | 1.8005         | 1-1/2            | 6-1/4        | 9-3/4  | 129661                  | 1,018.78 | 129667               | 1,558.12 |

## Expansion Chucking Reamers HSS



### High Speed Steel

An economical high production reamer, expansion feature permits reamer to be resharpened many times to its original diameter, saving on replacement costs.



| Dia.   | Flute Length | O.A.L. | Shank Dia. | Morse Taper | Flutes | Straight Shank Code No. | Price \$ | Taper Shank Code No. | Price \$ |
|--------|--------------|--------|------------|-------------|--------|-------------------------|----------|----------------------|----------|
| 3/8    | 3/4          | 7      | 5/16       | 1           | 8      | 129336                  | 238.81   | 129369               | 281.85   |
| 13/32  | 3/4          | 7      | 5/16       | 1           | 8      | 129337                  | 247.51   | 129370               | 391.48   |
| 7/16   | 7/8          | 7      | 3/8        | 1           | 6      | 129338                  | 265.45   | 129371               | 292.74   |
| 15/32  | 7/8          | 7      | 3/8        | 1           | 6      | 129339                  | 261.98   | 129372               | 299.36   |
| 1/2    | 1            | 8      | 7/16       | 1           | 6      | 129340                  | 266.96   | 129373               | 303.03   |
| 17/32  | 1            | 8      | 7/16       | 1           | 6      | 129341                  | 276.11   | 129374               | 309.53   |
| 9/16   | 1-1/8        | 8      | 7/16       | 1           | 6      | 129342                  | 282.03   | 129375               | 317.33   |
| 19/32  | 1-1/8        | 8      | 7/16       | 1           | 6      | 129343                  | 288.84   | 129376               | 321.92   |
| 5/8    | 1-1/4        | 9      | 9/16       | 2           | 6      | 129344                  | 309.87   | 129377               | 328.45   |
| 21/32  | 1-1/4        | 9      | 9/16       | 2           | 6      | 129345                  | 304.16   | 129378               | 343.37   |
| 11/16  | 1-1/4        | 9      | 9/16       | 2           | 6      | 129346                  | 309.53   | 129379               | 347.87   |
| 23/32  | 1-1/4        | 9      | 9/16       | 2           | 6      | 129347                  | 324.11   | 129380               | 353.58   |
| 3/4    | 1-3/8        | 9-1/2  | 5/8        | 2           | 6      | 129348                  | 337.83   | 129381               | 360.61   |
| 25/32  | 1-3/8        | 9-1/2  | 5/8        | 2           | 6      | 129349                  | 360.13   | 129382               | 377.46   |
| 13/16  | 1-3/8        | 9-1/2  | 5/8        | 2           | 6      | 129350                  | 370.54   | 129383               | 368.45   |
| 27/32  | 1-3/8        | 9-1/2  | 5/8        | 2           | 6      | 129351                  | 388.96   | 129384               | 404.72   |
| 7/8    | 1-1/2        | 10     | 3/4        | 2           | 6      | 129352                  | 418.48   | 129385               | 430.29   |
| 29/32  | 1-1/2        | 10     | 3/4        | 2           | 6      | 129353                  | 426.09   | 129386               | 446.46   |
| 15/16  | 1-1/2        | 10     | 3/4        | 3           | 6      | 129354                  | 246.59   | 129387               | 460.31   |
| 31/32  | 1-1/2        | 10     | 3/4        | 3           | 6      | 129355                  | 458.90   | 129388               | 479.33   |
| 1      | 1-5/8        | 10-1/2 | 7/8        | 3           | 8      | 129356                  | 478.66   | 129389               | 499.38   |
| 1-1/32 | 1-5/8        | 10-1/2 | 7/8        | 3           | 8      | 129357                  | 524.69   | 129390               | 538.14   |
| 1-1/16 | 1-5/8        | 10-1/2 | 7/8        | 3           | 8      | 129358                  | 541.78   | 129391               | 554.93   |
| 1-3/32 | 1-5/8        | 10-1/2 | 7/8        | 3           | 8      | 129359                  | 569.91   | 129392               | 587.10   |
| 1-1/8  | 1-3/4        | 11     | 7/8        | 3           | 8      | 129360                  | 603.95   | 129393               | 628.97   |
| 1-5/32 | 1-3/4        | 11     | 7/8        | 3           | 8      | 129361                  | 611.86   | 129394               | 644.46   |
| 1-3/16 | 1-3/4        | 11     | 1          | 3           | 8      | 129362                  | 629.52   | 129395               | 674.19   |
| 1-7/32 | 1-3/4        | 11     | 1          | 3           | 8      | 129363                  | 660.99   | 129396               | 779.07   |
| 1-1/4  | 1-7/8        | 11-1/2 | 1          | 4           | 8      | 129364                  | 674.96   | 129397               | 756.08   |
| 1-5/16 | 1-7/8        | 11-1/2 | 1          | 4           | 8      | 129365                  | 691.69   | 129398               | 734.11   |
| 1-3/8  | 2            | 12     | 1          | 4           | 8      | 129366                  | 721.51   | 129399               | 779.07   |
| 1-7/16 | 2            | 12     | 1-1/4      | 4           | 10     | 129367                  | 750.23   | 129400               | 815.02   |
| 1-1/2  | 2-1/8        | 12-1/2 | 1-1/4      | 4           | 10     | 129368                  | 781.86   | 129401               | 838.99   |

## Adjustable Blade Reamers HSS



| Size | Size Range     | Overall Length | Code No. | Price \$ |
|------|----------------|----------------|----------|----------|
| 8/A  | 1/4-9/32       | 3-1/2          | 109900   | 60.77    |
| 7/A  | 9/32-5/16      | 3-3/4          | 109902   | 60.77    |
| 6/A  | 5/16-11/32     | 4              | 109904   | 60.77    |
| 5/A  | 11/32-3/8      | 4-1/4          | 109906   | 60.77    |
| 4/A  | 3/8-13/32      | 4-1/2          | 109908   | 81.03    |
| 3/A  | 13/32-7/16     | 4-3/4          | 109910   | 83.04    |
| 2/A  | 7/16-15/32     | 5              | 109912   | 81.03    |
| A    | 15/32-17/32    | 5-1/4          | 109914   | 101.68   |
| B    | 17/32-19/32    | 5-3/4          | 109916   | 93.20    |
| C    | 19/32-21/32    | 6-1/4          | 109918   | 101.70   |
| D    | 21/32-23/32    | 6-3/4          | 109920   | 97.03    |
| E    | 23/32-25/32    | 7-1/4          | 109922   | 97.03    |
| F    | 25/32-27/32    | 7-3/4          | 109924   | 97.03    |
| G    | 27/32-15/16    | 8-1/4          | 109926   | 139.93   |
| H    | 15/16-1.1/16   | 8-3/4          | 109928   | 133.39   |
| I    | 1.1/16-1.3/16  | 10             | 109930   | 148.72   |
| J    | 1.3/16-1.11/32 | 11             | 109932   | 165.11   |
| K    | 1.11/32-1.1/2  | 12             | 109934   | 188.99   |
| L    | 1.1/2-1.13/16  | 13             | 109936   | 340.92   |
| M    | 1.13/16-2.7/32 | 15             | 109938   | 472.13   |
| N    | 2.7/32-2.3/4   | 17             | 109940   | 914.75   |
| O    | 2.3/4-3.11/32  | 19             | 109942   | 598.42   |

# Speeds & Feeds - 3 & 5 X D Premium Class Sub-Micrograin Carbide Drills — Non-Coolant Fed



## PC243, PC245

| Hardness        | <130HRB      |               | <180HRB          |               | <300HRB      |               | Tensile Strength:<br>400 - 700N/mm <sup>2</sup>                           |               | Tensile Strength:<br>700 - 850N/mm <sup>2</sup> |               | Tensile Strength:<br><1,000N/mm <sup>2</sup> |               |
|-----------------|--------------|---------------|------------------|---------------|--------------|---------------|---|---------------|---|---------------|--|---------------|
| Work Material   | Aluminum     |               | Cast Iron Alloys |               |              |               | Structural Steel, Case Hardened Steel, Free Cutting Steel, Tempered Steel |               |   |               |  |               |
| Cutting Speed   | 180 m/min    |               | 210 m/min        |               | 125 m/min    |               | 110 m/min   |               | 105 m/min                                       |               | 100 m/min                                    |               |
| Drill Dia. (mm) | Speed (/min) | Feed (mm/rev) | Speed (/min)     | Feed (mm/rev) | Speed (/min) | Feed (mm/rev) | Speed (/min)  | Feed (mm/rev) | Speed (/min)                                    | Feed (mm/rev) | Speed (/min)                                 | Feed (mm/rev) |
| 3.0             | 19,100       | 0.160         | 22,280           | 0.125         | 13,260       | 0.125         | 11,670  | 0.100         | 11,140  | 0.125         | 10,610                                       | 0.100         |
| 3.5             | 16,710       | 0.180         | 19,500           | 0.140         | 11,610       | 0.140         | 10,210  | 0.110         | 9,750   | 0.140         | 9,290  | 0.110         |
| 4.0             | 14,320       | 0.200         | 16,710           | 0.160         | 9,950        | 0.160         | 8,750   | 0.130         | 8,360   | 0.160         | 7,960  | 0.130         |
| 4.5             | 12,890       | 0.200         | 15,040           | 0.160         | 8,960        | 0.160         | 7,880   | 0.130         | 7,520   | 0.160         | 7,170  | 0.130         |
| 5.0             | 11,460       | 0.200         | 13,370           | 0.160         | 7,960        | 0.160         | 7,000   | 0.130         | 6,680   | 0.160         | 6,370  | 0.130         |
| 5.5             | 10,510       | 0.225         | 12,260           | 0.180         | 7,300        | 0.180         | 6,420   | 0.140         | 6,130   | 0.180         | 5,840  | 0.140         |
| 6.0             | 9,550        | 0.250         | 11,140           | 0.200         | 6,630        | 0.200         | 5,840   | 0.160         | 5,570   | 0.200         | 5,310  | 0.160         |
| 6.5             | 8,950        | 0.265         | 10,450           | 0.210         | 6,220        | 0.210         | 5,480   | 0.170         | 5,220   | 0.210         | 4,980  | 0.170         |
| 7.0             | 8,360        | 0.280         | 9,750            | 0.230         | 5,800        | 0.230         | 5,110   | 0.180         | 4,880   | 0.230         | 4,650  | 0.180         |
| 7.5             | 7,760        | 0.300         | 9,060            | 0.240         | 5,390        | 0.240         | 4,750   | 0.190         | 4,530   | 0.240         | 4,310  | 0.190         |
| 8.0             | 7,160        | 0.315         | 8,360            | 0.250         | 4,970        | 0.250         | 4,380   | 0.200         | 4,180   | 0.250         | 3,980  | 0.200         |
| 8.5             | 6,800        | 0.335         | 7,940            | 0.270         | 4,720        | 0.270         | 4,160   | 0.210         | 3,970   | 0.270         | 3,780  | 0.210         |
| 9.0             | 6,450        | 0.360         | 7,520            | 0.280         | 4,480        | 0.280         | 3,940   | 0.230         | 3,760   | 0.280         | 3,580  | 0.230         |
| 9.5             | 6,090        | 0.380         | 7,100            | 0.300         | 4,230        | 0.300         | 3,720   | 0.240         | 3,550   | 0.300         | 3,380  | 0.240         |
| 10.0            | 5,730        | 0.400         | 6,680            | 0.320         | 3,980        | 0.320         | 3,500   | 0.250         | 3,340   | 0.320         | 3,180  | 0.250         |
| 10.5            | 5,490        | 0.400         | 6,400            | 0.320         | 3,820        | 0.320         | 3,360   | 0.250         | 3,200   | 0.320         | 3,050  | 0.250         |
| 11.0            | 5,250        | 0.400         | 6,130            | 0.320         | 3,650        | 0.320         | 3,210   | 0.250         | 3,070   | 0.320         | 2,920  | 0.250         |
| 11.5            | 5,010        | 0.400         | 5,850            | 0.320         | 3,490        | 0.320         | 3,070   | 0.250         | 2,930   | 0.320         | 2,780  | 0.250         |
| 12.0            | 4,770        | 0.400         | 5,570            | 0.320         | 3,320        | 0.320         | 2,920   | 0.250         | 2,790   | 0.320         | 2,650  | 0.250         |
| 12.5            | 4,600        | 0.415         | 5,370            | 0.330         | 3,200        | 0.330         | 2,820   | 0.260         | 2,690   | 0.330         | 2,560  | 0.260         |
| 13.0            | 4,430        | 0.425         | 5,170            | 0.340         | 3,080        | 0.340         | 2,710   | 0.270         | 2,590   | 0.340         | 2,460  | 0.270         |
| 13.5            | 4,260        | 0.440         | 4,970            | 0.350         | 2,960        | 0.350         | 2,610   | 0.270         | 2,490   | 0.350         | 2,370  | 0.270         |
| 14.0            | 4,090        | 0.450         | 4,770            | 0.360         | 2,840        | 0.360         | 2,500   | 0.280         | 2,390   | 0.360         | 2,270  | 0.280         |
| 14.5            | 3,960        | 0.465         | 4,620            | 0.370         | 2,750        | 0.370         | 2,420   | 0.290         | 2,320   | 0.370         | 2,200  | 0.290         |
| 15.0            | 3,840        | 0.475         | 4,480            | 0.380         | 2,670        | 0.380         | 2,350   | 0.300         | 2,240   | 0.380         | 2,130  | 0.300         |
| 15.5            | 3,710        | 0.490         | 4,330            | 0.390         | 2,580        | 0.390         | 2,270   | 0.310         | 2,170   | 0.390         | 2,060  | 0.310         |
| 16.0            | 3,580        | 0.500         | 4,180            | 0.400         | 2,490        | 0.400         | 2,190   | 0.320         | 2,090   | 0.400         | 1,990  | 0.320         |
| 16.5            | 3,490        | 0.515         | 4,075            | 0.415         | 2,428        | 0.415         | 2,135   | 0.325         | 2,038   | 0.415         | 1,940  | 0.325         |
| 17.0            | 3,400        | 0.530         | 3,970            | 0.430         | 2,370        | 0.430         | 2,080   | 0.340         | 1,990   | 0.430         | 1,890  | 0.340         |
| 17.5            | 3,310        | 0.550         | 3,865            | 0.440         | 2,303        | 0.440         | 2,025   | 0.345         | 1,933   | 0.440         | 1,840  | 0.345         |
| 18.0            | 3,220        | 0.565         | 3,760            | 0.450         | 2,240        | 0.450         | 1,970   | 0.360         | 1,880   | 0.450         | 1,790  | 0.360         |
| 18.5            | 3,130        | 0.580         | 3,655            | 0.465         | 2,178        | 0.465         | 1,915   | 0.370         | 1,828   | 0.465         | 1,740  | 0.370         |
| 19.0            | 3,040        | 0.595         | 3,550            | 0.480         | 2,120        | 0.480         | 1,860   | 0.380         | 1,780   | 0.480         | 1,690  | 0.380         |
| 19.5            | 2,950        | 0.615         | 3,445            | 0.490         | 2,053        | 0.490         | 1,805   | 0.390         | 1,723   | 0.490         | 1,640  | 0.390         |
| 20.0            | 2,860        | 0.630         | 3,340            | 0.500         | 1,990        | 0.500         | 1,750   | 0.400         | 1,670   | 0.500         | 1,590  | 0.400         |

## Continued

| Hardness        | Tensile Strength:<br><1,200N/mm <sup>2</sup> |               | Tensile Strength:<br><820N/mm <sup>2</sup> |               | <30HRC         |               | <60HRC         |               |
|-----------------|--|---------------|--|---------------|----------------|---------------|----------------|---------------|
| Work Material   | High Alloyed Steel                           |               | Stainless Steel                            |               | Special Alloys |               | Hardened Steel |               |
| Cutting Speed   | 55 m/min                                     |               | 45 m/min                                   |               | 25 m/min       |               | 25 m/min       |               |
| Drill Dia. (mm) | Speed (/min)                                 | Feed (mm/rev) | Speed (/min)                               | Feed (mm/rev) | Speed (/min)   | Feed (mm/rev) | Speed (/min)   | Feed (mm/rev) |
| 3.0             | 5,840  | 0.080         | 4,770                                      | 0.065         | 2,650          | 0.065         | 2,650          | 0.040         |
| 3.5             | 5,110  | 0.090         | 4,180                                      | 0.070         | 2,320          | 0.070         | 2,320          | 0.045         |
| 4.0             | 4,380  | 0.100         | 3,580                                      | 0.080         | 1,990          | 0.080         | 1,990          | 0.050         |
| 4.5             | 3,940  | 0.100         | 3,220                                      | 0.080         | 1,790          | 0.080         | 1,790          | 0.050         |
| 5.0             | 3,500  | 0.100         | 2,860                                      | 0.080         | 1,590          | 0.080         | 1,590          | 0.050         |
| 5.5             | 3,210  | 0.115         | 2,630                                      | 0.090         | 1,460          | 0.090         | 1,460          | 0.055         |
| 6.0             | 2,920  | 0.125         | 2,390                                      | 0.100         | 1,330          | 0.100         | 1,330          | 0.065         |
| 6.5             | 2,740  | 0.135         | 2,240                                      | 0.105         | 1,250          | 0.105         | 1,250          | 0.065         |
| 7.0             | 2,560  | 0.145         | 2,090                                      | 0.115         | 1,160          | 0.115         | 1,160          | 0.070         |
| 7.5             | 2,370  | 0.150         | 1,940                                      | 0.120         | 1,080          | 0.120         | 1,080          | 0.075         |
| 8.0             | 2,190  | 0.160         | 1,790                                      | 0.125         | 990            | 0.125         | 990            | 0.080         |
| 8.5             | 2,080  | 0.170         | 1,700                                      | 0.135         | 940            | 0.135         | 940            | 0.085         |
| 9.0             | 1,970  | 0.180         | 1,610                                      | 0.145         | 900            | 0.145         | 900            | 0.090         |
| 9.5             | 1,860  | 0.190         | 1,520                                      | 0.150         | 850            | 0.150         | 850            | 0.095         |
| 10.0            | 1,750  | 0.200         | 1,430                                      | 0.160         | 800            | 0.160         | 800            | 0.100         |
| 10.5            | 1,680  | 0.200         | 1,370                                      | 0.160         | 770            | 0.160         | 770            | 0.100         |
| 11.0            | 1,610  | 0.200         | 1,310                                      | 0.160         | 730            | 0.160         | 730            | 0.100         |
| 11.5            | 1,530  | 0.200         | 1,250                                      | 0.160         | 700            | 0.160         | 700            | 0.100         |
| 12.0            | 1,460  | 0.200         | 1,190                                      | 0.160         | 660            | 0.160         | 660            | 0.100         |
| 12.5            | 1,410  | 0.220         | 1,150                                      | 0.165         | 640            | 0.165         | 640            | 0.105         |
| 13.0            | 1,360  | 0.240         | 1,110                                      | 0.170         | 620            | 0.170         | 620            | 0.105         |
| 13.5            | 1,300  | 0.260         | 1,060                                      | 0.175         | 590            | 0.175         | 590            | 0.110         |
| 14.0            | 1,250  | 0.280         | 1,020                                      | 0.180         | 570            | 0.180         | 570            | 0.110         |
| 14.5            | 1,210  | 0.275         | 990  | 0.185         | 550            | 0.185         | 550            | 0.115         |
| 15.0            | 1,170  | 0.265         | 960  | 0.190         | 540            | 0.190         | 540            | 0.120         |
| 15.5            | 1,130  | 0.260         | 930  | 0.195         | 520            | 0.195         | 520            | 0.120         |
| 16.0            | 1,090  | 0.250         | 900  | 0.200         | 500            | 0.200         | 500            | 0.125         |
| 16.5            | 1,060  | 0.260         | 880  | 0.205         | 490            | 0.205         | 490            | 0.130         |
| 17.0            | 1,040  | 0.265         | 860  | 0.215         | 480            | 0.215         | 480            | 0.135         |
| 17.5            | 1,010  | 0.275         | 830  | 0.220         | 460            | 0.220         | 460            | 0.140         |
| 18.0            | 990  | 0.280         | 810  | 0.225         | 450            | 0.225         | 450            | 0.145         |
| 18.5            | 960  | 0.290         | 790  | 0.230         | 440            | 0.230         | 440            | 0.145         |
| 19.0            | 930  | 0.300         | 770  | 0.240         | 430            | 0.240         | 430            | 0.150         |
| 19.5            | 910  | 0.305         | 740  | 0.245         | 410            | 0.245         | 410            | 0.155         |
| 20.0            | 880  | 0.315         | 720  | 0.250         | 400            | 0.250         | 400            | 0.160         |

## Speeds & Feeds - 3, 5 & 8 X D Premium Class Sub-Micrograin Carbide Drills — Coolant Fed



PC253, PC255, PC258

| Hardness        | <130HRB      |               | <180HRB          |               | <300HRB      |               | Tensile Strength:<br>400 - 700N/mm <sup>2</sup>                           |               | Tensile Strength:<br>700 - 850N/mm <sup>2</sup> |               | Tensile Strength:<br><1,000N/mm <sup>2</sup> |               |
|-----------------|--------------|---------------|------------------|---------------|--------------|---------------|---|---------------|---|---------------|--|---------------|
| Work Material   | Aluminum     |               | Cast Iron Alloys |               |              |               | Structural Steel, Case Hardened Steel, Free Cutting Steel, Tempered Steel |               |   |               |  |               |
| Cutting Speed   | 220 m/min    |               | 210 m/min        |               | 125 m/min    |               | 110 m/min   |               | 105 m/min                                       |               | 100 m/min                                    |               |
| Drill Dia. (mm) | Speed (/min) | Feed (mm/rev) | Speed (/min)     | Feed (mm/rev) | Speed (/min) | Feed (mm/rev) | Speed (/min)  | Feed (mm/rev) | Speed (/min)                                    | Feed (mm/rev) | Speed (/min)                                 | Feed (mm/rev) |
| 3.0             | 19,100       | 0.160         | 22,280           | 0.125         | 13,260       | 0.125         | 11,670  | 0.100         | 11,671  | 0.125         | 11,141                                       | 0.100         |
| 3.5             | 16,710       | 0.180         | 19,495           | 0.143         | 11,605       | 0.143         | 10,210  | 0.113         | 10,213  | 0.143         | 9,748  | 0.113         |
| 4.0             | 14,320       | 0.200         | 16,710           | 0.160         | 9,950        | 0.160         | 8,750   | 0.125         | 8,754   | 0.160         | 8,356  | 0.125         |
| 4.5             | 12,890       | 0.200         | 15,040           | 0.160         | 8,955        | 0.160         | 7,875   | 0.125         | 7,878   | 0.160         | 7,520  | 0.125         |
| 5.0             | 11,460       | 0.200         | 13,370           | 0.160         | 7,960        | 0.160         | 7,000   | 0.125         | 7,003   | 0.160         | 6,685  | 0.125         |
| 5.5             | 10,505       | 0.225         | 12,255           | 0.180         | 7,295        | 0.180         | 6,420   | 0.143         | 6,419   | 0.180         | 6,128  | 0.143         |
| 6.0             | 9,550        | 0.250         | 11,140           | 0.200         | 6,630        | 0.200         | 5,840   | 0.160         | 5,836   | 0.200         | 5,570  | 0.160         |
| 6.5             | 8,953        | 0.266         | 10,445           | 0.213         | 6,215        | 0.213         | 5,475   | 0.170         | 5,471   | 0.213         | 5,222  | 0.170         |
| 7.0             | 8,355        | 0.283         | 9,750            | 0.225         | 5,800        | 0.225         | 5,110   | 0.180         | 5,106   | 0.225         | 4,874  | 0.180         |
| 7.5             | 7,758        | 0.299         | 9,055            | 0.238         | 5,385        | 0.238         | 4,745   | 0.190         | 4,742   | 0.238         | 4,526  | 0.190         |
| 8.0             | 7,160        | 0.315         | 8,360            | 0.250         | 4,970        | 0.250         | 4,380   | 0.200         | 4,377   | 0.250         | 4,178  | 0.200         |
| 8.5             | 6,803        | 0.336         | 7,940            | 0.266         | 4,723        | 0.266         | 4,160   | 0.213         | 4,158   | 0.266         | 3,969  | 0.213         |
| 9.0             | 6,445        | 0.358         | 7,520            | 0.283         | 4,475        | 0.283         | 3,940   | 0.225         | 3,939   | 0.283         | 3,760  | 0.225         |
| 9.5             | 6,088        | 0.379         | 7,100            | 0.299         | 4,228        | 0.299         | 3,720   | 0.238         | 3,720   | 0.299         | 3,551  | 0.238         |
| 10.0            | 5,730        | 0.400         | 6,680            | 0.315         | 3,980        | 0.315         | 3,500   | 0.250         | 3,501   | 0.315         | 3,342  | 0.250         |
| 10.5            | 5,490        | 0.400         | 6,403            | 0.315         | 3,815        | 0.315         | 3,355   | 0.250         | 3,356   | 0.315         | 3,203  | 0.250         |
| 11.0            | 5,250        | 0.400         | 6,125            | 0.315         | 3,650        | 0.315         | 3,210   | 0.250         | 3,210   | 0.315         | 3,064  | 0.250         |
| 11.5            | 5,010        | 0.400         | 5,848            | 0.315         | 3,485        | 0.315         | 3,065   | 0.250         | 3,064   | 0.315         | 2,924  | 0.250         |
| 12.0            | 4,770        | 0.400         | 5,570            | 0.315         | 3,320        | 0.315         | 2,920   | 0.250         | 2,918   | 0.315         | 2,785  | 0.250         |
| 12.5            | 4,600        | 0.413         | 5,370            | 0.326         | 3,200        | 0.326         | 2,815   | 0.258         | 2,814   | 0.326         | 2,686  | 0.258         |
| 13.0            | 4,430        | 0.425         | 5,170            | 0.338         | 3,080        | 0.338         | 2,710   | 0.265         | 2,709   | 0.338         | 2,586  | 0.265         |
| 13.5            | 4,260        | 0.438         | 4,970            | 0.349         | 2,960        | 0.349         | 2,605   | 0.273         | 2,605   | 0.349         | 2,487  | 0.273         |
| 14.0            | 4,090        | 0.450         | 4,770            | 0.360         | 2,840        | 0.360         | 2,500   | 0.280         | 2,501   | 0.360         | 2,387  | 0.280         |
| 14.5            | 3,963        | 0.463         | 4,623            | 0.370         | 2,753        | 0.370         | 2,423   | 0.289         | 2,423   | 0.370         | 2,313  | 0.289         |
| 15.0            | 3,835        | 0.475         | 4,475            | 0.380         | 2,665        | 0.380         | 2,345   | 0.298         | 2,345   | 0.380         | 2,238  | 0.298         |
| 15.5            | 3,708        | 0.488         | 4,328            | 0.390         | 2,578        | 0.390         | 2,268   | 0.306         | 2,267   | 0.390         | 2,164  | 0.306         |
| 16.0            | 3,580        | 0.500         | 4,180            | 0.400         | 2,490        | 0.400         | 2,190   | 0.315         | 2,188   | 0.400         | 2,089  | 0.315         |
| 16.5            | 3,490        | 0.516         | 4,075            | 0.413         | 2,428        | 0.413         | 2,135   | 0.326         | 2,134   | 0.413         | 2,037  | 0.326         |
| 17.0            | 3,400        | 0.533         | 3,970            | 0.425         | 2,365        | 0.425         | 2,080   | 0.336         | 2,079   | 0.425         | 1,984  | 0.336         |
| 17.5            | 3,310        | 0.549         | 3,865            | 0.438         | 2,303        | 0.438         | 2,025   | 0.347         | 2,024   | 0.438         | 1,932  | 0.347         |
| 18.0            | 3,220        | 0.565         | 3,760            | 0.450         | 2,240        | 0.450         | 1,970   | 0.358         | 1,970   | 0.450         | 1,880  | 0.358         |
| 18.5            | 3,130        | 0.581         | 3,655            | 0.463         | 2,178        | 0.463         | 1,915   | 0.368         | 1,915   | 0.463         | 1,828  | 0.368         |
| 19.0            | 3,040        | 0.598         | 3,550            | 0.475         | 2,115        | 0.475         | 1,860   | 0.379         | 1,860   | 0.475         | 1,776  | 0.379         |
| 19.5            | 2,950        | 0.614         | 3,445            | 0.488         | 2,053        | 0.488         | 1,805   | 0.389         | 1,805   | 0.488         | 1,723  | 0.389         |
| 20.0            | 2,860        | 0.630         | 3,340            | 0.500         | 1,990        | 0.500         | 1,750   | 0.400         | 1,751   | 0.500         | 1,671  | 0.400         |

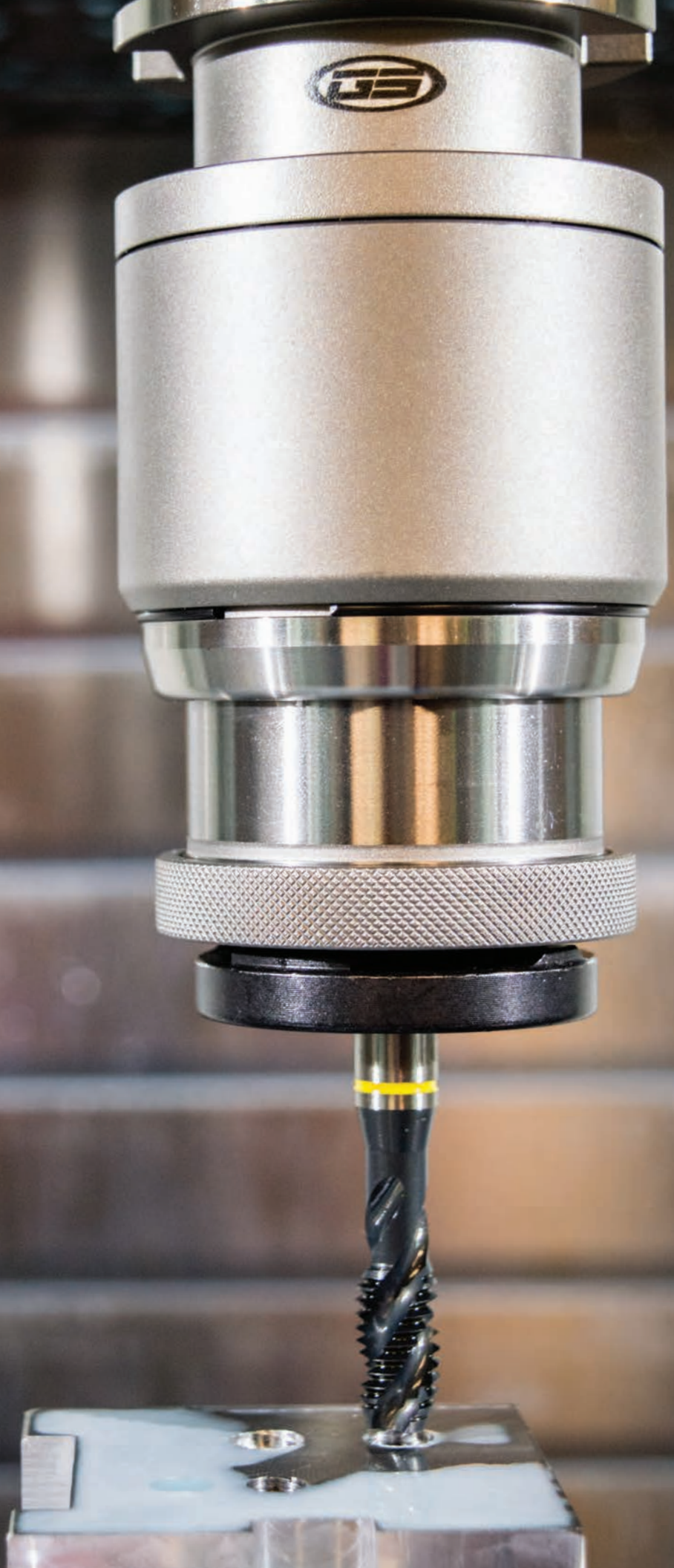
### Continued

| Hardness        | Tensile Strength:<br><1,200N/mm <sup>2</sup> |               | Tensile Strength:<br><820N/mm <sup>2</sup> |               | <30HRC         |               | <60HRC         |               |
|-----------------|--|---------------|--|---------------|----------------|---------------|----------------|---------------|
| Work Material   | High Alloyed Steel                           |               | Stainless Steel                            |               | Special Alloys |               | Hardened Steel |               |
| Cutting Speed   | 55 m/min                                     |               | 45 m/min                                   |               | 25 m/min       |               | 25 m/min       |               |
| Drill Dia. (mm) | Speed (/min)                                 | Feed (mm/rev) | Speed (/min)                               | Feed (mm/rev) | Speed (/min)   | Feed (mm/rev) | Speed (/min)   | Feed (mm/rev) |
| 3.0             | 5,836  | 0.080         | 4,775                                      | 0.063         | 3,714          | 0.063         | 3,714          | 0.040         |
| 3.5             | 5,106  | 0.090         | 4,178                                      | 0.072         | 3,249          | 0.072         | 3,249          | 0.045         |
| 4.0             | 4,377  | 0.100         | 3,581                                      | 0.080         | 2,785          | 0.080         | 2,785          | 0.050         |
| 4.5             | 3,939  | 0.100         | 3,223                                      | 0.080         | 2,507          | 0.080         | 2,507          | 0.050         |
| 5.0             | 3,501  | 0.100         | 2,865                                      | 0.080         | 2,228          | 0.080         | 2,228          | 0.050         |
| 5.5             | 3,210  | 0.113         | 2,626                                      | 0.090         | 2,043          | 0.090         | 2,043          | 0.057         |
| 6.0             | 2,918  | 0.125         | 2,387                                      | 0.100         | 1,857          | 0.100         | 1,857          | 0.063         |
| 6.5             | 2,735  | 0.134         | 2,238                                      | 0.106         | 1,741          | 0.106         | 1,741          | 0.067         |
| 7.0             | 2,553  | 0.143         | 2,089                                      | 0.113         | 1,625          | 0.113         | 1,625          | 0.072         |
| 7.5             | 2,371  | 0.151         | 1,940                                      | 0.119         | 1,509          | 0.119         | 1,509          | 0.076         |
| 8.0             | 2,188  | 0.160         | 1,791                                      | 0.125         | 1,393          | 0.125         | 1,393          | 0.080         |
| 8.5             | 2,079  | 0.170         | 1,701                                      | 0.134         | 1,323          | 0.134         | 1,323          | 0.085         |
| 9.0             | 1,970  | 0.180         | 1,611                                      | 0.143         | 1,253          | 0.143         | 1,253          | 0.090         |
| 9.5             | 1,860  | 0.190         | 1,522                                      | 0.151         | 1,184          | 0.151         | 1,184          | 0.095         |
| 10.0            | 1,751  | 0.200         | 1,432                                      | 0.160         | 1,114          | 0.160         | 1,114          | 0.100         |
| 10.5            | 1,678  | 0.200         | 1,373                                      | 0.160         | 1,068          | 0.160         | 1,068          | 0.100         |
| 11.0            | 1,605  | 0.200         | 1,313                                      | 0.160         | 1,021          | 0.160         | 1,021          | 0.100         |
| 11.5            | 1,532  | 0.200         | 1,253                                      | 0.160         | 975            | 0.160         | 975            | 0.100         |
| 12.0            | 1,459  | 0.200         | 1,194                                      | 0.160         | 928            | 0.160         | 928            | 0.100         |
| 12.5            | 1,407  | 0.220         | 1,151                                      | 0.165         | 895            | 0.165         | 895            | 0.103         |
| 13.0            | 1,355  | 0.240         | 1,108                                      | 0.170         | 862            | 0.170         | 862            | 0.105         |
| 13.5            | 1,303  | 0.260         | 1,066                                      | 0.175         | 829            | 0.175         | 829            | 0.108         |
| 14.0            | 1,251  | 0.280         | 1,023                                      | 0.180         | 796            | 0.180         | 796            | 0.110         |
| 14.5            | 1,211  | 0.273         | 991  | 0.185         | 771            | 0.185         | 771            | 0.114         |
| 15.0            | 1,172  | 0.265         | 959  | 0.190         | 746            | 0.190         | 746            | 0.118         |
| 15.5            | 1,133  | 0.258         | 927  | 0.195         | 721            | 0.195         | 721            | 0.121         |
| 16.0            | 1,094  | 0.250         | 895  | 0.200         | 696            | 0.200         | 696            | 0.125         |
| 16.5            | 1,067  | 0.258         | 873  | 0.206         | 679            | 0.206         | 679            | 0.129         |
| 17.0            | 1,039  | 0.266         | 850  | 0.213         | 661            | 0.213         | 661            | 0.134         |
| 17.5            | 1,012  | 0.274         | 828  | 0.219         | 644            | 0.219         | 644            | 0.138         |
| 18.0            | 985  | 0.283         | 806  | 0.225         | 627            | 0.225         | 627            | 0.143         |
| 18.5            | 957  | 0.291         | 783  | 0.231         | 609            | 0.231         | 609            | 0.147         |
| 19.0            | 930  | 0.299         | 761  | 0.238         | 592            | 0.238         | 592            | 0.151         |
| 19.5            | 903  | 0.307         | 739  | 0.244         | 574            | 0.244         | 574            | 0.156         |
| 20.0            | 875  | 0.315         | 716  | 0.250         | 557            | 0.250         | 557            | 0.160         |

## Speeds & Feeds for Solid Carbide Jobber Drills

| Work Material   | Steels            |               |                                 |               |                              |               | Austenitic Stainless |               | Cast Irons               |               |                                 |               | Non-Ferrous  |               |                  |               |
|-----------------|-------------------|---------------|---------------------------------|---------------|------------------------------|---------------|----------------------|---------------|--------------------------|---------------|---------------------------------|---------------|--------------|---------------|------------------|---------------|
|                 | Low Carbon Steels |               | Alloy Steels (up to 35HRC) 4140 |               | Alloy Steels (36-45HRC) 4140 |               | 304/316              |               | Gray Cast Iron A48 Class |               | Ductile Cast Iron A536/60-40-18 |               | Plastic      |               | Kevlar/ Graphite |               |
| Cutting Speed   | 55 m/min          |               | 50 m/min                        |               | 45 m/min                     |               | 40 m/min             |               | 85 m/min                 |               | 55 m/min                        |               | 120 m/min    |               | 120 m/min        |               |
| Drill Dia. (mm) | Speed (/min)      | Feed (mm/rev) | Speed (/min)                    | Feed (mm/rev) | Speed (/min)                 | Feed (mm/rev) | Speed (/min)         | Feed (mm/rev) | Speed (/min)             | Feed (mm/rev) | Speed (/min)                    | Feed (mm/rev) | Speed (/min) | Feed (mm/rev) | Speed (/min)     | Feed (mm/rev) |
| 1.0             | 17,520            | 0.025         | 15,925                          | 0.025         | 14,335                       | 0.025         | 12,740               | 0.025         | 27,075                   | 0.025         | 17,520                          | 0.025         | 38,220       | 0.006         | 38,220           | 0.006         |
| 1.5             | 11,680            | 0.050         | 10,615                          | 0.050         | 9,555                        | 0.050         | 8,495                | 0.050         | 18,050                   | 0.050         | 11,680                          | 0.050         | 25,480       | 0.013         | 25,480           | 0.013         |
| 2.0             | 8,760             | 0.051         | 10,618                          | 0.051         | 9,558                        | 0.051         | 8,493                | 0.051         | 13,535                   | 0.051         | 8,760                           | 0.051         | 25,480       | 0.028         | 25,480           | 0.028         |
| 2.5             | 7,005             | 0.063         | 7,964                           | 0.063         | 7,169                        | 0.063         | 6,369                | 0.063         | 10,830                   | 0.063         | 7,005                           | 0.063         | 19,110       | 0.039         | 19,110           | 0.039         |
| 3.0             | 5,840             | 0.076         | 5,310                           | 0.076         | 4,780                        | 0.076         | 4,245                | 0.076         | 9,025                    | 0.076         | 5,840                           | 0.076         | 12,740       | 0.050         | 12,740           | 0.050         |
| 3.5             | 5,005             | 0.089         | 4,550                           | 0.089         | 4,095                        | 0.089         | 3,640                | 0.089         | 7,735                    | 0.089         | 5,005                           | 0.089         | 10,920       | 0.051         | 10,920           | 0.051         |
| 4.0             | 4,380             | 0.101         | 3,980                           | 0.101         | 3,585                        | 0.101         | 3,185                | 0.101         | 6,770                    | 0.101         | 4,380                           | 0.101         | 9,555        | 0.052         | 9,555            | 0.052         |
| 4.5             | 3,895             | 0.114         | 3,540                           | 0.114         | 3,185                        | 0.114         | 2,830                | 0.114         | 6,015                    | 0.114         | 3,895                           | 0.114         | 8,495        | 0.063         | 8,495            | 0.063         |
| 5.0             | 3,505             | 0.127         | 3,185                           | 0.127         | 2,865                        | 0.127         | 2,550                | 0.127         | 5,415                    | 0.127         | 3,505                           | 0.127         | 7,645        | 0.064         | 7,645            | 0.064         |
| 5.5             | 3,185             | 0.139         | 2,895                           | 0.139         | 2,605                        | 0.139         | 2,315                | 0.139         | 4,920                    | 0.139         | 3,185                           | 0.139         | 6,950        | 0.070         | 6,950            | 0.070         |
| 6.0             | 2,920             | 0.152         | 2,655                           | 0.152         | 2,390                        | 0.152         | 2,125                | 0.152         | 4,510                    | 0.152         | 2,920                           | 0.152         | 6,370        | 0.076         | 6,370            | 0.076         |
| 6.5             | 2,695             | 0.158         | 2,450                           | 0.158         | 2,205                        | 0.158         | 1,960                | 0.158         | 4,165                    | 0.158         | 2,695                           | 0.158         | 5,880        | 0.079         | 5,880            | 0.079         |
| 7.0             | 2,505             | 0.165         | 2,275                           | 0.165         | 2,050                        | 0.165         | 1,820                | 0.165         | 3,870                    | 0.165         | 2,505                           | 0.165         | 5,460        | 0.082         | 5,460            | 0.082         |
| 7.5             | 2,335             | 0.171         | 2,125                           | 0.171         | 1,910                        | 0.171         | 1,700                | 0.171         | 3,610                    | 0.171         | 2,335                           | 0.171         | 5,095        | 0.085         | 5,095            | 0.085         |
| 8.0             | 2,190             | 0.178         | 1,990                           | 0.178         | 1,790                        | 0.178         | 1,595                | 0.178         | 3,385                    | 0.178         | 2,190                           | 0.178         | 4,780        | 0.089         | 4,780            | 0.089         |
| 8.5             | 2,060             | 0.184         | 1,875                           | 0.184         | 1,685                        | 0.184         | 1,500                | 0.184         | 3,185                    | 0.184         | 2,060                           | 0.184         | 4,495        | 0.092         | 4,495            | 0.092         |
| 9.0             | 1,945             | 0.190         | 1,770                           | 0.190         | 1,595                        | 0.190         | 1,415                | 0.190         | 3,010                    | 0.190         | 1,945                           | 0.190         | 4,245        | 0.095         | 4,245            | 0.095         |
| 9.5             | 1,845             | 0.197         | 1,675                           | 0.197         | 1,510                        | 0.197         | 1,340                | 0.197         | 2,850                    | 0.197         | 1,845                           | 0.197         | 4,025        | 0.098         | 4,025            | 0.098         |
| 10.0            | 1,750             | 0.203         | 1,595                           | 0.203         | 1,435                        | 0.203         | 1,275                | 0.203         | 2,705                    | 0.203         | 1,750                           | 0.203         | 3,820        | 0.101         | 3,820            | 0.101         |
| 10.5            | 1,670             | 0.216         | 1,515                           | 0.216         | 1,365                        | 0.216         | 1,215                | 0.216         | 2,580                    | 0.216         | 1,670                           | 0.216         | 3,640        | 0.114         | 3,640            | 0.114         |
| 11.0            | 1,595             | 0.229         | 1,450                           | 0.229         | 1,305                        | 0.229         | 1,160                | 0.229         | 2,460                    | 0.229         | 1,595                           | 0.229         | 3,475        | 0.127         | 3,475            | 0.127         |
| 11.5            | 1,525             | 0.241         | 1,385                           | 0.241         | 1,245                        | 0.241         | 1,110                | 0.241         | 2,355                    | 0.241         | 1,525                           | 0.241         | 3,325        | 0.139         | 3,325            | 0.139         |
| 12.0            | 1,460             | 0.254         | 1,325                           | 0.254         | 1,195                        | 0.254         | 1,060                | 0.254         | 2,255                    | 0.254         | 1,460                           | 0.254         | 3,185        | 0.152         | 3,185            | 0.152         |

# Threading & Tapping



# Threading & Tapping

|   |        |        |
|---|--------|--------|
| <b>SOWA HIGH PERFORMANCE TAP SELECTION</b> .....  | C2     |        |
| <b>YELLOW RING TAPS, HSSE-V3 UP TO 35HRC</b>  |        |        |
| Spiral Point Taps - Black Oxide & Bright Finish .....   | C3     |        |
| Spiral Flute Taps - Black Oxide & Bright Finish .....   | C4     |        |
| UN8 DIN Length ANSI Shank Taps .....  | C5     |        |
| DIN Length ANSI Shank Spiral Point & Spiral Flute Taps .....                                  | C5     |        |
| 4" & 6" O.A.L. Spiral Point & Spiral Flute Taps .....   | C5     |        |
| NPT Spiral Flute Pipe Taps .....  | C6     |        |
| <b>ORANGE RING TAPS, HSSE-V3 UP TO 35HRC FOR STAINLESS STEEL</b>                              |        |        |
| Spiral Point Taps .....   | C6     |        |
| Spiral Flute Taps .....   | C6     |        |
| <b>SOWA HSS TAPS</b>  |        |        |
| Spiral Flute Taps for Aluminum .....  | C7     |        |
| Roll Form Taps .....  | C7     |        |
| NPT Taps .....  | C7     |        |
| Hand Taps .....   | C8     |        |
| <b>GENERAL PURPOSE TAPS</b>   |        |        |
| NPT Taps .....  | C9     |        |
| Metric Spiral Point Taps .....  | C9     |        |
| Tap & Die Sets .....  | C10    |        |
| Hand Tap Sets .....   | C10    |        |
| Tap & Drill Sets .....  | C11    |        |
| Adjustable Tap Wrench .....   | C11    |        |
| 'T' Ratchet Type Tap Wrench .....   | C11    |        |
| Screw Extractors .....  | C12    |        |
| Adjustable Round Split Dies .....   | C12-13 |        |
| Die Stocks .....  | C13    |        |
| Hex Dies .....  | C14    |        |
| <b>TAPPING SPEED GUIDE, CONVERSION TABLE,<br/>ANSI TAP DIMENSIONS, TAP/DRILL CHARTS</b> ..... |        | C15-19 |

## High Performance Taps

Recommended Cutting Conditions



We have taken the guesswork out of your tap selection!



### HSSE-V3 ANSI SHANK Yellow Ring Pg. C3

#### Yellow Ring HSSE-V3 Steels and Other Materials Up to 35HRC

For Tough Materials including:

- HIGH CARBON STEEL
- HIGH ALLOY
- TITANIUM
- ALUMINUM

| Materials Main Group | Materials Sub-Group                      | Condition  | Hardness (HRC) | Cutting Speed (FPM) |
|----------------------|--|------------|----------------|---------------------|
| Tool Steels          | 01, A-2, D-2, H-13, P-20                 | Annealed   | <35            | 15-25               |
| Medium Carbon        | 1030, 1035, 1038, 1040, 1045, 1050       | Normalized | <28            | 20-40               |
| Alloyed High Carbon  | 1065, 1070, 1080, 1090, 1095, 1561, 1572 | Normalized | <32            | 20-30               |
| High Strength        | 4140, 4340                               | Normalized | <32            | 20-30               |
| Titanium             | Commercially Pure                        | Annealed   | <32            | 15-30               |
| Stainless Steel      |  | Annealed   | <29            | 20-30               |
| Aluminum             | Cast, Wrought                            | -          | -              | 30-90               |

### HSSE-V3 ANSI SHANK Orange Ring Pg. C6



#### Orange Ring HSSE-V3 for Stainless Steel and Other Materials

For STAINLESS STEEL as well as:

- LOW CARBON STEELS
- MEDIUM CARBON STEELS
- ALLOYED HIGH CARBON

| Materials Main Group | Materials Sub-Group                            | Condition  | Hardness (HRC) | Cutting Speed (FPM) |
|----------------------|--|------------|----------------|---------------------|
| Stainless Steel      | 200 Series                                     | Annealed   | <28            | 20-35               |
|                      | 300 Series, 17-4 PH, 15-5, A286                | Annealed   | <28            | 20-35               |
|                      | 400 Series                                     | Annealed   | <29            | 20-35               |
|                      | 400 Series                                     | Hardened   | 35-42          | 15-20               |
|                      | 17-4PH, 15-5, A286                             | Hardened   | 35-42          | 15-20               |
| Low Carbon Steels    | 1010, 1018                                     | Normalized | <20            | 25-50               |
| Alloyed High Carbon  | 1050, 1065, 1070, 1080, 1090, 1095, 1561, 1572 | Normalized | <25            | 20-30               |
| Beryllium            |  |            | <25            | 20-30               |

### HSSE-V3 ANSI SHANK Green Series Pg. C7



#### Green Series HSSE-V3 for Aluminum and Other Materials

For ALUMINUM:

- PURE/LOW
- DIE CAST

| Materials Main Group | Materials Sub-Group                       | Condition | Hardness (HRC) | Cutting Speed (FPM) |
|----------------------|---|-----------|----------------|---------------------|
| Steels               | Sheet, Low/Medium Carbon, Stainless Steel | Hardened  | <20            | 20-50               |
| Aluminum             | Pure/Low                                  | -         | -              | 30-60               |
| Aluminum             | Die Cast                                  | -         | -              | 30-60               |

# Yellow Ring HSSE-V3 Spiral Point Taps — Black Oxide Finish



## HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



• 4.5 Pitch lead (Intermediate)

## Inch

| Tap      | No. Flutes | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | H2 Limit Price \$ | Black Oxide Code No. | H3 Limit Price \$ | Black Oxide Code No. | H4 Limit Price \$ |
|----------|------------|----------------------|---------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| 2-56     | 2          | 1-3/4                | 0.433               | 122550               | 26.69             | -                    | -                 | -                    | -                 |
| 3-48     | 2          | 1-13/16              | 0.512               | 122552               | 21.34             | -                    | -                 | -                    | -                 |
| 4-40     | 2          | 1-7/8                | 0.433               | 123296               | 17.60             | -                    | -                 | -                    | -                 |
| 4-40     | 2          | 1-7/8                | 0.433               | -                    | -                 | 122554               | 17.60             | -                    | -                 |
| 6-32     | 3          | 2                    | 0.512               | -                    | -                 | 123300               | 14.64             | -                    | -                 |
| 6-40     | 3          | 2                    | 0.512               | -                    | -                 | 123334               | 14.64             | -                    | -                 |
| 8-32     | 3          | 2-1/8                | 0.512               | -                    | -                 | 123302               | 14.64             | -                    | -                 |
| 10-24    | 3          | 2-3/8                | 0.512               | -                    | -                 | 123304               | 14.64             | -                    | -                 |
| 10-32    | 3          | 2-3/8                | 0.512               | -                    | -                 | 123338               | 14.64             | -                    | -                 |
| 12-24    | 3          | 2-3/8                | 0.512               | -                    | -                 | 123306               | 14.64             | -                    | -                 |
| 1/4-20   | 3          | 2-1/2                | 0.630               | -                    | -                 | 123308               | 16.19             | -                    | -                 |
| 1/4-28   | 3          | 2-1/2                | 0.630               | -                    | -                 | 123342               | 16.19             | -                    | -                 |
| 5/16-18  | 3          | 2-23/32              | 0.748               | -                    | -                 | 123310               | 18.20             | -                    | -                 |
| 5/16-24  | 3          | 2-23/32              | 0.748               | -                    | -                 | 123344               | 18.20             | -                    | -                 |
| 3/8-16   | 3          | 2-15/16              | 0.748               | -                    | -                 | 123312               | 20.55             | -                    | -                 |
| 3/8-24   | 3          | 2-15/16              | 0.748               | -                    | -                 | 123346               | 20.55             | -                    | -                 |
| 7/16-14  | 3          | 3-5/32               | 0.866               | -                    | -                 | 123314               | 26.69             | -                    | -                 |
| 7/16-20  | 3          | 3-5/32               | 0.866               | -                    | -                 | 123348               | 26.69             | -                    | -                 |
| 1/2-13   | 3          | 3-3/8                | 0.945               | -                    | -                 | 123316               | 30.83             | -                    | -                 |
| 1/2-20   | 3          | 3-3/8                | 0.945               | -                    | -                 | 123350               | 30.83             | -                    | -                 |
| 5/8-11   | 3          | 3-13/16              | 1.102               | -                    | -                 | 123318               | 55.96             | -                    | -                 |
| 5/8-18   | 3          | 3-13/16              | 1.102               | -                    | -                 | 123352               | 55.96             | -                    | -                 |
| 3/4-10   | 3          | 4-1/4                | 1.220               | -                    | -                 | 123320               | 87.80             | -                    | -                 |
| 3/4-16   | 3          | 4-1/4                | 1.220               | -                    | -                 | 123353               | 87.80             | -                    | -                 |
| 7/8-9    | 3          | 4-11/16              | 1.339               | -                    | -                 | -                    | -                 | 123321               | 125.63            |
| 7/8-14   | 3          | 4-11/16              | 1.339               | -                    | -                 | -                    | -                 | 123359               | 137.16            |
| 1-8      | 4          | 5-1/8                | 1.496               | -                    | -                 | -                    | -                 | 123323               | 167.31            |
| 1-12     | 4          | 5-1/8                | 1.496               | -                    | -                 | -                    | -                 | 123361               | 182.70            |
| 1-14     | 4          | 5-1/8                | 1.496               | -                    | -                 | -                    | -                 | 123360               | 187.84            |
| 1-1/8-7  | 4          | 5-7/16               | 1.732               | -                    | -                 | -                    | -                 | 123364               | 281.65            |
| 1-1/8-12 | 4          | 5-7/16               | 1.732               | -                    | -                 | -                    | -                 | 123365               | 299.67            |
| 1-1/4-7  | 4          | 5-3/4                | 1.732               | -                    | -                 | -                    | -                 | 123367               | 369.50            |
| 1-1/4-12 | 4          | 5-3/4                | 1.732               | -                    | -                 | -                    | -                 | 123369               | 374.58            |
| 1-3/8-6  | 4          | 6-1/16               | 2.000               | -                    | -                 | -                    | -                 | 123371               | 465.51            |
| 1-3/8-12 | 4          | 6-1/16               | 2.000               | -                    | -                 | -                    | -                 | 123373               | 469.05            |
| 1-1/2-6  | 4          | 6-3/8                | 2.000               | -                    | -                 | -                    | -                 | 123363               | 535.34            |
| 1-1/2-12 | 4          | 6-3/8                | 2.000               | -                    | -                 | -                    | -                 | 123375               | 546.99            |

## Metric

| Tap         | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | Price \$ |
|-------------|------------|---------------|----------------------|---------------------|----------------------|----------|
| M2 x 0.4    | 2          | D3            | 1-3/4                | 0.433               | 123502               | 23.15    |
| M2.5 x 0.45 | 2          | D3            | 1-13/16              | 0.512               | 123504               | 22.72    |
| M3 x 0.5    | 3          | D3            | 1-15/16              | 0.433               | 123505               | 22.79    |
| M3.5 x 0.6  | 3          | D4            | 2                    | 0.512               | 123506               | 20.28    |
| M4 x 0.7    | 3          | D4            | 2-1/8                | 0.512               | 123507               | 20.28    |
| M4.5 x 0.75 | 3          | D4            | 2-3/8                | 0.512               | 123508               | 23.20    |
| M5 x 0.8    | 3          | D4            | 2-3/8                | 0.512               | 123509               | 20.28    |
| M6 x 1      | 3          | D5            | 2-1/2                | 0.630               | 123510               | 20.28    |
| M7 x 1      | 3          | D5            | 2-23/32              | 0.630               | 123511               | 22.79    |
| M8 x 1      | 3          | D5            | 2-23/32              | 0.748               | 123512               | 22.79    |
| M8 x 1.25   | 3          | D5            | 2-23/32              | 0.748               | 123513               | 22.79    |
| M10 x 1.25  | 3          | D5            | 2-15/16              | 0.748               | 123516               | 31.67    |
| M10 x 1.5   | 3          | D6            | 2-15/16              | 0.748               | 123515               | 31.67    |
| M12 x 1.25  | 3          | D5            | 3-3/8                | 0.945               | 123518               | 38.00    |
| M12 x 1.75  | 3          | D6            | 3-3/8                | 0.945               | 123517               | 38.00    |
| M14 x 1.5   | 3          | D7            | 3-19/32              | 0.984               | 123519               | 56.59    |

| Tap       | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | Price \$ |
|-----------|------------|---------------|----------------------|---------------------|----------------------|----------|
| M14 x 2   | 3          | D6            | 3-19/32              | 0.984               | 123520               | 56.59    |
| M16 x 1.5 | 3          | D6            | 3-13/16              | 1.102               | 123522               | 68.64    |
| M16 x 2   | 3          | D7            | 3-13/16              | 1.102               | 123521               | 68.64    |
| M18 x 1.5 | 4          | D6            | 4-1/32               | 1.102               | 123523               | 96.27    |
| M18 x 2.5 | 4          | D7            | 4-1/32               | 1.102               | 123524               | 96.27    |
| M20 x 1.5 | 4          | D5            | 4-15/32              | 1.220               | 123525               | 138.17   |
| M20 x 2.5 | 4          | D6            | 4-15/32              | 1.220               | 123526               | 154.23   |
| M22 x 1.5 | 4          | D6            | 4-11/16              | 1.339               | 123527               | 147.24   |
| M22 x 2.5 | 4          | D6            | 4-11/16              | 1.339               | 123528               | 145.86   |
| M24 x 1.5 | 4          | D5            | 4-29/32              | 1.339               | 123529               | 204.42   |
| M24 x 3   | 4          | D7            | 4-29/32              | 1.339               | 123530               | 194.67   |
| M27 x 1.5 | 4          | D7            | 5-1/8                | 1.181               | 123531               | 335.30   |
| M27 x 3   | 4          | D7            | 5-1/8                | 1.181               | 123532               | 315.13   |
| M30 x 1.5 | 4          | D7            | 5-7/16               | 1.378               | 123533               | 419.95   |
| M30 x 3.5 | 4          | D7            | 5-7/16               | 1.378               | 123534               | 413.41   |



# Threading & Tapping

## Yellow Ring HSSE-V3 Spiral Flute Taps — Black Oxide Finish



### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



• 2.5 Pitch lead (Bottoming)

### Inch

| Tap      | No. Flutes | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | H2 Limit Price \$ | Black Oxide Code No. | H3 Limit Price \$ | Black Oxide Code No. | H4 Limit Price \$ |
|----------|------------|----------------------|---------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| 2-56     | 2          | 1-3/4                | 0.433               | 122500               | 32.03             | -                    | -                 | -                    | -                 |
| 3-48     | 2          | 1-13/16              | 0.512               | 122502               | 25.61             | -                    | -                 | -                    | -                 |
| 4-40     | 2          | 1-7/8                | 0.433               | 123362               | 21.13             | -                    | -                 | -                    | -                 |
| 4-40     | 2          | 1-7/8                | 0.433               | -                    | -                 | 122506               | 21.13             | -                    | -                 |
| 6-32     | 3          | 2                    | 0.512               | 123366               | 17.57             | -                    | -                 | -                    | -                 |
| 8-32     | 3          | 2-1/8                | 0.512               | 123368               | 17.57             | -                    | -                 | -                    | -                 |
| 10-24    | 3          | 2-3/8                | 0.512               | -                    | -                 | 123370               | 17.57             | -                    | -                 |
| 10-32    | 3          | 2-3/8                | 0.512               | -                    | -                 | 123382               | 17.57             | -                    | -                 |
| 1/4-20   | 3          | 2-1/2                | 0.512               | -                    | -                 | 123372               | 19.42             | -                    | -                 |
| 1/4-28   | 3          | 2-1/2                | 0.512               | -                    | -                 | 123384               | 19.42             | -                    | -                 |
| 5/16-18  | 3          | 2-23/32              | 0.630               | -                    | -                 | 123374               | 21.84             | -                    | -                 |
| 5/16-24  | 3          | 2-23/32              | 0.630               | -                    | -                 | 123386               | 21.84             | -                    | -                 |
| 3/8-16   | 3          | 2-15/16              | 0.748               | -                    | -                 | 123376               | 24.65             | -                    | -                 |
| 3/8-24   | 3          | 2-15/16              | 0.748               | -                    | -                 | 123388               | 24.65             | -                    | -                 |
| 7/16-14  | 3          | 3-5/32               | 0.748               | -                    | -                 | 123378               | 32.03             | -                    | -                 |
| 7/16-20  | 3          | 3-5/32               | 0.748               | -                    | -                 | 123389               | 32.03             | -                    | -                 |
| 1/2-13   | 3          | 3-3/8                | 0.866               | -                    | -                 | 123380               | 36.99             | -                    | -                 |
| 1/2-20   | 3          | 3-3/8                | 0.866               | -                    | -                 | 123392               | 36.99             | -                    | -                 |
| 5/8-11   | 4          | 3-13/16              | 0.945               | -                    | -                 | 123452               | 67.15             | -                    | -                 |
| 5/8-18   | 4          | 3-13/16              | 0.945               | -                    | -                 | 123462               | 67.15             | -                    | -                 |
| 3/4-10   | 4          | 4-1/4                | 1.102               | -                    | -                 | 123454               | 105.36            | -                    | -                 |
| 3/4-16   | 4          | 4-1/4                | 1.102               | -                    | -                 | 123464               | 105.36            | -                    | -                 |
| 7/8-9    | 4          | 4-11/16              | 1.220               | -                    | -                 | -                    | -                 | 123466               | 150.75            |
| 7/8-14   | 4          | 4-11/16              | 1.220               | -                    | -                 | -                    | -                 | 123468               | 164.59            |
| 1-8      | 4          | 5-1/8                | 1.339               | -                    | -                 | -                    | -                 | 123469               | 200.78            |
| 1-12     | 4          | 5-1/8                | 1.339               | -                    | -                 | -                    | -                 | 123470               | 219.24            |
| 1-14     | 4          | 5-1/8                | 1.496               | -                    | -                 | -                    | -                 | 123465               | 225.41            |
| 1-1/8-7  | 4          | 5-7/16               | 1.496               | -                    | -                 | -                    | -                 | 123471               | 337.98            |
| 1-1/8-12 | 4          | 5-7/16               | 1.496               | -                    | -                 | -                    | -                 | 123472               | 359.60            |
| 1-1/4-7  | 4          | 5-3/4                | 1.732               | -                    | -                 | -                    | -                 | 123473               | 443.40            |
| 1-1/4-12 | 4          | 5-3/4                | 1.732               | -                    | -                 | -                    | -                 | 123474               | 449.51            |
| 1-3/8-6  | 4          | 6-1/16               | 1.732               | -                    | -                 | -                    | -                 | 123475               | 558.62            |
| 1-3/8-12 | 4          | 6-1/16               | 1.732               | -                    | -                 | -                    | -                 | 123476               | 562.86            |
| 1-1/2-6  | 4          | 6-3/8                | 2.000               | -                    | -                 | -                    | -                 | 123477               | 642.41            |
| 1-1/2-12 | 4          | 6-3/8                | 2.000               | -                    | -                 | -                    | -                 | 123478               | 656.38            |

### Metric

| Tap        | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | Price \$ |
|------------|------------|---------------|----------------------|---------------------|----------------------|----------|
| M3 x 0.5   | 3          | D3            | 1-15/16              | 0.197               | 123650               | 27.34    |
| M3.5 x 0.6 | 3          | D4            | 2                    | 0.236               | 123651               | 24.33    |
| M4 x 0.7   | 3          | D4            | 2-1/8                | 0.276               | 123652               | 24.33    |
| M5 x .8    | 3          | D4            | 2-3/8                | 0.315               | 123654               | 24.33    |
| M6 x 1     | 3          | D5            | 2-1/2                | 0.394               | 123656               | 24.33    |
| M7 x 1     | 3          | D5            | 2-23/32              | 0.394               | 123657               | 27.34    |
| M8 x 1     | 3          | D5            | 2-23/32              | 0.492               | 123659               | 27.34    |
| M8 x 1.25  | 3          | D5            | 2-23/32              | 0.492               | 123658               | 27.34    |
| M10 x 1.25 | 3          | D5            | 2-15/16              | 0.591               | 123661               | 38.01    |
| M10 x 1.5  | 3          | D6            | 2-15/16              | 0.591               | 123660               | 38.01    |
| M12 x 1.25 | 3          | D5            | 3-3/8                | 0.689               | 123663               | 45.60    |
| M12 x 1.75 | 3          | D6            | 3-3/8                | 0.689               | 123662               | 45.60    |
| M14 x 1.5  | 3          | D6            | 3-19/32              | 0.787               | 123665               | 67.91    |
| M14 x 2    | 3          | D7            | 3-19/32              | 0.787               | 123667               | 67.91    |

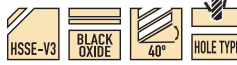
| Tap       | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Black Oxide Code No. | Price \$ |
|-----------|------------|---------------|----------------------|---------------------|----------------------|----------|
| M16 x 1.5 | 3          | D6            | 3-13/16              | 0.787               | 123668               | 82.37    |
| M16 x 2   | 3          | D7            | 3-13/16              | 0.787               | 123669               | 82.37    |
| M18 x 1.5 | 4          | D6            | 4-1/32               | 0.984               | 123670               | 115.53   |
| M18 x 2.5 | 4          | D7            | 4-1/32               | 0.984               | 123671               | 115.53   |
| M20 x 1.5 | 4          | D5            | 4-15/32              | 0.984               | 123672               | 165.82   |
| M20 x 2.5 | 4          | D6            | 4-15/32              | 0.984               | 123673               | 185.07   |
| M22 x 1.5 | 4          | D6            | 4-11/16              | 0.984               | 123674               | 176.68   |
| M22 x 2.5 | 4          | D6            | 4-11/16              | 0.984               | 123675               | 175.02   |
| M24 x 1.5 | 4          | D5            | 4-29/32              | 1.181               | 123676               | 245.30   |
| M24 x 3   | 4          | D7            | 4-29/32              | 1.181               | 123677               | 233.60   |
| M27 x 1.5 | 4          | D7            | 5-1/8                | 1.181               | 123678               | 402.36   |
| M27 x 3   | 4          | D7            | 5-1/8                | 1.181               | 123679               | 378.15   |
| M30 x 1.5 | 4          | D7            | 5-7/16               | 1.378               | 123680               | 503.94   |
| M30 x 3.5 | 4          | D7            | 5-7/16               | 1.378               | 123681               | 496.10   |

## Yellow Ring HSSE-V3 UN8 DIN Length ANSI Shank Taps



### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC



• 2.5 Pitch lead (Bottoming)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 1-8     | 4          | H7            | 6.299                | 1.417               | 123055   | 266.73   |
| 1-1/8-8 | 4          | H9            | 7.087                | 1.575               | 123056   | 426.79   |
| 1-1/4-8 | 4          | H9            | 7.087                | 1.575               | 123079   | 524.11   |
| 1-3/8-8 | 5          | H9            | 7.874                | 1.654               | 123080   | 588.31   |
| 1-1/2-8 | 5          | H9            | 7.874                | 1.654               | 123057   | 750.56   |
| 1-3/4-8 | 6          | H9            | 7.874                | 1.772               | 123058   | 768.28   |
| 2-8     | 6          | H10           | 8.858                | 1.969               | 123059   | 1,720.99 |

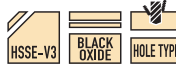
## Yellow Ring HSSE-V3 DIN Length ANSI Shank Spiral Point Taps



### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC

These taps combine ANSI shank specifications with advantage of DIN lengths for added reach.



• 4.5 Pitch lead (Intermediate)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 10-24   | 3          | H3            | 2.756                | 0.591               | 124820   | 15.32    |
| 1/4-20  | 3          | H3            | 3.150                | 0.669               | 124822   | 16.98    |
| 5/16-18 | 3          | H3            | 3.543                | 0.669               | 124824   | 18.98    |
| 3/8-16  | 3          | H3            | 3.937                | 0.787               | 124826   | 25.12    |
| 7/16-14 | 3          | H3            | 3.937                | 0.866               | 124828   | 27.93    |
| 1/2-13  | 3          | H3            | 4.331                | 0.984               | 124830   | 32.27    |
| 5/8-11  | 3          | H3            | 4.331                | 1.063               | 124832   | 58.49    |
| 3/4-10  | 3          | H3            | 4.921                | 1.181               | 124834   | 91.78    |

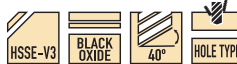
## Yellow Ring HSSE-V3 DIN Length ANSI Shank Spiral Flute Taps



### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC

These taps combine ANSI shank specifications with advantage of DIN lengths for added reach.



• 2.5 Pitch lead (Bottoming)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 10-24   | 3          | H3            | 2.756                | 0.417               | 124800   | 18.38    |
| 1/4-20  | 3          | H3            | 3.150                | 0.500               | 124802   | 20.38    |
| 5/16-18 | 3          | H3            | 3.543                | 0.556               | 124804   | 22.77    |
| 3/8-16  | 3          | H3            | 3.937                | 0.625               | 124806   | 30.14    |
| 7/16-14 | 3          | H3            | 3.937                | 0.714               | 124808   | 33.52    |
| 1/2-13  | 3          | H3            | 4.331                | 0.769               | 124810   | 38.72    |
| 5/8-11  | 4          | H3            | 4.331                | 0.909               | 124812   | 70.18    |
| 3/4-10  | 4          | H3            | 4.921                | 1.000               | 124814   | 110.13   |

## Yellow Ring 4" & 6" O.A.L. Spiral Point HSSE-V3 Taps — Inch

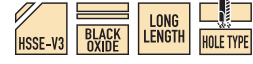


### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC



Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life. Designed for long reach applications.



• 4.5 Pitch lead (Intermediate)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 4-40    | 2          | H2            | 4"                   | 0.433               | 122700   | 29.53    |
| 6-32    | 3          | H3            | 4"                   | 0.512               | 122702   | 26.48    |
| 8-32    | 3          | H3            | 4"                   | 0.512               | 122704   | 29.03    |
| 10-24   | 3          | H3            | 6"                   | 0.512               | 122706   | 29.03    |
| 10-32   | 3          | H3            | 6"                   | 0.512               | 122708   | 29.03    |
| 1/4-20  | 3          | H3            | 6"                   | 0.630               | 122710   | 41.08    |
| 1/4-28  | 3          | H3            | 6"                   | 0.630               | 122712   | 41.08    |
| 5/16-18 | 3          | H3            | 6"                   | 0.748               | 122714   | 48.25    |
| 5/16-24 | 3          | H3            | 6"                   | 0.748               | 122716   | 48.25    |
| 3/8-16  | 3          | H3            | 6"                   | 0.748               | 122718   | 60.87    |
| 3/8-24  | 3          | H3            | 6"                   | 0.748               | 122720   | 60.87    |
| 7/16-14 | 3          | H3            | 6"                   | 0.866               | 122722   | 76.13    |
| 7/16-20 | 3          | H3            | 6"                   | 0.866               | 122724   | 76.13    |
| 1/2-13  | 3          | H3            | 6"                   | 0.945               | 122726   | 84.05    |
| 1/2-20  | 3          | H3            | 6"                   | 0.945               | 122728   | 84.05    |
| 5/8-11  | 3          | H3            | 6"                   | 1.102               | 122730   | 126.28   |
| 3/4-10  | 3          | H3            | 6"                   | 1.220               | 122731   | 200.26   |
| 7/8-9   | 3          | H4            | 6"                   | 1.339               | 122732   | 268.72   |
| 1-8     | 4          | H4            | 6"                   | 1.496               | 122733   | 346.75   |

## Yellow Ring 4" & 6" O.A.L. Spiral Flute HSSE-V3 Taps — Inch

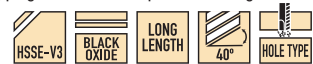


### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC



Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life. Designed for long reach applications.



• 2.5 Pitch lead (Bottoming)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 4-40    | 2          | H2            | 4"                   | 0.433               | 123060   | 36.10    |
| 6-32    | 3          | H3            | 4"                   | 0.512               | 123061   | 34.40    |
| 8-32    | 3          | H3            | 4"                   | 0.512               | 123062   | 35.51    |
| 10-24   | 3          | H3            | 4"                   | 0.512               | 123063   | 35.77    |
| 10-32   | 3          | H3            | 6"                   | 0.512               | 123073   | 35.77    |
| 1/4-20  | 3          | H3            | 6"                   | 0.630               | 123064   | 45.31    |
| 1/4-28  | 3          | H3            | 6"                   | 0.630               | 123074   | 45.31    |
| 5/16-18 | 3          | H3            | 6"                   | 0.748               | 123065   | 58.33    |
| 5/16-24 | 3          | H3            | 6"                   | 0.748               | 123075   | 58.33    |
| 3/8-16  | 3          | H3            | 6"                   | 0.748               | 123066   | 71.02    |
| 3/8-24  | 3          | H3            | 6"                   | 0.748               | 123076   | 71.02    |
| 7/16-14 | 3          | H3            | 6"                   | 0.866               | 123067   | 90.88    |
| 7/16-20 | 3          | H3            | 6"                   | 0.866               | 123077   | 90.88    |
| 1/2-13  | 3          | H3            | 6"                   | 0.945               | 123068   | 112.61   |
| 1/2-20  | 3          | H3            | 6"                   | 0.945               | 123078   | 112.61   |
| 5/8-11  | 4          | H3            | 6"                   | 1.102               | 123069   | 142.37   |
| 3/4-10  | 4          | H3            | 6"                   | 1.220               | 123070   | 230.46   |
| 7/8-9   | 4          | H4            | 6"                   | 1.339               | 123071   | 315.76   |
| 1-8     | 4          | H4            | 6"                   | 1.496               | 123072   | 411.21   |

Alloy / High  
Carbon Steels

Stainless Steel

Aluminum

## Yellow Ring HSSE-V3 NPT Spiral Flute Pipe Taps



### HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2
- Up to 35HRC



• 2.5 Pitch lead (Bottoming)

| Tap          | No. Flutes | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|--------------|------------|----------------------|---------------------|----------|----------|
| 1/16-27      | 4          | 2-1/8                | 0.688               | 123400   | 50.97    |
| 1/8-27       | 4          | 2-1/8                | 0.750               | 123402   | 50.97    |
| 1/4-18       | 4          | 2-7/16               | 1.063               | 123404   | 56.13    |
| 3/8-18       | 4          | 2-9/16               | 1.063               | 123406   | 74.25    |
| 1/2-14       | 4          | 3-1/8                | 1.375               | 123410   | 118.09   |
| 3/4-14       | 5          | 3-1/4                | 1.375               | 123412   | 164.98   |
| 1-11-1/2     | 5          | 3-3/4                | 1.750               | 123414   | 250.90   |
| 1-1/4-11-1/2 | 5          | 4                    | 1.750               | 123416   | 355.88   |
| 1-1/2-11-1/2 | 5          | 4-1/4                | 1.750               | 123418   | 428.94   |
| 2-11-1/2     | 5          | 4-1/2                | 1.750               | 123420   | 714.95   |

## Orange Ring HSSE-V3 Spiral Flute Taps — Inch



### HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35HRC



• 2.5 Pitch lead (Bottoming)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 2-56    | 2          | H2            | 1-3/4                | 0.433               | 124928   | 50.66    |
| 3-48    | 2          | H2            | 1-13/16              | 0.512               | 124929   | 44.44    |
| 4-40    | 2          | H2            | 1-7/8                | 0.250               | 124965   | 36.79    |
| 6-32    | 3          | H2            | 2                    | 0.313               | 124966   | 30.04    |
| 8-32    | 3          | H2            | 2-1/8                | 0.313               | 124967   | 29.93    |
| 10-24   | 3          | H3            | 2-3/8                | 0.417               | 124968   | 30.69    |
| 10-32   | 3          | H3            | 2-3/8                | 0.417               | 124979   | 30.69    |
| 1/4-20  | 3          | H3            | 2-1/2                | 0.500               | 124969   | 33.68    |
| 1/4-28  | 3          | H3            | 2-1/2                | 0.500               | 124980   | 33.68    |
| 5/16-18 | 3          | H3            | 2-23/32              | 0.556               | 124970   | 37.44    |
| 5/16-24 | 3          | H3            | 2-23/32              | 0.556               | 124981   | 37.44    |
| 3/8-16  | 3          | H3            | 2-15/16              | 0.625               | 124971   | 41.71    |
| 3/8-24  | 3          | H3            | 2-15/16              | 0.625               | 124982   | 41.71    |
| 7/16-14 | 3          | H3            | 3-5/32               | 0.714               | 124972   | 53.77    |
| 7/16-20 | 3          | H3            | 3-5/32               | 0.714               | 124964   | 53.77    |
| 1/2-13  | 3          | H3            | 3-3/8                | 0.769               | 124973   | 63.22    |
| 1/2-20  | 3          | H3            | 3-3/8                | 0.769               | 124983   | 63.22    |
| 9/16-12 | 4          | H3            | 3-19/32              | 0.880               | 124974   | 102.09   |
| 5/8-11  | 4          | H3            | 3-13/16              | 0.909               | 124975   | 120.35   |
| 5/8-18  | 4          | H3            | 3-13/16              | 0.909               | 124984   | 120.35   |
| 3/4-10  | 4          | H3            | 4-1/4                | 1.000               | 124976   | 153.76   |
| 3/4-16  | 4          | H3            | 4-1/4                | 1.000               | 124985   | 153.76   |
| 7/8-9   | 4          | H4            | 4-11/16              | 1.111               | 124977   | 206.77   |
| 7/8-14  | 4          | H4            | 4-11/16              | 1.111               | 124986   | 206.77   |
| 1-8     | 4          | H4            | 5-1/8                | 1.250               | 124978   | 265.58   |
| 1-12    | 4          | H4            | 5-1/8                | 1.250               | 124987   | 265.58   |

## Orange Ring HSSE-V3 Spiral Point Taps — Inch



### HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35HRC



• 4.5 Pitch lead (Intermediate)

| Tap     | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|---------------|----------------------|---------------------|----------|----------|
| 2-56    | 2          | H2            | 1-3/4                | 0.433               | 124926   | 40.16    |
| 3-48    | 2          | H2            | 1-13/16              | 0.512               | 124927   | 34.07    |
| 4-40    | 2          | H2            | 1-7/8                | 0.433               | 124930   | 25.39    |
| 6-32    | 3          | H3            | 2                    | 0.512               | 124931   | 21.37    |
| 8-32    | 3          | H3            | 2-1/8                | 0.512               | 124932   | 21.37    |
| 10-24   | 3          | H3            | 2-3/8                | 0.512               | 124933   | 21.76    |
| 10-32   | 3          | H3            | 2-3/8                | 0.512               | 124945   | 21.76    |
| 1/4-20  | 3          | H3            | 2-1/2                | 0.630               | 124934   | 23.71    |
| 1/4-28  | 3          | H3            | 2-1/2                | 0.630               | 124946   | 23.71    |
| 5/16-18 | 3          | H3            | 2-23/32              | 0.748               | 124935   | 25.78    |
| 5/16-24 | 3          | H3            | 2-23/32              | 0.748               | 124947   | 25.78    |
| 3/8-16  | 3          | H3            | 2-15/16              | 0.748               | 124936   | 29.01    |
| 3/8-24  | 3          | H3            | 2-15/16              | 0.748               | 124948   | 29.01    |

## Orange Ring HSSE-V3 Spiral Flute Taps — Metric



### HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35HRC



• 2.5 Pitch lead (Bottoming)

| Tap        | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|------------|------------|---------------|----------------------|---------------------|----------|----------|
| M3 x 0.5   | 3          | D3            | 1-15/16              | 0.197               | 124988   | 36.14    |
| M4 x 0.7   | 3          | D4            | 2-1/8                | 0.276               | 124989   | 34.72    |
| M5 x 0.8   | 3          | D4            | 2-3/8                | 0.315               | 124990   | 35.37    |
| M6 x 1     | 3          | D5            | 2-1/2                | 0.394               | 124991   | 39.00    |
| M8 x 1.25  | 3          | D5            | 2-23/32              | 0.492               | 124992   | 43.39    |
| M10 x 1.25 | 3          | D5            | 2-15/16              | 0.591               | 124993   | 61.79    |
| M10 x 1.5  | 3          | D6            | 2-15/16              | 0.591               | 124994   | 61.79    |
| M12 x 1.75 | 3          | D6            | 3-3/8                | 0.689               | 124995   | 73.58    |
| M14 x 2    | 3          | D7            | 3-19/32              | 0.787               | 124996   | 102.35   |
| M16 x 2    | 3          | D7            | 3-13/16              | 0.787               | 124997   | 69.06    |
| M18 x 2.5  | 4          | D7            | 4-1/32               | 0.984               | 124998   | 149.89   |
| M20 x 2.5  | 4          | D6            | 4-15/32              | 0.984               | 124999   | 153.76   |
| M22 x 2.5  | 4          | D6            | 4-11/16              | 0.984               | 124943   | 180.58   |
| M24 x 3    | 4          | D7            | 4-29/32              | 1.181               | 124944   | 244.07   |

## Orange Ring HSSE-V3 Spiral Point Taps — Metric



### HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35HRC



• 4.5 Pitch lead (Intermediate)

| Tap        | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|------------|------------|---------------|----------------------|---------------------|----------|----------|
| M3 x 0.5   | 3          | D3            | 1-15/16              | 0.433               | 124955   | 29.40    |
| M4 x 0.7   | 3          | D4            | 2-1/8                | 0.512               | 124956   | 24.36    |
| M5 x 0.8   | 3          | D4            | 2-3/8                | 0.512               | 124957   | 25.01    |
| M6 x 1     | 3          | D5            | 2-1/2                | 0.630               | 124958   | 27.47    |
| M8 x 1.25  | 3          | D5            | 2-23/32              | 0.748               | 124959   | 30.04    |
| M10 x 1.25 | 3          | D5            | 2-15/16              | 0.748               | 124960   | 43.39    |
| M10 x 1.5  | 3          | D6            | 2-15/16              | 0.748               | 124961   | 43.39    |
| M12 x 1.75 | 3          | D6            | 3-3/8                | 0.945               | 124962   | 50.13    |
| M14 x 2    | 3          | D6            | 3-19/32              | 0.984               | 124897   | 54.55    |
| M16 x 2    | 3          | D7            | 3-13/16              | 1.102               | 124899   | 105.33   |
| M18 x 2.5  | 3          | D7            | 4-1/32               | 1.102               | 124901   | 116.19   |
| M20 x 2.5  | 3          | D6            | 4-1/4                | 1.220               | 124903   | 139.27   |
| M22 x 2.5  | 3          | D6            | 4-11/16              | 1.339               | 124905   | 162.20   |
| M24 x 3    | 3          | D7            | 4-29/32              | 1.339               | 124907   | 217.63   |

## HSSE — V3 Spiral Flute Taps For Aluminum



### Aluminum

High performance taps with special geometries and bright finish for Aluminum.



• 2.5 Pitch lead (Bottoming)

| Tap           | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------------|------------|---------------|----------------------|---------------------|----------|----------|
| <b>Inch</b>   |            |               |                      |                     |          |          |
| 4-40          | 2          | H2            | 1-7/8                | 0.250               | 124400   | 25.55    |
| 6-32          | 2          | H3            | 2                    | 0.313               | 124405   | 20.41    |
| 8-32          | 2          | H3            | 2-1/8                | 0.313               | 124415   | 20.41    |
| 10-24         | 2          | H3            | 2-3/8                | 0.417               | 124420   | 20.41    |
| 10-32         | 2          | H3            | 2-3/8                | 0.417               | 124425   | 20.41    |
| 1/4-20        | 2          | H3            | 2-1/2                | 0.500               | 124430   | 22.11    |
| 1/4-28        | 2          | H3            | 2-1/2                | 0.500               | 124440   | 22.11    |
| 5/16-18       | 2          | H3            | 2-23/32              | 0.556               | 124445   | 27.00    |
| 5/16-24       | 2          | H3            | 2-23/32              | 0.556               | 124455   | 27.00    |
| 3/8-16        | 2          | H3            | 2-15/16              | 0.625               | 124465   | 31.53    |
| 3/8-24        | 2          | H3            | 2-15/16              | 0.625               | 124475   | 31.53    |
| <b>Metric</b> |            |               |                      |                     |          |          |
| M3 x 0.5      | 2          | D3            | 1-15/16              | 0.197               | 124600   | 30.44    |
| M4 x 0.7      | 2          | D4            | 2-1/8                | 0.276               | 124605   | 27.99    |
| M5 x 0.8      | 2          | D5            | 2-3/8                | 0.315               | 124610   | 27.99    |
| M6 x 1.0      | 2          | D5            | 2-1/2                | 0.394               | 124615   | 27.99    |
| M8 x 1.25     | 2          | D5            | 2-23/32              | 0.492               | 124620   | 30.44    |
| M10 x 1.25    | 2          | D5            | 2-15/16              | 0.591               | 124625   | 42.78    |
| M10 x 1.5     | 2          | D6            | 2-15/16              | 0.591               | 124630   | 42.78    |

## HSS NPT Taps



Ground thread High Speed Steel pipe taps.



| Tap          | No. Flutes | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|--------------|------------|----------------------|---------------------|----------|----------|
| 1/16-27      | 4          | 2-1/8                | 0.688               | 123430   | 35.94    |
| 1/8-27       | 4          | 2-1/8                | 0.750               | 123432   | 35.94    |
| 1/4-18       | 4          | 2-7/16               | 1.063               | 123434   | 39.72    |
| 3/8-18       | 4          | 2-9/16               | 1.063               | 123436   | 52.55    |
| 1/2-14       | 4          | 3-1/8                | 1.375               | 123438   | 83.47    |
| 3/4-14       | 5          | 3-1/4                | 1.375               | 123440   | 116.60   |
| 1-11-1/2     | 5          | 3-3/4                | 1.750               | 123442   | 177.58   |
| 1-1/4-11-1/2 | 5          | 4                    | 1.750               | 123444   | 412.52   |
| 1-1/2-11-1/2 | 7          | 4-1/4                | 1.750               | 123446   | 454.31   |
| 2-11-1/2     | 7          | 4-1/2                | 1.750               | 123448   | 665.07   |

## HSS 6" OAL NPT Taps



Long series high speed steel pipe taps for longer reach applications.



| Tap     | No. Flutes | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------|------------|----------------------|---------------------|----------|----------|
| 1/16-27 | 4          | 6"                   | 0.688               | 122430   | 51.33    |
| 1/4-18  | 4          | 6"                   | 1.063               | 122434   | 128.20   |
| 3/8-18  | 4          | 6"                   | 1.063               | 122436   | 151.43   |
| 1/2-14  | 4          | 6"                   | 1.375               | 122438   | 218.77   |

## HSS Roll Form Taps



Extended life results from tap geometry that allows optimum cutting performance and close control over tapped hole size. Superior wear resistance, heat treated for toughness.



- Used for thread forming in copper, brass, aluminum, die castings, leaded steels, low carbon steels and stainless steels



| Tap           | Thread Limits | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|---------------|---------------|----------------------|---------------------|----------|----------|
| <b>Inch</b>   |               |                      |                     |          |          |
| 4-40          | H5            | 1-7/8                | 0.560               | 124650   | 26.38    |
| 6-32          | H5            | 2                    | 0.480               | 124655   | 16.95    |
| 8-32          | H5            | 2-1/8                | 0.500               | 124660   | 21.49    |
| 10-24         | H6            | 2-3/8                | 0.640               | 124665   | 17.60    |
| 10-32         | H6            | 2-3/8                | 0.640               | 124670   | 17.60    |
| 1/4-20        | H6            | 2-1/2                | 0.830               | 124675   | 18.58    |
| 1/4-28        | H6            | 2-1/2                | 0.830               | 124680   | 24.17    |
| 5/16-18       | H7            | 2-23/32              | 0.930               | 124685   | 15.39    |
| 5/16-24       | H7            | 2-23/32              | 0.930               | 124690   | 15.39    |
| 3/8-16        | H7            | 2-15/16              | 0.980               | 124695   | 29.31    |
| 3/8-24        | H7            | 2-15/16              | 0.980               | 124700   | 21.02    |
| 1/2-13        | H8            | 2-23/32              | 0.930               | 124705   | 51.96    |
| 1/2-20        | H8            | 2-15/16              | 0.980               | 124710   | 61.72    |
| <b>Metric</b> |               |                      |                     |          |          |
| M3 x 0.5      | D5            | 1-15/16              | 0.620               | 124750   | 15.77    |
| M4 x 0.7      | D6            | 2-1/8                | 0.500               | 124755   | 17.50    |
| M5 x 0.8      | D7            | 2-3/8                | 0.640               | 124760   | 17.93    |
| M6 x 1.0      | D8            | 2-1/2                | 0.830               | 124765   | 18.92    |
| M8 x 1.25     | D9            | 2-23/32              | 0.930               | 124770   | 33.10    |
| M10 x 1.5     | D10           | 2-15/16              | 0.980               | 124775   | 28.30    |

## HSS NPT Interrupted Thread Taps



These taps are designed to produce less cutting pressure in a variety of applications.



| Tap      | No. Flutes | Overall Length (in.) | Thread Length (in.) | Code No. | Price \$ |
|----------|------------|----------------------|---------------------|----------|----------|
| 1/8-27   | 4          | 2-1/8                | 0.750               | 123700   | 55.86    |
| 1/4-18   | 4          | 2-7/16               | 1.063               | 123702   | 62.09    |
| 3/8-18   | 4          | 2-9/16               | 1.063               | 123704   | 78.22    |
| 1/2-14   | 4          | 3-1/8                | 1.375               | 123706   | 124.91   |
| 3/4-14   | 5          | 3-1/4                | 1.375               | 123708   | 177.58   |
| 1-11-1/2 | 5          | 3-3/4                | 1.750               | 123710   | 271.81   |

Alloy / High Carbon Steels

Stainless Steel

Aluminum

# Threading & Tapping

## Hand Taps — Inch

High Speed Steel for hand tapping of through or blind holes in ferrous and non-ferrous alloys.



| Tap      | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Taper Code No. | Price \$ | Plug Code No. | Price \$ | Bottom Code No. | Price \$ |
|----------|------------|---------------|----------------------|---------------------|----------------|----------|---------------|----------|-----------------|----------|
| 6-32     | 3          | H3            | 2                    | 0.688               | 123032         | 7.70     | 123034        | 7.70     | 123036          | 7.70     |
| 8-32     | 4          | H3            | 2-1/8                | 0.750               | 123038         | 7.95     | 123040        | 7.95     | 123042          | 7.95     |
| 10-24    | 4          | H3            | 2-3/8                | 0.875               | 123044         | 8.19     | 123046        | 8.19     | 123048          | 8.19     |
| 10-32    | 4          | H3            | 2-3/8                | 0.875               | 123104         | 8.19     | 123106        | 8.19     | 123108          | 8.19     |
| 12-24    | 4          | H3            | 2-3/8                | 0.938               | 123050         | 8.67     | 123052        | 8.67     | 123054          | 8.67     |
| 1/4-20   | 4          | H3            | 2-1/2                | 1.000               | 123116         | 8.80     | 123118        | 8.80     | 123120          | 8.80     |
| 1/4-28   | 4          | H3            | 2-1/2                | 1.000               | 123200         | 8.80     | 123202        | 8.80     | 123204          | 8.80     |
| 5/16-18  | 4          | H3            | 2-23/32              | 1.125               | 123122         | 10.75    | 123124        | 10.75    | 123126          | 10.75    |
| 5/16-24  | 4          | H3            | 2-23/32              | 1.125               | 123206         | 10.75    | 123208        | 10.75    | 123210          | 10.75    |
| 3/8-16   | 4          | H3            | 2-15/16              | 1.250               | 123128         | 12.22    | 123130        | 12.22    | 123132          | 12.22    |
| 3/8-24   | 4          | H3            | 2-15/16              | 1.250               | 123212         | 12.22    | 123214        | 12.22    | 123216          | 12.22    |
| 7/16-14  | 4          | H3            | 3-5/32               | 1.438               | 123134         | 20.90    | 123136        | 20.90    | 123138          | 20.90    |
| 7/16-20  | 4          | H3            | 3-5/32               | 1.438               | 123218         | 20.90    | 123220        | 20.90    | 123222          | 20.90    |
| 1/2-13   | 4          | H3            | 3-3/8                | 1.656               | 123140         | 22.00    | 123142        | 22.00    | 123144          | 22.00    |
| 1/2-20   | 4          | H3            | 3-3/8                | 1.656               | 123224         | 24.69    | 123226        | 24.69    | 123228          | 24.69    |
| 9/16-12  | 4          | H3            | 3-19/32              | 1.656               | 123146         | 36.66    | 123148        | 36.66    | 123150          | 36.66    |
| 9/16-18  | 4          | H3            | 3-19/32              | 1.656               | 123230         | 36.66    | 123232        | 36.66    | 123234          | 36.66    |
| 5/8-11   | 4          | H3            | 3-13/16              | 1.813               | 123152         | 43.99    | 123154        | 43.99    | 123156          | 43.99    |
| 5/8-18   | 4          | H3            | 3-13/16              | 1.813               | 123236         | 43.99    | 123238        | 43.99    | 123240          | 43.99    |
| 3/4-10   | 4          | H3            | 4-1/4                | 2.000               | 123158         | 61.60    | 123160        | 61.60    | 123162          | 61.60    |
| 3/4-16   | 4          | H3            | 4-1/4                | 2.000               | 123242         | 61.60    | 123244        | 61.60    | 123246          | 61.60    |
| 7/8-9    | 4          | H4            | 4-11/16              | 2.219               | 123164         | 85.91    | 123166        | 85.91    | 123168          | 85.91    |
| 7/8-14   | 4          | H4            | 4-11/16              | 2.219               | 123248         | 85.91    | 123250        | 85.91    | 123252          | 85.91    |
| 1-8      | 4          | H4            | 5-1/8                | 2.500               | 123170         | 114.39   | 123172        | 114.39   | 123174          | 114.39   |
| 1-12     | 4          | H4            | 5-1/8                | 2.500               | 123254         | 118.06   | 123256        | 118.06   | 123258          | 118.06   |
| 1-14     | 4          | H4            | 5-1/8                | 2.500               | 123260         | 118.06   | 123262        | 118.06   | 123264          | 118.06   |
| 1-1/8-7  | 4          | H4            | 5-7/16               | 2.562               | 123176         | 185.16   | 123178        | 185.16   | 123180          | 185.16   |
| 1-1/8-12 | 4          | H4            | 5-7/16               | 2.562               | 123266         | 197.01   | 123268        | 197.01   | 123270          | 197.01   |
| 1-1/4-7  | 4          | H4            | 5-3/4                | 2.562               | 123272         | 242.97   | 123274        | 242.97   | 123276          | 242.97   |
| 1-1/4-12 | 6          | H4            | 5-3/4                | 2.562               | 123536         | 246.76   | 123538        | 246.76   | 123540          | 246.76   |
| 1-3/8-6  | 4          | H4            | 6-1/16               | 3.000               | 123278         | 306.03   | 123280        | 306.03   | 123282          | 306.03   |
| 1-3/8-12 | 6          | H4            | 6-1/16               | 3.000               | 123542         | 307.98   | 123544        | 307.98   | 123546          | 307.98   |
| 1-1/2-6  | 4          | H4            | 6-3/8                | 3.000               | 123284         | 351.98   | 123286        | 351.98   | 123288          | 351.98   |
| 1-1/2-12 | 6          | H4            | 6-3/8                | 3.000               | 123548         | 359.56   | 123550        | 359.56   | 123552          | 359.56   |

## Hand Taps — Metric

High Speed Steel for hand tapping of through or blind holes in ferrous and non-ferrous alloys.



| Tap        | No. Flutes | Thread Limits | Overall Length (in.) | Thread Length (in.) | Taper Code No. | Price \$ | Plug Code No. | Price \$ | Bottom Code No. | Price \$ |
|------------|------------|---------------|----------------------|---------------------|----------------|----------|---------------|----------|-----------------|----------|
| M3 x 0.5   | 3          | D3            | 1-15/16              | 5/8                 | 123479         | 13.08    | 123480        | 13.08    | 123481          | 13.08    |
| M4 x 0.7   | 3          | D4            | 2-1/8                | 3/4                 | 123496         | 10.75    | 123482        | 10.75    | 123483          | 10.75    |
| M5 x 0.8   | 3          | D4            | 2-3/8                | 7/8                 | 123497         | 10.75    | 123484        | 10.75    | 123485          | 10.75    |
| M6 x 1.0   | 4          | D5            | 2-1/2                | 1                   | 123498         | 11.36    | 123486        | 11.36    | 123487          | 11.36    |
| M8 x 1.25  | 4          | D5            | 2-23/32              | 1-1/8               | 123499         | 12.46    | 123488        | 12.46    | 123489          | 12.46    |
| M10 x 1.25 | 4          | D5            | 2-15/16              | 1-1/4               | 123500         | 23.47    | 123490        | 23.47    | 123491          | 23.47    |
| M10 x 1.5  | 4          | D6            | 2-15/16              | 1-1/4               | 123501         | 23.47    | 123492        | 23.47    | 123493          | 23.47    |
| M12 x 1.75 | 4          | D6            | 3-3/8                | 1-21/32             | 123503         | 27.62    | 123494        | 27.50    | 123495          | 27.50    |
| M14 x 2.0  | 4          | D7            | 3-19/32              | 1-21/32             | 123081         | 41.05    | 123082        | 41.05    | 123083          | 41.05    |
| M16 x 2.0  | 4          | D7            | 3-13/16              | 1-13/16             | 123084         | 50.23    | 123085        | 50.23    | 123086          | 50.23    |
| M18 x 2.5  | 4          | D7            | 4-1/32               | 1-13/16             | 123087         | 67.47    | 123088        | 67.47    | 123089          | 67.47    |
| M20 x 2.5  | 4          | D6            | 4-15/32              | 2                   | 123090         | 91.90    | 123091        | 91.90    | 123092          | 91.90    |
| M22 x 2.5  | 4          | D6            | 4-11/16              | 2-7/32              | 123093         | 100.58   | 123094        | 100.58   | 123095          | 100.58   |
| M24 x 3.0  | 4          | D7            | 4-29/32              | 2-7/32              | 123096         | 118.54   | 123098        | 118.54   | 123097          | 118.54   |

Alloy / High Carbon Steels    Stainless Steel    Aluminum

## HSS Ground Taps

- High Speed hand taps
- High Speed spiral point
- 30° slow spiral ground thread taps



**QUALITY  
IMPORT**



| Tap  | TPI<br>NC | TPI<br>NF | Taper<br>Code No. | Price \$ | Plug<br>Code No. | Price \$ | Bottom<br>Code No. | Price \$ | Spiral Point<br>Code No. | Price \$ | Spiral Flute<br>Code No. | Price \$ |
|------|-----------|-----------|-------------------|----------|------------------|----------|--------------------|----------|--------------------------|----------|--------------------------|----------|
| 0    |           | 80        | 113056            | 13.29    | 113058           | 13.29    | 113060             | 13.29    | 113322                   | 26.46    | -                        | -        |
| 1    | 64        |           | 113002            | 9.24     | 113004           | 13.71    | 113006             | 13.71    | 113290                   | 16.15    | -                        | -        |
| 1    |           | 72        | 113062            | 9.24     | 113064           | 9.24     | 113066             | 9.24     | 113324                   | 16.15    | -                        | -        |
| 2    | 56        |           | 113008            | 8.61     | 113010           | 8.61     | 113012             | 8.61     | 113292                   | 13.71    | -                        | -        |
| 2    |           | 64        | 113068            | 8.61     | 113070           | 12.85    | 113072             | 8.61     | 113326                   | 10.52    | -                        | -        |
| 3    | 48        |           | 113014            | 9.03     | 113016           | 6.06     | 113018             | 6.06     | 113294                   | 11.05    | 113358                   | 13.38    |
| 3    |           | 56        | 113074            | 6.90     | 113076           | 7.22     | 113078             | 6.70     | 113328                   | 12.22    | 113360                   | 9.56     |
| 4    | 40        |           | 113020            | 5.52     | 113022           | 9.35     | 113024             | 6.27     | 113296                   | 8.92     | -                        | -        |
| 4    |           | 48        | 113080            | 5.42     | 113082           | 5.42     | 113084             | 5.42     | 113330                   | 6.90     | 113354                   | 7.19     |
| 5    | 40        |           | 113026            | 5.10     | 113028           | 5.10     | 113030             | 5.10     | 113298                   | 5.95     | 113364                   | 6.20     |
| 5    |           | 44        | 113086            | 5.42     | 113088           | 5.42     | 113090             | 5.42     | 113332                   | 6.90     | -                        | -        |
| 6    | 32        |           | -                 | -        | -                | -        | -                  | -        | 113300                   | 4.63     | 113366                   | 21.78    |
| 6    |           | 40        | 113092            | 4.25     | 113094           | 4.25     | 113096             | 6.16     | 113334                   | 8.61     | -                        | -        |
| 8    | 32        |           | -                 | -        | -                | -        | -                  | -        | 113302                   | 4.75     | 113368                   | 17.96    |
| 8    |           | 36        | 113098            | 4.25     | 113100           | 4.25     | 113102             | 4.25     | 113336                   | 15.45    | 113357                   | 10.07    |
| 10   | 24        |           | -                 | -        | -                | -        | -                  | -        | 113304                   | 7.17     | 113370                   | 9.19     |
| 10   |           | 32        | -                 | -        | -                | -        | -                  | -        | 113338                   | 6.96     | 113382                   | 9.19     |
| 12   | 24        |           | -                 | -        | -                | -        | -                  | -        | 113306                   | 5.74     | -                        | -        |
| 12   |           | 28        | 113110            | 4.88     | 113112           | 4.88     | 113114             | 4.88     | 113340                   | 5.74     | 113383                   | 10.07    |
| 1/4  | 20        |           | -                 | -        | -                | -        | -                  | -        | 113308                   | 7.17     | 113372                   | 5.42     |
| 1/4  |           | 28        | -                 | -        | -                | -        | 113204             | 6.73     | 113342                   | 6.73     | 113384                   | 6.08     |
| 5/16 | 18        |           | -                 | -        | -                | -        | 113126             | 7.17     | 113310                   | 6.85     | 113374                   | 6.53     |
| 5/16 |           | 24        | -                 | -        | -                | -        | -                  | -        | 113344                   | 8.29     | 113386                   | 9.62     |
| 3/8  | 16        |           | -                 | -        | -                | -        | -                  | -        | 113312                   | 9.50     | 113376                   | 11.51    |
| 3/8  |           | 24        | -                 | -        | -                | -        | -                  | -        | 113346                   | 6.90     | 113388                   | 8.42     |
| 7/16 | 14        |           | -                 | -        | -                | -        | -                  | -        | 113314                   | 10.94    | 113378                   | 19.26    |
| 7/16 |           | 20        | -                 | -        | -                | -        | -                  | -        | 113348                   | 10.94    | 113390                   | 19.26    |
| 1/2  | 13        |           | -                 | -        | -                | -        | -                  | -        | 113316                   | 11.81    | 113380                   | 29.27    |
| 1/2  |           | 20        | -                 | -        | -                | -        | -                  | -        | 113350                   | 19.13    | 113392                   | 23.02    |
| 9/16 | 12        |           | -                 | -        | -                | -        | -                  | -        | 113317                   | 39.10    | -                        | -        |
| 9/16 |           | 18        | -                 | -        | -                | -        | -                  | -        | 113351                   | 17.75    | -                        | -        |
| 5/8  | 11        |           | -                 | -        | -                | -        | -                  | -        | 113318                   | 19.21    | 113452                   | 43.50    |
| 5/8  |           | 18        | -                 | -        | -                | -        | -                  | -        | 113352                   | 36.12    | 113462                   | 29.55    |
| 3/4  | 10        |           | -                 | -        | -                | -        | -                  | -        | 113320                   | 27.93    | 113454                   | 61.19    |
| 3/4  |           | 16        | -                 | -        | -                | -        | -                  | -        | 113353                   | 57.79    | 113464                   | 61.19    |
| 7/8  | 9         |           | -                 | -        | -                | -        | -                  | -        | 113321                   | 77.14    | -                        | -        |
| 7/8  |           | 14        | -                 | -        | -                | -        | -                  | -        | 113359                   | 77.14    | -                        | -        |
| 1    | 8         |           | -                 | -        | -                | -        | -                  | -        | 113323                   | 110.24   | -                        | -        |
| 1    |           | 12        | -                 | -        | -                | -        | -                  | -        | 113361                   | 108.23   | -                        | -        |
| 1    |           | 14        | -                 | -        | -                | -        | 113264             | 131.37   | 113363                   | 108.23   | -                        | -        |

Threading & Tapping

## HSS NPT Taps



**QUALITY  
IMPORT**



| Tap          | No. Flutes | Thread Length (in.) | Overall Length (in.) | Code No. | Price \$ |
|--------------|------------|---------------------|----------------------|----------|----------|
| 1/16-27      | 4          | 11/16               | 2-1/8                | 113430   | 9.93     |
| 1/8-27       | 4          | 3/4                 | 2-1/8                | 113432   | 10.93    |
| 1/4-18       | 4          | 1-1/16              | 2-7/16               | 113434   | 15.68    |
| 3/8-18       | 4          | 1-1/16              | 2-9/16               | 113436   | 16.01    |
| 1/2-14       | 4          | 1-3/8               | 3-1/8                | 113438   | 25.83    |
| 3/4-14       | 5          | 1-3/8               | 3-1/4                | 113440   | 39.73    |
| 1-11-1/2     | 5          | 1-3/4               | 3-3/4                | 113442   | 68.66    |
| 1-1/4-11-1/2 | 5          | 1-3/4               | 4                    | 113444   | 115.68   |
| 1-1/2-11-1/2 | 7          | 1-3/4               | 4-1/4                | 113446   | 166.80   |
| 2-11-1/2     | 7          | 1-3/4               | 4-1/2                | 113448   | 280.82   |

## Metric Spiral Point Taps

High Speed spiral point



**QUALITY  
IMPORT**



| Tap         | Code No. | Price \$ |
|-------------|----------|----------|
| M1.6 x 0.35 | 113500   | 43.80    |
| M1.8 x 0.35 | 113501   | 44.72    |
| M2 x 0.4    | 113502   | 38.64    |
| M2.2 x 0.45 | 113503   | 19.17    |
| M2.5 x 0.45 | 113504   | 30.92    |
| M3 x 0.5    | 113505   | 23.16    |
| M3.5 x 0.6  | 113506   | 23.16    |
| M4 x 0.7    | 113507   | 20.59    |
| M5 x .80    | 113509   | 20.59    |
| M6 x 1.0    | 113510   | 20.59    |
| M6.3 x 1.0  | 113511   | 25.49    |
| M7 x 1.0    | 113512   | 20.58    |
| M8 x 1.25   | 113513   | 20.58    |
| M8 x 1.0    | 113514   | 23.16    |
| M10 x 1.5   | 113515   | 28.33    |
| M10 x 1.25  | 113516   | 33.45    |
| M12 x 1.75  | 113517   | 48.94    |
| M12 x 1.25  | 113518   | 54.10    |
| M14 x 2.0   | 113519   | 72.15    |
| M14 x 1.5   | 113520   | 72.15    |
| M16 x 2.0   | 113521   | 82.44    |
| M18 x 2.5   | 113522   | 105.57   |
| M20 x 2.5   | 113523   | 118.52   |

# Threading & Tapping

## Tap & Die Sets — Wooden Case

**QUALITY  
IMPORT**



| Description   | Code No. | Price \$ |
|---|----------|----------|
| 1/4" - 1/2" <b>NC</b> , 2 taps per size (Set No. 521)           | 113620   | 1,623.50 |
| 1/4" - 1/2" <b>NC</b> , 3 taps per size (Set No. 521)           |          |          |
| Sets consist of the following:                                  |          |          |
| • 1/4", 5/16", 3/8", 7/16", 1/2" taps and dies                  | 113625   | 1,695.93 |
| • 1" and 1-1/2" die stocks                                      |          |          |
| • #1 and #3 tap wrenches  |          |          |
| 1/4" - 3/4" <b>NC</b> , 2 taps per size (Set No. 527)           | 113630   | 1,887.60 |
| 1/4" - 3/4" <b>NF</b> , 2 taps per size (Set No. 527)           | 113633   | 2,038.94 |
| 1/4" - 3/4" <b>NC</b> , 3 taps per size (Set No. 527)           |          |          |
| Sets consist of the following:                                  |          |          |
| • 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" taps and dies      | 113635   | 2,106.67 |
| • 1" and 1-1/2" die stocks                                      |          |          |
| • #1 and #3 tap wrenches  |          |          |
| 1/4" - 3/4" <b>NC</b> , 2 taps per size (Set No. 5)             | 113610   | 2,033.72 |
| 1/4" - 3/4" <b>NF</b> , 2 taps per size (Set No. 5)             |          |          |
| Sets consists of the following:                                 |          |          |
| • 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 3/4" taps & dies | 113612   | 2,038.94 |
| • 1" and 1-1/2" dies stocks                                     |          |          |
| • #1 and #3 tap wrenches  |          |          |
| 1/4" - 1" <b>NC</b> , 2 taps per size (Set No. 533)             | 113640   | 2,497.46 |
| 1/4" - 1" <b>NF</b> , 2 taps per size (Set No. 533)             |          |          |
| Sets consist of the following:                                  |          |          |
| • 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 1" taps and dies  | 113643   | 2,509.80 |
| • 1" and 1-1/2" die stocks                                      |          |          |
| • #1 and #3 tap wrenches  |          |          |

## Tap & Die Sets — Metal Case

**QUALITY  
IMPORT**



| Description  | Code No. | Price \$ |
|--|----------|----------|
| <b>3 - 12 mm, 3 taps per size (Set No. P.V. 12)</b>      |          |          |
| 29 piece set consists of the following:                  |          |          |
| • 3, 4, 6, 8, 10, 12mm taps (Taper, Plug, Bottom)        | 113600   | 494.21   |
| • 3, 4, 6, 8, 10, 12mm dies                              |          |          |
| • 1 bar type, 1 ratchet type tap wrench                  |          |          |
| • 1 die stock, 1 screw pitch gauge, 1 screw driver       |          |          |
| <b>3-20 mm, 3 taps per size (Set No. P.V. 2)</b>         |          |          |
| 52 piece set consists of the following:                  |          |          |
| • 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20mm taps (T, P, B) | 113605   | 1,935.80 |
| • 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20mm dies           |          |          |
| • 2 bar type, 2 ratchet type tap wrenches                |          |          |
| • 2 die stocks, 1 screw pitch gauge, 1 screw driver      |          |          |

**HSS**

## HSS Hand Tap Sets

**QUALITY  
IMPORT**

Includes: 1pc ea. Taper, Plug and Bottoming in a convenient plastic case.



| Tap  | TPI | Code No. | Price \$ |
|------|-----|----------|----------|
| 6    | 32  | 113037   | 23.28    |
| 10   | 24  | 113049   | 10.27    |
| 10   | 32  | 113109   | 10.60    |
| 12   | 24  | 113055   | 12.12    |
| 1/4  | 20  | 113121   | 26.62    |
| 1/4  | 28  | 113205   | 16.11    |
| 5/16 | 18  | 113127   | 31.29    |
| 5/16 | 24  | 113211   | 20.87    |
| 3/8  | 16  | 113133   | 35.55    |
| 3/8  | 24  | 113217   | 28.70    |
| 7/16 | 14  | 113139   | 60.81    |
| 7/16 | 20  | 113223   | 29.81    |
| 1/2  | 13  | 113145   | 66.56    |
| 1/2  | 20  | 113229   | 62.17    |

## Yellow Ring Tap & Drill Set

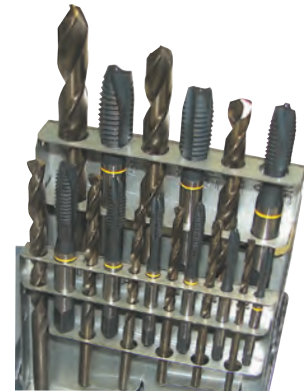


**Featuring:**  
Yellow Ring Spiral Point Taps for tough materials including:

- High Carbon Steel
- High Alloy
- Titanium
- Aluminum

Premium HSS Drills with 135° split points

Comes in metal case.



| Description   | Code No. | Price \$ |
|---|----------|----------|
| <b>N.C. Yellow Ring Spiral Point tap and drill set</b>                          |          |          |
| Set consists of the following:  |          |          |
| <b>Taps</b> - 6-32 to 1/2-13 Drills - #36, #29, #25, #21, #7, F, 5/16, U, 27/64 | 113651   | 252.33   |
| <b>N.F. Yellow Ring Spiral Point tap and drill set</b>                          |          |          |
| Set consists of the following:  |          |          |
| <b>Taps</b> - 6-40 to 1/2-20 Drills - #36, #29, #25, #21, #7, F, 5/16, U, 27/64 | 113656   | 266.63   |
| <b>Metric Yellow Ring Spiral Point tap and drill set</b>                        |          |          |
| Set consists of the following:  |          |          |
| <b>Taps</b> - M2.5 to M12 Drills - #46, 40, 33, 30, 19, 9, H, Q                 | 113657   | 279.87   |

Alloy / High Carbon Steels

Stainless Steel

Aluminum

## HSS Hand Tap & Drill Sets

- High Speed Steel taps and drills
- Metal case



| Description   | Code No. | Price \$ |
|---|----------|----------|
| <b>NC hand taps #6-1/2 NC tap and drill set</b>                           |          |          |
| Set consists of the following taps and drills plus metal box              |          |          |
| <b>Taps</b> - 6-32, 8-32, 10-24, 1/4-20, 5/16-18, 3/8-16, 7/16-14, 1/2-13 | 113650   | 177.27   |
| <b>Drills</b> - #36, #29, #7, F, 5/16, U, 27/64                           |          |          |
| <b>NF hand taps #6-1/2 NF tap and drill set</b>                           |          |          |
| Set consists of the following taps and drills plus metal box              |          |          |
| <b>Taps</b> - 6-40, 8-36, 10-32, 1/4-28, 5/16-24, 3/8-24, 7/16-20, 1/2-20 | 113655   | 217.47   |
| <b>Drills</b> - #33, #29, #21, #3, #1, Q, 25/64, 29/64                    |          |          |

## Adjustable Tap Wrench



| Tool No. | For DIN Tap Size           | For ANSI Tap | Square  | Sq. Max | Length (mm) | Code No. | Price \$ |
|----------|----------------------------|--------------|---------|---------|-------------|----------|----------|
| 130/0    | M1-8 1/16-1/4              | M6 1/4       | 2.0-5.0 | 0.197   | 130         | 113717   | 31.29    |
| 130/1.5  | M1-12 1/16-1/2 NPT-1/8     | M10 3/8      | 2.1-8.0 | 0.315   | 176         | 113794   | 33.57    |
| 130/2    | M4-12 5/32-1/2 NPT-1/8     | M14 9/16     | 3.0-9.0 | 0.354   | 280         | 113725   | 48.59    |
| 130/3    | M5-20 7/32-3/4 NPT-1/8-1/2 | M18 3/4      | 4.9-12  | 0.472   | 380         | 113730   | 75.15    |
| 130/4    | M11-27 7/16-1" NPT-1/4-3/4 | M25 1"       | 5.5-16  | 0.630   | 505         | 113735   | 122.47   |
| 130/5L   | M13-32 1/2-1-1/4 NPT-1/4-1 | M30 1-1/4    | 7-20    | 0.787   | 700         | 113740   | 196.04   |

## Adjustable Tap Wrench – 'T' Ratchet Type



| Tool No. | For DIN Tap Size | For ANSI Tap | Length (mm) | Square  | Sq. Max | Code No. | Price \$ |
|----------|------------------|--------------|-------------|---------|---------|----------|----------|
| 100/1    | M3-10 1/8 - 3/8  | M6 1/4       | 85          | 2.4-5.5 | 0.217   | 113700   | 70.30    |
| 100/2    | M5-12 7/32 - 1/2 | M12 1/2      | 100         | 4.5-8.0 | 0.315   | 113705   | 86.59    |
| 100/10   | M3-10 1/8 - 3/8  | M6 1/4       | 250         | 2.4-5.5 | 0.217   | 113710   | 112.74   |
| 100/20   | M5-12 7/32 - 1/2 | M12 1/2      | 300         | 4.5-8.0 | 0.315   | 113715   | 130.46   |

## 93 Series Tap Wrenches

- For holding taps, drills, reamers and small tools to be turned by hand
- Body is centered for use on lathe centres or drilling machines to start tap straight
- Jaws conform to the tool being held and are heat treated
- Wrenches have sliding handle which is frictionally held
- Designed to hold square shanks



| Cap. Tap Size | Cap. Square Shank | Body Length | Starrett No. | Sowa Code No. | Price \$ |
|---------------|-------------------|-------------|--------------|---------------|----------|
| 1/16-3/16"    | 1/16-5/32"        | 2"          | 93A          | 629100        | 65.00    |
| 7/32-7/16"    | 5/32-1/4"         | 2 1/2"      | 93B          | 629101        | 69.00    |
| 1/4-1/2"      | 3/16-5/16         | 3 1/2"      | 93C          | 629102        | 88.00    |



GS Tooling  
Taper Tension/  
Compression  
Tap Holders

Quickly change your  
tools in seconds.

See Pages G63-67



# Threading & Tapping

## Screw Extractors



### Spiral Flute/Straight Flute

- For removing broken screws, studs, pipe fittings, etc., without damaging the threads



| Tap | Drill Size | Screws & Bolts Sizes | Pipe Size | Spiral Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|-----|------------|----------------------|-----------|-----------------------|----------|-------------------------|----------|
| 1   | 5/64       | 3/16 - 1/4           | -         | 110950                | 5.11     | 110962                  | 6.16     |
| 2   | 7/64       | 1/4 - 5/16           | -         | 110951                | 5.39     | 110963                  | 6.65     |
| 3   | 5/32       | 5/16 - 7/16          | -         | 110952                | 6.70     | 110964                  | 7.52     |
| 4   | 7/32       | 7/16 - 9/16          | 1/8       | 110953                | 7.28     | 110965                  | 8.23     |
| 5   | 17/64      | 9/16 - 3/4           | 1/4       | 110954                | 8.72     | 110966                  | 9.88     |
| 6   | 13/32      | 3/4 - 1              | 3/8       | 110955                | 20.58    | -                       | -        |
| 7   | 17/32      | 1 - 1-3/8            | 1/2       | 110956                | 33.10    | -                       | -        |
| 8   | 13/16      | 1-3/8 - 1-3/4        | 3/4       | 110957                | 52.05    | -                       | -        |
| 9   | 1-1/16     | 1-3/4 - 2-1/8        | 1         | 110958                | 76.81    | -                       | -        |
| 10  | 1-9/32     | 2-1/8 - 2-1/2        | 1-1/4     | 110959                | 106.65   | -                       | -        |
| 11  | 1-17/32    | 2-1/2 - 3            | 1-1/2     | 110960                | 163.06   | -                       | -        |
| 12  | 1-15/16    | 3 - 3-1/2            | 2         | 110961                | 260.21   | -                       | -        |

## HSS Adjustable Round Split Dies — Inch

**QUALITY IMPORT**



HSS

### Coarse Threads

| Size               | TPI | Code No. | Price \$ |
|--------------------|-----|----------|----------|
| <b>13/16" O.D.</b> |     |          |          |
| 2                  | 56  | 140310   | 17.49    |
| 4                  | 40  | 140320   | 21.21    |
| 5                  | 40  | 140325   | 21.74    |
| 6                  | 32  | 140330   | 35.04    |
| 8                  | 32  | 140335   | 21.74    |
| 10                 | 24  | 140340   | 35.04    |
| 12                 | 24  | 140345   | 25.63    |
| 1/4                | 20  | 140350   | 25.63    |
| 5/16               | 18  | 140355   | 25.63    |
| <b>1" O.D.</b>     |     |          |          |
| 6                  | 32  | 140360   | 42.50    |
| 8                  | 32  | 140365   | 27.18    |
| 10                 | 24  | 140370   | 32.00    |
| 12                 | 24  | 140375   | 32.45    |
| 1/4                | 20  | 140380   | 32.00    |
| 5/16               | 18  | 140385   | 32.00    |
| 3/8                | 16  | 140390   | 32.00    |
| 7/16               | 14  | 140395   | 32.00    |
| 1/2                | 13  | 140400   | 32.00    |
| <b>1-1/2" O.D.</b> |     |          |          |
| 1/4                | 20  | 140405   | 53.79    |
| 5/16               | 18  | 140410   | 53.79    |
| 3/8                | 16  | 140415   | 53.79    |
| 7/16               | 14  | 140420   | 53.79    |
| 1/2                | 13  | 140425   | 53.79    |
| 9/16               | 12  | 140430   | 53.79    |
| 5/8                | 11  | 140435   | 53.79    |
| 3/4                | 10  | 140437   | 53.79    |
| <b>2" O.D.</b>     |     |          |          |
| 5/8                | 11  | 140440   | 92.05    |
| 3/4                | 10  | 140445   | 92.05    |
| 7/8                | 9   | 140450   | 92.05    |
| 1                  | 8   | 140455   | 92.05    |

## Screw Extractor Sets



- For removing broken screws, studs, pipe fittings, etc., without damaging the threads



| Description                  | Spiral Flute Code No. | Price \$ | Straight Flute Code No. | Price \$ |
|------------------------------|-----------------------|----------|-------------------------|----------|
| 5pc set incl. #1, 2, 3, 4, 5 | 110967                | 33.25    | 110969                  | 38.41    |
| 4pc set incl. #6, 7, 8, 9    | 110968                | 182.53   | -                       | -        |
| 9pc set incl. #1 through 9   | 110970                | 215.78   | -                       | -        |

## HSS Adjustable Round Split Dies — Inch

**QUALITY IMPORT**



HSS

### Fine Threads

| Size               | TPI | Code No. | Price \$ |
|--------------------|-----|----------|----------|
| <b>13/16" O.D.</b> |     |          |          |
| 0                  | 80  | 140460   | 49.53    |
| 2                  | 64  | 140470   | 21.74    |
| 4                  | 48  | 140480   | 21.74    |
| 5                  | 44  | 140485   | 21.74    |
| 6                  | 40  | 140490   | 21.74    |
| 8                  | 36  | 140495   | 21.74    |
| 10                 | 32  | 140500   | 36.35    |
| 12                 | 28  | 140505   | 25.63    |
| 1/4                | 28  | 140510   | 25.63    |
| 5/16               | 24  | 140515   | 25.63    |
| <b>1" O.D.</b>     |     |          |          |
| 6                  | 40  | 140520   | 32.00    |
| 8                  | 36  | 140525   | 32.00    |
| 10                 | 32  | 140530   | 32.00    |
| 12                 | 28  | 140535   | 32.00    |
| 1/4                | 28  | 140540   | 32.00    |
| 5/16               | 24  | 140545   | 32.00    |
| 3/8                | 24  | 140550   | 32.00    |
| 7/16               | 20  | 140555   | 32.00    |
| 1/2                | 20  | 140560   | 32.00    |
| <b>1-1/2" O.D.</b> |     |          |          |
| 1/4                | 28  | 140565   | 53.79    |
| 5/16               | 24  | 140570   | 53.79    |
| 3/8                | 24  | 140575   | 53.79    |
| 7/16               | 20  | 140580   | 53.79    |
| 1/2                | 20  | 140585   | 53.79    |
| 9/16               | 18  | 140590   | 53.79    |
| 5/8                | 18  | 140595   | 53.79    |
| 3/4                | 16  | 140597   | 53.79    |
| <b>2" O.D.</b>     |     |          |          |
| 5/8                | 18  | 140600   | 92.05    |
| 3/4                | 16  | 140605   | 92.05    |
| 7/8                | 14  | 140610   | 92.05    |
| 1                  | 14  | 140615   | 92.05    |

## HSS Adjustable Round Split Dies — Metric

HSS Metric ISO Threads/Right Hand

- High Speed Steel
- Outside diameter in inches

### Coarse Threads

|                    | Size (mm) | Pitch (mm) | Code No. | Price \$ |
|--------------------|-----------|------------|----------|----------|
| <b>13/16" O.D.</b> |           |            |          |          |
|                    | M1        | 0.25       | 140700   | 85.87    |
|                    | M1.2      | 0.25       | 140701   | 49.53    |
|                    | M1.8      | 0.35       | 140703   | 49.53    |
|                    | M2.5      | 0.45       | 140705   | 49.53    |
|                    | M4        | 0.70       | 140706   | 35.07    |
|                    | M4        | 0.75       | 140707   | 35.07    |
|                    | M5        | 0.8        | 140708   | 35.07    |
| <b>1" O.D.</b>     |           |            |          |          |
|                    | M2        | 0.4        | 140709   | 34.29    |
|                    | M2.2      | 0.45       | 140710   | 62.25    |
|                    | M2.3      | 0.4        | 140711   | 62.25    |
|                    | M2.5      | 0.45       | 140712   | 62.25    |
|                    | M2.6      | 0.45       | 140713   | 62.25    |
|                    | M3        | 0.5        | 140714   | 42.50    |
|                    | M3.5      | 0.5        | 140715   | 38.93    |
|                    | M3.5      | 0.6        | 140716   | 42.50    |
|                    | M4        | 0.7        | 140717   | 42.50    |
|                    | M4.5      | 0.75       | 140718   | 42.50    |
|                    | M5        | 1          | 140719   | 42.50    |
|                    | M5        | 0.8        | 140720   | 42.50    |
|                    | M5.5      | 0.9        | 140721   | 42.50    |
|                    | M6        | 1          | 140722   | 42.50    |
|                    | M6        | 1.25       | 140723   | 42.50    |
|                    | M6.3      | 1          | 140724   | 62.26    |
|                    | M7        | 1          | 140725   | 42.50    |
|                    | M8        | 1.25       | 140726   | 23.10    |
|                    | M9        | 1.25       | 140727   | 42.50    |
|                    | M10       | 1.5        | 140728   | 42.50    |
|                    | M11       | 1.5        | 140729   | 42.50    |
| <b>1-1/2" O.D.</b> |           |            |          |          |
|                    | M10       | 1.5        | 140731   | 65.04    |
|                    | M11       | 1.5        | 140732   | 63.40    |
|                    | M12       | 1.75       | 140733   | 65.04    |
|                    | M14       | 2          | 140734   | 65.04    |
|                    | M16       | 2          | 140735   | 65.04    |
|                    | M18       | 2.5        | 140736   | 65.04    |
|                    | M20       | 2.5        | 140737   | 65.04    |
| <b>2" O.D.</b>     |           |            |          |          |
|                    | M18       | 2.5        | 140738   | 122.59   |
|                    | M20       | 2.5        | 140739   | 122.59   |
|                    | M22       | 2.5        | 140740   | 122.59   |
|                    | M24       | 3          | 140741   | 128.75   |
|                    | M27       | 3          | 140742   | 122.59   |
|                    | M30       | 3.5        | 140743   | 128.75   |
| <b>2-1/2" O.D.</b> |           |            |          |          |
|                    | M36       | 4          | 140744   | 190.18   |
| <b>3" O.D.</b>     |           |            |          |          |
|                    | M42       | 4.5        | 140745   | 310.34   |
|                    | M45       | 4.50       | 140746   | 284.48   |
|                    | M48       | 5          | 140747   | 297.85   |

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**QUALITY  
IMPORT**

HSS

### Fine Threads

|                    | Size (mm) | Pitch (mm) | Code No. | Price \$ |
|--------------------|-----------|------------|----------|----------|
| <b>13/16" O.D.</b> |           |            |          |          |
|                    | M4        | 0.5        | 140748   | 35.07    |
| <b>1" O.D.</b>     |           |            |          |          |
|                    | M4        | 0.5        | 140749   | 42.50    |
|                    | M4.5      | 0.5        | 140750   | 42.50    |
|                    | M5        | 0.5        | 140751   | 42.50    |
|                    | M6        | 0.75       | 140752   | 42.50    |
|                    | M6        | 0.5        | 140753   | 42.50    |
|                    | M7        | 0.75       | 140754   | 42.50    |
|                    | M8        | 1          | 140755   | 42.50    |
|                    | M8        | 0.75       | 140756   | 42.50    |
|                    | M10       | 1.25       | 140757   | 42.50    |
|                    | M10       | 1          | 140758   | 42.50    |
|                    | M10       | 0.75       | 140759   | 42.50    |
|                    | M12       | 1          | 140760   | 42.50    |
| <b>1-1/2" O.D.</b> |           |            |          |          |
|                    | M9        | 1          | 140761   | 65.04    |
|                    | M10       | 1.25       | 140762   | 65.04    |
|                    | M10       | 1          | 140763   | 65.04    |
|                    | M10       | 0.75       | 140764   | 61.46    |
|                    | M11       | 1          | 140765   | 65.04    |
|                    | M12       | 1.5        | 140766   | 65.04    |
|                    | M12       | 1.25       | 140767   | 65.04    |
|                    | M14       | 1.5        | 140768   | 65.04    |
|                    | M14       | 1.25       | 140769   | 65.04    |
|                    | M14       | 1          | 140770   | 65.04    |
|                    | M15       | 1.5        | 140771   | 65.04    |
|                    | M16       | 1.5        | 140772   | 65.04    |
|                    | M16       | 1          | 140773   | 65.04    |
|                    | M17       | 1.5        | 140774   | 65.04    |
|                    | M18       | 2          | 140775   | 65.04    |
|                    | M18       | 1.5        | 140776   | 68.31    |
|                    | M18       | 1          | 140777   | 65.04    |
|                    | M20       | 1.5        | 140778   | 65.04    |
|                    | M20       | 1          | 140779   | 65.04    |
| <b>2" O.D.</b>     |           |            |          |          |
|                    | M20       | 2          | 140780   | 122.59   |
|                    | M20       | 1.5        | 140781   | 122.59   |
|                    | M20       | 1          | 140782   | 122.59   |
|                    | M22       | 2          | 140783   | 122.59   |
|                    | M22       | 1.5        | 140784   | 128.75   |
|                    | M22       | 1          | 140785   | 122.59   |
|                    | M24       | 2          | 140786   | 122.59   |
|                    | M24       | 1.5        | 140787   | 128.75   |
|                    | M26       | 1.5        | 140788   | 122.59   |
|                    | M27       | 2          | 140789   | 122.59   |
|                    | M28       | 1.5        | 140790   | 122.59   |
|                    | M30       | 2          | 140791   | 122.59   |
|                    | M30       | 1.5        | 140792   | 122.59   |
| <b>2-1/2" O.D.</b> |           |            |          |          |
|                    | M33       | 2          | 140793   | 190.18   |
| <b>3" O.D.</b>     |           |            |          |          |
|                    | M21       | 3          | 140794   | 284.48   |

### Die Stocks

**SOWA**



| Tool No. | (mm)        | (in.)       | Length (mm) | Code No. | Price \$ |
|----------|-------------|-------------|-------------|----------|----------|
| 13/16    | 20.6 x 6.35 | 13/16 x 1/4 | 200         | 113750   | 22.73    |
| 1        | 25.4 x 9.5  | 1 x 3/8     | 224         | 113755   | 23.51    |
| 1 1/2    | 38.1 x 12.7 | 1-1/2 x 1/2 | 315         | 113760   | 39.70    |
| 2        | 50.8 x 15.9 | 2 x 5/8     | 560         | 113765   | 87.52    |

## Hex Dies — Inch

ISO Threads/Right Hand

- Carbon Steel
- Used for rethreading and cleaning threads



**QUALITY  
IMPORT**

### Coarse Threads

| Size  | TPI   | Code No. | Price \$ |
|-------|-------|----------|----------|
| 2     | 56    | 140800   | 28.34    |
| 4     | 40    | 140801   | 28.34    |
| 5     | 40    | 140803   | 28.34    |
| 6     | 32    | 140805   | 28.34    |
| 8     | 32    | 140807   | 28.34    |
| 10    | 24    | 140809   | 28.34    |
| 12    | 24    | 140811   | 28.34    |
| 1/4   | 20    | 140813   | 28.34    |
| 5/16  | 18    | 140815   | 31.22    |
| 3/8   | 16    | 140817   | 32.92    |
| 7/16  | 14    | 140819   | 32.92    |
| 1/2   | 13    | 140821   | 39.57    |
| 9/16  | 12    | 140823   | 42.07    |
| 5/8   | 11    | 140825   | 48.72    |
| 11/16 | 11    | 140827   | 54.55    |
| 3/4   | 10    | 140829   | 64.52    |
| 7/8   | 9     | 140831   | 72.42    |
| 1     | 8     | 140833   | 82.83    |
| 1-1/8 | 7     | 140836   | 97.01    |
| 1-1/4 | 7     | 140838   | 116.57   |
| 1-3/8 | 6     | 140840   | 124.46   |
| 1-1/2 | 6     | 140842   | 134.88   |
| 1-5/8 | 5-1/2 | 140844   | 228.50   |
| 1-3/4 | 5     | 140845   | 276.40   |
| 2     | 4-1/2 | 140846   | 345.45   |
| 2-1/4 | 4-1/2 | 140847   | 555.11   |
| 2-1/2 | 4     | 140848   | 647.63   |
| 2-3/4 | 4     | 140849   | 881.06   |
| 3     | 4     | 140850   | 967.40   |
| 3-1/4 | 4     | 140851   | 1,216.05 |
| 3-1/2 | 4     | 140852   | 1,313.77 |
| 3-3/4 | 4     | 140853   | 1,410.91 |
| 4     | 4     | 140854   | 1,561.24 |

### Fine Threads

| Size  | TPI | Code No. | Price \$ |
|-------|-----|----------|----------|
| 4     | 48  | 140802   | 28.34    |
| 5     | 44  | 140804   | 28.34    |
| 6     | 40  | 140806   | 28.34    |
| 8     | 36  | 140808   | 28.34    |
| 10    | 32  | 140810   | 28.34    |
| 12    | 28  | 140812   | 28.34    |
| 1/4   | 28  | 140814   | 28.34    |
| 5/16  | 24  | 140816   | 31.22    |
| 3/8   | 24  | 140818   | 32.92    |
| 7/16  | 20  | 140820   | 37.05    |
| 1/2   | 20  | 140822   | 39.57    |
| 9/16  | 18  | 140824   | 42.07    |
| 5/8   | 18  | 140826   | 48.72    |
| 11/16 | 16  | 140828   | 54.55    |
| 3/4   | 16  | 140830   | 64.52    |
| 7/8   | 14  | 140832   | 72.42    |
| 1     | 12  | 140834   | 82.83    |
| 1     | 14  | 140835   | 82.83    |
| 1-1/8 | 12  | 140837   | 97.01    |
| 1-1/4 | 12  | 140839   | 116.57   |
| 1-3/8 | 12  | 140841   | 124.46   |
| 1-1/2 | 12  | 140843   | 134.88   |

## Hex Dies — Metric

Metric ISO Threads/Right Hand

- Carbon Steel
- Used for rethreading and cleaning threads



**QUALITY  
IMPORT**

| Size (mm) | Pitch (mm) | Code No. | Price \$ |
|-----------|------------|----------|----------|
| M3        | 0.5        | 140864   | 26.56    |
| M3        | 0.6        | 140865   | 26.56    |
| M3.5      | 0.5        | 140866   | 26.59    |
| M3.5      | 0.6        | 140867   | 26.56    |
| M4        | 0.7        | 140868   | 26.56    |
| M4        | 0.75       | 140869   | 26.56    |
| M4.5      | 0.75       | 140870   | 26.56    |
| M5        | 0.8        | 140871   | 26.56    |
| M5        | 0.9        | 140872   | 28.62    |
| M6        | 1.00       | 140873   | 27.95    |
| M6.3      | 1.00       | 140874   | 27.95    |
| M7        | 1.00       | 140875   | 31.42    |
| M8        | 0.75       | 140876   | 31.42    |
| M8        | 1.00       | 140877   | 31.42    |
| M8        | 1.25       | 140878   | 31.42    |
| M9        | 1.00       | 140879   | 32.82    |
| M9        | 1.25       | 140880   | 32.82    |
| M10       | 1.25       | 140881   | 36.96    |
| M10       | 1.50       | 140882   | 36.96    |
| M11       | 1.50       | 140883   | 36.96    |
| M12       | 1.25       | 140884   | 39.66    |
| M12       | 1.50       | 140885   | 39.66    |
| M12       | 1.75       | 140886   | 39.66    |
| M14       | 1.25       | 140887   | 42.22    |
| M14       | 1.50       | 140888   | 42.22    |
| M14       | 2.00       | 140889   | 42.22    |
| M16       | 1.50       | 140890   | 48.47    |
| M16       | 2          | 140891   | 48.47    |
| M18       | 1.50       | 140892   | 72.47    |
| M18       | 2.00       | 140893   | 72.47    |
| M20       | 1.50       | 140894   | 72.47    |
| M20       | 2.00       | 140895   | 72.47    |
| M22       | 1.50       | 140896   | 93.10    |
| M22       | 2.5        | 140897   | 93.10    |
| M24       | 2.00       | 140898   | 93.10    |
| M24       | 3.00       | 140899   | 93.10    |
| M27       | 2.00       | 140900   | 103.54   |
| M27       | 3.00       | 140901   | 103.54   |
| M30       | 1.50       | 140902   | 125.28   |
| M30       | 2.00       | 140903   | 125.28   |
| M30       | 3.00       | 140904   | 125.28   |
| M33       | 2.00       | 140905   | 137.82   |
| M33       | 3.50       | 140906   | 137.82   |
| M36       | 3.00       | 140907   | 151.78   |
| M36       | 4.00       | 140908   | 151.78   |
| M39       | 3.00       | 140909   | 166.11   |
| M39       | 4.00       | 140910   | 166.11   |
| M42       | 3.00       | 140911   | 206.43   |

## NPT Hex Dies — Inch

- Carbon Steel
- Used for rethreading and cleaning threads

**QUALITY  
IMPORT**

| Size  | TPI    | Code No. | Price \$ |
|-------|--------|----------|----------|
| 1/8   | 27     | 140855   | 39.57    |
| 1/4   | 18     | 140856   | 59.13    |
| 3/8   | 18     | 140857   | 77.88    |
| 1/2   | 14     | 140858   | 102.39   |
| 3/4   | 14     | 140859   | 131.16   |
| 1     | 11-1/2 | 140860   | 174.44   |
| 1-1/4 | 11-1/2 | 140861   | 248.74   |
| 1-1/2 | 11-1/2 | 140862   | 364.30   |
| 2     | 11-1/2 | 140863   | 738.99   |

## Tapping Speed Guide

### Tapping Speed Guide

Proper tapping speeds are very important in obtaining efficient tapping results. There are many factors which affect proper tapping speeds, some of which are listed below.

#### Material Factors:

- Thermo-conductivity of the material and wall thickness as it affects heat dispersion
- Variations in carbon content of steel
- Hard spots in material
- Depth of hole to be tapped
- Percentage of full thread to be tapped

#### Tap Factors:

- Major diameters, pitch and lead
- Style of tap
- Width of lands
- Amount of hook or rake
- Length of chamfer
- Bottoming taps normally require slower speeds than plug chamfered taps

| Materials                       |  |            | Speed<br>Feet/Minute |
|---------------------------------|--|------------|----------------------|
| <b>HSSE-V3</b>                  |  |            |                      |
| Stainless Steel                 | 200 Series,                                  | Annealed   | 20-35                |
|                                 | 300 Series, 17-4, 15-5                       | Annealed   | 20-35                |
|                                 | AM286  | Annealed   | 15-25                |
|                                 | 400 Series                                   | Annealed   | 20-35                |
| Tool Steels                     | 01, A-2, D-2, H-13, P-20                     | Annealed   | 15-25                |
| Medium Carbon                   | 1030, 1035, 1038,<br>1040, 1045, 1050        | Normalized | 20-40                |
| Alloyed High Carbon             | 1065, 1070, 1080,<br>1090, 1095, 1561, 1572  | Normalized | 20-30                |
| High Strength                   | 4140, 4340                                   | Normalized | 20-30                |
| Titanium                        | Commercially Pure                            | Annealed   | 15-30                |
| Aluminum                        | Cast, Wrought                                | -          | 30-90                |
| <b>ALUMINUM</b>                 |  |            |                      |
| Aluminum                        |  | 25-60      |                      |
| Die Cast Aluminum               |  | 30-80      |                      |
| <b>ROLL FORM</b>                |  |            |                      |
| Steels                          | Sheet, Low/Medium<br>Carbon/Stainless Steels | Hardened   | 20-50                |
| Aluminum/Copper                 | Pure/Low Alloyed                             |            | 30-60                |
| Aluminum Cast,<br>Copper Alloys | Die Cast, Zinc Die Cast,<br>Brass, Bronze    |            | 30-80                |

## Conversion Table, Surface Feet Per Minute to Revolutions Per Minute

Proper tapping speeds are determined best by experiment. In the table below, speeds shown should be used as a guide only, and the suggested surface feet per minute adjusted upward or downward until the best results are obtained.

| Surface Feet Per Minute | 20   | 25   | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100  | 110  | 120  | 130  | 140  | 150  |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Tap Size                | RPM  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <b>0</b>                | 1273 | 1592 | 1910 | 2546 | 3183 | 3820 | 4456 | 5093 | 5730 | 6366 | 7003 | 7639 | 8276 | 8913 | 9549 |
| <b>1</b>                | 1047 | 1308 | 1570 | 2093 | 2617 | 3140 | 3663 | 4186 | 4710 | 5233 | 5756 | 6279 | 6808 | 7326 | 7849 |
| <b>2</b>                | 888  | 1110 | 1333 | 1777 | 2221 | 2665 | 3109 | 3554 | 3999 | 4442 | 4886 | 5330 | 5774 | 6218 | 6662 |
| <b>3</b>                | 772  | 964  | 1157 | 1543 | 1929 | 2315 | 2701 | 3086 | 3472 | 3858 | 4244 | 4629 | 5015 | 5401 | 5787 |
| <b>4</b>                | 682  | 853  | 1023 | 1364 | 1705 | 2046 | 2387 | 2728 | 3069 | 3411 | 3751 | 4092 | 4434 | 4775 | 5116 |
| <b>5</b>                | 611  | 764  | 917  | 1222 | 1528 | 1833 | 2139 | 2445 | 2750 | 3056 | 3361 | 3667 | 3973 | 4278 | 4584 |
| <b>6</b>                | 553  | 691  | 829  | 1106 | 1382 | 1658 | 1934 | 2211 | 2487 | 2764 | 3040 | 3316 | 3592 | 3869 | 4145 |
| <b>8</b>                | 466  | 583  | 699  | 932  | 1165 | 1398 | 1631 | 1864 | 2097 | 2330 | 2563 | 2796 | 3029 | 3262 | 3495 |
| <b>10</b>               | 402  | 502  | 603  | 804  | 1005 | 1208 | 1406 | 1607 | 1808 | 2009 | 2210 | 2411 | 2612 | 2813 | 3014 |
| <b>12</b>               | 354  | 442  | 531  | 707  | 884  | 1061 | 1238 | 1415 | 1592 | 1769 | 1945 | 2122 | 2300 | 2476 | 2653 |
| <b>1/4</b>              | 306  | 382  | 458  | 611  | 764  | 917  | 1070 | 1222 | 1375 | 1528 | 1681 | 1833 | 1986 | 2139 | 2292 |
| <b>5/16</b>             | 245  | 306  | 367  | 489  | 611  | 733  | 856  | 978  | 1100 | 1222 | 1345 | 1467 | 1589 | 1711 | 1833 |
| <b>3/8</b>              | 204  | 255  | 306  | 407  | 509  | 611  | 713  | 815  | 917  | 1019 | 1120 | 1222 | 1324 | 1426 | 1528 |
| <b>7/16</b>             | 175  | 219  | 262  | 349  | 437  | 524  | 611  | 698  | 786  | 872  | 960  | 1048 | 1135 | 1222 | 1310 |
| <b>1/2</b>              | 153  | 191  | 229  | 306  | 382  | 458  | 535  | 611  | 688  | 764  | 840  | 917  | 993  | 1070 | 1146 |
| <b>9/16</b>             | 137  | 172  | 206  | 275  | 344  | 412  | 481  | 550  | 619  | 687  | 756  | 825  | 893  | 963  | 1031 |
| <b>5/8</b>              | 122  | 153  | 183  | 244  | 306  | 367  | 428  | 489  | 550  | 611  | 672  | 733  | 794  | 856  | 917  |
| <b>3/4</b>              | 102  | 128  | 153  | 203  | 255  | 306  | 357  | 407  | 458  | 509  | 560  | 611  | 662  | 713  | 764  |
| <b>7/8</b>              | 87   | 109  | 131  | 175  | 218  | 262  | 306  | 350  | 392  | 437  | 480  | 524  | 568  | 611  | 655  |
| <b>1</b>                | 76   | 96   | 115  | 153  | 191  | 230  | 268  | 306  | 344  | 382  | 420  | 458  | 497  | 535  | 573  |

#### Mechanical Factors:

- Type of tapping machine and holder; speeds for small diameter taps are often governed by the limitations of the machine
- Condition of tapping machine and spindle
- Type of fixture; vertical or horizontal tapping (faster speeds for vertical tapping)
- Method of feeding the tap
- Cutting fluid used and method of application
- The optimum speed for tapping is the highest speed that conditions permit, consistent with economic tool life

## ANSI Tap Dimensions

| Mach. Screw Size No. | Nominal Fractional Diameter (in.) | Nominal Metric Diameter (mm) | Tap Dimensions — Inches |               |               |                |                |
|----------------------|-----------------------------------|------------------------------|-------------------------|---------------|---------------|----------------|----------------|
|                      |                                   |                              | Overall Length          | Thread Length | Square Length | Shank Diameter | Size of Square |
| 0                    | 1/16                              | M1.6                         | 1-5/8                   | 5/16          | 3/16          | 0.141          | 0.110          |
| 1                    |                                   | M1.8                         | 1-11/16                 | 3/8           | 3/16          | 0.141          | 0.110          |
| 2                    |                                   | M2, M2.2                     | 1-3/4                   | 7/16          | 3/16          | 0.141          | 0.110          |
| 3                    | 3/32                              | M2.5                         | 1-13/16                 | 1/2           | 3/16          | 0.141          | 0.110          |
| 4                    |                                   |                              | 1-7/8                   | 9/16          | 3/16          | 0.141          | 0.110          |
| 5                    | 1/8                               | M3, M3.15                    | 1-15/16                 | 5/8           | 3/16          | 0.141          | 0.110          |
| 6                    |                                   | M3.5                         | 2                       | 11/16         | 3/16          | 0.141          | 0.110          |
| 8                    | 5/32                              | M4                           | 2-1/8                   | 3/4           | 1/4           | 0.168          | 0.131          |
| 10                   | 3/16                              | M4.5, M5                     | 2-3/8                   | 7/8           | 1/4           | 0.194          | 0.152          |
| 12                   | 7/32                              |                              | 2-3/8                   | 15/16         | 9/32          | 0.220          | 0.165          |
| 14                   | 1/4                               | M6, M6.3                     | 2-1/2                   | 1             | 5/16          | 0.255          | 0.191          |
|                      | 5/16                              | M7, M8                       | 2-23/32                 | 1-1/8         | 3/8           | 0.318          | 0.238          |
|                      | 3/8                               | M10                          | 2-15/16                 | 1-1/4         | 7/16          | 0.381          | 0.286          |
|                      | 7/16                              |                              | 3-5/32                  | 1-7/16        | 13/32         | 0.323          | 0.242          |
|                      | 1/2                               | M12, 12.5                    | 3-3/8                   | 1-21/32       | 7/16          | 0.367          | 0.275          |
|                      | 9/16                              | M14                          | 3-19/32                 | 1-21/32       | 1/2           | 0.429          | 0.322          |
|                      | 5/8                               | M16                          | 3-13/16                 | 1-13/16       | 9/16          | 0.480          | 0.360          |
|                      | 11/16                             | M18                          | 4-1/32                  | 1-13/16       | 5/8           | 0.542          | 0.406          |
|                      | 3/4                               |                              | 4-1/4                   | 2             | 11/16         | 0.590          | 0.442          |
|                      | 13/16                             | M20                          | 4-15/32                 | 2             | 11/16         | 0.652          | 0.489          |
|                      | 7/8                               | M22                          | 4-11/16                 | 2-7/32        | 3/4           | 0.697          | 0.523          |
|                      | 15/16                             | M24                          | 4-29/32                 | 2-7/32        | 3/4           | 0.760          | 0.570          |
|                      | 1                                 | M25                          | 5-1/8                   | 2-1/2         | 13/16         | 0.800          | 0.600          |
|                      | 1-1/16                            | M27                          | 5-1/8                   | 2-1/2         | 7/8           | 0.895          | 0.672          |
|                      | 1-1/8                             |                              | 5-7/16                  | 2-9/16        | 7/8           | 0.896          | 0.672          |
|                      | 1-3/16                            | M30                          | 5-7/16                  | 2-9/16        | 1             | 1.021          | 0.766          |
|                      | 1-1/4                             |                              | 5-3/4                   | 2-9/16        | 1             | 1.021          | 0.766          |
|                      | 1-5/16                            | M33                          | 5-3/4                   | 2-9/16        | 1-1/16        | 1.108          | 0.831          |
|                      | 1-3/8                             |                              | 6-1/16                  | 3             | 1-1/16        | 1.108          | 0.831          |
|                      | 1-7/16                            | M36                          | 6-1/16                  | 3             | 1-1/8         | 1.233          | 0.925          |
|                      | 1-1/2                             |                              | 6-3/8                   | 3             | 1-1/8         | 1.233          | 0.925          |
|                      | 1-5/8                             | M39                          | 6-11/16                 | 3-3/16        | 1-1/8         | 1.305          | 0.979          |
|                      | 1-3/4                             | M42                          | 7                       | 3-3/16        | 1-1/4         | 1.430          | 1.072          |
|                      | 1-7/8                             |                              | 7-5/16                  | 3-9/16        | 1-1/4         | 1.519          | 1.139          |
|                      | 2                                 | M48                          | 7-5/8                   | 3-9/16        | 1-3/8         | 1.644          | 1.233          |

| Nominal Size Inches | NPT Dimensions — Inches |               |               |                |                |
|---------------------|-------------------------|---------------|---------------|----------------|----------------|
|                     | Overall Length          | Thread Length | Square Length | Shank Diameter | Size of Square |
| 1/16                | 2-1/8                   | 11/16         | 3/8           | 0.3125         | 0.234          |
| 1/8                 | 2-1/8                   | 3/4           | 3/8           | 0.3125         | 0.234          |
| 1/8                 | 2-1/8                   | 3/4           | 3/8           | 0.4375         | 0.328          |
| 1/4                 | 2-7/16                  | 1-1/16        | 7/16          | 0.5625         | 0.421          |
| 3/8                 | 2-9/16                  | 1-1/16        | 1/2           | 0.7000         | 0.531          |
| 1/2                 | 3-1/8                   | 1-3/8         | 5/8           | 0.6875         | 0.515          |
| 3/4                 | 3-1/4                   | 1-3/8         | 11/16         | 0.9063         | 0.679          |
| 1                   | 3-3/4                   | 1-3/4         | 13/16         | 1.1250         | 0.843          |
| 1-1/4               | 4                       | 1-3/4         | 15/16         | 1.3125         | 0.984          |
| 1-1/2               | 4-1/4                   | 1-3/4         | 1             | 1.5000         | 1.125          |
| 2                   | 4-1/2                   | 1-3/4         | 1-1/8         | 1.8750         | 1.406          |

## Tap/Drill Chart — Inch

To minimize tapping problems and lengthen tool life, use the largest drill possible to produce a minor diameter that will result in the lowest percentage of full thread consistent with adequate strength. A minor diameter that provides a 55% to 65% thread is sufficient for most requirements, but in some cases a higher percentage of thread may be necessary to conform with the minor diameter limits of the thread class specified.

### Tap Drill Sizes

Drills generally cut holes larger than their diameters. In the table to the right, the probable percentages of full thread were determined by the average amount oversize the various drills are expected to cut.

### SUGGESTED PIPE TAP DRILL SIZES

| Tap Size | Pipe Tap Drill Size |          |
|----------|---------------------|----------|
|          | Taper               | Straight |
| 1/16     | D                   | —        |
| 1/8      | R                   | S        |
| 1/4      | 7/16                | 29/64    |
| 3/8      | 37/64               | 19/32    |
| 1/2      | 23/32               | 47/64    |
| 3/4      | 59/64               | 15/16    |
| 1        | 1-5/32              | 1-3/16   |
| 1-1/4    | 1-1/2               | 1-33/64  |
| 1-1/2    | 1-47/64             | 1-3/4    |
| 2        | 2-7/32              | 2-7/32   |
| 2-1/2    | 2-5/8               | —        |
| 3        | 3-1/4               | —        |

\* Sizes given permit direct tapping without reaming the hole, but only give a full thread for the first two or three threads

† For Dryseal Straight Pipe Threads suggested drill sizes are as shown, except; 1/4" pipe, use 0.444 drill size

### TAP/DRILL SELECTION

| Tap   | Tap Drill | Decimal Equiv. of Tap Drill | Theo. Oversize Mean (%) | Probable Oversize Mean | Probable Hole Size | % of Threads |
|-------|-----------|-----------------------------|-------------------------|------------------------|--------------------|--------------|
| 0-80  | 56        | 0.0465                      | 83                      | 0.0015                 | 0.0480             | 74           |
|       | 3/64      | 0.0469                      | 81                      | 0.0015                 | 0.0484             | 71           |
| 1-64  | 54        | 0.0550                      | 89                      | 0.0015                 | 0.0565             | 81           |
|       | 53        | 0.0595                      | 67                      | 0.0015                 | 0.0610             | 59           |
| 1-72  | 53        | 0.0595                      | 75                      | 0.0015                 | 0.0610             | 67           |
|       | 1/16      | 0.0625                      | 58                      | 0.0015                 | 0.0640             | 50           |
| 5-56  | 51        | 0.0670                      | 82                      | 0.0017                 | 0.0687             | 74           |
|       | 50        | 0.0700                      | 69                      | 0.0017                 | 0.0717             | 62           |
|       | 49        | 0.0730                      | 56                      | 0.0017                 | 0.0747             | 49           |
| 2-64  | 50        | 0.0700                      | 79                      | 0.0017                 | 0.0717             | 70           |
|       | 49        | 0.0730                      | 64                      | 0.0017                 | 0.0747             | 56           |
| 3-48  | 48        | 0.0760                      | 85                      | 0.0019                 | 0.0779             | 78           |
|       | 5/64      | 0.0781                      | 77                      | 0.0019                 | 0.0800             | 70           |
|       | 47        | 0.0785                      | 76                      | 0.0019                 | 0.0801             | 69           |
|       | 46        | 0.0810                      | 67                      | 0.0019                 | 0.0829             | 60           |
|       | 45        | 0.0820                      | 61                      | 0.0019                 | 0.0839             | 56           |
| 3-56  | 46        | 0.0810                      | 78                      | 0.0019                 | 0.0829             | 69           |
|       | 45        | 0.0820                      | 73                      | 0.0019                 | 0.0839             | 65           |
| 4-40  | 44        | 0.0860                      | 56                      | 0.0020                 | 0.0880             | 47           |
|       | 44        | 0.0860                      | 80                      | 0.0020                 | 0.0880             | 74           |
|       | 43        | 0.0890                      | 71                      | 0.0020                 | 0.0910             | 65           |
|       | 42        | 0.0935                      | 57                      | 0.0020                 | 0.0955             | 51           |
| 4-48  | 3/32      | 0.0938                      | 56                      | 0.0020                 | 0.0958             | 50           |
|       | 42        | 0.0935                      | 68                      | 0.0020                 | 0.0955             | 61           |
|       | 3/32      | 0.0938                      | 68                      | 0.0020                 | 0.0958             | 60           |
| 5-40  | 41        | 0.0960                      | 59                      | 0.0020                 | 0.0980             | 52           |
|       | 40        | 0.0980                      | 83                      | 0.0023                 | 0.1003             | 76           |
|       | 39        | 0.0995                      | 79                      | 0.0023                 | 0.1018             | 71           |
|       | 38        | 0.1015                      | 72                      | 0.0023                 | 0.1038             | 65           |
| 5-44  | 37        | 0.1040                      | 65                      | 0.0023                 | 0.1063             | 58           |
|       | 38        | 0.1015                      | 79                      | 0.0023                 | 0.1038             | 72           |
|       | 37        | 0.1040                      | 71                      | 0.0023                 | 0.1063             | 63           |
| 6-32  | 36        | 0.1065                      | 63                      | 0.0023                 | 0.1088             | 55           |
|       | 37        | 0.1040                      | 84                      | 0.0023                 | 0.1063             | 78           |
|       | 36        | 0.1065                      | 78                      | 0.0023                 | 0.1088             | 72           |
|       | 7/64      | 0.1094                      | 70                      | 0.0026                 | 0.1120             | 64           |
|       | 35        | 0.1100                      | 69                      | 0.0026                 | 0.1126             | 63           |
| 6-40  | 34        | 0.1110                      | 67                      | 0.0026                 | 0.1136             | 60           |
|       | 33        | 0.1130                      | 62                      | 0.0026                 | 0.1156             | 55           |
|       | 34        | 0.1110                      | 83                      | 0.0026                 | 0.1136             | 75           |
|       | 33        | 0.1130                      | 77                      | 0.0026                 | 0.1156             | 69           |
| 8-32  | 32        | 0.1160                      | 68                      | 0.0026                 | 0.1186             | 60           |
|       | 29        | 0.1360                      | 69                      | 0.0029                 | 0.1389             | 62           |
|       | 28        | 0.1405                      | 58                      | 0.0029                 | 0.1434             | 51           |
| 8-36  | 29        | 0.1360                      | 78                      | 0.0029                 | 0.1389             | 70           |
|       | 28        | 0.1405                      | 68                      | 0.0029                 | 0.1434             | 57           |
|       | 9/64      | 0.1406                      | 68                      | 0.0029                 | 0.1435             | 57           |
| 10-24 | 27        | 0.1440                      | 85                      | 0.0032                 | 0.1472             | 79           |
|       | 26        | 0.1470                      | 79                      | 0.0032                 | 0.1502             | 74           |
|       | 25        | 0.1495                      | 75                      | 0.0032                 | 0.1527             | 69           |
|       | 24        | 0.1520                      | 70                      | 0.0032                 | 0.1552             | 64           |
|       | 23        | 0.1540                      | 67                      | 0.0032                 | 0.1572             | 61           |
|       | 5/32      | 0.1563                      | 62                      | 0.0032                 | 0.1595             | 56           |
|       | 22        | 0.1570                      | 61                      | 0.0032                 | 0.1602             | 55           |
| 10-32 | 5/32      | 0.1563                      | 83                      | 0.0032                 | 0.1595             | 75           |
|       | 22        | 0.1570                      | 81                      | 0.0032                 | 0.1602             | 73           |
|       | 21        | 0.1590                      | 76                      | 0.0032                 | 0.1672             | 64           |
|       | 20        | 0.1610                      | 71                      | 0.0032                 | 0.1642             | 64           |
|       | 19        | 0.1660                      | 59                      | 0.0032                 | 0.1692             | 51           |
| 12-24 | 11/64     | 0.1719                      | 82                      | 0.0035                 | 0.1754             | 75           |
|       | 17        | 0.1730                      | 79                      | 0.0035                 | 0.1765             | 73           |
|       | 16        | 0.1770                      | 72                      | 0.0035                 | 0.1805             | 66           |
|       | 15        | 0.1800                      | 67                      | 0.0035                 | 0.1835             | 60           |
|       | 14        | 0.1820                      | 63                      | 0.0035                 | 0.1855             | 56           |
| 12-28 | 16        | 0.1770                      | 84                      | 0.0035                 | 0.1805             | 77           |
|       | 15        | 0.1800                      | 78                      | 0.0035                 | 0.1835             | 70           |
|       | 14        | 0.1820                      | 73                      | 0.0038                 | 0.1835             | 66           |
|       | 13        | 0.1850                      | 67                      | 0.0035                 | 0.1885             | 59           |
|       | 3/16      | 0.1875                      | 61                      | 0.0035                 | 0.1970             | 54           |

# Threading & Tapping

## Tap/Drill Chart — Inch — Cont'd

### Formula: Percentage of Full Thread

$$\frac{\text{Threads Per Inch} \times \text{Major Dia. of Tap} - \text{Drill Dia.}}{0.01299} = \text{Percentage of Full Thread}$$

Example: Determine percentage of full thread for 2" – 12N Tap, using 1.9219" Drill.

$$2.0000 - 1.9219 = 0.0781 \div 0.01299 = 6.012$$

Threads Per Inch = x 12  
Theoretical Percentage of Full Threads = 72.144

### Formula: Tap Drill Size

$$\frac{\text{Major Dia. of Tap} - 0.1299 \times \text{Percent of Full Thread}}{\text{Number of threads Per inch}} = \text{Drill Size}$$

Example: Determine drill size for 2"–12N Tap, 70% Full Thread.  
Basic Major Diameter of Tap = 2.0000"

$$0.01299 \times 70 = 0.9093 \div 12 = 0.0758"$$

Theoretical Drill Size = 1.9242"  
Nearest Standard Drill Size 1 59/64 = 1.9219"

|                              | *Deep Hole Tapping | Average Commercial | Thin Sheet Stock or Stamping |
|------------------------------|--------------------|--------------------|------------------------------|
| <b>FREE CUTTING MATERIAL</b> |                    |                    |                              |
| Aluminum                     |                    |                    |                              |
| Brass                        |                    |                    |                              |
| Bronze                       |                    |                    |                              |
| Cast Iron                    | 60%-70%            | 65%-70%            | 75%-85%                      |
| Copper                       |                    |                    |                              |
| Mild Steel                   |                    |                    |                              |
| Tool Steel                   |                    |                    |                              |
| <b>FREE CUTTING MATERIAL</b> |                    |                    |                              |
| Cast Steel                   |                    |                    |                              |
| Drop Forging                 |                    |                    |                              |
| Monel Metal                  | 55%-65%            | 65%-70%            |                              |
| Nickel Steel                 |                    |                    |                              |
| Stainless Steel              |                    |                    |                              |

\* Sizes given permit direct tapping without reaming the hole, but only give a full thread for the first two or three threads

## TAP/DRILL SELECTION

| Tap      | Tap Drill | Decimal Equiv. of Tap Drill | Theo. Oversize Mean (%) | Probable Oversize Mean | Probable Hole Size | % of Threads |
|----------|-----------|-----------------------------|-------------------------|------------------------|--------------------|--------------|
| 1/4-20   | 9         | 0.1960                      | 83                      | 0.0038                 | 0.1998             | 77           |
|          | 8         | 0.1990                      | 79                      | 0.0039                 | 0.2028             | 73           |
|          | 7         | 0.2010                      | 75                      | 0.0038                 | 0.2048             | 70           |
|          | 13/64     | 0.2031                      | 72                      | 0.0038                 | 0.2068             | 66           |
|          | 6         | 0.2040                      | 71                      | 0.0038                 | 0.2078             | 65           |
|          | 5         | 0.2055                      | 69                      | 0.0038                 | 0.2093             | 63           |
| 1/4-28   | 4         | 0.2090                      | 63                      | 0.0038                 | 0.2128             | 57           |
|          | 3         | 0.2130                      | 80                      | 0.0038                 | 0.2168             | 72           |
|          | 7/32      | 0.2188                      | 67                      | 0.0038                 | 0.2226             | 59           |
|          | 2         | 0.2210                      | 63                      | 0.0038                 | 0.2248             | 55           |
| 5/16-18  | F         | 0.2570                      | 77                      | 0.0038                 | 0.2608             | 72           |
|          | G         | 0.2610                      | 71                      | 0.0041                 | 0.2651             | 66           |
|          | 17/64     | 0.2656                      | 65                      | 0.0041                 | 0.2697             | 59           |
|          | H         | 0.2660                      | 64                      | 0.0041                 | 0.2701             | 59           |
| 5/16-24  | H         | 0.2660                      | 86                      | 0.0041                 | 0.2701             | 78           |
|          | I         | 0.2720                      | 75                      | 0.0041                 | 0.2761             | 67           |
|          | J         | 0.2770                      | 66                      | 0.0041                 | 0.2811             | 58           |
| 3/8-16   | 5/16      | 0.3125                      | 77                      | 0.0044                 | 0.3169             | 72           |
|          | O         | 0.3160                      | 73                      | 0.0044                 | 0.3204             | 68           |
|          | P         | 0.3230                      | 64                      | 0.0044                 | 0.3274             | 59           |
| 3/8-24   | 21/64     | 0.3281                      | 87                      | 0.0044                 | 0.3325             | 79           |
|          | Q         | 0.3320                      | 79                      | 0.0044                 | 0.3364             | 71           |
|          | R         | 0.3390                      | 67                      | 0.0044                 | 0.3434             | 58           |
|          | T         | 0.3580                      | 86                      | 0.0046                 | 0.3626             | 81           |
| 7/16-14  | 23/64     | 0.3594                      | 84                      | 0.0046                 | 0.3640             | 79           |
|          | U         | 0.3680                      | 75                      | 0.0046                 | 0.3726             | 70           |
|          | 3/8       | 0.3750                      | 67                      | 0.0046                 | 0.3796             | 62           |
|          | V         | 0.3770                      | 65                      | 0.0046                 | 0.3816             | 61           |
|          | W         | 0.3860                      | 79                      | 0.0046                 | 0.3906             | 72           |
| 7/16-20  | 25/64     | 0.3906                      | 72                      | 0.0046                 | 0.3952             | 65           |
|          | X         | 0.3970                      | 62                      | 0.0046                 | 0.4016             | 55           |
|          | 27/64     | 0.4219                      | 78                      | 0.0047                 | 0.4266             | 73           |
| 1/2-13   | 7/16      | 0.4375                      | 63                      | 0.0047                 | 0.4422             | 58           |
|          | 29/64     | 0.4531                      | 72                      | 0.0047                 | 0.4578             | 65           |
| 1/2-20   | 15/32     | 0.4688                      | 87                      | 0.0048                 | 0.4736             | 82           |
|          | 31/64     | 0.4844                      | 72                      | 0.0048                 | 0.4892             | 68           |
| 9/16-12  | 1/2       | 0.5000                      | 87                      | 0.0048                 | 0.5048             | 80           |
|          | 33/64     | 0.5156                      | 65                      | 0.0048                 | 0.5204             | 58           |
| 5/8-11   | 17/32     | 0.5313                      | 79                      | 0.0049                 | 0.5362             | 75           |
|          | 35/64     | 0.5469                      | 66                      | 0.0049                 | 0.5618             | 62           |
|          | 9/16      | 0.5628                      | 87                      | 0.0049                 | 0.5674             | 80           |
| 5/8-18   | 37/64     | 0.5781                      | 65                      | 0.0049                 | 0.5831             | 58           |
|          | 41/64     | 0.6406                      | 84                      | 0.0050                 | 0.6456             | 80           |
| 3/4-10   | 21/32     | 0.6563                      | 72                      | 0.0050                 | 0.6613             | 68           |
|          | 3/4-16    | 11/16                       | 0.6875                  | 77                     | 0.0050             | 0.6925       |
| 7/8-9    | 49/64     | 0.7656                      | 76                      | 0.0052                 | 0.7708             | 72           |
|          | 25/32     | 0.7812                      | 65                      | 0.0052                 | 0.7864             | 61           |
| 7/8-14   | 51/64     | 0.7969                      | 84                      | 0.0052                 | 0.8021             | 79           |
|          | 13/16     | 0.8125                      | 67                      | 0.0052                 | 0.8177             | 62           |
| 1-8      | 55/64     | 0.8594                      | 87                      | 0.0059                 | 0.8653             | 83           |
|          | 7/8       | 0.8750                      | 77                      | 0.0059                 | 0.8809             | 73           |
|          | 57/64     | 0.8906                      | 67                      | 0.0059                 | 0.8965             | 64           |
|          | 29/32     | 0.9063                      | 58                      | 0.0059                 | 0.9122             | 54           |
| 1-12     | 29/32     | 0.9063                      | 87                      | 0.0059                 | 0.9122             | 81           |
|          | 59/64     | 0.9219                      | 72                      | 0.0060                 | 0.9279             | 67           |
|          | 15/16     | 0.9375                      | 58                      | 0.0060                 | 0.9435             | 52           |
| 1-14     | 59/64     | 0.9219                      | 84                      | 0.0060                 | 0.9279             | 78           |
|          | 15/16     | 0.9375                      | 67                      | 0.0060                 | 0.9435             | 61           |
| 1-1/8-7  | 31/21     | 0.9688                      | 84                      | 0.0062                 | 0.9750             | 81           |
|          | 63/64     | 0.9844                      | 76                      | 0.0067                 | 0.9911             | 72           |
|          | 1         | 1.0000                      | 67                      | 0.0070                 | 1.0070             | 64           |
| 1-1/8-12 | 1-1/64    | 1.0156                      | 59                      | 0.0070                 | 1.0226             | 55           |
|          | 1-1/32    | 1.0313                      | 87                      | 0.0071                 | 1.0384             | 80           |
|          | 1-3/64    | 1.0469                      | 72                      | 0.0072                 | 1.0541             | 66           |
| 1-1/4-7  | 1-3/32    | 1.0938                      | 84                      |                        |                    |              |
|          | 1-7/64    | 1.1094                      | 76                      |                        |                    |              |
|          | 1-1/8     | 1.1250                      | 67                      |                        |                    |              |
| 1-1/4-12 | 1-5/32    | 1.1563                      | 87                      |                        |                    |              |
|          | 1-11/64   | 1.1719                      | 72                      |                        |                    |              |
| 1-3/8-6  | 1-3/16    | 1.1875                      | 87                      |                        |                    |              |
|          | 1-13/64   | 1.2031                      | 79                      |                        |                    |              |
|          | 1-7/32    | 1.2188                      | 72                      |                        |                    |              |
| 1-3/8-12 | 1-15/64   | 1.2344                      | 65                      |                        |                    |              |
|          | 1-9/32    | 1.2813                      | 87                      |                        |                    |              |
|          | 1-19/64   | 1.2969                      | 72                      |                        |                    |              |
| 1-1/2-6  | 1-5/16    | 1.3125                      | 87                      |                        |                    |              |
|          | 1-21/64   | 1.3281                      | 79                      |                        |                    |              |
|          | 1-11/32   | 1.3438                      | 72                      |                        |                    |              |
|          | 1-23/64   | 1.3594                      | 65                      |                        |                    |              |
| 1-1/2-12 | 1-13/32   | 1.4063                      | 87                      |                        |                    |              |
|          | 1-27/64   | 1.4219                      | 72                      |                        |                    |              |

Reaming Recommended

## Tap/Drill Chart — Metric

### METRIC TAP DRILL SIZES

(Drill sizes based on approximate 72%-77% Full Thread)

| Tap Size                    | Pitch Form | Tap Drill Size | Alt. Tap Drill | Tap Size                  | Pitch Form | Tap Drill Size | Alt. Tap Drill |
|-----------------------------|------------|----------------|----------------|---------------------------|------------|----------------|----------------|
| <b>I.S.O. METRIC COARSE</b> |            |                |                | <b>I.S.O. METRIC FINE</b> |            |                |                |
| 1.6                         | 0.35mm     | 1.25mm         | 3/64           | 3                         | 0.35mm     | 2.65mm         | 37             |
| 1.7                         | 0.35mm     | 1.35mm         | 55             | 4                         | 0.35mm     | 3.65mm         | 27             |
| 1.8                         | 0.35mm     | 1.45mm         | 54             | 4                         | 0.50mm     | 3.50mm         | 29             |
| 2                           | 0.40mm     | 1.60mm         | 1/16           | 4.5                       | 0.45mm     | 4.06mm         | 21             |
| 2.2                         | 0.45mm     | 1.75mm         | 50             | 5                         | 0.50mm     | 4.50mm         | 16             |
| 2.3                         | 0.40mm     | 1.90mm         | 49             | 5                         | 0.70mm     | 4.30mm         | 18             |
| 2.5                         | 0.45mm     | 2.05mm         | 46             | 5                         | 0.75mm     | 4.25mm         | 18             |
| 2.6                         | 0.45mm     | 2.15mm         | 44             | 5.5                       | 0.50mm     | 5.00mm         | 9              |
| 3                           | 0.5mm      | 2.50mm         | 40             | 6                         | 0.50mm     | 5.50mm         | 7/32           |
| 3.5                         | 0.60mm     | 2.90mm         | 33             | 6                         | 0.75mm     | 5.25mm         | 5              |
| 4                           | 0.70mm     | 3.30mm         | 30             | 7                         | 0.75mm     | 6.25mm         | D              |
| 4.5                         | 0.75mm     | 3.70mm         | 27             | 8                         | 0.50mm     | 7.50mm         | M              |
| 5                           | 0.80mm     | 4.20mm         | 19             | 8                         | 1.00mm     | 7.00mm         | J              |
| 5.5                         | 0.90mm     | 4.60mm         | 15             | 9                         | 0.50mm     | 8.50mm         | Q              |
| 6                           | 1.00mm     | 5.00mm         | 9              | 9                         | 1.00mm     | 8.00mm         | O              |
| 7                           | 1.00mm     | 6.00mm         | 15/64          | 10                        | 0.50mm     | 9.50mm         | 3/8            |
| 8                           | 1.25mm     | 6.80mm         | H              | 10                        | 0.75mm     | 9.25mm         | U              |
| 9                           | 1.25mm     | 7.80mm         | 5/16           | 10                        | 1.00mm     | 9.00mm         | T              |
| 10                          | 1.50mm     | 8.50mm         | Q              | 10                        | 1.25mm     | 8.75mm         | 11/32          |
| 11                          | 1.50mm     | 9.50mm         | 3/8            | 11                        | 1.00mm     | 10.00mm        | X              |
| 12                          | 1.75mm     | 10.20mm        | Y              | 12                        | 1.00mm     | 11.00mm        | 7/16           |
| 14                          | 2.00mm     | 12.00mm        | 15/32          | 12                        | 1.25mm     | 10.75mm        | 27/64          |
| 16                          | 2.00mm     | 14.00mm        | 35/64          | 12                        | 1.50mm     | 10.50mm        | Z              |
| 18                          | 2.50mm     | 15.50mm        | 39/64          | 13                        | 1.50mm     | 11.50mm        | 29/64          |
| 20                          | 2.50mm     | 17.50mm        | 11/16          | 13                        | 1.75mm     | 11.25mm        | 7/16           |
| 22                          | 2.50mm     | 19.50mm        | 49/64          | 14                        | 1.25mm     | 12.75mm        | 1/2            |
| 24                          | 3.00mm     | 21.00mm        | 53/64          | 14                        | 1.50mm     | 12.50mm        | 31/64          |
| 27                          | 3.00mm     | 24.00mm        | 61/64          | 15                        | 1.50mm     | 13.50mm        | 17/32          |
| 30                          | 3.50mm     | 26.50mm        | 1-3/64         | 16                        | 1.00mm     | 15.00mm        | 19/32          |
| 33                          | 3.50mm     | 29.50mm        | 1-5/32         | 16                        | 1.25mm     | 14.75mm        | 37/64          |
| 36                          | 4.00mm     | 32.00mm        | 1-1/4          | 16                        | 1.50mm     | 14.50mm        | 9/16           |
| 39                          | 4.00mm     | 35.00mm        | 1-3/8          | 18                        | 1.00mm     | 17.00mm        | 43/64          |
|                             |            |                |                | 18                        | 1.25mm     | 16.75mm        | 21/32          |
|                             |            |                |                | 18                        | 1.50mm     | 16.50mm        | 41/64          |
|                             |            |                |                | 18                        | 2.00mm     | 16.00mm        | 5/8            |
|                             |            |                |                | 20                        | 1.00mm     | 19.00mm        | 3/4            |
|                             |            |                |                | 20                        | 1.50mm     | 18.50mm        | 47/64          |
|                             |            |                |                | 20                        | 2.00mm     | 18.00mm        | 45/64          |
|                             |            |                |                | 22                        | 1.0mm      | 21.00mm        | 53/64          |
|                             |            |                |                | 22                        | 1.50mm     | 20.50mm        | 13/16          |
|                             |            |                |                | 22                        | 2.00mm     | 20.00mm        | 25/32          |
|                             |            |                |                | 24                        | 1.00mm     | 23.00mm        | 29/32          |
|                             |            |                |                | 24                        | 1.50mm     | 22.50mm        | 7/8            |
|                             |            |                |                | 24                        | 2.00mm     | 22.00mm        | 55/64          |
|                             |            |                |                | 24                        | 2.50mm     | 21.50mm        | 27/32          |



# Cutting Tools

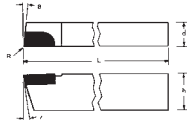


# Cutting Tools

|  |        |
|--|--------|
| Brazed Tool Bits .....                               | D2-3   |
| Cut-Off Blades .....                                 | D4     |
| HSS & Cobalt Tool Bits .....                         | D4-5   |
| Carbide Tipped, HSS & Indexable Boring Bars .....    | D5     |
| Precision Boring Heads .....                         | D5     |
| Carbide & HSS Mini Bore Tools .....                  | D5     |
| Borite "Mini Tool Holders" .....                     | D5     |
| Counterbores .....                                   | D5-6   |
| Annular Cutters .....                                | D6     |
| Corner Rounding End Mills .....                      | D7     |
| T-Slot Cutters, HSS, Cobalt M42 & M42 Roughers ..... | D7     |
| Woodruff Keyseat Cutters .....                       | D7     |
| Concave & Convex, Shank Type Cutters .....           | D8     |
| Dovetail Angular Cutters - 45° & 60° .....           | D8     |
| Double Angle, Shank Type Cutters .....               | D8     |
| Plain & Staggered Tooth Milling Cutters .....        | D8-11  |
| Slitting Saws .....                                  | D11-12 |
| Angle Cutters .....                                  | D12-13 |
| Concave & Convex Cutters .....                       | D13    |
| Shell End Mills .....                                | D14    |
| Heavy Duty Plain Milling Cutters .....               | D14    |
| Involute Gear Cutters .....                          | D14    |
| Screw Slotting Saws .....                            | D14-15 |
| Carbide Saw Blades .....                             | D15    |
| Knurling Tools .....                                 | D16    |
| Broaches, Hassay-Savage .....                        | D16-27 |

## Turning Style "A" Brazed Tools

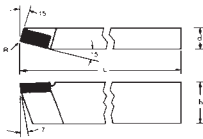
Grade C2 – Cast Iron  
Grade C5 – Steel



| Tool Right Hand | Tool Left Hand | Shank (d) | Shank (h) | Shank (L) | Nose Radius | R.H. C2 Code No. | Price \$ | L.H. C2 Code No. | Price \$ | R.H. C5 Code No. | Price \$ | L.H. C5 Code No. | Price \$ |
|-----------------|----------------|-----------|-----------|-----------|-------------|------------------|----------|------------------|----------|------------------|----------|------------------|----------|
| AR4             | AL4            | 1/4       | 1/4       | 2         | 1/64        | 141500           | 10.43    | 141600           | 3.89     | 141700           | 3.89     | 141800           | 3.89     |
| AR5             | AL5            | 5/16      | 5/16      | 2-1/4     | 1/64        | 141502           | 12.89    | 141602           | 12.89    | 141702           | 3.99     | 141802           | 3.99     |
| AR6             | AL6            | 3/8       | 3/8       | 2-1/2     | 1/64        | 141504           | 3.99     | 141604           | 3.99     | 141704           | 3.99     | 141804           | 3.99     |
| AR7             | AL7            | 7/16      | 7/16      | 3         | 1/32        | 141506           | 10.75    | -                | -        | 141706           | 12.82    | 141806           | 12.82    |
| AR8             | AL8            | 1/2       | 1/2       | 3-1/2     | 1/32        | 141508           | 5.95     | 141608           | 5.95     | 141708           | 5.95     | 141808           | 5.95     |
| AR10            | AL10           | 5/8       | 5/8       | 4         | 1/32        | 141510           | 9.50     | 141610           | 9.50     | 141710           | 9.50     | 141810           | 9.50     |
| AR12            | AL12           | 3/4       | 3/4       | 4-1/2     | 1/32        | 141512           | 51.27    | 141612           | 51.27    | 141712           | 55.04    | 141812           | 55.04    |

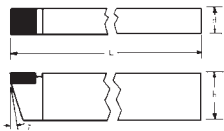
## Turning Style "B" Brazed Tools

Grade C2 – Cast Iron  
Grade C5 – Steel



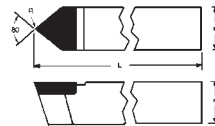
| Tool Right Hand | Tool Left Hand | Shank (d) | Shank (h) | Shank (L) | Nose Radius | R.H. C2 Code No. | Price \$ | L.H. C2 Code No. | Price \$ | R.H. C5 Code No. | Price \$ | L.H. C5 Code No. | Price \$ |
|-----------------|----------------|-----------|-----------|-----------|-------------|------------------|----------|------------------|----------|------------------|----------|------------------|----------|
| BR4             | BL4            | 1/4       | 1/4       | 2         | 1/64        | 141528           | 9.29     | 141628           | 15.60    | 141728           | 10.43    | 141828           | 9.29     |
| BR5             | BL5            | 5/16      | 5/16      | 2-1/4     | 1/64        | 141530           | 16.53    | 141630           | 9.89     | 141730           | 10.31    | -                | -        |
| BR6             | BL6            | 3/8       | 3/8       | 2-1/2     | 1/64        | 141532           | 12.94    | 141632           | 12.94    | 141732           | 12.94    | 141832           | 12.94    |
| BR7             | BL7            | 7/16      | 7/16      | 3         | 1/32        | 141534           | 16.91    | 141634           | 10.75    | 141734           | 11.19    | -                | -        |
| BR8             | BL8            | 1/2       | 1/2       | 3-1/2     | 1/32        | 141536           | 15.43    | 141636           | 18.31    | 141736           | 18.00    | 141836           | 18.00    |
| BR10            | BL10           | 5/8       | 5/8       | 4         | 1/32        | 141538           | 25.69    | 141638           | 28.26    | 141738           | 25.69    | 141838           | 23.68    |
| BR12            | BL12           | 3/4       | 3/4       | 4-1/2     | 1/32        | 141540           | 51.29    | 141640           | 62.90    | 141740           | 55.04    | 141840           | 55.04    |

## Turning/Facing Style "C" Brazed Tools



| Tool Style | Shank (d) | Shank (h) | Shank (L) | Grade C2 Code No. | Price \$ | Grade C5 Code No. | Price \$ |
|------------|-----------|-----------|-----------|-------------------|----------|-------------------|----------|
| C4         | 1/4       | 1/4       | 2         | 141542            | 10.43    | 141642            | 3.89     |
| C5         | 5/16      | 5/16      | 2-1/4     | 141544            | 16.14    | 141644            | 10.31    |
| C6         | 3/8       | 3/8       | 2-1/2     | 141546            | 12.94    | 141646            | 4.23     |
| C7         | 7/16      | 7/16      | 3         | 141548            | 17.30    | 141648            | 11.19    |
| C8         | 1/2       | 1/2       | 3-1/2     | 141550            | 15.43    | 141650            | 6.52     |
| C10        | 5/8       | 5/8       | 4         | 141552            | 25.69    | 141652            | 28.26    |
| C12        | 3/4       | 3/4       | 4-1/2     | -                 | -        | 141654            | 64.75    |
| C16        | 1         | 1         | 6         | 141556            | 67.66    | 141656            | 76.43    |

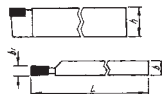
## Chamfering Style "D" Brazed Tools



| Tool Style | Shank (d) | Shank (h) | Shank (L) | Grade C2 Code No. | Price \$ | Grade C5 Code No. | Price \$ |
|------------|-----------|-----------|-----------|-------------------|----------|-------------------|----------|
| D4         | 1/4       | 1/4       | 2         | 141558            | 10.43    | 141658            | 9.29     |
| D5         | 5/16      | 5/16      | 2-1/4     | 141560            | 10.31    | 141660            | 12.89    |
| D6         | 3/8       | 3/8       | 2-1/2     | 141562            | 12.94    | 141662            | 4.23     |
| D7         | 7/16      | 7/16      | 3         | 141564            | 10.75    | 141664            | 12.82    |
| D8         | 1/2       | 1/2       | 3-1/2     | 141566            | 15.43    | 141666            | 5.72     |
| D10        | 5/8       | 5/8       | 4         | 141568            | 23.68    | 141668            | 25.69    |
| D12        | 3/4       | 3/4       | 4-1/2     | 141570            | 51.29    | 141670            | 55.04    |

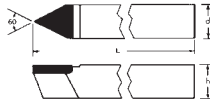
## Carbide Tipped Brazed Cut-Off Tools

Grade C2 – Cast Iron  
Grade C5 – Steel



| Tool Right Hand | Tool Left Hand | Top Width | b   | Shank (h) | L | R.H. C2 Code No. | Price \$ | L.H. C2 Code No. | Price \$ | R.H. C5 Code No. | Price \$ | L.H. C5 Code No. | Price \$ |
|-----------------|----------------|-----------|-----|-----------|---|------------------|----------|------------------|----------|------------------|----------|------------------|----------|
| CTR-11          | CTL-11         | 1/8       | 1/2 | 1         | 5 | 141585           | 36.81    | 141685           | 40.98    | 141785           | 43.41    | 141885           | 43.39    |
| CTR-22          | CTL-22         | 3/16      | 1/2 | 1         | 5 | 141586           | 41.55    | 141686           | 41.55    | 141786           | 43.36    | 141886           | 43.36    |
| CTR-33          | CTL-33         | 1/4       | 1/2 | 1         | 5 | 141587           | 42.70    | 141687           | 38.38    | 141787           | 43.30    | -                | -        |
| CTR-44          | CTL-44         | 5/16      | 1/2 | 1         | 5 | 141588           | 45.48    | 141688           | 45.48    | 141788           | 38.38    | 141888           | 45.48    |
| CTR-55          | CTL-55         | 3/8       | 5/8 | 1-1/4     | 5 | 141589           | 58.63    | 141689           | 56.96    | 141789           | 58.63    | 141889           | 56.96    |

## Threading Style "E" Brazed Tools



| Tool Style | Shank (d) | Shank (h) | Shank (L) | Grade C2 Code No. | Price \$ | Grade C5 Code No. | Price \$ |
|------------|-----------|-----------|-----------|-------------------|----------|-------------------|----------|
| E4         | 1/4       | 1/4       | 2         | -                 | -        | 141672            | 3.89     |
| E5         | 5/16      | 5/16      | 2-1/4     | 141574            | 12.47    | 141674            | 12.89    |
| E6         | 3/8       | 3/8       | 2-1/2     | 141576            | 12.94    | 141676            | 4.23     |
| E8         | 1/2       | 1/2       | 3-1/2     | 141578            | 15.43    | 141678            | 6.41     |
| E10        | 5/8       | 5/8       | 4         | 141580            | 25.69    | 141680            | 25.69    |
| E12        | 3/4       | 3/4       | 4-1/2     | 141582            | 52.76    | 141682            | 55.04    |

## Carbide Tipped Boring Bars

- Black oxide coating retains lubrications to aid in wear-resistance and chip flow
- Carbide-tips cut faster than high speed steel
- Commonly used on ferrous and non-ferrous materials including cast iron, steel and steel alloys



# BORITE



| Shank Dia. | Length  | Bore Depth | Min. Bore | Tool No. | C2 Cast Iron Code No. | Price \$ | C6 Steel Code No. | Price \$ | Set Code No. | Price \$ |
|------------|---------|------------|-----------|----------|-----------------------|----------|-------------------|----------|--------------|----------|
| 3/8        | 2       | 3/4        | 5/16      | A5S      | 145200                | 27.68    | 145308            | 27.68    | 145218       | 283.65   |
| 3/8        | 2-3/8   | 1-1/8      | 5/16      | A5M      | 145202                | 28.05    | 145310            | 28.05    | (A-375-C2)   |          |
| 3/8        | 2-3/4   | 1-1/2      | 5/16      | A5L      | 145204                | 29.03    | 145312            | 29.03    |              |          |
| 3/8        | 2-3/16  | 15/16      | 3/8       | A3S      | 145206                | 30.60    | 145314            | 30.60    |              |          |
| 3/8        | 2-21/32 | 1-13/32    | 3/8       | A3M      | 145208                | 31.73    | 145316            | 31.73    | 145326       | 283.65   |
| 3/8        | 3-1/8   | 1-7/8      | 3/8       | A3L      | 145210                | 32.85    | 145318            | 32.85    | (A375-C6)    |          |
| 3/8        | 2-3/8   | 1-1/8      | 7/16      | A7S      | 145212                | 33.68    | 145320            | 33.68    |              |          |
| 3/8        | 2-15/16 | 1-11/16    | 7/16      | A7M      | 145214                | 34.50    | 145322            | 34.50    |              |          |
| 3/8        | 3-1/2   | 2-1/4      | 7/16      | A7L      | 145216                | 35.78    | 145324            | 35.78    |              |          |
| 1/2        | 2-1/4   | 3/4        | 5/16      | B5S      | 145220                | 36.90    | 145328            | 36.90    |              |          |
| 1/2        | 2-5/8   | 1-1/8      | 5/16      | B5M      | 145222                | 37.88    | 145330            | 37.88    | 145238       | 371.25   |
| 1/2        | 3       | 1-1/2      | 5/16      | B5L      | 145224                | 38.93    | 145332            | 38.93    | (B-500-C2)   |          |
| 1/2        | 2-5/8   | 1-1/8      | 7/16      | B7S      | 145226                | 40.73    | 145334            | 40.73    |              |          |
| 1/2        | 3-3/16  | 1-11/16    | 7/16      | B7M      | 145228                | 41.40    | 145336            | 41.40    |              |          |
| 1/2        | 3-3/4   | 2-1/4      | 7/16      | B7L      | 145230                | 42.15    | 145338            | 42.15    | 145346       | 371.25   |
| 1/2        | 3       | 1-1/2      | 9/16      | B9S      | 145232                | 43.73    | 145340            | 43.73    | (B-500-C6)   |          |
| 1/2        | 3-3/4   | 2-1/4      | 9/16      | B9M      | 145234                | 44.48    | 145342            | 44.48    |              |          |
| 1/2        | 4-1/2   | 3          | 9/16      | B9L      | 145236                | 45.23    | 145344            | 45.23    |              |          |
| 5/8        | 2-1/4   | 3/4        | 5/16      | D5S      | 145240                | 44.40    | 145348            | 44.40    |              |          |
| 5/8        | 2-5/8   | 1-1/8      | 5/16      | D5M      | 145242                | 46.20    | 145350            | 46.20    |              |          |
| 5/8        | 3       | 1-1/2      | 5/16      | D5L      | 145244                | 47.70    | 145352            | 47.70    | 145264       | 666.30   |
| 5/8        | 2-5/8   | 1-1/8      | 7/16      | D7S      | 145246                | 50.63    | 145354            | 50.63    | (D625-C2)    |          |
| 5/8        | 3-3/16  | 1-11/16    | 7/16      | D7M      | 145248                | 52.58    | 145356            | 52.58    |              |          |
| 5/8        | 3-3/4   | 2-1/4      | 7/16      | D7L      | 145250                | 54.30    | 145358            | 54.30    |              |          |
| 5/8        | 3       | 1-1/2      | 9/16      | D9S      | 145252                | 56.70    | 145360            | 56.70    |              |          |
| 5/8        | 3-3/4   | 2-1/4      | 9/16      | D9M      | 145254                | 58.65    | 145362            | 58.65    | 145372       | 666.30   |
| 5/8        | 4-1/2   | 3          | 9/16      | D9L      | 145256                | 60.08    | 145364            | 60.08    | (D625-C6)    |          |
| 5/8        | 3-3/8   | 1-7/8      | 11/16     | D11S     | 145258                | 63.15    | 145366            | 63.15    |              |          |
| 5/8        | 4-5/16  | 2-13/16    | 11/16     | D11M     | 145260                | 65.25    | 145368            | 65.25    |              |          |
| 5/8        | 5-1/4   | 3-3/4      | 11/16     | D11L     | 145262                | 66.96    | 145370            | 66.96    |              |          |
| 3/4        | 3-1/8   | 1-1/8      | 7/16      | C7S      | 145266                | 51.68    | 145374            | 51.68    |              |          |
| 3/4        | 3-11/16 | 1-11/16    | 7/16      | C7M      | 145268                | 53.33    | 145376            | 53.33    |              |          |
| 3/4        | 4-1/4   | 2-1/4      | 7/16      | C7L      | 145270                | 55.20    | 145378            | 55.20    | 145290       | 764.78   |
| 3/4        | 3-1/2   | 1-1/2      | 9/16      | C9S      | 145272                | 57.60    | 145380            | 57.60    | (C-750-C2)   |          |
| 3/4        | 4-1/4   | 2-1/4      | 9/16      | C9M      | 145274                | 59.78    | 145382            | 59.78    |              |          |
| 3/4        | 5       | 3          | 9/16      | C9L      | 145276                | 61.43    | 145384            | 61.43    |              |          |
| 3/4        | 3-7/8   | 1-7/8      | 11/16     | C11S     | 145278                | 64.20    | 145386            | 64.20    |              |          |
| 3/4        | 4-13/16 | 2-13/16    | 11/16     | C11M     | 145280                | 66.60    | 145388            | 66.60    |              |          |
| 3/4        | 5-3/4   | 3-3/4      | 11/16     | C11L     | 145282                | 68.18    | 145390            | 68.18    | 145398       | 764.93   |
| 3/4        | 4-1/4   | 2-1/4      | 13/16     | C13S     | 145284                | 73.20    | 145392            | 73.20    | (C-750-C6)   |          |
| 3/4        | 5-3/8   | 3-3/8      | 13/16     | C13M     | 145286                | 75.60    | 145394            | 75.60    |              |          |
| 3/4        | 6-1/2   | 4-1/2      | 13/16     | C13L     | 145288                | 78.38    | 145396            | 78.38    |              |          |
| 1          | 5       | 3          | 9/16      | E9L      | 145292                | 101.55   | 145400            | 101.55   | 145306       | 442.58   |
| 1          | 5-3/4   | 3-3/4      | 11/16     | E11L     | 145294                | 106.88   | 145402            | 106.88   | (E100-C2)    |          |
| 1          | 6-1/2   | 4-1/2      | 7/8       | E14L     | 145296                | 113.63   | 145404            | 113.63   |              |          |
| 1          | 6-1/2   | 4-1/2      | 1-1/16    | E18L     | 145298                | 120.60   | 145406            | 120.60   | 145414       | 442.58   |
| 1          | 7-3/4   | 5-3/4      | 1-1/4     | E20L     | 145300                | 107.63   | 145408            | 107.63   | (E100-C6)    |          |

Cutting Tools

# Cutting Tools

## Square Ground Tool Bits — 5% Cobalt

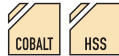
Cobalt HSS ground tool bits exhibit superior performance when cutting forgings, castings and cuts of a heavy nature.



| Square Size | Overall Length (in.) | 5% Cobalt Code No. | Price \$ |
|-------------|----------------------|--------------------|----------|
| 1/8         | 2-1/2                | 102000             | 6.55     |
| 1/4         | 2-1/2                | 102006             | 9.98     |
| 1/4         | 3                    | 102008             | 10.01    |
| 1/4         | 6                    | 102010             | 19.55    |
| 5/16        | 2-1/2                | 102012             | 11.60    |
| 5/16        | 3                    | 102014             | 15.43    |
| 5/16        | 6                    | 102016             | 27.09    |
| 3/8         | 3                    | 102018             | 18.96    |
| 3/8         | 4                    | 102020             | 24.70    |
| 3/8         | 6                    | 102022             | 36.32    |
| 7/16        | 3-1/2                | 102024             | 28.40    |
| 1/2         | 4                    | 102026             | 40.69    |
| 1/2         | 6                    | 102028             | 60.00    |
| 5/8         | 4-1/2                | 102030             | 60.14    |
| 5/8         | 5                    | 102032             | 75.51    |
| 5/8         | 6                    | 102034             | 90.46    |
| 3/4         | 6                    | 102038             | 126.77   |
| 7/8         | 6                    | 102040             | 169.65   |
| 1           | 7                    | 102044             | 251.36   |

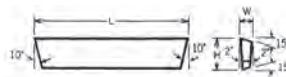
## Rectangular Ground Tool Bits

Cobalt HSS ground tool bits exhibit superior performance when cutting forgings, castings and cuts of a heavy nature.



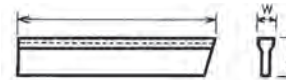
| Width (in.) | Height (in.) | Length (in.) | HSS Code No. | Price \$ | 5% Cobalt Code No. | Price \$ |
|-------------|--------------|--------------|--------------|----------|--------------------|----------|
| 1/4         | 3/8          | 2-1/2        | -            | -        | 102050             | 12.18    |
| 1/4         | 3/8          | 3            | 160305       | 14.39    | 102052             | 14.37    |
| 1/4         | 1/2          | 4            | 160310       | 22.95    | 102054             | 23.90    |
| 1/4         | 1/2          | 6            | -            | -        | 102056             | 35.05    |
| 1/4         | 3/4          | 5            | 160315       | 34.08    | 102058             | 42.64    |
| 1/4         | 1            | 6            | 160320       | 51.93    | 102060             | 67.58    |
| 5/16        | 1/2          | 4            | -            | -        | 102062             | 27.59    |
| 5/16        | 3/4          | 5            | -            | -        | 102064             | 49.32    |
| 5/16        | 1            | 6            | -            | -        | 102066             | 77.23    |
| 3/8         | 1/2          | 4            | 160325       | 29.18    | 102068             | 32.18    |
| 3/8         | 1/2          | 6            | -            | -        | 102070             | 47.59    |
| 3/8         | 5/8          | 4            | 160330       | 36.61    | 102072             | 39.55    |
| 3/8         | 5/8          | 5            | -            | -        | 102074             | 48.62    |
| 3/8         | 3/4          | 4            | -            | -        | 102076             | 44.86    |
| 3/8         | 3/4          | 5            | 160335       | 51.10    | 102078             | 57.81    |
| 3/8         | 3/4          | 6            | -            | -        | 102080             | 68.97    |
| 3/8         | 1            | 6            | -            | -        | 102082             | 90.46    |
| 1/2         | 3/4          | 5            | -            | -        | 102088             | 74.14    |
| 1/2         | 3/4          | 6            | -            | -        | 102090             | 88.84    |
| 1/2         | 1            | 7            | 160345       | 111.92   | 102092             | 134.25   |
| 1/2         | 1-1/4        | 7            | 160350       | 136.27   | 102094             | 166.42   |
| 1/2         | 1-1/2        | 7            | -            | -        | 102096             | 198.02   |
| 5/8         | 7/8          | 6            | 160360       | 135.40   | 102100             | 125.85   |
| 5/8         | 1            | 7            | 160365       | 114.93   | 102102             | 164.93   |
| 5/8         | 1-1/4        | 7            | 160370       | 148.91   | -                  | -        |
| 3/4         | 1            | 6            | 160375       | 142.30   | 102104             | 168.72   |
| 3/4         | 1-1/4        | 6            | 160380       | 165.34   | 102106             | 209.07   |

## Cut-Off Blades — 5% Cobalt



| Width (in.) | Height (in.) | Length (in.) | 5% Cobalt Code No. | Price \$ |
|-------------|--------------|--------------|--------------------|----------|
| 1/8         | 3/4          | 5            | 104378             | 35.74    |
| 1/8         | 3/4          | 6            | 104380             | 42.42    |
| 1/8         | 7/8          | 6            | 104382             | 47.93    |
| 3/16        | 1            | 6-1/2        | 104384             | 79.41    |
| 3/16        | 1            | 7            | 104386             | 85.51    |
| 1/4         | 1-1/4        | 6-1/2        | 104390             | 124.24   |

## Cut-Off Blades "P" Type (T-Shape) — Cobalt



| Width (in.) | Height (in.) | Length (in.) | 5% Cobalt Code No. | Price \$ |
|-------------|--------------|--------------|--------------------|----------|
| 1/16        | 1/2          | 4-1/2        | 104890             | 32.07    |
| 3/32        | 1/2          | 4-1/2        | 104892             | 32.07    |
| 3/32        | 11/16        | 5            | 104894             | 45.05    |
| 1/8         | 11/16        | 5            | 104896             | 64.98    |
| 1/8         | 3/4          | 5            | 104898             | 50.57    |
| 5/32        | 11/16        | 5            | 104900             | 54.36    |
| 1/8         | 7/8          | 6            | 104902             | 64.01    |
| 5/32        | 7/8          | 6            | 104904             | 74.25    |
| 3/16        | 7/8          | 6            | 104906             | 86.54    |
| 1/4         | 7/8          | 6            | 104908             | 109.30   |

## HSS Round Tool Bits



| Dia. | Length | Code No. | Price \$ |
|------|--------|----------|----------|
| 1/8  | 2      | 102110   | 1.73     |
| 3/16 | 2-1/2  | 102112   | 2.18     |
| 1/4  | 3      | 102114   | 7.13     |
| 5/8  | 6      | 102122   | 44.83    |
| 3/4  | 6      | 102124   | 61.14    |

## HSS Round Tool Bits



| Dia. | Length | Code No. | Price \$ |
|------|--------|----------|----------|
| 1/8  | 2-3/4  | 160205   | 5.10     |
| 3/16 | 3-1/2  | 160210   | 7.65     |
| 1/4  | 4      | 160215   | 12.17    |
| 1/4  | 8      | 160255   | 17.03    |
| 5/16 | 4-1/2  | 160220   | 14.63    |
| 5/16 | 8      | 160260   | 21.86    |
| 3/8  | 5      | 160225   | 21.73    |
| 7/16 | 5-1/2  | 160230   | 29.19    |
| 1/2  | 6      | 160235   | 36.59    |
| 9/16 | 6      | 160240   | 44.67    |
| 5/8  | 6      | 160245   | 51.10    |
| 3/4  | 6      | 160250   | 68.13    |

## Square Tool Bits



| Square Size | Overall Length (in.) | HSS Code No. | Price \$ | 5% Cobalt Code No. | Price \$ |
|-------------|----------------------|--------------|----------|--------------------|----------|
| 1/8         | 2-1/2                | 159002       | 7.33     | 160103             | 12.17    |
| 3/16        | 2-1/2                | 159004       | 13.34    | 160105             | 15.60    |
| 1/4         | 2-1/2                | 159006       | 14.12    | 160110             | 17.47    |
| 5/16        | 2-1/2                | 159008       | 15.13    | 160115             | 20.44    |
| 5/16        | 3                    | 159010       | 16.68    | 160117             | 22.05    |
| 3/8         | 3                    | 159012       | 21.41    | 160120             | 23.92    |
| 7/16        | 4                    | 159014       | 21.88    | 160125             | 40.77    |
| 1/4         | 4                    | 159016       | 18.71    | 160127             | 23.47    |
| 1/2         | 4                    | 159018       | 33.84    | 160130             | 41.76    |
| 5/8         | 5                    | 159020       | 46.26    | 160135             | 77.07    |
| 3/4         | 5                    | 159022       | 72.58    | 160140             | 112.38   |
| 1/4         | 6                    | 159024       | 28.21    | -                  | -        |
| 5/16        | 6                    | 159026       | 29.23    | -                  | -        |
| 3/8         | 6                    | 159028       | 39.11    | -                  | -        |
| 1/2         | 6                    | 159030       | 50.15    | -                  | -        |
| 7/8         | 6                    | 159032       | 110.36   | 160145             | 126.76   |
| 1           | 7                    | 159034       | 172.98   | 160155             | 260.44   |
| 1-1/4       | 7                    | 159036       | 267.63   | 160160             | 437.92   |

## Precision Boring Heads

- Ideal for mill or jig bore operation
- These heads readily adapt to many different machines due to interchangeable shanks



Shanks ► P. G79-80, G89

| Head Dia. | Hole Size | Offset | Code No. | Price \$ |
|-----------|-----------|--------|----------|----------|
| 2         | 1/2       | 1/2    | 356001   | 192.37   |
| 3         | 3/4       | 3/4    | 356002   | 277.28   |
| 4         | 1         | 1      | 356003   | 472.52   |

## Carbide Tipped Boring Bar Sets — C6

These bars are made of extra heavy construction ensuring that more steel is behind the cutting face for chatter-free and heavier cuts.

- Extra heavy construction - 100% longer tool life
- All shanks ground to +0.0" - 0.0010"
- Designed so that the same bar can bore flat bottomed holes or face



**QUALITY IMPORT**

| Shank Size | Pieces per Set | Code No. | Price \$ |
|------------|----------------|----------|----------|
| 3/8        | 9              | 140920   | 55.85    |
| 1/2        | 9              | 140930   | 63.39    |
| 5/8        | 12             | 140940   | 109.20   |
| 3/4        | 12             | 140950   | 109.20   |
| 1          | 6              | 140960   | 188.23   |

## C2 Grade Carbide Mini Bore Tools

**BORITE**

- Ease of precision in small hole boring
- All mini bore tools fit in any of the Mini Tool Holders
- Carbide tools are interchangeable in holders



| Shank Dia. | Min. Bore Dia. | Max. Bore Dia. | Overall Length | Carbide Code No. | Price \$ |
|------------|----------------|----------------|----------------|------------------|----------|
| 1/4        | 1/16           | 5/16           | 2              | 145022           | 72.60    |
| 1/4        | 3/32           | 15/32          | 2              | 145024           | 79.88    |
| 1/4        | 1/8            | 5/8            | 2              | 145026           | 86.40    |
| 1/4        | 5/32           | 25/32          | 2              | 145028           | 96.60    |
| 1/4        | 3/16           | 15/16          | 2              | 145030           | 104.18   |
| 1/4        | 1/4            | 1-1/4          | 2              | 145032           | 121.65   |

## Borite "Mini Tool Holders"

**BORITE**

All mini-bore tools fit all holders.

| Model No. | Shank Size | Code No. | Price \$ |
|-----------|------------|----------|----------|
| 1         | 3/8        | 145042   | 53.10    |
| 2         | 1/2        | 145044   | 53.10    |
| 3         | 5/8        | 145046   | 60.00    |
| 4         | 3/4        | 145048   | 60.00    |

## Carbide Borite Mini Sets

**BORITE**

Set includes one each mini-tool boring bar plus holder.

| Model No. | Shank Size | Carbide Code No. | Price \$ |
|-----------|------------|------------------|----------|
| 1C-135    | 3/8        | 145034           | 614.18   |
| 2C-235    | 1/2        | 145036           | 614.18   |
| 3C-335    | 5/8        | 145038           | 621.00   |
| 4C-435    | 3/4        | 145040           | 621.00   |

## HSCO Capscrew Counterbores

**QUALITY IMPORT**



| Capscrew Size | Pilot Dia. | Cutter Dia. | Shank Dia. | Capscrew Length | Overall Length | Code No. | Price \$ |
|---------------|------------|-------------|------------|-----------------|----------------|----------|----------|
| #6            | 0.150      | 0.242       | 7/32       | 1-1/16          | 3              | 150302   | 41.64    |
| #8            | 11/64      | 19/64       | 1/4        | 1-1/16          | 3              | 150304   | 41.64    |
| #10           | 13/64      | 21/64       | 5/16       | 1-1/16          | 3-1/2          | 150306   | 46.54    |
| 1/4           | 9/32       | 13/32       | 3/8        | 1-3/8           | 5              | 150308   | 56.04    |
| 5/16          | 11/32      | 1/2         | 7/16       | 1-3/8           | 5              | 150310   | 66.59    |
| 3/8           | 13/32      | 19/32       | 1/2        | 1-1/2           | 6              | 150312   | 80.34    |
| 7/16          | 15/32      | 11/16       | 1/2        | 1-3/4           | 7              | 150314   | 100.27   |
| 1/2           | 17/32      | 25/32       | 3/4        | 2               | 7-1/2          | 150316   | 120.55   |
| 9/16          | 9/16       | 13/16       | 3/4        | 2-3/8           | 7-1/2          | 150318   | 138.21   |
| 5/8           | 21/32      | 31/32       | 3/4        | 2-3/8           | 7-1/2          | 150320   | 145.30   |
| 3/4           | 13/16      | 1-3/16      | 3/4        | 2-3/8           | 7-1/2          | 150322   | 176.94   |
| 3/4           | 25/32      | 1-3/16      | 1          | 2-7/8           | 8              | 150324   | 255.41   |
| 7/8           | 15/16      | 1-3/8       | 1          | 2-7/8           | 8              | 150326   | 332.09   |
| 1             | 1-1/16     | 1-9/16      | 1          | 3-1/8           | 10             | 150328   | 477.37   |

## HSS Solid Capscrew Counterbores, Straight Shank

**QUALITY IMPORT**



| Screw Size | Pilot Dia. | Cutter Dia. | Shank Dia. | Overall Length | Grade C5 Code No. | Price \$ |
|------------|------------|-------------|------------|----------------|-------------------|----------|
| #5         | 0.141      | 0.221       | 3/16       | 3              | 150105            | 45.01    |
| #6         | 0.150      | 0.242       | 7/32       | 3              | 150110            | 45.01    |
| #8         | 11/64      | 19/64       | 1/4        | 3              | 150115            | 45.39    |
| #10        | 13/64      | 21/64       | 5/16       | 3-1/2          | 150120            | 47.16    |
| 1/4        | 9/32       | 13/32       | 3/8        | 5              | 150125            | 59.27    |
| 5/16       | 11/32      | 1/2         | 7/16       | 5              | 150130            | 64.27    |
| 3/8        | 13/32      | 19/32       | 1/2        | 6              | 150135            | 97.75    |
| 7/16       | 15/32      | 11/16       | 1/2        | 7              | 150140            | 85.29    |
| 1/2        | 17/32      | 25/32       | 1/2        | 7-1/2          | 150145            | 103.87   |
| 5/8        | 21/32      | 31/32       | 3/4        | 7-1/2          | 150150            | 182.88   |
| 3/4        | 13/16      | 1-3/16      | 1          | 8              | 150155            | 283.81   |
| 7/8        | 15/16      | 1-3/8       | 1          | 8              | 150160            | 305.66   |

## HSCO Straight Shank Counterbores — Metric

**QUALITY IMPORT**



| Screw Size | Pilot Dia. | Cutter Dia. | Cutter Length | Shank Dia. | Code No. | Price \$ |
|------------|------------|-------------|---------------|------------|----------|----------|
| M3         | 3.4        | 6           | 25.400        | 7/32       | 150400   | 45.53    |
| M4         | 4.5        | 8           | 25.400        | 5/16       | 150405   | 41.55    |
| M5         | 5.5        | 10          | 31.750        | 3/8        | 150410   | 55.06    |
| M6         | 6.6        | 11          | 34.925        | 7/16       | 150415   | 65.70    |
| M8         | 9          | 15          | 38.894        | 1/2        | 150420   | 70.29    |
| M10        | 11         | 18          | 44.450        | 1/2        | 150425   | 92.26    |
| M12        | 14         | 20          | 50.800        | 1/2        | 150430   | 86.29    |
| M14        | 15         | 24          | 60.325        | MT2        | 150435   | 109.41   |
| M16        | 17         | 26          | 79.375        | MT2        | 150440   | 159.30   |
| M20        | 21         | 33          | 79.375        | MT2        | 150445   | 254.99   |

## HSS Taper Shank Counterbores — Inch

**QUALITY IMPORT**



| Screw Size | Pilot Dia. | Cutter Dia. | Taper Shank | Overall Length | Code No. | Price \$ |
|------------|------------|-------------|-------------|----------------|----------|----------|
| 5/8        | 21/32      | 31/32       | MT 2        | 8-1/4          | 150205   | 183.72   |
| 3/4        | 13/16      | 1-3/16      | MT 3        | 9              | 150210   | 291.98   |
| 7/8        | 15/16      | 1-3/8       | MT 3        | 9              | 150220   | 303.72   |
| 1          | 1-1/16     | 1-9/16      | MT 3        | 10             | 150230   | 335.23   |

## HSS Straight Shank Counterbores — Metric

**QUALITY IMPORT**



| Screw Size | Pilot Dia. | Cutter Dia. | Cutter Length | Shank Dia. | Code No. | Price \$ |
|------------|------------|-------------|---------------|------------|----------|----------|
| M3         | 3.4        | 6           | 25.400        | 7/32       | 150170   | 47.26    |
| M4         | 4.5        | 8           | 25.400        | 5/16       | 150171   | 51.97    |
| M5         | 5.5        | 10          | 31.750        | 3/8        | 150172   | 65.87    |
| M6         | 6.6        | 11          | 34.925        | 7/16       | 150173   | 73.21    |
| M8         | 9          | 15          | 38.894        | 1/2        | 150174   | 73.21    |
| M10        | 11         | 18          | 44.450        | 1/2        | 150175   | 80.10    |
| M12        | 14         | 20          | 50.800        | 1/2        | 150176   | 112.47   |
| M14        | 15         | 24          | 60.325        | MT2        | 150177   | 142.06   |
| M16        | 17         | 26          | 79.375        | MT2        | 150178   | 195.02   |
| M20        | 21         | 33          | 79.375        | MT2        | 150179   | 301.02   |

## Counterbore Sets — Straight Shank

**QUALITY IMPORT**



\* block not included



| Description  | Code No. | Price \$ |
|--|----------|----------|
| Inch HSCO - 7pc Set Includes: #6, #8, #10, 1/4", 5/16", 3/8", 1/2" | 150190   | 436.70   |
| Inch HSS - 7pc Set Includes: #6, #8, #10, 1/4", 5/16", 3/8", 1/2"  | 150200   | 445.09   |
| Metric HSCO - 7pc Set Includes: M3, M4, M5, M6, M8, M10, M12       | 150192   | 439.96   |
| Metric HSS - 7pc Set Includes: M3, M4, M5, M6, M8, M10, M12        | 150195   | 484.89   |

## HSS Annular Cutter Sets



| 5pc Set                           | 1" Depth Code No. | Price \$ | 2" Depth Code No. | Price \$ |
|-----------------------------------|-------------------|----------|-------------------|----------|
| 9/16, 11/16, 13/16, 15/16, 1-1/16 | 138148            | 515.61   | 138150            | 781.33   |

## HSS Annular Cutters — Inch



- Eliminate multi-step drilling
- Lower cost per hole
- Better finishing
- More accurate, cleaner holes
- Longer tool life
- 3/4" shank diameter with two flats
- Cutters are interchangeable with other standard hole cutting systems



| Size    | 1" Depth Code No. | Price \$ | 2" Depth Code No. | Price \$ | 3" Depth Code No. | Price \$ |
|---------|-------------------|----------|-------------------|----------|-------------------|----------|
| 7/16    | 138000            | 48.98    | 138054            | 70.02    | -                 | -        |
| 1/2     | 138002            | 51.21    | 138056            | 72.46    | -                 | -        |
| 9/16    | 138004            | 53.44    | 138058            | 73.52    | -                 | -        |
| 5/8     | 138006            | 56.53    | 138060            | 73.52    | -                 | -        |
| 11/16   | 138008            | 58.97    | 138062            | 82.76    | -                 | -        |
| 3/4     | 138010            | 87.44    | 138064            | 93.29    | -                 | -        |
| 13/16   | 138012            | 64.60    | 138066            | 100.29   | 138108            | 244.41   |
| 7/8     | 138014            | 69.80    | 138068            | 114.32   | 138110            | 270.37   |
| 15/16   | 138016            | 103.91   | 138070            | 154.58   | 138112            | 298.89   |
| 1       | 138018            | 82.12    | 138072            | 123.56   | 138114            | 298.89   |
| 1-1/16  | 138020            | 88.29    | 138074            | 173.61   | 138116            | 316.28   |
| 1-1/8   | 138022            | 98.81    | 138076            | 139.93   | 138118            | 353.81   |
| 1-3/16  | 138024            | 132.38   | 138078            | 180.83   | 138120            | 365.03   |
| 1-1/4   | 138026            | 110.60   | 138080            | 158.62   | 138122            | 382.26   |
| 1-5/16  | 138028            | 148.21   | 138082            | 203.35   | 138124            | 396.73   |
| 1-3/8   | 138030            | 164.04   | 138084            | 218.33   | 138126            | 431.22   |
| 1-7/16  | 138032            | 179.77   | 138086            | 237.99   | 138128            | 473.88   |
| 1-1/2   | 138034            | 195.60   | 138088            | 248.29   | 138130            | 491.40   |
| 1-9/16  | 138036            | 206.01   | 138090            | 265.72   | 138132            | 560.28   |
| 1-5/8   | 138038            | 211.53   | 138092            | 279.95   | 138134            | 580.07   |
| 1-11/16 | 138040            | 237.99   | 138094            | 311.83   | -                 | -        |
| 1-3/4   | 138042            | 243.09   | 138096            | 316.93   | 138138            | 657.82   |
| 1-13/16 | 138044            | 274.86   | 138098            | 343.48   | -                 | -        |
| 1-7/8   | 138046            | 274.86   | 138100            | 348.59   | 138142            | 570.11   |
| 1-15/16 | 138048            | 285.27   | 138102            | 369.73   | 138144            | 764.40   |
| 2       | 138050            | 306.30   | 138104            | 409.47   | 138146            | 812.16   |
| 2-1/16  | 138052            | 356.45   | 138106            | 432.84   | -                 | -        |

FOR ANNULAR CUTTER HOLDERS SEE PAGE G81

## T-Slot Cutters, HSS, Cobalt M42 and M42 Roughers



| Bolt Size | Cutter Dia. | Cutter Width | Neck Dia. | Shank Dia. | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ | Cobalt Rougher Code No. | Price \$ |
|-----------|-------------|--------------|-----------|------------|--------------|----------|-----------------|----------|-------------------------|----------|
| 1/4       | 9/16        | 15/64        | 17/64     | 1/2        | 120905       | 103.45   | 122005          | 120.96   | -                       | -        |
| 5/16      | 21/32       | 17/64        | 21/64     | 1/2        | 120910       | 111.99   | 122010          | 189.70   | -                       | -        |
| 3/8       | 25/32       | 21/64        | 13/32     | 3/4        | 120915       | 137.83   | 122015          | 186.62   | -                       | -        |
| 1/2       | 31/32       | 25/64        | 17/32     | 3/4        | 120920       | 155.45   | -               | -        | -                       | -        |
| 5/8       | 1-1/4       | 31/64        | 21/32     | 1          | -            | -        | -               | -        | 122065                  | 430.79   |
| 3/4       | 1-15/32     | 5/8          | 25/32     | 1          | -            | -        | 122030          | 327.54   | 122070                  | 351.99   |
| 1         | 1-27/32     | 53/64        | 1-1/32    | 1-1/4      | 120935       | 382.62   | 122035          | 1,421.28 | 122075                  | 946.56   |
| 1-1/4     | 2-7/32      | 1-3/32       | 1-9/32    | 1-1/4      | 120940       | 628.03   | 122040          | 1,040.91 | 122080                  | 812.08   |
| 1-1/2     | 2-21/32     | 1-11/32      | 1-17/32   | 1-1/4      | 120945       | 831.29   | 122045          | 1,078.61 | 122085                  | 970.42   |

## Ejector Pins For Annular Cutters



| Depth | Diameter       | Code No. | Price \$ |
|-------|----------------|----------|----------|
| 1"    | 4mm            | 138161   | 18.59    |
| 1"    | 6.35mm         | 138159   | 18.59    |
| 1"    | 8mm            | 138163   | 43.35    |
| 2"    | 4mm            | 138167   | 22.63    |
| 2"    | 6.35mm         | 138165   | 22.63    |
| 2"    | 8mm            | 138169   | 33.89    |
| 3"    | 1/4" (short)   | 138152   | 20.49    |
| 3"    | 6.35mm         | 138171   | 60.13    |
| 4"    | 6mm            | 138175   | 100.09   |
| 4"    | 1/4" (long)    | 138154   | 23.65    |
| 4"    | 8mm            | 138177   | 112.62   |
| 5"    | 5/16" (x-long) | 138156   | 44.68    |

## Corner Rounding End Mills



| Radius | Shank Dia. | Largest Dia. | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|--------|------------|--------------|--------------|----------|-----------------|----------|
| 1/16   | 3/8        | 7/16         | 136750       | 22.83    | 122200          | 128.92   |
| 3/32   | 3/8        | 1/2          | 136751       | 22.83    | 122205          | 133.97   |
| 1/8    | 1/2        | 5/8          | 136752       | 33.66    | 122210          | 168.62   |
| 5/32   | 1/2        | 3/4          | 136753       | 131.55   | 122215          | 210.75   |
| 3/16   | 1/2        | 7/8          | 136754       | 53.18    | 122220          | 210.73   |
| 3/16   | 3/4        | 7/8          | 136755       | 53.18    | 122225          | 301.22   |
| 1/4    | 1/2        | 1            | 136756       | 69.00    | 122230          | 240.46   |
| 1/4    | 3/4        | 1            | 136757       | 62.34    | 122235          | 275.12   |
| 5/16   | 1/2        | 1-1/8        | 136758       | 205.83   | 122240          | 318.75   |
| 5/16   | 3/4        | 1-1/8        | -            | -        | 122245          | 339.60   |
| 5/16   | 7/8        | 1-1/8        | -            | -        | 122250          | 257.01   |
| 3/8    | 1/2        | 1-1/4        | 136760       | 106.24   | 122255          | 386.68   |
| 3/8    | 3/4        | 1-1/4        | -            | -        | 122260          | 351.99   |
| 3/8    | 7/8        | 1-1/4        | 136761       | 50.79    | 122265          | 429.62   |
| 7/16   | 3/4        | 1-3/8        | 136762       | 77.08    | 122270          | 422.06   |
| 7/16   | 1          | 1-3/8        | 136748       | 323.41   | -               | -        |
| 1/2    | 3/4        | 1-3/8        | -            | -        | 122275          | 475.65   |
| 1/2    | 1          | 1-1/2        | 136763       | 172.73   | 122280          | 492.03   |
| 5/8    | 3/4        | 1-15/16      | 136765       | 253.39   | 122285          | 715.23   |
| 3/4    | 3/4        | 1-7/8        | 136767       | 178.45   | 122290          | 873.89   |

## Woodruff Keyseat Cutters



1/2" Shank Diameter

- Straight teeth
- Staggered teeth



| Model No.  | Mill Dia. | Face Width | Overall Length | Straight Teeth Code No. | Price \$ | Staggered Teeth Code No. | Price \$ |        |
|--|-----------|------------|----------------|-------------------------|----------|--------------------------|----------|--------|
| 202  | 1/4       | 1/16       | 2-1/16         | 125005                  | 77.29    | 125007                   | 80.78    |        |
| 202-1/2  | 5/16      | 1/16       | 2-1/16         | 125010                  | 77.29    | 125012                   | 80.78    |        |
| 203  | 3/8       | 1/16       | 2-1/16         | 125020                  | 77.29    | 125022                   | 80.78    |        |
| 204  | 1/2       | 1/16       | 2-1/16         | 125105                  | 81.72    | 125107                   | 85.02    |        |
| 302-1/2  | 5/16      | 3/32       | 2-3/32         | 125015                  | 77.29    | 125017                   | 113.33   |        |
| 303  | 3/8       | 3/32       | 2-3/32         | 125023                  | 77.29    | 125024                   | 81.29    |        |
| 304  | 1/2       | 3/32       | 2-3/32         | 125110                  | 78.39    | 125112                   | 102.47   |        |
| 305  | 5/8       | 3/32       | 2-3/32         | 125115                  | 66.98    | 125117                   | 103.05   |        |
| 403  | 3/8       | 1/8        | 2-1/8          | 125025                  | 77.29    | -                        | -        |        |
| 404  | 1/2       | 1/8        | 2-1/8          | 125120                  | 78.39    | 125122                   | 85.02    |        |
| 405  | 5/8       | 1/8        | 2-1/8          | 125125                  | 83.94    | 125127                   | 103.05   |        |
| 406  | 3/4       | 1/8        | 2-1/8          | 125130                  | 90.16    | 125132                   | 92.71    |        |
| 505  | 5/8       | 5/32       | 2-5/32         | 125135                  | 86.31    | 125137                   | 73.38    |        |
| 506  | 3/4       | 5/32       | 2-5/32         | 125145                  | 82.44    | 125147                   | 80.63    |        |
| 507  | 7/8       | 5/32       | 2-5/32         | 125155                  | 92.70    | 125157                   | 97.62    |        |
| 605  | 5/8       | 3/16       | 2-3/16         | 125140                  | 74.66    | 125142                   | 61.46    |        |
| 606  | 3/4       | 3/16       | 2-3/16         | 125160                  | 101.75   | 125162                   | 92.71    |        |
| 607  | 7/8       | 3/16       | 2-3/16         | 125165                  | 92.70    | 125167                   | 97.62    |        |
| 608  | 1         | 3/16       | 2-3/16         | 125175                  | 125.44   | 125177                   | 126.25   |        |
| 609  | 1-1/8     | 3/16       | 2-3/16         | 125190                  | 132.02   | 125192                   | 120.59   |        |
| 610  | 1-1/4     | 3/16       | 2-3/16         | 125215                  | 137.78   | 125217                   | 152.04   |        |
| 707  | 7/8       | 7/32       | 2-7/32         | 125170                  | 110.71   | 125172                   | 49.08    |        |
| 708  | 1         | 7/32       | 2-7/32         | 125180                  | 135.61   | 125182                   | 109.41   |        |
| 709  | 1-1/8     | 7/32       | 2-7/32         | 125205                  | 137.29   | 125207                   | 120.59   |        |
| 710  | 1-1/4     | 7/32       | 2-7/32         | 125220                  | 149.43   | 125222                   | 131.48   |        |
| 806  | 3/4       | 1/4        | 2-1/4          | 125150                  | 101.75   | 125152                   | 92.71    |        |
| 807  | 7/8       | 1/4        | 2-1/4          | 125195                  | 95.30    | 125197                   | 136.48   |        |
| 808  | 1         | 1/4        | 2-1/4          | 125200                  | 127.02   | 125202                   | 126.25   |        |
| 809  | 1-1/8     | 1/4        | 2-1/4          | 125210                  | 122.12   | 125212                   | 168.16   |        |
| 810  | 1-1/4     | 1/4        | 2-1/4          | 125225                  | 133.97   | 125227                   | 181.31   |        |
| 811  | 1-3/8     | 1/4        | 2-1/4          | 125230                  | 162.26   | 125232                   | 146.29   |        |
| 812  | 1-1/2     | 1/4        | 2-1/4          | 125235                  | 182.89   | 125237                   | 195.81   |        |
| 1008   | 1         | 5/16       | 2-5/16         | 125240                  | 113.33   | 125242                   | 152.04   |        |
| 1009   | 1-1/8     | 5/16       | 2-5/16         | 125245                  | 141.69   | 125247                   | 168.16   |        |
| 1010   | 1-1/4     | 5/16       | 2-5/16         | 125250                  | 136.55   | 125252                   | 203.94   |        |
| 1011   | 1-3/8     | 5/16       | 2-5/16         | 125255                  | 175.14   | 125257                   | 156.03   |        |
| 1012   | 1-1/2     | 5/16       | 2-5/16         | 125260                  | 182.89   | 125262                   | 169.69   |        |
| 1208   | 1         | 3/8        | 2-3/8          | 125185                  | 133.22   | 125187                   | 152.40   |        |
| 1210   | 1-1/4     | 3/8        | 2-3/8          | 125265                  | 147.13   | 125267                   | 168.17   |        |
| 1211   | 1-3/8     | 3/8        | 2-3/8          | 125270                  | 175.14   | 125272                   | 156.03   |        |
| 1212   | 1-1/2     | 3/8        | 2-3/8          | 125275                  | 203.84   | 125277                   | 206.07   |        |
| <b>8 Piece Set:</b> No. 204, 304, 305, 406, 605, 606, 608, 806       |           |            |                |                         | 125276   | 524.65                   | 125258   | 647.40 |
| <b>9 Piece Set:</b> No. 204, 404, 406, 806, 606, 608, 808, 610, 1210 |           |            |                |                         | -        | -                        | 125259   | 849.64 |
| <b>41 Piece Set:</b> includes all sizes                              |           |            |                |                         | 125279   | 3,667.32                 | -        | -      |

Cutting Tools



# Cutting Tools

## Dovetail Angular Cutters — 45°

- R.H. cut—weldon shank
- 45° angle cutters



| Dia.  | Width | Shank | Length | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|-------|-------|-------|--------|--------------|----------|-----------------|----------|
| 3/8   | 1/8   | 3/8   | 2-1/8  | 125303       | 164.86   | 122100          | 181.35   |
| 1/2   | 5/32  | 3/8   | 2-1/8  | 125305       | 162.32   | 122105          | 178.68   |
| 3/4   | 1/4   | 3/8   | 2-1/8  | 125310       | 168.16   | 122110          | 183.93   |
| 1-3/8 | 7/16  | 5/8   | 2-7/8  | 125315       | 231.87   | 122115          | 324.56   |
| 1-7/8 | 9/16  | 7/8   | 3-1/4  | 125320       | 394.16   | 122120          | 685.24   |
| 2-1/4 | 5/8   | 1     | 3-3/4  | 125325       | 479.12   | 122125          | 872.37   |

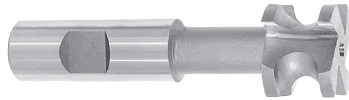
## Dovetail Angular Cutters — 60°

- R.H. cut—weldon shank
- 60° angle cutters



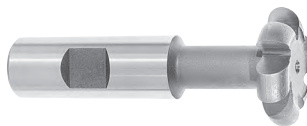
| Dia.  | Width  | Shank | Length | HSS Code No. | Price \$ | Cobalt Code No. | Price \$ |
|-------|--------|-------|--------|--------------|----------|-----------------|----------|
| 3/8   | 3/16   | 3/8   | 2-1/8  | 125328       | 168.18   | 122130          | 181.35   |
| 1/2   | 1/4    | 3/8   | 2-1/8  | 125330       | 162.32   | 122135          | 178.68   |
| 3/4   | 5/16   | 3/8   | 2-1/8  | 125335       | 168.16   | 122140          | 183.93   |
| 1-3/8 | 9/16   | 5/8   | 2-7/8  | 125340       | 231.87   | 122145          | 331.08   |
| 1-7/8 | 13/16  | 7/8   | 3-1/4  | 125345       | 394.16   | 122150          | 591.46   |
| 2-1/4 | 1-1/16 | 1     | 3-3/4  | 125350       | 479.12   | 122155          | 872.37   |

## Concave, Shank Type Cutters, HSS



| Radius | Shank Dia. | Overall Length | Cutter Dia. | No. Flutes | Code No. | Price \$ |
|--------|------------|----------------|-------------|------------|----------|----------|
| 1/32   | 1/2        | 3              | 3/4         | 6          | 126070   | 218.04   |
| 1/16   | 1/2        | 3              | 3/4         | 6          | 126071   | 194.44   |
| 3/32   | 1/2        | 3              | 3/4         | 6          | 126072   | 173.42   |
| 1/8    | 3/4        | 3-1/2          | 1           | 6          | 126073   | 236.43   |
| 5/32   | 3/4        | 3-1/2          | 1           | 6          | 126074   | 265.39   |
| 3/16   | 3/4        | 3-1/2          | 1           | 6          | 126075   | 249.62   |
| 1/4    | 3/4        | 4              | 1-1/4       | 4          | 126076   | 315.36   |
| 5/16   | 3/4        | 4              | 1-1/4       | 4          | 126077   | 394.19   |
| 3/8    | 3/4        | 4-3/16         | 1-1/2       | 4          | 126078   | 444.07   |

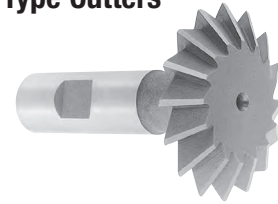
## Convex, Shank Type Cutters, HSS



| Radius | Shank Dia. | Overall Length | Cutter Dia. | No. Flutes | Code No. | Price \$ |
|--------|------------|----------------|-------------|------------|----------|----------|
| 1/32   | 1/2        | 3              | 3/4         | 6          | 126079   | 168.12   |
| 1/16   | 1/2        | 3              | 3/4         | 6          | 126080   | 144.52   |
| 3/32   | 1/2        | 3              | 7/8         | 6          | 126081   | 152.45   |
| 1/8    | 3/4        | 3-1/2          | 1-1/4       | 6          | 126082   | 225.97   |
| 5/32   | 3/4        | 3-1/2          | 1-5/16      | 6          | 126083   | 249.67   |
| 3/16   | 3/4        | 3-1/2          | 1-3/8       | 6          | 126084   | 262.80   |
| 1/4    | 3/4        | 4              | 1-1/2       | 6          | 126085   | 304.80   |
| 5/16   | 3/4        | 4              | 1-5/8       | 6          | 126086   | 415.16   |
| 3/8    | 3/4        | 4-3/16         | 1-3/4       | 6          | 126087   | 446.69   |

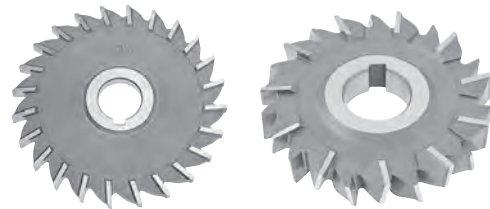
## Double Angle, Shank Type Cutters

- Right hand cut



| Incl. Angle | Cutter Dia. | Shank Dia. | Overall Length | Cutter Thickness | Code No. | Price \$ |
|-------------|-------------|------------|----------------|------------------|----------|----------|
| 60°         | 3/4         | 3/8        | 2-3/8          | 3/16             | 126088   | 127.76   |
| 60°         | 1           | 1/2        | 2-27/32        | 5/16             | 126089   | 189.19   |
| 60°         | 1-3/8       | 5/8        | 3-7/32         | 7/16             | 126090   | 257.62   |
| 60°         | 1-1/2       | 5/8        | 3-3/8          | 1/2              | 126091   | 316.86   |
| 60°         | 1-7/8       | 3/4        | 3-25/32        | 5/8              | 126092   | 345.44   |
| 60°         | 2-1/4       | 7/8        | 4-5/32         | 3/4              | 126093   | 412.48   |
| 60°         | 2-1/4       | 3/4        | 3-1/8          | 1/2              | 126094   | 309.18   |
| 90°         | 3/4         | 3/8        | 2-7/16         | 1/4              | 126095   | 128.75   |
| 90°         | 1           | 1/2        | 2-29/32        | 3/8              | 126096   | 189.19   |
| 90°         | 1-3/8       | 5/8        | 3-9/32         | 1/2              | 126097   | 257.62   |
| 90°         | 1-1/2       | 5/8        | 3-7/16         | 9/16             | 126098   | 317.94   |
| 90°         | 1-7/8       | 3/4        | 3-25/32        | 5/8              | 126099   | 353.26   |
| 90°         | 2-1/4       | 7/8        | 4-5/32         | 3/4              | 126100   | 318.47   |

## Plain & Staggered Tooth Milling Cutters — HSS



| Dia.  | Width | Bore | No. of Teeth | Plain Tooth Code No. | Price \$ | No. of Teeth | Stagg. Tooth Code No. | Price \$ |
|-------|-------|------|--------------|----------------------|----------|--------------|-----------------------|----------|
| 2     | 3/16  | 1/2  | 14           | 125405               | 126.48   | -            | -                     | -        |
| 2     | 1/4   | 1/2  | 14           | 125410               | 131.35   | -            | -                     | -        |
| 2     | 3/8   | 1/2  | 14           | 125415               | 141.72   | -            | -                     | -        |
| 2     | 3/16  | 5/8  | 14           | 125420               | 124.12   | -            | -                     | -        |
| 2     | 1/4   | 5/8  | 14           | 125425               | 128.78   | -            | -                     | -        |
| 2     | 3/8   | 5/8  | 14           | 125430               | 144.26   | -            | -                     | -        |
| 2     | 1/4   | 7/8  | 14           | 125435               | 131.37   | -            | -                     | -        |
| 2     | 5/16  | 7/8  | 14           | 125440               | 131.90   | -            | -                     | -        |
| 2     | 3/8   | 7/8  | 14           | 125445               | 144.24   | -            | -                     | -        |
| 2     | 7/16  | 7/8  | 14           | 125450               | 162.34   | -            | -                     | -        |
| 2-1/2 | 3/16  | 7/8  | 16           | 125455               | 156.33   | 16           | 130605                | 136.92   |
| 2-1/2 | 1/4   | 7/8  | 16           | 125460               | 164.44   | 16           | 130610                | 154.54   |
| 2-1/2 | 5/16  | 7/8  | 16           | 125465               | 164.91   | 16           | 130615                | 162.32   |
| 2-1/2 | 3/8   | 7/8  | 16           | 125470               | 173.42   | 16           | 130620                | 167.48   |
| 2-1/2 | 7/16  | 7/8  | 16           | 125475               | 160.68   | 16           | 130625                | 135.69   |
| 2-1/2 | 1/2   | 7/8  | 16           | 125480               | 189.18   | 16           | 130630                | 185.52   |
| 2-1/2 | 3/16  | 1    | 16           | 125485               | 156.35   | -            | -                     | -        |
| 2-1/2 | 1/4   | 1    | 16           | 125490               | 164.97   | 16           | 130635                | 152.00   |
| 2-1/2 | 5/16  | 1    | 16           | 125495               | 172.88   | -            | -                     | -        |
| 2-1/2 | 3/8   | 1    | 16           | 125500               | 180.99   | -            | -                     | -        |
| 2-1/2 | 7/16  | 1    | 16           | 125505               | 177.76   | 16           | 130640                | 166.59   |
| 2-1/2 | 1/2   | 1    | 16           | 125510               | 197.71   | 16           | 130645                | 155.87   |
| 2-1/2 | 5/8   | 1    | 16           | 125515               | 203.52   | -            | -                     | -        |
| 3     | 3/16  | 1    | 18           | 125520               | 161.82   | 16           | 130650                | 173.05   |
| 3     | 7/32  | 1    | 18           | 125525               | 140.20   | 16           | 130655                | 167.71   |
| 3     | 1/4   | 1    | 18           | 125530               | 172.78   | 16           | 130660                | 236.48   |
| 3     | 9/32  | 1    | 18           | 125535               | 164.91   | 16           | 130665                | 177.80   |
| 3     | 5/16  | 1    | 18           | 125540               | 170.07   | 16           | 130670                | 193.67   |
| 3     | 11/32 | 1    | 18           | 125545               | 175.16   | -            | -                     | -        |
| 3     | 3/8   | 1    | 18           | 125550               | 192.67   | 16           | 130675                | 200.34   |
| 3     | 13/32 | 1    | 18           | 125555               | 166.37   | -            | -                     | -        |
| 3     | 7/16  | 1    | 18           | 125560               | 170.42   | 16           | 130680                | 198.36   |
| 3     | 1/2   | 1    | 18           | 125565               | 207.75   | 16           | 130685                | 218.53   |
| 3     | 9/16  | 1    | 18           | 125570               | 189.75   | 16           | -                     | -        |
| 3     | 5/8   | 1    | 18           | 125575               | 218.98   | 16           | 130695                | 231.83   |
| 3     | 11/16 | 1    | 18           | 125580               | 205.13   | 16           | 130700                | 218.07   |
| 3     | 3/4   | 1    | 18           | 125585               | 242.16   | -            | -                     | -        |

## Plain & Staggered Tooth Milling Cutters — Cont'd

| Dia.  | Width  | Bore  | No. of Teeth | Plain Tooth Code No. | Price \$ | No. of Teeth | Stagg. Tooth Code No. | Price \$ | Dia. | Width  | Bore  | No. of Teeth | Plain Tooth Code No. | Price \$ | No. of Teeth | Stagg. Tooth Code No. | Price \$ |
|-------|--------|-------|--------------|----------------------|----------|--------------|-----------------------|----------|------|--------|-------|--------------|----------------------|----------|--------------|-----------------------|----------|
| 3     | 13/16  | 1     | 18           | 125590               | 227.08   | 16           | 130710                | 252.50   | 5    | 3/8    | 1     | 24           | 125920               | 349.52   | 22           | 135140                | 417.32   |
| 3     | 7/8    | 1     | 18           | 125595               | 268.02   | -            | -                     | -        | 5    | 13/32  | 1     | 24           | 125925               | 349.13   | -            | -                     | -        |
| 3     | 15/16  | 1     | 18           | -                    | -        | 16           | 130720                | 319.77   | 5    | 7/16   | 1     | 24           | 125930               | 355.97   | 22           | 135145                | 374.41   |
| 3     | 1      | 1     | 18           | 125605               | 323.20   | 16           | 130725                | 358.05   | 5    | 1/2    | 1     | 24           | 125935               | 451.65   | 22           | 135150                | 443.15   |
| 3     | 3/16   | 1-1/4 | -            | -                    | -        | 16           | 130730                | 162.91   | 5    | 9/16   | 1     | -            | -                    | -        | 22           | 135155                | 434.99   |
| 3     | 1/4    | 1-1/4 | 18           | 125610               | 112.93   | 16           | 130735                | 172.58   | 5    | 5/8    | 1     | 24           | 125945               | 494.56   | 22           | 135160                | 491.41   |
| 3     | 5/16   | 1-1/4 | 18           | 125615               | 170.84   | 16           | 130740                | 158.22   | 5    | 11/16  | 1     | 24           | 125950               | 478.87   | 22           | 135165                | 502.40   |
| 3     | 3/8    | 1-1/4 | 18           | 125620               | 171.61   | 16           | 130745                | 185.49   | 5    | 3/4    | 1     | 24           | 125955               | 564.94   | 22           | 135170                | 561.93   |
| 3     | 7/16   | 1-1/4 | 18           | 125625               | 153.95   | 16           | 130750                | 176.51   | 5    | 13/16  | 1     | 24           | 125960               | 315.28   | 22           | 135175                | 554.69   |
| 3     | 1/2    | 1-1/4 | 18           | 125630               | 212.55   | 16           | 130755                | 206.11   | 5    | 7/8    | 1     | 24           | 125965               | 418.57   | 22           | 135180                | 585.06   |
| 3     | 9/16   | 1-1/4 | -            | -                    | -        | 16           | 130760                | 197.15   | 5    | 15/16  | 1     | 24           | 125970               | 418.57   | -            | -                     | -        |
| 3     | 5/8    | 1-1/4 | 18           | 125635               | 197.15   | 16           | 130765                | 207.18   | 5    | 1      | 1     | 24           | 125975               | 617.18   | -            | -                     | -        |
| 3     | 11/16  | 1-1/4 | -            | -                    | -        | 16           | 130770                | 218.66   | 5    | 1/4    | 1-1/4 | 24           | 125980               | 332.30   | 22           | 135185                | 376.11   |
| 3     | 3/4    | 1-1/4 | 18           | 125640               | 208.58   | 16           | 130775                | 260.14   | 5    | 5/16   | 1-1/4 | 24           | 125985               | 337.45   | 22           | 135190                | 368.02   |
| 3     | 13/16  | 1-1/4 | -            | -                    | -        | 16           | 130780                | 252.50   | 5    | 11/32  | 1-1/4 | 24           | 125990               | 298.28   | -            | -                     | -        |
| 3     | 7/8    | 1-1/4 | 18           | -                    | -        | 16           | 130785                | 247.72   | 5    | 3/8    | 1-1/4 | 24           | 125995               | 346.52   | 22           | 135195                | 417.32   |
| 3     | 15/16  | 1-1/4 | -            | -                    | -        | 16           | 130790                | 260.21   | 5    | 13/32  | 1-1/4 | 24           | 130105               | 345.63   | -            | -                     | -        |
| 3     | 1      | 1-1/4 | 18           | 125650               | 289.56   | 16           | 130795                | 298.81   | 5    | 7/16   | 1-1/4 | 24           | 130110               | 344.03   | 22           | 135200                | 417.32   |
| 3-1/2 | 3/16   | 1     | 20           | 125655               | 195.78   | -            | -                     | -        | 5    | 1/2    | 1-1/4 | 24           | 130115               | 452.36   | 22           | 135205                | 459.37   |
| 3-1/2 | 1/4    | 1     | 20           | 125660               | 200.96   | 18           | 130800                | 244.72   | 5    | 9/16   | 1-1/4 | 24           | 130120               | 419.89   | 22           | 135210                | 433.53   |
| 3-1/2 | 5/16   | 1     | 20           | 125665               | 216.42   | -            | -                     | -        | 5    | 5/8    | 1-1/4 | 24           | 130125               | 494.56   | 22           | 135215                | 493.17   |
| 3-1/2 | 3/8    | 1     | 20           | 125670               | 224.15   | 18           | 130805                | 273.08   | 5    | 11/16  | 1-1/4 | -            | -                    | -        | 22           | 135220                | 495.87   |
| 3-1/2 | 7/16   | 1     | 20           | 125675               | 229.11   | -            | -                     | -        | 5    | 3/4    | 1-1/4 | 24           | 130135               | 564.11   | 22           | 135225                | 574.45   |
| 3-1/2 | 1/2    | 1     | 20           | 125680               | 257.65   | 18           | 130810                | 311.73   | 5    | 13/16  | 1-1/4 | 24           | 130140               | 362.64   | -            | -                     | -        |
| 3-1/2 | 5/8    | 1     | 20           | 125685               | 296.92   | 18           | 130815                | 303.65   | 5    | 7/8    | 1-1/4 | 24           | 130145               | 554.69   | 22           | 135235                | 569.95   |
| 3-1/2 | 7/16   | 1-1/4 | 20           | 125690               | 208.20   | -            | -                     | -        | 5    | 15/16  | 1-1/4 | 24           | 130150               | 363.95   | 22           | 135240                | 617.18   |
| 3-1/2 | 1/2    | 1-1/4 | 20           | 125695               | 229.11   | -            | -                     | -        | 5    | 1      | 1-1/4 | 24           | 130155               | 625.47   | 22           | 135245                | 712.08   |
| 4     | 3/16   | 1     | -            | 125700               | 235.76   | 18           | 130825                | 242.13   | 5    | 1-1/4  | 1-1/4 | 24           | 130160               | 746.90   | -            | -                     | -        |
| 4     | 7/32   | 1     | 22           | 125705               | 226.68   | 18           | 130830                | 242.13   | 6    | 1/4    | 1     | 26           | 130165               | 445.64   | 24           | 135250                | 507.50   |
| 4     | 1/4    | 1     | 22           | 125710               | 252.47   | 18           | 130835                | 257.40   | 6    | 5/16   | 1     | 26           | 130170               | 448.21   | 24           | 135255                | 507.50   |
| 4     | 9/32   | 1     | 22           | 125715               | 236.98   | 18           | 130840                | 257.56   | 6    | 3/8    | 1     | 26           | 130175               | 492.06   | 24           | 135260                | 541.74   |
| 4     | 5/16   | 1     | 22           | 125720               | 263.25   | 18           | 130845                | 266.00   | 6    | 7/16   | 1     | 26           | 130180               | 473.92   | 24           | 135265                | 514.92   |
| 4     | 11/32  | 1     | 22           | 125725               | 241.36   | 18           | 130850                | 273.08   | 6    | 1/2    | 1     | 26           | 130185               | 579.57   | 24           | 135270                | 625.96   |
| 4     | 3/8    | 1     | 22           | 125730               | 277.76   | 18           | 130855                | 279.30   | 6    | 9/16   | 1     | 26           | 130190               | 564.87   | 24           | 135275                | 585.06   |
| 4     | 7/16   | 1     | 22           | 125735               | 283.37   | 18           | 130860                | 289.04   | 6    | 5/8    | 1     | 26           | 130195               | 428.60   | 24           | 135280                | 617.18   |
| 4     | 13/32  | 1     | 22           | 125740               | 281.21   | -            | -                     | -        | 6    | 11/16  | 1     | 26           | 130200               | 635.62   | 24           | 135285                | 655.82   |
| 4     | 1/2    | 1     | 22           | 125745               | 323.42   | 18           | 130865                | 322.23   | 6    | 3/4    | 1     | 26           | 130205               | 675.87   | 24           | 135290                | 692.87   |
| 4     | 9/16   | 1     | 22           | 125750               | 300.31   | 18           | 130870                | 341.59   | 6    | 13/16  | 1     | 26           | 130210               | 711.61   | 24           | 135295                | 760.14   |
| 4     | 5/8    | 1     | 22           | 125755               | 367.28   | 18           | 130875                | 383.15   | 6    | 7/8    | 1     | 26           | 130215               | 569.23   | 24           | 135300                | 808.06   |
| 4     | 11/16  | 1     | 22           | 125760               | 328.64   | 18           | 130880                | 260.21   | 6    | 15/16  | 1     | 26           | 130220               | 799.08   | -            | -                     | -        |
| 4     | 3/4    | 1     | 22           | 125765               | 386.42   | 18           | 130885                | 379.38   | 6    | 1      | 1     | 26           | 130225               | 842.81   | 24           | 135305                | 874.78   |
| 4     | 13/16  | 1     | 22           | 125770               | 364.23   | 18           | 130890                | 371.06   | 6    | 1-1/4  | 1     | 26           | 130230               | 647.11   | -            | -                     | -        |
| 4     | 7/8    | 1     | 22           | 125775               | 393.71   | 18           | 130895                | 392.85   | 6    | 1/4    | 1-1/4 | 26           | 130235               | 444.06   | 24           | 135310                | 507.50   |
| 4     | 15/16  | 1     | 22           | 125780               | 275.03   | 18           | 130900                | 414.78   | 6    | 9/32   | 1-1/4 | 26           | 130240               | 397.79   | 24           | 135315                | 455.47   |
| 4     | 1      | 1     | 22           | 125785               | 473.99   | 18           | 130905                | 484.32   | 6    | 5/16   | 1-1/4 | 26           | 130245               | 397.79   | 24           | 135320                | 507.50   |
| 4     | 3/16   | 1-1/4 | -            | -                    | -        | 18           | 130910                | 242.13   | 6    | 11/32  | 1-1/4 | 26           | 130250               | 404.63   | -            | -                     | -        |
| 4     | 7/32   | 1-1/4 | 22           | 125790               | 202.53   | 18           | 130915                | 241.73   | 6    | 3/8    | 1-1/4 | 26           | 130255               | 492.06   | 24           | 135325                | 510.06   |
| 4     | 1/4    | 1-1/4 | 22           | 125795               | 242.16   | 18           | 130920                | 257.54   | 6    | 13/32  | 1-1/4 | 26           | 130260               | 462.02   | -            | -                     | -        |
| 4     | 9/32   | 1-1/4 | 22           | 125800               | 212.70   | 18           | 130925                | 246.04   | 6    | 7/16   | 1-1/4 | 26           | 130265               | 475.53   | 24           | 135330                | 535.86   |
| 4     | 5/16   | 1-1/4 | 22           | 125805               | 247.30   | 18           | 130930                | 265.41   | 6    | 1/2    | 1-1/4 | 26           | 130270               | 579.57   | 24           | 135335                | 592.47   |
| 4     | 11/32  | 1-1/4 | 22           | 125810               | 225.04   | 18           | 130935                | 243.66   | 6    | 9/16   | 1-1/4 | 26           | 130275               | 568.22   | 24           | 135340                | 608.60   |
| 4     | 3/8    | 1-1/4 | 22           | 125815               | 265.33   | 18           | 130940                | 279.30   | 6    | 5/8    | 1-1/4 | 26           | 130280               | 600.33   | 24           | 135345                | 690.36   |
| 4     | 7/16   | 1-1/4 | 22           | 125820               | 286.41   | 18           | 130945                | 275.71   | 6    | 11/16  | 1-1/4 | -            | -                    | -        | 24           | 135350                | 579.84   |
| 4     | 13/32  | 1-1/4 | 22           | 125825               | 208.20   | -            | -                     | -        | 6    | 3/4    | 1-1/4 | 26           | 130290               | 675.87   | 24           | 135355                | 772.82   |
| 4     | 1/2    | 1-1/4 | 22           | 125830               | 323.58   | 18           | 130950                | 322.08   | 6    | 13/16  | 1-1/4 | 26           | 130295               | 711.61   | 24           | 135360                | 760.14   |
| 4     | 9/16   | 1-1/4 | 22           | 125835               | 297.25   | 18           | 130955                | 324.87   | 6    | 7/8    | 1-1/4 | 26           | 130300               | 569.23   | 24           | 135365                | 768.85   |
| 4     | 5/8    | 1-1/4 | 22           | 125840               | 359.53   | 18           | 130960                | 378.27   | 6    | 15/16  | 1-1/4 | 26           | 130305               | 519.23   | 24           | 135370                | 817.68   |
| 4     | 11/16  | 1-1/4 | 22           | 125845               | 328.92   | 18           | -                     | -        | 6    | 1      | 1-1/4 | 26           | 130310               | 837.73   | 24           | 135375                | 859.65   |
| 4     | 3/4    | 1-1/4 | 22           | 125850               | 370.35   | 18           | 130970                | 396.71   | 6    | 1-1/8  | 1-1/4 | 26           | 130315               | 898.45   | 24           | 135380                | 935.64   |
| 4     | 13/16  | 1-1/4 | 22           | 125855               | 270.96   | 18           | 130975                | 321.37   | 6    | 1-3/16 | 1-1/4 | -            | -                    | -        | 24           | 135385                | 977.92   |
| 4     | 7/8    | 1-1/4 | 22           | 125860               | 386.18   | 18           | 130980                | 404.79   | 6    | 1-1/4  | 1-1/4 | 26           | 130320               | 996.24   | 24           | 135390                | 1,138.65 |
| 4     | 15/16  | 1-1/4 | 22           | 125865               | 275.03   | 18           | 130985                | 348.56   | 6    | 1-1/2  | 1-1/4 | -            | -                    | -        | 24           | 135395                | 1,168.10 |
| 4     | 1      | 1-1/4 | 22           | 125870               | 451.67   | 18           | 130990                | 489.49   | 6    | 1      | 1-1/2 | -            | -                    | -        | 24           | 135400                | 645.93   |
| 4     | 1-1/8  | 1-1/4 | 22           | 125875               | 462.02   | 18           | 130995                | 465.35   | 7    | 1/4    | 1-1/4 | 28           | 130325               | 674.42   | 26           | 135405                | 875.05   |
| 4     | 1-3/16 | 1-1/4 | -            | -                    | -        | 18           | 135105                | 489.04   | 7    | 5/16   | 1-1/4 | 28           | 130330               | 692.87   | 26           | 135410                | 792.53   |
| 4     | 1-1/4  | 1-1/4 | 22           | 125880               | 564.94   | 18           | 135110                | 589.80   | 7    | 3/8    | 1-1/4 | 28           | 130335               | 767.93   | 26           | 135415                | 852.84   |
| 4     | 1-1/2  | 1-1/4 | 22           | 125885               | 576.50   | 18           | 135115                | 709.73   | 7    | 7/16   | 1-1/4 | 28           | 130340               | 738.49   | 26           | 135420                | 898.45   |
| 4-1/2 | 1/2    | 1     | -            | -                    | -        | 20           | 135120                | 374.41   | 7    | 1/2    | 1-1/4 | 28           | 130345               | 476.04   | 26           | 135425                | 972.66   |
| 4-1/2 | 3/8    | 1-1/4 | 24           | 125890               | 309.31   | -            | -                     | -        | 7    | 9/16   | 1-1/4 | 28           | 130350               | 844.69   | 26           | 135430                | 960.93   |
| 4-1/2 | 1/2    | 1-1/4 | 24           | 125895               | 309.31   | 20           | 135125                | 374.41   | 7    | 5/8    | 1-1/4 | 28           | 130355               | 891.76   | 26           | 135435                | 996.24   |
| 5     | 1/4    | 1     | 24           | 125900               | 343.95   | 22           | 135130                | 376.11   | 7    | 11/16  | 1-1/4 | 28           | 130360               | 938.99   | 26           | 135440                | 1,099.09 |
| 5     | 9/32   | 1     | 24           | 125905               | 332.30   | -            | -                     | -        | 7    | 3/4    | 1-1/4 | 28           | 130365               | 997.98   | 26           | 135445                | 1,099.09 |
| 5     | 5/16   | 1     | 24           | 125910               | 337.45   | 22           | 135135                | 396.71   | 7    | 13/16  | 1-1/4 | 28           | 130370               | 1,038.50 | 26           | 135450                | 1,235.51 |
| 5     | 11/32  | 1     | 24           | 125915               | 309.31   | -            | -                     | -        | 7    | 7/8    | 1-1/4 | 28           | 130375               | 1,105.77 | 26           | 135455                | 1,235.51 |

Cutting Tools

## Plain & Staggered Tooth Milling Cutters — HSS, Cont'd

| Dia. | Width | Bore  | No. of Teeth | Plain Tooth Code No. | Price \$ | No. of Teeth | Stagg. Tooth Code No. | Price \$ |
|------|-------|-------|--------------|----------------------|----------|--------------|-----------------------|----------|
| 7    | 15/16 | 1-1/4 | 28           | 130380               | 1,164.75 | 26           | 135460                | 1,350.15 |
| 7    | 1     | 1-1/4 | 28           | 130385               | 1,233.92 | 26           | 135465                | 1,350.15 |
| 7    | 3/8   | 1-1/2 | -            | -                    | -        | 26           | 135470                | 775.25   |
| 7    | 7/16  | 1-1/2 | -            | -                    | -        | 26           | 135475                | 927.23   |
| 7    | 1/2   | 1-1/2 | -            | -                    | -        | 26           | 135480                | 333.12   |
| 7    | 5/8   | 1-1/2 | -            | -                    | -        | 26           | 135485                | 905.58   |
| 7    | 3/4   | 1-1/2 | -            | -                    | -        | 26           | 135490                | 1,099.09 |
| 7    | 7/8   | 1-1/2 | -            | -                    | -        | 26           | 135495                | 1,229.00 |
| 7    | 1     | 1-1/2 | -            | -                    | -        | 26           | 135500                | 1,208.21 |
| 8    | 1/4   | 1     | 32           | 130390               | 1,053.29 | 28           | 135505                | 937.43   |
| 8    | 5/16  | 1     | 32           | 130395               | 1,109.33 | -            | -                     | -        |
| 8    | 3/8   | 1     | 32           | 130400               | 1,092.51 | 28           | 135510                | 1,085.74 |
| 8    | 7/16  | 1     | 32           | 130405               | 1,039.81 | -            | -                     | -        |
| 8    | 1/2   | 1     | 32           | 130410               | 1,144.71 | -            | -                     | -        |
| 8    | 1/4   | 1-1/4 | 32           | 130415               | 1,058.74 | 28           | 135520                | 1,035.32 |
| 8    | 5/16  | 1-1/4 | 32           | 130420               | 941.61   | 28           | 135525                | 1,087.83 |
| 8    | 3/8   | 1-1/4 | 32           | 130425               | 1,080.50 | 28           | -                     | -        |
| 8    | 7/16  | 1-1/4 | 32           | 130430               | 1,144.71 | 28           | 135535                | 1,085.57 |
| 8    | 1/2   | 1-1/4 | 32           | 130435               | 1,144.71 | 28           | 135540                | 1,163.46 |
| 8    | 9/16  | 1-1/4 | 32           | 130440               | 1,053.34 | 28           | 135545                | 1,257.45 |
| 8    | 5/8   | 1-1/4 | 32           | 130445               | 1,280.89 | 28           | 135550                | 1,257.45 |
| 8    | 11/16 | 1-1/4 | 32           | 130450               | 1,237.11 | 28           | 135555                | 1,244.09 |
| 8    | 3/4   | 1-1/4 | 32           | 130455               | 1,285.14 | 28           | 135560                | 1,368.74 |
| 8    | 13/16 | 1-1/4 | 32           | 130460               | 1,045.61 | 28           | 135565                | 1,200.79 |
| 8    | 7/8   | 1-1/4 | 32           | 130465               | 1,219.39 | 28           | 135570                | 1,518.68 |
| 8    | 15/16 | 1-1/4 | 32           | 130470               | 1,473.20 | 28           | 135575                | 1,629.82 |
| 8    | 1     | 1-1/4 | 32           | 130475               | 1,528.71 | 28           | 135580                | 1,629.82 |
| 8    | 1/4   | 1-1/2 | -            | -                    | -        | 28           | 135585                | 733.56   |
| 8    | 5/16  | 1-1/2 | -            | -                    | -        | 28           | 135590                | 974.29   |
| 8    | 3/8   | 1-1/2 | -            | -                    | -        | 28           | 135595                | 1,028.34 |
| 8    | 7/16  | 1-1/2 | -            | -                    | -        | 28           | 135600                | 1,085.57 |
| 8    | 1/2   | 1-1/2 | -            | -                    | -        | 28           | 135605                | 1,085.57 |
| 8    | 5/8   | 1-1/2 | -            | -                    | -        | 28           | 135615                | 1,257.45 |
| 8    | 11/16 | 1-1/2 | -            | -                    | -        | 28           | 135620                | 1,368.74 |
| 8    | 3/4   | 1-1/2 | -            | -                    | -        | 28           | 135625                | 1,368.74 |
| 8    | 13/16 | 1-1/2 | -            | -                    | -        | 28           | 135630                | 1,518.68 |
| 8    | 7/8   | 1-1/2 | -            | -                    | -        | 28           | 135635                | 1,380.65 |
| 8    | 15/16 | 1-1/2 | -            | -                    | -        | 28           | 135640                | 1,629.82 |
| 8    | 1     | 1-1/2 | -            | -                    | -        | 28           | 135645                | 1,481.79 |
| 8    | 1-1/8 | 1-1/2 | -            | -                    | -        | 28           | 135650                | 1,737.76 |
| 8    | 1-1/4 | 1-1/2 | -            | -                    | -        | 28           | 135655                | 1,667.16 |
| 8    | 1-1/2 | 1-1/2 | -            | -                    | -        | 28           | 135660                | 2,088.36 |
| 9    | 1/4   | 1-1/4 | 34           | 130485               | 1,289.57 | -            | -                     | -        |
| 9    | 3/8   | 1-1/4 | 34           | 130490               | 1,471.47 | 30           | 135665                | 1,451.26 |
| 9    | 1/2   | 1-1/4 | 34           | 130495               | 1,685.01 | 30           | 135670                | 1,629.82 |
| 9    | 5/8   | 1-1/4 | 34           | 130500               | 1,567.94 | 30           | 135675                | 1,737.76 |
| 9    | 3/4   | 1-1/4 | 34           | 130505               | 1,828.71 | 30           | 135680                | 1,894.40 |
| 9    | 1     | 1-1/4 | 34           | 130510               | 1,856.03 | 30           | 135685                | 2,585.37 |
| 9    | 1/4   | 1-1/2 | -            | -                    | -        | 30           | 135690                | 1,289.57 |
| 9    | 3/8   | 1-1/2 | -            | -                    | -        | 30           | 135695                | 1,318.92 |
| 9    | 1/2   | 1-1/2 | -            | -                    | -        | 30           | 135700                | 1,481.79 |
| 9    | 5/8   | 1-1/2 | -            | -                    | -        | 30           | 135705                | 1,737.76 |
| 9    | 3/4   | 1-1/2 | -            | -                    | -        | 30           | 135710                | 1,894.40 |
| 9    | 1     | 1-1/2 | -            | -                    | -        | 30           | 135715                | 1,852.85 |
| 10   | 3/8   | 1-1/4 | -            | -                    | -        | 32           | 135720                | 2,030.82 |
| 10   | 5/8   | 1-1/4 | 36           | 130515               | 1,917.21 | -            | -                     | -        |
| 10   | 3/4   | 1-1/4 | 36           | 130520               | 2,692.70 | -            | -                     | -        |
| 10   | 13/16 | 1-1/4 | -            | -                    | -        | 32           | 135725                | 2,683.28 |
| 10   | 1/4   | 1-1/2 | 36           | 130525               | 1,714.07 | 32           | 135730                | 1,754.63 |
| 10   | 5/16  | 1-1/2 | 36           | 130530               | 1,884.37 | 32           | 135735                | 1,919.82 |
| 10   | 3/8   | 1-1/2 | 36           | 130535               | 1,997.24 | 32           | 135740                | 2,027.63 |
| 10   | 7/16  | 1-1/2 | 36           | 130540               | 2,197.89 | 32           | 135745                | 1,758.41 |
| 10   | 1/2   | 1-1/2 | 36           | 130545               | 2,280.42 | 32           | 135750                | 2,304.10 |
| 10   | 9/16  | 1-1/2 | 36           | 130550               | 2,123.37 | 32           | 135755                | 2,356.25 |
| 10   | 5/8   | 1-1/2 | 36           | 130555               | 2,425.41 | 32           | 135760                | 2,214.30 |
| 10   | 11/16 | 1-1/2 | 36           | 130560               | 1,982.14 | 32           | 135765                | 2,521.59 |
| 10   | 3/4   | 1-1/2 | -            | -                    | -        | 32           | 135770                | 2,572.00 |
| 10   | 13/16 | 1-1/2 | 36           | 130570               | 2,678.22 | 32           | 135775                | 2,683.28 |
| 10   | 7/8   | 1-1/2 | 36           | 130575               | 2,789.36 | 32           | 135780                | 2,806.20 |
| 10   | 15/16 | 1-1/2 | 36           | 130580               | 2,909.07 | 32           | 135785                | 2,660.35 |
| 10   | 1     | 1-1/2 | 36           | 130585               | 2,852.73 | 32           | 135790                | 3,065.67 |
| 10   | 1-1/8 | 1-1/2 | -            | -                    | -        | 32           | 135800                | 2,937.11 |
| 10   | 1-1/4 | 1-1/2 | 36           | 130590               | 3,274.90 | 32           | 135805                | 3,630.42 |
| 10   | 1-1/2 | 1-1/2 | 36           | 130595               | 3,527.72 | 32           | 135810                | 4,132.51 |

## Plain Tooth Slitting Saws

- Plain tooth with side chip clearance



| Dia.  | No. of Teeth | Thickness | Hole Size | Code No. | Price \$ |
|-------|--------------|-----------|-----------|----------|----------|
| 2     | 22           | 1/16      | 5/8       | 135870   | 142.52   |
| 2     | 22           | 5/64      | 5/8       | 135871   | 125.23   |
| 2     | 22           | 3/32      | 5/8       | 135872   | 125.05   |
| 2     | 22           | 1/8       | 5/8       | 135874   | 125.03   |
| 2     | 22           | 5/32      | 5/8       | 135877   | 129.61   |
| 2-1/2 | 28           | 1/16      | 7/8       | 135878   | 156.20   |
| 2-1/2 | 28           | 1/16      | 1         | 135879   | 145.03   |
| 2-1/2 | 28           | 5/64      | 7/8       | 135880   | 122.91   |
| 2-1/2 | 28           | 3/32      | 7/8       | 135900   | 159.75   |
| 2-1/2 | 28           | 3/32      | 1         | 135901   | 145.45   |
| 2-1/2 | 28           | 7/64      | 7/8       | 135902   | 94.81    |
| 2-1/2 | 28           | 1/8       | 7/8       | 135905   | 148.59   |
| 2-1/2 | 28           | 1/8       | 1         | 135903   | 149.13   |
| 2-1/2 | 28           | 9/64      | 7/8       | 135904   | 110.55   |
| 2-1/2 | 28           | 11/64     | 7/8       | 135907   | 110.55   |
| 3     | 32           | 1/16      | 1         | 135911   | 177.81   |
| 3     | 32           | 5/64      | 1         | 135906   | 168.13   |
| 3     | 32           | 3/32      | 1         | 135910   | 166.85   |
| 3     | 32           | 7/64      | 1         | 135912   | 170.19   |
| 3     | 32           | 7/64      | 1-1/4     | 135914   | 118.26   |
| 3     | 32           | 1/8       | 1         | 135915   | 169.77   |
| 3     | 32           | 9/64      | 1         | 135917   | 174.47   |
| 3     | 32           | 9/64      | 1-1/4     | 135916   | 162.15   |
| 3     | 32           | 5/32      | 1         | 135920   | 178.60   |
| 3     | 32           | 11/64     | 1         | 135921   | 147.45   |
| 3     | 32           | 11/64     | 1-1/4     | 135922   | 141.80   |
| 3     | 32           | 3/16      | 1         | 135925   | 189.20   |
| 3     | 32           | 3/16      | 1-1/4     | 135926   | 173.48   |
| 3     | 32           | 7/32      | 1         | 135927   | 192.98   |
| 3     | 32           | 7/32      | 1-1/4     | 135928   | 118.26   |
| 3     | 32           | 1/4       | 1         | 135929   | 201.44   |
| 3     | 32           | 1/4       | 1-1/4     | 135931   | 185.53   |
| 4     | 36           | 1/16      | 1         | 135933   | 257.98   |
| 4     | 36           | 1/16      | 1-1/4     | 135934   | 253.37   |
| 4     | 36           | 5/64      | 1         | 135936   | 231.60   |
| 4     | 36           | 3/32      | 1         | 135930   | 237.51   |
| 4     | 36           | 3/32      | 1-1/4     | 135938   | 233.30   |
| 4     | 36           | 7/64      | 1         | 135932   | 236.49   |
| 4     | 36           | 7/64      | 1-1/4     | 135939   | 120.88   |
| 4     | 36           | 1/8       | 1         | 135935   | 235.56   |
| 4     | 36           | 1/8       | 1-1/4     | 135941   | 232.60   |
| 4     | 36           | 9/64      | 1         | 135937   | 238.69   |
| 4     | 36           | 9/64      | 1-1/4     | 135942   | 228.68   |
| 4     | 36           | 5/32      | 1         | 135940   | 252.27   |
| 4     | 36           | 5/32      | 1-1/4     | 135943   | 238.97   |
| 4     | 36           | 11/64     | 1         | 135944   | 236.83   |
| 4     | 36           | 11/64     | 1-1/4     | 135946   | 190.18   |
| 4     | 36           | 3/16      | 1         | 135945   | 265.51   |
| 4     | 36           | 3/16      | 1-1/4     | 135947   | 260.61   |
| 4     | 36           | 7/32      | 1         | 135948   | 245.83   |
| 4     | 36           | 7/32      | 1-1/4     | 135949   | 248.88   |
| 4     | 36           | 1/4       | 1         | 135951   | 283.77   |
| 4     | 36           | 1/4       | 1-1/4     | 135953   | 281.66   |
| 5     | 40           | 1/16      | 1         | 135954   | 315.94   |
| 5     | 40           | 1/16      | 1-1/4     | 135956   | 317.16   |
| 5     | 40           | 3/32      | 1         | 135950   | 312.05   |
| 5     | 40           | 3/32      | 1-1/4     | 135952   | 294.49   |
| 5     | 40           | 7/64      | 1         | 135957   | 316.75   |
| 5     | 40           | 7/16      | 1-1/4     | 135958   | 164.46   |
| 5     | 40           | 1/8       | 1         | 135955   | 318.45   |
| 5     | 40           | 1/8       | 1-1/4     | 135960   | 328.45   |
| 5     | 40           | 9/64      | 1         | 135959   | 308.89   |
| 5     | 40           | 9/64      | 1-1/4     | 135961   | 313.23   |
| 5     | 40           | 5/32      | 1         | 135970   | 349.62   |
| 5     | 40           | 5/32      | 1-1/4     | 135965   | 351.94   |
| 5     | 40           | 11/64     | 1         | 135962   | 325.87   |
| 5     | 40           | 11/64     | 1-1/4     | 135963   | 228.98   |
| 5     | 40           | 3/16      | 1         | 135975   | 362.96   |
| 5     | 40           | 3/16      | 1-1/4     | 135977   | 365.20   |



## Staggered Tooth Slitting Saws

- Staggered tooth with side chip clearance



## Plain Tooth Slitting Saws — Cont'd

| Dia. | No. of Teeth | Thickness | Hole Size | Code No. | Price \$ |
|------|--------------|-----------|-----------|----------|----------|
| 5    | 40           | 7/32      | 1         | 135964   | 372.03   |
| 5    | 40           | 7/32      | 1-1/4     | 135966   | 368.53   |
| 5    | 40           | 1/4       | 1         | 135967   | 387.60   |
| 5    | 40           | 1/4       | 1-1/4     | 135968   | 357.11   |
| 6    | 42           | 1/16      | 1         | 135969   | 432.97   |
| 6    | 42           | 1/16      | 1-1/4     | 135971   | 426.56   |
| 6    | 42           | 3/32      | 1         | 135972   | 408.21   |
| 6    | 42           | 3/32      | 1-1/4     | 135973   | 407.54   |
| 6    | 42           | 7/64      | 1         | 135974   | 382.11   |
| 6    | 42           | 7/64      | 1-1/4     | 135976   | 344.03   |
| 6    | 42           | 1/8       | 1         | 135980   | 417.63   |
| 6    | 42           | 1/8       | 1-1/4     | 135985   | 422.30   |
| 6    | 42           | 9/64      | 1         | 135986   | 395.04   |
| 6    | 42           | 9/64      | 1-1/4     | 135987   | 387.77   |
| 6    | 42           | 5/32      | 1         | 135988   | 449.87   |
| 6    | 42           | 5/32      | 1-1/4     | 135989   | 410.58   |
| 6    | 42           | 11/64     | 1         | 135991   | 387.77   |
| 6    | 42           | 11/64     | 1-1/4     | 135992   | 387.77   |
| 6    | 42           | 3/16      | 1         | 135990   | 460.34   |
| 6    | 42           | 3/16      | 1-1/4     | 135995   | 460.34   |
| 6    | 42           | 1/4       | 1         | 135993   | 479.41   |
| 6    | 42           | 1/4       | 1-1/4     | 135994   | 252.21   |
| 8    | 48           | 1/8       | 1         | 135857   | 458.09   |
| 8    | 48           | 1/8       | 1-1/4     | 135996   | 912.23   |
| 8    | 48           | 3/16      | 1-1/4     | 135997   | 912.23   |
| 8    | 48           | 1/4       | 1-1/4     | 135998   | 840.34   |
| 10   | 50           | 3/16      | 1-1/4     | 135863   | 1,320.51 |
| 10   | 50           | 3/16      | 1-1/2     | 135864   | 1,320.51 |
| 10   | 50           | 1/4       | 1-1/2     | 135866   | 988.95   |

| Dia. | No. of Teeth | Thickness | Hole Size | Code No. | Price \$ |
|------|--------------|-----------|-----------|----------|----------|
| 3    | 32           | 1/16      | 1         | 138900   | 260.28   |
| 3    | 32           | 1/16      | 1-1/4     | 138901   | 207.62   |
| 3    | 32           | 5/64      | 1         | 138902   | 237.95   |
| 3    | 32           | 5/64      | 1-1/4     | 138903   | 189.60   |
| 3    | 32           | 3/32      | 1         | 138904   | 237.95   |
| 3    | 32           | 3/32      | 1-1/4     | 138905   | 204.30   |
| 3    | 32           | 7/64      | 1         | 138906   | 231.13   |
| 3    | 32           | 1/8       | 1         | 140102   | 254.88   |
| 3    | 32           | 9/64      | 1         | 138909   | 246.99   |
| 3    | 32           | 9/64      | 1-1/4     | 138910   | 195.99   |
| 3    | 32           | 5/32      | 1         | 140103   | 250.35   |
| 3    | 32           | 5/32      | 1-1/4     | 138911   | 199.77   |
| 3    | 32           | 11/64     | 1         | 138912   | 143.36   |
| 3    | 32           | 3/16      | 1         | 140105   | 228.11   |
| 3    | 32           | 3/16      | 1-1/4     | 138914   | 189.90   |
| 3    | 32           | 7/32      | 1         | 138915   | 194.49   |
| 3    | 32           | 1/4       | 1         | 140106   | 243.86   |
| 4    | 34           | 1/16      | 1         | 138917   | 334.69   |
| 4    | 34           | 1/16      | 1-1/4     | 138918   | 287.99   |
| 4    | 34           | 5/64      | 1         | 138919   | 307.40   |
| 4    | 34           | 5/64      | 1-1/4     | 138920   | 245.68   |
| 4    | 34           | 3/32      | 1         | 138921   | 312.33   |
| 4    | 34           | 3/32      | 1-1/4     | 139922   | 294.10   |
| 4    | 34           | 7/64      | 1         | 139923   | 319.73   |
| 4    | 34           | 7/64      | 1-1/4     | 139924   | 196.81   |
| 4    | 34           | 1/8       | 1         | 139925   | 319.79   |
| 4    | 34           | 1/8       | 1-1/4     | 139926   | 303.13   |
| 4    | 34           | 9/64      | 1         | 140107   | 327.25   |
| 4    | 34           | 9/64      | 1-1/4     | 139927   | 261.22   |
| 4    | 34           | 5/32      | 1         | 140108   | 334.62   |
| 4    | 34           | 5/32      | 1-1/4     | 139928   | 329.65   |
| 4    | 34           | 11/64     | 1-1/4     | 139930   | 161.91   |
| 4    | 34           | 3/16      | 1         | 140110   | 339.61   |
| 4    | 34           | 3/16      | 1-1/4     | 139931   | 297.16   |
| 4    | 34           | 7/32      | 1         | 139932   | 274.71   |
| 4    | 34           | 1/4       | 1         | 140111   | 286.27   |
| 4    | 34           | 1/4       | 1-1/4     | 140112   | 332.19   |
| 5    | 38           | 3/32      | 1         | 139934   | 409.01   |
| 5    | 38           | 1/8       | 1         | 139935   | 421.36   |
| 5    | 38           | 1/8       | 1-1/4     | 140113   | 421.44   |
| 5    | 38           | 9/64      | 1         | 139937   | 199.31   |
| 5    | 38           | 9/64      | 1-1/4     | 139938   | 199.31   |
| 5    | 38           | 5/32      | 1         | 139939   | 433.82   |
| 5    | 38           | 5/32      | 1-1/4     | 139940   | 255.58   |
| 5    | 38           | 11/64     | 1         | 140114   | 211.63   |
| 5    | 38           | 11/64     | 1-1/4     | 139941   | 216.84   |
| 5    | 38           | 3/16      | 1         | 140115   | 451.11   |
| 5    | 38           | 3/16      | 1-1/4     | 140117   | 448.66   |
| 5    | 38           | 1/4       | 1         | 140120   | 461.12   |
| 5    | 38           | 1/4       | 1-1/4     | 139942   | 429.25   |
| 6    | 42           | 1/8       | 1         | 139943   | 532.91   |
| 6    | 42           | 1/8       | 1-1/4     | 140121   | 510.61   |
| 6    | 42           | 9/64      | 1         | 139944   | 267.03   |
| 6    | 42           | 5/32      | 1         | 139946   | 545.36   |
| 6    | 42           | 5/32      | 1-1/4     | 140122   | 474.57   |
| 6    | 42           | 11/64     | 1         | 139947   | 450.24   |
| 6    | 42           | 3/16      | 1         | 140125   | 570.10   |
| 6    | 42           | 3/16      | 1-1/4     | 140130   | 575.09   |
| 6    | 42           | 1/4       | 1         | 140135   | 592.49   |
| 6    | 42           | 1/4       | 1-1/4     | 140140   | 587.48   |
| 7    | 46           | 1/8       | 1         | 139949   | 666.17   |
| 7    | 46           | 3/16      | 1-1/4     | 139952   | 830.41   |
| 8    | 50           | 3/16      | 1         | 139953   | 801.41   |
| 8    | 50           | 3/16      | 1-1/4     | 140145   | 957.17   |
| 8    | 50           | 1/4       | 1-1/4     | 140150   | 990.27   |
| 10   | 60           | 3/16      | 1-1/4     | 139954   | 1,555.88 |
| 10   | 60           | 1/4       | 1-1/4     | 140155   | 1,694.81 |



Cutting Tools

Hand Tools See Chapter K

## Plain Metal Slitting Saws



| Dia.  | No. of Teeth | Face Width | Hole Size | Code No. | Price \$ |
|-------|--------------|------------|-----------|----------|----------|
| 1-3/4 | 28           | 1/32       | 1/2       | 139150   | 56.68    |
| 2     | 28           | 3/32       | 1/2       | 139152   | 57.89    |
| 2     | 28           | 1/16       | 1/2       | 136001   | 52.04    |
| 2     | 28           | 1/8        | 1/2       | 139164   | 56.73    |
| 2-1/2 | 28           | 3/64       | 3/8       | 136003   | 56.68    |
| 2-1/2 | 28           | 1/32       | 3/8       | 139153   | 56.68    |
| 2-1/2 | 28           | 1/32       | 7/8       | 136004   | 56.68    |
| 2-1/2 | 28           | 3/64       | 7/8       | 136005   | 56.68    |
| 2-1/2 | 28           | 1/16       | 7/8       | 136006   | 56.30    |
| 2-1/2 | 28           | 3/32       | 7/8       | 139154   | 56.54    |
| 2-1/2 | 28           | 1/8        | 7/8       | 136007   | 56.73    |
| 2-1/2 | 28           | 1/16       | 1         | 136008   | 56.30    |
| 3     | 30           | 1/64       | 1         | 136009   | 105.59   |
| 3     | 30           | 1/32       | 1         | 136010   | 61.80    |
| 3     | 30           | 3/64       | 1         | 136011   | 63.06    |
| 3     | 30           | 1/16       | 1         | 136012   | 66.33    |
| 3     | 30           | 5/64       | 1         | 136013   | 66.49    |
| 3     | 30           | 3/32       | 1         | 136014   | 64.94    |
| 3     | 30           | 7/64       | 1         | 136015   | 67.76    |
| 3     | 30           | 1/8        | 1         | 136016   | 67.29    |
| 3     | 30           | 9/64       | 1         | 136017   | 69.39    |
| 3     | 30           | 5/32       | 1         | 136018   | 70.70    |
| 3     | 30           | 3/16       | 1         | 136019   | 75.36    |
| 3-1/2 | 30           | 1/32       | 1         | 136020   | 87.60    |
| 3-1/2 | 30           | 3/64       | 1         | 136021   | 92.71    |
| 3-1/2 | 30           | 1/16       | 1         | 136022   | 90.82    |
| 3-1/2 | 30           | 3/32       | 1         | 136023   | 94.76    |
| 3-1/2 | 30           | 1/8        | 1         | 136024   | 100.74   |
| 3-1/2 | 36           | 1/8        | 1         | 139155   | 101.23   |
| 3-1/2 | 30           | 9/64       | 1         | 139156   | 93.39    |
| 3-1/2 | 30           | 3/16       | 1         | 136027   | 110.33   |
| 4     | 36           | 1/64       | 1         | 136028   | 144.22   |
| 4     | 36           | 1/32       | 1         | 136029   | 87.60    |
| 4     | 36           | 3/64       | 1         | 136030   | 92.58    |
| 4     | 36           | 1/16       | 1         | 136031   | 90.83    |
| 4     | 36           | 5/64       | 1         | 136032   | 96.20    |
| 4     | 36           | 3/32       | 1         | 136033   | 96.71    |
| 4     | 36           | 7/64       | 1         | 136034   | 100.88   |
| 4     | 36           | 1/8        | 1         | 136035   | 101.28   |
| 4     | 36           | 9/64       | 1         | 136036   | 105.08   |
| 4     | 36           | 5/32       | 1         | 136037   | 104.06   |
| 4     | 36           | 3/16       | 1         | 136038   | 110.33   |
| 4-1/2 | 36           | 1/32       | 1         | 136039   | 142.50   |
| 4-1/2 | 36           | 3/64       | 1         | 136040   | 120.29   |
| 4-1/2 | 36           | 1/16       | 1         | 136041   | 120.29   |
| 4-1/2 | 36           | 3/32       | 1         | 136042   | 133.60   |
| 4-1/2 | 36           | 1/8        | 1         | 136043   | 138.72   |
| 5     | 40           | 3/64       | 1         | 136044   | 122.91   |
| 5     | 40           | 1/16       | 1         | 136045   | 120.94   |
| 5     | 40           | 5/64       | 1         | 136046   | 129.14   |
| 5     | 40           | 3/32       | 1         | 136047   | 132.44   |
| 5     | 40           | 7/64       | 1         | 136048   | 134.67   |
| 5     | 40           | 1/8        | 1         | 136049   | 138.72   |
| 5     | 40           | 9/64       | 1         | 136050   | 145.04   |
| 5     | 40           | 5/32       | 1         | 136051   | 145.04   |
| 5     | 40           | 3/16       | 1         | 136052   | 154.15   |
| 5     | 40           | 1/16       | 1-1/4     | 136053   | 122.01   |
| 5     | 40           | 3/32       | 1-1/4     | 136054   | 132.44   |
| 5     | 40           | 1/8        | 1-1/4     | 136055   | 136.62   |
| 5     | 40           | 5/32       | 1-1/4     | 136056   | 142.69   |
| 5     | 42           | 3/16       | 1-1/4     | 136057   | 155.90   |
| 6     | 42           | 3/64       | 1         | 136058   | 180.35   |
| 6     | 42           | 1/16       | 1         | 136059   | 159.54   |
| 6     | 42           | 5/64       | 1         | 136060   | 166.37   |
| 6     | 42           | 3/32       | 1         | 136061   | 183.92   |
| 6     | 42           | 7/64       | 1         | 136062   | 196.72   |
| 6     | 42           | 1/8        | 1         | 136063   | 187.38   |
| 6     | 42           | 9/64       | 1         | 136064   | 196.71   |



## Plain Metal Slitting Saws — Cont'd

| Dia. | No. of Teeth | Face Width | Hole Size | Code No. | Price \$ |
|------|--------------|------------|-----------|----------|----------|
| 6    | 42           | 5/32       | 1         | 136065   | 218.62   |
| 6    | 42           | 3/16       | 1         | 136066   | 224.68   |
| 6    | 42           | 1/16       | 1-1/4     | 136067   | 157.19   |
| 6    | 42           | 3/32       | 1-1/4     | 136068   | 178.26   |
| 6    | 42           | 1/8        | 1-1/4     | 136069   | 187.38   |
| 6    | 42           | 5/32       | 1-1/4     | 136070   | 224.64   |
| 6    | 42           | 3/16       | 1-1/4     | 136071   | 243.92   |
| 8    | 48           | 3/32       | 1         | 139159   | 354.73   |
| 8    | 48           | 1/8        | 1         | 136072   | 398.47   |
| 8    | 48           | 3/16       | 1         | 136073   | 466.02   |
| 8    | 48           | 3/32       | 1-1/4     | 136074   | 352.55   |
| 8    | 48           | 1/8        | 1-1/4     | 136075   | 394.15   |
| 8    | 48           | 3/16       | 1-1/4     | 136076   | 443.44   |
| 10   | 56           | 3/32       | 1-1/4     | 139162   | 573.16   |
| 10   | 56           | 1/8        | 1-1/4     | 136077   | 588.98   |
| 10   | 56           | 3/16       | 1-1/4     | 136078   | 710.54   |
| 10   | 62           | 1/4        | 1-1/4     | 139163   | 702.90   |

## Single Angle Cutters

- Right hand and left hand
- 45° and 60° angles



| Dia.  | Face Width | No. of Teeth | Hole Size | Angle | Right Code No. | Price \$ | Left Code No. | Price \$ |
|-------|------------|--------------|-----------|-------|----------------|----------|---------------|----------|
| 2-1/2 | 1/2        | 18           | 7/8       | 45°   | 136550         | 286.46   | 136583        | 336.96   |
| 2-1/2 | 1/2        | 18           | 7/8       | 60°   | 136551         | 216.43   | 136584        | 318.19   |
| 2-3/4 | 1/2        | 18           | 1         | 45°   | 136552         | 268.01   | 136585        | 276.30   |
| 2-3/4 | 1/2        | 18           | 1         | 60°   | 136553         | 270.65   | 136586        | 251.01   |
| 3     | 1/2        | 22           | 1         | 45°   | 136554         | 280.86   | 136587        | 313.51   |
| 3     | 1/2        | 22           | 1         | 60°   | 136555         | 310.97   | 136588        | 303.75   |
| 3     | 1/2        | 22           | 1-1/4     | 45°   | 136556         | 336.38   | 136589        | 286.23   |
| 3     | 1/2        | 22           | 1-1/4     | 60°   | 136557         | 270.44   | 136590        | 151.10   |
| 3     | 5/8        | 22           | 1         | 45°   | 136558         | 465.09   | 136591        | 309.31   |
| 3     | 5/8        | 22           | 1         | 60°   | 136559         | 400.42   | 136592        | 250.04   |
| 3     | 5/8        | 22           | 1-1/4     | 45°   | 136560         | 383.82   | 136593        | 274.74   |
| 3     | 5/8        | 22           | 1-1/4     | 60°   | 136561         | 369.71   | 136594        | 274.74   |
| 3     | 3/4        | 22           | 1         | 45°   | 136562         | 473.83   | 136595        | 399.39   |
| 3     | 3/4        | 22           | 1         | 60°   | 136563         | 425.70   | 136596        | 426.68   |
| 3     | 3/4        | 22           | 1-1/4     | 60°   | 136564         | 449.32   | 136597        | 447.41   |
| 4     | 1/2        | 26           | 1         | 45°   | 136565         | 635.87   | 136598        | 497.31   |
| 4     | 1/2        | 26           | 1         | 60°   | 136566         | 609.55   | 136599        | 354.21   |
| 4     | 1/2        | 26           | 1-1/4     | 45°   | 136567         | 389.67   | 136600        | 497.31   |
| 4     | 1/2        | 26           | 1-1/4     | 60°   | 136568         | 563.35   | 136601        | 389.67   |
| 4     | 3/4        | 26           | 1         | 45°   | 136569         | 751.49   | 136602        | 579.70   |
| 4     | 3/4        | 26           | 1         | 60°   | 136570         | 722.35   | 136603        | 614.67   |
| 4     | 3/4        | 26           | 1-1/4     | 45°   | 136571         | 675.17   | 136604        | 684.18   |
| 4     | 3/4        | 26           | 1-1/4     | 60°   | 136572         | 600.90   | 136605        | 579.70   |
| 4     | 1          | 26           | 1-1/4     | 45°   | 136573         | 715.18   | 136606        | 638.97   |
| 4     | 1          | 26           | 1-1/4     | 60°   | 136574         | 715.19   | 136607        | 638.97   |
| 5     | 3/4        | 28           | 1-1/4     | 45°   | 136575         | 560.81   | 136608        | 724.99   |
| 5     | 3/4        | 28           | 1-1/4     | 60°   | 136576         | 728.63   | 136609        | 702.74   |
| 5     | 1          | 28           | 1-1/4     | 45°   | 136577         | 1,047.89 | 136610        | 936.33   |
| 5     | 1          | 28           | 1-1/4     | 60°   | 136578         | 871.76   | 136611        | 840.92   |
| 6     | 3/4        | 30           | 1-1/4     | 45°   | 136579         | 1,111.29 | 136612        | 879.87   |
| 6     | 3/4        | 30           | 1-1/4     | 60°   | 136580         | 879.87   | 136613        | 958.35   |
| 6     | 1          | 30           | 1-1/4     | 45°   | 136581         | 1,103.88 | 136614        | 1,103.88 |
| 6     | 1          | 30           | 1-1/4     | 60°   | 136582         | 1,103.88 | 136615        | 1,103.88 |

## Concave Cutters



| Circle Dia. | Cutter Dia. | Hole Size | No. of Teeth | Code No. | Price \$ |
|-------------|-------------|-----------|--------------|----------|----------|
| 1/16        | 2-1/4       | 1         | 14           | 136655   | 182.10   |
| 3/32        | 2-1/4       | 1         | 14           | 136656   | 134.24   |
| 1/8         | 2-1/4       | 1         | 14           | 136657   | 188.08   |
| 5/32        | 2-1/4       | 1         | 14           | 136658   | 313.07   |
| 3/16        | 2-1/4       | 1         | 14           | 136659   | 288.55   |
| 7/32        | 2-1/4       | 1         | 14           | 136660   | 319.46   |
| 1/4         | 2-1/2       | 1         | 12           | 136661   | 262.76   |
| 9/32        | 2-1/2       | 1         | 12           | 136662   | 350.28   |
| 5/16        | 2-3/4       | 1         | 12           | 136663   | 267.78   |
| 11/32       | 2-3/4       | 1         | 12           | 136664   | 290.87   |
| 3/8         | 2-3/4       | 1         | 12           | 136665   | 306.50   |
| 13/32       | 2-3/4       | 1         | 12           | 136666   | 231.02   |
| 7/16        | 3           | 1         | 12           | 136667   | 412.18   |
| 1/2         | 2-1/4       | 7/8       | 12           | 136668   | 485.20   |
| 1/2         | 3           | 1         | 12           | 136669   | 365.24   |
| 9/16        | 3           | 1         | 12           | 136671   | 401.97   |
| 5/8         | 2-3/4       | 1         | 12           | 136672   | 654.32   |
| 5/8         | 3           | 1         | 12           | 136673   | 377.75   |
| 5/8         | 3-1/2       | 1-1/4     | 12           | 136674   | 565.66   |
| 11/16       | 3           | 1         | 12           | 136675   | 370.62   |
| 3/4         | 3           | 1         | 12           | 136676   | 617.49   |
| 3/4         | 3-3/4       | 1-1/4     | 12           | 136677   | 569.95   |
| 13/16       | 3-1/4       | 1-1/4     | 12           | 136679   | 452.44   |
| 7/8         | 3-1/4       | 1         | 12           | 136680   | 756.96   |
| 7/8         | 4           | 1-1/4     | 12           | 136681   | 452.44   |
| 15/16       | 3-1/2       | 1         | 10           | 136682   | 550.92   |
| 1           | 3-1/4       | 1         | 10           | 136683   | 798.22   |
| 1           | 4-1/4       | 1-1/4     | 10           | 136684   | 978.89   |
| 1-1/16      | 4           | 1-1/4     | 10           | 136685   | 1,028.34 |
| 1-1/8       | 4           | 1-1/4     | 10           | 136686   | 874.49   |
| 1-3/16      | 3-1/4       | 1         | 10           | 136687   | 874.49   |
| 1-1/4       | 4           | 1-1/4     | 10           | 136688   | 1,525.49 |
| 1-3/8       | 4-1/4       | 1-1/4     | 10           | 136689   | 1,041.27 |
| 1-1/2       | 4-1/4       | 1-1/4     | 10           | 136690   | 1,254.11 |
| 1-5/8       | 5-1/2       | 1-1/4     | 10           | 136691   | 1,274.88 |
| 1-3/4       | 5-1/2       | 1-1/4     | 10           | 136692   | 2,662.81 |
| 1-7/8       | 6           | 1-1/2     | 10           | 136693   | 1,645.21 |
| 2           | 6           | 1-1/2     | 10           | 136694   | 2,055.48 |

## Convex Cutters



| Circle Dia. | Cutter Dia. | Hole Size | No. of Teeth | Code No. | Price \$ |
|-------------|-------------|-----------|--------------|----------|----------|
| 1/16        | 2-1/4       | 1         | 14           | 136700   | 247.33   |
| 3/32        | 2-1/4       | 1         | 14           | 136702   | 244.72   |
| 1/8         | 2           | 7/8       | 14           | 136703   | 229.18   |
| 1/8         | 2-1/4       | 1         | 14           | 136704   | 247.29   |
| 5/32        | 2-1/4       | 1         | 14           | 136705   | 252.25   |
| 3/16        | 2           | 7/8       | 14           | 136706   | 172.10   |
| 3/16        | 2-1/4       | 1         | 14           | 136707   | 218.08   |
| 7/32        | 2-1/4       | 1         | 14           | 136708   | 200.42   |
| 1/4         | 2           | 7/8       | 14           | 136709   | 226.68   |
| 1/4         | 2-1/4       | 1         | 14           | 136710   | 257.51   |
| 1/4         | 2-1/2       | 1         | 14           | 136711   | 221.53   |
| 9/32        | 2-1/2       | 1         | 14           | 136712   | 252.68   |
| 11/32       | 2-3/4       | 1         | 12           | 136714   | 304.00   |
| 3/8         | 2-1/4       | 7/8       | 12           | 136715   | 518.78   |
| 3/8         | 2-3/4       | 1         | 12           | 136716   | 275.61   |
| 3/32        | 2-3/4       | 1         | 12           | 136717   | 319.43   |
| 7/16        | 3           | 1         | 12           | 136718   | 502.29   |
| 1/2         | 2-1/4       | 7/8       | 12           | 136719   | 225.78   |
| 1/2         | 3           | 1         | 12           | 136720   | 309.16   |
| 9/16        | 2-3/4       | 1         | 12           | 136721   | 438.33   |
| 9/16        | 3           | 1         | 12           | 136722   | 376.15   |
| 5/8         | 2-3/4       | 1         | 12           | 136723   | 415.88   |
| 5/8         | 3           | 1         | 12           | 136724   | 450.75   |
| 5/8         | 3-1/2       | 1-1/4     | 12           | 136725   | 453.33   |
| 11/16       | 3           | 1         | 12           | 136726   | 463.17   |
| 3/4         | 3           | 1         | 12           | 136727   | 342.30   |
| 3/4         | 3-3/4       | 1-1/4     | 12           | 136728   | 533.24   |
| 7/8         | 3-1/4       | 1         | 12           | 136730   | 587.34   |
| 7/8         | 4           | 1-1/4     | 12           | 136731   | 663.78   |
| 15/16       | 3-1/2       | 1         | 12           | 136732   | 467.54   |
| 1           | 3-1/4       | 1         | 12           | 136733   | 628.53   |
| 1           | 4-1/4       | 1-1/4     | 12           | 136734   | 796.16   |
| 1-1/8       | 4           | 1-1/4     | 12           | 136735   | 865.93   |
| 1-1/4       | 4           | 1-1/4     | 12           | 136736   | 1,004.69 |
| 1-3/8       | 4-1/4       | 1-1/4     | 12           | 136737   | 1,035.65 |
| 1-1/2       | 4-1/4       | 1-1/4     | 12           | 136738   | 1,089.04 |
| 1-5/8       | 5-1/2       | 1-1/4     | 12           | 136739   | 1,567.16 |
| 1-3/4       | 5-1/2       | 1-1/4     | 12           | 136740   | 1,254.97 |
| 1-7/8       | 6           | 1-1/2     | 12           | 136741   | 1,368.29 |
| 2           | 6           | 1-1/2     | 12           | 136742   | 1,428.15 |

## Double Angle Cutters

- 45°, 60°, and 90° angles



| Dia.  | Face Width | Hole Size | No. of Teeth | Angle | Code No. | Price \$ |
|-------|------------|-----------|--------------|-------|----------|----------|
| 2-3/4 | 1/2        | 1         | 18           | 45°   | 136620   | 296.92   |
| 2-3/4 | 1/2        | 1         | 18           | 60°   | 136621   | 291.71   |
| 2-3/4 | 1/2        | 1         | 18           | 90°   | 136622   | 291.67   |
| 3     | 5/8        | 1         | 22           | 45°   | 136623   | 467.71   |
| 3     | 5/8        | 1         | 22           | 60°   | 136624   | 420.41   |
| 3     | 5/8        | 1         | 22           | 90°   | 136625   | 415.21   |
| 3     | 3/4        | 1         | 22           | 60°   | 136626   | 512.38   |
| 3     | 3/4        | 1         | 22           | 90°   | 136627   | 511.71   |
| 4     | 1/2        | 1-1/4     | 26           | 45°   | 136628   | 591.45   |
| 4     | 1/2        | 1-1/4     | 26           | 60°   | 136629   | 515.69   |
| 4     | 1/2        | 1-1/4     | 26           | 90°   | 136630   | 591.45   |
| 4     | 3/4        | 1         | 26           | 45°   | 136631   | 700.90   |
| 4     | 3/4        | 1         | 26           | 60°   | 136632   | 584.04   |
| 4     | 3/4        | 1         | 26           | 90°   | 136633   | 700.92   |
| 4     | 3/4        | 1-1/4     | 26           | 45°   | 136634   | 667.32   |
| 4     | 3/4        | 1-1/4     | 26           | 60°   | 136635   | 700.90   |
| 4     | 3/4        | 1-1/4     | 26           | 90°   | 136636   | 667.32   |

| Dia. | Face Width | Hole Size | No. of Teeth | Angle | Code No. | Price \$ |
|------|------------|-----------|--------------|-------|----------|----------|
| 4    | 1          | 1-1/4     | 26           | 60°   | 136637   | 772.39   |
| 4    | 1          | 1-1/4     | 26           | 90°   | 136638   | 772.39   |
| 5    | 3/4        | 1-1/4     | 28           | 45°   | 136639   | 578.23   |
| 5    | 3/4        | 1-1/4     | 28           | 60°   | 136640   | 879.82   |
| 5    | 3/4        | 1-1/4     | 28           | 90°   | 136641   | 808.95   |
| 5    | 1          | 1-1/4     | 28           | 45°   | 136642   | 1,031.53 |
| 5    | 1          | 1-1/4     | 28           | 60°   | 136643   | 1,020.22 |
| 5    | 1          | 1-1/4     | 28           | 90°   | 136644   | 968.05   |
| 6    | 3/4        | 1-1/4     | 30           | 45°   | 136645   | 910.50   |
| 6    | 3/4        | 1-1/4     | 30           | 60°   | 136646   | 1,096.19 |
| 6    | 3/4        | 1-1/4     | 30           | 90°   | 136647   | 1,223.18 |
| 6    | 1          | 1-1/4     | 30           | 45°   | 136648   | 1,317.90 |
| 6    | 1          | 1-1/4     | 30           | 60°   | 136649   | 1,331.19 |
| 6    | 1          | 1-1/4     | 30           | 90°   | 136650   | 1,317.90 |
| 6    | 1-1/2      | 1-1/4     | 30           | 45°   | 136651   | 1,688.38 |
| 6    | 1-1/2      | 1-1/4     | 30           | 60°   | 136652   | 1,645.12 |
| 6    | 1-1/2      | 1-1/4     | 30           | 90°   | 136653   | 1,628.51 |

## Shell End Mills

- Right hand



| Mill Dia. | Hole Size | Length of Cut | No. of Teeth | Right Code No. | Price \$ |
|-----------|-----------|---------------|--------------|----------------|----------|
| 1-1/4     | 1/2       | 1             | 8            | 140160         | 166.30   |
| 1-1/2     | 1/2       | 1-1/8         | 8            | 140162         | 181.71   |
| 1-3/4     | 3/4       | 1-1/4         | 8            | 140164         | 207.13   |
| 2         | 3/4       | 1-3/8         | 10           | 140166         | 263.37   |
| 2-1/4     | 1         | 1-1/2         | 10           | 140168         | 299.20   |
| 2-1/2     | 1         | 1-5/8         | 10           | 140170         | 425.48   |
| 2-3/4     | 1         | 1-5/8         | 10           | 140172         | 447.15   |
| 3         | 1-1/4     | 1-3/4         | 10           | 140174         | 526.20   |
| 3-1/2     | 1-1/4     | 1-7/8         | 12           | 140176         | 679.51   |
| 4         | 1-1/2     | 2-1/4         | 14           | 140178         | 1,062.73 |
| 4-1/2     | 1-1/2     | 2-1/4         | 14           | 140180         | 729.92   |
| 5         | 1-1/2     | 2-1/4         | 16           | 140182         | 1,720.12 |
| 5-1/2     | 2         | 2-1/4         | 16           | 140184         | 1,909.64 |
| 6         | 2         | 2-1/4         | 16           | 140186         | 2,125.09 |

## Heavy Duty Plain Milling Cutters

- Right hand



| Mill Dia. | Hole Size | Length of Cut | No. of Teeth | Right Code No. | Price \$ |
|-----------|-----------|---------------|--------------|----------------|----------|
| 3         | 1-1/4     | 1-1/4         | 8            | 140215         | 276.79   |
| 4         | 1-1/2     | 2             | 10           | 140245         | 556.45   |
| 4         | 1-1/2     | 3             | 10           | 140250         | 820.88   |
| 4-1/2     | 2         | 6             | 10           | 140265         | 2,340.42 |

## Involute Gear Cutters

Used to mill spur gears having a 14-1/2° pressure angle. For each diametral pitch priced, 8 cutters are required to produce a full set of gears from 12 teeth to a rack. Eight cutters are made for each diametral pitch. When ordering state diametral pitch and the number of cutters from the table in accordance with the number of teeth to be cut. Specify arbor hole where choice exists.

These cutters may be sharpened repeatedly without changing their original form.



| Cutter No. | Range of Teeth Cut |
|------------|--------------------|
| 1          | 135 to Rack        |
| 2          | 55 to 134          |
| 3          | 35 to 54           |
| 4          | 26 to 34           |
| 5          | 21 to 25           |
| 6          | 17 to 20           |
| 7          | 14 to 16           |
| 8          | 12 to 13           |

## Screw Slotting Saws

### High Speed Steel

Standard screw slotting saws are available in 1-3/4" diameter with 90 teeth, 2-1/4" diameter with 60 teeth and 2-3/4" diameter with 72 teeth. Also available in a 2-3/4" diameter and 1" hole with 56 teeth.



### With 90 teeth



| Dia.  | Face Width | Hole Size | 90 Teeth Code No. | Price \$ |
|-------|------------|-----------|-------------------|----------|
| 1-3/4 | 0.010      | 1/2       | 137078            | 35.75    |
| 1-3/4 | 0.012      | 1/2       | 137079            | 30.66    |
| 1-3/4 | 0.020      | 1/2       | 137080            | 24.64    |
| 1-3/4 | 0.008      | 5/8       | 137081            | 39.31    |
| 1-3/4 | 0.010      | 5/8       | 137082            | 35.75    |
| 1-3/4 | 0.012      | 5/8       | 137083            | 32.82    |
| 1-3/4 | 0.014      | 5/8       | 137084            | 25.22    |
| 1-3/4 | 0.016      | 5/8       | 137085            | 25.22    |
| 1-3/4 | 0.018      | 5/8       | 137086            | 23.68    |
| 1-3/4 | 0.020      | 5/8       | 137087            | 24.64    |
| 1-3/4 | 0.023      | 5/8       | 137088            | 22.81    |
| 1-3/4 | 0.025      | 5/8       | 137089            | 24.64    |
| 1-3/4 | 0.028      | 5/8       | 137090            | 24.64    |
| 1-3/4 | 0.032      | 5/8       | 137091            | 26.69    |
| 1-3/4 | 0.036      | 5/8       | 137092            | 24.54    |
| 1-3/4 | 0.040      | 5/8       | 137093            | 24.54    |
| 1-3/4 | 0.045      | 5/8       | 137094            | 26.89    |
| 1-3/4 | 0.051      | 5/8       | 137095            | 26.89    |
| 1-3/4 | 0.057      | 5/8       | 137096            | 27.74    |
| 1-3/4 | 0.064      | 5/8       | 137097            | 30.45    |
| 1-3/4 | 0.072      | 5/8       | 137098            | 27.07    |

### With 60 teeth

| Dia.  | Face Width | Hole Size | 60 Teeth Code No. | Price \$ |
|-------|------------|-----------|-------------------|----------|
| 2-1/4 | 0.008      | 5/8       | 137099            | 67.79    |
| 2-1/4 | 0.010      | 5/8       | 137100            | 51.56    |
| 2-1/4 | 0.012      | 5/8       | 137101            | 42.42    |
| 2-1/4 | 0.014      | 5/8       | 137102            | 36.03    |
| 2-1/4 | 0.016      | 5/8       | 137103            | 36.85    |
| 2-1/4 | 0.018      | 5/8       | 137104            | 29.93    |
| 2-1/4 | 0.020      | 5/8       | 137105            | 31.51    |
| 2-1/4 | 0.023      | 5/8       | 137106            | 31.51    |
| 2-1/4 | 0.025      | 5/8       | 137107            | 31.15    |
| 2-1/4 | 0.028      | 5/8       | 137108            | 31.53    |
| 2-1/4 | 0.032      | 5/8       | 137109            | 29.40    |
| 2-1/4 | 0.035      | 5/8       | 137110            | 28.47    |
| 2-1/4 | 0.036      | 5/8       | 137111            | 29.43    |
| 2-1/4 | 0.040      | 5/8       | 137112            | 32.16    |
| 2-1/4 | 0.045      | 5/8       | 137113            | 33.66    |
| 2-1/4 | 0.051      | 5/8       | 137114            | 33.66    |
| 2-1/4 | 0.057      | 5/8       | 137115            | 32.86    |
| 2-1/4 | 0.064      | 5/8       | 137116            | 32.79    |
| 2-1/4 | 0.072      | 5/8       | 137117            | 33.66    |
| 2-1/4 | 0.081      | 5/8       | 137118            | 37.49    |
| 2-1/4 | 0.091      | 5/8       | 137119            | 38.05    |
| 2-1/4 | 0.102      | 5/8       | 137120            | 39.89    |



## Screw Slotting Saws — Cont'd

### With 72 teeth

| Dia.  | Face Width | Hole Size | 72 Teeth Code No. | Price \$ |
|-------|------------|-----------|-------------------|----------|
| 2-3/4 | 0.010      | 3/4       | 137001            | 60.30    |
| 2-3/4 | 0.012      | 3/4       | 137002            | 41.69    |
| 2-3/4 | 0.016      | 3/4       | 137004            | 49.93    |
| 2-3/4 | 0.020      | 3/4       | 137006            | 34.16    |
| 2-3/4 | 0.023      | 3/4       | 137007            | 27.07    |
| 2-3/4 | 0.025      | 3/4       | 137008            | 33.66    |
| 2-3/4 | 0.028      | 3/4       | 137009            | 46.28    |
| 2-3/4 | 0.032      | 3/4       | 137010            | 33.66    |
| 2-3/4 | 0.036      | 3/4       | 137011            | 33.66    |
| 2-3/4 | 0.040      | 3/4       | 137012            | 32.65    |
| 2-3/4 | 0.045      | 3/4       | 137013            | 37.64    |
| 2-3/4 | 0.051      | 3/4       | 137014            | 37.64    |
| 2-3/4 | 0.057      | 3/4       | 137015            | 38.64    |
| 2-3/4 | 0.064      | 3/4       | 137016            | 49.94    |
| 2-3/4 | 0.072      | 3/4       | 137017            | 38.05    |
| 2-3/4 | 0.081      | 3/4       | 137018            | 46.22    |
| 2-3/4 | 0.091      | 3/4       | 137019            | 47.36    |
| 2-3/4 | 0.102      | 3/4       | 137020            | 49.41    |
| 2-3/4 | 0.114      | 3/4       | 137021            | 51.13    |
| 2-3/4 | 0.128      | 3/4       | 137022            | 52.60    |
| 2-3/4 | 0.162      | 3/4       | 137023            | 65.82    |
| 2-3/4 | 0.182      | 3/4       | 137024            | 77.45    |

### With 72 Teeth and 56 Teeth

| Dia.  | Face Width | Hole Size | 72 Teeth Code No. | Price \$ | 56 Teeth Code No. | Price \$ |
|-------|------------|-----------|-------------------|----------|-------------------|----------|
| 2-3/4 | 0.010      | 1         | 137025            | 62.55    | -                 | -        |
| 2-3/4 | 0.012      | 1         | 137026            | 57.57    | 137052            | 55.06    |
| 2-3/4 | 0.013      | 1         | 137027            | 55.06    | -                 | -        |
| 2-3/4 | 0.014      | 1         | 137028            | 54.09    | 137055            | 51.87    |
| 2-3/4 | 0.016      | 1         | 137029            | 49.12    | 137056            | 48.54    |
| 2-3/4 | 0.018      | 1         | 137030            | 46.38    | 137057            | 45.48    |
| 2-3/4 | 0.020      | 1         | 137031            | 33.18    | 137058            | 31.63    |
| 2-3/4 | 0.023      | 1         | 137032            | 33.66    | 137059            | 31.37    |
| 2-3/4 | 0.025      | 1         | 137033            | 32.86    | 137060            | 31.37    |
| 2-3/4 | 0.028      | 1         | 137034            | 35.76    | 137061            | 31.63    |
| 2-3/4 | 0.032      | 1         | 137035            | 32.52    | 137062            | 33.66    |
| 2-3/4 | 0.036      | 1         | 137036            | 35.76    | 137063            | 33.66    |
| 2-3/4 | 0.040      | 1         | 137037            | 32.25    | 137064            | 32.65    |
| 2-3/4 | 0.045      | 1         | 137038            | 39.93    | 137065            | 37.64    |
| 2-3/4 | 0.051      | 1         | 137039            | 39.93    | 137066            | 37.64    |
| 2-3/4 | 0.057      | 1         | 137040            | 39.93    | 137067            | 38.61    |
| 2-3/4 | 0.064      | 1         | 137041            | 39.52    | 137068            | 43.79    |
| 2-3/4 | 0.072      | 1         | 137042            | 39.21    | 137069            | 39.86    |
| 2-3/4 | 0.081      | 1         | 137043            | 50.42    | 137070            | 44.00    |
| 2-3/4 | 0.091      | 1         | 137044            | 48.83    | -                 | -        |
| 2-3/4 | 0.102      | 1         | 137045            | 52.54    | 137072            | 49.41    |
| 2-3/4 | 0.114      | 1         | 137046            | 52.54    | 137073            | 52.54    |
| 2-3/4 | 0.128      | 1         | 137047            | 54.27    | 137074            | 52.60    |
| 2-3/4 | 0.144      | 1         | 137048            | 61.57    | 137075            | 60.30    |
| 2-3/4 | 0.162      | 1         | 137049            | 68.87    | 137076            | 65.82    |
| 2-3/4 | 0.182      | 1         | 137050            | 79.74    | -                 | -        |

## Solid Tungsten Carbide Saw Blades



### Slotting, Slitting, Mica Undercutting

- Standards
- Metrics
- Radius Saws
- Circular Slitting Knives
- Specials
- "V" Cutters
- Re-Sharpener
- All saws are hollow ground to our standards, or your specifications
- Sizes priced are considered standard saws
- For metrics, special sizes, or tolerances, call or write for availability and prices. Many variations can be made, some at no additional cost
- If you need engineering assistance in selecting or designing a saw, we're only a phone call away and delighted to help
- When ordering, specify: O.D.; I.D.; thickness; no. of teeth; hub (if desired); and any special tolerances or extras. Various quantity discounts are available on all saws
- Although not standard on carbide saws, the manufacturer can provide keyways upon request, at an additional cost



| O.D.  | I.D.<br>+0.001-0.000 |     | No. of Teeth | Thickness Range (dec.) | Thickness Range (in.) |
|-------|----------------------|-----|--------------|------------------------|-----------------------|
| 5/16  |                      | 1/8 | 12           | 0.011 - 0.045          | 1/32 - 3/64           |
| 3/8   | 1/8                  |     | 14           | 0.011 - 0.045          | 1/32 - 3/64           |
| 1/2   | 1/8                  |     | 14           | 0.011 - 0.045          | 1/32 - 3/64           |
| 9/16  | 3/16                 |     | 16           | 0.011 - 0.045          | 1/32 - 3/64           |
| 5/8   | 3/16                 |     | 16           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 11/16 | 3/16                 |     | 16           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 3/4   | 1/4                  |     | 18           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 7/8   | 5/16                 |     | 18           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 1     | 1/4                  |     |              |                        |                       |
|       | 5/16                 | 3/8 | 20           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 1-1/8 | 3/8                  |     | 22           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 1-1/4 | 5/16                 | 3/8 | 24           | 0.011 - 0.0625         | 1/32 - 1/16           |
| 1-3/8 |                      | 1/2 | 24           | 0.015 - 0.080          | 1/32 - 3/32           |
| 1-1/2 | 5/16                 |     | 32           | 0.015 - 0.080          | 1/32 - 3/32           |
| 1-3/4 | 1/2                  |     | 32           | 0.015 - 0.080          | 1/32 - 3/32           |
| 2     | 1/2                  |     | 40           | 0.015 - 0.125          | 1/32 - 1/8            |
| 2-1/4 | 5/8                  |     | 44           | 0.015 - 0.125          | 1/32 - 1/8            |
| 2-3/8 | 5/8                  |     | 48           | 0.015 - 0.125          | 1/32 - 1/8            |
| 2-1/2 | 1/2                  |     | 48           | 0.015 - 0.125          | 1/32 - 1/8            |
| 2-3/4 |                      | 1   | 56           | 0.015 - 0.125          | 1/32 - 1/8            |
| 3     |                      | 1   | 60           | 0.020 - 0.150          | 1/32 - 3/16           |
| 4     |                      | 1   | 72           | 0.020 - 0.150          | 1/32 - 1/4            |
| 5     |                      | 1   | 90           | 0.030 - 0.150          | 1/16 - 1/4            |
| 6     |                      | 1   | 120          | 0.020 - 0.150          | 1/32 - 1/4            |



## Revolving Knurling Tool Holder



The Revolving Head Knurling Tools embody all the features of standard model Knurling Tools plus one important extra – these tools are fitted with four pairs of knurls; any of which can be instantly brought to bear on the workpiece. No time is lost changing knurls. Furnished with press-style, standard face diamond pattern knurls in fine and coarse pitch.



### Holder

| Holder Size     | Dia. | Knurl Face Size | Hole | Code No. | Price \$ |
|-----------------|------|-----------------|------|----------|----------|
| 20 x 30 x 200mm | 20mm | 10mm            | 6mm  | 474200   | 523.25   |

### Replacement Knurls

| Size          | Replacement Knurls         | Pitch    | Code No. | Price \$ |
|---------------|----------------------------|----------|----------|----------|
| 20 x 10 x 6mm | Straight coarse            | 20 x 1   | 474230   | 18.33    |
| 20 x 10 x 6mm | Straight fine              | 20 x 0.6 | 474235   | 18.33    |
| 20 x 10 x 6mm | Diagonal coarse right hand | 20 x 1   | 474240   | 18.33    |
| 20 x 10 x 6mm | Diagonal fine right hand   | 20 x 0.6 | 474245   | 18.33    |
| 20 x 10 x 6mm | Diagonal left hand coarse  | 20 x 1   | 474250   | 18.33    |
| 20 x 10 x 6mm | Diagonal left hand fine    | 20 x 0.6 | 474255   | 18.33    |

## Keyway Broach Sets With Collared Bushings

- Specialty tools designed for cutting keyways in machined holes
- Typically used manually with an arbor press or hydraulic press to produce the keyways
- Well suited for use in a variety of ferrous and non-ferrous materials



| Model No.  | Description  | Dura Case EDP No. | Code No. | Price \$ |
|------------|--|-------------------|----------|----------|
| #1         | 3 Broaches: 1/16-I, 3/32-I, 1/8-I<br>5 Bushings: 1/4-I, 5/16-I, 3/8-I, 7/16-I, 1/2-I<br>15 Keyway Combinations   | 15315             | 182050   | 595.83   |
| C-1        | 4 Broaches: 1/8-II, 3/16-II, 1/4-III, 3/8-III<br>9 Bushings: 1/2-II, 5/8-II, 3/4-II, 7/8-II, 1-III, 1-1/8-III, 1-1/4-III, 1-3/8-III, 1-1/2-III<br>18 Keyway Combinations   | 15318             | 182052   | 1,040.74 |
| C-1A       | 4 Broaches: 1/8-II, 3/16-II, 1/4-III, 3/8-III<br>9 Bushings: 9/16-II, 11/16-II, 13/16-II, 15/16-III, 1-1/16-III, 1-3/16-III, 1-5/16-III, 1-7/16-III, 1-9/16-III<br>18 Keyway Combinations  | 15319             | 182054   | 1,040.74 |
| C-2        | 3 Broaches: 1/8-II, 3/16-III, 1/4-III<br>9 Bushings: 9/16-II, 11/16-II, 13/16-II, 15/16-III, 1-1/16-III, 1-3/16-III, 1-5/16-III, 1-7/16-III, 1-9/16-III<br>15 Keyway Combinations  | 15320             | 182056   | 882.59   |
| C-2A       | 3 Broaches: 1/8-II, 3/16-III, 1/4-III<br>9 Bushings: 1/2-II, 5/8-II, 3/4-II, 7/8-II, 1-III, 1-1/8-III, 1-1/4-III, 1-3/8-III, 1-1/2-III<br>15 Keyway Combinations   | 15321             | 182058   | 882.59   |
| C-10A      | 3 Broaches: 1/8-II, 3/16-III, 1/4-III<br>18 Bushings: 1/2-II, 9/16-II, 5/8-II, 11/16-II, 3/4-II, 13/16-II, 7/8-II, 15/16-III, 1-III, 1-1/16-III, 1-1/8-III, 1-3/16-III, 1-1/4-III, 1-5/16-III, 1-3/8-III, 1-7/16-III, 1-1/2-III, 1-9/16-III<br>30 Keyway Combinations          | 15330             | 182060   | 1,259.67 |
| C-10       | 4 Broaches: 1/8-II, 3/16-II, 1/4-III, 3/8-III<br>18 Bushings: 1/2-II, 9/16-II, 5/8-II, 11/16-II, 3/4-II, 13/16-II, 7/8-II, 15/16-III, 1-III, 1-1/16-III, 1-1/8-III, 1-3/16-III, 1-1/4-III, 1-5/16-III, 1-3/8-III, 1-7/16-III, 1-1/2-III, 1-9/16-III<br>36 Keyway Combinations  | 15336             | 182062   | 1,332.23 |
| #10 Metric | 2 Broaches: 2mm-I, 3mm-I<br>5 Bushings: 6mm-I, 7mm-I, 8mm-I, 9mm-I, 10mm-I<br>10 Keyway Combinations   | 15410             | 182064   | 533.98   |
| #18 Metric | 4 Broaches: 4mm-II, 5mm-II, 6mm-III, 8mm-III<br>9 Bushings: 12mm-II, 14mm-II, 16mm-II, 18mm-II, 20mm-III, 22mm-III, 24mm-III, 26mm-III, 28mm-III<br>18 Keyway Combinations   | 15418             | 182066   | 1,216.57 |
| #40 Metric | 6 Broaches: 2mm-I, 3mm-I, 4mm-II, 5mm-II, 6mm-III, 8mm-III<br>18 Bushings: 8mm-I, 10mm-I, 12mm-II, 14mm-II, 16mm-II, 18mm-II, 18mm-III, 19mm-III, 20mm-III, 22mm-III, 24mm-III, 25mm-III, 26mm-III, 28mm-III, 30mm-III, 32mm-III, 34mm-III, 36mm-III<br>36 Keyway Combinations | 15440             | 182068   | 1,981.44 |

## Keyway Broach Sets With Plain Bushings

- Specialty tools designed for cutting keyways in machined holes
- Typically used manually with an arbor press or hydraulic press to produce the keyways
- Well suited for use in a variety of ferrous and non-ferrous materials



| Model No.  | Description  | Wooden Case EDP No. | Code No. | Price \$ |
|------------|--|---------------------|----------|----------|
| 3-D        | 4 Broaches: 5/16-IV, 3/8-IV, 7/16-IV, 1/2-IV<br>8 Bushings: 1-1/2-IV, 1-5/8-IV, 1-3/4-IV, 1-7/8-IV, 2-IV, 2-1/8-IV, 2-1/4-IV, 2-1/2-IV<br>32 Keyway Combinations   | 15024               | 182014   | 2,083.81 |
| 3-DA       | 4 Broaches: 5/16-IV, 3/8-IV, 7/16-IV, 1/2-IV<br>8 Bushings: 1-7/16-IV, 1-9/16-IV, 1-11/16-IV, 1-13/16-IV, 1-15/16-IV, 2-3/16-IV, 2-7/16-IV, 2-15/16-IV<br>32 Keyway Combinations   | 15124               | 182016   | 2,083.81 |
| 4E         | 2 Broaches: 5/8-V, 3/4-V<br>6 Bushings: 2-3/8-V, 2-1/2-V, 2-5/8-V, 2-3/4-V, 2-7/8-V, 3-V<br>12 Keyway Combinations   | 15012               | 182018   | 2,147.53 |
| 4F         | 2 Broaches: 5/8-V, 3/4-V<br>6 Bushings: 2-5/16-V, 2-7/16-V, 2-9/16-V, 2-11/16-V, 2-13/16-V, 2-15/16-V<br>12 Keyway Combinations  | 15014               | 182020   | 2,147.53 |
| #5         | 3 Broaches: 1/2-IV, 5/8-V, 3/4-V<br>17 Bushings: 2-IV, 2-1/16-IV, 2-1/8-IV, 2-3/16-IV, 2-1/4-IV, 2-5/16-IV, 2-3/8-IV, 2-7/16-IV, 2-1/2-V, 2-9/16-V, 2-5/8-V, 2-11/16-V, 2-3/4-V, 2-13/16-V, 2-7/8-V, 2-15/16-V, 3-V<br>26 Keyway Combinations  | 15026               | 182022   | 3,809.90 |
| #100       | 9 Broaches: 1/8-II, 3/16-II, 1/4-III, 5/16-III, 3/8-IV, 7/16-IV, 1/2-IV, 5/8-V, 3/4-V<br>43 Bushings: 1/2-II, 9/16-II, 5/8-II, 11/16-II, 3/4-II, 13/16-II, 7/8-II, 15/16-III, 1-III, 1-1/16-III, 1-1/8-III, 1-3/16-III, 1-1/4-III, 1-5/16-III, 1-3/8-III, 1-1/2-III, 1-9/16-III, 1-7/16-IV, 1-1/2-IV, 1-9/16-IV, 1-5/8-IV, 1-11/16-IV, 1-3/4-IV, 1-13/16-IV, 1-7/8-IV, 1-15/16-IV, 2-IV, 2-1/16-IV, 2-1/8-IV, 2-3/16-IV, 2-1/4-IV, 2-5/16-IV, 2-3/8-IV, 2-7/16-IV, 2-1/2-V, 2-9/16-V, 2-5/8-V, 2-11/16-V, 2-3/4-V, 2-13/16-V, 2-7/8-V, 2-15/16-V, 3-V<br>102 Keyway Combinations | 15100               | 182024   | 7,198.82 |
| #24 Metric | 3 Broaches: 10mm-IV, 12mm-IV, 14mm-IV<br>8 Bushings: 34mm-IV, 36mm-IV, 38mm-IV, 40mm-IV, 42mm-IV, 44mm-IV, 46mm-IV, 48mm-IV<br>24 Keyway Combinations  | 15224               | 182036   | 2,049.27 |
| #12 Metric | 2 Broaches: 16mm-V, 18mm-V<br>6 Bushings: 54mm-V, 56mm-V, 58mm-V, 60mm-V, 62mm-V, 64mm-V<br>12 Keyway Combinations   | 15212               | 182038   | 2,758.00 |
| #30 Metric | 3 Broaches: 14mm-IV, 16mm-V, 18mm-V<br>17 Bushings: 44mm-IV, 45mm-IV, 46mm-IV, 48mm-IV, 50mm-IV, 52mm-V, 54mm-V, 55mm-V, 56mm-V, 58mm-V, 60mm-V, 62mm-V, 64mm-V, 65mm-V, 66mm-V, 68mm-V, 70mm-V<br>29 Keyway Combinations  | 15230               | 182040   | 4,548.98 |

Cutting Tools



## Arbor Presses

See Page H19



## Keyway Broaches — Inch



- Specialty tools designed for cutting keyways in machined holes
- Typically used manually with an arbor press or hydraulic press to produce the keyways
- Well suited for use in a variety of ferrous and non-ferrous materials

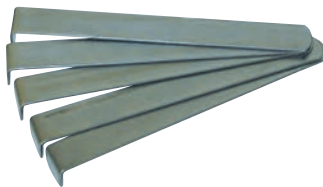


| Broach       | Keyway Width Tol. | Dim.          | No. Shims | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$ |
|--------------|-------------------|---------------|-----------|--------------------|----------------|----------|----------|
| 1/16-I (A)   | 0.0625-0.0635     | 1/8 x 5-1/4   | 0         | 13/64-1-1/8        | 10104          | 182070   | 132.00   |
| 3/32-I (A)   | 0.0937-0.0947     | 1/8 x 5-1/4   | 0         | 13/64-1-1/8        | 10106          | 182072   | 132.00   |
| 1/8-I (A)    | 0.1252-0.1262     | 1/8 x 5-1/4   | 1         | 13/64-1-1/8        | 10108          | 182074   | 132.00   |
| 3/32-II (B)  | 0.0937-0.0947     | 3/16 x 7      | 0         | 19/64-1-11/16      | 10206          | 182076   | 156.81   |
| 1/8-II (B)   | 0.1252-0.1262     | 3/16 x 7      | 1         | 19/64-1-11/16      | 10208          | 182078   | 156.81   |
| 5/32-II (B)  | 0.1564-0.1574     | 3/16 x 7      | 1         | 19/64-1-11/16      | 10210          | 182080   | 156.81   |
| 3/16-II (B)  | 0.1877-0.1887     | 3/16 x 7      | 1         | 19/64-1-11/16      | 10212          | 182082   | 156.81   |
| 3/16-III (C) | 0.1877-0.1887     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 10312          | 182084   | 197.69   |
| 1/4-III (C)  | 0.2502-0.2512     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 10316          | 182086   | 197.69   |
| 5/16-III (C) | 0.3127-0.3137     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 10320          | 182088   | 197.69   |
| 3/8-III (C)  | 0.3755-0.3765     | 3/8 x 11-7/8  | 2         | 13/32-2-1/2        | 10324          | 182090   | 197.69   |
| 5/16-IV (D)  | 0.3127-0.3137     | 9/16 x 13-7/8 | 1         | 3/4-6              | 10420          | 182092   | 302.29   |
| 3/8-IV (D)   | 0.3755-0.3765     | 9/16 x 13-7/8 | 2         | 3/4-6              | 10424          | 182094   | 302.29   |
| 7/16-IV (D)  | 0.4380-0.4390     | 9/16 x 13-7/8 | 2         | 3/4-6              | 10428          | 182096   | 302.29   |
| 1/2-IV (D)   | 0.5006-0.5016     | 9/16 x 13-7/8 | 3         | 3/4-6              | 10432          | 182098   | 302.29   |
| 9/16-IV (D)  | 0.5630-0.5640     | 9/16 x 13-7/8 | 3         | 3/4-6              | 10436          | 182100   | 302.29   |
| 5/8-V (E)    | 0.6260-0.6270     | 3/4 x 15-1/4  | 4         | 3/4-6              | 10540          | 182102   | 504.53   |
| 3/4-V (E)    | 0.7515-0.7525     | 3/4 x 15-1/4  | 5         | 3/4-6              | 10548          | 182104   | 504.53   |
| 7/8-VI (F)   | 0.8765-0.8775     | 1 x 19-1/4    | 6         | 3/4-6              | 10656          | 182106   | 1,038.60 |
| 1-VI (F)     | 1.0015-1.0025     | 1 x 19-1/4    | 7         | 3/4-6              | 10664          | 182108   | 1,038.60 |
| 1-1/8        | 1.1260-1.1270     | 1-1/8 x 23    | 8         | 3/4-6              | 10666          | 182110   | 2,533.85 |
| 1-1/4        | 1.2510-1.2520     | 1-1/4 x 23    | 9         | 3/4-6              | 10668          | 182112   | 2,831.90 |
| 1-3/8        | 1.3760-1.3770     | 1-3/8 x 23    | 10        | 3/4-6              | 10670          | 182114   | 3,197.59 |
| 1-1/2        | 1.5020-1.5030     | 1-1/2 x 23    | 11        | 3/4-6              | 10672          | 182116   | 3,691.35 |

## Shim Sets For Keyway Broaches — Inch



**NOTE:**  
Extra shims are available in sets.  
Please refer to the column Shims  
Required in the broach chart. Note  
that shims correspond to broach size,  
not the bushing type.



| Size         | Thickness | Length x Width | Hassay EDP No. | Set Size | Code No. | Price \$ |
|--------------|-----------|----------------|----------------|----------|----------|----------|
| 1/8-I (A)    | 0.031     | 1-3/8 x 1/8    | 30108          | 1        | 182140   | 9.73     |
| 1/8-II (B)   | 0.031     | 1-7/8 x 3/16   | 30208          | 1        | 182142   | 9.73     |
| 5/32-II (B)  | 0.042     | 1-7/8 x 3/16   | 30210          | 1        | 182144   | 9.73     |
| 3/16-II (B)  | 0.050     | 1-7/8 x 3/16   | 30212          | 1        | 182146   | 9.73     |
| 3/16-III (C) | 0.050     | 2-7/8 x 3/8    | 30312          | 1        | 182148   | 9.73     |
| 1/4-III (C)  | 0.062     | 2-7/8 x 3/8    | 30316          | 1        | 182150   | 9.73     |
| 5/16-III (C) | 0.078     | 2-7/8 x 3/8    | 30320          | 2        | 182152   | 19.19    |
| 3/8-III (C)  | 0.062     | 2-7/8 x 3/8    | 30324          | 2        | 182154   | 19.19    |
| 5/16-IV (D)  | 0.078     | 6-1/4 x 9/16   | 30420          | 2        | 182156   | 26.33    |
| 3/8-IV (D)   | 0.062     | 6-1/4 x 9/16   | 30424          | 2        | 182158   | 26.33    |
| 7/16-IV (D)  | 0.075     | 6-1/4 x 9/16   | 30428          | 3        | 182160   | 40.79    |
| 1/2-IV (D)   | 0.062     | 6-1/4 x 9/16   | 30432          | 3        | 182162   | 40.79    |
| 5/8-V (E)    | 0.062     | 6-3/4 x 3/4    | 30540          | 4        | 182164   | 54.89    |
| 3/4-V (E)    | 0.062     | 6-3/4 x 3/4    | 30548          | 5        | 182166   | 66.94    |
| 7/8-VI (F)   | 0.062     | 6-3/4 x 3/4    | 30656          | 6        | 182168   | 95.41    |
| 1-VI (F)     | 0.062     | 6-3/4 x 3/4    | 30664          | 7        | 182170   | 112.28   |
| 1-1/8        | 0.062     | 7 x 1-1/8      | 30740          | 8        | 182172   | 126.47   |
| 1-1/4        | 0.062     | 7 x 1-1/8      | 30750          | 9        | 182174   | 288.72   |

## Collared & Plain Bushings — Inch



- Used in conjunction with keyway broaches and shims to cut the keyway
- Used manually with an arbor press or hydraulic press and broaches to produce the keyways
- Straight precision slot acts as a guide for the broach



| Diameter                         | Length  | Hassay EDP No. | Code No. | Price \$ |
|----------------------------------|---------|----------------|----------|----------|
| <b>I (A) Collared Bushings</b>   |         |                |          |          |
| 1/4                              | 1-1/8   | 20116          | 182180   | 38.91    |
| 5/16                             | 1-1/8   | 20120          | 182182   | 38.91    |
| 3/8                              | 1-1/8   | 20124          | 182184   | 38.91    |
| 7/16                             | 1-1/8   | 20128          | 182186   | 36.32    |
| 1/2                              | 1-1/8   | 20132          | 182188   | 38.91    |
| <b>II (B) Collared Bushings</b>  |         |                |          |          |
| 1/2                              | 1-11/16 | 20232          | 182190   | 34.27    |
| 9/16                             | 1-11/16 | 20236          | 182192   | 34.27    |
| 5/8                              | 1-11/16 | 20240          | 182194   | 34.27    |
| 11/16                            | 1-11/16 | 20244          | 182196   | 32.02    |
| 3/4                              | 1-11/16 | 20248          | 182198   | 34.27    |
| 13/16                            | 1-11/16 | 20252          | 182200   | 32.02    |
| 7/8                              | 1-11/16 | 20256          | 182202   | 34.27    |
| <b>III (C) Collared Bushings</b> |         |                |          |          |
| 3/4                              | 2-1/2   | 20348          | 182204   | 43.91    |
| 13/16                            | 2-1/2   | 20352          | 182206   | 43.91    |
| 7/8                              | 2-1/2   | 20356          | 182208   | 43.91    |
| 15/16                            | 2-1/2   | 20360          | 182210   | 43.91    |
| 1                                | 2-1/2   | 20364          | 182212   | 43.91    |
| 1-1/16                           | 2-1/2   | 20368          | 182214   | 43.91    |
| 1-1/8                            | 2-1/2   | 20372          | 182216   | 48.64    |
| 1-3/16                           | 2-1/2   | 20376          | 182218   | 51.23    |
| 1-1/4                            | 2-1/2   | 20380          | 182220   | 51.23    |
| 1-5/16                           | 2-1/2   | 20384          | 182224   | 47.87    |
| 1-3/8                            | 2-1/2   | 20388          | 182226   | 51.23    |
| 1-7/16                           | 2-1/2   | 20392          | 182228   | 51.23    |
| 1-1/2                            | 2-1/2   | 20396          | 182230   | 51.23    |
| 1-9/16                           | 2-1/2   | 20400          | 182232   | 51.23    |
| <b>IV (D) Plain Bushings</b>     |         |                |          |          |
| 1-7/16                           | 4       | 21492          | 182238   | 50.09    |
| 1-1/2                            | 4       | 21496          | 182240   | 53.55    |
| 1-9/16                           | 4       | 21500          | 182242   | 55.96    |
| 1-5/8                            | 4       | 21504          | 182246   | 55.96    |
| 1-11/16                          | 4       | 21508          | 182248   | 68.15    |
| 1-3/4                            | 4       | 21512          | 182250   | 72.92    |
| 1-13/16                          | 5       | 21516          | 182252   | 70.56    |
| 1-7/8                            | 5       | 21520          | 182254   | 75.51    |
| 1-15/16                          | 5       | 21524          | 182256   | 77.83    |
| 2                                | 5       | 21528          | 182258   | 77.83    |
| 2-1/16                           | 5       | 21532          | 182260   | 72.76    |
| 2-1/8                            | 5       | 21536          | 182262   | 77.83    |
| 2-3/16                           | 5       | 21540          | 182264   | 80.24    |
| 2-1/4                            | 5       | 21544          | 182266   | 102.10   |
| 2-5/16                           | 5       | 21548          | 182268   | 95.44    |
| 2-3/8                            | 6       | 21552          | 182270   | 107.10   |
| 2-7/16                           | 6       | 21556          | 182272   | 100.07   |
| 2-1/2                            | 6       | 21560          | 182274   | 100.07   |
| 2-9/16                           | 6       | 21564          | 182276   | 138.78   |
| 2-5/8                            | 6       | 21568          | 182278   | 138.78   |
| 2-11/16                          | 6       | 21572          | 182280   | 129.68   |
| 2-3/4                            | 6       | 21576          | 182282   | 138.78   |
| 2-13/16                          | 6       | 21580          | 182284   | 138.78   |
| 2-7/8                            | 6       | 21584          | 182286   | 138.78   |
| 2-15/16                          | 6       | 21588          | 182288   | 141.10   |
| 3                                | 6       | 21592          | 182290   | 141.10   |
| <b>V (E) Plain Bushings</b>      |         |                |          |          |
| 2-5/16                           | 6       | 21688          | 182292   | 119.24   |
| 2-3/8                            | 6       | 21692          | 182294   | 119.24   |
| 2-7/16                           | 6       | 21696          | 182296   | 121.56   |
| 2-1/2                            | 6       | 21700          | 182298   | 121.56   |
| 2-9/16                           | 6       | 21704          | 182300   | 145.83   |
| 2-5/8                            | 6       | 21708          | 182302   | 145.83   |
| 2-11/16                          | 6       | 21712          | 182306   | 145.83   |
| 2-3/4                            | 6       | 21716          | 182308   | 145.83   |
| 2-13/16                          | 6       | 21720          | 182310   | 150.74   |
| 2-7/8                            | 6       | 21724          | 182312   | 150.74   |
| 2-15/16                          | 6       | 21728          | 182314   | 140.91   |
| 3                                | 6       | 21732          | 182316   | 150.74   |

## Keyway Broaches — Metric



- Specialty tools designed for cutting keyways in machined holes
- Typically used manually with an arbor press or hydraulic press to produce the keyways
- Well suited for use in a variety of ferrous and non-ferrous materials



| Broach      | Keyway Width Tol. | Dim.          | No. Shims | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$ |
|-------------|-------------------|---------------|-----------|--------------------|----------------|----------|----------|
| 2mm-I (A)   | 0.0787-0.0792     | 1/8 x 5-1/4   | 0         | 13/64-1-1/8        | 11102          | 182318   | 132.00   |
| 3mm-I (A)   | 0.1181-0.1186     | 1/8 x 5-1/4   | 1         | 13/64-1-1/8        | 11103          | 182320   | 132.00   |
| 4mm-II (B)  | 0.1575-0.1580     | 1/4 x 7       | 1         | 19/64-1-11/16      | 11204          | 182322   | 156.81   |
| 5mm-II (B)  | 0.1968-0.1973     | 1/4 x 7       | 1         | 19/64-1-11/16      | 11205          | 182324   | 156.81   |
| 5mm-III (C) | 0.1968-0.1973     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 11305          | 182326   | 197.87   |
| 6mm-III (C) | 0.2362-0.2367     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 11306          | 182328   | 197.87   |
| 7mm-III (C) | 0.2756-0.2761     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 11307          | 182330   | 197.87   |
| 8mm-III (C) | 0.3150-0.3155     | 3/8 x 11-7/8  | 1         | 13/32-2-1/2        | 11308          | 182332   | 197.87   |
| 10mm-IV (D) | 0.3937-0.3942     | 9/16 x 13-7/8 | 2         | 3/4-6              | 11410          | 182334   | 302.29   |
| 12mm-IV (D) | 0.4724-0.4730     | 9/16 x 13-7/8 | 2         | 3/4-6              | 11412          | 182336   | 302.29   |
| 14mm-IV (D) | 0.5512-0.5519     | 9/16 x 13-7/8 | 2         | 3/4-6              | 11414          | 182338   | 302.29   |
| 16mm-V (E)  | 0.6299-0.6306     | 3/4 x 15-1/4  | 3         | 3/4-6              | 11516          | 182340   | 504.53   |
| 18mm-V (E)  | 0.7087-0.7093     | 3/4 x 15-1/4  | 3         | 3/4-6              | 11518          | 182342   | 504.53   |
| 20mm-VI (F) | 0.7874-0.7883     | 1 x 19-1/4    | 3         | 3/4-6              | 11620          | 182344   | 1,038.60 |
| 22mm-VI (F) | 0.8661-0.8669     | 1 x 19-1/4    | 4         | 3/4-6              | 11622          | 182346   | 1,038.60 |
| 24mm-VI     | 0.9449-0.9458     | 1 x 19-1/4    | 4         | 3/4-6              | 11624          | 182348   | 1,038.60 |
| 25mm-VI     | 0.9842-0.9851     | 1 x 19-1/4    | 4         | 3/4-6              | 11625          | 182350   | 1,038.60 |
| 28mm        | 1.1030-1.1040     | 1-1/8 x 23    | 5         | 3/4-6              | 11628          | 182352   | 2,720.18 |
| 30mm        | 1.1817-1.1827     | 1-1/4 x 23    | 5         | 3/4-6              | 11630          | 182354   | 2,766.67 |
| 32mm        | 1.2605-1.2615     | 1-1/4 x 23    | 5         | 3/4-6              | 11632          | 182356   | 3,097.44 |
| 36mm        | 1.4180-1.4190     | 1-7/16 x 23   | 5         | 3/4-6              | 11636          | 182358   | 3,753.99 |

## Shim Sets For Keyway Broaches — Metric



### NOTE:

Extra shims are available in sets. Please refer to the column Shims Required in the broach chart. Note that shims correspond to broach size, not the bushing type.



| Size        | Length Thickness | Hassay x Width | EDP No. | Set Size | Code No. | Price \$ |
|-------------|------------------|----------------|---------|----------|----------|----------|
| 3mm-I (A)   | 0.031            | 1-3/8 x 1/8    | 31103   | 1        | 182370   | 9.73     |
| 4mm-II (B)  | 0.038            | 1-7/8 x 1/4    | 31204   | 1        | 182372   | 9.73     |
| 5mm-II (B)  | 0.050            | 1-7/8 x 1/4    | 31205   | 1        | 182374   | 9.73     |
| 5mm-III (C) | 0.047            | 2-7/8 x 3/8    | 31305   | 1        | 182376   | 9.73     |
| 6mm-III (C) | 0.062            | 2-7/8 x 3/8    | 31306   | 1        | 182378   | 9.73     |
| 7mm-III (C) | 0.062            | 2-7/8 x 3/8    | 31307   | 1        | 182380   | 9.73     |
| 8mm-III (C) | 0.078            | 2-7/8 x 3/8    | 31308   | 2        | 182382   | 19.19    |
| 10mm-IV (D) | 0.056            | 6-1/4 x 9/16   | 31410   | 2        | 182384   | 26.33    |
| 12mm-IV (D) | 0.056            | 6-1/4 x 9/16   | 31412   | 2        | 182386   | 26.33    |
| 14mm-IV (D) | 0.062            | 6-1/4 x 9/16   | 31414   | 2        | 182388   | 26.33    |
| 16mm-V (E)  | 0.062            | 6-3/4 x 3/4    | 31516   | 3        | 182390   | 40.79    |
| 18mm-V (E)  | 0.062            | 6-3/4 x 3/4    | 31518   | 3        | 182392   | 40.79    |
| 20mm-VI (F) | 0.062            | 6-3/4 x 1      | 31620   | 3        | 182394   | 47.75    |
| 22mm-VI (F) | 0.062            | 6-3/4 x 1      | 31622   | 4        | 182396   | 64.62    |
| 24mm-VI (F) | 0.062            | 6-3/4 x 1      | 31624   | 5        | 182398   | 78.72    |
| 25mm-VI (F) | 0.062            | 6-3/4 x 1      | 31625   | 4        | 182400   | 64.62    |
| 28mm        | 0.062            | 7 x 1          | 31628   | 5        | 182402   | 78.72    |
| 32mm        | 0.062            | 7 x 1-1/4      | 31632   | 5        | 182406   | 162.26   |

## Collared & Plain Bushings — Metric



- Used in conjunction with keyway broaches and shims to cut the keyway
- Used manually with an arbor press or hydraulic press and broaches to produce the keyways
- Straight precision slot acts as a guide for the broach



| Diameter (mm)                    | Diameter (in.) | Hassay EDP No. | Code No. | Price \$ |
|----------------------------------|----------------|----------------|----------|----------|
| <b>I (A) Collared Bushings</b>   |                |                |          |          |
| 6mm                              | 0.2362         | 22106          | 182410   | 36.32    |
| 7mm                              | 0.2756         | 22107          | 182412   | 38.91    |
| 8mm                              | 0.3150         | 22108          | 182414   | 36.32    |
| 9mm                              | 0.3543         | 22109          | 182416   | 38.91    |
| 10mm                             | 0.3937         | 22110          | 182418   | 38.91    |
| <b>II (B) Collared Bushings</b>  |                |                |          |          |
| 11mm                             | 0.4331         | 22211          | 182420   | 36.32    |
| 12mm                             | 0.4724         | 22212          | 182422   | 38.91    |
| 13mm                             | 0.5118         | 22213          | 182424   | 38.91    |
| 14mm                             | 0.5512         | 22214          | 182426   | 38.91    |
| 15mm                             | 0.5905         | 22215          | 182428   | 36.32    |
| 16mm                             | 0.6299         | 22216          | 182430   | 38.91    |
| 17mm                             | 0.6693         | 22217          | 182432   | 41.59    |
| 18mm                             | 0.7087         | 22218          | 182434   | 41.59    |
| 19mm                             | 0.7480         | 22219          | 182436   | 41.59    |
| <b>III (C) Collared Bushings</b> |                |                |          |          |
| 17mm                             | 0.6693         | 22317          | 182440   | 46.32    |
| 18mm                             | 0.7087         | 22318          | 182442   | 1,549.92 |
| 19mm                             | 0.7480         | 22319          | 182444   | 46.32    |
| 20mm                             | 0.7874         | 22320          | 182446   | 46.32    |
| 22mm                             | 0.8661         | 22322          | 182448   | 46.32    |
| 24mm                             | 0.9449         | 22324          | 182450   | 48.64    |
| 25mm                             | 0.9842         | 22325          | 182452   | 48.64    |
| 26mm                             | 1.0236         | 22326          | 182454   | 48.64    |
| 27mm                             | 1.0630         | 22327          | 182456   | 48.64    |
| 28mm                             | 1.1024         | 22328          | 182458   | 53.55    |
| 30mm                             | 1.1811         | 22330          | 182460   | 53.55    |
| 32mm                             | 1.2598         | 22332          | 182462   | 55.96    |
| 34mm                             | 1.3386         | 22334          | 182464   | 55.96    |
| 35mm                             | 1.3779         | 22335          | 182466   | 55.96    |
| 36mm                             | 1.4173         | 22336          | 182468   | 55.96    |
| <b>IV (D) Plain Bushings</b>     |                |                |          |          |
| 32mm                             | 1.2598         | 22432          | 182451   | 70.60    |
| 34mm                             | 1.3386         | 22434          | 182453   | 70.60    |
| 35mm                             | 1.3779         | 22435          | 182455   | 70.60    |
| 36mm                             | 1.4173         | 22436          | 182457   | 70.60    |
| 38mm                             | 1.4961         | 22438          | 182459   | 70.60    |
| 40mm                             | 1.5748         | 22440          | 182461   | 77.83    |
| 42mm                             | 1.6535         | 22442          | 182463   | 77.83    |
| 44mm                             | 1.7323         | 22444          | 182465   | 77.83    |
| 45mm                             | 1.7716         | 22445          | 182467   | 85.14    |
| 46mm                             | 1.8110         | 22446          | 182469   | 85.14    |
| 48mm                             | 1.8898         | 22448          | 182470   | 90.14    |
| 50mm                             | 1.9685         | 22450          | 182472   | 90.14    |
| 52mm                             | 2.0472         | 22452          | 182474   | 121.56   |
| 54mm                             | 2.1260         | 22454          | 182476   | 121.56   |
| 55mm                             | 2.1653         | 22455          | 182478   | 121.56   |
| 56mm                             | 2.2047         | 22456          | 182480   | 121.56   |
| <b>V (E) Plain Bushings</b>      |                |                |          |          |
| 52mm                             | 2.0472         | 22552          | 182482   | 150.74   |
| 54mm                             | 2.1260         | 22554          | 182484   | 150.74   |
| 55mm                             | 2.1653         | 22555          | 182486   | 153.15   |
| 56mm                             | 2.2047         | 22556          | 182488   | 153.15   |
| 58mm                             | 2.2835         | 22558          | 182490   | 153.15   |
| 60mm                             | 2.3622         | 22560          | 182492   | 155.74   |
| 62mm                             | 2.4409         | 22562          | 182494   | 155.74   |
| 64mm                             | 2.5197         | 22564          | 182496   | 167.52   |
| 65mm                             | 2.5590         | 22565          | 182498   | 167.52   |
| 66mm                             | 2.5984         | 22566          | 182500   | 170.11   |
| 68mm                             | 2.6772         | 22568          | 182502   | 170.11   |
| 70mm                             | 2.7559         | 22570          | 182504   | 170.11   |
| 72mm                             | 2.8346         | 22572          | 182506   | 170.11   |

Cutting Tools

# Cutting Tools

## One Pass Keyway Broaches — Inch



\* OP designates one-pass, no chamfer  
\*\* COP designates chamfer, one-pass



| Broach   | Keyway Width Tol. | Dim. (in.)    | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$ |
|----------|-------------------|---------------|--------------------|----------------|----------|----------|
| 1/8-II   | 0.1252-0.1262     | 3/16 x 10-3/4 | 1/4-1-1/2          | 10208-OP       | 182120   | 471.62   |
| 5/32-II  | 0.1564-0.1574     | 3/16 x 10-3/4 | 1/4-1-1/2          | 10210-COP      | 182122   | 471.62   |
| 3/16-II  | 0.1877-0.1887     | 3/16 x 10-3/4 | 1/4-1-1/2          | 10212-OP       | 182124   | 374.67   |
| 1/4-III  | 0.2502-0.2512     | 3/8 x 18-1/2  | 5/16-1-11/16       | 10316-COP      | 182128   | 551.99   |
| 5/16-III | 0.3127-0.3137     | 3/8 x 18-1/2  | 5/16-1-11/16       | 10320-COP      | 182130   | 574.96   |
| 3/8-III  | 0.3755-0.3765     | 3/8 x 18-1/2  | 5/16-1-11/16       | 10324-OP       | 182132   | 446.16   |

## One Pass Keyway Broaches — Metric



\* OP designates one-pass, no chamfer  
\*\* COP designates chamfer, one-pass



| Broach  | Keyway Width Tol. | Dim. (in.)   | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$ |
|---------|-------------------|--------------|--------------------|----------------|----------|----------|
| 3mm-I   | 0.1185-0.1190     | 1/8 x 8-1/2  | 13/64-1-1/8        | 11103-OP       | 182360   | 512.12   |
| 4mm-II  | 0.1581-0.1585     | 1/4 x 10-3/4 | 1/4-1-1/2          | 11204-COP      | 182362   | 593.07   |
| 5mm-II  | 0.1975-0.1979     | 1/4 x 10-3/4 | 1/4-1-1/2          | 11205-COP      | 182364   | 472.22   |
| 6mm-III | 0.2372-0.2376     | 3/8 x 18-1/2 | 5/16-1-11/16       | 11306-COP      | 182366   | 569.57   |
| 8mm-III | 0.3159-0.3163     | 3/8 x 18-1/2 | 5/16-1-11/16       | 11308-COP      | 182368   | 600.10   |

## Square Broaches



- Used to machine internal and external surfaces, such as holes, keyways, and teeth of internal gears
- Designed to be used manually with an arbor press to produce the square holes
- Well suited for use in a variety of ferrous and non-ferrous materials
- Each tooth is progressively larger and each cuts slightly deeper than the tooth before



| Square Size   | Keyway Width Tol. | Broach Length | Pilot Diameter | Drill Size | Min/Max   | Hassay EDP No. | Code No. | Price \$ |
|---------------|-------------------|---------------|----------------|------------|-----------|----------------|----------|----------|
| <b>Inch</b>   |                   |               |                |            |           |                |          |          |
| 1/8           | 0.1250-0.1260     | 4-5/8         | 0.1280         | No. 30     | 3/16-1/2  | 13008          | 182510   | 294.86   |
| 5/32          | 0.1565-0.1575     | 5-5/8         | 0.1585         | No. 21     | 1/4-1/2   | 13010          | 182512   | 335.56   |
| 3/16          | 0.1880-0.1890     | 5-11/16       | 0.1930         | No. 10     | 1/4-5/8   | 13012          | 182514   | 297.45   |
| 7/32          | 0.2190-0.2200     | 6-7/8         | 0.2275         | No. 1      | 1/4-3/4   | 13014          | 182516   | 335.56   |
| 1/4           | 0.2505-0.2515     | 7             | 0.2651         | 17/64      | 1/4-3/4   | 13016          | 182518   | 294.86   |
| 9/32          | 0.2815-0.2825     | 7-1/4         | 19/64          | 19/64      | 3/8-1     | 13018          | 182520   | 366.88   |
| 5/16          | 0.3130-0.3140     | 8-1/8         | 21/64          | 21/64      | 3/8-1     | 13020          | 182522   | 299.85   |
| 11/32         | 0.3440-0.3450     | 9-5/8         | 23/64          | 23/64      | 3/8-1-1/4 | 13022          | 182524   | 481.99   |
| 3/8           | 0.3755-0.3765     | 9-7/8         | 25/64          | 25/64      | 3/8-1-1/4 | 13024          | 182526   | 386.23   |
| 13/32         | 0.4065-0.4075     | 10-7/8        | 27/64          | 27/64      | 1/2-1-3/8 | 13026          | 182528   | 575.36   |
| 7/16          | 0.4385-0.4395     | 11-3/8        | 29/64          | 29/64      | 1/2-1-3/8 | 13028          | 182530   | 489.17   |
| 15/32         | 0.4690-0.4700     | 12-1/2        | 1/2            | 1/2        | 1/2-1-3/8 | 13030          | 182532   | 757.50   |
| 1/2           | 0.5005-0.5015     | 12-5/8        | 17/32          | 17/32      | 1/2-1-3/8 | 13032          | 182534   | 563.39   |
| 9/16          | 0.5630-0.5640     | 14-7/8        | 19/32          | 19/32      | 1/2-1-1/2 | 13036          | 182536   | 726.38   |
| 5/8           | 0.6260-0.6270     | 16-13/16      | 21/32          | 21/32      | 5/8-1-5/8 | 13040          | 182538   | 851.27   |
| 11/16         | 0.6885-0.6895     | 18-1/2        | 3/4            | 3/4        | 5/8-1-5/8 | 13044          | 182540   | 987.72   |
| 3/4           | 0.7510-0.7520     | 18-7/8        | 13/16          | 13/16      | 5/8-1-5/8 | 13048          | 182544   | 1,145.93 |
| 7/8           | 0.8765-0.8775     | 22-3/4        | 15/16          | 15/16      | 5/8-2     | 13056          | 182546   | 1,654.25 |
| 1             | 1.0020-1.0030     | 24-1/2        | 1-3/32         | 1-3/32     | 5/8-2     | 13064          | 182548   | 1,764.38 |
| <b>Metric</b> |                   |               |                |            |           |                |          |          |
| 4mm           | 0.1580-0.1585     | 5-9/16        | 0.1655         | 4.2        | 5/16-5/8  | 17001          | 182560   | 352.52   |
| 5mm           | 0.1973-0.1983     | 6-7/8         | 0.2047         | 5.2        | 3/8-3/4   | 17002          | 182562   | 438.70   |
| 6mm           | 0.2367-0.2377     | 7             | 0.2500         | 6.35       | 3/8-3/4   | 17003          | 182564   | 438.70   |
| 8mm           | 0.3155-0.3165     | 8-3/16        | 0.3267         | 8.3        | 7/16-7/8  | 17004          | 182566   | 443.69   |
| 10mm          | 0.3942-0.3952     | 10-7/8        | 0.4057         | 10.3       | 1/2-1     | 17005          | 182568   | 508.33   |
| 12mm          | 0.4729-0.4739     | 12-1/2        | 0.4921         | 12.5       | 5/8-1-1/4 | 17006          | 182570   | 750.32   |
| 14mm          | 0.5517-0.5527     | 14-7/8        | 0.5905         | 15.0       | 3/4-1-1/2 | 17007          | 182572   | 901.34   |
| 16mm          | 0.6310-0.6320     | 16-13/16      | 0.6693         | 17.0       | 7/8-1-3/4 | 17008          | 182574   | 1,050.17 |
| 18mm          | 0.7092-0.7102     | 18-1/2        | 0.7874         | 20.0       | 7/8-1-3/4 | 17009          | 182576   | 1,392.91 |
| 20mm          | 0.7879-0.7889     | 18-7/8        | 0.8661         | 22.0       | 7/8-1-3/4 | 17010          | 182578   | 1,757.20 |
| 22mm          | 0.8666-0.8676     | 23-1/4        | 0.9448         | 24.0       | 7/8-1-3/4 | 17011          | 182580   | 1,841.19 |
| 24mm          | 0.9454-0.9464     | 24-9/16       | 1.0236         | 26.0       | 7/8-1-3/4 | 17012          | 182582   | 2,080.98 |
| 25mm          | 0.9848-0.9858     | 24-9/16       | 1.0630         | 27.0       | 7/8-1-3/4 | 17013          | 182584   | 2,090.56 |

## Full Square Broaches — Inch



- Used to machine internal and external surfaces, such as holes, keyways, and teeth of internal gears
- Designed to be used manually with an arbor press to produce the square holes
- Well suited for use in a variety of ferrous and non-ferrous materials



| Square Size | Tol.            | Broach Length | Pilot Dia. | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$        |
|-------------|-----------------|---------------|------------|--------------------|----------------|----------|-----------------|
| 3/16        | 0.1880 - 0.1890 | 6-1/4         | 0.1870     | 3/16-1/2           | 14012          | 182550   | <b>565.76</b>   |
| 1/4         | 0.2505 - 0.2515 | 8-5/8         | 0.2495     | 1/4-5/8            | 14016          | 182552   | <b>565.76</b>   |
| 5/16        | 0.3130 - 0.3140 | 10-1/4        | 0.3120     | 1/4-3/4            | 14020          | 182554   | <b>598.78</b>   |
| 3/8         | 0.3755 - 0.3765 | 12-1/4        | 0.3745     | 3/8-1              | 14024          | 182556   | <b>739.97</b>   |
| 1/2         | 0.5005 - 0.5015 | 14-7/16       | 0.4995     | 3/8-1              | 14032          | 182558   | <b>1,082.33</b> |

## Hexagon Broaches



- For cutting hexagonal shaped holes in round machined holes
- Designed to be used manually with an arbor press or hydraulic press
- Well suited for use in a variety of ferrous and non-ferrous materials



| Hex Broach    | Tol.            | Broach Length | Pilot Dia. | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$        |
|---------------|-----------------|---------------|------------|--------------------|----------------|----------|-----------------|
| <b>Inch</b>   |                 |               |            |                    |                |          |                 |
| 1/8           | 0.1255 - 0.1260 | 4-5/8         | 0.1245     | 3/16-3/8           | 12008          | 182590   | <b>334.46</b>   |
| 5/32          | 0.1565 - 0.1570 | 5-1/2         | 0.1557     | 1/4-1/2            | 12010          | 182594   | <b>386.53</b>   |
| 3/16          | 0.1880 - 0.1890 | 5-9/16        | 0.1870     | 1/4-5/8            | 12012          | 182596   | <b>355.61</b>   |
| 7/32          | 0.2190 - 0.2200 | 6             | 0.2182     | 1/4-3/4            | 12014          | 182598   | <b>424.44</b>   |
| 1/4           | 0.2505 - 0.2515 | 6-1/2         | 0.2495     | 1/4-3/4            | 12016          | 182600   | <b>355.61</b>   |
| 9/32          | 0.2815 - 0.2825 | 7-3/4         | 0.2807     | 3/8-1              | 12018          | 182602   | <b>446.18</b>   |
| 5/16          | 0.3130 - 0.3140 | 8-1/4         | 0.3120     | 3/8-1              | 12020          | 182604   | <b>372.47</b>   |
| 11/32         | 0.3440 - 0.3450 | 8-1/4         | 0.3432     | 3/8-1-1/4          | 12022          | 182606   | <b>545.13</b>   |
| 3/8           | 0.3755 - 0.3765 | 9             | 0.3745     | 3/8-1-1/4          | 12024          | 182608   | <b>442.19</b>   |
| 13/32         | 0.4065 - 0.4075 | 10            | 0.4057     | 1/2-1-3/8          | 12026          | 182610   | <b>658.95</b>   |
| 7/16          | 0.4385 - 0.4395 | 10-3/4        | 0.4370     | 1/2-1-3/8          | 12028          | 182612   | <b>557.30</b>   |
| 15/32         | 0.4690 - 0.4700 | 12-3/8        | 0.4682     | 1/2-1-3/8          | 12030          | 182614   | <b>795.21</b>   |
| 1/2           | 0.5005 - 0.5015 | 12-1/2        | 0.4995     | 1/2-1-3/8          | 12032          | 182616   | <b>649.77</b>   |
| 9/16          | 0.5630 - 0.5640 | 14-1/4        | 0.5620     | 1/2-1-1/2          | 12036          | 182618   | <b>794.81</b>   |
| 5/8           | 0.6260 - 0.6270 | 16-7/8        | 0.6245     | 5/8-1-5/8          | 12040          | 182620   | <b>912.81</b>   |
| 11/16         | 0.6880 - 0.6890 | 17            | 0.6870     | 5/8-1-5/8          | 12044          | 182622   | <b>1,008.07</b> |
| 3/4           | 0.7510 - 0.7520 | 17-7/8        | 0.7495     | 5/8-1-5/8          | 12048          | 182624   | <b>1,064.13</b> |
| 7/8           | 0.8755 - 0.8765 | 18-7/8        | 0.8745     | 5/8-1-5/8          | 12056          | 182626   | <b>1,673.11</b> |
| 1             | 1.0020 - 1.0030 | 19-7/8        | 0.9995     | 5/8-1-5/8          | 12064          | 182628   | <b>1,754.60</b> |
| <b>Metric</b> |                 |               |            |                    |                |          |                 |
| 4mm           | 0.1580-0.1585   | 5-1/2         | 0.1575     | 1/4-1/2            | 12104          | 182640   | <b>809.87</b>   |
| 5mm           | 0.1973-0.1983   | 6             | 0.1968     | 1/4-3/4            | 12105          | 182642   | <b>848.57</b>   |
| 6mm           | 0.2367-0.2377   | 6-1/2         | 0.2362     | 1/4-3/4            | 12106          | 182644   | <b>883.98</b>   |
| 7mm           | 0.2760-0.2770   | 7-3/4         | 0.2756     | 3/8-1              | 12107          | 182646   | <b>1,005.48</b> |
| 8mm           | 0.3155-0.3165   | 8-1/4         | 0.3150     | 3/8-1              | 12108          | 182648   | <b>1,002.79</b> |
| 10mm          | 0.3942-0.3952   | 10            | 0.3937     | 1/2-1-3/8          | 12110          | 182650   | <b>1,246.08</b> |
| 12mm          | 0.4729-0.4739   | 12-3/8        | 0.4724     | 1/2-1-3/8          | 12112          | 182652   | <b>1,306.92</b> |
| 14mm          | 0.5517-0.5527   | 14-1/4        | 0.5512     | 1/2-1-1/2          | 12114          | 182654   | <b>1,566.47</b> |
| 16mm          | 0.6310-0.6320   | 16-7/8        | 0.6290     | 5/8-1-5/8          | 12116          | 182656   | <b>1,726.67</b> |
| 18mm          | 0.7092-0.7102   | 17            | 0.7087     | 5/8-1-5/8          | 12118          | 182658   | <b>2,082.98</b> |
| 20mm          | 0.7879-0.7889   | 17-7/8        | 0.7874     | 5/8-1-5/8          | 12120          | 182660   | <b>2,285.17</b> |
| 22mm          | 0.8666-0.8676   | 18-7/8        | 0.8661     | 5/8-1-5/8          | 12122          | 182662   | <b>2,352.30</b> |
| 24mm          | 0.9454-0.9464   | 19-7/8        | 0.9449     | 5/8-1-5/8          | 12124          | 182664   | <b>2,526.67</b> |
| 25mm          | 0.9848-0.9858   | 19-7/8        | 0.9842     | 5/8-1-5/8          | 12125          | 182666   | <b>2,543.23</b> |

## Keyseating Broaches



- Side relief eliminates drag in multiple-pass broaching
- Precision grinding of the rake face insures consistent performance and free cutting action after several sharpenings
- An undercut pilot allows easier entry on each pass



| Broach Size   | Keyway Width Tol. | Dim. WxHxL       | Cut Length Min/Max | Hassay EDP No. | Code No. | Price \$        |
|---------------|-------------------|------------------|--------------------|----------------|----------|-----------------|
| <b>Inch</b>   |                   |                  |                    |                |          |                 |
| 1/16          | 0.0625-0.0635     | 3/16 x 3/8 x 16  | 5/8-1-7/8          | 10701          | 182670   | <b>484.39</b>   |
| 3/32          | 0.0937-0.0947     | 3/16 x 3/8 x 16  | 5/8-1-7/8          | 10702          | 182672   | <b>484.39</b>   |
| 1/8           | 0.1252-0.1262     | 3/16 x 7/16 x 16 | 5/8-1-7/8          | 10703          | 182674   | <b>484.39</b>   |
| 5/32          | 0.1564-0.1574     | 3/16 x 1/2 x 16  | 5/8-1-7/8          | 10704          | 182676   | <b>484.39</b>   |
| 3/16          | 0.1877-0.1887     | 3/16 x 9/16 x 16 | 5/8-1-7/8          | 10705          | 182678   | <b>508.33</b>   |
| 3/16          | 0.1877-0.1887     | 3/16 x 3/4 x 20  | 5/8-3-1/8          | 10706          | 182680   | <b>563.99</b>   |
| 1/4           | 0.2502-0.2512     | 1/4 x 3/4 x 16   | 5/8-1-5/8          | 10707          | 182682   | <b>544.44</b>   |
| 1/4           | 0.2502-0.2512     | 1/4 x 3/4 x 20   | 5/8-3-1/8          | 10708          | 182684   | <b>613.86</b>   |
| 5/16          | 0.3127-0.3137     | 5/16 x 7/8 x 16  | 1-1/16-3-3/16      | 10709          | 182686   | <b>572.96</b>   |
| 5/16          | 0.3127-0.3137     | 5/16 x 7/8 x 20  | 1-1/16-5-3/16      | 10710          | 182688   | <b>640.20</b>   |
| 3/8           | 0.3755-0.3765     | 3/8 x 7/8 x 16   | 1-1/16-3-3/16      | 10711          | 182690   | <b>601.89</b>   |
| 3/8           | 0.3755-0.3765     | 3/8 x 7/8 x 20   | 1-1/16-5-5/16      | 10712          | 182692   | <b>700.05</b>   |
| 7/16          | 0.4380-0.4390     | 7/16 x 1 x 16    | 1-1/16-3-3/16      | 10713          | 182694   | <b>899.15</b>   |
| 7/16          | 0.4380-0.4390     | 7/16 x 1 x 20    | 1-1/16-5-3/16      | 10714          | 182696   | <b>731.37</b>   |
| 1/2           | 0.5006-0.5016     | 1/2 x 1 x 20     | 1-1/16-5-3/16      | 10715          | 182698   | <b>750.32</b>   |
| 9/16          | 0.5630-0.5640     | 9/16 x 1 x 20    | 1-1/16-5-3/16      | 10716          | 182700   | <b>810.37</b>   |
| 5/8           | 0.6260-0.6270     | 5/8 x 1 x 20     | 1-1/16-5-3/16      | 10717          | 182702   | <b>827.13</b>   |
| 3/4           | 0.7515-0.7525     | 3/4 x 1 x 20     | 1-1/16-5-3/16      | 10718          | 182704   | <b>901.34</b>   |
| 7/8           | 0.8765-0.8775     | 7/8 x 1 x 20     | 1-1/16-5-3/16      | 10719          | 182706   | <b>1,071.71</b> |
| 1             | 1.0015-1.0025     | 1 x 1 x 20       | 1-1/16-5-3/16      | 10720          | 182708   | <b>1,114.81</b> |
| <b>Metric</b> |                   |                  |                    |                |          |                 |
| 2mm           | 0.0787-0.0792     | 3/16 x 3/8 x 16  | 5/8-1-7/8          | 11701          | 182710   | <b>530.07</b>   |
| 3mm           | 0.1181-0.1186     | 3/16 x 7/16 x 16 | 5/8-1-7/8          | 11702          | 182712   | <b>530.07</b>   |
| 4mm           | 0.1575-0.1580     | 3/16 x 1/2 x 16  | 5/8-1-7/8          | 11703          | 182714   | <b>537.25</b>   |
| 5mm           | 0.1968-0.1973     | 5mm x 9/16 x 16  | 5/8-1-7/8          | 11704          | 182716   | <b>537.25</b>   |
| 5mm           | 0.1968-0.1973     | 5mm x 3/4 x 20   | 5/8-3-1/8          | 11705          | 182718   | <b>626.03</b>   |
| 6mm           | 0.2362-0.2367     | 6mm x 3/16 x 16  | 5/8-1-7/8          | 11706          | 182720   | <b>563.39</b>   |
| 6mm           | 0.2362-0.2367     | 6mm x 3/4 x 20   | 5/8-3-1/8          | 11707          | 182722   | <b>630.62</b>   |
| 8mm           | 0.3150-0.3155     | 8mm x 7/8 x 20   | 1-1/16-3-3/16      | 11708          | 182724   | <b>589.72</b>   |
| 8mm           | 0.3150-0.3155     | 8mm x 7/8 x 20   | 1-1/16-5-5/16      | 11709          | 182726   | <b>685.68</b>   |
| 10mm          | 0.3937-0.3942     | 10mm x 7/8 x 16  | 1-1/16-5-5/16      | 11710          | 182728   | <b>652.66</b>   |
| 10mm          | 0.3937-0.3942     | 10mm x 7/8 x 20  | 1-1/16-5-5/16      | 11711          | 182730   | <b>750.32</b>   |
| 12mm          | 0.4724-0.4730     | 12mm x 1 x 20    | 1-1/16-5-5/16      | 11712          | 182732   | <b>839.10</b>   |
| 14mm          | 0.5512-0.5519     | 14mm x 1 x 20    | 1-1/16-5-5/16      | 11713          | 182734   | <b>899.15</b>   |
| 16mm          | 0.6299-0.6306     | 16mm x 1 x 20    | 1-1/16-5-5/16      | 11714          | 182736   | <b>973.36</b>   |
| 18mm          | 0.7087-0.7093     | 18mm x 1 x 20    | 1-1/16-5-5/16      | 11715          | 182738   | <b>1,052.56</b> |
| 20mm          | 0.7874-0.7883     | 20mm x 1 x 20    | 1-1/16-5-5/16      | 11716          | 182740   | <b>1,136.55</b> |
| 22mm          | 0.8661-0.8669     | 22mm x 1 x 20    | 1-1/16-5-5/16      | 11717          | 182742   | <b>1,208.37</b> |
| 24mm          | 0.9449-0.9458     | 24mm x 1 x 20    | 1-1/16-5-5/16      | 11718          | 182744   | <b>1,294.56</b> |
| 25mm          | 0.9843-0.9853     | 25mm x 1 x 20    | 1-1/16-5-5/16      | 11719          | 182746   | <b>1,328.27</b> |

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## Hex Rotary/Punch Broaches

- For cutting mild steel applications



### With 0.315" Shank — Inch

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 0.051    | 5/64         | 1-1/4          | 66002          | 182750   | 132.77   |
| 1/16     | 3/32         | 1-1/4          | 66004          | 182752   | 132.77   |
| 5/64     | 7/64         | 1-1/4          | 66005          | 182754   | 132.77   |
| 3/32     | 9/64         | 1-1/4          | 66006          | 182756   | 132.77   |
| 7/64     | 5/32         | 1-1/4          | 66007          | 182758   | 132.77   |
| 1/8      | 3/16         | 1-1/4          | 66008          | 182760   | 132.77   |
| 9/64     | 7/32         | 1-1/4          | 66009          | 182762   | 132.77   |
| 5/32     | 1/4          | 1-1/4          | 66010          | 182764   | 132.77   |
| 3/16     | 9/32         | 1-1/4          | 66012          | 182766   | 132.77   |
| 7/32     | 11/32        | 1-1/4          | 66014          | 182768   | 132.77   |
| 1/4      | 3/8          | 1-1/4          | 66016          | 182770   | 132.77   |
| 9/32     | 3/8          | 1-1/4          | 66018          | 182772   | 175.26   |
| 5/16     | 3/8          | 1-1/4          | 66020          | 182774   | 175.26   |
| 11/32    | 7/16         | 1-1/4          | 66022          | 182776   | 175.26   |
| 3/8      | 1/2          | 1-1/4          | 66024          | 182778   | 182.54   |
| 13/32    | 1/2          | 1-1/4          | 66026          | 182780   | 182.54   |
| 7/16     | 1/2          | 1-1/4          | 66028          | 182782   | 182.54   |
| 15/32    | 1/2          | 1-1/4          | 66030          | 182784   | 182.54   |
| 1/2      | 1/2          | 1-1/4          | 66032          | 182786   | 182.54   |

### With 0.500" Shank — Inch

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 3/32     | 9/64         | 1-3/4          | 66106          | 182820   | 156.01   |
| 7/64     | 5/32         | 1-3/4          | 66107          | 182824   | 156.01   |
| 1/8      | 3/16         | 1-3/4          | 66108          | 182826   | 156.01   |
| 9/64     | 7/32         | 1-3/4          | 66109          | 182828   | 156.01   |
| 5/32     | 1/4          | 1-3/4          | 66110          | 182830   | 156.01   |
| 3/16     | 9/32         | 1-3/4          | 66112          | 182832   | 156.01   |
| 7/32     | 9/32         | 1-3/4          | 66114          | 182834   | 156.01   |
| 1/4      | 3/8          | 1-3/4          | 66116          | 182836   | 156.01   |
| 9/32     | 7/16         | 1-3/4          | 66118          | 182838   | 156.01   |
| 5/16     | 1/2          | 1-3/4          | 66120          | 182840   | 156.01   |
| 3/8      | 9/16         | 1-3/4          | 66124          | 182844   | 156.01   |
| 7/16     | 5/8          | 1-3/4          | 66128          | 182848   | 207.58   |
| 15/32    | 5/8          | 1-3/4          | 66130          | 182850   | 207.58   |
| 1/2      | 5/8          | 1-3/4          | 66132          | 182852   | 207.58   |
| 9/16     | 5/8          | 1-3/4          | 66136          | 182856   | 213.56   |
| 5/8      | 3/4          | 1-3/4          | 66140          | 182860   | 218.65   |
| 11/16    | 7/8          | 1-3/4          | 66144          | 182864   | 224.04   |
| 3/4      | 7/8          | 1-3/4          | 66148          | 182868   | 229.92   |

### With 0.315" Shank — Metric

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 1.3mm    | 3/32         | 1-1/4          | 662013         | 182790   | 132.77   |
| 1.5mm    | 3/32         | 1-1/4          | 662015         | 182791   | 132.77   |
| 2mm      | 7/64         | 1-1/4          | 66202          | 182792   | 132.77   |
| 2.5mm    | 5/32         | 1-1/4          | 662025         | 182794   | 132.77   |
| 3mm      | 3/16         | 1-1/4          | 66203          | 182796   | 132.77   |
| 4mm      | 1/4          | 1-1/4          | 66204          | 182798   | 132.77   |
| 5mm      | 5/16         | 1-1/4          | 66205          | 182800   | 132.77   |
| 6mm      | 3/8          | 1-1/4          | 66206          | 182802   | 132.77   |
| 7mm      | 3/8          | 1-1/2          | 66207          | 182804   | 180.55   |
| 8mm      | 3/8          | 1-1/2          | 66208          | 182806   | 180.55   |
| 9mm      | 3/8          | 1-1/2          | 66209          | 182808   | 180.55   |
| 10mm     | 1/2          | 1-1/2          | 66210          | 182810   | 180.55   |
| 11mm     | 1/2          | 1-1/2          | 66211          | 182812   | 180.55   |
| 12mm     | 1/2          | 1-1/2          | 66212          | 182814   | 180.55   |

### With 0.500" Shank — Metric

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 2mm      | 5/32         | 1-1/2          | 66302          | 182870   | 156.01   |
| 2.5mm    | 5/32         | 1-1/2          | 663025         | 182872   | 156.11   |
| 3mm      | 3/16         | 1-1/2          | 66303          | 182874   | 156.01   |
| 4mm      | 1/4          | 1-1/2          | 66304          | 182876   | 156.01   |
| 5mm      | 5/16         | 1-1/2          | 66305          | 182878   | 156.01   |
| 6mm      | 3/8          | 1-1/2          | 66306          | 182880   | 156.01   |
| 7mm      | 1/2          | 1-1/2          | 66307          | 182882   | 156.01   |
| 8mm      | 1/2          | 1-1/2          | 66308          | 182884   | 156.01   |
| 9mm      | 1/2          | 1-1/2          | 66309          | 182886   | 156.01   |
| 10mm     | 9/16         | 1-1/2          | 66310          | 182888   | 156.01   |
| 11mm     | 9/16         | 2              | 66311          | 182890   | 153.24   |
| 12mm     | 5/8          | 2              | 66312          | 182892   | 207.58   |
| 13mm     | 5/8          | 2              | 66313          | 182894   | 207.58   |
| 14mm     | 5/8          | 2              | 66314          | 182896   | 213.56   |
| 15mm     | 5/8          | 2              | 66315          | 182898   | 213.56   |
| 16mm     | 5/8          | 2              | 66316          | 182900   | 218.65   |
| 17mm     | 7/8          | 2              | 66317          | 182902   | 218.65   |
| 18mm     | 7/8          | 2              | 66318          | 182904   | 229.92   |
| 19mm     | 7/8          | 2              | 66319          | 182906   | 229.92   |

### With 0.750" Shank — Inch

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 3/8      | 1/2          | 2-1/2          | 66524          | 182908   | 207.58   |
| 7/16     | 1/2          | 2-1/2          | 66528          | 182910   | 207.58   |
| 1/2      | 1/2          | 2-1/2          | 66532          | 182912   | 207.58   |
| 9/16     | 3/4          | 2-1/2          | 66536          | 182914   | 287.78   |
| 5/8      | 3/4          | 2-1/2          | 66540          | 182916   | 287.78   |
| 3/4      | 7/8          | 2-3/4          | 66548          | 182918   | 303.54   |
| 7/8      | 7/8          | 2-3/4          | 66556          | 182920   | 303.54   |
| 1        | 7/8          | 2-3/4          | 66564          | 182922   | 325.68   |

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## Hex Rotary/Punch Broaches — M42 Cobalt



- Provides edge toughness for standard operations, and resists heat to better effect tool life in machining most metals
- For broaching materials such as ductile iron, tool steel, stainless steels, titanium alloys. This superior grade of HSS provides significantly longer tool life with these more difficult to machine alloys.



### With 0.315" Shank — Inch

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 1/16        | 3/32         | 1-1/4          | 66004-M        | 182213   | 168.78   |
| 5/64        | 7/64         | 1-1/4          | 66005-M        | 182215   | 168.78   |
| 3/32        | 9/64         | 1-1/4          | 66006-M        | 182217   | 168.78   |
| 7/64        | 5/32         | 1-1/4          | 66007-M        | 182219   | 168.78   |
| 1/8         | 3/16         | 1-1/4          | 66008-M        | 182221   | 168.78   |
| 9/64        | 7/32         | 1-1/4          | 66009-M        | 182223   | 168.78   |
| 5/32        | 1/4          | 1-1/4          | 66010-M        | 182225   | 168.78   |
| 3/16        | 9/32         | 1-1/4          | 66012-M        | 182227   | 168.78   |
| 7/32        | 11/32        | 1-1/4          | 66014-M        | 182229   | 168.78   |
| 1/4         | 3/8          | 1-1/4          | 66016-M        | 182231   | 168.78   |
| 9/32        | 3/8          | 1-1/4          | 66018-M        | 182233   | 209.77   |
| 5/16        | 3/8          | 1-1/4          | 66020-M        | 182235   | 209.77   |
| 11/32       | 7/16         | 1-1/4          | 66022-M        | 182237   | 209.77   |
| 3/8         | 1/2          | 1-1/4          | 66024-M        | 182239   | 209.77   |

### With 0.315" Shank — Metric

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 2mm         | 7/64         | 1-1/4          | 66202-M        | 182241   | 168.78   |
| 2.5mm       | 5/32         | 1-1/4          | 662025-M       | 182243   | 168.78   |
| 3mm         | 3/16         | 1-1/4          | 66203-M        | 182245   | 168.78   |
| 3.5mm       | 3/16         | 1-1/4          | 662035-M       | 182247   | 168.78   |
| 4mm         | 1/4          | 1-1/4          | 66204-M        | 182249   | 168.78   |
| 4.5mm       | 1/4          | 1-1/4          | 662045-M       | 182251   | 168.78   |

### With 0.500" Shank — Inch

| Hex Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|----------|--------------|----------------|----------------|----------|----------|
| 3/32     | 9/64         | 1-3/4          | 66106-M        | 182253   | 209.77   |
| 7/64     | 5/32         | 1-3/4          | 66107-M        | 182255   | 209.77   |
| 1/8      | 3/16         | 1-3/4          | 66108-M        | 182257   | 209.77   |
| 9/64     | 7/32         | 1-3/4          | 66109-M        | 182259   | 209.77   |
| 5/32     | 1/4          | 1-3/4          | 66110-M        | 182261   | 209.77   |
| 3/16     | 9/32         | 1-3/4          | 66112-M        | 182263   | 209.77   |
| 7/32     | 9/32         | 1-3/4          | 66114-M        | 182265   | 209.77   |
| 1/4      | 3/8          | 1-3/4          | 66116-M        | 182267   | 209.77   |
| 9/32     | 7/16         | 1-3/4          | 66118-M        | 182269   | 209.77   |
| 5/16     | 1/2          | 1-3/4          | 66120-M        | 182271   | 209.77   |
| 11/32    | 9/16         | 1-3/4          | 66122-M        | 182273   | 209.77   |
| 3/8      | 9/16         | 1-3/4          | 66124-M        | 182275   | 209.77   |

## Square Rotary/Punch Broaches



- For cutting mild steel applications



### With 0.315" Shank — Inch

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 1/16        | 1/8          | 1-1/4          | 68004          | 182930   | 132.77   |
| 3/32        | 9/64         | 1-1/4          | 68006          | 182932   | 132.77   |
| 1/8         | 3/16         | 1-1/4          | 68008          | 182934   | 132.77   |
| 5/32        | 1/4          | 1-1/4          | 68010          | 182936   | 132.77   |
| 3/16        | 9/32         | 1-1/4          | 68012          | 182938   | 132.77   |
| 7/32        | 11/32        | 1-1/4          | 68014          | 182940   | 132.77   |
| 1/4         | 3/8          | 1-1/2          | 68016          | 182942   | 180.35   |
| 9/32        | 3/8          | 1-1/2          | 68018          | 182944   | 180.35   |
| 5/16        | 3/8          | 1-1/2          | 68020          | 182946   | 180.35   |
| 11/32       | 3/8          | 1-1/2          | 68022          | 182948   | 183.14   |
| 3/8         | 3/8          | 1-1/2          | 68024          | 182950   | 183.14   |

### With 0.315" Shank — Metric

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 1.5mm       | 3/32         | 1-1/4          | 682015         | 182277   | 132.77   |
| 2mm         | 7/64         | 1-1/4          | 68202          | 182279   | 132.77   |
| 2.5mm       | 5/32         | 1-1/4          | 682025         | 182281   | 132.77   |
| 3mm         | 3/16         | 1-1/4          | 68203          | 182283   | 132.77   |
| 3.5mm       | 3/16         | 1-1/4          | 682035         | 182285   | 132.77   |
| 4mm         | 1/4          | 1-1/4          | 68204          | 182287   | 132.77   |
| 4.5mm       | 1/4          | 1-1/4          | 662045         | 182289   | 132.77   |
| 5mm         | 5/16         | 1-1/4          | 68205          | 182291   | 132.77   |
| 6mm         | 3/8          | 1-1/4          | 68206          | 182293   | 132.77   |
| 7mm         | 3/8          | 1-1/4          | 68207          | 182295   | 180.55   |
| 8mm         | 3/8          | 1-1/4          | 68208          | 182297   | 180.55   |
| 9mm         | 3/8          | 1-1/4          | 68209          | 182299   | 180.55   |
| 10mm        | 1/2          | 1-1/4          | 68210          | 182301   | 180.55   |

### With 0.500" Shank — Inch

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 3/32        | 9/64         | 1-1/2          | 68106          | 182960   | 156.11   |
| 1/8         | 3/16         | 1-1/2          | 68108          | 182962   | 156.11   |
| 5/32        | 1/4          | 1-1/2          | 68110          | 182964   | 156.11   |
| 3/16        | 9/32         | 1-1/2          | 68112          | 182966   | 156.11   |
| 7/32        | 11/32        | 1-1/2          | 68114          | 182968   | 156.11   |
| 1/4         | 3/8          | 1-1/2          | 68116          | 182970   | 156.11   |
| 9/32        | 7/16         | 1-1/2          | 68118          | 182972   | 156.11   |
| 5/16        | 1/2          | 1-1/2          | 68120          | 182974   | 156.11   |
| 11/32       | 9/16         | 1-1/2          | 68122          | 182976   | 219.05   |
| 3/8         | 5/8          | 2              | 68124          | 182978   | 219.05   |
| 7/16        | 5/8          | 2              | 68128          | 182980   | 219.05   |
| 1/2         | 5/8          | 2              | 68132          | 182982   | 219.05   |
| 9/16        | 3/4          | 2              | 68136          | 182984   | 229.92   |
| 5/8         | 7/8          | 2              | 68140          | 182986   | 229.92   |

### With 0.500" Shank — Metric

| Square Size | Depth of Cut | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|-------------|--------------|----------------|----------------|----------|----------|
| 1.5mm       | 3/32         | 1-3/4          | 683015         | 182303   | 156.11   |
| 2mm         | 7/64         | 1-3/4          | 68302          | 182305   | 156.11   |
| 2.5mm       | 5/32         | 1-3/4          | 683025         | 182307   | 156.11   |
| 3mm         | 3/16         | 1-3/4          | 68303          | 182309   | 156.11   |
| 3.5mm       | 3/16         | 1-3/4          | 683035         | 182311   | 156.11   |
| 4mm         | 1/4          | 1-3/4          | 68304          | 182313   | 156.11   |
| 4.5mm       | 1/4          | 1-3/4          | 683045         | 182315   | 156.11   |
| 5mm         | 5/16         | 1-3/4          | 68305          | 182317   | 156.11   |
| 6mm         | 3/8          | 1-3/4          | 68306          | 182319   | 156.11   |
| 7mm         | 3/8          | 1-3/4          | 68307          | 182321   | 156.11   |
| 8mm         | 3/8          | 1-3/4          | 68308          | 182323   | 156.11   |
| 9mm         | 3/8          | 1-3/4          | 68309          | 182325   | 156.11   |
| 10mm        | 1/2          | 1-3/4          | 68310          | 182327   | 156.11   |
| 11mm        | 9/16         | 1-3/4          | 68311          | 182329   | 207.58   |
| 12mm        | 5/8          | 1-3/4          | 68312          | 182331   | 207.58   |



## CNC — Single Point Keyway Broaches

### A CNC Broaching Alternative

Broaching keyways on CNC machines today is as common as turning a part. It will eliminate part handling and improve your control when you design your process to incorporate short effective nibbling broaches that take the place of much longer tools and sometimes timely set up on secondary machines.

Blind hole and through hole CNC keyway broaching with standard tools that are off the shelf, will give you a profitable alternative and save you time.

Blind hole or through hole CNC keyway broaching is achieved through the use of single point nibbling cutters that are designed with two separate cutting surfaces at 180° apart. The one piece construction is created on a high speed tooling blank that is a common size round shank with ground timing flats to align the keyway for timing to the part it is broaching. These tools will offer long tool life, and can be easily sharpened many times for extended tool life. Ideally designed for either CNC lathe or CNC vertical machining centres, these tools can get the job done quickly and effectively:

- For a CNC lathe, the tool is mounted directly into the turret on centreline while a setscrew-locking holder will lock the tool in place and position
- For a CNC vertical machining centre, a collet will hold the tool shank and provide timing orientation. With the spindle locked, the broach can be brought in line with the pre-prepared bore diameter and chamferlead of the part to start broaching

With the spindle locked, the broach can be brought in line with the pre-prepared bore diameter and chamfer lead of the part to start broaching the keyway at a speed of 10 - 30 in/min and an in-feed of 0.003 -0.005 depth per pass, using a flood coolant for lubrication during the cut. The in-feeding cycle is repeated until the desired depth of the keyway is achieved. Chips can be removed from the bottom of the hole in a couple of ways:

- If the hole is a blind hole bore, remove the chips by either prior trepanning the bottom of the keyway area and allow chips to fall away
- Or pre-drill a hole from the outside to the inside of the part at the bottom of the keyway location.
- With a through hole, you can broach right through, but do not disengage with the part, and simply de-burr the keyway upon completion.

### Things That You Should Know:

- Standard tooling will come with common shank diameters
- The keyway size and length or depth of cut will determine the shank size
- Strength and rigidity in the set-up will give you longer tool life
- Consider using the larger shank size to process your jobs
- Keyway production will achieve excellent finishes and better accuracy
- You can design and create your own special tool with our help



### The Advantages

- Complete the part on one machine
- Only way to keyway a blind hole
- Cut down on set-up time
- Become more flexible with machining
- Manage small lot production
- Use cost effective standard tooling
- No bushing guide required
- No hydraulic press or pull required
- No additional operator needed



### Inch Shank

| Size | Tolerance (in.) | Shank Dia. (in.) | Overall Length (in.) | Max L.O.C. (in.) | Hassay EDP No. | Code No. | Price \$ |
|------|-----------------|------------------|----------------------|------------------|----------------|----------|----------|
| 1/8  | 0.1265          | 0.625            | 3.75                 | 1.50             | 69008          | 182627   | 657.05   |
| 4mm  | 0.159           | 0.625            | 3.75                 | 1.50             | 69004          | 182629   | 657.05   |
| 3/16 | 0.189           | 0.625            | 3.75                 | 1.50             | 69012          | 182630   | 657.05   |
| 5mm  | 0.198           | 0.625            | 3.75                 | 1.50             | 69005          | 182631   | 657.05   |
| 6mm  | 0.238           | 0.875            | 4.50                 | 2.00             | 69106          | 182632   | 705.53   |
| 1/4  | 0.252           | 0.875            | 4.50                 | 2.00             | 69116          | 182633   | 705.53   |
| 5/16 | 0.314           | 0.875            | 4.50                 | 2.00             | 69120          | 182634   | 981.75   |
| 8mm  | 0.317           | 0.875            | 4.50                 | 2.00             | 69108          | 182635   | 705.53   |
| 3/8  | 0.377           | 1.00             | 4.50                 | 2.00             | 69224          | 182636   | 773.46   |
| 10mm | 0.396           | 1.00             | 4.50                 | 2.00             | 69210          | 182637   | 773.46   |
| 12mm | 0.4745          | 1.00             | 4.50                 | 2.00             | 69212          | 182638   | 773.46   |
| 1/2  | 0.502           | 1.00             | 4.50                 | 2.00             | 69232          | 182639   | 773.46   |

### Metric Shank

| Size | Tolerance (in.) | Shank Dia. (mm) | Overall Length (in.) | Max L.O.C. (in.) | Hassay EDP No. | Code No. | Price \$ |
|------|-----------------|-----------------|----------------------|------------------|----------------|----------|----------|
| 1/8  | 0.127           | 16              | 3.75                 | 1.5              | 69308          | 182189   | 554.71   |
| 4mm  | 0.159           | 16              | 3.75                 | 1.5              | 69304          | 182191   | 554.71   |
| 3/16 | 0.189           | 16              | 3.75                 | 1.5              | 69312          | 182193   | 554.71   |
| 5mm  | 0.198           | 16              | 3.75                 | 1.5              | 69305          | 182195   | 554.71   |
| 6mm  | 0.238           | 20              | 4.50                 | 2                | 69406          | 182197   | 613.76   |
| 1/4  | 0.252           | 20              | 4.50                 | 2                | 69416          | 182199   | 613.76   |
| 5/16 | 0.314           | 20              | 4.50                 | 2                | 69420          | 182201   | 657.65   |
| 8mm  | 0.317           | 20              | 4.50                 | 2                | 69408          | 182203   | 657.65   |
| 3/8  | 0.377           | 25              | 4.50                 | 2                | 69524          | 182205   | 736.65   |
| 10mm | 0.396           | 25              | 4.50                 | 2                | 69510          | 182207   | 736.65   |
| 12mm | 0.474           | 25              | 4.50                 | 2                | 69512          | 182209   | 736.65   |
| 1/2  | 0.502           | 25              | 4.50                 | 2                | 69532          | 182211   | 736.65   |

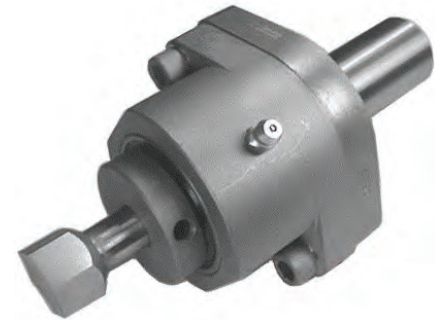


Use GS CAT40 ER Collet Chucks & Collets to hold your CNC Single Point Keyway Broaches.

See Pages G18-32



# Adjustable Rotary Broach Holders



## For Broaches With 0.315 Diameter Shanks

| Overall Length | Shank Dia. | Shank Length | Broach Shank Depth | Hassay EDP No. | Code No. | Price \$        |
|----------------|------------|--------------|--------------------|----------------|----------|-----------------|
| 3-27/64        | 5/8        | 1-1/2        | 9/16               | P-67040        | 182173   | <b>2,831.10</b> |
| 3-59/64        | 3/4        | 2            | 9/16               | P-67048S       | 182175   | <b>2,924.47</b> |

## For Broaches With 0.500 Diameter Shanks

| Overall Length | Shank Dia. | Shank Length | Broach Shank Depth | Hassay EDP No. | Code No. | Price \$        |
|----------------|------------|--------------|--------------------|----------------|----------|-----------------|
| 4-17/32        | 3/4        | 2            | 0.742              | P-67048        | 182177   | <b>3,172.35</b> |
| 4-17/32        | 1          | 2            | 0.742              | P-67064        | 182179   | <b>3,260.53</b> |
| 5-17/32        | 1-1/4      | 3            | 0.742              | P-67068        | 182181   | <b>3,359.18</b> |
| 5-17/32        | 1-1/2      | 3            | 0.742              | P-67072        | 182183   | <b>2,961.72</b> |

## For Broaches With 0.750 Diameter Shanks - Heavy Duty

| Overall Length | Shank Dia. | Shank Length | Broach Shank Depth | Hassay EDP No. | Code No. | Price \$        |
|----------------|------------|--------------|--------------------|----------------|----------|-----------------|
| 7-9/16         | 1-1/2      | 3            | 1.25               | P-67072HDS     | 182185   | <b>6,306.39</b> |
| 7-9/16         | 1-3/4      | 3            | 1.25               | P-67076HD      | 182187   | <b>5,688.60</b> |

## Applications

**ROTARY/PUNCH BROACHES:** Used in a variety of machines to cut polygons in blind holes: Any type of CNC or manual turning, milling, drilling or screw machine. The practical forming length of rotary/punch broaching is usually up to 1-1/2 times the size of the broach (measured across flats).

**ROTARY BROACH HOLDERS:** For optimal tool life in large production settings these broaches are used in Rotary Broach Holders. Holders and broaches are sold separately and available from stock for immediate delivery. These holders are for use on any type CNC or manual turning, milling, drilling or screw machine. The holder has an internal live spindle, which holds the end cutting broach tool. The centreline of the cutting tool is offset at 1° from the centreline of the workpiece. This causes the broach to wobble creating a shearing effect as the broach is advanced into the workpiece or vice versa as described below.

**BROACHING A ROTATING WORKPIECE:** In a turning or screw machine, the holder is mounted stationary while its internal live spindle and the broach rotates after contact with the rotating workpiece. At the appropriate feed, the workpiece is “sheared” by the pressure of the broach through a wobbling type action producing the polygon shape desired.

**BROACHING A STATIONARY WORKPIECE:** In a milling or drilling machine, the holder is mounted into and rotates with the machine spindle while its internal live spindle along with the broach remains stationary upon contact with the stationary workpiece. While the machine spindle is rotating, the broach’s pressure shears the polygon shape into the workpiece (wobbling type action).

**PUNCHING VERSUS ROTARY BROACHING:** Many applications can be achieved without the rotary broach holder. For the purpose of merely punching a polygon into an existing pilot hole, these broaches have successfully been used with universal machining methods.

## Rotary Broaching Set-Up Plugs

For hex broach set-up only.



### 8mm Shank

| Size | Plug Dia. (-0.001") | Shank Dia. (-0.0050") | Plug Depth | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|------|---------------------|-----------------------|------------|----------------|----------------|----------|----------|
| 1/8  | 0.129               | 8mm                   | 5/16       | 1-1/4          | 67008          | 182063   | 66.63    |
| 3/16 | 0.193               | 8mm                   | 5/16       | 1-1/4          | 67012          | 182065   | 66.63    |
| 1/4  | 0.257               | 8mm                   | 5/16       | 1-1/4          | 67016          | 182067   | 66.63    |
| 3/8  | 0.387               | 8mm                   | 1/2        | 1-1/4          | 67024          | 182071   | 66.63    |
| 1/2  | 0.515               | 8mm                   | 1/2        | 1-1/4          | 67032          | 182073   | 66.63    |

### 0.500" Shank

| Size | Plug Dia. (-0.001") | Shank Dia. (-0.0050") | Plug Depth | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|------|---------------------|-----------------------|------------|----------------|----------------|----------|----------|
| 3/16 | 0.193               | 0.500                 | 5/16       | 1-3/4          | 67112          | 182075   | 93.17    |
| 1/4  | 0.257               | 0.500                 | 5/16       | 1-3/4          | 67116          | 182077   | 93.17    |
| 3/8  | 0.387               | 0.500                 | 5/16       | 1-3/4          | 67124          | 182079   | 93.17    |
| 1/2  | 0.515               | 0.500                 | 1/2        | 1-3/4          | 67132          | 182081   | 93.17    |
| 5/8  | 0.643               | 0.500                 | 1/2        | 1-3/4          | 67140          | 182083   | 93.17    |

### 0.750" Shank

| Size | Plug Dia. (-0.001") | Shank Dia. (-0.0050") | Plug Depth | Overall Length | Hassay EDP No. | Code No. | Price \$ |
|------|---------------------|-----------------------|------------|----------------|----------------|----------|----------|
| 3/8  | 0.387               | 0.750                 | 1/2        | 2-1/2          | 67524          | 182085   | 111.72   |
| 1/2  | 0.515               | 0.750                 | 1/2        | 2-1/2          | 67532          | 182087   | 111.72   |
| 5/8  | 0.643               | 0.750                 | 3/4        | 2-1/2          | 67540          | 182089   | 111.72   |
| 3/4  | 0.771               | 0.750                 | 3/4        | 2-3/4          | 67548          | 182091   | 111.72   |

## Swiss Style Rotary Hex Punch Broaches

For use with Swiss Style Non-Adjustable Holders

- Consistent high tolerance forms for long production runs
- Superb surface finishes
- Outstanding tool life in Stainless & Titanium
- M2 for use with mild steel (HSS)
- PM-M4 for use with Stainless Steel, Titanium & other high alloy steels



### 8mm Shank — Inch

| Hex Size | Across Flats (±0.0002") | Max Depth of Cut | Overall Length | Hassay EDP No. | M2 Code No. | Price \$ | Hassay EDP No. | PMM4 Code No. | Price \$ |
|----------|-------------------------|------------------|----------------|----------------|-------------|----------|----------------|---------------|----------|
| 0.051    | 0.0510                  | 5/64             | 28mm           | 76002          | 182093      | 134.06   | 77002          | 182115        | 140.25   |
| 1/16     | 0.0645                  | 3/32             | 28mm           | 76004          | 182095      | 134.06   | 77004          | 182117        | 140.25   |
| 5/64     | 0.0801                  | 7/64             | 28mm           | 76005          | 182097      | 134.06   | 77005          | 182119        | 140.25   |
| 3/32     | 0.0958                  | 9/64             | 28mm           | 76006          | 182099      | 134.06   | 77006          | 182121        | 140.25   |
| 7/64     | 0.1113                  | 5/32             | 28mm           | 76007          | 182101      | 134.06   | 77007          | 182123        | 140.25   |
| 1/8      | 0.1270                  | 3/16             | 28mm           | 76008          | 182103      | 134.06   | 77008          | 182125        | 140.25   |
| 9/64     | 0.1426                  | 7/32             | 28mm           | 76009          | 182105      | 134.06   | 77009          | 182127        | 140.25   |
| 5/32     | 0.1585                  | 1/4              | 28mm           | 76010          | 182107      | 134.06   | 77010          | 182129        | 140.25   |
| 3/16     | 0.1895                  | 9/32             | 28mm           | 76012          | 182109      | 134.06   | 77012          | 182131        | 140.25   |
| 7/32     | 0.2207                  | 11/32            | 28mm           | 76014          | 182111      | 134.06   | 77014          | 182133        | 140.25   |
| 1/4      | 0.2520                  | 3/8              | 28mm           | 76016          | 182113      | 134.06   | 77016          | 182135        | 140.25   |

### 8mm Shank — Metric

| Hex Size | Across Flats (±0.0002") | Max Depth of Cut | Overall Length | Hassay EDP No. | M2 Code No. | Price \$ | Hassay EDP No. | PMM4 Code No. | Price \$ |
|----------|-------------------------|------------------|----------------|----------------|-------------|----------|----------------|---------------|----------|
| 1.5mm    | 0.0610                  | 3/32             | 28mm           | 762015         | 182137      | 134.06   | 772015         | 182155        | 140.25   |
| 2mm      | 0.0807                  | 5/32             | 28mm           | 76202          | 182139      | 134.06   | 77202          | 182157        | 140.25   |
| 2.5mm    | 0.1004                  | 5/32             | 28mm           | 762025         | 182141      | 134.06   | 772025         | 182159        | 140.25   |
| 3mm      | 0.1201                  | 3/16             | 28mm           | 76203          | 182143      | 134.06   | 77203          | 182161        | 140.25   |
| 3.5mm    | 0.1398                  | 3/16             | 28mm           | 762035         | 182145      | 134.06   | 772035         | 182163        | 140.25   |
| 4mm      | 0.1595                  | 1/4              | 28mm           | 76204          | 182147      | 134.06   | 77204          | 182165        | 140.25   |
| 4.5mm    | 0.1792                  | 1/4              | 28mm           | 762045         | 182149      | 134.06   | 772045         | 182167        | 140.25   |
| 5mm      | 0.1989                  | 5/16             | 28mm           | 76205          | 182151      | 134.06   | 77205          | 182169        | 140.25   |
| 6mm      | 0.2382                  | 3/8              | 28mm           | 76206          | 182153      | 134.06   | 77206          | 182171        | 140.25   |

# Swiss Style Non-Adjustable Rotary Broach Holders



## Swiss Style Holders

- No centre indicating required – self-centering
- Smaller head diameter eliminates interference on tool blocks
- Longer shank can be cut to proper length
- Short head length for limited back work space
- Built in wobble cutting feature 1° angle
- Heavy duty bearing takes 2,250 lbs. pushing force
- Swiss made quality high-precision
- Fits most swiss type tool blocks and gang machines
- Holds 8mm shank swiss style rotary punch broaches



| Shank Dia. | Shank Length | Hassay EDP No.   | Code No. | Price \$ |
|------------|--------------|------------------|----------|----------|
| 5/8        | 1-1/2        | HSP-2160-158-038 | 182033   | 2,692.15 |
| 3/4        | 4            | HSP-2160-190-100 | 182035   | 2,692.15 |
| 1          | 4-3/4        | HSP-2160-254-120 | 182037   | 2,692.15 |
| 12mm       | 38mm         | HSP-2160-120-038 | 182039   | 2,692.15 |
| 14mm       | 38mm         | HSP-2160-140-038 | 182041   | 2,692.15 |
| 16mm       | 38mm         | HSP-2160-160-038 | 182043   | 2,692.15 |
| 20mm       | 100mm        | HSP-2160-200-100 | 182045   | 2,692.15 |
| 22mm       | 100mm        | HSP-2160-220-100 | 182047   | 2,692.15 |
| 25mm       | 120mm        | HSP-2160-250-120 | 182049   | 2,353.64 |

## Self Centering Holders

Designed for CNC machines, the new 2100 Series Broach Holder meets the challenge. Faster and easier setup.

- Places rotary broach on centre, eliminates the need to indicate the holder
- Cylindrical shank design with Weldon Notch perfect for lathe or machining centre applications
- Micro-manufacturing includes medical, dental, automotive and aircraft micro components, with micro precision systems that require high precision tolerance and quality
- Holds 8mm shank Swiss Style Rotary Punch Broaches



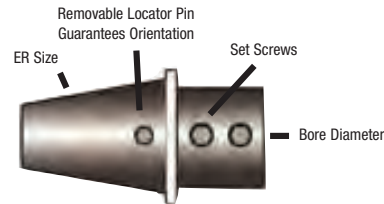
| Shank Dia. | Shank Length | Hassay EDP No. | Code No. | Price \$ |
|------------|--------------|----------------|----------|----------|
| 15.87mm    | 38mm         | HSP-2100-58    | 182051   | 2,241.81 |
| 19.05mm    | 38mm         | HSP-2102       | 182053   | 2,428.20 |
| 25.4mm     | 38mm         | HSP-2104       | 182055   | 2,241.81 |
| 16mm       | 38mm         | HSP-2100-16    | 182057   | 2,241.81 |
| 20mm       | 38mm         | HSP-2101       | 182059   | 2,241.81 |
| 25mm       | 50mm         | HSP-2103       | 182061   | 2,241.81 |

# Quick Change ER Collet Punch & Index Broach ER Holder Systems



## For Swiss and CNC machining

When orientation and concentricity of an internal polygon profile is crucial, an ER holder can be used to securely hold a punch or index broach tool and accurately align the tool to centre, while ensuring perfect alignment of the profile orientation. **These quick change holders can be preset and reloaded in seconds.**



## Punch Broach / Boring Adaptors & Nuts

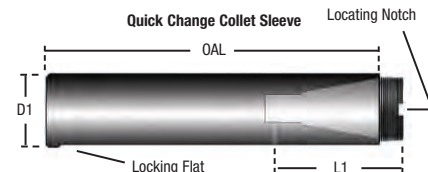
| ER Size | Bore Dia. | Nut Thread                  | Hassay EDP No. | Code No. | Price \$ |
|---------|-----------|-----------------------------|----------------|----------|----------|
| ER16    | 0.250     | M19 x 1mm Nut & Locator Pin | HSP-PA16-25001 | 182001   | 250.97   |
| ER16    | 8mm       | M19 x 1mm Nut & Locator Pin | HSP-PA16-31501 | 182003   | 250.97   |
| ER20    | 0.250     | M24 x 1mm Nut & Locator Pin | HSP-PA20-25001 | 182005   | 250.97   |
| ER20    | 8mm       | M24 x 1mm Nut & Locator Pin | HSP-PA20-31501 | 182007   | 250.97   |

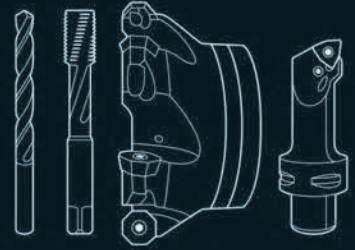


## Quick Change Collet Sleeves

For shank only holders.

| Collet | D1    | L1   | Overall Length | Hassay EDP No.  | Code No. | Price \$ |
|--------|-------|------|----------------|-----------------|----------|----------|
| ER16   | 0.500 | 1.1  | 4.5            | HSP-CS16-160500 | 182009   | 239.70   |
| ER16   | 0.625 | 1.1  | 4.5            | HSP-CS16-160625 | 182011   | 239.70   |
| ER16   | 0.750 | 1.1  | 4.5            | HSP-CS16-160750 | 182013   | 254.46   |
| ER16   | 20mm  | 28mm | 71mm           | HSP-CS16-160787 | 182015   | 217.36   |
| ER16   | 22mm  | 28mm | 118mm          | HSP-CS16-160866 | 182017   | 217.36   |
| ER16   | 25mm  | 28mm | 95mm           | HSP-CS16-160984 | 182019   | 239.70   |
| ER16   | 1     | 1.1  | 4.5            | HSP-CS16-161000 | 182021   | 254.46   |
| ER20   | 0.750 | 1.2  | 4.5            | HSP-CS20-200750 | 182023   | 254.46   |
| ER20   | 22mm  | 30mm | 114mm          | HSP-CS20-200866 | 182025   | 254.46   |
| ER20   | 1.00  | 1.2  | 4.5            | HSP-CS20-201000 | 182027   | 254.46   |
| ER20   | 1.250 | 1.2  | 4.5            | HSP-CS20-201250 | 182029   | 254.46   |
| ER20   | 32mm  | 30mm | 118mm          | HSP-CS20-201260 | 182031   | 254.46   |





With around 45,000 standard tools for turning, milling, holemaking and threading, Walter offers you outstanding productivity and reliability from an extensive range of precision, high-quality machining tools from the Walter, Walter Titex and Walter Prototyp competence brands.

## Tiger-tec® Gold

High-performance turning  
Reliable improvements in cost-efficiency



The new generation of cutting tool materials from Walter has arrived and is already redefining peak performance in machining. But how can we set new standards in a segment that already seems to be optimized?

Walter raises the bar through a determination to better ourselves over and over again. Along with superior technology, Walter also has our customers to thank, whose challenges are at the heart of Walter's drive. Having mastered milling and holemaking, Tiger-tec® Gold has conquered the third machining discipline – turning.

High-performance holemaking  
Guaranteed process reliability



High-performance milling  
Significant improvements in productivity





# Indexable Cutting Tools

**SELECTION OF GRADES & CHIPBREAKERS** ..... E2-7

## **TURNING**

Turning Inserts ..... E8-33

Turning Inserts for Aluminum ..... E34-37

C.B.N. Turning Inserts ..... E38

CERAMIC Inserts ..... E39-41

Turning Toolholder Index ..... E44-47

Turning Toolholders ..... E47-59

## **BORING**

Boring Bar Index ..... E62-64

Boring Bars ..... E64-73

## **PART-OFF & THREADING**

M.T.G. Grooving & Part Off ..... E74-76

Threading Inserts & Holders ..... E77-89

## **MILLING & DRILLING**

Milling Inserts ..... E90-105

Milling Cutter Index ..... E106-111

AP/AD Technical Data ..... E112-113

Max Mill Technical Information ..... E114-116

Milling Cutters ..... E117-148

Indexable Drills ..... E149

Combo Turning & Drilling Tool ..... E150

Nine9 NC Spot Drills ..... E151-153

Nine9 Engraving Tools ..... E154-155

Max Drill System ..... E156-160

**INDEXABLE KITS** ..... E161-172

**TECHNICAL INFORMATION** ..... E173-195

# Indexable Cutting Tools

## Sowa Indexable Grade Identification

This is your **quick reference colour band guide** that you will see throughout this catalogue. It will make your insert choice **quick, easy, and accurate**.

### Material Group

|                   |                             |                              |                                  |
|-------------------|-----------------------------|------------------------------|----------------------------------|
| <b>P</b><br>Steel | <b>M</b><br>Stainless Steel | <b>K</b><br>Cast Iron - Alum | <b>S</b><br>Heat Resistant Alloy |
|-------------------|-----------------------------|------------------------------|----------------------------------|

**P**

Material

|          |  |
|----------|--|
| <b>P</b> | Steel                                  |
| <b>M</b> | Stainless Steel                        |
| <b>K</b> | Cast Iron<br>Aluminum                  |
| <b>S</b> | Heat Resistant Alloy<br>Titanium Alloy |

**T**

Application

|                    |
|--------------------|
| <b>T</b> = Turning |
| <b>M</b> = Milling |

**10**

ISO Grade

|                          |
|--------------------------|
| <b>10</b> = ISO 10 Grade |
| <b>20</b> = ISO 20 Grade |
| <b>30</b> = ISO 30 Grade |
| <b>40</b> = ISO 40 Grade |

**C**

Coating

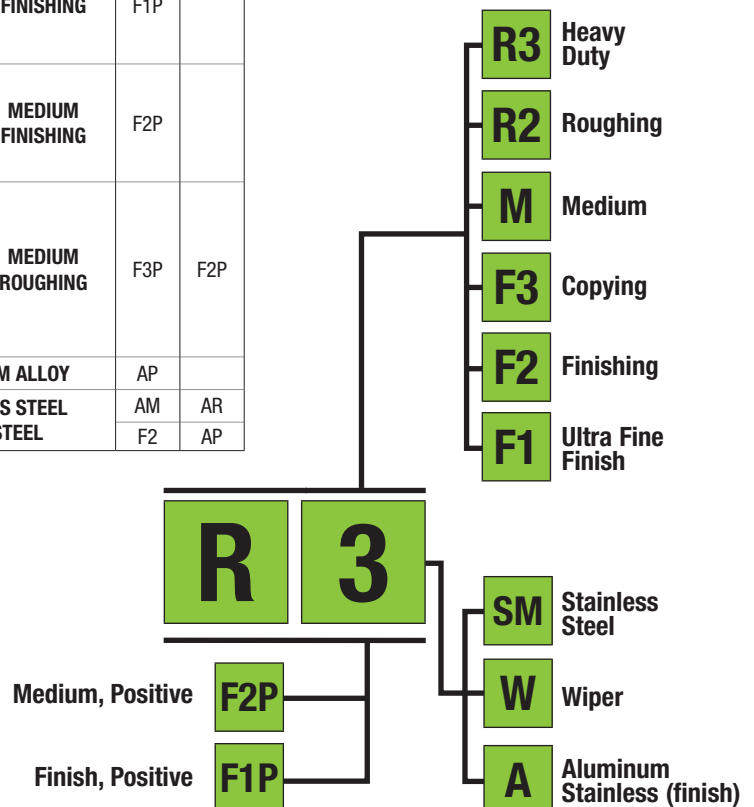
|                          |
|--------------------------|
| <b>C</b> = C.V.D. Coated |
| <b>U</b> = Uncoated      |
| <b>S</b> = Cermet        |
| <b>P</b> = P.V.D. Coated |

## Chipbreaker Quick Choice

| APPLICATION  |  |                   | SOWA |     |
|--|--|-------------------|------|-----|
|  |  |                   | MAIN | SUB |
| <b>N<br/>E<br/>G<br/>A<br/>•<br/>T<br/>Y<br/>P<br/>E</b> | <b>S<br/>T<br/>E<br/>E<br/>L<br/>S</b> | EXTREME FINISHING | F1   | VF  |
|  |  | FINISHING         | F2   |     |
|  |  | MEDIUM FINISHING  | F3   | M   |
|  |  | MEDIUM ROUGHING   | M    |     |
|  |  | ROUGHING          | R2   | R1  |
|  |  | HEAVY             | R3   |     |
|  |  | WIPER             | W    |     |
|  | GENERAL                                |                   |      |     |
|  | STAINLESS STEEL<br>MILD STEEL          |                   | G    | R2  |
|  |  |                   | A    | F3  |
| SM   |  |                   | M    |     |
| MM   |  |                   | R1   |     |
| MI   |  |                   | VM   |     |
| CAST IRON  |  |                   | G    |     |
|  |  | R1                | R2   |     |
| ALUMINUM   |  | A                 |      |     |

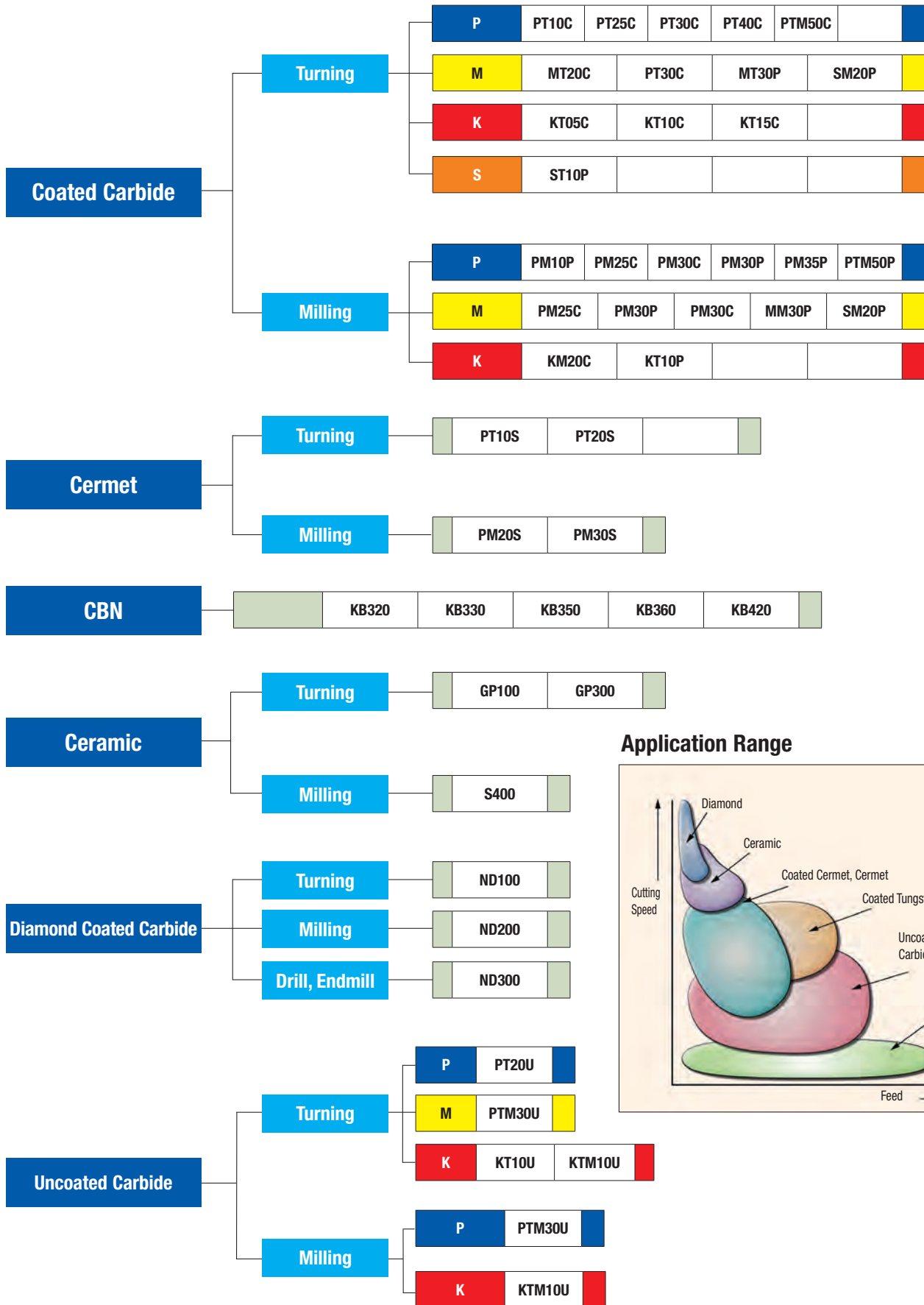
| APPLICATION  |  |                 |                  | SOWA |     |
|--|--|-----------------|------------------|------|-----|
|  |  |                 |                  | MAIN | SUB |
| <b>P<br/>O<br/>S<br/>I<br/>•<br/>T<br/>Y<br/>P<br/>E</b> | <b>C<br/>A<br/>S<br/>T<br/>I<br/>R<br/>O<br/>N</b> | FINISHING       | F1P              |      |     |
|  |  |                 | MEDIUM FINISHING | F2P  |     |
|  |  |                 | MEDIUM ROUGHING  | F3P  | F2P |
|  |  | ALUMINUM ALLOY  |                  | AP   |     |
|  |  | STAINLESS STEEL |                  | AM   | AR  |
|  |  | MILD STEEL      |                  | F2   | AP  |

### Code Key

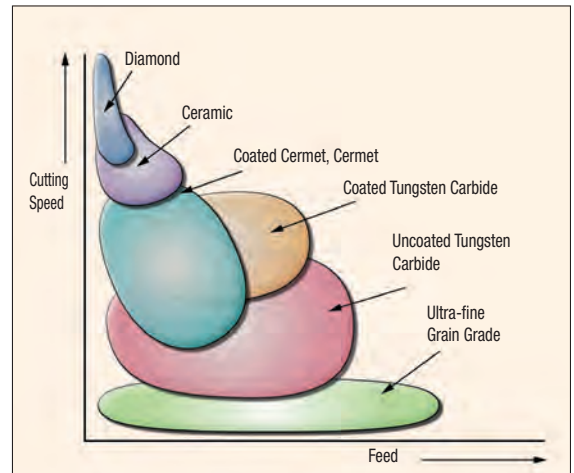


**i.e. CNMG 432 R3 PT10C**

# Sowa Indexable Grades



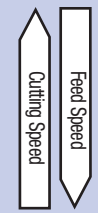
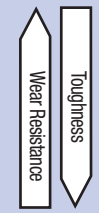
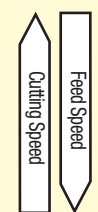
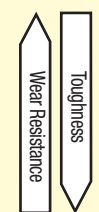

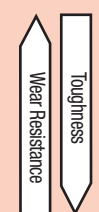
## Application Range





# Indexable Cutting Tools

## Tungsten Carbide ISO Grade

| Class | Class of Symbol                          | Workpiece   | Way of Cut   | Working Condition   | High Performance Diection   |   |
|-------|--|---|--|---|---|---|
|       |  |   |  |   | Cutting Condition   | Quality of Tip  |
| P     | P01                                      | Steels, Cast Steels   | Precision Turning, Precision Boring                                | Small cutting area in high cutting speed. Expect good dimension and surface with no vibration.                      |    |    |
|       | P10                                      | Steels, Cast Steels   | Turning, Copy Machining, Threading Cutting, Surface Finish Milling | Small cutting area in high cutting speed or good working condition.   |   |   |
|       | P20                                      | Steels, Cast Steels, Malleable Cast Iron  | Turning, Copy Machining, Milling, Planing                          | Medium cutting area in medium cutting speed and small cutting area in planing.                                      |   |   |
|       | P30                                      | Steels, Cast Steels, Malleable Cast Iron  | Turning, Milling, Planing  | Medium/large cutting area in low/medium cutting speed or poor working condition.                                    |   |   |
| M     | M10                                      | Steels, Cast Steels, Cast Iron  | Turning, Milling   | Small/medium cutting area in medium/high cutting speed or using in common for castability cast iron.                |    |    |
|       | M20                                      | Steels, Cast Steels, Cast Iron  | Turning, Milling   | Medium cutting area in medium cutting speed or no using in common for steels, cast iron. Or poor working condition. |   |   |
|       |  | Hadfield, Steels, Austenite Steels, Special Cast Iron                                       | Turning, Milling   | Medium cutting area in medium cutting speed or poor working condition.  |   |   |
|       | M30                                      | Steels, Cast Steels, Cast Iron, Austenite Steels, Special Cast Iron, Heat Resisting Alloy   | Turning, Milling, Planing, Cutting-Off                             | Medium/large cutting area in medium cutting speed. Or working condition is worse than M20.                          |   |   |
| K     | K01                                      | Cast Iron   | Precision Turning, Precision Boring, Surface Finish Milling        | Small cutting arear in high cutting speed or no vibration.  |  |  |
|       |  | High Hardness Cast Iron, Quenched Steels  | Turning  | Small cutting area in exfrom low cutting speed or no vibration.   |   |   |
|       |  | Black Lead, Hard Paper, Ceramic High Si-Al  |  | No vibration.   |   |   |
|       | K10                                      | Cast Iron, Malleable Cast Iron  | Turning, Milling, Boring, Reamer                                   | Small/medium cutting area in medium cutting speed. Or Generd working in comparating.                                |   |   |
|       |  | Quenched Steels   | Turning  | Small cutting area in low cutting speed or no vibration in comparative.   |   |   |
|       |  | Si-Al Alloy, High Hardness Copper, Glass, Ceramic, Hard Rubber, Hard Paper, Synthetic Resin |  | No vibration in comparative.  |   |   |
|       | K20                                      | Cast Iron (Hb200 and Below)   | Turning, Milling, Planing, Boring, Reamer, Broach                  | Medium/large cutting speed in medium cutting speed or general working demanding high toughness.                     |   |   |
| K30   | Low Hardness Cast Iron, Copper, Aluminum | Turning, Milling, Planing, Copy Machining   | Large cutting area or poor working condition.                      |   |   |   |

# Grade Application

## Turning

| Cutting Condition |                           | ISO | Coated Carbide | Cermet | C.B.N. | Ceramic | Uncoated Carbide |
|-------------------|---------------------------|-----|----------------|--------|--------|---------|------------------|
| P                 | Intermittent & Heavy Duty | P50 |                |        |        |         |                  |
|                   |                           | P40 |                |        |        |         |                  |
|                   | Low Speed                 | P30 |                |        |        |         |                  |
|                   |                           | P20 |                |        |        |         |                  |
|                   | High Speed                | P01 |                |        |        |         |                  |
| M                 | Low Speed                 | M40 |                |        |        |         |                  |
|                   |                           | M30 |                |        |        |         |                  |
|                   | High Speed                | M20 |                |        |        |         |                  |
|                   |                           | M10 |                |        |        |         |                  |
| K                 | Low Speed                 | K40 |                |        |        |         |                  |
|                   |                           | K30 |                |        |        |         |                  |
|                   | High Speed                | K20 |                |        |        |         |                  |
|                   |                           | K01 |                |        |        |         |                  |
| S                 | Continuous Cutting        | S10 |                |        |        |         |                  |
|                   | Interrupted Cutting       | S20 |                |        |        |         |                  |

## Milling

## Drilling

| Cutting Condition |                           | ISO | Coated Carbide | Cermet | C.B.N. | Ceramic | Uncoated Carbide | Coated Carbide |
|-------------------|---------------------------|-----|----------------|--------|--------|---------|------------------|----------------|
| P                 | Intermittent & Heavy Duty | P50 |                |        |        |         |                  |                |
|                   |                           | P40 |                |        |        |         |                  |                |
|                   | Low Speed                 | P30 |                |        |        |         |                  |                |
|                   |                           | P20 |                |        |        |         |                  |                |
|                   | High Speed                | P01 |                |        |        |         |                  |                |
| M                 | Low Speed                 | M40 |                |        |        |         |                  |                |
|                   |                           | M30 |                |        |        |         |                  |                |
|                   | High Speed                | M20 |                |        |        |         |                  |                |
|                   |                           | M10 |                |        |        |         |                  |                |
| K                 | Low Speed                 | K40 |                |        |        |         |                  |                |
|                   |                           | K30 |                |        |        |         |                  |                |
|                   | High Speed                | K20 |                |        |        |         |                  |                |
|                   |                           | K01 |                |        |        |         |                  |                |

## Turning Insert Code System



| 1 Insert Shape |          |          |          |
|----------------|----------|----------|----------|
|                |          |          |          |
| <b>C</b>       | <b>D</b> | <b>E</b> | <b>K</b> |
|                |          |          |          |
| <b>L</b>       | <b>R</b> | <b>S</b> | <b>T</b> |
|                |          |          |          |
| <b>V</b>       | <b>W</b> |          |          |

| 2 Clearance Angle |          |          |          |
|-------------------|----------|----------|----------|
|                   |          |          |          |
| <b>B</b>          | <b>C</b> | <b>D</b> | <b>E</b> |
|                   |          |          |          |
| <b>F</b>          | <b>N</b> | <b>P</b> |          |
| <b>Special</b>    |          |          |          |
| <b>0</b>          |          |          |          |



| 3 Tolerance  |   |                              |                       |
|--------------|---|------------------------------|-----------------------|
|              |   |                              |                       |
| <b>class</b> | <b>d</b>                                    | <b>m</b>                     | <b>t</b>              |
| <b>A</b>     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0002        | + <sub>-</sub> 0.0010 |
| <b>C</b>     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.0010 |
| <b>H</b>     | + <sub>-</sub> 0.0005                       | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.0010 |
| <b>E</b>     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.0010 |
| <b>G</b>     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.005  |
| <b>J</b>     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0002        | + <sub>-</sub> 0.001  |
| <b>K</b>     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.001  |
| <b>L</b>     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.001  |
| <b>M</b>     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.003 - 0.008 | + <sub>-</sub> 0.005  |
| <b>U</b>     | + <sub>-</sub> 0.003 - + <sub>-</sub> 0.01  | + <sub>-</sub> 0.005 - 0.015 | + <sub>-</sub> 0.005  |

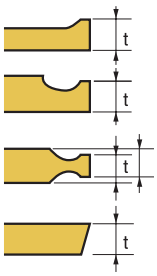
| Tolerance on C, H, R, T, W class (exceptional) |                      |                      |                      |                      |
|--|----------------------|----------------------|----------------------|----------------------|
| d  | Tolerance on d       |                      | Tolerance on m       |                      |
|  | J, K, L, M, N        | U                    | M, N                 | U                    |
| 1/4  | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 |
| 3/8  | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 |
| 1/2  | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.008 |
| 5/8  | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007 | + <sub>-</sub> 0.06  | + <sub>-</sub> 0.011 |
| 3/4  | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007 | + <sub>-</sub> 0.06  | + <sub>-</sub> 0.011 |
| 1  | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.01  | + <sub>-</sub> 0.07  | + <sub>-</sub> 0.015 |

| Tolerance on D class (exceptional) |                      |                       |
|------------------------------------|----------------------|-----------------------|
| d                                  | Tolerance on d       | Tolerance on m        |
| 1/4                                | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.0043 |
| 3/8                                | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.0043 |
| 1/2                                | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.006  |
| 5/8                                | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007  |
| 3/4                                | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007  |

| 4 Cross Section Type |          |
|----------------------|----------|
|                      |          |
| <b>A</b>             | <b>B</b> |
|                      |          |
| <b>C</b>             | <b>F</b> |
|                      |          |
| <b>G</b>             | <b>H</b> |
|                      |          |
| <b>J</b>             | <b>M</b> |
|                      |          |
| <b>N</b>             | <b>Q</b> |
|                      |          |
| <b>R</b>             | <b>T</b> |
|                      |          |
| <b>U</b>             | <b>W</b> |
| <b>Special Type</b>  |          |
| <b>X</b>             |          |

# Turning Insert Code System

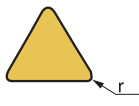
## 6 Height of Cutting Edge



| Symbol | Height of Cutting Edge (t) |       |
|--------|----------------------------|-------|
|        | Metric                     | Inch  |
| -      | 0.5(1)                     | 0.79  |
| T0     | 0.6                        | 1.00  |
| 01     | 1(2)                       | 1.59  |
| T1     | 1.2                        | 1.98  |
| 02     | 1.5(3)                     | 2.38  |
| 03     | 2                          | 3.18  |
| T3     | 2.5                        | 3.97  |
| 04     | 3                          | 4.76  |
| 05     | 3.5                        | 5.56  |
| 06     | 4                          | 6.35  |
| 07     | 5                          | 7.94  |
| 09     | 6                          | 9.52  |
| 11     | 7                          | 11.11 |
| 12     | 8                          | 12.70 |

( ) Symbol for small size insert

## 7 Nose Corner Radius (Nose R)



| Symbol | Corner Radius |                       |
|--------|---------------|-----------------------|
|        | Metric        | Inch                  |
| 01     | 0             | 0.1                   |
| 02     | 0.5           | 0.2                   |
| 04     | 1             | 0.4                   |
| 08     | 2             | 0.8                   |
| 12     | 3             | 1.2                   |
| 16     | 4             | 1.6                   |
| 20     | 5             | 2.0                   |
| 24     | 6             | 2.4                   |
| 28     | 7             | 2.8                   |
| 32     | 8             | 3.2                   |
| 00     | -             | Round Insert (Inch)   |
| M0     | -             | Round Insert (Metric) |

**3**  
**5**

**3**  
**6**


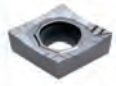
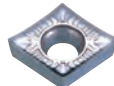




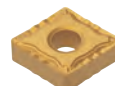
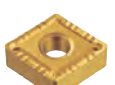


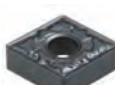







**2**  
**7**

**R1**  
**8**

## 5 Cutting Edge Length, Diameter of Inscribed Circle

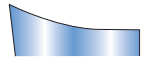
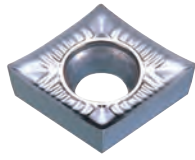
| Symbol |    |    |    |    |    |    | IC     |         |
|--------|----|----|----|----|----|----|--------|---------|
| C      | D  | S  | T  | R  | V  | W  |        |         |
| Metric |    |    |    |    |    |    | Inch   | d(inch) |
| 03     | 04 | 03 | 06 | 03 | -  | 02 | 1.2(5) | 5/32    |
| 04     | 05 | 04 | 08 | 04 | 08 | S3 | 1.5(6) | 3/16    |
| 05     | 06 | 05 | 09 | 05 | 09 | 03 | 1.8(7) | 7/32    |
| -      | -  | -  | -  | 06 | -  | -  | -      | 0.236   |
| 06     | 07 | 06 | 11 | 06 | 11 | 04 | 2      | 1/4     |
| 08     | 09 | 07 | 13 | 07 | 13 | 05 | 2.5    | 5/16    |
| -      | -  | -  | -  | 08 | -  | -  | -      | 0.315   |
| 09     | 11 | 09 | 16 | 09 | 16 | 06 | 3      | 3/8     |
| -      | -  | -  | -  | 10 | -  | -  | -      | 0.394   |
| 11     | 13 | 11 | 19 | 11 | 19 | 07 | 3.5    | 7/16    |
| -      | -  | -  | -  | 12 | -  | -  | -      | 0.472   |
| 12     | 15 | 12 | 22 | 12 | 22 | 08 | 4      | 1/2     |
| 14     | 17 | 14 | 24 | 14 | 24 | 09 | 4.5    | 9/16    |
| 16     | 19 | 15 | 27 | 15 | 27 | 10 | 5      | 5/8     |
| -      | -  | -  | -  | 16 | -  | -  | -      | 0.630   |
| 17     | 21 | 17 | 30 | 17 | 30 | 11 | 5.5    | 11/16   |
| 19     | 23 | 19 | 33 | 19 | 33 | 13 | 6      | 3/4     |
| -      | -  | -  | -  | 20 | -  | -  | -      | 0.787   |
| 22     | 27 | 22 | 38 | 22 | 38 | 15 | 7      | 7/8     |
| -      | -  | -  | -  | 25 | -  | -  | -      | 0.984   |
| 25     | 31 | 25 | 44 | 25 | 44 | 17 | 8      | 1       |
| 32     | 38 | 31 | 54 | 31 | 54 | 21 | 10     | 1-1/4   |
| -      | -  | -  | -  | 32 | -  | -  | -      | 1.260   |

## 8 Chip Breaker for Turning

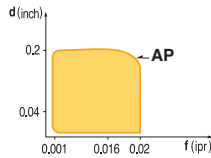
|   |   |   |   |
|---|---|---|---|
|  |  |  |  |
| <b>A</b>  | <b>AM</b>   | <b>AP</b>   | <b>F1P</b>  |
|  |  |  |  |
| <b>F2P</b>  | <b>F3P</b>  | <b>F1</b>   | <b>F2</b>   |
|  |  |  |  |
| <b>F3</b>   | <b>G</b>  | <b>M</b>  | <b>M1</b>   |
|  |  |  |  |
| <b>MM</b>   | <b>R1</b>   | <b>R2</b>   | <b>R3</b>   |
|  |  |  |   |
| <b>SM</b>   | <b>WF</b>   | <b>WM</b>   |   |



### CCGT-AP (AP Chipbreaker is for Aluminum)

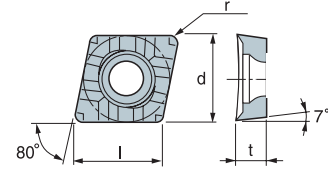


Exclusive chip breaker for aluminum and aluminum alloy



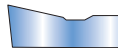
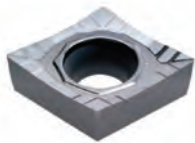
■ USE Aluminum Cutting

■ Recommendation  
**AP**  $d = 0.005 \sim 0.2$ inch  
 $f = 0.001 \sim 0.02$ ipr



|                 |        | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated      | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|--------------------|--------|-----|------|-------|--------------------|----------|
| Designation     | ISO    | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100               | KT10U              | l      | d   | t    | r     | Holder             | Page No. |
| CCGT 21.51-AP   | 060204 |                |       |       |       |       |       |       |       |       |       |                     | 146024<br>\$ 20.67 | 0.256  | 1/4 | 3/32 | 1/64  | Turning<br>SCACR/L | E55      |
| CCGT 32.50.5-AP | 09T302 |                |       |       |       |       |       |       |       |       |       |                     | 146027<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 0.008 |                    |          |
| CCGT 32.51-AP   | 09T304 |                |       |       |       |       |       |       |       |       |       | 146701<br>\$ 151.30 | 146011<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 1/64  |                    |          |
| CCGT 32.52-AP   | 09T308 |                |       |       |       |       |       |       |       |       |       |                     | 146012<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 1/32  |                    |          |
| CCGT 431-AP     | 120404 |                |       |       |       |       |       |       |       |       |       |                     | 146627<br>\$ 28.08 | 0.508  | 1/2 | 3/16 | 1/64  |                    |          |
| CCGT 432-AP     | 120408 |                |       |       |       |       |       |       |       |       |       |                     | 146023<br>\$ 28.08 | 0.508  | 1/2 | 3/16 | 1/32  |                    |          |

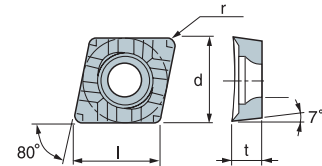
### CCGT-AM (AM Chipbreaker is for Aluminum)



High stability of cutting edge secures great performance in high speed and interrupted cutting  
 High speed of medium and interrupted operation

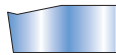
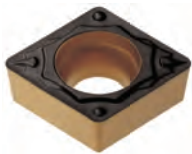
■ USE Aluminum Cutting

■ Recommendation  
**AM**  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr

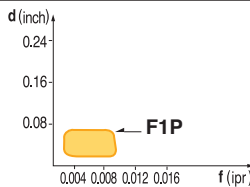


|                 |        | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|-----|------|-------|--------------------|----------|
| Designation     | ISO    | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U             | l      | d   | t    | r     | Holder             | Page No. |
| CCGT 21.50.5-AM | 060202 |                |       |       |       |       |       |       |       |       |       |        |       | 145661<br>\$ 20.10 | 0.256  | 1/4 | 3/32 | 0.008 | Turning<br>SCACR/L | E55      |
| CCGT 21.51-AM   | 060204 |                |       |       |       |       |       |       |       |       |       |        |       | 145681<br>\$ 20.10 | 0.256  | 1/4 | 3/32 | 1/64  |                    |          |
| CCGT 21.52-AM   | 060208 |                |       |       |       |       |       |       |       |       |       |        |       | 145682<br>\$ 20.10 | 0.256  | 1/4 | 3/32 | 1/32  |                    |          |
| CCGT 32.50.5-AM | 09T302 |                |       |       |       |       |       |       |       |       |       |        |       | 145662<br>\$ 23.55 | 0.382  | 3/8 | 5/32 | 0.008 |                    |          |
| CCGT 32.51-AM   | 09T304 |                |       |       |       |       |       |       |       |       |       |        |       | 145683<br>\$ 23.55 | 0.382  | 3/8 | 5/32 | 1/64  |                    |          |
| CCGT 430.5-AM   | 120402 |                |       |       |       |       |       |       |       |       |       |        |       | 145684<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 0.008 |                    |          |
| CCGT 431-AM     | 120404 |                |       |       |       |       |       |       |       |       |       |        |       | 145685<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 1/64  |                    |          |
| CCGT 432-AM     | 120408 |                |       |       |       |       |       |       |       |       |       |        |       | 145686<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 1/32  |                    |          |

### CCGT-F1P

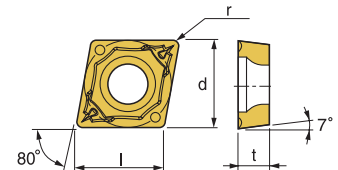


Excellent chip control at shallow depth of cut and low feed rate  
 Excellent surface finish of workpiece due to reduced cutting force  
 Suitable for fine boring



■ USE Finishing

■ Recommendation  
**F1P**  $d = 0.004 \sim 0.06$ inch  
 $f = 0.002 \sim 0.01$ ipr

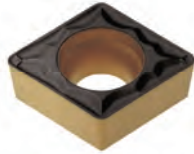


|                  |        | Coated Carbide |       |       |       |       |       |                    |                    |       |       | Cermet             |                    | Uncoated Carbide | (inch) |      |      |                   | Applicable Holders |          |
|------------------|--------|----------------|-------|-------|-------|-------|-------|--------------------|--------------------|-------|-------|--------------------|--------------------|------------------|--------|------|------|-------------------|--------------------|----------|
| Designation      | ISO    | PT10C          | PT20C | PT22C | PT25C | PT30C | MT20C | MT30P              | KT05C              | KT10C | ST10P | PT10S              | PT20S              | KTM10U           | l      | d    | t    | r                 | Holder             | Page No. |
| CCGT 32.50.5-F1P | 09T302 |                |       |       |       |       |       | 145626<br>\$ 25.04 |                    |       |       | 145627<br>\$ 25.04 |                    |                  | 0.382  | 3/8  | 5/32 | 0.008             | Turning<br>SCACR/L | E55      |
| CCGT 32.51-F1P   | 09T304 |                |       |       |       |       |       | 149289<br>\$ 26.16 | 145691<br>\$ 25.04 |       |       |                    | 149177<br>\$ 20.91 | 0.382            | 3/8    | 5/32 | 1/64 | Boring<br>SCLCR/L |                    |          |
| CCGT 32.52-F1P   | 09T308 |                |       |       |       |       |       | 145693<br>\$ 25.04 |                    |       |       |                    |                    | 0.382            | 3/8    | 5/32 | 1/32 |                   |                    |          |

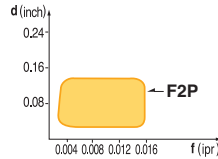
#### Quick Choice Grade Selection

|                   |                             |                              |                                  |
|-------------------|-----------------------------|------------------------------|----------------------------------|
| <b>P</b><br>Steel | <b>M</b><br>Stainless Steel | <b>K</b><br>Cast Iron - Alum | <b>S</b><br>Heat Resistant Alloy |
|-------------------|-----------------------------|------------------------------|----------------------------------|

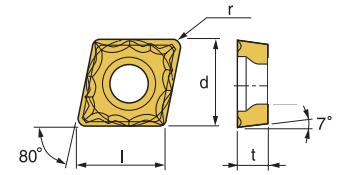
## CCMT-F1P/F2P



- Excellent chip control at wide range of cutting conditions
- Suitable for stainless steel cutting

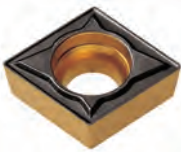


- USE Medium
- Recommendation  
F2P  $d = 0.02 \sim 0.14$  inch  
 $f = 0.002 \sim 0.016$  ipr

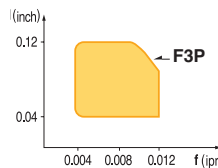


| Designation      | ISO    | Coated Carbide |                    |       |                    |                    |                    |       |       |       |       |                    | Cermet             | Uncoated Carbide | (inch) |        |       |   | Applicable Holders                      |            |
|------------------|--------|----------------|--------------------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|--------------------|--------------------|------------------|--------|--------|-------|---|---|------------|
|                  |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | MT15C              | MT20C | MT30P | KT05C | KT10C | ST10P              |                    |                  | PT20S  | KTM10U | l     | d                                       | t                                       | r          |
| CCMT 21.50.5-F1P | 060202 |                |                    |       |                    |                    |                    |       |       |       |       |                    |                    |                  | 0.256  | 1/4    | 3/32  | 0.008                                   | Turning<br>SCACR/L<br>Boring<br>SCLCR/L | E55<br>E69 |
| CCMT 32.51-F1P   | 09T304 |                |                    |       | 149257<br>\$ 15.28 |                    |                    |       |       |       |       |                    |                    | 0.382            | 3/8    | 5/32   | 1/64  |   |   |            |
| CCMT 21.50.5-F2P | 060202 |                | 149494<br>\$ 14.58 |       | 149252<br>\$ 14.59 |                    |                    |       |       |       |       |                    |                    | 0.256            | 1/4    | 3/32   | 0.008 | Turning<br>SCACR/L<br>Boring<br>SCLCR/L | E55<br>E69                              |            |
| CCMT 21.51-F2P   | 060204 |                | 149495<br>\$ 14.59 |       | 149227<br>\$ 14.58 |                    | 149255<br>\$ 14.59 |       |       |       |       | 148450<br>\$ 14.18 |                    | 0.256            | 1/4    | 3/32   | 1/64  |   |   |            |
| CCMT 21.52-F2P   | 060208 |                | 149496<br>\$ 14.58 |       | 149497<br>\$ 14.59 |                    |                    |       |       |       |       |                    |                    | 0.256            | 1/4    | 3/32   | 1/32  |   |   |            |
| CCMT 32.50.5-F2P | 09T302 |                | 149498<br>\$ 15.03 |       |                    |                    |                    |       |       |       |       | 148452<br>\$ 14.63 |                    | 0.382            | 3/8    | 5/32   | 0.008 |   |   |            |
| CCMT 32.51-F2P   | 09T304 |                | 149499<br>\$ 15.03 |       | 149220<br>\$ 15.03 | 149010<br>\$ 15.03 | 149238<br>\$ 15.03 |       |       |       |       | 145698<br>\$ 14.63 |                    | 0.382            | 3/8    | 5/32   | 1/64  |   |   |            |
| CCMT 32.52-F2P   | 09T308 |                | 149501<br>\$ 15.03 |       | 149221<br>\$ 15.03 | 148549<br>\$ 15.03 | 149247<br>\$ 15.03 |       |       |       |       |                    | 148454<br>\$ 15.03 |                  | 0.382  | 3/8    | 5/32  |   |   | 1/32       |
| CCMT 431-F2P     | 120404 |                |                    |       |                    | 145718<br>\$ 19.34 |                    |       |       |       |       | 145732<br>\$ 19.91 |                    | 0.508            | 1/2    | 3/16   | 1/64  |   |   |            |
| CCMT 432-F2P     | 120408 |                |                    |       | 149299<br>\$ 19.92 |                    | 149337<br>\$ 19.92 |       |       |       |       | 145632<br>\$ 19.34 |                    | 0.508            | 1/2    | 3/16   | 1/32  |   |   |            |

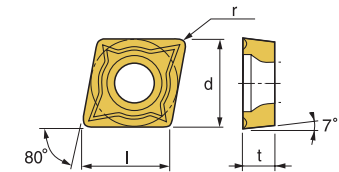
## CCMT-F3P



- Suitable for intermittent cutting and cast iron machining
- Good surface finish due to low cutting force
- Suitable for both boring and outer diameter turning

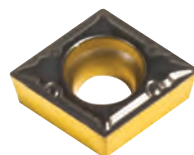


- USE Medium
- Recommendation  
F3P  $d = 0.04 \sim 0.12$  inch  
 $f = 0.004 \sim 0.012$  ipr



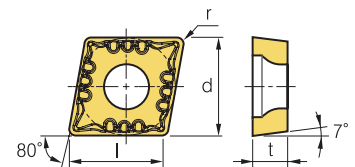
| Designation    | ISO    | Coated Carbide |       |       |                    |                    |                    |                    |       |       |       |       | Cermet | Uncoated Carbide | (inch) |       |      |   | Applicable Holders                      |            |
|----------------|--------|----------------|-------|-------|--------------------|--------------------|--------------------|--------------------|-------|-------|-------|-------|--------|------------------|--------|-------|------|---|---|------------|
|                |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | MT20C              | MT30P              | KT05C | KT10C | PT10S | PT20S |        |                  | KT10U  | PM20U | l    | d                                       | t                                       | r          |
| CCMT 21.51-F3P | 060204 |                |       |       | 149241<br>\$ 14.58 | 145735<br>\$ 14.58 |                    |                    |       |       |       |       |        |                  | 0.256  | 1/4   | 3/32 | 1/64                                    | Turning<br>SCACR/L<br>Boring<br>SCLCR/L | E55<br>E69 |
| CCMT 21.52-F3P | 060208 |                |       |       |                    | 145750<br>\$ 14.58 |                    |                    |       |       |       |       |        | 0.256            | 1/4    | 3/32  | 1/32 |   |   |            |
| CCMT 32.51-F3P | 09T304 |                |       |       | 149230<br>\$ 15.03 | 145774<br>\$ 15.03 |                    | 145779<br>\$ 14.63 |       |       |       |       |        | 0.382            | 3/8    | 5/32  | 1/64 | Turning<br>SCACR/L<br>Boring<br>SCLCR/L | E55<br>E69                              |            |
| CCMT 32.52-F3P | 09T308 |                |       |       | 149242<br>\$ 15.03 |                    | 145797<br>\$ 15.03 |                    |       |       |       |       |        | 0.382            | 3/8    | 5/32  | 1/32 |   |   |            |
| CCMT 431-F3P   | 120404 |                |       |       | 149262<br>\$ 19.91 | 145894<br>\$ 19.34 |                    |                    |       |       |       |       |        | 0.508            | 1/2    | 3/16  | 1/64 |   |   |            |
| CCMT 432-F3P   | 120408 |                |       |       | 149287<br>\$ 19.91 | 146159<br>\$ 19.91 |                    |                    |       |       |       |       |        | 0.508            | 1/2    | 3/16  | 1/32 |   |   |            |

## CCMT-FVL



- Stable chip control in high toughness material; low carbon steel, pipe steel and steel plates
- Improved chip control for facing, copy machining, and better surface finish

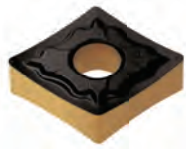
- USE Finishing
- Recommendation  
FVL  $d = 0.008 \sim 0.059$  inch  
 $f = 0.004 \sim 0.014$  ipr



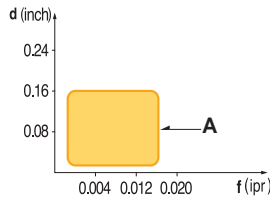
| Designation      | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       |       |       | Cermet | Uncoated Carbide | (inch) |        |      |       | Applicable Holders                      |            |
|------------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|--------|--------|------|-------|---|------------|
|                  |        | PT10C          | PT15C              | PT20C | PT25C | PT30C | MT15C | MT20C | MT30P | KT05C | KT10C | ST10P |        |                  | PT20S  | KTM10U | l    | d     | t                                       | r          |
| CCMT 21.50.5-FVL | 060202 |                | 149468<br>\$ 14.80 |       |       |       |       |       |       |       |       |       |        |                  | 0.256  | 1/4    | 3/32 | 0.008 | Turning<br>SCACR/L<br>Boring<br>SCLCR/L | E55<br>E69 |



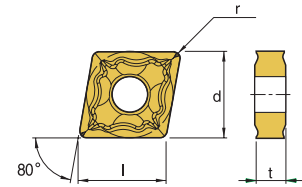
## CNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum

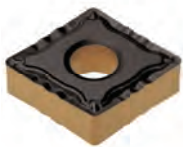


- USE Light & Medium
- Recommendation **A**  $d = 0.03 \sim 0.16$ inch  
 $f = 0.002 \sim 0.016$ ipr

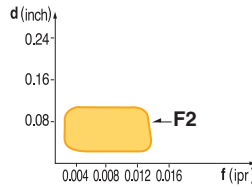


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch)             |       |     |      | Applicable Holders |  |                   |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|--------------------|-------|-------|-------|--------|-------|------------------|--------------------|-------|-----|------|--------------------|--|-------------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PM10P | MT20C | MT30P              | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l                  | d     | t   | r    | Holder             | Page No.                                 |                   |
| CNMG 431-A  | 120404 |                |       |       |                    |       |       |                    |       |       |       |        |       |                  | 147524<br>\$ 14.23 | 0.508 | 1/2 | 3/16 | 1/64               | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49 |
| CNMG 432-A  | 120408 |                |       |       | 149285<br>\$ 17.74 |       |       | 147525<br>\$ 17.72 |       |       |       |        |       |                  | 147526<br>\$ 14.23 | 0.508 | 1/2 | 3/16 | 1/32               | Boring<br>MCLNR/L<br>PCLNR/L             | E64<br>E67        |

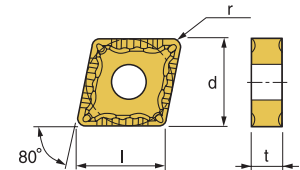
## CNMG-F2



- Excellent chip control at varied depth of cutting
- Strong cutting edge toughness due to special design

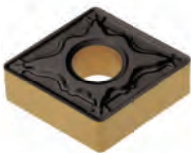


- USE Finishing
- Recommendation **F2**  $d = 0.01 \sim 0.1$ inch  
 $f = 0.002 \sim 0.014$ ipr

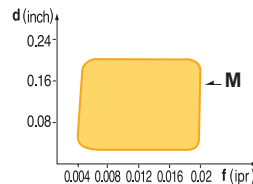


| Designation | ISO    | Coated Carbide |                    |                    |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |       |     |      | Applicable Holders |  |                   |
|-------------|--------|----------------|--------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-------|-----|------|--------------------|--|-------------------|
|             |        | PT10C          | PT15C              | PT25C              | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | KT15C | PT10S  | PT20S | KTM10U           | l      | d     | t   | r    | Holder             | Page No.                                 |                   |
| CNMG 431-F2 | 120404 |                | 149333<br>\$ 17.21 |                    |       |       |       |       |       |       |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/64               | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49 |
| CNMG 432-F2 | 09T304 |                | 149390<br>\$ 17.72 | 149391<br>\$ 17.72 |       |       |       |       |       |       |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/32               | Boring<br>MCLNR/L<br>PCLNR/L             | E64<br>E67        |

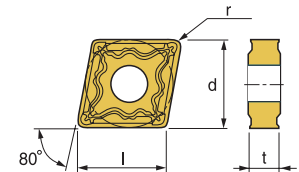
## CNMG-M/M1



- Wide available chip control range from medium-finishing to medium-roughing
- Suitable chip breaker for CNC machining



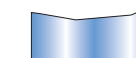
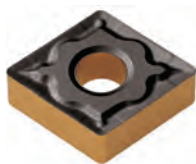
- USE Medium
- Recommendation **M**  $d = 0.04 \sim 0.2$ inch  
 $f = 0.004 \sim 0.02$ ipr



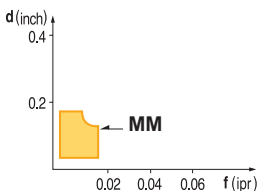
| Designation | ISO    | Coated Carbide |                    |       |                    |                    |       |                    |       |                    |       | Cermet |       | Uncoated Carbide | (inch) |       |     |      | Applicable Holders |  |                   |
|-------------|--------|----------------|--------------------|-------|--------------------|--------------------|-------|--------------------|-------|--------------------|-------|--------|-------|------------------|--------|-------|-----|------|--------------------|--|-------------------|
|             |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | MT20C | MT30P              | KT05C | KT10C              | ST10P | PT10S  | PT20S | KTM10U           | l      | d     | t   | r    | Holder             | Page No.                                 |                   |
| CNMG 431-M  | 120404 |                |                    |       | 149394<br>\$ 17.72 | 147531<br>\$ 17.21 |       | 148819<br>\$ 17.21 |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/64               | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49 |
| CNMG 431-M1 | 120404 |                |                    |       | 149251<br>\$ 17.72 |                    |       |                    |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/64               | Boring<br>MCLNR/L<br>PCLNR/L             | E64<br>E67        |
| CNMG 432-M1 | 120408 |                | 149393<br>\$ 17.21 |       | 149377<br>\$ 17.72 |                    |       |                    |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/32               |  |                   |
| CNMG 432-M  | 120408 |                |                    |       | 149231<br>\$ 17.72 | 147535<br>\$ 17.72 |       |                    |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 1/32               |  |                   |
| CNMG 433-M  | 120412 |                |                    |       | 149375<br>\$ 17.72 | 147538<br>\$ 17.21 |       |                    |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 3/64               |  |                   |
| CNMG 433-M1 | 120142 |                | 149555<br>\$ 17.72 |       |                    |                    |       |                    |       |                    |       |        |       |                  |        | 0.508 | 1/2 | 3/16 | 3/64               |  |                   |
| CNMG 543-M  | 160612 |                |                    |       |                    | 148306<br>\$ 27.19 |       |                    |       |                    |       |        |       |                  |        | 0.634 | 5/8 | 1/4  | 3/64               |  |                   |
| CNMG 643-M  | 190612 |                |                    |       |                    |                    |       |                    |       | 148949<br>\$ 29.43 |       |        |       |                  |        | 0.760 | 3/4 | 1/4  | 3/64               |  |                   |



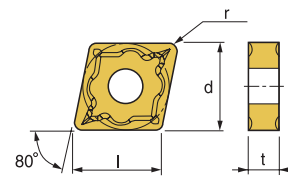
## CNMG-MM



Excellent choice for a variety of steels including Stainless Steel

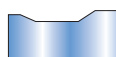
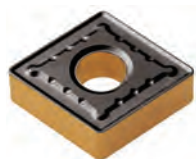


- USE Steels/Stainless Steels
- Recommendation  
MM  $d = 0.04 \sim 0.16$ inch  
 $f = 0.004 \sim 0.016$ ipr

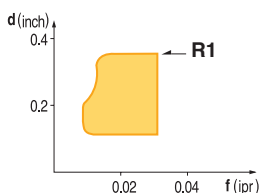


| Designation | ISO    | Coated Carbide |       |                    |       |                    |                    |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |                              | Applicable Holders                       |                   |
|-------------|--------|----------------|-------|--------------------|-------|--------------------|--------------------|--------------------|-------|-------|-------|--------|-------|------------------|--------|------|------|------------------------------|--|-------------------|
|             |        | PT15C          | PT20C | PT25C              | PT30C | MT15C              | MT20C              | MT30P              | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d    | t    | r                            | Holder                                   | Page No.          |
| CNMG 432-MM | 120408 |                |       | 149256<br>\$ 18.08 |       | 149322<br>\$ 18.03 |                    | 146014<br>\$ 17.21 |       |       |       |        |       |                  | 0.508  | 1/2  | 3/16 | 1/32                         | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49 |
| CNMG 433-MM | 120412 |                |       |                    |       |                    | 146019<br>\$ 17.21 |                    |       |       |       |        |       | 0.508            | 1/2    | 3/16 | 3/64 | Boring<br>MCLNR/L<br>PCLNR/L |  |                   |

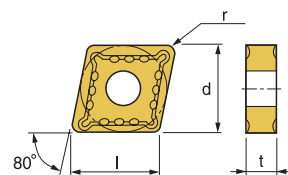
## CNMG-R1



- Suitable for deep depth of cut and fast feed cutting of steel and cast iron
- Suitable for intermittent cutting

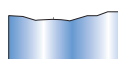


- USE Roughing
- Recommendation  
R1  $d = 0.12 \sim 0.32$ inch  
 $f = 0.012 \sim 0.032$ ipr

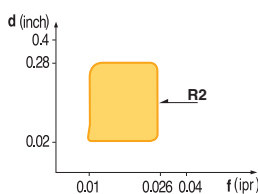


| Designation | ISO    | Coated Carbide |       |       |                    |                    |                    |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |                              | Applicable Holders                       |                   |            |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------------------------------|--|-------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | PT40C              | MT30P | KT05C | KT10C | KT15C | PT10S  | PT20S | KTM10U           | l      | d   | t    | r                            | Holder                                   | Page No.          |            |
| CNMG 432-R1 | 120408 |                |       |       | 149254<br>\$ 17.72 | 147485<br>\$ 17.72 | 146025<br>\$ 17.21 |       |       |       |       |        |       |                  | 0.508  | 1/2 | 3/16 | 1/32                         | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49 |            |
| CNMG 543-R1 | 160612 |                |       |       | 149345<br>\$ 26.77 | 146187<br>\$ 26.77 |                    |       |       |       |       |        |       | 0.634            | 5/8    | 1/4 | 3/64 | Boring<br>MCLNR/L<br>PCLNR/L |  |                   | E64<br>E67 |
| CNMG 544-R1 | 160616 |                |       |       |                    | 146028<br>\$ 26.77 |                    |       |       |       |       |        |       | 0.634            | 5/8    | 1/4 | 1/16 |                              |  |                   |            |
| CNMG 643-R1 | 190612 |                |       |       | 149330<br>\$ 36.87 | 146198<br>\$ 35.84 |                    |       |       |       |       |        |       | 0.760            | 3/4    | 1/4 | 3/64 |                              |  |                   |            |
| CNMG 644-R1 | 190616 |                |       |       |                    | 146033<br>\$ 35.84 |                    |       |       |       |       |        |       | 0.760            | 3/4    | 1/4 | 1/16 |                              |  |                   |            |

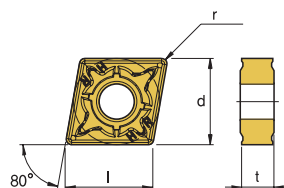
## CNMG-R2



- Excellent chip control at deep depth of cut and fast feed rate
- Strong cutting edge makes excellent cutting performance at intermittent cutting



- USE Roughing
- Recommendation  
R2  $d = 0.1 \sim 0.28$ inch  
 $f = 0.01 \sim 0.026$ ipr



| Designation | ISO    | Coated Carbide |       |                    |                    |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |  | Applicable Holders |                              |            |
|-------------|--------|----------------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|--|--------------------|------------------------------|------------|
|             |        | PT10C          | PT20C | PT25C              | PT30C              | PT40C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d    | t    | r  | Holder             | Page No.                     |            |
| CNMG 432-R2 | 120408 |                |       | 149398<br>\$ 18.03 |                    |                    |       |       |       |       |       |        |       | 0.508            | 1/2    | 3/16 | 1/32 | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L | E48<br>E48<br>E49  |                              |            |
| CNMG 433-R2 | 120412 |                |       |                    | 147495<br>\$ 17.21 |                    |       |       |       |       |       |        |       | 0.508            | 1/2    | 3/16 | 3/64 |  |                    | Boring<br>MCLNR/L<br>PCLNR/L | E64<br>E67 |
| CNMG 543-R2 | 160612 |                |       | 149399<br>\$ 18.03 |                    | 148700<br>\$ 27.24 |       |       |       |       |       |        |       | 0.634            | 5/8    | 1/4  | 3/64 |  |                    |                              |            |
| CNMG 642-R2 | 190608 |                |       |                    | 147500<br>\$ 36.37 |                    |       |       |       |       |       |        |       | 0.760            | 3/4    | 1/4  | 1/32 |  |                    |                              |            |
| CNMG 643-R2 | 190612 |                |       | 149409<br>\$ 27.19 | 147501<br>\$ 35.84 | 148699<br>\$ 35.84 |       |       |       |       |       |        |       | 0.760            | 3/4    | 1/4  | 3/64 |  |                    |                              |            |

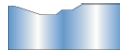
### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

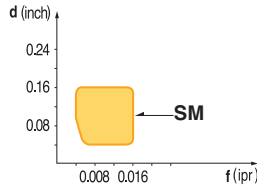




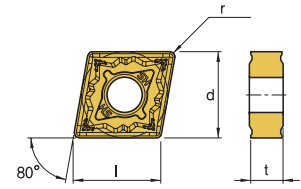
## CNMG-SM (SM Chipbreaker is for Stainless Steel medium feed.)



- Exclusive design for stainless steel cutting provides longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land

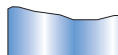


- USE Stainless Steel
- Recommendation  
SM  $d = 0.04 \sim 0.16$ inch  
 $f = 0.004 \sim 0.016$ ipr

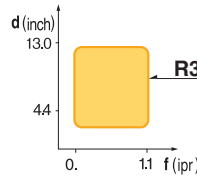


| Designation | ISO    | Coated Carbide |       |       |       |                    |       |                    |       |       |                    | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders                                   |          |
|-------------|--------|----------------|-------|-------|-------|--------------------|-------|--------------------|-------|-------|--------------------|--------|-------|------------------|--------|-----|------|------|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | MT15C              | MT20C | MT30P              | KT05C | KT10C | ST10P              | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder   | Page No. |
| CNMG 431-SM | 120404 |                |       |       |       | 149296<br>\$ 18.08 |       | 147487<br>\$ 17.72 |       |       | 148379<br>\$ 17.21 |        |       |                  | 0.508  | 1/2 | 3/16 | 1/64 | Turning<br>MCKNR/L E48<br>MCLNR/L E48<br>MCRNR/L E49 |          |
| CNMG 432-SM | 120408 |                |       |       |       |                    |       | 147489<br>\$ 17.72 |       |       | 148380<br>\$ 17.72 |        |       |                  | 0.508  | 1/2 | 3/16 | 1/32 |  |          |
| CNMG 433-SM | 120412 |                |       |       |       |                    |       | 146040<br>\$ 17.21 |       |       | 148855<br>\$ 17.21 |        |       |                  | 0.508  | 1/2 | 3/16 | 3/64 | Boring<br>MCLNR/L E64<br>PCLNR/L E67                 |          |
| CNMG 543-SM | 160612 |                |       |       |       |                    |       | 148940<br>\$ 26.77 |       |       |                    |        |       | 0.634            | 5/8    | 1/4 | 3/64 |      |  |          |
| CNMG 643-SM | 190612 |                |       |       |       |                    |       | 148939<br>\$ 35.84 |       |       | 148952<br>\$ 35.84 |        |       | 0.760            | 3/4    | 1/4 | 3/64 |      |  |          |

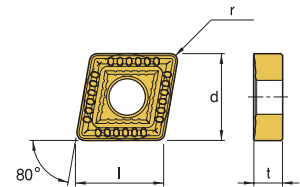
## CNMM-R3



- Specially designed toughest cutting edge provides superior cutting performance at deep depth of cut and fast feed rate
- Unique design of dot on cutting edge makes smooth chip flow and reduce cutting force

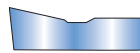
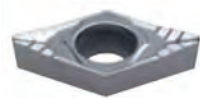


- USE Heavy Duty
- Recommendation  
R3  $d = 0.16 \sim 0.52$ inch  
 $f = 0.018 \sim 0.06$ ipr



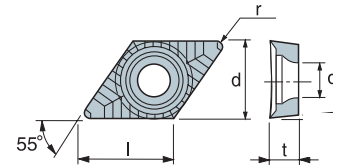
| Designation | ISO    | Coated Carbide |       |       |       |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |  | Applicable Holders                   |          |
|-------------|--------|----------------|-------|-------|-------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|--|--------------------------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d    | t    | r  | Holder                               | Page No. |
| CNMM 432-R3 | 120408 |                |       |       |       | 147505<br>\$ 17.51 |       |       |       |       |       |        |       | 0.508            | 1/2    | 3/16 | 1/32 | Turning<br>MCKNR/L E48<br>MCLNR/L E48<br>MCRNR/L E49 |                                      |          |
| CNMM 643-R3 | 190612 |                |       |       |       | 147508<br>\$ 35.84 |       |       |       |       |       |        |       | 0.760            | 3/4    | 1/4  | 3/64 |  | Boring<br>MCLNR/L E64<br>PCLNR/L E67 |          |

## DCGT-AM (AM Chipbreaker is for Aluminum)



- Exclusive chip breaker for aluminum and aluminum alloy

- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr

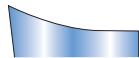
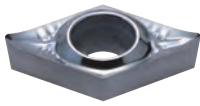


| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide | (inch) |      |       |   | Applicable Holders |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|------------------|--------|------|-------|---|--------------------|----------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100              | KT10U            | l      | d    | t     | r   | Holder             | Page No. |
| DCGT 21.50.5-AM | 070202 |                |       |       |       |       |       |       |       |       |       | 146048<br>\$ 20.10 | 0.307            | 1/4    | 3/32 | 0.008 | Turning<br>SDJCR/L E56<br>SDNCN E57             |                    |          |
| DCGT 21.52-AM   | 070208 |                |       |       |       |       |       |       |       |       |       | 146052<br>\$ 20.67 | 0.307            | 1/4    | 3/32 | 1/32  |   |                    |          |
| DCGT 32.50.5-AM | 11T302 |                |       |       |       |       |       |       |       |       |       | 145664<br>\$ 24.23 | 0.457            | 3/8    | 5/32 | 0.008 | Boring<br>SDQCR E70<br>SDUCR E70<br>SDZCR/L E71 |                    |          |
| DCGT 32.51-AM   | 11T304 |                |       |       |       |       |       |       |       |       |       | 146059<br>\$ 23.55 | 0.457            | 3/8    | 5/32 | 1/64  |   |                    |          |
| DCGT 32.52-AM   | 11T308 |                |       |       |       |       |       |       |       |       |       | 146063<br>\$ 23.55 | 0.457            | 3/8    | 5/32 | 1/32  |   |                    |          |

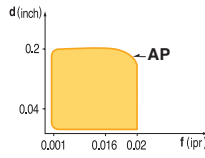
### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

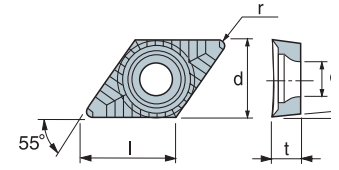
## DCGT-AP (AP Chipbreaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy

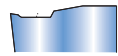
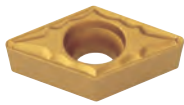


- USE Aluminum Cutting
- Recommendation AP  $d = 0.005 \sim 0.2 \text{ inch}$   
 $f = 0.001 \sim 0.02 \text{ ipr}$

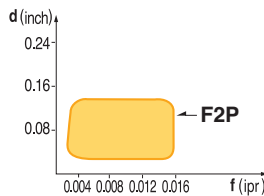


| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated      | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders   |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|--------------------|--------|-----|------|-------|--|----------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100               | KT10U              | l      | d   | t    | r     | Holder   | Page No. |
| DCGT 21.50.5-AP | 070202 |                |       |       |       |       |       |       |       |       |       |                     | 146988<br>\$ 20.10 | 0.307  | 1/4 | 3/32 | 0.008 | Turning<br>SDJCR/L E56<br>SDNCN E57<br>Boring<br>SDQCR E70<br>SDUCR E70<br>SDZCR/L E71 |          |
| DCGT 21.51-AP   | 070204 |                |       |       |       |       |       |       |       |       |       |                     | 146989<br>\$ 20.67 | 0.307  | 1/4 | 3/32 | 1/64  |  |          |
| DCGT 32.50.5-AP | 11T302 |                |       |       |       |       |       |       |       |       |       |                     | 146990<br>\$ 24.23 | 0.457  | 3/8 | 5/32 | 0.008 |  |          |
| DCGT 32.51-AP   | 11T304 |                |       |       |       |       |       |       |       |       |       | 146703<br>\$ 151.30 | 146991<br>\$ 24.23 | 0.457  | 3/8 | 5/32 | 1/64  |  |          |
| DCGT 32.52-AP   | 11T308 |                |       |       |       |       |       |       |       |       |       | 146704<br>\$ 151.30 | 146992<br>\$ 24.23 | 0.457  | 3/8 | 5/32 | 1/32  |  |          |
| DCGT 32.53-AP   | 120404 |                |       |       |       |       |       |       |       |       |       |                     | 147764<br>\$ 23.55 | 0.457  | 3/8 | 5/32 | 3/64  |  |          |

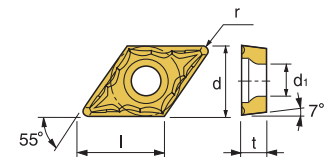
## DCMT-F1P/F2P



- Excellent chip control at wide range of cutting conditions
- Suitable for stainless steel cutting

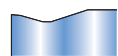
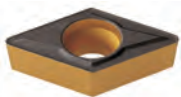


- USE Medium
- Recommendation F2P  $d = 0.02 \sim 0.14 \text{ inch}$   
 $f = 0.002 \sim 0.016 \text{ ipr}$

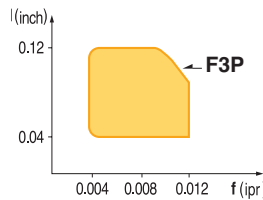


| Designation      | ISO    | Coated Carbide |                    |       |                    |                    |                    |       |                    |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |       | Applicable Holders   |          |
|------------------|--------|----------------|--------------------|-------|--------------------|--------------------|--------------------|-------|--------------------|-------|-------|--------|-------|------------------|--------|-----|------|-------|--|----------|
|                  |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | MT15C              | MT20C | MT30P              | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r     | Holder   | Page No. |
| DCMT 21.51-F2P   | 070204 |                | 149503<br>\$ 15.15 |       | 149260<br>\$ 16.79 |                    |                    |       | 149011<br>\$ 16.79 |       |       |        |       |                  | 0.307  | 1/4 | 3/32 | 1/64  | Turning<br>SDJCR/L E56<br>SDNCN E57<br>Boring<br>SDQCR E70<br>SDUCR E70<br>SDZCR/L E71 |          |
| DCMT 21.52-F2P   | 070208 |                | 149505<br>\$ 15.15 |       | 149507<br>\$ 15.15 |                    |                    |       |                    |       |       |        |       |                  | 0.307  | 1/4 | 3/32 | 1/32  |  |          |
| DCMT 32.50.5-F2P | 11T302 |                | 149509<br>\$ 18.71 |       |                    |                    |                    |       |                    |       |       |        |       |                  | 0.457  | 3/8 | 5/32 | 0.008 |  |          |
| DCMT 32.51-F2P   | 11T304 |                | 149511<br>\$ 18.71 |       | 149222<br>\$ 18.71 | 146069<br>\$ 18.20 | 149250<br>\$ 18.71 |       |                    |       |       |        |       |                  | 0.457  | 3/8 | 5/32 | 1/64  |  |          |
| DCMT 32.52-F2P   | 11T308 |                | 149513<br>\$ 18.71 |       | 149226<br>\$ 18.71 |                    | 149292<br>\$ 18.71 |       |                    |       |       |        |       |                  | 0.457  | 3/8 | 5/32 | 1/32  |  |          |
|                  |        |                |                    |       |                    |                    |                    |       |                    |       |       |        |       |                  |        |     |      |       |  |          |

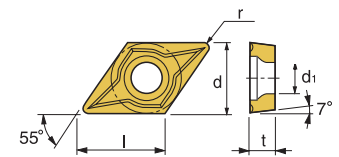
## DCMT-F3P



- Excellent chip control at shallow depth of cut and low feed rate
- Excellent surface finish of workpiece due to reduced cutting force
- Suitable for fine boring

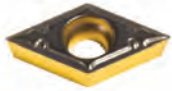


- USE Medium
- Recommendation F3P  $d = 0.04 \sim 0.12 \text{ inch}$   
 $f = 0.004 \sim 0.012 \text{ ipr}$



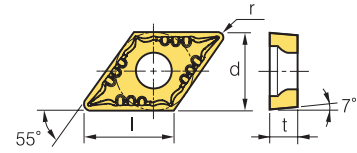
| Designation    | ISO    | Coated Carbide |                    |       |                    |                    |       |       |       |       |       | Cermet |        | Uncoated Carbide |       | (inch) |      |      |  | Applicable Holders |  |
|----------------|--------|----------------|--------------------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|--------|------------------|-------|--------|------|------|--|--------------------|--|
|                |        | PT10C          | PT15C              | PT22C | PT25C              | PT30C              | MT15C | MT30P | KT05C | KT10C | PT10S | PT20S  | KTM10U | PM20U            | l     | d      | t    | r    | Holder   | Page No.           |  |
| DCMT 21.51-F3P | 070204 |                |                    |       | 149332<br>\$ 16.79 |                    |       |       |       |       |       |        |        |                  | 0.307 | 1/4    | 3/32 | 1/64 | Turning<br>SDJCR/L E56<br>SDNCN E57<br>Boring<br>SDQCR E70<br>SDUCR E70<br>SDZCR/L E71 |                    |  |
| DCMT 32.51-F3P | 11T304 |                |                    |       | 149267<br>\$ 18.71 | 146030<br>\$ 18.71 |       |       |       |       |       |        |        |                  | 0.457 | 3/8    | 5/32 | 1/64 |  |                    |  |
| DCMT 32.52-F3P | 11T308 |                | 149329<br>\$ 18.71 |       | 149328<br>\$ 18.71 | 146032<br>\$ 18.20 |       |       |       |       |       |        |        |                  | 0.457 | 3/8    | 5/32 | 1/32 |  |                    |  |

## DCMT-FVL



- Stable chip control in high toughness material; low carbon steel, pipe steel, and steel plates
- Improved chip control for facing, copy machining, and better surface finish

- USE Finishing
- Recommendation  
FVL  $d = 0.008 \sim 0.059$ inch  
 $f = 0.004 \sim 0.014$ ipr



| Designation      | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       |       | Cermet |        | Uncoated Carbide |       | (inch) |      |       |                  | Applicable Holders |     |  |
|------------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|------------------|-------|--------|------|-------|------------------|--------------------|-----|--|
|                  |        | PT10C          | PT15C              | PT22C | PT25C | PT30C | MT15C | MT30P | KT05C | KT10C | PT10S | PT20S  | KTM10U | PM20U            | l     | d      | t    | r     | Holder           | Page No.           |     |  |
| DCMT 21.50.5-FVL | 070202 |                | 149469<br>\$ 15.15 |       |       |       |       |       |       |       |       |        |        |                  | 0.307 | 1/4    | 3/32 | 0.008 | SDJCR/L<br>SDNCN | E56<br>E57         |     |  |
|                  |        |                |                    |       |       |       |       |       |       |       |       |        |        |                  |       |        |      |       | <b>Turning</b>   |                    |     |  |
|                  |        |                |                    |       |       |       |       |       |       |       |       |        |        |                  |       |        |      |       | <b>Boring</b>    |                    |     |  |
|                  |        |                |                    |       |       |       |       |       |       |       |       |        |        |                  |       |        |      |       | SDQCR            |                    | E70 |  |
|                  |        |                |                    |       |       |       |       |       |       |       |       |        |        |                  |       |        |      |       | SDUCR            |                    | E70 |  |
|                  |        |                |                    |       |       |       |       |       |       |       |       |        |        |                  |       |        |      |       | SDZCR/L          |                    | E71 |  |

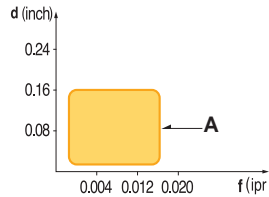
## DNM\_ 55° Negative Turning Inserts



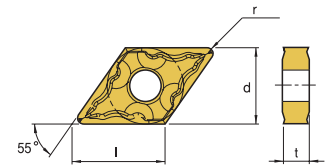
### DNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum

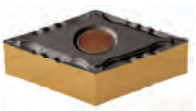


- USE Light & Medium
- Recommendation  
A  $d = 0.03 \sim 0.16$ inch  
 $f = 0.002 \sim 0.016$ ipr

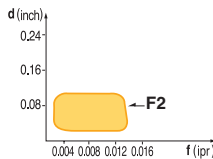


| Designation | ISO    | Coated Carbide |       |       |       |                    |       |                    |       |       |                    | Cermet |       | Uncoated Carbide   |       | (inch) |      |      |                    | Applicable Holders |  |
|-------------|--------|----------------|-------|-------|-------|--------------------|-------|--------------------|-------|-------|--------------------|--------|-------|--------------------|-------|--------|------|------|--------------------|--------------------|--|
|             |        | PT10C          | PT20C | PT22C | PT30C | MT15C              | MT20C | MT30P              | KT05C | KT10C | ST10P              | PT10S  | PT20S | KTM10U             | l     | d      | t    | r    | Holder             | Page No.           |  |
| DNMG 431-A  | 150404 |                |       |       |       |                    |       | 147577<br>\$ 21.11 |       |       | 148381<br>\$ 21.11 |        |       | 147578<br>\$ 17.42 | 0.610 | 1/2    | 3/16 | 1/64 | MDJNR/L            | E49                |  |
| DNMG 432-A  | 150408 |                |       |       |       | 149338<br>\$ 21.75 |       | 147580<br>\$ 21.74 |       |       | 148382<br>\$ 21.11 |        |       | 147581<br>\$ 17.42 | 0.610 | 1/2    | 3/16 | 1/32 | PDSNR/L<br>PDUNR/L | E67<br>E68         |  |

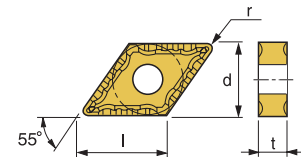
### DNMG-F2



- Excellent chip control at varied depth of cutting
- Strong cutting edge toughness due to special design



- USE Finishing
- Recommendation  
F2  $d = 0.015 \sim 0.1$ inch  
 $f = 0.002 \sim 0.014$ ipr



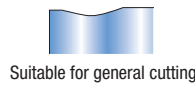
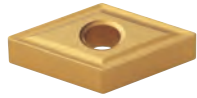
| Designation | ISO    | Coated Carbide |                    |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide |       | (inch) |      |      |                    | Applicable Holders |  |
|-------------|--------|----------------|--------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|-------|--------|------|------|--------------------|--------------------|--|
|             |        | PT10C          | PT15C              | PT20C | PT25C              | PM10P | MT20C | MT30P | KT05C | KT10C | KT15C | PT10S  | PT20S | KTM10U           | l     | d      | t    | r    | Holder             | Page No.           |  |
| DNMG 431-F2 | 150404 |                | 149298<br>\$ 21.74 |       |                    |       |       |       |       |       |       |        |       |                  | 0.610 | 1/2    | 3/16 | 1/64 | MDJNR/L            | E49                |  |
| DNMG 432-F2 | 150408 |                | 149435<br>\$ 21.74 |       | 149437<br>\$ 21.74 |       |       |       |       |       |       |        |       |                  | 0.610 | 1/2    | 3/16 | 1/32 | PDSNR/L<br>PDUNR/L | E67<br>E68         |  |

#### Quick Choice Grade Selection

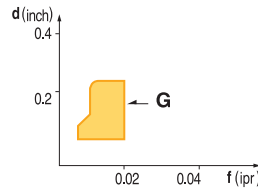
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



## DNMG-G



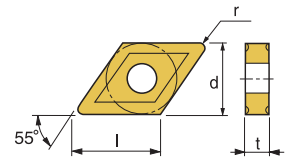
Suitable for general cutting



■ USE  
General Cutting

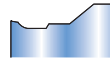
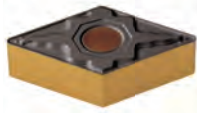
■ Recommendation

**G**  $d = 0.16 \sim 0.4 \text{ inch}$   
 $f = 0.02 \sim 0.04 \text{ ipr}$

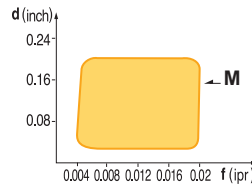


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders                                 |                   |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|--|-------------------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder   | Page No.          |
| DNMG 432-G  | 150408 |                |       |       | 147554<br>\$ 21.11 |       |       |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/32 | Turning<br>MDJNR/L<br>Boring<br>PDSNR/L<br>PDUNR/L | E49<br>E67<br>E68 |

## DNMG-M/M1



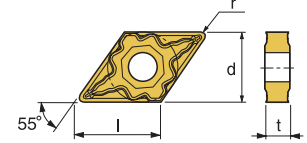
Wide available chip control range from medium-finishing to medium-roughing  
Suitable chip breaker for CNC machining



■ USE  
Medium

■ Recommendation

**M**  $d = 0.04 \sim 0.2 \text{ inch}$   
 $f = 0.004 \sim 0.02 \text{ ipr}$



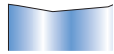
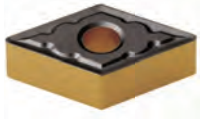
| Designation | ISO    | Coated Carbide |                    |       |                    |                    |       |       |       |       |       | Cermet |        | Uncoated Carbide | (inch) |      |      |  | Applicable Holders |  |
|-------------|--------|----------------|--------------------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|--------|------------------|--------|------|------|--|--------------------|--|
|             |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | MT30P | KT05C | KT10C | ST10P | PT10S | PT20S  | KTM10U | l                | d      | t    | r    | Holder   | Page No.           |  |
| DNMG 431-M  | 150404 |                |                    |       | 149261<br>\$ 22.12 |                    |       |       |       |       |       |        |        | 0.610            | 1/2    | 3/16 | 1/64 | Turning<br>MDJNR/L<br>Boring<br>PDSNR/L<br>PDUNR/L | E49<br>E67<br>E68  |  |
| DNMG 432-M  | 150408 |                | 149334<br>\$ 22.10 |       | 149233<br>\$ 21.74 |                    |       |       |       |       |       |        | 0.610  | 1/2              | 3/16   | 1/32 |      |  |                    |  |
| DNMG 441-M  | 150604 |                | 149441<br>\$ 22.10 |       | 149445<br>\$ 22.10 |                    |       |       |       |       |       |        | 0.610  | 1/2              | 1/4    | 1/64 |      |  |                    |  |
| DNMG 431-M1 | 150404 |                | 149439<br>\$ 21.75 |       |                    |                    |       |       |       |       |       |        | 0.610  | 1/2              | 3/16   | 1/64 |      |  |                    |  |
| DNMG 432-M1 | 150408 |                |                    |       | 149243<br>\$ 21.74 | 145651<br>\$ 21.73 |       |       |       |       |       |        | 0.610  | 1/2              | 3/16   | 1/32 |      |  |                    |  |



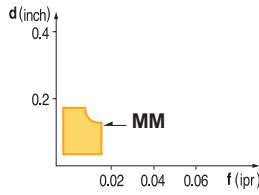
## Chip Hooks and Magnetic Chip Collectors

Find them on Page I7

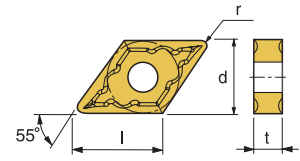
### DNMG-MM



Excellent choice for a variety of steels including Stainless Steel

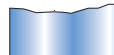


- USE Steels/Stainless Steels
- Recommendation **MM**  $d = 0.04 \sim 0.16 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$

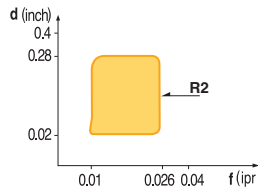


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders           |            |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|------------------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder                       | Page No.   |
| DNMG 431-MM | 150404 |                |       |       | 149258<br>\$ 22.12 |       |       |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/64 | Turning<br>MDJNR/L           | E49        |
| DNMG 432-MM | 150408 |                |       |       | 149279<br>\$ 22.12 |       |       |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/32 | Boring<br>PDSNR/L<br>PDUNR/L | E67<br>E68 |

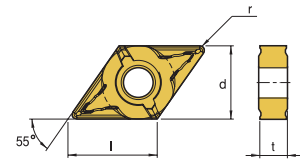
### DNMG-R2



- Excellent chip control at deep depth of cut and fast feed rate
- Strong cutting edge makes excellent cutting performance at intermittent cutting

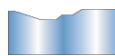


- USE Roughing
- Recommendation **F3**  $d = 0.1 \sim 0.28 \text{ inch}$   
 $f = 0.01 \sim 0.026 \text{ ipr}$

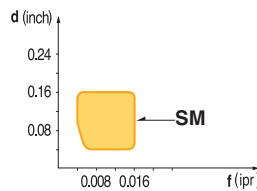


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders           |            |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|------------------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder                       | Page No.   |
| DNMG 432-R2 | 150408 |                |       |       | 147564<br>\$ 22.12 |       |       |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/32 | Turning<br>MDJNR/L           | E49        |
|             |        |                |       |       |                    |       |       |       |       |       |       |        |       |                  |        |     |      |      | Boring<br>PDSNR/L<br>PDUNR/L | E67<br>E68 |

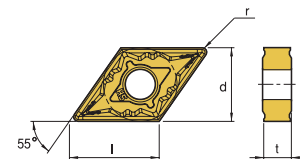
### DNMG-SM



- Exclusive design for stainless steel cutting provides longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land



- USE Stainless Steel
- Recommendation **SM**  $d = 0.04 \sim 0.16 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$



| Designation | ISO    | Coated Carbide |       |       |                    |       |                    |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|--------------------|-------|--------------------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | MT15C | MT20C              | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder             | Page No. |
| DNMG 431-SM | 150404 |                |       |       | 149297<br>\$ 22.10 |       |                    |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/64 | Turning<br>MDJNR/L | E49      |
| DNMG 432-SM | 150408 |                |       |       |                    |       | 147561<br>\$ 21.74 |       |       |       |       |        |       |                  | 0.610  | 1/2 | 3/16 | 1/32 | Boring<br>PDUNR/L  | E68      |
|             |        |                |       |       |                    |       |                    |       |       |       |       |        |       |                  |        |     |      |      |                    |          |

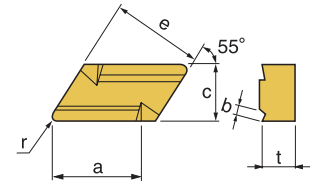
#### Quick Choice Grade Selection



## KNUX 55° Negative Turning Inserts



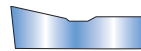
- USE General Cutting



| Designation     | ISO | Coated Carbide |       |       |                    |                    |       |       |       |       |       | Uncoated Carbide   |       | (inch) |        |        |       |       | Applicable Holders |          |
|-----------------|-----|----------------|-------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------------------|-------|--------|--------|--------|-------|-------|--------------------|----------|
|                 |     | PT10C          | PT20C | PT22C | PT25C              | PT30C              | MT20C | MT30P | KT05C | KT10C | PT20U | PTM30U             | a     | e      | t      | r      | c     | b     | Holder             | Page No. |
| KNUX 160405 R11 |     |                |       |       | 149223<br>\$ 28.31 | 147597<br>\$ 28.31 |       |       |       |       |       | 146853<br>\$ 22.08 | 0.630 | 0.636  | 3/16   | 0.0197 | 3/8   | 0.087 | Turning<br>CKJNR/L | E47      |
| KNUX 160410 R11 |     |                |       |       | 147599<br>\$ 28.31 |                    |       |       |       |       |       | 0.630              | 0.636 | 3/16   | 0.0394 | 3/8    | 0.087 |       |                    |          |
| KNUX 160405 L11 |     |                |       |       | 149266<br>\$ 28.31 |                    |       |       |       |       |       | 0.630              | 0.636 | 3/16   | 0.0197 | 3/8    | 0.087 |       |                    |          |
| KNUX 160410 L11 |     |                |       |       | 149336<br>\$ 27.51 |                    |       |       |       |       |       | 0.630              | 0.636 | 3/16   | 0.0394 | 3/8    | 0.126 |       |                    |          |

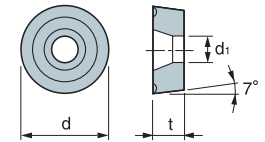
## RC\_\_ Positive Turning Inserts

### RCGT-AM ("AM" Chipbreaker is for Aluminum)



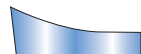
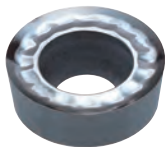
Exclusive chip breaker for aluminum and aluminum alloy

- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr

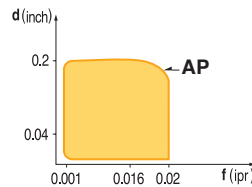


| Designation    | ISO | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet             |       | Uncoated Carbide |      | (inch) |                  |     |        | Applicable Holders |  |
|----------------|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|-------|------------------|------|--------|------------------|-----|--------|--------------------|--|
|                |     | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | PT10S | PT20S              | KT10U | PM20U            | l    | d      | t                | d1  | Holder | Page No.           |  |
| RCGT 0803MO-AM |     |                |       |       |       |       |       |       |       |       |       | 146078<br>\$ 22.08 |       | 0.315            | 1/8  | 9/64   | Turning<br>PRDCN | E55 |        |                    |  |
| RCGT 1003MO-AM |     |                |       |       |       |       |       |       |       |       |       | 146081<br>\$ 28.04 |       | 0.394            | 1/8  | 5/32   |                  |     |        |                    |  |
| RCGT 10T3MO-AM |     |                |       |       |       |       |       |       |       |       |       | 145665<br>\$ 28.04 |       | 0.394            | 5/32 | 11/64  |                  |     |        |                    |  |
| RCGT 1204MO-AM |     |                |       |       |       |       |       |       |       |       |       | 145666<br>\$ 32.88 |       | 0.472            | 3/16 | 11/64  |                  |     |        |                    |  |

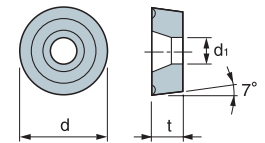
### RCGT-AP ("AP" Chipbreaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy



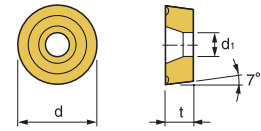
- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.005 \sim 0.2$ inch  
 $f = 0.001 \sim 0.02$ ipr



| Designation    | ISO | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet             |       | Uncoated Carbide |      | (inch) |                  |     |        | Applicable Holders |  |
|----------------|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|-------|------------------|------|--------|------------------|-----|--------|--------------------|--|
|                |     | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | PT10S | PT20S              | KT10U | PM20U            | l    | d      | t                | d1  | Holder | Page No.           |  |
| RCGT 0803MO-AP |     |                |       |       |       |       |       |       |       |       |       | 146315<br>\$ 22.08 |       | 0.315            | 1/8  | 9/64   | Turning<br>PRDCN | E55 |        |                    |  |
| RCGT 10T3MO-AP |     |                |       |       |       |       |       |       |       |       |       | 147377<br>\$ 28.86 |       | 0.394            | 5/32 | 11/64  |                  |     |        |                    |  |
| RCGT 1204MO-AP |     |                |       |       |       |       |       |       |       |       |       | 148421<br>\$ 33.83 |       | 0.472            | 3/16 | 11/64  |                  |     |        |                    |  |

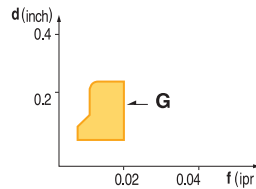
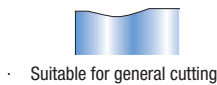
# Indexable Cutting Tools

## RCMX

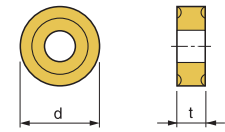


| Designation | ISO | Coated Carbide |       |       |                    |       |       |       |       | Cermet |       | Uncoated Carbide |       | (inch) |       |      | Applicable Holders |    |                         |
|-------------|-----|----------------|-------|-------|--------------------|-------|-------|-------|-------|--------|-------|------------------|-------|--------|-------|------|--------------------|----|-------------------------|
|             |     | PT10C          | PT20C | PT22C | PT25C              | PM10P | MT20C | MT30P | KT05C | KT10C  | PT10S | PT20S            | KT10U | PM20U  | l     | d    | t                  | d1 | Holder                  |
| RCMX 1003MO |     |                |       |       | 149294<br>\$ 14.92 |       |       |       |       |        |       |                  |       |        | 0.394 | 1/8  | 0.142              |    | Turning<br>PRDCN<br>E55 |
| RCMX 1204MO |     |                |       |       | 149272<br>\$ 19.10 |       |       |       |       |        |       |                  |       |        | 0.472 | 3/16 | 0.165              |    |                         |

## RNMG Negative Turning Inserts



- USE  
General Cutting
- Recommendation  
G d = 0.16~0.4inch  
f = 0.02~0.04ipr

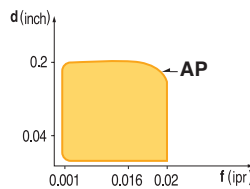
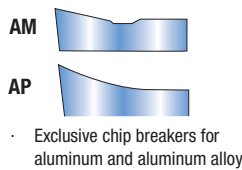
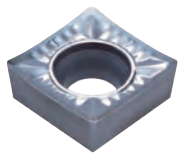


| Designation | ISO    | Coated Carbide |       |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide |       | (inch) |     |      | Applicable Holders |    |        |
|-------------|--------|----------------|-------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|-------|--------|-----|------|--------------------|----|--------|
|             |        | PT10C          | PT22C | PT30C              | PM25C | PM10P | MT20C | MT30P | KT05C | KT10C  | PT10S | PT20S            | KT10U | PM20U  | l   | d    | t                  | d1 | Holder |
| RNMG 43-G   | 120400 |                |       | 148724<br>\$ 17.80 |       |       |       |       |       |        |       |                  |       |        | 1/2 | 3/16 | 13/64              |    |        |
| RNMG 64-G   | 190600 |                |       | 146783<br>\$ 34.35 |       |       |       |       |       |        |       |                  |       |        | 3/4 | 1/4  | 5/16               |    |        |
| RNMG 84-G   | 250600 |                |       | 146092<br>\$ 64.05 |       |       |       |       |       |        |       |                  |       |        | 1   | 1/4  | 23/64              |    |        |

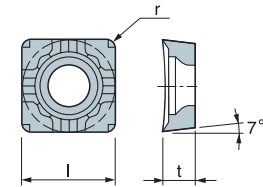
## SC\_T 90° Positive Turning Inserts



### SCGT-AM/AP (AM & AP Chipbreakers are for Aluminum)



- USE  
Aluminum Cutting
- Recommendation  
AM d = 0.020~0.157inch  
f = 0.002~0.020ipr  
AP d = 0.005~0.2inch  
f = 0.001~0.02ipr



| Designation      | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated | Uncoated Carbide   | (inch) |      |      | Applicable Holders        |                |
|------------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------------|--------|------|------|---------------------------|----------------|
|                  |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100          | KT10U              | l      | t    | r    | Holder                    | Page No.       |
| SCGT 32.51-AM    | 09T304 |                |       |       |       |       |       |       |       |       |       |                | 146094<br>\$ 24.57 | 3/8    | 5/32 | 1/64 | Turning<br>SSBCR/L<br>E57 |                |
| SCGT 32.52-AM    | 09T308 |                |       |       |       |       |       |       |       |       |       |                | 145667<br>\$ 24.57 | 3/8    | 5/32 | 1/32 |                           | SSSCR/L<br>E58 |
| SCGT 431-AM      | 120404 |                |       |       |       |       |       |       |       |       |       |                | 146101<br>\$ 27.28 | 1/2    | 3/16 | 1/64 | Boring<br>SSKCR/L<br>E71  |                |
| SCGT 432-AM      | 120408 |                |       |       |       |       |       |       |       |       |       |                | 145668<br>\$ 27.28 | 1/2    | 3/16 | 1/32 |                           |                |
| SCGT 32.51-AP(K) | 09T304 |                |       |       |       |       |       |       |       |       |       |                | 146993<br>\$ 24.57 | 3/8    | 5/32 | 1/64 |                           |                |
| SCGT 32.52-AP    | 09T308 |                |       |       |       |       |       |       |       |       |       |                | 146994<br>\$ 25.31 | 3/8    | 5/32 | 1/32 |                           |                |
| SCGT 431-AP      | 120404 |                |       |       |       |       |       |       |       |       |       |                | 146996<br>\$ 27.28 | 1/2    | 3/16 | 1/64 |                           |                |
| SCGT 432-AP      | 120408 |                |       |       |       |       |       |       |       |       |       |                | 146995<br>\$ 28.08 | 1/2    | 3/16 | 1/32 |                           |                |

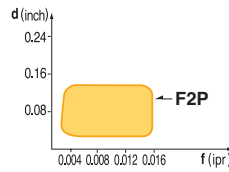
### Quick Choice Grade Selection



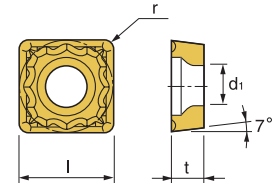
## SCMT-F2P



- Excellent chip control at wide range of cutting conditions
- Suitable for stainless steel cutting



- USE Medium
- Recommendation  
F2P  $d = 0.02 \sim 0.14$  inch  
 $f = 0.002 \sim 0.016$  ipr

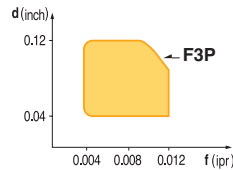


| Designation    | ISO    | Coated Carbide |                    |       |                    |       |       |       |       |       |       |       | Cermet |   |   | Diamond Coated | Uncoated Carbide | (inch)   |                               |                   | Applicable Holders |  |
|----------------|--------|----------------|--------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|-------|--------|---|---|----------------|------------------|----------|-------------------------------|-------------------|--------------------|--|
|                |        | PT10C          | PT15C              | PT20C | PT30C              | PM10P | KT05C | KT10C | PT10S | PT20S | ST10P | ND100 | KT10U  | l | t | r              | Holder           | Page No. |                               |                   |                    |  |
| SCMT 32.52-F2P | 09T308 |                | 149281<br>\$ 15.03 |       | 146932<br>\$ 14.63 |       |       |       |       |       |       |       |        |   |   | 3/8            | 5/32             | 1/32     | SSBCR/L<br>SSSCR/L<br>SSKCR/L | E57<br>E58<br>E71 |                    |  |

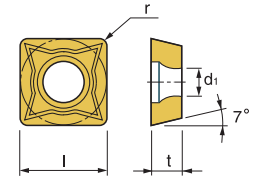
## SCMT-F3P



- Suitable for intermittent cutting and cast iron machining
- Good surface finish due to low cutting force
- Suitable for both boring and outer diameter turning



- USE Medium
- Recommendation  
F3P  $d = 0.04 \sim 0.12$  inch  
 $f = 0.004 \sim 0.012$  ipr



| Designation    | ISO    | Coated Carbide |                    |       |                    |                    |       |       |       |                    |       |       | Cermet |   |   | Diamond Coated | Uncoated Carbide | (inch) |                    |            | Applicable Holders |  |
|----------------|--------|----------------|--------------------|-------|--------------------|--------------------|-------|-------|-------|--------------------|-------|-------|--------|---|---|----------------|------------------|--------|--------------------|------------|--------------------|--|
|                |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | KT10C | KT15C | PT20S | PT30S              | ND100 | KT10U | l      | t | r | Holder         | Page No.         |        |                    |            |                    |  |
| SCMT 21.51-F2P | 070204 |                |                    |       |                    | 146107<br>\$ 14.18 |       |       |       |                    |       |       |        |   |   | 1/4            | 3/32             | 1/64   | SSBCR/L<br>SSSCR/L | E57<br>E58 |                    |  |
| SCMT 32.51-F3P | 09T304 |                |                    |       |                    | 146109<br>\$ 15.03 |       |       |       |                    |       |       |        |   |   | 3/8            | 5/32             | 1/64   | SSBCR/L<br>SSSCR/L | E57<br>E58 |                    |  |
| SCMT 32.52-F3P | 09T308 |                |                    |       | 149281<br>\$ 15.03 | 148830<br>\$ 15.03 |       |       |       | 149224<br>\$ 15.03 |       |       |        |   |   | 3/8            | 5/32             | 1/32   | SSKCR/L            | E71        |                    |  |
| SCMT 431-F3P   | 120404 |                |                    |       | 149319<br>\$ 19.91 |                    |       |       |       |                    |       |       |        |   |   | 1/2            | 3/16             | 1/64   |                    |            |                    |  |
| SCMT 432-F3P   | 120408 |                | 149320<br>\$ 19.91 |       |                    |                    |       |       |       |                    |       |       |        |   |   | 1/2            | 3/16             | 1/32   |                    |            |                    |  |

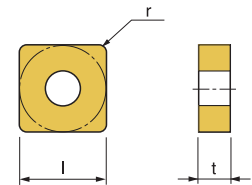
## SNM\_ 90° Negative Turning Inserts



### SNMA



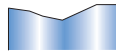
- Flat top geometry for the machining of Cast Iron & Hardened steels



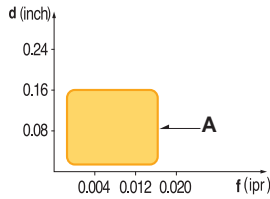
| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       |       | Cermet |                    |   | Uncoated Carbide | (inch) |        |          | Applicable Holders |     |      |      |  |                          |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------------------|---|------------------|--------|--------|----------|--------------------|-----|------|------|--|--------------------------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | KT15C | PT10S | PT20S  | KT10U              | l | t                | r      | Holder | Page No. |                    |     |      |      |  |                          |
| SNMA 434    | 120416 |                |       |       |       |       |       |       |       |       |       |       |        | 149327<br>\$ 17.21 |   |                  |        |        |          |                    | 1/2 | 3/16 | 1/16 | MSDNN<br>MSKNR/L<br>MSRNR/L<br>PSKNR/L | E50<br>E50<br>E51<br>E68 |



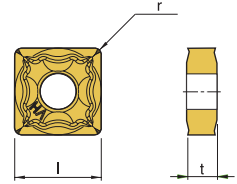
## SNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum

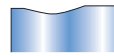
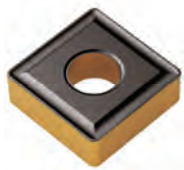


- USE Light & Medium
- Recommendation **A**  $d = 0.03 \sim 0.14 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$

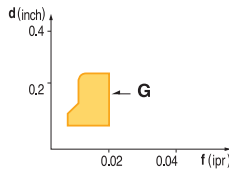


| Designation | ISO    | Coated Carbide |       |       |       |       |                    |       |       |       |       | Cermet |                    | Uncoated Carbide | (inch) |      |                       | Applicable Holders                                 |          |
|-------------|--------|----------------|-------|-------|-------|-------|--------------------|-------|-------|-------|-------|--------|--------------------|------------------|--------|------|-----------------------|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C              | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S              | KTM10U           | l      | t    | r                     | Holder   | Page No. |
| SNMG 431-A  | 120404 |                |       |       |       |       | 147710<br>\$ 17.21 |       |       |       |       |        |                    |                  | 1/2    | 3/16 | 1/64                  | Turning<br>MSDNN E50<br>MSKNR/L E50<br>MSRNR/L E51 |          |
| SNMG 432-A  | 120408 |                |       |       |       |       | 147713<br>\$ 17.72 |       |       |       |       |        | 147714<br>\$ 14.23 | 1/2              | 3/16   | 1/32 | Boring<br>PSKNR/L E68 |  |          |

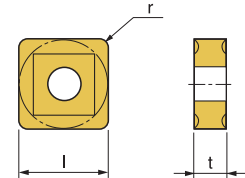
## SNMG-G



- Suitable for general cutting condition cutting

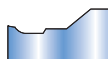


- USE General Cutting
- Recommendation **G**  $d = 0.16 \sim 0.4 \text{ inch}$   
 $f = 0.02 \sim 0.04 \text{ ipr}$

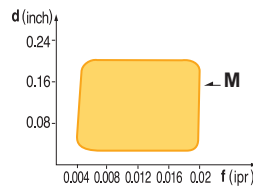


| Designation | ISO    | Coated Carbide |       |       |                    |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |                       | Applicable Holders                                 |          |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|-----------------------|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | t    | r                     | Holder   | Page No. |
| SNMG 431-G  | 120404 |                |       |       |                    | 147741<br>\$ 17.21 |       |       |       |       |       |        |       |                  | 1/2    | 3/16 | 1/64                  | Turning<br>MSDNN E50<br>MSKNR/L E50<br>MSRNR/L E51 |          |
| SNMG 432-G  | 120408 |                |       |       | 149280<br>\$ 17.72 |                    |       |       |       |       |       |        |       | 1/2              | 3/16   | 1/32 | Boring<br>PSKNR/L E68 |  |          |
| SNMG 642-G  | 190608 |                |       |       |                    | 146436<br>\$ 35.84 |       |       |       |       |       |        |       | 3/4              | 1/4    | 1/32 |                       |  |          |
| SNMG 866-G  | 250924 |                |       |       |                    | 146156<br>\$ 73.71 |       |       |       |       |       |        |       | 1.00             | 3/8    | 3/32 |                       |  |          |

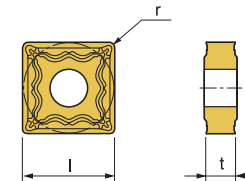
## SNMG-M



- Wide available chip control range from medium-finishing to medium-roughing
- Suitable chip breaker for CNC machining



- USE Medium
- Recommendation **M**  $d = 0.04 \sim 0.2 \text{ inch}$   
 $f = 0.004 \sim 0.02 \text{ ipr}$



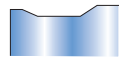
| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      | Applicable Holders                                 |                       |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|--|-----------------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | t    | r    | Holder   | Page No.              |
| SNMG 432-M  | 120408 |                |       |       | 149325<br>\$ 18.08 |       |       |       |       |       |       |        |       |                  | 1/2    | 3/16 | 1/32 | Turning<br>MSDNN E50<br>MSKNR/L E50<br>MSRNR/L E51 |                       |
|             |        |                |       |       |                    |       |       |       |       |       |       |        |       |                  |        |      |      |  | Boring<br>PSKNR/L E68 |

### Quick Choice Grade Selection

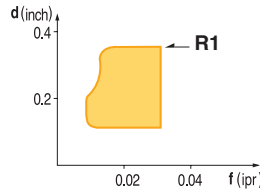
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



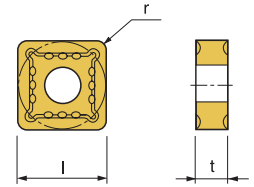
## SNMG-R1



- Excellent chip control at deep depth of cut and fast feed rate
- Strong cutting edge makes excellent cutting performance at intermittent cutting

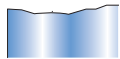


- USE Roughing
- Recommendation  
**R1**  $d = 0.12 \sim 0.32 \text{ inch}$   
 $f = 0.012 \sim 0.032 \text{ ipr}$

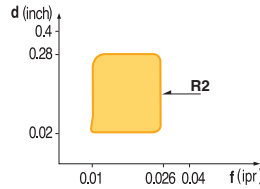


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      | Applicable Holders |            |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|--------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | t    | r    | Holder             | Page No.   |
| SNMG 433-R1 | 120412 |                |       |       | 146415<br>\$ 17.21 |       |       |       |       |       |       |        |       |                  | 1/2    | 3/16 | 3/64 | Turning<br>MSDNN   | E50        |
| SNMG 543-R1 | 150612 |                |       |       | 146429<br>\$ 28.24 |       |       |       |       |       |       |        |       |                  | 5/8    | 1/4  | 3/64 | MSKNR/L<br>MSRNR/L | E50<br>E51 |
| SNMG 643-R1 | 190612 |                |       |       | 146079<br>\$ 36.87 |       |       |       |       |       |       |        |       |                  | 3/4    | 1/4  | 3/64 | Boring<br>PSKNR/L  | E68        |

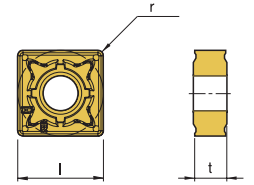
## SNMG(M)-R2



- Suitable for heavy duty cutting due to strong cutting edge
- Wide chip control range with low cutting force

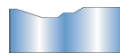


- USE Roughing
- Recommendation  
**R2**  $d = 0.12 \sim 0.44 \text{ inch}$   
 $f = 0.012 \sim 0.052 \text{ ipr}$

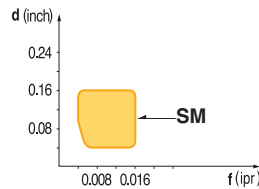


| Designation | ISO    | Coated Carbide |       |       |                    |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      | Applicable Holders |            |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|--------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PT40C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PM20U            | l      | t    | r    | Holder             | Page No.   |
| SNMG 433-R2 | 120412 |                |       |       | 147753<br>\$ 18.08 |                    |       |       |       |       |       |        |       |                  | 1/2    | 3/16 | 3/64 | Turning<br>MSDNN   | E50        |
| SNMG 543-R2 | 150612 |                |       |       | 147757<br>\$ 27.44 |                    |       |       |       |       |       |        |       |                  | 5/8    | 1/4  | 3/64 | MSKNR/L<br>MSRNR/L | E50<br>E51 |
| SNMG 643-R2 | 190612 |                |       |       | 146412<br>\$ 35.84 | 148626<br>\$ 36.37 |       |       |       |       |       |        |       |                  | 3/4    | 1/4  | 3/64 | Boring<br>PSKNR/L  | E68        |
| SNMG 644-R2 | 190616 |                |       |       | 146377<br>\$ 35.84 |                    |       |       |       |       |       |        |       |                  | 3/4    | 1/4  | 1/16 |                    |            |

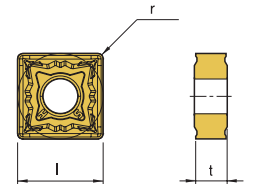
## SNMG-SM



- Exclusive design for stainless steel cutting provide longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land



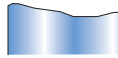
- USE Stainless Steel
- Recommendation  
**SM**  $d = 0.04 \sim 0.16 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$



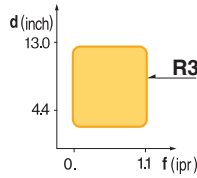
| Designation | ISO    | Coated Carbide |       |       |       |       |       |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      | Applicable Holders |            |
|-------------|--------|----------------|-------|-------|-------|-------|-------|--------------------|-------|-------|-------|--------|-------|------------------|--------|------|------|--------------------|------------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P              | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | t    | r    | Holder             | Page No.   |
| SNMG 431-SM | 120404 |                |       |       |       |       |       | 148161<br>\$ 17.21 |       |       |       |        |       |                  | 1/2    | 3/16 | 1/64 | Turning<br>MSDNN   | E50        |
| SNMG 432-SM | 120408 |                |       |       |       |       |       | 147747<br>\$ 17.72 |       |       |       |        |       |                  | 1/2    | 3/16 | 1/32 | MSKNR/L<br>MSRNR/L | E50<br>E51 |
|             |        |                |       |       |       |       |       |                    |       |       |       |        |       |                  |        |      |      | Boring<br>PSKNR/L  | E68        |

# Indexable Cutting Tools

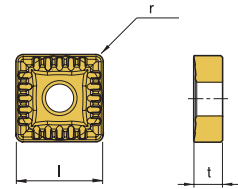
## SNMM-R3



- Specially designed toughest cutting edge provides superior cutting performance at deep depth of cut and fast feed rate
- Unique design of dot on cutting edge makes smooth chip flow and reduce cutting force



- USE Heavy Duty
- Recommendation  
R3  $d = 0.16 \sim 0.52 \text{ inch}$   
 $f = 0.018 \sim 0.06 \text{ ipr}$

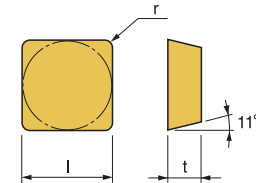
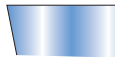
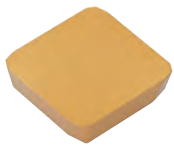


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      | Applicable Holders          |                   |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|-----------------------------|-------------------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PT40C | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PM20U            | l      | t    | r    | Holder                      | Page No.          |
| SNMM 643-R3 | 190612 |                |       |       | 147703<br>\$ 36.37 |       |       |       |       |       |       |        |       |                  | 3/4    | 1/4  | 3/64 | MSDNN<br>MSKNR/L<br>MSRNR/L | E50<br>E50<br>E51 |
| SNMM 856-R3 | 250724 |                |       |       | 147706<br>\$ 65.60 |       |       |       |       |       |       |        |       |                  | 1.00   | 5/16 | 3/32 | PSKNR/L                     | E68               |

## SP\_\_ 90° Positive Turning Inserts



### SPG

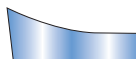
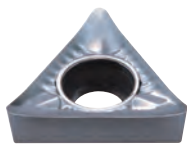


| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide   | (inch) |      |      | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|------|------|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PM20U              | l      | t    | r    | Holder             | Page No. |
| SPG 633     | 190412 |                |       |       |       |       |       |       |       |       |       |        |       | 146463<br>\$ 31.35 | 3/4    | 3/16 | 3/64 |                    |          |

## TC\_T 60° Positive Turning Inserts

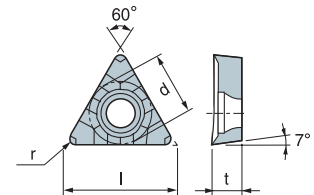


### TCGT-AM (AM Chipbreaker is for Aluminum)



- Exclusive chip breaker for aluminum and aluminum alloy

- USE Aluminum Cutting
- Recommendation  
AM  $d = 0.020 \sim 0.157 \text{ inch}$   
 $f = 0.002 \sim 0.020 \text{ ipr}$



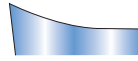
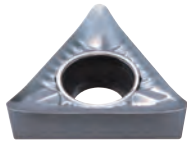
| Designation   | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated | Uncoated Carbide   | (inch) |     |      |      | Applicable Holders |          |
|---------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------------|--------|-----|------|------|--------------------|----------|
|               |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100          | KT10U              | l      | d   | t    | r    | Holder             | Page No. |
| TCGT 21.51-AM | 110204 |                |       |       |       |       |       |       |       |       |       |                | 146120<br>\$ 20.46 | 0.433  | 1/4 | 3/32 | 1/64 | STFCR/L            | E58      |
| TCGT 21.52-AM | 110208 |                |       |       |       |       |       |       |       |       |       |                | 146121<br>\$ 20.46 | 0.433  | 1/4 | 3/32 | 1/32 | STGCR/L            | E59      |
| TCGT 32.50.5  | 16T302 |                |       |       |       |       |       |       |       |       |       |                | 146123<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/64 | STFCR/L            | E72      |
| TCGT 32.51-AM | 16T304 |                |       |       |       |       |       |       |       |       |       |                | 146135<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/64 | CT45°              | E142     |
| TCGT 32.52-AM | 16T308 |                |       |       |       |       |       |       |       |       |       |                | 146137<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/32 |                    |          |

#### Quick Choice Grade Selection

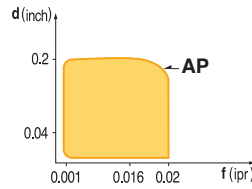
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

# TC\_T 60° Positive Turning Inserts

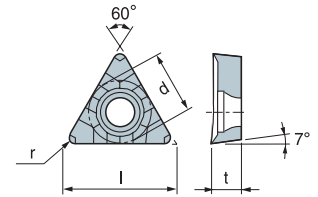
## TCGT-AP (AP Chipbreaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy

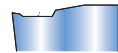


- USE Aluminum Cutting
- Recommendation  
**AP**  $d = 0.005 \sim 0.2 \text{ inch}$   
 $f = 0.001 \sim 0.02 \text{ ipr}$

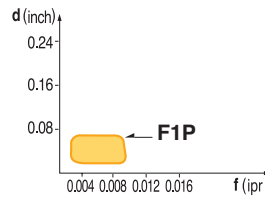


| Designation      | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders |          |
|------------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------------|--------|-----|------|-------|--------------------|----------|
|                  |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100          | KT10U              | l      | d   | t    | r     | Holder             | Page No. |
| TCGT 21.50.5-AP  | 110202 |                |       |       |       |       |       |       |       |       |       |                | 146504<br>\$ 21.03 | 0.433  | 1/4 | 3/32 | 0.008 | Turning<br>STFCR/L | E58      |
| TCGT 21.51-AP    | 110204 |                |       |       |       |       |       |       |       |       |       |                | 146505<br>\$ 21.03 | 0.433  | 1/4 | 3/32 | 1/64  | STGCR/L<br>Boring  | E59      |
| TCGT 21.52-AP    | 110208 |                |       |       |       |       |       |       |       |       |       |                | 146506<br>\$ 20.46 | 0.433  | 1/4 | 3/32 | 1/32  | STFCR/L<br>Chamfer | E72      |
| TCGT 32.51-AP(K) | 16T304 |                |       |       |       |       |       |       |       |       |       |                | 146507<br>\$ 26.64 | 0.650  | 3/8 | 5/32 | 1/64  | CT45°              | E142     |
| TCGT 32.52-AP(K) | 16T308 |                |       |       |       |       |       |       |       |       |       |                | 146508<br>\$ 26.64 | 0.650  | 3/8 | 5/32 | 1/32  |                    |          |

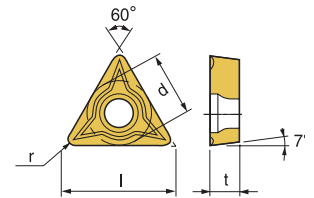
## TCGT-F1P



Excellent chip control at wide range of cutting conditions  
 Suitable for stainless steel cutting

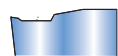
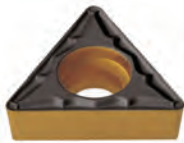


- USE Medium
- Recommendation  
**F1P**  $d = 0.004 \sim 0.06 \text{ inch}$   
 $f = 0.002 \sim 0.01 \text{ ipr}$

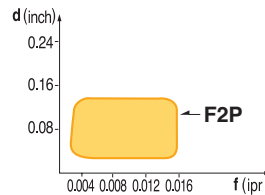


| Designation      | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet | Uncoated Carbide | (inch)             |       |      |      | Applicable Holders |                    |          |
|------------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|--------------------|-------|------|------|--------------------|--------------------|----------|
|                  |        | PT10C          | PT20C | PT22C | PM30C | PT30C | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S            | KT10U              | l     | d    | t    | r                  | Holder             | Page No. |
| TCGT 1.81.51-F1P | 090204 |                |       |       |       |       |       |       |       |       |       |        |                  | 146690<br>\$ 11.64 | 0.378 | 7/32 | 3/32 | 1/64               | Turning<br>STFCR/L | E58      |
|                  |        |                |       |       |       |       |       |       |       |       |       |        |                  |                    |       |      |      |                    | STGCR/L            | E59      |
|                  |        |                |       |       |       |       |       |       |       |       |       |        |                  |                    |       |      |      |                    | Boring<br>STFCR/L  | E72      |
|                  |        |                |       |       |       |       |       |       |       |       |       |        |                  |                    |       |      |      |                    | Chamfer<br>CT45°   | E142     |

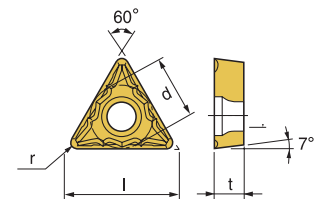
## TCMT-F1P/F2P



Excellent chip control at wide range of cutting conditions  
 Suitable for stainless steel cutting



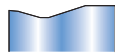
- USE Medium
- Recommendation  
**F2P**  $d = 0.02 \sim 0.14 \text{ inch}$   
 $f = 0.002 \sim 0.016 \text{ ipr}$



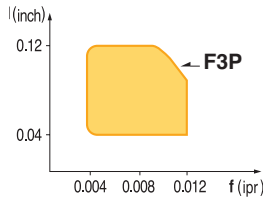
| Designation      | ISO    | Coated Carbide |                    |       |                    |                    |                    |                    |       |                    |       | Cermet | (inch) |       |     |      | Applicable Holders |                    |            |
|------------------|--------|----------------|--------------------|-------|--------------------|--------------------|--------------------|--------------------|-------|--------------------|-------|--------|--------|-------|-----|------|--------------------|--------------------|------------|
|                  |        | PT10C          | PT15C              | PT20C | PT25C              | PM30C              | PT30C              | MT15C              | MT20C | MT30P              | KT10C | PT10S  | PT20S  | l     | d   | t    | r                  | Holder             | Page No.   |
| TCMT 32.50.5-F1P | 16T302 |                | 149517<br>\$ 17.46 |       |                    |                    |                    |                    |       |                    |       |        |        | 0.650 | 3/8 | 5/32 | 0.008              | Turning            |            |
| TCMT 21.50.5-F2P | 110202 |                | 149514<br>\$ 14.36 |       |                    |                    |                    |                    |       |                    |       |        |        | 0.433 | 1/4 | 3/32 | 0.008              | STFCR/L<br>STGCR/L | E58<br>E59 |
| TCMT 21.51-F2P   | 110204 |                | 149515<br>\$ 14.35 |       | 149282<br>\$ 14.35 |                    | 146138<br>\$ 13.90 | 149331<br>\$ 14.36 |       | 146140<br>\$ 13.90 |       |        |        | 0.433 | 1/4 | 3/32 | 1/64               | STFCR/L<br>Chamfer | E72        |
| TCMT 21.52-F2P   | 110208 |                | 149516<br>\$ 14.35 |       | 149286<br>\$ 14.35 | 146142<br>\$ 13.90 |                    |                    |       |                    |       |        |        | 0.433 | 1/4 | 3/32 | 1/32               | CT45°              | E142       |
| TCMT 32.51-F2P   | 16T304 |                | 149518<br>\$ 17.20 |       | 149232<br>\$ 17.20 |                    |                    |                    |       |                    |       |        |        | 0.650 | 3/8 | 5/32 | 1/64               |                    |            |
| TCMT 32.52-F2P   | 16T308 |                | 149343<br>\$ 17.20 |       | 149362<br>\$ 17.20 | 146613<br>\$ 17.50 |                    | 149263<br>\$ 17.20 |       |                    |       |        |        | 0.650 | 3/8 | 5/32 | 1/32               |                    |            |

# Indexable Cutting Tools

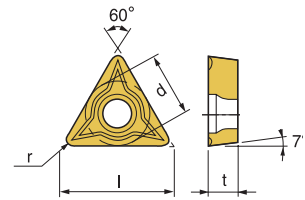
## TCMT-F3P



- Suitable for intermittent cutting and cast iron machining
- Good surface finish due to low cutting force
- Suitable for both boring and outer diameter turning



- USE Medium
- Recommendation **F3P**  $d = 0.04 \sim 0.12$  inch  
 $f = 0.004 \sim 0.012$  ipr

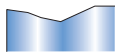
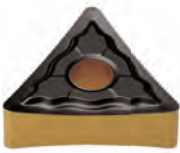


| Designation    | ISO    | Coated Carbide |                    |       |                    |                    |       |       |       | Cermet |       | Uncoated Carbide |       | (inch) |      |      |  | Applicable Holders                    |          |
|----------------|--------|----------------|--------------------|-------|--------------------|--------------------|-------|-------|-------|--------|-------|------------------|-------|--------|------|------|--|---------------------------------------|----------|
|                |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | MT30P | KT05C | KT10C | PT10S  | PT20S | KTM30U           | PM20U | l      | d    | t    | r  | Holder                                | Page No. |
| TCMT 21.51-F3P | 110204 |                |                    |       | 149253<br>\$ 14.36 | 146503<br>\$ 14.36 |       |       |       |        |       |                  |       | 0.433  | 1/4  | 3/32 | 1/64   | Turning<br>STFCR/L E58<br>STGCR/L E59 |          |
| TCMT 21.52-F3P | 110208 |                |                    |       |                    | 146144<br>\$ 14.36 |       |       |       |        |       |                  | 0.433 | 1/4    | 3/32 | 1/32 |  |                                       |          |
| TCMT 32.51-F3P | 16T304 |                |                    |       | 149235<br>\$ 17.20 |                    |       |       |       |        |       |                  | 0.650 | 3/8    | 5/32 | 1/64 | Boring<br>STFCR/L E72<br>Chamfer<br>CT45° E142 |                                       |          |
| TCMT 32.52-F3P | 16T308 |                | 149342<br>\$ 16.74 |       | 149239<br>\$ 17.20 |                    |       |       |       |        |       |                  | 0.650 | 3/8    | 5/32 | 1/32 |  |                                       |          |

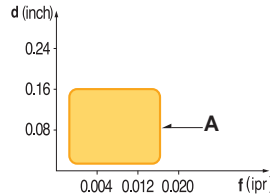
## TNMG 60° Negative Turning Inserts



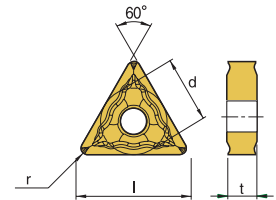
### TNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum



- USE Light & Medium
- Recommendation **A**  $d = 0.03 \sim 0.16$  inch  
 $f = 0.002 \sim 0.016$  ipr



| Designation | ISO    | Coated Carbide |       |       |                    |                    |       |                    |       | Cermet |       | Uncoated Carbide | (inch)             |        |     |      | Applicable Holders |  |   |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|-------|--------------------|-------|--------|-------|------------------|--------------------|--------|-----|------|--------------------|--|---|
|             |        | PT10C          | PT20C | PT22C | PT25C              | MT15C              | MT20C | MT30P              | KT05C | KT10C  | ST10P | PT10S            | PT20S              | KTM10U | l   | d    | t                  | r  | Holder  |
| TNMG 331-A  | 160404 |                |       |       |                    | 149290<br>\$ 15.47 |       | 147632<br>\$ 15.07 |       |        |       |                  | 147633<br>\$ 12.48 | 0.650  | 3/8 | 3/16 | 1/64               | Turning<br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53 |   |
| TNMG 332-A  | 160408 |                |       |       | 149346<br>\$ 15.47 |                    |       | 147635<br>\$ 15.47 |       |        |       |                  | 147636<br>\$ 12.48 | 0.650  | 3/8 | 3/16 | 1/32               |  |   |
| TNMG 432-A  | 220408 |                |       |       | 149293<br>\$ 22.03 |                    |       |                    |       |        |       |                  | 148375<br>\$ 17.58 | 0.866  | 1/2 | 3/16 | 1/32               |  | Boring<br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |
|             |        |                |       |       |                    |                    |       |                    |       |        |       |                  |                    |        |     |      |                    |  |   |

#### Quick Choice Grade Selection

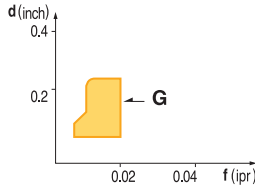


# TNMG 60° Negative Turning Inserts

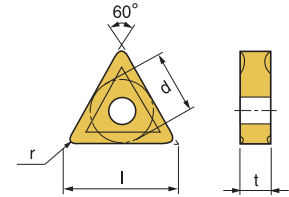
## TNMG-G



· Suitable for general cutting condition cutting



- USE General Cutting
- Recommendation  
**G**  $d = 0.16 \sim 0.4 \text{ inch}$   
 $f = 0.02 \sim 0.04 \text{ ipr}$

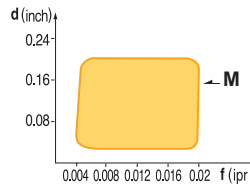


| Designation | ISO    | Coated Carbide |       |       |       |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|-------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT25C | PT30C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder             | Page No. |
| TNMG 321-G  | 160304 |                |       |       |       | 146270<br>\$ 14.23 |       |       |       |       |       |        |       | 0.650            | 3/8    | 1/8  | 1/64 | <b>Turning</b><br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53<br><b>Boring</b><br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |                    |          |
| TNMG 322-G  | 160308 |                |       |       |       | 146093<br>\$ 14.23 |       |       |       |       |       |        |       | 0.650            | 3/8    | 1/8  | 1/32 |   |                    |          |
| TNMG 431-G  | 220404 |                |       |       |       | 149324<br>\$ 22.03 |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/64 |   |                    |          |
| TNMG 432-G  | 220408 |                |       |       |       | 149283<br>\$ 22.03 |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 |   |                    |          |
| TNMG 433-G  | 220412 |                |       |       |       | 146633<br>\$ 21.40 |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 3/64 |   |                    |          |
| TNMG 438-G  | 220432 |                |       |       |       | 146726<br>\$ 22.03 |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/8  |   |                    |          |
| TNMG 543-G  | 270612 |                |       |       |       | 149275<br>\$ 35.38 |       |       |       |       |       |        |       | 1.083            | 5/8    | 1/4  | 3/64 |   |                    |          |
| TNMG 544-G  | 270616 |                |       |       |       | 148550<br>\$ 35.38 |       |       |       |       |       |        |       | 1.083            | 5/8    | 1/4  | 1/16 |   |                    |          |

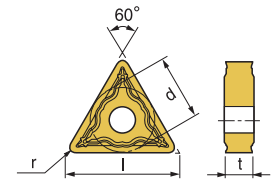
## TNMG-M/M1



· Wide available chip control range from medium-finishing to medium-roughing  
 · Suitable chip breaker for CNC machining



- USE Medium
- Recommendation  
**M**  $d = 0.04 \sim 0.2 \text{ inch}$   
 $f = 0.004 \sim 0.02 \text{ ipr}$



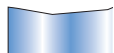
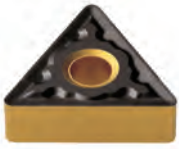
| Designation | ISO    | Coated Carbide |       |       |       |                    |                    |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|-------|--------------------|--------------------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--------------------|----------|
|             |        | PT10C          | PT15C | PT20C | PT25C | PT30C              | MT20C              | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder             | Page No. |
| TNMG 331-M1 | 160404 |                |       |       |       | 149259<br>\$ 15.47 |                    |       |       |       |       |        |       | 0.650            | 3/8    | 3/16 | 1/64 | <b>Turning</b><br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53<br><b>Boring</b><br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |                    |          |
| TNMG 332-M  | 160408 |                |       |       |       | 147641<br>\$ 15.47 |                    |       |       |       |       |        |       | 0.650            | 3/8    | 3/16 | 1/32 |   |                    |          |
| TNMG 431-M  | 220404 |                |       |       |       | 149240<br>\$ 22.41 |                    |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/64 |   |                    |          |
| TNMG 432-M  | 220408 |                |       |       |       | 149228<br>\$ 22.41 | 147645<br>\$ 22.03 |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 |   |                    |          |
| TNMG 432-M1 | 220408 |                |       |       |       | 149278<br>\$ 22.03 |                    |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 |   |                    |          |
| TNMG 433-M  | 220412 |                |       |       |       | 149288<br>\$ 22.37 |                    |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 3/64 |   |                    |          |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

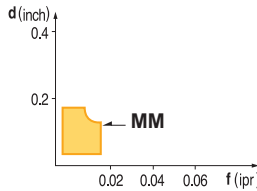
Images are representational only and may not reflect actual product.

# Indexable Cutting Tools

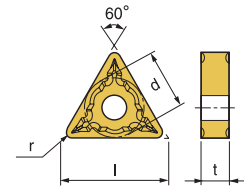
## TNMG-MM



Excellent choice for a variety of steels including stainless steel

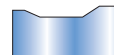


- USE Steels/Stainless Steels
- Recommendation  
MM  $d = 0.04 \sim 0.16$ inch  
 $f = 0.004 \sim 0.016$ ipr

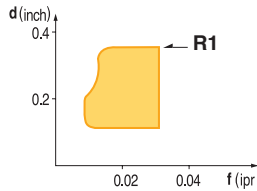


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders   |          |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder   | Page No. |
| TNMG 332-MM | 160408 |                |       |       | 149323<br>\$ 16.48 |       |       |       |       |       |       |        |       |                  | 0.650  | 3/8  | 3/16 | 1/32  | Turning<br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53 |          |
| TNMG 431-MM | 220404 |                |       |       | 149244<br>\$ 22.37 |       |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/64 | Boring<br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |  |          |
| TNMG 432-MM | 220408 |                |       |       | 149234<br>\$ 22.41 |       |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 |   |  |          |

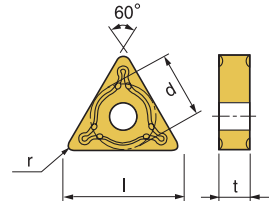
## TNMG-R1



- Excellent chip control at deep depth of cut and fast feed rate
- Strong cutting edge makes excellent cutting performance at intermittent cutting

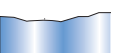


- USE Roughing
- Recommendation  
R1  $d = 0.1 \sim 0.28$ inch  
 $f = 0.010 \sim 0.026$ ipr

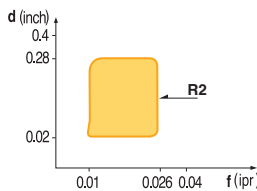


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders   |          |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder   | Page No. |
| TNMG 332-R1 | 160408 |                |       |       | 146573<br>\$ 15.47 |       |       |       |       |       |       |        |       |                  | 0.650  | 3/8  | 3/16 | 1/32  | Turning<br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53 |          |
| TNMG 432-R1 | 220408 |                |       |       | 146621<br>\$ 22.03 |       |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 | Boring<br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |  |          |
| TNMG 433-R1 | 220412 |                |       |       | 146638<br>\$ 21.40 |       |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 3/64 |   |  |          |

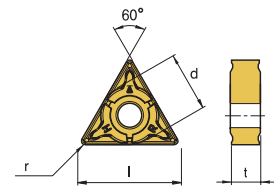
## TNMG-R2



- Suitable for heavy duty cutting due to strong cutting edge
- Wide chip control range with low cutting force

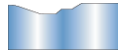


- USE Roughing
- Recommendation  
R2  $d = 0.12 \sim 0.44$ inch  
 $f = 0.012 \sim 0.052$ ipr

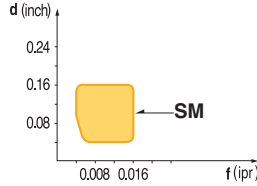


| Designation | ISO    | Coated Carbide |                    |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders   |          |
|-------------|--------|----------------|--------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--|----------|
|             |        | PT10C          | PT15C              | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder   | Page No. |
| TNMG 432-R2 | 220408 |                | 149340<br>\$ 17.23 |       | 147623<br>\$ 22.03 |       |       |       |       |       |       |        |       |                  | 0.886  | 1/2  | 3/16 | 1/32  | Turning<br>MTCNN E51<br>MTFNR/L E52<br>MTENN E52<br>MTGNR/L E53<br>MTJNR/L E53 |          |
| TNMG 433-R2 | 220412 |                |                    |       | 147625<br>\$ 21.73 |       |       |       |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 3/64 | Boring<br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |  |          |
|             |        |                |                    |       |                    |       |       |       |       |       |       |        |       |                  |        |      |      |   |  |          |

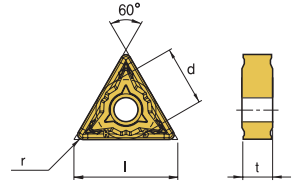
# TNMG-SM



- Exclusive design for stainless steel cutting provide longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land



- USE Stainless Steel
- Recommendation  
**SM**  $d = 0.04 \sim 0.16$ inch  
 $f = 0.004 \sim 0.016$ ipr

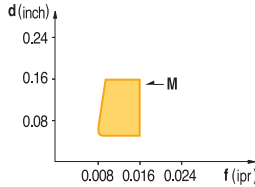
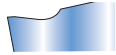


| Designation | ISO    | Coated Carbide |       |       |       |       |                    |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders   |          |
|-------------|--------|----------------|-------|-------|-------|-------|--------------------|--------------------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | MT15C | MT20C              | MT30P              | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r   | Holder   | Page No. |
| TNMG 331-SM | 160404 |                |       |       |       |       |                    | 146169<br>\$ 15.07 |       |       |       |        |       |                  | 0.650  | 3/8  | 3/16 | 1/64  | Turning<br>MTCNN E51<br>MTFNR/L E52<br>MTENN E53<br>MTGNR/L E53<br>MTJNR/L E53 |          |
| TNMG 332-SM | 160408 |                |       |       |       |       |                    | 147614<br>\$ 15.47 |       |       |       |        |       | 0.650            | 3/8    | 3/16 | 1/32 |   |  |          |
| TNMG 432-SM | 220408 |                |       |       |       |       | 149271<br>\$ 22.37 | 147616<br>\$ 22.03 |       |       |       |        |       | 0.886            | 1/2    | 3/16 | 1/32 | Boring<br>MTFNR E65<br>MTUNR E65<br>PTFNR/L E69 |  |          |

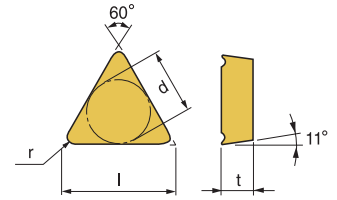
# TPMR 60° Positive Turning Inserts



## TPMR-F/TPMR-M



- Recommendation  
**M**  $d = 0.06 \sim 0.16$ inch  
 $f = 0.008 \sim 0.016$ ipr

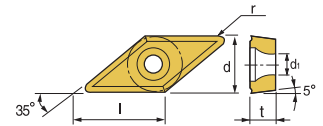
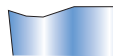


| Designation | ISO    | Coated Carbide |       |       |                    |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r | Holder             | Page No. |
| TPMR 321-F  | 160304 |                |       |       | 149268<br>\$ 15.72 |                    |       |       |       |       |       |        |       | 0.650            | 3/8    | 1/8  | 1/64 |   |                    |          |
| TPMR 322-M  | 160308 |                |       |       | 149229<br>\$ 15.72 |                    |       |       |       |       |       |        | 0.650 | 3/8              | 1/8    | 1/32 |      |   |                    |          |
| TPMR 432-M  | 220408 |                |       |       |                    | 147957<br>\$ 29.19 |       |       |       |       |       |        | 0.886 | 1/2              | 3/16   | 1/32 |      |   |                    |          |

# V\_\_ T 35° Positive Turning Inserts



## VBMT/VBMT-F2P



| Designation    | ISO    | Coated Carbide |       |       |                    |                    |                    |       |       |                    |       | Cermet |       | Uncoated Carbide | (inch) |      |      |                                      | Applicable Holders |          |
|----------------|--------|----------------|-------|-------|--------------------|--------------------|--------------------|-------|-------|--------------------|-------|--------|-------|------------------|--------|------|------|--------------------------------------|--------------------|----------|
|                |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | MT20C              | MT30P | KT05C | KT10C              | ST10P | PT10S  | PT20S | PTM30U           | l      | d    | t    | r                                    | Holder             | Page No. |
| VBMT 331       | 160404 |                |       |       | 149276<br>\$ 24.90 | 146846<br>\$ 24.22 |                    |       |       |                    |       |        |       | 0.650            | 3/8    | 3/16 | 1/64 | Boring<br>SVQBR/L E72<br>SVUBR/L E73 |                    |          |
| VBMT 332       | 160408 |                |       |       | 149269<br>\$ 24.90 | 146849<br>\$ 24.22 |                    |       |       |                    |       |        | 0.650 | 3/8              | 3/16   | 1/32 |      |                                      |                    |          |
| VBMT 32.51-F2P | 16T304 |                |       |       |                    |                    | 145633<br>\$ 18.20 |       |       |                    |       |        | 0.650 | 3/8              | 5/32   | 1/64 |      |                                      |                    |          |
| VBMT 331-F2P   | 160404 |                |       |       |                    | 146171<br>\$ 24.22 |                    |       |       |                    |       |        | 0.650 | 3/8              | 3/16   | 1/64 |      |                                      |                    |          |
| VBMT 332-F2P   | 160408 |                |       |       |                    |                    | 145622<br>\$ 24.22 |       |       | 145623<br>\$ 24.22 |       |        | 0.650 | 3/8              | 3/16   | 1/32 |      |                                      |                    |          |

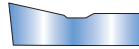
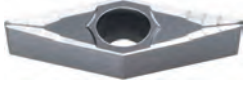
Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



# Indexable Cutting Tools

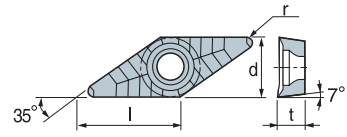
## VCGT-AM (AM Chip breaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy

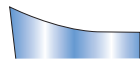
■ USE  
Aluminum Cutting

■ Recommendation  
AP  $d = 0.020 \sim 0.157 \text{ inch}$   
 $f = 0.002 \sim 0.020 \text{ ipr}$

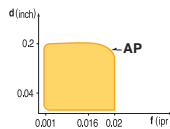


| Designation   | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |       |      | Applicable Holders     |   |
|---------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|-------|------|------------------------|---|
|               |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l     | d    | t                      | r |
| VCGT 221-AM   | 110304 |                |       |       |       |       |       |       |       |       |       |                    | 145670<br>\$ 24.71 | 0.354  | 1/4   | 1/8   | 1/64 | Turning<br>SVJCR/L E59 |   |
| VCGT 222-AM   | 110308 |                |       |       |       |       |       |       |       |       |       | 145671<br>\$ 24.71 | 0.354              | 1/4    | 1/8   | 1/32  |      |                        |   |
| VCGT 330.5-AM | 160402 |                |       |       |       |       |       |       |       |       |       | 145672<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 0.008 |      |                        |   |
| VCGT 331-AM   | 160404 |                |       |       |       |       |       |       |       |       |       | 146177<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 1/64  |      |                        |   |
| VCGT 332-AM   | 160408 |                |       |       |       |       |       |       |       |       |       | 146180<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 1/32  |      |                        |   |
| VCGT 333-AM   | 160412 |                |       |       |       |       |       |       |       |       |       | 146181<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 3/64  |      |                        |   |

## VCGT-AP (AP Chip breaker is for Aluminum)

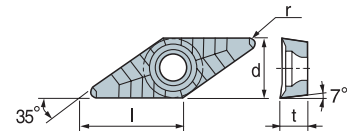


Exclusive chip breaker for aluminum and aluminum alloy



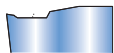
■ USE  
Aluminum Cutting

■ Recommendation  
AP  $d = 0.005 \sim 0.2 \text{ inch}$   
 $f = 0.001 \sim 0.02 \text{ ipr}$

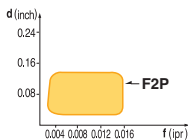


| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |      |      | Applicable Holders     |   |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|------|------|------------------------|---|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l    | d    | t                      | r |
| VCGT 331-AP | 160404 |                |       |       |       |       |       |       |       |       |       |                    | 146850<br>\$ 29.05 | 0.650  | 3/8   | 3/16 | 1/64 | Turning<br>SVJCR/L E59 |   |
| VCGT 332-AP | 160408 |                |       |       |       |       |       |       |       |       |       | 146545<br>\$ 29.05 | 0.650              | 3/8    | 3/16  | 1/32 |      |                        |   |
| VCGT 333-AP | 160412 |                |       |       |       |       |       |       |       |       |       | 146852<br>\$ 29.05 | 0.650              | 3/8    | 3/16  | 3/64 |      |                        |   |

## VCMT-F2P

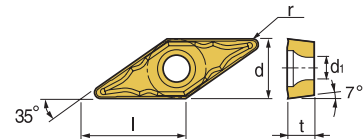


Excellent chip control at wide range of cutting conditions  
Suitable for stainless steel cutting



■ USE  
Medium

■ Recommendation  
F2P  $d = 0.02 \sim 0.14 \text{ inch}$   
 $f = 0.002 \sim 0.016 \text{ ipr}$



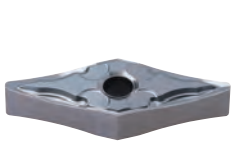
| Designation  | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet             |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders     |        |
|--------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------------------|-------|------------------|--------|-----|------|------|------------------------|--------|
|              |        | PT10C          | PT20C | PT22C | PT25C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S              | PT20S |                  | PTM30U | l   | d    | t    | r                      | Holder |
| VCMT 331-F2P | 160404 |                |       |       |                    |       |       |       |       |       |       | 148461<br>\$ 24.97 |       |                  | 0.650  | 3/8 | 3/16 | 1/64 | Turning<br>SVJCR/L E59 |        |
| VCMT 332-F2P | 160408 |                |       |       | 149273<br>\$ 24.30 |       |       |       |       |       |       | 148462<br>\$ 24.97 |       |                  | 0.650  | 3/8 | 3/16 | 1/32 |                        |        |

### Quick Choice Grade Selection

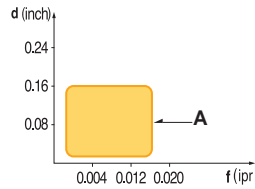
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

# VNMG 35° Negative Turning Inserts

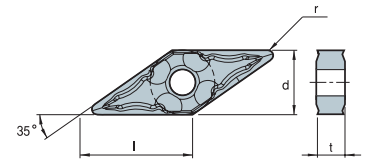
## VNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum

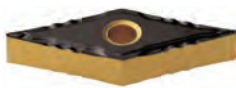


- USE Light & Medium
- Recommendation **A**  $d = 0.03\sim 0.16\text{inch}$   
 $f = 0.002\sim 0.016\text{ipr}$

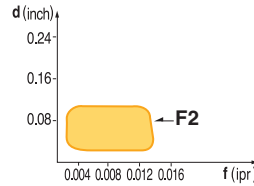


| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet |                    | Uncoated Carbide | (inch) |                    |       |     | Applicable Holders |          |                    |     |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------------------|------------------|--------|--------------------|-------|-----|--------------------|----------|--------------------|-----|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S              | KTM10U           | l      | d                  | t     | r   | Holder             | Page No. |                    |     |
| VNMG 331-A  | 160404 |                |       |       |       |       |       |       |       |       |       |        | 148385<br>\$ 21.93 |                  |        | 145546<br>\$ 17.96 | 0.654 | 3/8 | 3/16               | 1/64     | Turning<br>MVJNR/L | E54 |
| VNMG 332-A  | 160408 |                |       |       |       |       |       |       |       |       |       |        | 148386<br>\$ 21.93 |                  |        | 145547<br>\$ 17.96 | 0.654 | 3/8 | 3/16               | 1/32     |                    |     |

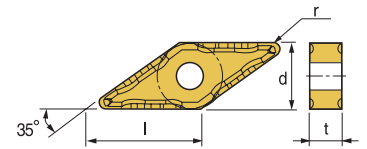
## VNMG-F2



- Excellent chip control at varied depth of cutting
- Strong cutting edge toughness due to special design



- USE Finishing
- Recommendation **F2**  $d = 0.012\sim 0.1\text{inch}$   
 $f = 0.002\sim 0.014\text{ipr}$

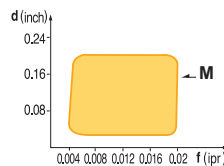


| Designation   | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |                    | Uncoated Carbide | (inch) |       |     |      | Applicable Holders |                    |     |
|---------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|--------------------|------------------|--------|-------|-----|------|--------------------|--------------------|-----|
|               |        | PT10C          | PT20C | PT22C | PT25C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S              | PTM30U           | l      | d     | t   | r    | Holder             | Page No.           |     |
| VNMG 330.5-F2 | 160402 |                |       |       | 149270<br>\$ 22.57 |       |       |       |       |       |       |        | 147660<br>\$ 17.76 |                  |        | 0.654 | 3/8 | 3/16 | 0.008              | Turning<br>MVJNR/L | E54 |
| VNMG 331-F2   | 160404 |                |       |       | 149321<br>\$ 22.56 |       |       |       |       |       |       |        | 147661<br>\$ 17.50 |                  |        | 0.654 | 3/8 | 3/16 | 1/64               |                    |     |
| VNMG 332-F2   | 160408 |                |       |       |                    |       |       |       |       |       |       |        | 147662<br>\$ 17.76 |                  |        | 0.654 | 3/8 | 3/16 | 1/32               |                    |     |

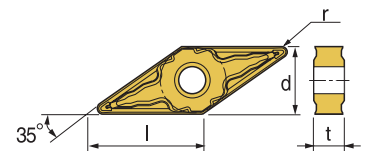
## VNMG-M/M1



- Wide available chip control range from medium-finishing to medium-roughing
- Suitable chip breaker for CNC machining



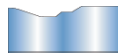
- USE Medium
- Recommendation **M**  $d = 0.04\sim 0.2\text{inch}$   
 $f = 0.004\sim 0.02\text{ipr}$



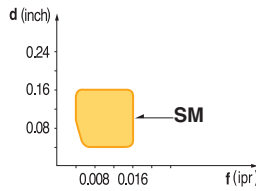
| Designation | ISO    | Coated Carbide |       |                    |                    |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |       |     |        | Applicable Holders |                    |     |
|-------------|--------|----------------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-------|-----|--------|--------------------|--------------------|-----|
|             |        | PT10C          | PT20C | PT25C              | PT30C              | MT15C              | MT20C | KT05C | KT10C | ST10P | PT10S | PT20S  | KT10U | l                | d      | t     | r   | Holder | Page No.           |                    |     |
| VNMG 331-M  | 160404 |                |       | 149284<br>\$ 22.92 |                    |                    |       |       |       |       |       |        |       |                  |        | 0.653 | 3/8 | 3/16   | 1/64               | Turning<br>MVJNR/L | E54 |
| VNMG 332-M  | 160408 |                |       | 149265<br>\$ 22.56 |                    | 149339<br>\$ 22.28 |       |       |       |       |       |        |       |                  |        | 0.653 | 3/8 | 3/16   | 1/32               |                    |     |
| VNMG 333-M  | 160412 |                |       |                    | 148866<br>\$ 22.28 |                    |       |       |       |       |       |        |       |                  |        | 0.653 | 3/8 | 3/16   | 3/64               |                    |     |
| VNMG 333-M1 | 160412 |                |       | 149274<br>\$ 22.57 |                    |                    |       |       |       |       |       |        |       |                  |        | 0.653 | 3/8 | 3/16   | 3/64               |                    |     |

# Indexable Cutting Tools

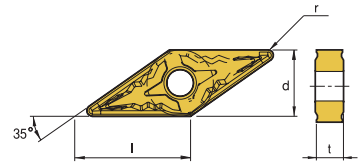
## VNMG-SM



- Exclusive design for stainless steel cutting provide longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land



- USE Stainless Steel
- Recommendation  
SM  $d = 0.04 \sim 0.16$  inch  
 $f = 0.004 \sim 0.016$  ipr

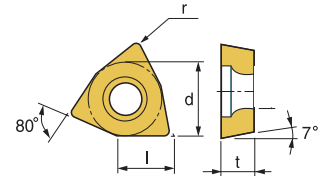


| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |                    |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------------|-------|--------|-------|------------------|--------|-----|------|------|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C              | ST10P | PT10S  | PT20S | PTM30U           | l      | d   | t    | r    | Holder             | Page No. |
| VNMG 332-SM | 160408 |                |       |       |       |       |       |       |       |                    |       |        |       |                  | 0.654  | 3/8 | 3/16 | 1/32 | Turning<br>MVJNR/L | E54      |
|             |        |                |       |       |       |       |       |       |       | 148390<br>\$ 22.56 |       |        |       |                  |        |     |      |      |                    |          |

## W\_\_ T 80° Positive Turning Inserts



### WCMT-C20/C21

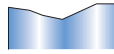


| Designation      | ISO    | Coated Carbide |       |       |       |                    |       |       |       |       |       | Cermet |       | Uncoated Carbide   | (inch) |      |      |      | Applicable Holders |          |
|------------------|--------|----------------|-------|-------|-------|--------------------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|------|------|------|--------------------|----------|
|                  |        | PT10C          | PT20C | PT22C | PT30C | PM10P              | PM35P | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U             | l      | d    | t    | r    | Holder             | Page No. |
| WCMT 1.81.52-C20 | 030208 |                |       |       |       | 146242<br>\$ 21.11 |       |       |       |       |       |        |       | 146537<br>\$ 16.44 | 0.149  | 7/32 | 3/32 | 1/32 | Boring<br>SWLCR/L  | E73      |
| WCMT 21.52-C20   | 040208 |                |       |       |       | 146237<br>\$ 21.16 |       |       |       |       |       |        |       | 147155<br>\$ 16.46 | 0.169  | 1/4  | 3/32 | 1/32 |                    |          |
| WCMT 2.522-C20   | 050308 |                |       |       |       | 146236<br>\$ 22.56 |       |       |       |       |       |        |       |                    | 0.212  | 5/16 | 1/8  | 1/32 |                    |          |
| WCMT 32.52-C20   | 06T308 |                |       |       |       | 146235<br>\$ 22.56 |       |       |       |       |       |        |       | 146539<br>\$ 17.52 | 0.256  | 3/8  | 5/32 | 1/32 |                    |          |
| WCMT 432-C20     | 080408 |                |       |       |       | 146855<br>\$ 27.58 |       |       |       |       |       |        |       |                    | 0.342  | 1/2  | 3/16 | 1/32 |                    |          |
| WCMT 433-C20     | 080412 |                |       |       |       | 146000<br>\$ 27.58 |       |       |       |       |       |        |       | 146563<br>\$ 21.48 | 0.342  | 1/2  | 3/16 | 3/64 |                    |          |

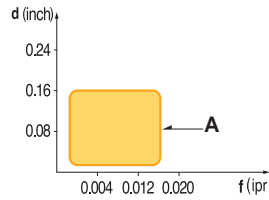
#### Quick Choice Grade Selection



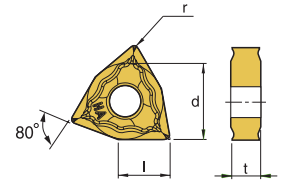
## WNMG-A



- Sharp cutting edge generates low cutting force
- Specially designed tough main cutting edge
- Suitable for cutting of low carbon steel, stainless steel, aluminum

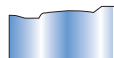


- USE Light & Medium
- Recommendation  
A  $d = 0.032 \sim 0.16 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$

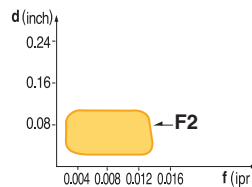


| Designation | ISO    | Coated Carbide |       |       |       |       |                    |       |       |       |       | Cermet |                    | Uncoated Carbide | (inch) |       |     |      | Applicable Holders |                    |     |
|-------------|--------|----------------|-------|-------|-------|-------|--------------------|-------|-------|-------|-------|--------|--------------------|------------------|--------|-------|-----|------|--------------------|--------------------|-----|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C              | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S              | KTM10U           | l      | d     | t   | r    | Holder             | Page No.           |     |
| WNMG 431-A  | 080404 |                |       |       |       |       | 147689<br>\$ 17.21 |       |       |       |       |        | 148422<br>\$ 17.21 |                  |        | 0.343 | 1/2 | 3/16 | 1/64               | Turning<br>MWLNR/L | E54 |
| WNMG 432-A  | 080408 |                |       |       |       |       | 147692<br>\$ 17.21 |       |       |       |       |        | 148423<br>\$ 17.21 |                  |        | 0.343 | 1/2 | 3/16 | 1/32               | Boring<br>MWLNR/L  | E66 |

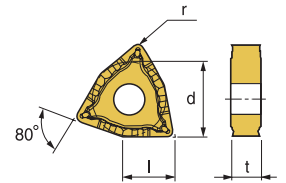
## WNMG-F2



- Excellent chip control at varied depth of cutting
- Strong cutting edge toughness due to special design



- USE Finishing
- Recommendation  
F2  $d = 0.01 \sim 0.1 \text{ inch}$   
 $f = 0.002 \sim 0.014 \text{ ipr}$



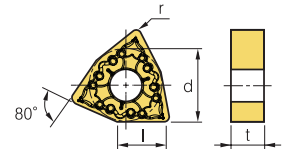
| Designation | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |       |     |      | Applicable Holders |                    |     |
|-------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-------|-----|------|--------------------|--------------------|-----|
|             |        | PT10C          | PT15C              | PT20C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d     | t   | r    | Holder             | Page No.           |     |
| WNMG 431-F2 | 080404 |                | 149411<br>\$ 17.72 |       |       |       |       |       |       |       |       |        |       |                  |        | 0.343 | 1/2 | 3/16 | 1/64               | Turning<br>MWLNR/L | E54 |
|             |        |                |                    |       |       |       |       |       |       |       |       |        |       |                  |        |       |     |      |                    | Boring<br>MWLNR/L  | E66 |

## WNMG-FVL



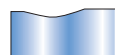
- Stable chip control in high toughness material; low carbon steel, pipe steel, and steel plates
- Improved chip control for facing, copy machining, and better surface finish

- USE Finishing
- Recommendation  
FVL  $d = 0.008 \sim 0.059 \text{ inch}$   
 $f = 0.004 \sim 0.014 \text{ ipr}$

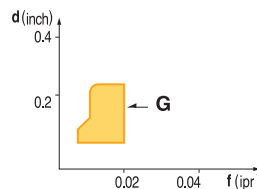


| Designation  | ISO    | Coated Carbide |                    |       |                    |       |       |       |       |       |       | Cermet |        | Uncoated Carbide | (inch) |     |      |        | Applicable Holders |                   |     |
|--------------|--------|----------------|--------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|--------|------------------|--------|-----|------|--------|--------------------|-------------------|-----|
|              |        | PT10C          | PT15C              | PT20C | PT25C              | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S | PT20S  | KTM10U | l                | d      | t   | r    | Holder | Page No.           |                   |     |
| WNMG 432-FVL | 080404 |                | 149413<br>\$ 17.74 |       | 149415<br>\$ 17.72 |       |       |       |       |       |       |        |        |                  | 0.343  | 1/2 | 3/16 | 1/64   | Turning<br>MWLNR/L | E54               |     |
|              |        |                |                    |       |                    |       |       |       |       |       |       |        |        |                  |        |     |      |        |                    | Boring<br>MWLNR/L | E66 |

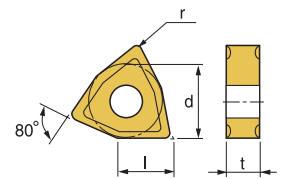
## WNMG-G



- Suitable for general cutting



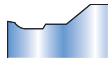
- USE General Cutting
- Recommendation  
G  $d = 0.16 \sim 0.4 \text{ inch}$   
 $f = 0.02 \sim 0.04 \text{ ipr}$



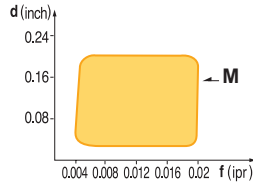
| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders |                   |     |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|--------------------|-------------------|-----|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder             | Page No.          |     |
| WNMG 432-G  | 080408 |                |       |       | 146861<br>\$ 17.21 |       |       |       |       |       |       |        |       |                  | 0.343  | 1/2 | 3/16 | 1/32 | Turning<br>MWLNR/L | E54               |     |
|             |        |                |       |       |                    |       |       |       |       |       |       |        |       |                  |        |     |      |      |                    | Boring<br>MWLNR/L | E66 |



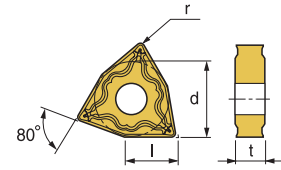
## WNMG-M/M1



- Wide available chip control range from medium-finishing to medium-roughing
- Suitable chip breaker for CNC machining

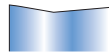
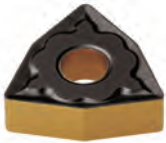


- USE Medium
- Recommendation  
M  $d = 0.04 \sim 0.2$  inch  
 $f = 0.004 \sim 0.02$  ipr

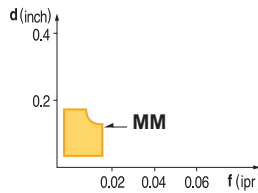


| Designation | ISO    | Coated Carbide |                    |       |                    |                    |                    |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |   | Applicable Holders |  |
|-------------|--------|----------------|--------------------|-------|--------------------|--------------------|--------------------|--------------------|-------|-------|-------|--------|-------|------------------|--------|------|------|---|--------------------|--|
|             |        | PT10C          | PT15C              | PT20C | PT25C              | PT30C              | PTM50C             | MT30P              | KT10C | ST10P | PT10S | PT20S  | KT10U | l                | d      | t    | r    | Holder                                  | Page No.           |  |
| WNMG 431-M  | 080404 |                | 149417<br>\$ 17.72 |       | 149326<br>\$ 18.03 |                    |                    |                    |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 1/64 | Turning<br>MwLNR/L<br>Boring<br>MwLNR/L | E54<br>E66         |  |
| WNMG 432-M  | 080408 |                | 149335<br>\$ 17.51 |       | 149248<br>\$ 18.08 | 147695<br>\$ 17.21 |                    |                    |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 1/32 |   |                    |  |
| WNMG 431-M1 | 080404 |                |                    |       | 149423<br>\$ 17.74 |                    |                    |                    |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 1/64 |   |                    |  |
| WNMG 432-M1 | 080408 |                | 149419<br>\$ 17.72 |       | 149425<br>\$ 17.72 |                    | 145639<br>\$ 21.93 | 145660<br>\$ 17.21 |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 1/32 |   |                    |  |
| WNMG 433-M1 | 080412 |                | 149421<br>\$ 17.72 |       | 149427<br>\$ 17.72 |                    |                    |                    |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 3/64 |   |                    |  |

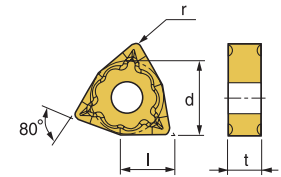
## WNMG-MM



- Excellent choice for a variety of steels including stainless steel

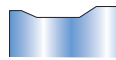
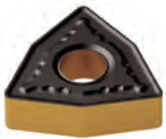


- USE Steels/Stainless Steels
- Recommendation  
MM  $d = 0.04 \sim 0.16$  inch  
 $f = 0.004 \sim 0.016$  ipr

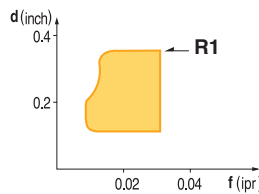


| Designation | ISO    | Coated Carbide |       |       |                    |                    |       |                    |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders                      |            |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|-------|--------------------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|---|------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | MT15C              | MT20C | MT30P              | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d   | t    | r    | Holder                                  | Page No.   |
| WNMG 432-MM | 080408 |                |       |       | 149249<br>\$ 18.03 | 149318<br>\$ 18.03 |       | 146188<br>\$ 17.21 |       |       |       |        |       |                  | 0.343  | 1/2 | 3/16 | 1/32 | Turning<br>MwLNR/L<br>Boring<br>MwLNR/L | E54<br>E66 |

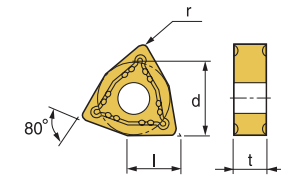
## WNMG-R1



- Excellent chip control at deep depth of cut and fast feed rate
- Strong cutting edge makes excellent cutting performance at intermittent cutting

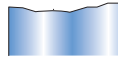


- USE Roughing
- Recommendation  
R1  $d = 0.1 \sim 0.28$  inch  
 $f = 0.010 \sim 0.026$  ipr

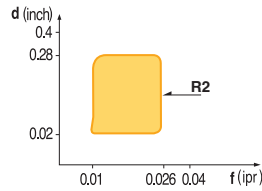


| Designation | ISO    | Coated Carbide |       |       |                    |                    |                    |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |      |      |      | Applicable Holders                      |            |
|-------------|--------|----------------|-------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|--------|-------|------------------|--------|------|------|------|---|------------|
|             |        | PT10C          | PT20C | PT22C | PT25C              | PT30C              | PT40C              | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U           | l      | d    | t    | r    | Holder                                  | Page No.   |
| WNMG 432-R1 | 080408 |                |       |       | 149277<br>\$ 17.72 | 146857<br>\$ 17.72 | 146194<br>\$ 17.21 |       |       |       |       |        |       |                  | 0.343  | 1/2  | 3/16 | 1/32 | Turning<br>MwLNR/L<br>Boring<br>MwLNR/L | E54<br>E66 |
| WNMG 433-R1 | 080412 |                |       |       |                    | 146862<br>\$ 17.21 | 146199<br>\$ 17.21 |       |       |       |       |        |       | 0.343            | 1/2    | 3/16 | 1/64 |      |   |            |

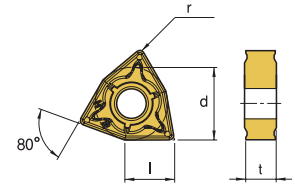
## WNMG-R2



- Suitable for heavy duty cutting due to strong cutting edge
- Wide chip control range with low cutting force

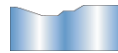


- USE Roughing
- Recommendation  
**R2**  $d = 0.12 \sim 0.44 \text{ inch}$   
 $f = 0.012 \sim 0.052 \text{ ipr}$

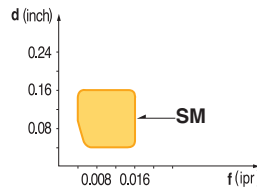


| Designation | ISO    | Coated Carbide |       |       |                    |       |       |       |       |       |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|--------------------|-------|-------|-------|-------|-------|-------|--------|-------|------------------|--------|-----|------|------|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KT10U            | l      | d   | t    | r    | Holder             | Page No. |
| WNMG 432-R2 | 080408 |                |       |       | 148170<br>\$ 17.21 |       |       |       |       |       |       |        |       |                  | 0.343  | 1/2 | 3/16 | 1/32 | Turning<br>MWLNR/L | E54      |
| WNMG 433-R2 | 080412 |                |       |       | 147684<br>\$ 17.56 |       |       |       |       |       |       |        |       |                  | 0.343  | 1/2 | 3/16 | 3/64 | Boring<br>MWLNR/L  | E66      |

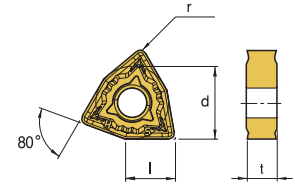
## WNMG-SM



- Exclusive design for stainless steel cutting providing longer tool life
- Wear resistance has been reinforced through high rake angle of chip breaker land



- USE Stainless Steel
- Recommendation  
**SM**  $d = 0.04 \sim 0.16 \text{ inch}$   
 $f = 0.004 \sim 0.016 \text{ ipr}$



| Designation | ISO    | Coated Carbide |       |       |                    |       |                    |       |       |                    |       | Cermet |       | Uncoated Carbide | (inch) |     |      |      | Applicable Holders |          |
|-------------|--------|----------------|-------|-------|--------------------|-------|--------------------|-------|-------|--------------------|-------|--------|-------|------------------|--------|-----|------|------|--------------------|----------|
|             |        | PT10C          | PT20C | PT22C | PT30C              | MT15C | MT20C              | MT30P | KT05C | KT10C              | ST10P | PT10S  | PT20S | KT10U            | l      | d   | t    | r    | Holder             | Page No. |
| WNMG 331-SM | 060404 |                |       |       |                    |       | 146201<br>\$ 14.48 |       |       |                    |       |        |       |                  | 0.256  | 3/8 | 3/16 | 1/64 | Turning<br>MWLNR/L | E54      |
| WNMG 332-SM | 060408 |                |       |       | 149344<br>\$ 14.70 |       | 146202<br>\$ 14.48 |       |       |                    |       |        |       |                  | 0.256  | 3/8 | 3/16 | 1/32 | Boring<br>MWLNR/L  | E66      |
| WNMG 431-SM | 080404 |                |       |       |                    |       | 146204<br>\$ 17.21 |       |       | 148424<br>\$ 17.21 |       |        |       |                  | 0.343  | 1/2 | 3/16 | 1/64 |                    |          |
| WNMG 432-SM | 080408 |                |       |       |                    |       | 147677<br>\$ 17.72 |       |       | 148425<br>\$ 17.21 |       |        |       |                  | 0.343  | 1/2 | 3/16 | 1/32 |                    |          |
| WNMG 433-SM | 080412 |                |       |       |                    |       | 147678<br>\$ 17.72 |       |       |                    |       |        |       |                  | 0.343  | 1/2 | 3/16 | 3/64 |                    |          |

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Images are representational only and may not reflect actual product.

Quick Choice Grade Selection



## Aluminum Machining Chip Breaker AP



### Recommended Cutting Condition

$d=0.004\sim 0.200\text{inch}$   
 $f=0.0012\sim 0.0020\text{ipr}$

### Special Features

- 1) Uniquely designed inclined plane provides smooth chip flow and chip breaking at the same time, thus cutting force is lower and longer tool life can be acquired.
- 2) High rake angle of main cutting edge reduces cutting force and prolongs tool life.
- 3) "AP" type chip breaker equipped with mirror face on top face through special buffing process. This mirror face prevents sticking of workpiece material on cutting edge and provides smooth chip flow.

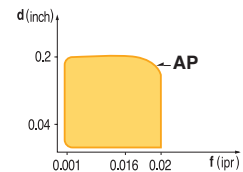
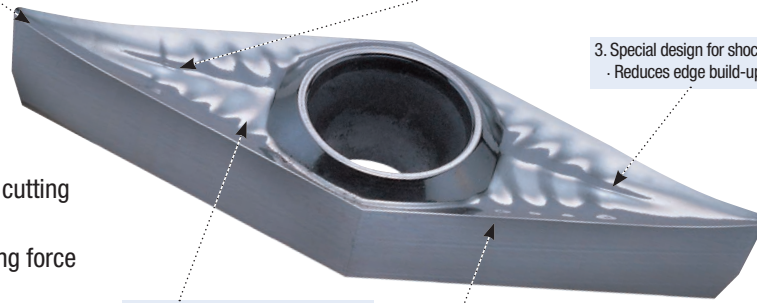
1. High rake angle  
 · Reduces cutting force

2. Unique chip breaker design  
 · Effective chip control  
 · Smooth chip flow

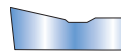
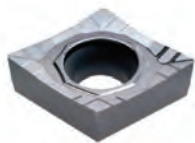
3. Special design for shock-absorbing  
 · Reduces edge build-up

5. 3 Dimensional unique design  
 · Fine surface finish & long tool life

4. Sharp cutting edge  
 · Distributes cutting force  
 · Increases tool life



## CCGT-AM (AM Chip breaker is for Aluminum)

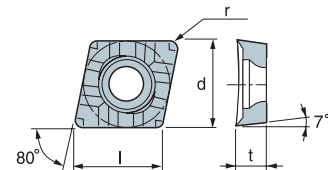


- High stability of cutting edge secures great performance in high speed and interrupted cutting
- High speed of medium and interrupted operation

■ USE  
 Aluminum Cutting

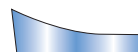
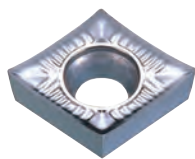
■ Recommendation

**W**  $d = 0.020\sim 0.157\text{inch}$   
 $f = 0.002\sim 0.020\text{ipr}$

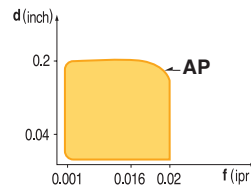


| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders                                 |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|-----|------|-------|--|----------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | PT10S  | PT20S | KTM10U             | l      | d   | t    | r     | Holder   | Page No. |
| CCGT 21.50.5-AM | 060202 |                |       |       |       |       |       |       |       |       |       |        |       | 145661<br>\$ 20.10 | 0.256  | 1/4 | 3/32 | 0.008 | Turning<br>SCACR/L<br>SCLCR/L<br>Boring<br>SCLCR/L | E55      |
| CCGT 32.50.5-AM | 09T302 |                |       |       |       |       |       |       |       |       |       |        |       | 145662<br>\$ 23.55 | 0.382  | 3/8 | 5/32 | 0.008 |  |          |
| CCGT 32.51-AM   | 09T304 |                |       |       |       |       |       |       |       |       |       |        |       | 145683<br>\$ 23.55 | 0.382  | 3/8 | 5/32 | 1/64  |  | E69      |
| CCGT 430.5-AM   | 120402 |                |       |       |       |       |       |       |       |       |       |        |       | 145684<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 0.008 |  |          |
| CCGT 431-AM     | 120404 |                |       |       |       |       |       |       |       |       |       |        |       | 145685<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 1/64  |  |          |
| CCGT 432-AM     | 120408 |                |       |       |       |       |       |       |       |       |       |        |       | 145686<br>\$ 27.28 | 0.508  | 1/2 | 3/16 | 1/32  |  |          |

## CCGT-AP (AP Chip breaker is for Aluminum)



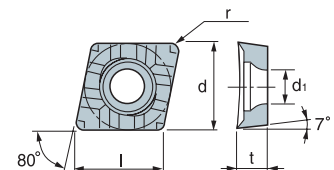
Exclusive chip breaker for aluminum and aluminum alloy



■ USE  
 Aluminum Cutting

■ Recommendation

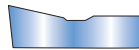
**AP**  $d = 0.005\sim 0.2\text{inch}$   
 $f = 0.001\sim 0.02\text{ipr}$



| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated      | Uncoated Carbide   | (inch) |     |      |       | Applicable Holders                                 |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|--------------------|--------|-----|------|-------|--|----------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100               | KT10U              | l      | d   | t    | r     | Holder   | Page No. |
| CCGT 21.51-AP   | 060204 |                |       |       |       |       |       |       |       |       |       |                     | 146024<br>\$ 20.67 | 0.256  | 1/4 | 3/32 | 1/64  | Turning<br>SCACR/L<br>SCLCR/L<br>Boring<br>SCLCR/L | E55      |
| CCGT 32.50.5-AP | 09T302 |                |       |       |       |       |       |       |       |       |       |                     | 146027<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 0.008 |  |          |
| CCGT 32.51-AP   | 09T304 |                |       |       |       |       |       |       |       |       |       | 146701<br>\$ 151.30 | 146011<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 1/64  |  | E69      |
| CCGT 32.52-AP   | 09T308 |                |       |       |       |       |       |       |       |       |       |                     | 146012<br>\$ 24.23 | 0.382  | 3/8 | 5/32 | 1/32  |  |          |
| CCGT 431-AP     | 120404 |                |       |       |       |       |       |       |       |       |       |                     | 146627<br>\$ 28.08 | 0.508  | 1/2 | 3/16 | 1/64  |  |          |
| CCGT 432-AP     | 120408 |                |       |       |       |       |       |       |       |       |       |                     | 146023<br>\$ 28.08 | 0.508  | 1/2 | 3/16 | 1/32  |  |          |



## DCGT-AM (AM Chip breaker is for Aluminum)

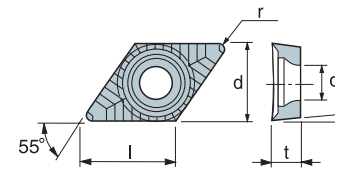


Exclusive chip breaker for aluminum and aluminum alloy

■ USE  
Aluminum Cutting

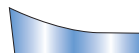
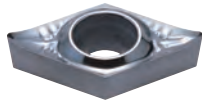
■ Recommendation

**AP**  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr

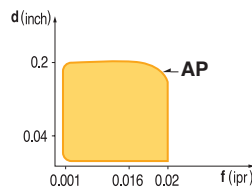


| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |       |                    | Applicable Holders          |            |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|-------|--------------------|-----------------------------|------------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l     | d                  | t                           | r          |
| DCGT 21.50.5-AM | 070202 |                |       |       |       |       |       |       |       |       |       |                    | 146048<br>\$ 20.10 | 0.307  | 1/4   | 3/32  | 0.008              | Turning<br>SDJCR/L<br>SDNCN | E56<br>E57 |
| DCGT 21.52-AM   | 070208 |                |       |       |       |       |       |       |       |       |       | 146052<br>\$ 20.67 | 0.307              | 1/4    | 3/32  | 1/32  | Boring             |                             |            |
| DCGT 32.50.5-AP | 11T302 |                |       |       |       |       |       |       |       |       |       | 145664<br>\$ 24.23 | 0.457              | 3/8    | 5/32  | 0.008 | SDQCR/L            | E70                         |            |
| DCGT 32.52-AP   | 11T308 |                |       |       |       |       |       |       |       |       |       | 146063<br>\$ 23.55 | 0.457              | 3/8    | 5/32  | 1/32  | SDUCR/L<br>SDZCR/L | E70<br>E71                  |            |

## DCGT-AP (AP Chip breaker is for Aluminum)



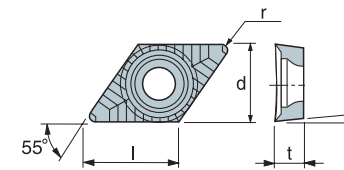
Exclusive chip breaker for aluminum and aluminum alloy



■ USE  
Aluminum Cutting

■ Recommendation

**AP**  $d = 0.005 \sim 0.2$ inch  
 $f = 0.001 \sim 0.02$ ipr



| Designation     | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated      | Uncoated Carbide   | (inch) |       |       |         | Applicable Holders          |            |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|--------------------|--------|-------|-------|---------|-----------------------------|------------|
|                 |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                     |                    | ND100  | KT10U | l     | d       | t                           | r          |
| DCGT 21.50.5-AP | 070202 |                |       |       |       |       |       |       |       |       |       |                     | 146988<br>\$ 20.10 | 0.307  | 1/4   | 3/32  | 0.008   | Turning<br>SDJCR/L<br>SDNCN | E56<br>E57 |
| DCGT 21.51-AP   | 070204 |                |       |       |       |       |       |       |       |       |       | 146989<br>\$ 20.67  | 0.307              | 1/4    | 3/32  | 1/64  | Boring  |                             |            |
| DCGT 32.50.5-AP | 11T302 |                |       |       |       |       |       |       |       |       |       | 146990<br>\$ 24.23  | 0.457              | 3/8    | 5/32  | 0.008 | SDQCR/L | E70                         |            |
| DCGT 32.51-AP   | 11T304 |                |       |       |       |       |       |       |       |       |       | 146703<br>\$ 151.30 | 146991<br>\$ 24.23 | 0.457  | 3/8   | 5/32  | 1/64    | SDUCR/L<br>SDZCR/L          | E70<br>E71 |
| DCGT 32.52-AP   | 11T308 |                |       |       |       |       |       |       |       |       |       | 146704<br>\$ 151.30 | 146992<br>\$ 24.23 | 0.457  | 3/8   | 5/32  | 1/32    |                             |            |
| DCGT 32.53-AP   | 120404 |                |       |       |       |       |       |       |       |       |       | 147764<br>\$ 23.55  | 0.457              | 3/8    | 5/32  | 3/64  |         |                             |            |

## RCGT-AM (AM Chip breaker is for Aluminum)

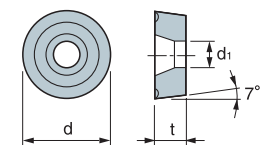


Exclusive chip breaker for aluminum and aluminum alloy

■ USE  
Aluminum Cutting

■ Recommendation

**AP**  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr



| Designation    | ISO | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet             |       | Uncoated Carbide |      | (inch) |                  |     |        | Applicable Holders |  |
|----------------|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|-------|------------------|------|--------|------------------|-----|--------|--------------------|--|
|                |     | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | PT10S | PT20S              | KT10U | PM20U            | l    | d      | t                | d1  | Holder | Page No.           |  |
| RCGT 0803MO-AM |     |                |       |       |       |       |       |       |       |       |       | 146078<br>\$ 22.08 |       | 0.315            | 1/8  | 0.008  | Turning<br>PRDCN | E55 |        |                    |  |
| RCGT 1003MO-AP |     |                |       |       |       |       |       |       |       |       |       | 146081<br>\$ 28.04 |       | 0.394            | 1/8  | 9/64   |                  |     |        |                    |  |
| RCGT 10T3MO-AM |     |                |       |       |       |       |       |       |       |       |       | 145665<br>\$ 28.04 |       | 0.394            | 5/32 | 1/64   |                  |     |        |                    |  |
| RCGT 1204MO-AM |     |                |       |       |       |       |       |       |       |       |       | 145666<br>\$ 32.88 |       | 0.472            | 3/16 | 1/32   |                  |     |        |                    |  |

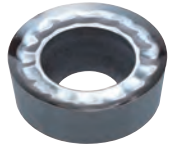
Quick Choice Grade Selection



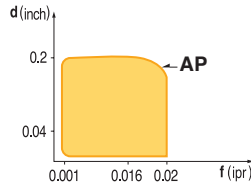




## RCGT-AP (AP Chip breaker is for Aluminum)



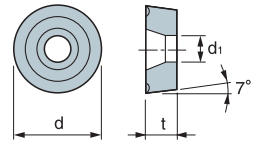
Exclusive chip breaker for aluminum and aluminum alloy



■ USE Aluminum Cutting

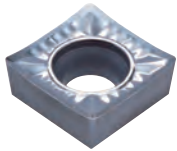
■ Recommendation

**AP**  $d = 0.005 \sim 0.02 \text{ inch}$   
 $f = 0.001 \sim 0.02 \text{ ipr}$

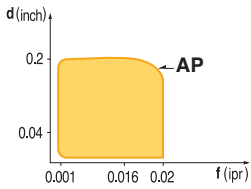


| Designation    | ISO | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet | Uncoated Carbide   |       | (inch) |      |       | Applicable Holders |        |
|----------------|-----|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------------------|-------|--------|------|-------|--------------------|--------|
|                |     | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | PT10S |        | PT20S              | KT10U | PM20U  | d    | t     | d1                 | Holder |
| RCGT 0803MO-AP |     |                |       |       |       |       |       |       |       |       |       |        | 146315<br>\$ 22.08 |       | 0.315  | 1/8  | 0.008 | Turning<br>PRDCN   | E55    |
| RCGT 10T3MO-AP |     |                |       |       |       |       |       |       |       |       |       |        | 147377<br>\$ 28.86 |       | 0.394  | 5/32 | 1/64  |                    |        |
| RCGT 1204MO-AP |     |                |       |       |       |       |       |       |       |       |       |        | 148421<br>\$ 33.83 |       | 0.472  | 3/16 | 1/32  |                    |        |

## SCGT-AM/AP (AM & AP Chip breakers are for Aluminum)



AM  
AP  
Exclusive chip breakers for aluminum and aluminum alloy

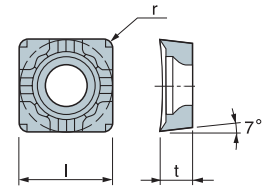


■ USE Aluminum Cutting

■ Recommendation

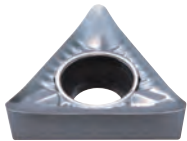
**AM**  $d = 0.020 \sim 0.157 \text{ inch}$   
 $f = 0.002 \sim 0.020 \text{ ipr}$

**AP**  $d = 0.005 \sim 0.2 \text{ inch}$   
 $f = 0.001 \sim 0.02 \text{ ipr}$



| Designation      | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated | Uncoated Carbide   | (inch) |      |      | Applicable Holders |          |
|------------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------------|--------|------|------|--------------------|----------|
|                  |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100          | KT10U              | l      | t    | r    | Holder             | Page No. |
| SCGT 32.51-AM    | 09T304 |                |       |       |       |       |       |       |       |       |       |                | 146094<br>\$ 24.57 | 3/8    | 5/32 | 1/64 | Turning<br>SSBCR/L | E57      |
| SCGT 431-AM      | 120404 |                |       |       |       |       |       |       |       |       |       |                | 146101<br>\$ 27.28 | 1/2    | 3/16 | 1/64 |                    |          |
| SCGT 432-AM      | 120408 |                |       |       |       |       |       |       |       |       |       |                | 145668<br>\$ 27.28 | 1/2    | 3/16 | 1/32 | SSKCR/L            | E71      |
| SCGT 32.51-AP(K) | 09T304 |                |       |       |       |       |       |       |       |       |       |                | 146993<br>\$ 24.57 | 3/8    | 5/32 | 1/64 |                    |          |
| SCGT 32.52-AP    | 09T308 |                |       |       |       |       |       |       |       |       |       |                | 146994<br>\$ 25.31 | 3/8    | 5/32 | 1/32 |                    |          |
| SCGT 431-AP      | 120404 |                |       |       |       |       |       |       |       |       |       |                | 146996<br>\$ 27.28 | 1/2    | 3/16 | 1/64 |                    |          |
| SCGT 432-AP      | 120408 |                |       |       |       |       |       |       |       |       |       |                | 146995<br>\$ 28.08 | 1/2    | 3/16 | 1/32 |                    |          |

## TCGT-AM (AM Chip breaker is for Aluminum)

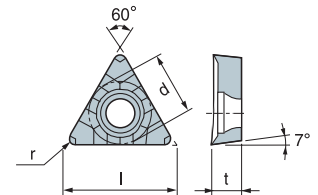


Exclusive chip breaker for aluminum and aluminum alloy

■ USE Aluminum Cutting

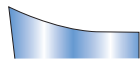
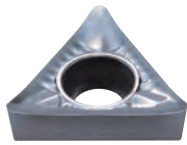
■ Recommendation

**AM**  $d = 0.020 \sim 0.157 \text{ inch}$   
 $f = 0.002 \sim 0.020 \text{ ipr}$

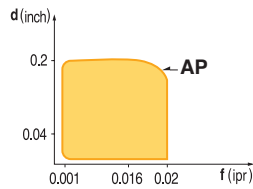


| Designation   | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated | Uncoated Carbide   | (inch) |     |      |      | Applicable Holders |          |
|---------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------------------|--------|-----|------|------|--------------------|----------|
|               |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P | ND100          | KT10U              | l      | d   | t    | r    | Holder             | Page No. |
| TCGT 21.51-AM | 110204 |                |       |       |       |       |       |       |       |       |       |                | 146120<br>\$ 20.46 | 0.433  | 1/4 | 3/32 | 1/64 | Turning<br>STFCR/L | E58      |
| TCGT 21.52-AM | 110208 |                |       |       |       |       |       |       |       |       |       |                | 146121<br>\$ 20.46 | 0.433  | 1/4 | 3/32 | 1/32 |                    |          |
| TCGT 32.50.5  | 16T302 |                |       |       |       |       |       |       |       |       |       |                | 146123<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/64 | STFCR/L            | E72      |
| TCGT 32.51-AM | 16T304 |                |       |       |       |       |       |       |       |       |       |                | 146135<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/64 |                    |          |
| TCGT 32.52-AM | 16T308 |                |       |       |       |       |       |       |       |       |       |                | 146137<br>\$ 25.90 | 0.650  | 3/8 | 5/32 | 1/32 |                    |          |

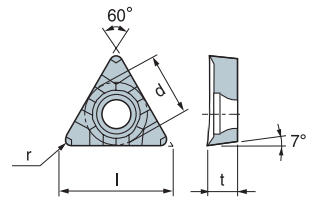
## TCGT-AP (AP Chip breaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy

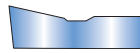
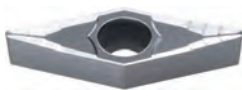


- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.005 \sim 0.2$ inch  
 $f = 0.001 \sim 0.02$ ipr



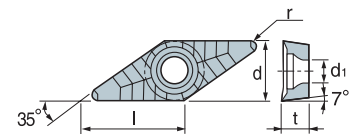
| Designation      | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |      |       | Applicable Holders   |   |
|------------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|------|-------|--|---|
|                  |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l    | d     | t  | r |
| TCGT 21.50.5-AP  | 110202 |                |       |       |       |       |       |       |       |       |       |                    | 146504<br>\$ 21.03 | 0.433  | 1/4   | 3/32 | 0.008 | Turning<br>STFCR/L E58<br>STGCR/L E59<br>Boring<br>STFCR/L E72 |   |
| TCGT 21.51-AP    | 110204 |                |       |       |       |       |       |       |       |       |       | 146505<br>\$ 21.03 | 0.433              | 1/4    | 3/32  | 1/64 |       |  |   |
| TCGT 21.52-AP    | 110208 |                |       |       |       |       |       |       |       |       |       | 146506<br>\$ 20.46 | 0.433              | 1/4    | 3/32  | 1/32 |       |  |   |
| TCGT 32.51-AP(K) | 16T304 |                |       |       |       |       |       |       |       |       |       | 146507<br>\$ 26.64 | 0.650              | 3/8    | 5/32  | 1/64 |       |  |   |
| TCGT 32.52-AP(K) | 16T308 |                |       |       |       |       |       |       |       |       |       | 146508<br>\$ 26.64 | 0.650              | 3/8    | 5/32  | 1/32 |       |  |   |

## VCGT-AM (AM Chip breaker is for Aluminum)



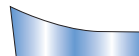
Exclusive chip breaker for aluminum and aluminum alloy

- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.020 \sim 0.157$ inch  
 $f = 0.002 \sim 0.020$ ipr

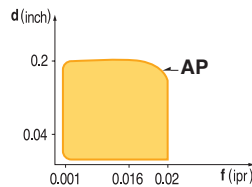


| Designation   | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |       |      | Applicable Holders     |   |
|---------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|-------|------|------------------------|---|
|               |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l     | d    | t                      | r |
| VCGT 222-AM   | 110308 |                |       |       |       |       |       |       |       |       |       |                    | 145671<br>\$ 24.71 | 0.354  | 1/4   | 1/8   | 1/32 | Turning<br>SVJCR/L E59 |   |
| VCGT 330.5-AM | 160402 |                |       |       |       |       |       |       |       |       |       | 145672<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 0.008 |      |                        |   |
| VCGT 331-AM   | 160404 |                |       |       |       |       |       |       |       |       |       | 146177<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 1/64  |      |                        |   |
| VCGT 332-AM   | 160408 |                |       |       |       |       |       |       |       |       |       | 146180<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 1/32  |      |                        |   |
| VCGT 333-AM   | 160412 |                |       |       |       |       |       |       |       |       |       | 146181<br>\$ 28.19 | 0.650              | 3/8    | 3/16  | 3/64  |      |                        |   |

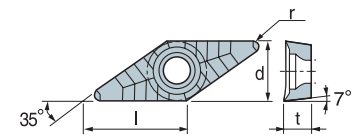
## VCGT-AP (AP Chipbreaker is for Aluminum)



Exclusive chip breaker for aluminum and aluminum alloy



- USE Aluminum Cutting
- Recommendation  
AP  $d = 0.005 \sim 0.2$ inch  
 $f = 0.001 \sim 0.02$ ipr



| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |       |       | Diamond Coated     | Uncoated Carbide   | (inch) |       |      |      | Applicable Holders     |   |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|-------|------|------|------------------------|---|
|             |        | PT10C          | PT20C | PT22C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C | ST10P |                    |                    | ND100  | KT10U | l    | d    | t                      | r |
| VCGT 331-AP | 160404 |                |       |       |       |       |       |       |       |       |       |                    | 146850<br>\$ 29.05 | 0.650  | 3/8   | 3/16 | 1/64 | Turning<br>SVJCR/L E59 |   |
| VCGT 332-AP | 160408 |                |       |       |       |       |       |       |       |       |       | 146545<br>\$ 29.05 | 0.650              | 3/8    | 3/16  | 1/32 |      |                        |   |
| VCGT 333-AP | 160412 |                |       |       |       |       |       |       |       |       |       | 146852<br>\$ 29.05 | 0.650              | 3/8    | 3/16  | 3/64 |      |                        |   |

Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

## C.B.N. Turning Inserts

SOWA C.B.N. products are made from Cubic Boron Nitride powder and special ceramic binder.  
 SOWA C.B.N. can provide excellent cutting performance for hardened steel and cast iron having high hardness.  
 Using a C.B.N. can replace additional grinding processes, thus saving costs.

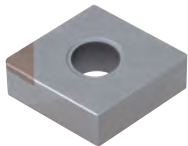
- Suitable for sintered alloy, hard material, heat treated alloy · Excellent surface finish at the cutting of hardened steel.
- Excellent for cast iron cutting

### Recommended Cutting Condition

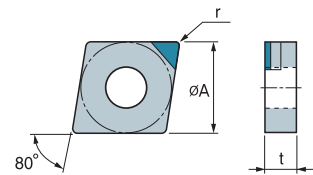
\*For additional technical information see page E179

| Workpiece                           | Speed (sfm) | Feed Turning(ipr) Milling(ipt) | Depth (inch) | 1 <sup>st</sup> Recommended Grade |
|-------------------------------------|-------------|--------------------------------|--------------|-----------------------------------|
| Gray Cast Iron<br>(180~230 HRB)     | 1325 ~ 3275 | 0.004 ~ 0.02                   | 0.005 ~ 0.04 | KB350                             |
|                                     | 1325 ~ 3275 | 0.004 ~ 0.02                   | 0.005 ~ 0.04 | KB360                             |
| Heat Treated Steel<br>(over 45HRC)  | 325 ~ 450   | 0.001 ~ 0.012                  | 0.005 ~ 0.04 | KB320<br>KB330                    |
| High Temp Alloy<br>(over 45HRC)     | 175 ~ 600   | 0.002 ~ 0.008                  | 0.005 ~ 0.04 | KB360                             |
| Sintered Alloy                      | 175 ~ 825   | 0.001 ~ 0.008                  | 0.005 ~ 0.04 | KB360                             |
| Carbide Roll, High Speed Steel Roll | 150 ~ 200   | 0.024 ~ 0.031                  | 0.08 ~ 0.16  | KB360                             |

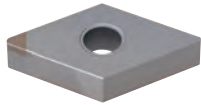
## CNMA



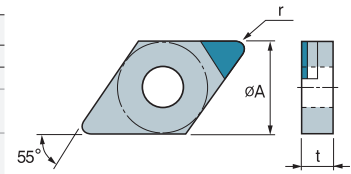
| Designation | ISO    | C.B.N.    |           |           | (inch) |      |         | Applicable Holders |          |
|-------------|--------|-----------|-----------|-----------|--------|------|---------|--------------------|----------|
|             |        | KB320     | KB350     | KB360     | A      | t    | r       | Holder             | Page No. |
| CNMA 432    | 120408 | 146131    | 147886    | 147965    | 1/2    | 3/16 | 1/32    | Turning            |          |
|             |        | \$ 141.87 | \$ 141.87 | \$ 141.87 |        |      |         | MCKNR/L            | E48      |
|             |        |           |           |           |        |      |         | MCLNR/L            | E48      |
|             |        |           |           |           |        |      |         | MCLNR/L            | E64      |
|             |        |           |           |           |        |      | PCLNR/L | E67                |          |



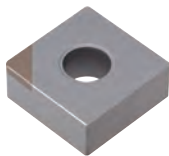
## DNMA



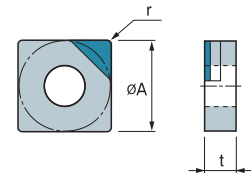
| Designation | ISO    | C.B.N.    |       |       | (inch) |      |      | Applicable Holders |          |
|-------------|--------|-----------|-------|-------|--------|------|------|--------------------|----------|
|             |        | KB320     | KB350 | KB360 | A      | t    | r    | Holder             | Page No. |
| DNMA 432    | 120408 | 146132    |       |       | 1/2    | 3/16 | 1/32 | Turning            |          |
|             |        | \$ 141.87 |       |       |        |      |      | MDJNR/L            | E49      |
|             |        |           |       |       |        |      |      | PSDNR/L            | E67      |
|             |        |           |       |       |        |      |      | PDUNR/L            | E68      |



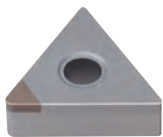
## SNMA



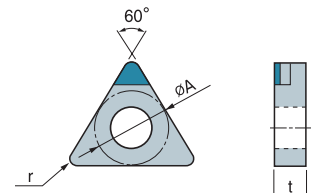
| Designation | ISO    | C.B.N.    |       |       | (inch) |      |      | Applicable Holders |          |
|-------------|--------|-----------|-------|-------|--------|------|------|--------------------|----------|
|             |        | KB320     | KB350 | KB360 | A      | t    | r    | Holder             | Page No. |
| SNMA 432    | 120408 | 146133    |       |       | 1/2    | 3/16 | 1/32 | Turning            |          |
|             |        | \$ 141.87 |       |       |        |      |      | MSDNN              | E50      |
|             |        |           |       |       |        |      |      | MSKNR/L            | E50      |
| SNMA-433    | 120412 | 146134    |       |       | 1/2    | 3/16 | 3/64 | Boring             |          |
|             |        | \$ 141.87 |       |       |        |      |      | MSRNR/L            | E51      |
|             |        |           |       |       |        |      |      | PSKNR/L            | E68      |



## TNMA



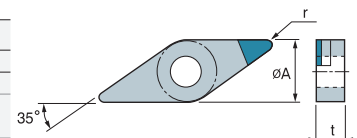
| Designation | ISO    | C.B.N.    |       |       | (inch) |      |      | Applicable Holders |          |
|-------------|--------|-----------|-------|-------|--------|------|------|--------------------|----------|
|             |        | KB320     | KB350 | KB360 | A      | t    | r    | Holder             | Page No. |
| TNMA 332    | 160408 | 146139    |       |       | 3/8    | 3/16 | 1/32 | Turning            |          |
|             |        | \$ 133.58 |       |       |        |      |      | MTFNR/L            | E52      |
|             |        |           |       |       |        |      |      | MTENN              | E52      |
| TNMA-432    | 220408 | 146141    |       |       | 1/2    | 3/16 | 1/32 | Boring             |          |
|             |        | \$ 146.77 |       |       |        |      |      | MTJNR/L            | E53      |
|             |        |           |       |       |        |      |      | PTFNR/L            | E69      |



## VNMA



| Designation | ISO    | C.B.N. |       |           | (inch) |      |      | Applicable Holders |         |          |
|-------------|--------|--------|-------|-----------|--------|------|------|--------------------|---------|----------|
|             |        | KB320  | KB350 | KB360     | A      | t    | r    | Hole               | Holder  | Page No. |
| VNMA 331    | 160402 |        |       | 147968    | 3/8    | 3/16 | 1/64 |                    | Turning |          |
|             |        |        |       | \$ 151.20 |        |      |      |                    | MVJNR/L | E54      |

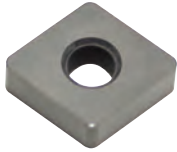


# CERAMIC Inserts

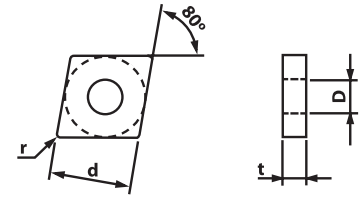


## CNGA

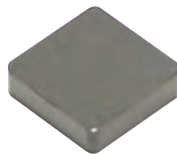
\*For additional technical information see page E181-182



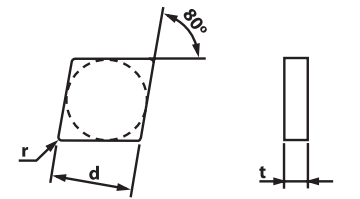
| Designation | ISO    | CERAMIC  |          |      | (inch) |       |       | Applicable Holders   |                                 |
|-------------|--------|----------|----------|------|--------|-------|-------|--|---------------------------------|
|             |        | GP100    | GP300    | S400 | d      | t     | r     | Holder   | Page No.                        |
| CNGA 431    | 120404 | 149416   | 149418   |      | 0.500  | 0.187 | 0.016 | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L<br>Boring<br>MCLNR/L<br>PCLNR/L | E48<br>E48<br>E49<br>E64<br>E67 |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |  |                                 |
| CNGA 432    | 120408 | 149420   | 149422   |      | 0.500  | 0.187 | 0.031 |  |                                 |
|             |        | \$ 22.30 | \$ 20.29 |      |        |       |       |  |                                 |
| CNGA 433    | 120412 | 149424   | 149426   |      | 0.500  | 0.187 | 0.047 |  |                                 |
|             |        | \$ 15.67 | \$ 20.29 |      |        |       |       |  |                                 |
| CNGA 434    | 120416 | 149428   | 149430   |      | 0.500  | 0.187 | 0.063 |  |                                 |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |  |                                 |
| CNGA 452    | 120708 | 149432   | 149434   |      | 0.500  | 0.313 | 0.031 |  |                                 |
|             |        | \$ 19.00 | \$ 20.01 |      |        |       |       |  |                                 |
| CNGA 453    | 120712 | 149436   | 149438   |      | 0.500  | 0.313 | 0.047 |  |                                 |
|             |        | \$ 19.00 | \$ 20.01 |      |        |       |       |  |                                 |



## CNGN



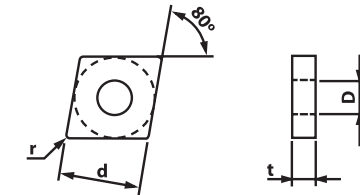
| Designation | ISO    | CERAMIC  |          |      | (inch) |       |       | Applicable Holders |          |
|-------------|--------|----------|----------|------|--------|-------|-------|--------------------|----------|
|             |        | GP100    | GP300    | S400 | d      | t     | r     | Holder             | Page No. |
| CNGN 431    | 150404 | 149400   | 149402   |      | 0.500  | 0.187 | 0.016 |                    |          |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |                    |          |
| CNGN 432    | 150408 | 149404   | 149406   |      | 0.500  | 0.187 | 0.031 |                    |          |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |                    |          |
| CNGN 433    | 150412 | 149408   | 149410   |      | 0.500  | 0.187 | 0.047 |                    |          |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |                    |          |
| CNGN 434    | 150416 | 149412   | 149414   |      | 0.500  | 0.187 | 0.063 |                    |          |
|             |        | \$ 15.67 | \$ 16.47 |      |        |       |       |                    |          |



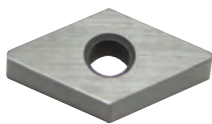
## CNMA



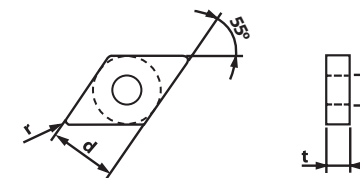
| Designation | ISO    | CERAMIC |       |          | (inch) |       |       | Applicable Holders   |                                 |
|-------------|--------|---------|-------|----------|--------|-------|-------|--|---------------------------------|
|             |        | GP100   | GP300 | S400     | d      | t     | r     | Holder   | Page No.                        |
| CNMA 432    | 150404 |         |       | 149558   | 0.500  | 0.187 | 0.031 | Turning<br>MCKNR/L<br>MCLNR/L<br>MCRNR/L<br>Boring<br>MCLNR/L<br>PCLNR/L | E48<br>E48<br>E49<br>E64<br>E67 |
|             |        |         |       | \$ 26.44 |        |       |       |  |                                 |
| CNMA 433    | 150412 |         |       | 149592   | 0.500  | 0.187 | 0.047 |  |                                 |
|             |        |         |       | \$ 28.89 |        |       |       |  |                                 |
| CNMA 434    | 150416 |         |       | 149562   | 0.500  | 0.187 | 0.063 |  |                                 |
|             |        |         |       | \$ 26.44 |        |       |       |  |                                 |
| CNMA 544    | 160416 |         |       | 149564   | 0.625  | 0.250 | 0.063 |  |                                 |
|             |        |         |       | \$ 38.64 |        |       |       |  |                                 |



## DNGA



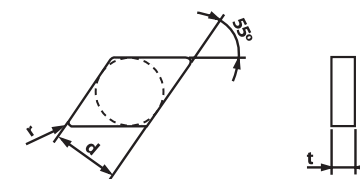
| Designation | ISO    | CERAMIC  |          |      | (inch) |       |       | Applicable Holders                                 |                   |
|-------------|--------|----------|----------|------|--------|-------|-------|--|-------------------|
|             |        | GP100    | GP300    | S400 | d      | t     | r     | Holder   | Page No.          |
| DNGA 431    | 150404 | 149448   | 149450   |      | 0.500  | 0.187 | 0.016 | Turning<br>MDJNR/L<br>Boring<br>PDSNR/L<br>PDUNR/L | E49<br>E67<br>E68 |
|             |        | \$ 27.57 | \$ 23.47 |      |        |       |       |  |                   |
| DNGA 432    | 150408 | 149452   | 149454   |      | 0.500  | 0.187 | 0.031 |  |                   |
|             |        | \$ 22.38 | \$ 27.57 |      |        |       |       |  |                   |
| DNGA 441    | 150604 | 149456   | 149458   |      | 0.500  | 0.250 | 0.016 |  |                   |
|             |        | \$ 23.75 | \$ 25.00 |      |        |       |       |  |                   |
| DNGA 442    | 150608 | 149460   | 149462   |      | 0.500  | 0.250 | 0.031 |  |                   |
|             |        | \$ 23.75 | \$ 22.38 |      |        |       |       |  |                   |
| DNGA 443    | 150612 | 149464   | 149466   |      | 0.500  | 0.250 | 0.047 |  |                   |
|             |        | \$ 23.75 | \$ 25.00 |      |        |       |       |  |                   |



## DNGN



| Designation | ISO    | CERAMIC  |       |      | (inch) |       |       | Applicable Holders |          |
|-------------|--------|----------|-------|------|--------|-------|-------|--------------------|----------|
|             |        | GP100    | GP300 | S400 | d      | t     | r     | Holder             | Page No. |
| DNGN 432    | 150408 | 149440   |       |      | 0.500  | 0.187 | 0.031 |                    |          |
|             |        | \$ 22.38 |       |      |        |       |       |                    |          |
| DNGN 433    | 150412 | 149442   |       |      | 0.500  | 0.187 | 0.047 |                    |          |
|             |        | \$ 22.38 |       |      |        |       |       |                    |          |
| DNGN 442    | 150608 | 149444   |       |      | 0.500  | 0.250 | 0.031 |                    |          |
|             |        | \$ 23.75 |       |      |        |       |       |                    |          |
| DNGN 443    | 150612 | 149446   |       |      | 0.500  | 0.250 | 0.047 |                    |          |
|             |        | \$ 23.75 |       |      |        |       |       |                    |          |



## CERAMIC Inserts

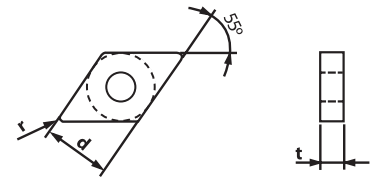


### DNMA

\*For additional technical information see page E181-182



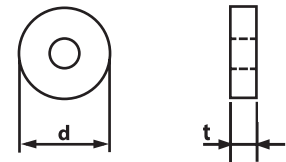
| Designation | ISO    | CERAMIC |       |                    | (inch) |       |       | Applicable Holders                                 |                   |
|-------------|--------|---------|-------|--------------------|--------|-------|-------|--|-------------------|
|             |        | GP100   | GP300 | S400               | d      | t     | r     | Holder   | Page No.          |
| DNMA 443    | 150612 |         |       | 149576<br>\$ 41.67 | 0.500  | 0.250 | 0.047 | Turning<br>MDJNR/L<br>Boring<br>PDSNR/L<br>PDUNR/L | E49<br>E67<br>E68 |



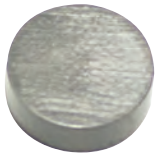
### RNGA



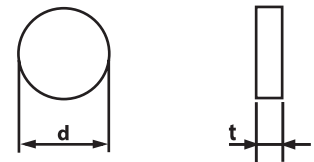
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |   | Applicable Holders |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|---|--------------------|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r | Holder             | Page No. |
| RNGA 43     | 120400 | 149480<br>\$ 17.98 | 149482<br>\$ 18.91 |      | 0.500  | 0.187 |   |                    |          |



### RNG



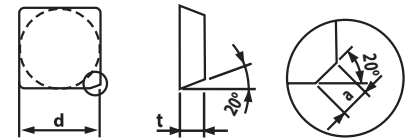
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |   | Applicable Holders |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|---|--------------------|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r | Holder             | Page No. |
| RNG 32      | 090300 | 149470<br>\$ 13.65 |                    |      | 0.375  | 0.125 |   |                    |          |
| RNG 33      | 090400 | 149472<br>\$ 14.37 | 149474<br>\$ 15.09 |      | 0.375  | 0.187 |   |                    |          |
| RNG 43      | 120400 | 149476<br>\$ 17.98 | 149478<br>\$ 15.01 |      | 0.500  | 0.187 |   |                    |          |



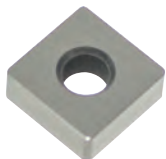
### SEKN (For Milling)



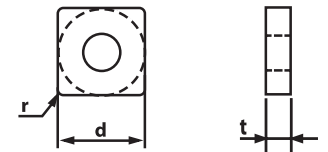
| Designation  | ISO      | CERAMIC |       |                    | (inch) |       |       | Applicable Holders |          |
|--------------|----------|---------|-------|--------------------|--------|-------|-------|--------------------|----------|
|              |          | GP100   | GP300 | S300               | d      | t     | r     | Holder             | Page No. |
| SEKN 42 AFTN | 1203AFTN |         |       | 149556<br>\$ 35.89 | 0.500  | 0.125 | 0.079 |                    |          |



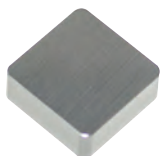
### SNGA



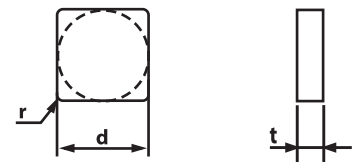
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |       | Applicable Holders                     |                   |
|-------------|--------|--------------------|--------------------|------|--------|-------|-------|--|-------------------|
|             |        | GP100              | GP300              | S400 | d      | t     | r     | Holder                                 | Page No.          |
| SNGA 432    | 120408 | 149586<br>\$ 14.30 |                    |      | 0.500  | 0.187 | 0.031 | Turning<br>MSDNN<br>MSKNR/L<br>MSRRR/L | E51<br>E50<br>E51 |
| SNGA 433    | 120412 | 149588<br>\$ 14.30 | 149590<br>\$ 15.02 |      | 0.500  | 0.187 | 0.047 | Boring<br>PSKNR/L                      | E68               |



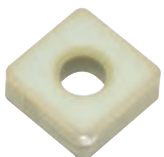
### SNGN



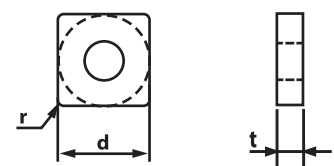
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |       | Applicable Holders |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|-------|--------------------|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r     | Holder             | Page No. |
| SNGN 432    | 120408 | 149580<br>\$ 14.30 |                    |      | 0.500  | 0.187 | 0.031 |                    |          |
| SNGN 433    | 120412 | 149582<br>\$ 14.30 | 149584<br>\$ 15.02 |      | 0.500  | 0.187 | 0.047 |                    |          |



### SNMA



| Designation | ISO    | CERAMIC |       |                    | (inch) |       |       | Applicable Holders          |            |
|-------------|--------|---------|-------|--------------------|--------|-------|-------|-----------------------------|------------|
|             |        | GP100   | GP300 | S400               | d      | t     | r     | Holder                      | Page No.   |
| SNMA 433    | 120412 |         |       | 149560<br>\$ 26.44 | 0.500  | 0.187 | 0.047 | Turning<br>MSDNN<br>MSKNR/L | E51<br>E50 |
| SNMA 434    | 120416 |         |       | 149594<br>\$ 21.45 | 0.500  | 0.187 | 0.063 | Boring<br>PSKNR/L           | E51<br>E68 |

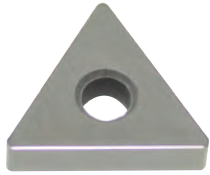


# CERAMIC Inserts

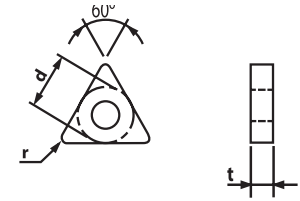


## TNGA

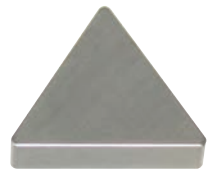
\*For additional technical information see page E181-182



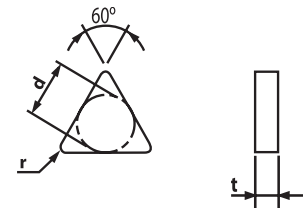
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |       | Applicable Holders  |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|-------|---|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r     | Holder  | Page No. |
| TNGA 222    | 110308 | 149403<br>\$ 12.28 | 149401<br>\$ 12.93 |      | 0.250  | 0.125 | 0.031 | <b>Turning</b><br>MTCNN E51<br>MTENN E52<br>MTFNR/L E52<br>MTGNR/L E53<br>MTJNR/L E53<br><b>Boring</b><br>MTFNR/L E65<br>MTUNR/L E65<br>PTFNR/L E69 |          |
| TNGA 331    | 160404 | 149520<br>\$ 13.50 | 149522<br>\$ 14.16 |      | 0.375  | 0.187 | 0.016 |   |          |
| TNGA 332    | 160408 | 149524<br>\$ 13.50 | 149526<br>\$ 12.27 |      | 0.375  | 0.187 | 0.031 |   |          |
| TNGA 333    | 160412 | 149528<br>\$ 13.50 | 149529<br>\$ 14.16 |      | 0.375  | 0.187 | 0.047 |   |          |
| TNGA 432    | 220408 | 149530<br>\$ 23.91 |                    |      | 0.500  | 0.187 | 0.031 |   |          |
| TNGA 433    | 220412 | 149532<br>\$ 20.65 |                    |      | 0.500  | 0.187 | 0.047 |   |          |
| TNGA 434    | 220416 | 149534<br>\$ 20.65 |                    |      | 0.500  | 0.187 | 0.063 |   |          |



## TNG



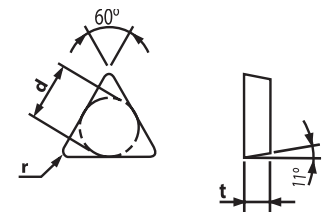
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |       | Applicable Holders |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|-------|--------------------|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r     | Holder             | Page No. |
| TNG 321     | 160304 | 149500<br>\$ 13.14 |                    |      | 0.375  | 0.125 | 0.016 |                    |          |
| TNG 332     | 160408 | 149502<br>\$ 13.50 | 149504<br>\$ 12.92 |      | 0.375  | 0.187 | 0.031 |                    |          |
| TNG 333     | 160412 | 149506<br>\$ 13.50 |                    |      | 0.375  | 0.187 | 0.047 |                    |          |
| TNG 431     | 220404 | 149508<br>\$ 20.65 |                    |      | 0.500  | 0.187 | 0.016 |                    |          |
| TNG 432     | 220408 | 149510<br>\$ 20.65 |                    |      | 0.500  | 0.187 | 0.031 |                    |          |
| TNG 433     | 220412 | 149512<br>\$ 20.65 |                    |      | 0.500  | 0.187 | 0.047 |                    |          |



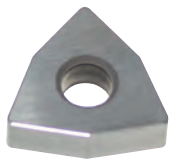
## TPG



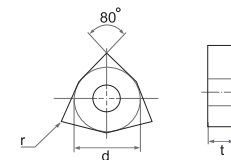
| Designation | ISO    | CERAMIC            |                    |      | (inch) |       |       | Applicable Holders |          |
|-------------|--------|--------------------|--------------------|------|--------|-------|-------|--------------------|----------|
|             |        | GP100              | GP300              | S400 | d      | t     | r     | Holder             | Page No. |
| TPG 221     | 110304 | 149536<br>\$ 17.62 | 149538<br>\$ 18.49 |      | 0.250  | 0.125 | 0.016 |                    |          |
| TPG 222     | 110408 | 149540<br>\$ 17.62 | 149542<br>\$ 18.49 |      | 0.250  | 0.125 | 0.031 |                    |          |
| TPG 321     | 160304 | 149544<br>\$ 18.78 | 149546<br>\$ 19.72 |      | 0.375  | 0.125 | 0.016 |                    |          |
| TPG 322     | 160308 | 149548<br>\$ 18.78 | 149550<br>\$ 16.55 |      | 0.375  | 0.125 | 0.031 |                    |          |
| TPG 323     | 160312 | 149552<br>\$ 18.78 | 149554<br>\$ 19.72 |      | 0.375  | 0.125 | 0.047 |                    |          |



## WNGA



| Designation | ISO    | CERAMIC |                    |                    | (inch) |       |       | Applicable Holders |          |
|-------------|--------|---------|--------------------|--------------------|--------|-------|-------|--------------------|----------|
|             |        | GP100   | GP300              | S400               | d      | t     | r     | Holder             | Page No. |
| WNGA 432    | 080408 |         | 149628<br>\$ 23.60 | 149630<br>\$ 35.98 | 0.500  | 0.187 | 0.031 |                    |          |
| WNGA 433    | 080412 |         | 149632<br>\$ 23.03 | 149634<br>\$ 35.98 | 0.500  | 0.187 | 0.047 |                    |          |



## Turning Toolholder Code System



| 1 Method of Mounting of Insert |          |          |          |
|--------------------------------|----------|----------|----------|
|                                |          |          |          |
| <b>C</b>                       | <b>D</b> | <b>M</b> | <b>P</b> |
|                                |          |          |          |
| <b>S</b>                       |          |          |          |

| 2 Insert Shape |          |          |          |
|----------------|----------|----------|----------|
|                |          |          |          |
| <b>C</b>       | <b>D</b> | <b>E</b> | <b>K</b> |
|                |          |          |          |
| <b>L</b>       | <b>R</b> | <b>S</b> | <b>T</b> |
|                |          |          |          |
| <b>V</b>       | <b>W</b> |          |          |



| 3 Holder Style |          |          |          |          |
|----------------|----------|----------|----------|----------|
|                |          |          |          |          |
| <b>B</b>       | <b>D</b> | <b>E</b> | <b>F</b> | <b>G</b> |
|                |          |          |          |          |
| <b>J</b>       | <b>K</b> | <b>L</b> | <b>N</b> | <b>R</b> |
|                |          |          |          |          |
| <b>S</b>       | <b>T</b> | <b>V</b> | <b>Y</b> |          |

| 4 Clearance Angle of Insert |          |
|-----------------------------|----------|
|                             |          |
| <b>B</b>                    | <b>C</b> |
|                             |          |
| <b>N</b>                    | <b>P</b> |

**5 Hand of Tool**

**L                      N                      R**

**6 Pocket Style**

C Single Wall (full construction)  
Otherwise Full Wall

**7 Holder Size**

| No. | Width | Height | No. | Width  | Height |
|-----|-------|--------|-----|--------|--------|
| 10  | 0.625 | 0.625  | 06  | 0.375  | 0.375  |
| 12  | 0.75  | 0.75   | 05  | 0.3125 | 0.3125 |
| 16  | 1.00  | 1.00   | 64  | 0.75   | 1.00   |
| 20  | 1.25  | 1.25   | 66  | 0.75   | 1.50   |
| 24  | 1.50  | 1.50   | 85  | 1.00   | 1.25   |
| 32  | 2.00  | 2.00   | 86  | 1.00   | 1.50   |
| 08  | 0.50  | 0.50   | 91  | 1.25   | 1.50   |

**S** **16**

**6** **7**

**4** **D**

**8** **9**

**8 Insert Size IC**

Number of 1/8" of inscribed circle

|    |         |
|----|---------|
| 2  | : 0.25  |
| 3  | : 0.375 |
| 4  | : 0.5   |
| 5  | : 0.625 |
| 6  | : 0.75  |
| 7  | : 0.875 |
| 8  | : 1.0   |
| 9  | : 1.125 |
| 10 | : 1.250 |
| 11 | : 1.375 |
| 12 | : 1.50  |

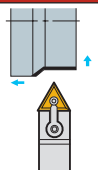
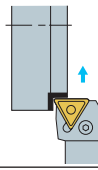
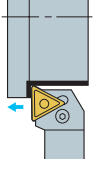
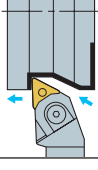
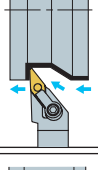
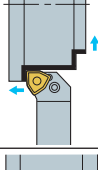
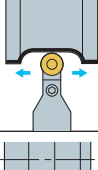
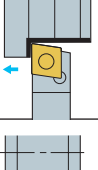
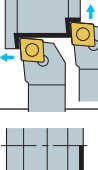
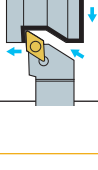
**9 Qualified Surface & Length**

|   |                                   |
|---|-----------------------------------|
| A | Qualified back and end 4" long    |
| B | Qualified back and end 4.5" long  |
| C | Qualified back and end 5" long    |
| D | Qualified back and end 6" long    |
| E | Qualified back and end 7" long    |
| F | Qualified back and end 8" long    |
| M | Qualified front and end 4"        |
| N | Qualified front and end 4.5"      |
| P | Qualified front and end 5"        |
| R | Qualified front and end 6"        |
| S | Qualified front and end 7"        |
| T | Qualified front and end 8"        |
| G | Qualified back and end 10" long   |
| H | Qualified back and end 12" long   |
| I | Qualified back and end 2.5" long  |
| J | Qualified back and end 2.75" long |
| K | Qualified back and end 3.15       |





# Turning Toolholder Index

| Cutting Shape   |  | Cat. No.          | Turning | Copying | Facing | Chamfering  | Available Inserts |
|---|--|-------------------|---------|---------|--------|---|-------------------|
| <p><b>MTENN</b></p>  <p>➤ P. E52</p>                                   | <p>10-3B<br/>12-3B<br/>16-4D<br/>20-5D</p>                                     | <p>•</p> <p>•</p> |         |         |        | <p>TN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br/>32.5 <input type="checkbox"/><br/>44 <input type="checkbox"/></p> <p>➤ P. E24-27, E38, E41</p>                            |                   |
| <p><b>MTFNR/L</b></p>  <p>➤ P. E52</p>                                 | <p>12-3B<br/>16-3D<br/>16-4D<br/>20-5D</p>                                     |                   |         | •       |        | <p>TN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br/>43 <input type="checkbox"/><br/>54 <input type="checkbox"/></p> <p>➤ P. E24-27, E38, E41</p>                              |                   |
| <p><b>MTGNR/L</b></p>  <p>➤ P. E53</p>                                 | <p>10-3B<br/>12-3B<br/>16-3D<br/>16-4D<br/>20-4D<br/>16-5D<br/>20-5D</p>       | •                 |         |         |        | <p>TN <input type="checkbox"/> <input type="checkbox"/> 21.5 <input type="checkbox"/><br/>33 <input type="checkbox"/><br/>43 <input type="checkbox"/><br/>54 <input type="checkbox"/></p> <p>➤ P. E24-27, E41</p> |                   |
| <p><b>MTJNR/L</b></p>  <p>➤ P. E53</p>                                 | <p>10-3B<br/>12-3B<br/>16-3D<br/>16-4D<br/>20-4D<br/>20-5D</p>                 | •                 | •       | •       |        | <p>TN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br/>43 <input type="checkbox"/></p> <p>➤ P. E24-27, E41</p>   |                   |
| <p><b>MVJNR/L</b></p>  <p>➤ P. E54</p>                                | <p>8-3A<br/>12-3C<br/>16-3D<br/>20-4D</p>                                      | •                 | •       |         |        | <p>VN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/></p> <p>➤ P. E29, E38</p>  |                   |
| <p><b>MWLNR/L</b></p>  <p>➤ P. E54</p>                               | <p>12-3B<br/>12-4D<br/>16-4D<br/>20-4D</p>                                     | •                 |         | •       |        | <p>WN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/></p> <p>➤ P. E31-33</p>  |                   |
| <p><b>PRDCN</b></p>  <p>➤ P. E55</p>                                 | <p>2525-M12</p>  | •                 | •       |         |        | <p>RCMX M0 <input type="checkbox"/><br/>M0 <input type="checkbox"/></p> <p>➤ P. E18, E36</p>  |                   |
| <p><b>SCACR/L</b></p> <p><b>Screw On System</b></p>  <p>➤ P. E55</p> | <p>06-2J<br/>08-3K<br/>12-4B</p>   | •                 |         |         |        | <p>CC <input type="checkbox"/> <input type="checkbox"/> 21.5 <input type="checkbox"/><br/>32.5 <input type="checkbox"/></p> <p>➤ P. E8-9</p>  |                   |
| <p><b>SCLCR/L</b></p>  <p>➤ P. E56</p>                               | <p>06-2      12-3<br/>08-2      16-3<br/>08-3      12-4<br/>10-3      16-4</p> | •                 |         | •       |        | <p>CC <input type="checkbox"/> T 21.5 <input type="checkbox"/><br/>32.5 <input type="checkbox"/></p> <p>➤ P. E34</p>  |                   |
| <p><b>SDJCR/L</b></p>  <p>➤ P. E56</p>                               | <p>06-2J      10-3A<br/>08-2K      12-3B<br/>10-2A      16-3D<br/>12-2B</p>    | •                 | •       |         |        | <p>DC <input type="checkbox"/> T 21.5 <input type="checkbox"/><br/>32.5 <input type="checkbox"/></p> <p>➤ P. E14, E35</p>   |                   |

## Turning Toolholder Index



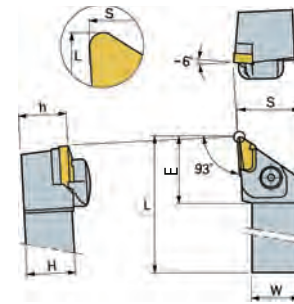
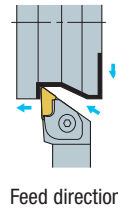
| Cutting Shape                          |  | Cat. No.   | Turning | Copying | Facing | Chamfering | Available Inserts                                       |
|--|--|--|---------|---------|--------|------------|---|
| SDNCN<br>▶ P. E57                      |  | 06-2J<br>08-2K<br>08-3A<br>10-3A<br>12-3B                              | •       | •       |        |            | DC □ T 21.5 □<br>32.5 □<br>▶ P. E14, E35                |
| SSBCR/L<br>▶ P. E57                    |  | 08-3K<br>10-3A<br>12-4B  | •       |         |        |            | SC □ T 32.5 □<br>43 □<br>▶ P. E19, E36                  |
| SSSCR/L<br>▶ P. E58                    |  | 10-3A<br>12-4B   | •       |         | •      |            | SC □ T 32.5 □<br>43 □<br>▶ P. E19, E36                  |
| STFCR/L<br>▶ P. E58                    |  | 06-1.8J<br>08-2K<br>10-2A<br>10-3A<br>12-3B                            |         |         | •      |            | TC □ T 1.81.5 □<br>21.5 □<br>32.5 □<br>▶ P. E22-24      |
| STGCR/L<br>Screw On System<br>▶ P. E59 |  | 05-1.8I<br>06-1.8J<br>08-2K<br>10-2A<br>8-3<br>12-3B<br>16-3D          | •       |         |        |            | TC □ T 1.81.5 □<br>21.5 □<br>32.5 □<br>▶ P. E22-24      |
| SVJCR/L<br>▶ P. E59                    |  | 08-2K 12-2.5B<br>10-2A 10-3A<br>12-B 12-3B<br>08-2.5K 16-3D<br>10-2.5A | •       | •       |        |            | VC □ T 22 □<br>VC □ T 2.52 □<br>VC □ T 33 □<br>▶ P. E28 |

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# External Turning Toolholders

## CKJNR/L



Right-hand shown

| Ref         | Holder Style                |          | Application      |       |       |       |       |       | Inserts |             | Parts          |         |        |        |            |         |       |
|-------------|-----------------------------|----------|------------------|-------|-------|-------|-------|-------|---------|-------------|----------------|---------|--------|--------|------------|---------|-------|
| Comment     | J Style, Approach Angle 93° |          | Turning, Copying |       |       |       |       |       |         |             |                |         |        |        |            |         |       |
| Designation | Code #                      | Price \$ | H                | W     | L     | S     | h     | E     | Inserts | Clamp       | Clamping Screw | Spring  | Pin    | Shim   | Shim Screw | Wrench  |       |
| CKJNR       | 2525-M16                    | 145857   | 235.85           | 0.984 | 0.984 | 5.900 | 1.260 | 0.984 | 1.260   | KN□□1604□□R | CTH6R1         | CHX0625 | SR3    | PN0515 | SK33C      | SHX0310 | HW20L |
|             | 3232-P16                    | 145858   | 259.96           | 1.26  | 1.260 | 6.900 | 1.575 | 1.260 | 146151  |             | 146541         | 146153  | 146152 | 146955 | 146155     | 146954  |       |
| CKJNL       | 2525-M16                    | 145715   | 235.85           | 0.984 | 0.984 | 5.900 | 1.260 | 0.984 | 1.260   | KN□□1604□□L | CTH6L1         | CHX0625 | SR3    | PN0515 | SK33CL     | SHX0310 | HW20L |
|             | 3232-P16                    | 146266   | 259.96           | 1.26  | 1.260 | 6.900 | 1.575 | 1.260 | 146542  |             | 146541         | 146153  | 146152 | 146264 | 146155     | 146954  |       |

➤ P. E17

Indexable Cutting Tools



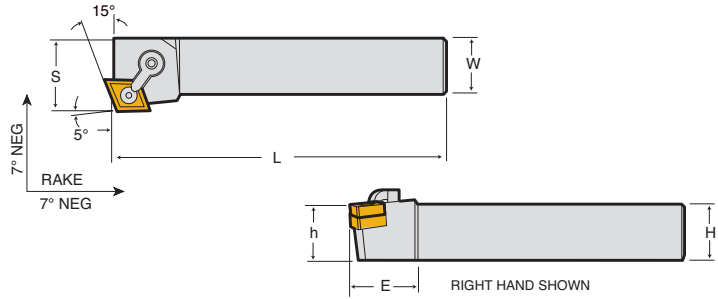
High  
Performance  
Live Centres

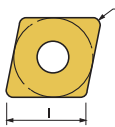





Precision.  
Quality.  
Performance.

See Pages H114-118



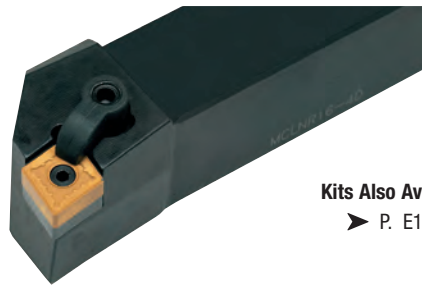
## MCKNR/L



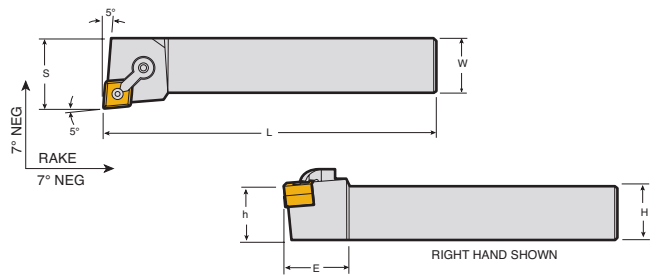
| Ref     | Holder Style                |          | Application |          |       |       |       |       |       |      | Inserts   |   |   |   |   |   | Parts   |  |  |  |  |
|---------|-----------------------------|----------|-------------|----------|-------|-------|-------|-------|-------|------|---|---|---|---|---|---|---|--|--|--|--|
| Comment | K Style, Approach Angle 75° |          | Facing      |          |       |       |       |       |       |      | Facing  |   |   |   |   |   | Parts   |  |  |  |  |
| MCKNR/L | Code #                      |          | Code #      |          | H     | W     | L     | S     | h     | E    |  |  |  |  |  |  | Clamp<br>Clamp Screw<br>Shim<br>Pin<br>Wrench |  |  |  |  |
|         | Right                       | Price \$ | Left        | Price \$ |       |       |       |       |       |      |   |   |   |   |   |   |   |  |  |  |  |
| 16-4D   | 145820                      | 217.17   | 145821      | 222.45   | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 1.25 | WN□□43□   | CL-20   | XNS-48  | ICSN-432  | NL-46   |   |   |  |  |  |  |
| 20-4D   | 145822                      | 267.05   | 145823      | 267.05   | 1.250 | 1.250 | 6.000 | 1.500 | 1.000 | 1.25 |   | 146918  | 146922  | 146908  | 146912  |   |   |  |  |  |  |
|         |                             |          |             |          |       |       |       |       |       |      |   | \$ 10.00  | \$ 2.31   | \$ 10.96  | \$ 5.04   |   |   |  |  |  |  |
| 20-5D   | 145824                      | 146.95   | 145825      | 146.95   | 1.250 | 1.250 | 6.000 | 1.500 | 1.375 | 1.47 | CN□□54□   | CL-12   | XNS-510   | ICSN-533  | NL-58   |   |   |  |  |  |  |
|         |                             |          |             |          |       |       |       |       |       |      |   | 146917  | 146920  | 146909  | 146913  |   |   |  |  |  |  |
|         |                             |          |             |          |       |       |       |       |       |      |   | \$ 10.00  | \$ 2.38   | \$ 13.55  | \$ 5.61   |   |   |  |  |  |  |
| 20-6D   | 145826                      | 159.73   | 145827      | 159.73   | 1.250 | 1.250 | 6.000 | 1.500 | 1.500 | 1.44 | CN□□64□   | CL-12   | XNS-510   | ICSN-633  | NL-68   |   |   |  |  |  |  |
|         |                             |          |             |          |       |       |       |       |       |      |   | 146917  | 146920  | 146910  | 146914  |   |   |  |  |  |  |
|         |                             |          |             |          |       |       |       |       |       |      |   | \$ 10.00  | \$ 2.38   | \$ 15.68  | \$ 6.30   |   |   |  |  |  |  |

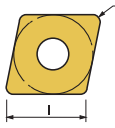




► P. E10-12, E38-39

## MCLNR/L



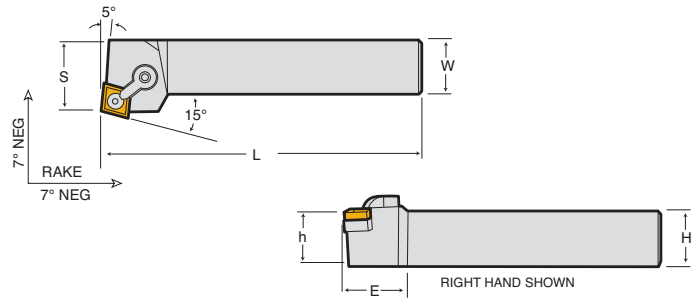
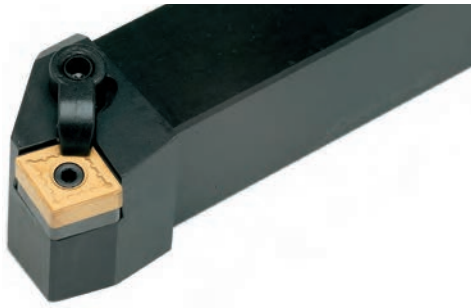
Kits Also Available  
► P. E168



| Ref     | Holder Style                |          | Application     |          |       |       |       |       |       |       | Inserts   |   |   |   |   | Parts                               |  |  |  |
|---------|-----------------------------|----------|-----------------|----------|-------|-------|-------|-------|-------|-------|---|---|---|---|---|-------------------------------------|--|--|--|
| Comment | L Style, Approach Angle 95° |          | Turning, Facing |          |       |       |       |       |       |       | Turning, Facing   |   |   |   |   | Parts                               |  |  |  |
| MCLNR/L | Code #                      |          | Code #          |          | H     | W     | L     | S     | h     | E     |  |  |  |  |  | Clamp<br>Clamp Screw<br>Shim<br>Pin |  |  |  |
|         | Right                       | Price \$ | Left            | Price \$ |       |       |       |       |       |       |   |   |   |   |   |                                     |  |  |  |
| 12-4B   | 145780                      | 227.36   | 145745          | 197.20   | 0.750 | 0.750 | 4.500 | 1.000 | 0.750 | 1.200 | CN□□43□   | CL-20   | XNS-48  | ICSN-432  | NL-46   |                                     |  |  |  |
| 16-4D   | 145828                      | 222.45   | 145829          | 217.17   | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 1.200 |   | 146918  | 146922  | 146908  | 146912  |                                     |  |  |  |
| 20-4D   | 145838                      | 260.72   | 145782          | 267.05   | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.300 |   | \$ 10.00  | \$ 2.31   | \$ 10.96  | \$ 5.04   |                                     |  |  |  |
| 20-5D   | 145830                      | 267.05   | 145831          | 267.05   | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.370 | CN□□54□   | CL-12   | XNS-510   | ICSN-533  | NL-58   |                                     |  |  |  |
|         |                             |          |                 |          |       |       |       |       |       |       |   | 146917  | 146920  | 146909  | 146913  |                                     |  |  |  |
|         |                             |          |                 |          |       |       |       |       |       |       |   | \$ 10.00  | \$ 2.38   | \$ 13.55  | \$ 5.61   |                                     |  |  |  |
| 20-6D   | 145832                      | 267.05   | 145833          | 267.05   | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.370 | CN□□64□   | CL-12   | XNS-510   | ICSN-633  | NL-68   |                                     |  |  |  |
| 24-6E   | 145834                      | 314.24   |                 |          | 1.500 | 1.500 | 7.000 | 2.000 | 1.500 | 1.496 |   | 146917  | 146920  | 146910  | 146914  |                                     |  |  |  |
|         |                             |          |                 |          |       |       |       |       |       |       |   | \$ 10.00  | \$ 2.38   | \$ 15.68  | \$ 6.30   |                                     |  |  |  |

► P. E10-12, E38-39

## MCRNR/L



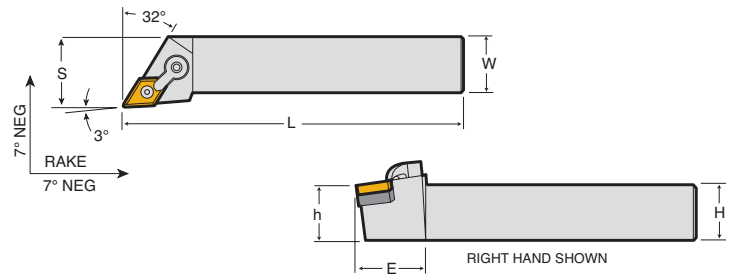
| Ref     | Holder Style                |          | Code # |          | Application     |       |       |      |       | Inserts | Parts   |                    |                   |                    |                   |
|---------|-----------------------------|----------|--------|----------|-----------------|-------|-------|------|-------|---------|---------|--------------------|-------------------|--------------------|-------------------|
| Comment | R Style, Approach Angle 75° |          |        |          | Turning, Facing |       |       |      |       |         | Clamp   | Clamp Screw        | Shim              | Pin                |                   |
| MCRNR/L | Right                       | Price \$ | Left   | Price \$ | H               | W     | L     | S    | h     | E       |         |                    |                   |                    |                   |
| 16-4D   | 145835                      | 222.45   | 145836 | 222.45   | 1.000           | 1.000 | 6.000 | 1.25 | 1.000 | 1.24    | CN□□43□ | CL-20              | XNS-48            | ICSN-432           | NL-46             |
| 20-4D   | 145837                      | 260.51   | 145778 | 272.01   | 1.250           | 1.250 | 6.000 | 1.50 | 1.250 | 1.24    |         | 146918<br>\$ 10.00 | 146922<br>\$ 2.31 | 146908<br>\$ 10.96 | 146912<br>\$ 5.04 |
| 20-5D   | 145839                      | 267.05   | 145840 | 267.05   | 1.250           | 1.250 | 6.000 | 1.50 | 1.250 | 1.34    | CN□□54□ | CL-12              | XNS-510           | ICSN-533           | NL-58             |
| 20-6D   | 145841                      | 267.05   | 145842 | 119.96   | 1.250           | 1.250 | 6.000 | 1.25 | 1.250 | 1.24    |         | 146917<br>\$ 10.00 | 146920<br>\$ 2.38 | 146909<br>\$ 13.55 | 146913<br>\$ 5.61 |
| 24-6E   | 145843                      | 314.24   | 145844 | 137.50   | 1.500           | 1.500 | 7.000 | 2.00 | 1.500 | 1.49    | CN□□64□ | CL-12              | XNS-510           | ICSN-633           | NL-68             |
|         |                             |          |        |          |                 |       |       |      |       |         |         | 146917<br>\$ 10.00 | 146920<br>\$ 2.38 | 146910<br>\$ 15.68 | 146914<br>\$ 6.30 |

➤ P. E10-12, E39

## MDJNR/L



Kits Also Available  
➤ P. E168

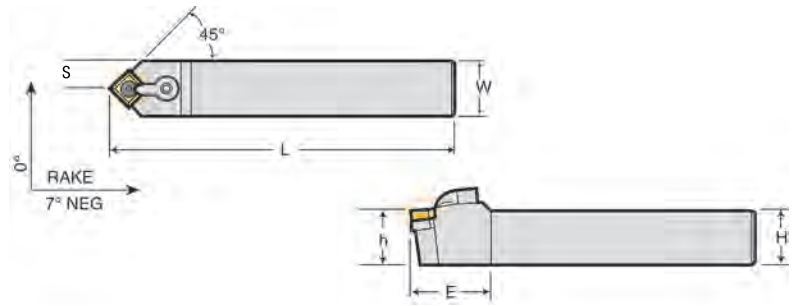


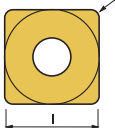




| Ref     | Holder Style                |          | Code # |          | Application      |       |       |       |       | Inserts | Parts   |                    |                   |                    |                   |
|---------|-----------------------------|----------|--------|----------|------------------|-------|-------|-------|-------|---------|---------|--------------------|-------------------|--------------------|-------------------|
| Comment | J Style, Approach Angle 93° |          |        |          | Turning, Copying |       |       |       |       |         | Clamp   | Clamp Screw        | Shim              | Pin                |                   |
| MDJNR/L | Right                       | Price \$ | Left   | Price \$ | H                | W     | L     | S     | h     | E       |         |                    |                   |                    |                   |
| 12-4B   | 146328                      | 197.20   | 146330 | 197.20   | 0.750            | 0.750 | 4.500 | 1.000 | 0.750 | 1.200   | DN□□44□ | CL-12              | XNS-59            | IDSN-432           | NL-46             |
| 16-4D   | 145845                      | 238.66   | 145846 | 217.17   | 1.000            | 1.000 | 6.000 | 1.250 | 1.000 | 1.250   |         | 146917<br>\$ 10.00 | 146921<br>\$ 2.38 | 146907<br>\$ 10.00 | 146912<br>\$ 5.04 |
| 20-4D   | 145847                      | 267.05   | 145848 | 267.05   | 1.250            | 1.250 | 6.000 | 1.500 | 1.250 | 1.240   |         |                    |                   |                    |                   |

➤ P. E14-16, E38-40



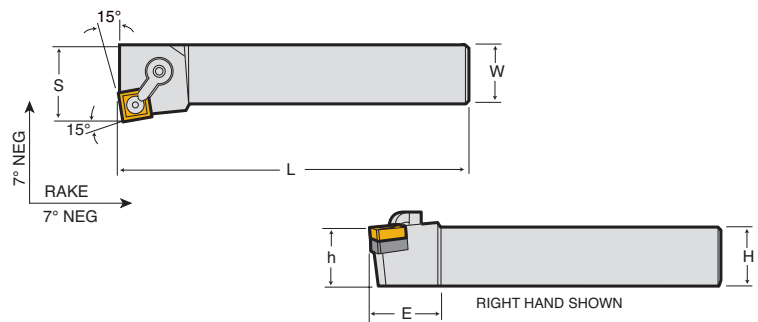
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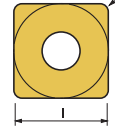






| Ref     | Holder Style                |          | Application      |       |       |       |       |       |         | Inserts   | Parts   |   |   |   |
|---------|-----------------------------|----------|------------------|-------|-------|-------|-------|-------|---------|---|---|---|---|---|
| Comment | D Style, Approach Angle 45° |          | Turning, Copying |       |       |       |       |       |         |  |  |  |  |  |
| MSDNN   | Code #                      | Price \$ | H                | W     | L     | S     | h     | E     | Clamp   |   |   |   |   |   |
| 12-4B   | 145860                      | 75.14    | 0.750            | 0.750 | 4.500 | 0.375 | 0.750 | 1.375 | SN□□43□ | CL-20   | XNS-48  | ISSN-432  | NL-46   |   |
|         |                             |          |                  |       |       |       |       |       |         | 146918  | 146922  | 146903  | 146912  |   |
|         |                             |          |                  |       |       |       |       |       |         | \$ 10.00  | \$ 2.31   | \$ 10.80  | \$ 5.04   |   |
| 16-4D   | 145799                      | 217.17   | 1.000            | 1.000 | 6.000 | 0.500 | 1.000 | 1.375 | SN□□43□ | CL-9  | XNS-59  | ISSN-432  | NL-46   |   |
| 85-4D   | 145759                      | 267.05   | 1.250            | 1.000 | 6.000 | 0.500 | 1.000 | 1.375 |         | 146916  | 146921  | 146903  | 146912  |   |
|         |                             |          |                  |       |       |       |       |       |         | \$ 10.00  | \$ 2.38   | \$ 10.80  | \$ 5.04   |   |
| 20-5E   | 147227                      | 177.14   | 1.250            | 1.250 | 7.000 | 0.625 | 1.250 | 1.610 | SN□□54□ | CL-12   | XNS-510   | ISSN-533  | NL-58   |   |
| 85-5D   | 145763                      | 177.14   | 1.250            | 1.000 | 6.000 | 0.500 | 1.250 | 1.610 |         | 146917  | 146920  | 146904  | 146913  |   |
|         |                             |          |                  |       |       |       |       |       |         | \$ 10.00  | \$ 2.38   | \$ 12.49  | \$ 5.61   |   |
| 20-6D   | 145866                      | 267.05   | 1.250            | 1.250 | 6.000 | 0.625 | 1.250 | 1.750 | SN□□64□ | CL-12   | XNS-510   | ISSN-633  | NL-68   |   |
| 24-6E   | 147404                      | 202.00   | 1.500            | 1.500 | 7.000 | 0.750 | 1.500 | 1.750 |         | 146917  | 146920  | 146905  | 146914  |   |
|         |                             |          |                  |       |       |       |       |       |         | \$ 10.00  | \$ 2.38   | \$ 16.04  | \$ 6.30   |   |

➤ P. E19-22, E38, E40

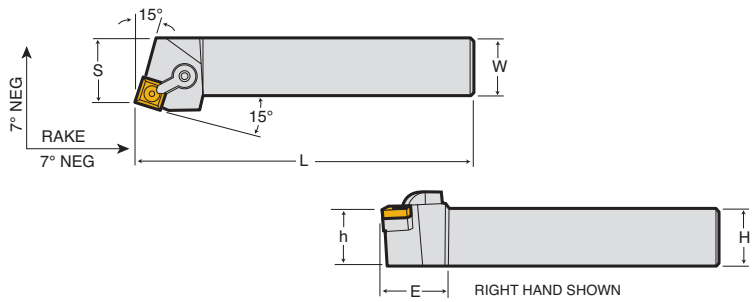
### MSKNR/L

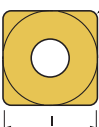






| Ref     | Holder Style                |        | Application |        |       |       |       |       |       | Inserts   | Parts   |   |   |   |         |
|---------|-----------------------------|--------|-------------|--------|-------|-------|-------|-------|-------|---|---|---|---|---|---------|
| Comment | K Style, Approach Angle 75° |        | Facing      |        |       |       |       |       |       |  |  |  |  |  |         |
| MSKNR/L | Code #                      |        | Code #      |        | H     | W     | L     | S     | h     |   |   |   |   |   | E       |
| 16-4D   | 145849                      | 222.45 | 145850      | 222.45 | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 1.250   | SN□□43□   | CL-9  | XNS-59  | ISSN-432  | NL-46   |
|         |                             |        |             |        |       |       |       |       |       |   |   | 146916  | 146921  | 146903  | 146912  |
|         |                             |        |             |        |       |       |       |       |       |   |   | \$ 9.75   | \$ 2.38   | \$ 10.80  | \$ 5.04 |
| 20-6D   | 145853                      | 267.05 |             |        | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.560   | SN□□64□   | CL-12   | XNS-510   | ISSN-633  | NL-68   |
| 24-6E   | 145855                      | 314.24 |             |        | 1.500 | 1.500 | 7.000 | 2.000 | 1.500 | 1.560   |   | 146917  | 146920  | 146905  | 146914  |
|         |                             |        |             |        |       |       |       |       |       |   |   | \$ 10.00  | \$ 2.38   | \$ 16.04  | \$ 6.30 |

➤ P. E19-22, E38, E40

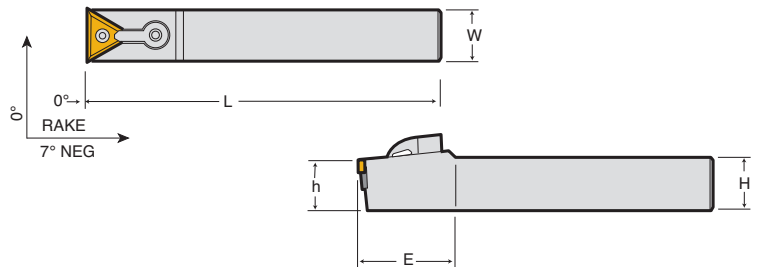
## MSRNR/L

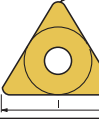






| Ref     | Holder Style                |          | Application |          | Inserts |       |       |       |       |       | Parts   |   |   |   |   |
|---------|-----------------------------|----------|-------------|----------|---------|-------|-------|-------|-------|-------|---|---|---|---|---|
| Comment | R Style, Approach Angle 75° |          | Turning     |          | Turning |       |       |       |       |       | Turning   |   |   |   |   |
| MSRNR/L | Code #                      |          | Code #      |          | H       | W     | L     | S     | h     | E     |  |  |  |  |  |
|         | Right                       | Price \$ | Left        | Price \$ |         |       |       |       |       |       |   |   |   |   |   |
| 12-4B   | 145869                      | 99.01    | 145870      | 99.01    | 0.750   | 0.750 | 4.500 | 0.878 | 0.750 | 1.230 | SN □ □ 43 □   | CL-12<br>146917<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | ISSN-432<br>146903<br>\$ 10.80  | NL-46<br>146912<br>\$ 5.04  |
| 16-4D   | 145800                      | 222.45   | 145801      | 222.45   | 1.000   | 1.000 | 6.000 | 1.128 | 1.000 | 1.230 | SN □ □ 43 □   | CL-12<br>146917<br>\$ 10.00   | XNS-59<br>146921<br>\$ 2.38   | ISSN-533<br>146904<br>\$ 12.49  | NL-58<br>146913<br>\$ 5.61  |
| 20-5D   | 145802                      | 267.05   | 145803      | 184.44   | 1.250   | 1.250 | 6.000 | 1.350 | 1.250 | 1.375 | SN □ □ 54 □   | CL-12<br>146917<br>\$ 10.00   | XNS-59<br>146921<br>\$ 2.38   | ISSN-533<br>146904<br>\$ 12.49  | NL-58<br>146913<br>\$ 5.61  |
| 20-6D   | 145804                      | 267.05   | 145805      | 267.05   | 1.250   | 1.250 | 6.000 | 1.318 | 1.250 | 1.500 | SN □ □ 64 □   | CL-12<br>146917<br>\$ 10.00   | XNS-510<br>146920<br>\$ 2.38  | ISSN-633<br>146905<br>\$ 16.04  | NL-68<br>146914<br>\$ 6.30  |
| 24-6E   | 145806                      | 314.24   | 145807      | 314.24   | 1.500   | 1.500 | 7.000 | 1.818 | 1.500 | 1.500 | SN □ □ 64 □   | CL-12<br>146917<br>\$ 10.00   | XNS-510<br>146920<br>\$ 2.38  | ISSN-633<br>146905<br>\$ 16.04  | NL-68<br>146914<br>\$ 6.30  |

► P. E19-22, E38, E40

## MTCNN



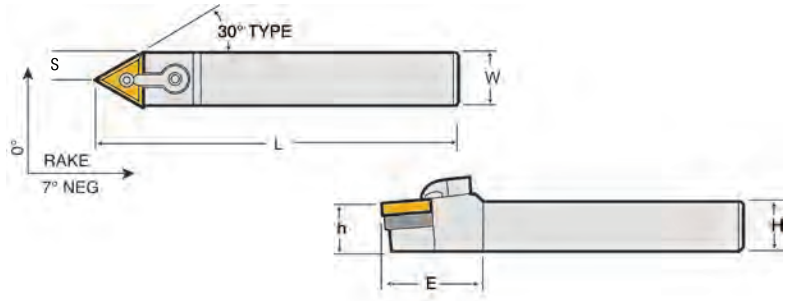
| Ref     | Holder Style |          | Application |          | Inserts |       |       |       |       |   | Parts   |   |   |   |
|---------|--------------|----------|-------------|----------|---------|-------|-------|-------|-------|---|---|---|---|---|
| Comment | C Style      |          | Turning     |          | Turning |       |       |       |       |   | Turning   |   |   |   |
| MTCNN   | Code #       |          | Code #      |          | H       | W     | L     | h     | E     |  |  |  |  |  |
|         | Code #       | Price \$ | Code #      | Price \$ |         |       |       |       |       |   |   |   |   |   |
| 12-4B   | 145859       | 264.75   |             |          | 0.750   | 0.750 | 4.500 | 0.750 | 1.430 | TN □ □ 43 □   | CL-12<br>146917<br>\$ 10.00   | XNS-59<br>146921<br>\$ 2.38   | ITSN-432<br>146901<br>\$ 12.05  | NL-46<br>146912<br>\$ 5.04  |

► P. E24-27, E41





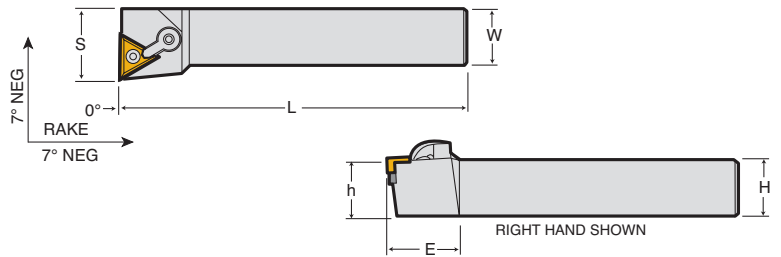
## MTENN



| Ref     | Holder Style                |          | Application      |       |       |       |       |       |         | Inserts | Parts   |          |        |  |
|---------|-----------------------------|----------|------------------|-------|-------|-------|-------|-------|---------|---------|---------|----------|--------|--|
| Comment | E Style, Approach Angle 60° |          | Turning, Copying |       |       |       |       |       |         |         |         |          |        |  |
| MTENN   | Code #                      | Price \$ | H                | W     | L     | S     | h     | E     | Clamp   |         |         |          |        |  |
| 10-3B   | 145889                      | 139.51   | 0.625            | 0.625 | 4.500 | 0.313 | 0.625 | 1.125 | TN□□33□ | CL-6    | XNS-36  | ITSN-332 | NL-34L |  |
| 12-3B   | 145890                      | 153.34   | 0.750            | 0.750 | 4.500 | 0.375 | 0.750 | 1.125 |         | 146915  | 146919  | 147114   | 146911 |  |
| 16-4D   | 145754                      | 233.08   | 1.000            | 1.000 | 6.000 | 0.500 | 1.000 | 1.250 | TN□□43□ | CL-9    | XNS-59  | ITSN-432 | NL-46  |  |
|         |                             |          |                  |       |       |       |       |       |         | 146916  | 146921  | 146901   | 146912 |  |
| 20-5D   | 145896                      | 177.14   | 1.250            | 1.250 | 6.000 | 0.625 | 1.250 | 1.625 | TN□□54□ | CL-9    | XNS-510 | ITSN-533 | NL-58  |  |
|         |                             |          |                  |       |       |       |       |       |         | 146916  | 146920  | 146902   | 146913 |  |

► P. E24-27, E38, E41

## MTFNR/L



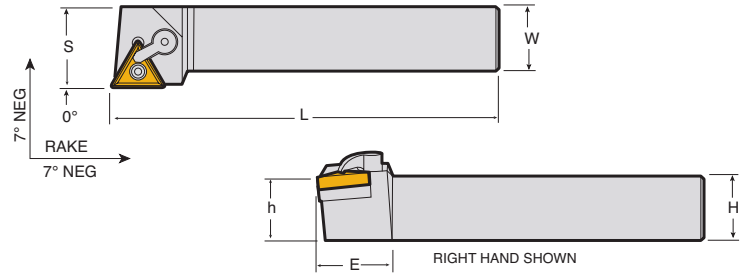
| Ref     | Holder Style                |        | Application |        |       |       |       |       |       | Inserts | Parts   |        |         |          |             |
|---------|-----------------------------|--------|-------------|--------|-------|-------|-------|-------|-------|---------|---------|--------|---------|----------|-------------|
| Comment | F Style, Approach Angle 90° |        | Facing      |        |       |       |       |       |       |         |         |        |         |          |             |
| MTFNR/L | Code #                      | Code # | H           | W      | L     | S     | h     | E     | Clamp |         |         |        |         |          | Clamp Screw |
| 12-3B   | 145760                      | 99.01  | 145761      | 99.01  | 0.750 | 0.750 | 4.500 | 1.000 | 0.750 | 0.787   | TN□□33□ | CL-20  | XNS-48  | ITSN-332 | NL-34L      |
| 16-3D   | 145787                      | 222.45 |             |        | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 0.787   |         | 146918 | 146922  | 147114   | 146911      |
| 16-4D   | 147370                      | 98.34  | 147272      | 222.45 | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 0.984   | TN□□43□ | CL-20  | XNS-48  | ITSN-433 | NL-46       |
|         |                             |        |             |        |       |       |       |       |       |         |         | 146918 | 146922  | 146977   | 146912      |
| 20-5D   | 147277                      | 204.79 | 147273      | 177.14 | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.299   | TN□□54□ | CL-12  | XNS-510 | ITSN-533 | NL-58       |
|         |                             |        |             |        |       |       |       |       |       |         |         | 146917 | 146920  | 146902   | 146913      |

► P. E24-27, E38, E41

## MTGNR/L



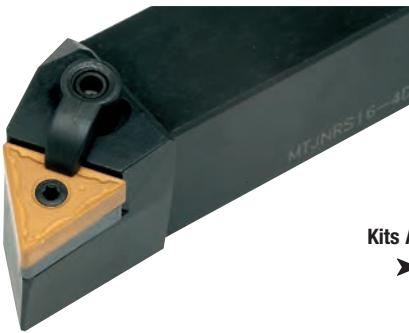
Kits Also Available  
➤ P. E168



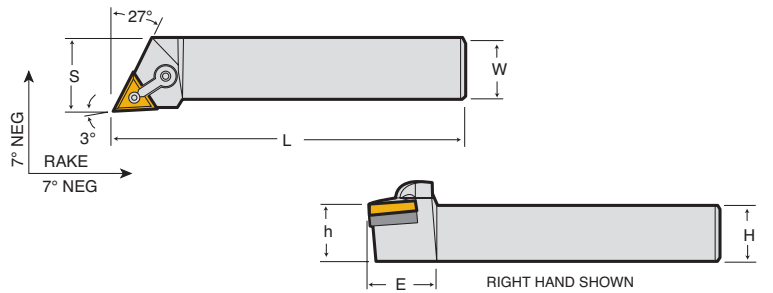
| Ref     | Holder Style                |          |        |          | Application |       |       |       |       |       | Inserts     | Parts                       |                              |                                |                             |
|---------|-----------------------------|----------|--------|----------|-------------|-------|-------|-------|-------|-------|-------------|-----------------------------|------------------------------|--------------------------------|-----------------------------|
| Comment | G Style, Approach Angle 90° |          |        |          | Turning     |       |       |       |       |       |             |                             |                              |                                |                             |
| MTGNR/L | Code #                      |          | Code # |          | H           | W     | L     | S     | h     | E     |             |                             |                              |                                |                             |
|         | Right                       | Price \$ | Left   | Price \$ |             |       |       |       |       |       | Clamp       | Clamp Screw                 | Shim                         | Pin                            |                             |
| 10-3B   | 145861                      | 139.51   | 145862 | 139.51   | 0.625       | 0.625 | 4.500 | 0.875 | 0.625 | 1.120 | TN □ □ 33 □ | CL-6<br>146915<br>\$ 10.00  | XNS-36<br>146919<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 12-3B   | 145863                      | 201.98   | 145864 | 201.98   | 0.750       | 0.750 | 4.500 | 1.000 | 0.750 | 1.120 |             | CL-9<br>146916<br>\$ 9.75   | XNS-59<br>146921<br>\$ 2.38  | ITSN-432<br>146901<br>\$ 12.05 | NL-46<br>146912<br>\$ 5.04  |
| 16-3D   | 145812                      | 222.45   | 145813 | 222.45   | 1.000       | 1.000 | 6.000 | 1.250 | 1.000 | 1.120 |             | CL-12<br>146917<br>\$ 10.00 | XNS-510<br>146920<br>\$ 2.38 | ITSN-533<br>146902<br>\$ 15.93 | NL-58<br>146913<br>\$ 5.61  |
| 16-4D   | 145814                      | 222.45   | 145815 | 222.45   | 1.000       | 1.000 | 6.000 | 1.250 | 1.000 | 1.300 | TN □ □ 43 □ | CL-6<br>146915<br>\$ 10.00  | XNS-36<br>146919<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 20-4D   | 145816                      | 267.05   | 145817 | 267.05   | 1.250       | 1.250 | 6.000 | 1.500 | 1.250 | 1.300 |             | CL-20<br>146918<br>\$ 10.00 | XNS-48<br>146922<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 16-5D   | 145730                      | 186.35   |        |          | 1.000       | 1.000 | 6.000 | 1.250 | 1.000 | 1.440 | TN □ □ 54 □ | CL-20<br>146918<br>\$ 10.00 | XNS-48<br>146922<br>\$ 2.31  | ITSN-432<br>146901<br>\$ 12.05 | NL-46<br>146912<br>\$ 5.04  |
| 20-5D   | 145818                      | 184.44   | 145819 | 184.44   | 1.250       | 1.250 | 6.000 | 1.500 | 1.250 | 1.440 |             | CL-12<br>146917<br>\$ 10.00 | XNS-510<br>146920<br>\$ 2.38 | ITSN-533<br>146902<br>\$ 15.93 | NL-58<br>146913<br>\$ 5.61  |

➤ P. E24-27, E41

## MTJNR/L



Kits Also Available  
➤ P. E169

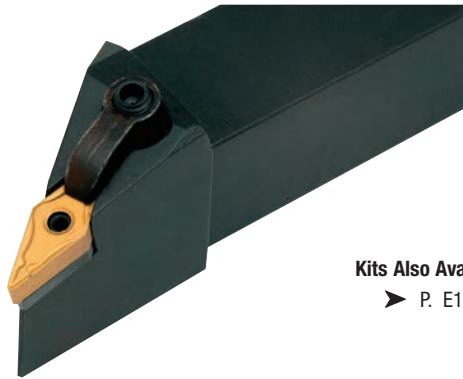


| Ref     | Holder Style                |          |        |          | Application              |       |       |       |       |       | Inserts     | Parts                       |                              |                                |                             |
|---------|-----------------------------|----------|--------|----------|--------------------------|-------|-------|-------|-------|-------|-------------|-----------------------------|------------------------------|--------------------------------|-----------------------------|
| Comment | J Style, Approach Angle 93° |          |        |          | Turning, Copying, Facing |       |       |       |       |       |             |                             |                              |                                |                             |
| MTJNR/L | Code #                      |          | Code # |          | H                        | W     | L     | S     | h     | E     |             |                             |                              |                                |                             |
|         | Right                       | Price \$ | Left   | Price \$ |                          |       |       |       |       |       | Clamp       | Clamp Screw                 | Shim                         | Pin                            |                             |
| 10-3B   | 145891                      | 182.32   | 145892 | 182.31   | 0.625                    | 0.625 | 4.500 | 0.875 | 0.625 | 1.120 | TN □ □ 33 □ | CL-6<br>146915<br>\$ 10.00  | XNS-36<br>146919<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 12-3D   | 145887                      | 208.48   | 145888 | 208.48   | 0.750                    | 0.750 | 6.000 | 1.000 | 0.750 | 1.100 |             | CL-20<br>146918<br>\$ 10.00 | XNS-48<br>146922<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 16-3D   | 145783                      | 229.61   | 148323 | 140.49   | 1.000                    | 1.000 | 6.000 | 1.250 | 1.000 | 1.299 |             | CL-20<br>146918<br>\$ 10.00 | XNS-48<br>146922<br>\$ 2.31  | ITSN-332<br>147114<br>\$ 7.78  | NL-34L<br>146911<br>\$ 5.47 |
| 16-4D   | 145757                      | 229.61   | 145756 | 229.61   | 1.000                    | 1.000 | 6.000 | 1.250 | 1.000 | 1.325 | TN □ □ 43 □ | CL-20<br>146918<br>\$ 10.00 | XNS-48<br>146922<br>\$ 2.31  | ITSN-432<br>146901<br>\$ 12.05 | NL-46<br>146912<br>\$ 5.04  |
| 20-4D   | 147147                      | 275.85   | 147213 | 275.85   | 1.250                    | 1.250 | 6.000 | 1.500 | 1.250 | 1.325 |             | CL-12<br>146917<br>\$ 10.00 | XNS-510<br>146920<br>\$ 2.38 | ITSN-533<br>146902<br>\$ 15.93 | NL-58<br>146913<br>\$ 5.61  |
| 20-5D   | 147033                      | 177.14   | 147035 | 161.04   | 1.250                    | 1.250 | 6.000 | 1.500 | 1.250 | 1.440 | TN □ □ 54 □ | CL-12<br>146917<br>\$ 10.00 | XNS-510<br>146920<br>\$ 2.38 | ITSN-533<br>146902<br>\$ 15.93 | NL-58<br>146913<br>\$ 5.61  |

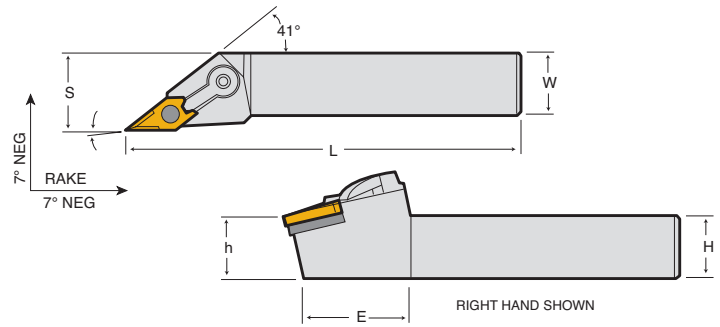
➤ P. E24-27, E41

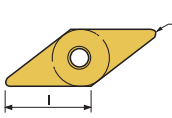




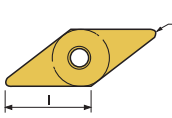






## MVJNR/L



Kits Also Available  
➤ P. E169



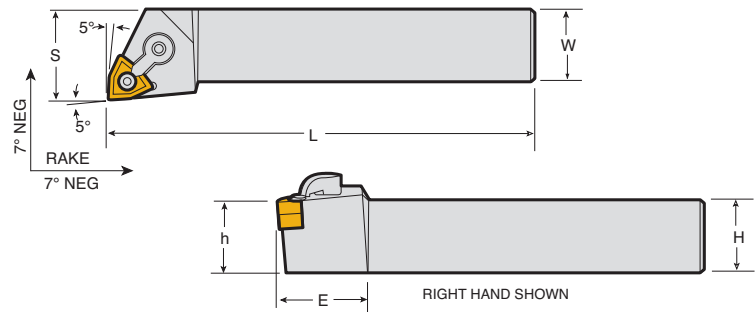
| Ref     | Holder Style                |          | Application      |          |       |       |       |       |       |       | Inserts   |   |   |   | Parts   |  |  |  |
|---------|-----------------------------|----------|------------------|----------|-------|-------|-------|-------|-------|-------|---|---|---|---|---|--|--|--|
| Comment | J Style, Approach Angle 93° |          | Turning, Copying |          |       |       |       |       |       |       |      |   |   |   |   |  |  |  |
| MVJNR/L | Code #                      |          | Code #           |          | H     | W     | L     | S     | h     | E     |    |  |  |  |  |  |  |  |
|         | Right                       | Price \$ | Left             | Price \$ |       |       |       |       |       |       |   |   |   |   |   |  |  |  |
| 12-3C   | 147265                      | 140.08   | 147417           | 140.08   | 0.750 | 0.750 | 5.000 | 1.000 | 0.750 | 1.660 | VN□□33□   | CL-30   | XNS-59  | IVSN-322  | NL-34L  |  |  |  |
| 16-3D   | 145893                      | 238.66   | 145738           | 238.66   | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 1.660 |   | 147214<br>\$ 17.69  | 146921<br>\$ 2.38   | 146983<br>\$ 8.65   | 146911<br>\$ 5.47   |  |  |  |
| 20-4D   | 147226                      | 160.88   | 147225           | 157.66   | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 2.000 | VN□□43□   | CL-30   | XNS-510   | IVSN-433  | NL-46   |  |  |  |
|         |                             |          |                  |          |       |       |       |       |       |       |   | 147214<br>\$ 17.69  | 146920<br>\$ 2.38   | 148287<br>\$ 11.57  | 146912<br>\$ 5.04   |  |  |  |

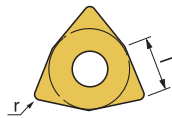




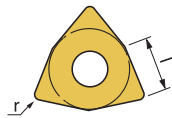




➤ P. E29, E38

## MWLNLR/L



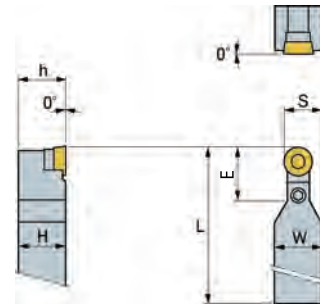
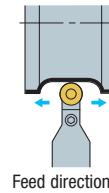
Kits Also Available  
➤ P. E169



| Ref      | Holder Style                |          | Application     |          |       |       |       |       |       |       | Inserts   |   |   |   | Parts   |  |  |  |
|----------|-----------------------------|----------|-----------------|----------|-------|-------|-------|-------|-------|-------|---|---|---|---|---|--|--|--|
| Comment  | L Style, Approach Angle 95° |          | Turning, Facing |          |       |       |       |       |       |       |      |   |   |   |   |  |  |  |
| MWLNLR/L | Code #                      |          | Code #          |          | H     | W     | L     | S     | h     | E     |    |  |  |  |  |  |  |  |
|          | Right                       | Price \$ | Left            | Price \$ |       |       |       |       |       |       |   |   |   |   |   |  |  |  |
| 12-3B    | 145744                      | 139.51   | 147148          | 197.58   | 0.750 | 0.750 | 4.500 | 1.000 | 0.750 | 1.000 | WN□□33□   | CL-6  | XNS-36  | IWSN-322  | NL-34L  |  |  |  |
| 12-4B    | 145875                      | 197.20   | 145876          | 197.20   | 0.750 | 0.750 | 4.500 | 1.000 | 0.750 | 1.250 | WN□□43□   | CL-20   | XNS-48  | IWSN-432  | NL-46   |  |  |  |
| 16-4D    | 145808                      | 153.63   | 145809          | 217.17   | 1.000 | 1.000 | 6.000 | 1.250 | 1.000 | 1.250 |   | 146918<br>\$ 10.00  | 146922<br>\$ 2.31   | 146906<br>\$ 20.58  | 146911<br>\$ 5.47   |  |  |  |
| 20-4D    | 145810                      | 260.72   | 145811          | 267.05   | 1.250 | 1.250 | 6.000 | 1.500 | 1.250 | 1.250 |   | 146918<br>\$ 10.00  | 146922<br>\$ 2.31   | 146906<br>\$ 15.58  | 146912<br>\$ 5.04   |  |  |  |

➤ P. E31-33

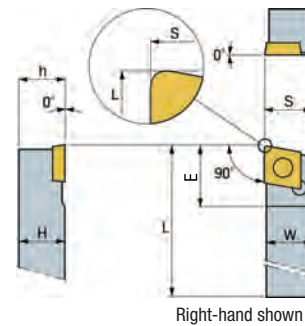
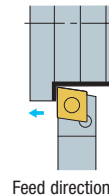
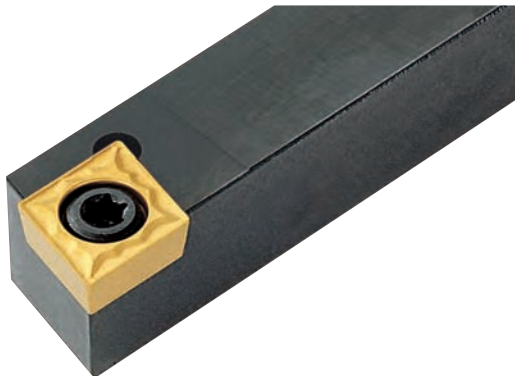
## PRDCN



| Ref     | Holder Style |          | Application      |       |       |       |       |       |              | Inserts                    | Parts                         |                           |                          |                            |  |
|---------|--------------|----------|------------------|-------|-------|-------|-------|-------|--------------|----------------------------|-------------------------------|---------------------------|--------------------------|----------------------------|--|
| Comment | D Style      |          | Turning, Copying |       |       |       |       |       |              |                            |                               |                           |                          |                            |  |
| PRDCN   | Code #       | Price \$ | H                | W     | L     | S     | h     | E     | Lever        |                            | Screw                         | Shim                      | Shim Pin                 | Wrench                     |  |
| 12-10B  | 148243       | 103.55   | 0.750            | 0.750 | 4.500 | 0.500 | 0.750 | 0.866 | RCMX 1003 M0 | LR10<br>148227<br>\$ 26.94 | VHX0514<br>148228<br>\$ 15.65 | SR10<br>148229<br>\$ 7.79 | SP3<br>146929<br>\$ 6.05 | HW20L<br>146954<br>\$ 3.28 |  |
| 16-12D  | 145719       | 114.10   | 1.000            | 1.000 | 6.000 | 0.728 | 1.000 | 0.945 | RCMX 1204 M0 | LR12<br>145723<br>\$ 26.94 | VHX0617<br>146926<br>\$ 13.34 | SR12<br>145725<br>\$ 7.79 | SP3<br>146929<br>\$ 6.05 | HW25L<br>146956<br>\$ 3.28 |  |

➤ P. E18, E36

## SCACR/L

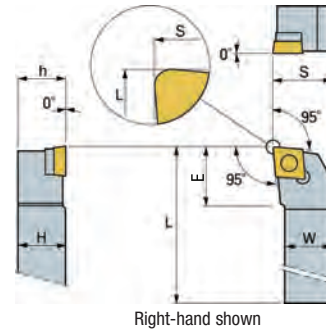
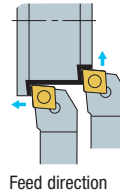


| Ref     | Holder Style                |                    | Application    |                    |       |       |       |       |       | Inserts | Parts     |                                 |        |   |                             |
|---------|-----------------------------|--------------------|----------------|--------------------|-------|-------|-------|-------|-------|---------|-----------|---------------------------------|--------|---|-----------------------------|
| Comment | A Style, Approach Angle 90° |                    | Turning        |                    |       |       |       |       |       |         |           |                                 |        |   |                             |
| SCACR/L | Code #                      | Code #             | H              | W                  | L     | S     | h     | E     | Screw |         | Shim      | Shim Screw                      | Wrench |   |                             |
| 08-3K   | Right<br>146327             | Price \$<br>140.01 | Left<br>145993 | Price \$<br>170.59 | 0.500 | 0.500 | 3.150 | 0.500 | 0.500 | 0.630   | CC□□32.5□ | FTGA03508<br>146931<br>\$ 14.82 | -      | - | TW15P<br>146940<br>\$ 17.45 |

➤ P. E8-9



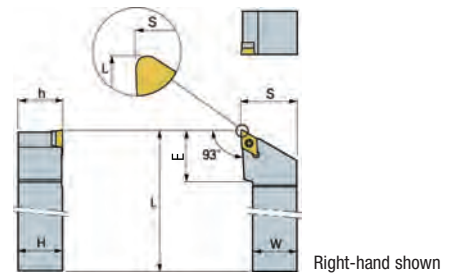
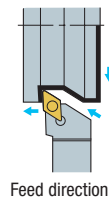
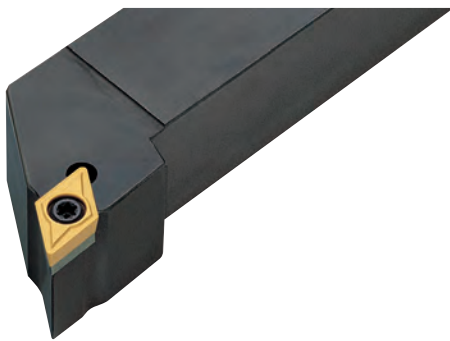
## SCLCR/L



| Ref     | Holder Style                |               | Application     |               | Inserts |       |       |       |       |       | Parts         |  |                                    |  |                                    |
|---------|-----------------------------|---------------|-----------------|---------------|---------|-------|-------|-------|-------|-------|---------------|--|------------------------------------|--|------------------------------------|
| Comment | L Style, Approach Angle 95° |               | Turning, Facing |               |         |       |       |       |       |       |               |  |                                    |  |                                    |
| SCLCR/L | Code #                      |               | Code #          |               |         |       |       |       |       |       | H             | W                                      | L                                  | S                                      | h                                  |
| 06-2J   | 146981                      | <b>86.32</b>  | 147291          | <b>73.10</b>  | 0.375   | 0.375 | 2.750 | 0.500 | 0.375 | 0.394 | CC □ T 21.5 □ | FTKA02565<br><b>146930</b><br>\$ 14.61 | -                                  | -                                      | TW07P<br><b>146939</b><br>\$ 16.73 |
| 08-2A   | 146784                      | <b>91.09</b>  | 146785          | <b>82.90</b>  | 0.500   | 0.500 | 4.000 | 0.625 | 0.500 | 0.490 | CC □ T 21.5 □ | FTKA02565<br><b>146930</b><br>\$ 14.61 | -                                  | -                                      | TW07P<br><b>146939</b><br>\$ 16.73 |
| 10-3A   | 146257                      | <b>91.59</b>  | 146787          | <b>121.46</b> | 0.625   | 0.625 | 4.000 | 0.750 | 0.625 | 0.630 | CC □ T 32.5 □ | FTGA03508<br><b>146931</b><br>\$ 14.82 | -                                  | -                                      | TW15P<br><b>146940</b><br>\$ 17.45 |
| 12-3B   | 146788                      | <b>148.04</b> | 147215          | <b>122.29</b> | 0.750   | 0.750 | 4.500 | 1.000 | 0.750 | 0.630 |               | FTGA03508<br><b>146931</b><br>\$ 14.82 | -                                  | -                                      | TW15P<br><b>146940</b><br>\$ 17.45 |
| 16-3D   | 146352                      | <b>100.46</b> | 146353          | <b>154.34</b> | 1.000   | 1.000 | 6.000 | 1.250 | 1.000 | 0.670 |               | FTGA03508<br><b>146931</b><br>\$ 14.82 | -                                  | -                                      | TW15P<br><b>146940</b><br>\$ 17.45 |
| 12-4B   | 145994                      | <b>170.68</b> | 146789          | <b>148.04</b> | 0.750   | 0.750 | 4.500 | 1.000 | 0.750 | 0.984 | CC □ T 43 □   | FTGA0411F<br><b>146944</b><br>\$ 13.62 | SC42S<br><b>146936</b><br>\$ 14.86 | SHXN0610F<br><b>145998</b><br>\$ 23.08 | TW15P<br><b>146940</b><br>\$ 17.45 |
| 16-4D   | 146790                      | <b>182.25</b> | 146791          | <b>158.09</b> | 1.000   | 1.000 | 6.000 | 1.250 | 1.000 | 1.024 |               | FTGA0411F<br><b>146944</b><br>\$ 13.62 | SC42S<br><b>146936</b><br>\$ 14.86 | SHXN0610F<br><b>145998</b><br>\$ 23.08 | TW15P<br><b>146940</b><br>\$ 17.45 |

► P. E34

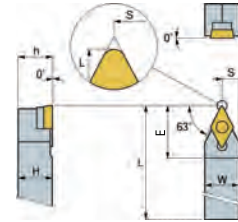
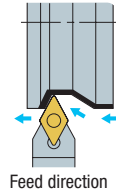
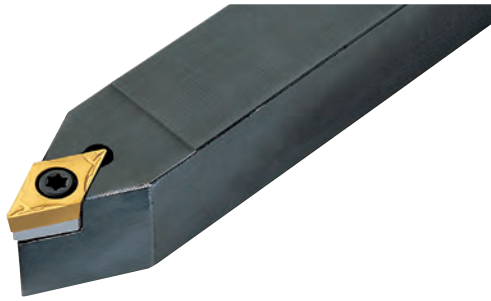
## SDJCR/L



| Ref     | Holder Style                |               | Application      |               | Inserts |       |       |       |       |       | Parts         |  |                                    |  |                                    |
|---------|-----------------------------|---------------|------------------|---------------|---------|-------|-------|-------|-------|-------|---------------|--|------------------------------------|--|------------------------------------|
| Comment | J Style, Approach Angle 93° |               | Turning, Copying |               |         |       |       |       |       |       |               |  |                                    |  |                                    |
| SDJCR/L | Code #                      |               | Code #           |               |         |       |       |       |       |       | H             | W                                      | L                                  | S                                      | h                                  |
| 12-3B   | 145798                      | <b>154.10</b> | 147146           | <b>140.08</b> | 0.750   | 0.750 | 4.500 | 1.000 | 0.750 | 0.945 | DC □ T 32.5 □ | FTGA03512<br><b>146933</b><br>\$ 14.82 | SD32S<br><b>146937</b><br>\$ 15.01 | SHXN0509F<br><b>146935</b><br>\$ 22.72 | TW15P<br><b>146940</b><br>\$ 17.45 |
| 16-3D   | 145985                      | <b>154.34</b> | 147230           | <b>154.34</b> | 1.000   | 1.000 | 6.000 | 1.250 | 1.000 | 1.142 |               | FTGA03512<br><b>146933</b><br>\$ 14.82 | SD32S<br><b>146937</b><br>\$ 15.01 | SHXN0509F<br><b>146935</b><br>\$ 22.72 | TW15P<br><b>146940</b><br>\$ 17.45 |

► P. E14, E35

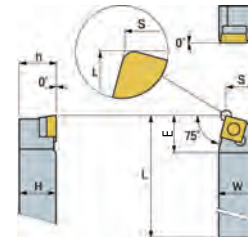
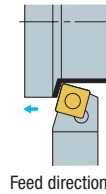
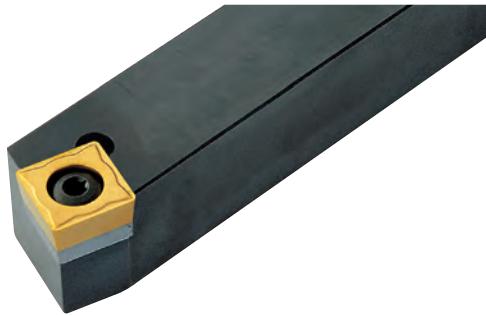
## SDNCN



| Ref     | Holder Style                |          | Application      |       |       |       |       |       |            | Inserts                         | Parts                       |                                 |                             |  |
|---------|-----------------------------|----------|------------------|-------|-------|-------|-------|-------|------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|--|
| Comment | N Style, Approach Angle 63° |          | Turning, Copying |       |       |       |       |       |            |                                 |                             |                                 |                             |  |
| SDNCN   | Code #                      | Price \$ | H                | W     | L     | S     | h     | E     | Screw      |                                 | Shim                        | Shim Screw                      | Wrench                      |  |
| 12-3B   | 145986                      | 166.64   | 0.750            | 0.750 | 4.500 | 0.375 | 0.750 | 1.181 | DC□T 32.5□ | FTGA03512<br>146933<br>\$ 14.82 | SD32S<br>146937<br>\$ 15.01 | SHXN0509F<br>146935<br>\$ 22.72 | TW15P<br>146940<br>\$ 17.45 |  |

► P. E14, E35

## SSBCR

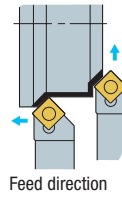


Right-hand shown

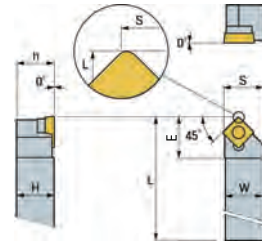
| Ref     | Holder Style                |        | Application |   |       |       |       |       |       | Inserts | Parts      |                                 |                             |                                 |                             |
|---------|-----------------------------|--------|-------------|---|-------|-------|-------|-------|-------|---------|------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|
| Comment | B Style, Approach Angle 75° |        | Turning     |   |       |       |       |       |       |         |            |                                 |                             |                                 |                             |
| SSBCR   | Code #                      | Code # | H           | W | L     | S     | h     | E     | Screw |         | Shim       | Shim Screw                      | Wrench                      |                                 |                             |
| 08-3K   | 145989                      | 140.01 |             |   | 0.500 | 0.500 | 3.150 | 0.450 | 0.500 | 0.630   | SC□T 32.5□ | FTGA03508<br>146931<br>\$ 14.82 | -                           | -                               | TW15P<br>146940<br>\$ 17.45 |
| 12-4B   | 145995                      | 170.68 |             |   | 0.750 | 0.750 | 4.500 | 0.600 | 0.750 | 0.984   | SC□T 43□   | FTGA0411F<br>146944<br>\$ 13.62 | SS42S<br>145997<br>\$ 15.01 | SHXN0610F<br>145998<br>\$ 23.08 | TW15P<br>146940<br>\$ 17.45 |

► P. E19, E36

## SSSCR



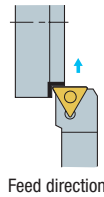
Right-hand shown



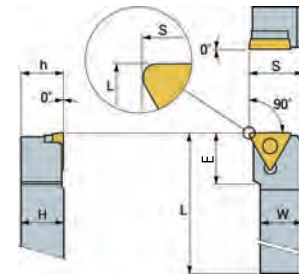
| Ref     | Holder Style                |          | Application     |          |       |       |       |       |       |       | Inserts       | Parts                           |                             |                                 |                             |
|---------|-----------------------------|----------|-----------------|----------|-------|-------|-------|-------|-------|-------|---------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|
| Comment | S Style, Approach Angle 45° |          | Turning, Facing |          |       |       |       |       |       |       |               |                                 |                             |                                 |                             |
| SSSCR   | Code #                      |          | Code #          |          | H     | W     | L     | S     | h     | E     |               |                                 |                             |                                 |                             |
|         | Right                       | Price \$ | Left            | Price \$ |       |       |       |       |       |       |               |                                 |                             |                                 |                             |
| 10-3A   | 145992                      | 140.01   |                 |          | 0.625 | 0.625 | 4.000 | 0.670 | 0.625 | 0.610 | SC □ T 32.5 □ | FTGA03512<br>146933<br>\$ 14.82 | -                           | -                               | TW15P<br>146940<br>\$ 17.45 |
| 12-4B   | 145996                      | 144.54   |                 |          | 0.750 | 0.750 | 4.500 | 0.659 | 0.750 | 0.945 | SC □ T 43 □   | FTGA0411F<br>146944<br>\$ 13.62 | SS42S<br>145997<br>\$ 15.01 | SHXN0610F<br>145998<br>\$ 23.08 | TW15P<br>146940<br>\$ 17.45 |

► P. E19, E36

## STFCR



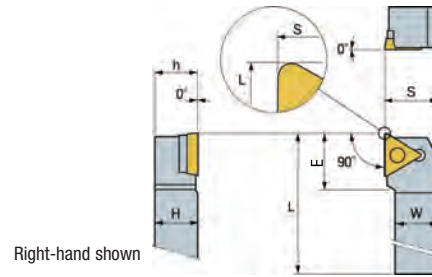
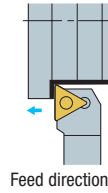
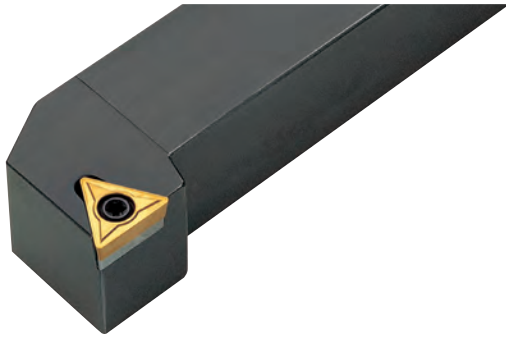
Right-hand shown



| Ref     | Holder Style                |          | Application |          |       |       |       |       |       |       | Inserts       | Parts                           |                             |                                 |                             |
|---------|-----------------------------|----------|-------------|----------|-------|-------|-------|-------|-------|-------|---------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|
| Comment | F Style, Approach Angle 90° |          | Facing      |          |       |       |       |       |       |       |               |                                 |                             |                                 |                             |
| STFCR   | Code #                      |          | Code #      |          | H     | W     | L     | S     | h     | E     |               |                                 |                             |                                 |                             |
|         | Right                       | Price \$ | Left        | Price \$ |       |       |       |       |       |       |               |                                 |                             |                                 |                             |
| 10-2A   | 145777                      | 186.39   |             |          | 0.625 | 0.625 | 4.000 | 0.750 | 0.625 | 0.551 | TC □ T 21.5 □ | FTKA02565<br>146930<br>\$ 14.61 | -                           | -                               | TW07P<br>146939<br>\$ 16.73 |
| 12-3B   | 145987                      | 170.68   |             |          | 0.750 | 0.750 | 4.500 | 1.000 | 0.750 | 0.748 | TC □ T 32.5 □ | FTGA03512<br>146933<br>\$ 14.82 | ST32S<br>145999<br>\$ 19.56 | SHXN0509F<br>146935<br>\$ 22.72 | TW15P<br>146940<br>\$ 17.45 |

► P. E22-24

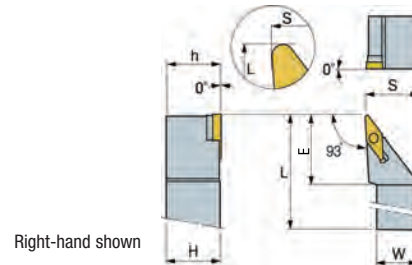
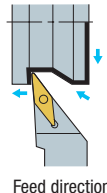
## STGCR/L



| Ref     | Holder Style                |          |        |          | Application |       |       |       |       |       | Inserts       | Parts                           |          |           |                             |
|---------|-----------------------------|----------|--------|----------|-------------|-------|-------|-------|-------|-------|---------------|---------------------------------|----------|-----------|-----------------------------|
| Comment | G Style, Approach Angle 90° |          |        |          | Turning     |       |       |       |       |       |               |                                 |          |           |                             |
| STGCR/L | Code #                      |          | Code # |          | H           | W     | L     | S     | h     | E     |               |                                 |          |           |                             |
|         | Right                       | Price \$ | Left   | Price \$ |             |       |       |       |       |       |               |                                 |          |           |                             |
| 08-2K   | 145988                      | 118.58   | 146713 | 121.46   | 0.500       | 0.500 | 3.150 | 0.625 | 0.500 | 0.551 | TC □ T 21.5 □ | FTKA02565<br>146930<br>\$ 14.61 | -        | -         | TW07P<br>146939<br>\$ 16.73 |
| 08-3K   | 145991                      | 166.64   | 146714 | 100.36   | 0.500       | 0.500 | 3.150 | 0.625 | 0.500 | 0.551 | TC □ T 32.5 □ | FTGA03512                       | ST32S    | SHXN0509F | TW15P                       |
| 12-3B   | 145991                      | 166.64   | 146715 | 170.68   | 0.750       | 0.750 | 4.500 | 1.000 | 0.750 | 0.827 |               | 146933                          | 145999   | 146935    | 146940                      |
| 16-3D   | 145793                      | 145.62   |        |          | 1.000       | 1.000 | 6.000 | 1.250 | 1.000 | 0.827 |               | \$ 14.82                        | \$ 19.56 | \$ 22.72  | \$ 17.45                    |

➤ P. E22-24

## SVJCR/L



| Ref     | Holder Style                |          |        |          | Application      |       |       |       |       |       | Inserts     | Parts     |          |           |          |
|---------|-----------------------------|----------|--------|----------|------------------|-------|-------|-------|-------|-------|-------------|-----------|----------|-----------|----------|
| Comment | J Style, Approach Angle 93° |          |        |          | Turning, Copying |       |       |       |       |       |             |           |          |           |          |
| SVJCR/L | Code #                      |          | Code # |          | H                | W     | L     | S     | h     | E     |             |           |          |           |          |
|         | Right                       | Price \$ | Left   | Price \$ |                  |       |       |       |       |       |             |           |          |           |          |
| 12-3C   | 148061                      | 144.54   |        |          | 0.750            | 0.750 | 5.000 | 1.000 | 0.750 | 1.575 | VC □ T 33 □ | FTGA03512 | SV32S    | SHXN0509F | TW15P    |
| 16-3D   | 147229                      | 125.57   | 147382 | 158.09   | 1.000            | 1.000 | 6.000 | 1.250 | 1.000 | 1.575 |             | 146933    | 146950   | 146935    | 146940   |
|         |                             |          |        |          |                  |       |       |       |       |       |             | \$ 14.82  | \$ 17.32 | \$ 22.72  | \$ 17.45 |

➤ P. E28

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.



| 1 Type of Bar |  |
|---------------|--|
| A             | Solid Steel with coolant hole  |
| B             | Solid Steel with anti-vibration  |
| C             | Carbide bar with fixed steel head  |
| D             | Solid steel bar with anti-vibration device and coolant hole                  |
| E             | Carbide bar with fixed steel head and coolant hole                           |
| G             | Carbide bar with fixed steel head and anti-vibration device and coolant hole |
| H             | Solid heavy metal bar  |
| J             | Solid heavy metal with coolant   |
| S             | Solid steel bar  |
| X             | Special bar  |

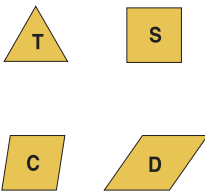
| 2 Bar Diameter   |       |        |
|--|-------|--------|
| Two characters to describe bar diameter (number of sixteenths) |       |        |
|  | 03    | 0.1875 |
|  | 04    | 0.250  |
|  | 05    | 0.3125 |
|  | 06    | 0.37   |
|  | 08    | 0.50   |
|  | 10    | 0.625  |
|  | 12    | 0.750  |
| 16   | 1.0   |        |
| 20   | 1.250 |        |
| 24   | 1.50  |        |
| 28   | 1.750 |        |
| 32   | 2.0   |        |
| 36   | 2.25  |        |
| 40   | 2.50  |        |



| 3 Type of Bar |                |      |
|---------------|----------------|------|
|               | F              | 3    |
|               | G              | 3.5  |
|               | H              | 4    |
|               | J              | 4.5  |
|               | K              | 5.0  |
|               | L              | 5.5  |
|               | M              | 6    |
|               | N              | 6.5  |
|               | P              | 6.75 |
|               | Q              | 7.0  |
|               | R              | 8.0  |
|               | S              | 10.3 |
|               | T              | 12.0 |
|               | U              | 14.0 |
|               | V              | 16.0 |
|               | W              | 18.0 |
| Y             | 20.0           |      |
| X             | Special length |      |

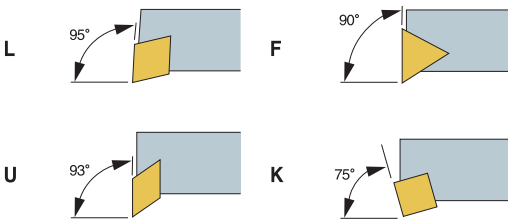
| 4 Method of Mounting Insert |                      |                              |                 |
|-----------------------------|----------------------|------------------------------|-----------------|
| <p>Top Clamping</p>         | <p>Hole Clamping</p> | <p>Top and Hole Clamping</p> | <p>Screw On</p> |
| <b>C</b>                    | <b>P</b>             | <b>M</b>                     | <b>S</b>        |

### 5 Insert Shape



|   |             |
|---|-------------|
| C | 80° Rhombic |
| D | 55° Rhombic |
| R | Round       |
| S | Square      |
| T | Triangle    |
| V | 35° Rhombic |
| W | 80° Trigon  |

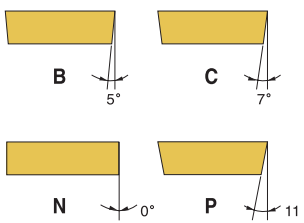
### 6 Bar Geometry



|   |        |   |                         |
|---|--------|---|-------------------------|
| F | 90°    | Q | 107.5°                  |
| K | 75°    | U | 93°                     |
| L | 95°    | S | 62.5°                   |
| P | 117.5° | Z | Negative 5° pull boring |

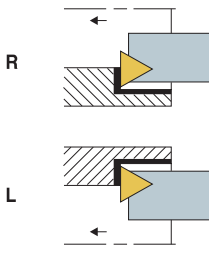


### 7 Insert Clearance Angle




|   |     |   |     |
|---|-----|---|-----|
| B | 5°  | F | 25° |
| C | 7°  | G | 30° |
| D | 15° | N | 0°  |
| E | 20° | P | 11° |

### 8 Hand of Bar



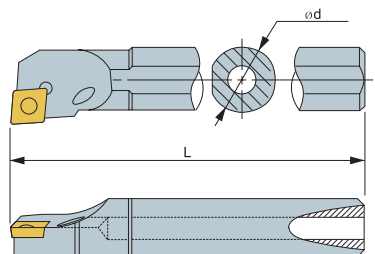
|   |            |
|---|------------|
| R | Right Hand |
| L | Left Hand  |
| N | Neutral    |

### 9 Insert Size IC



|     |        |    |       |
|-----|--------|----|-------|
| 1.2 | 0.156  | 4  | 0.5   |
| 1.5 | 0.188  | 5  | 0.625 |
| 1.8 | 0.219  | 6  | 0.75  |
| 2   | 0.25   | 8  | 1.0   |
| 2.5 | 0.3125 | 10 | 1.250 |
| 3   | 0.375  |    |       |

### Boring Bar with Coolant Hole



### 10 Manufacturing Option

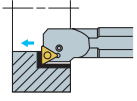
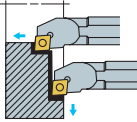
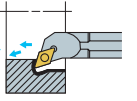
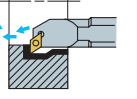
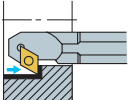
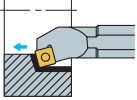
## Boring Bar Index



| Cutting Shape                              |  | Cat. No.   | Facing                | Copying | Through Hole Machining | Blind Hole Machining | Copying and Relief | Back Copying | Available Inserts  |
|--|--|--|-----------------------|---------|------------------------|----------------------|--------------------|--------------|--|
| <b>MCLNR/L</b><br><b>Clamp System</b>      |  | S10R-MCLNR/L3<br>S12U-MCLNR/L3<br>S16T-MCLNR/L3<br>S16T-MCLNR/L4<br>S20U-MCLNR/L4<br>S24V-MCLNR/L4<br>A16T-MCLNR/L4<br>A20U-MCLNR/L4   | •                     |         | •                      | •                    |                    |              | CN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 64 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/> |
|  |  | ➤ P. E64   | ➤ P. E10-12, E38-39   |         |                        |                      |                    |              |  |
| <b>MTFNR/L</b>                             |  | S20V-MTFNR-4<br>S32V-MTFNR-4<br>A16T-MTFNR/L-4   | •                     |         | •                      | •                    |                    |              | TN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br>43 <input type="checkbox"/><br>54 <input type="checkbox"/>   |
|  |  | ➤ P. E65   | ➤ P. E24-27, E41      |         |                        |                      |                    |              |  |
| <b>MTUNR/L</b>                             |  | S32V-MTUNR-4   | •                     |         | •                      | •                    |                    |              | TN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br>43 <input type="checkbox"/><br>54 <input type="checkbox"/>   |
|  |  | ➤ P. E65   | ➤ P. E24-27, E41      |         |                        |                      |                    |              |  |
| <b>MVUNR/L</b>                             |  | A16T-MVUNR/L-4   |                       | •       | •                      | •                    |                    |              | VN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/>   |
|  |  | ➤ P. E66   | ➤ P. E29              |         |                        |                      |                    |              |  |
| <b>MWLNRL/L</b>                            |  | S10R-MWLNRL/L3<br>S12U-MWLNRL/L3<br>S16T-MWLNRL/L3<br>S16T-MWLNRL/L4<br>S20U-MWLNRL/L4<br>S24V-MWLNRL/L4<br>A16T-MWLNRL/L4<br>A20U-MWLNRL/L4   | •                     |         | •                      | •                    |                    |              | WN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/>   |
|  |  | ➤ P. E66   | ➤ P. E31-33           |         |                        |                      |                    |              |  |
| <b>PCLNR/L</b><br><b>Lever Lock System</b> |  | S10R-PCLNR/L3<br>S12U-PCLNR/L3<br>S16T-PCLNR/L3<br>S16T-PCLNR/L4<br>S20U-PCLNR/L4<br>S24V-PCLNR/L4<br>S32W-PCLNR/L4<br>S32W-PCLNR/L6<br>A16R-PCLNR/L4<br>A20S-PCLNR/L4                 | •                     |         | •                      | •                    |                    |              | CN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 65 <input type="checkbox"/><br>CN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/> |
|  |  | ➤ P. E67   | ➤ P. E10-12, E38-39   |         |                        |                      |                    |              |  |
| <b>PDSNR</b>                               |  | S20U-PDSNR/L4<br>S24V-PDSNR/L4<br>S20U-PDSNR/L4-3<br>S24V-PDSNR/L4-3<br>A20S-PDSNR/L4<br>A20S-PDSNR/L4-3   |                       | •       | •                      |                      |                    |              | DN <input type="checkbox"/> <input type="checkbox"/> 44 <input type="checkbox"/><br>43 <input type="checkbox"/>  |
|  |  | ➤ P. E67   | ➤ P. E14-16, E39-40   |         |                        |                      |                    |              |  |
| <b>PDUNR</b>                               |  | S12S-PDUNR/L 3<br>S16T-PDUNR/L 3<br>S20U-PDUNR/L 3<br>S20U-PDUNR/L 4<br>S24V-PDUNR/L 4<br>S32W-PDUNR/L 4<br>S20U-PDUNR/L 4-3<br>S24V-PDUNR/L 4-3<br>A20S-PDUNR/L 4<br>A20S-PDUNR/L 4-3 |                       | •       | •                      | •                    |                    |              | DN <input type="checkbox"/> <input type="checkbox"/> 33 <input type="checkbox"/><br>44 <input type="checkbox"/><br>43 <input type="checkbox"/>   |
|  |  | ➤ P. E68   | ➤ P. E14-16, E39-40   |         |                        |                      |                    |              |  |
| <b>PSKNR/L</b>                             |  | S16T-PSKNR/L 4<br>S20U-PSKNR/L 4<br>S24V-PSKNR/L 4<br>A16R-PSKNR/L 4<br>A20S-PSKNR/L 4   |                       |         | •                      |                      |                    |              | SN <input type="checkbox"/> <input type="checkbox"/> 43 <input type="checkbox"/>   |
|  |  | ➤ P. E68   | ➤ P. E19-22, E38, E40 |         |                        |                      |                    |              |  |



## Boring Bar Index

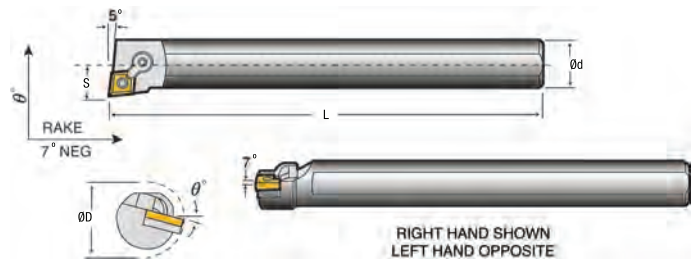
| Cutting Shape  | Cat. No.  | Facing   | Copying | Through Hole Machining | Blind Hole Machining | Copying and Relief | Back Copying | Available Inserts   |
|--|---|--|---------|------------------------|----------------------|--------------------|--------------|---|
| <b>PTFNR/L</b><br><b>Lever Lock System</b><br><br>P. E69 |    | S16T-PTFNR/L 2<br>S20S-PTFNR/L 2<br>S16T-PTFNR/L 2<br>S16T-PTFNR/L 3<br>S20U-PTFNR/L 3<br>S24V-PTFNR/L 3<br>A16R-PTFNR/L 3<br>A20S-PTFNR/L 3   | •       | •                      | •                    |                    |              | TN <input type="checkbox"/> 32 <input type="checkbox"/><br>33 <input type="checkbox"/>                                      |
|  |   |  |         |                        |                      |                    |              | P. E24-27, E38, E41   |
| <b>SCLCR/L</b><br><b>Screw On System</b><br><br>P. E69   |    | S05K-SCLCR/L 2<br>S06M-SCLCR/L 2<br>S08M-SCLCR/L 2<br>S08M-SCLCR/L 3<br>S10R-SCLCR/L 3<br>S12S-SCLCR/L 3<br>S16T-SCLCR/L 3<br>S16T-SCLCR/L 4<br>S20U-SCLCR/L 4<br>S24V-SCLCR/L 4<br>A05F-SCLCR/L 2<br>A06H-SCLCR/L 2<br>A08K-SCLCR/L 2<br>A08K-SCLCR/L 3<br>A10M-SCLCR/L 3<br>A12Q-SCLCR/L 3<br>A16R-SCLCR/L 3<br>A16R-SCLCR/L 4<br>A20S-SCLCR/L 4<br>C06-SCLCR/L 2<br>C08-SCLCR/L 2<br>C10-SCLCR/L 3<br>C12-SCLCR/L-3 | •       | •                      | •                    |                    |              | CC <input type="checkbox"/> T 21.5 <input type="checkbox"/><br>32.5 <input type="checkbox"/><br>43 <input type="checkbox"/> |
|  |   |  |         |                        |                      |                    |              | P. E8-9   |
| <b>SDQCR/L</b><br><br>P. E70                             |  | S16M-SDQCR/L 2<br>S08M-SDQCR/L 2<br>S10R-SDQCR/L 2<br>S12S-SDQCR/L 2<br>S10R-SDQCR/L 2<br>S16T-SDQCR/L 2<br>A06H-SDQCR/L 2<br>A08K-SDQCR/L 2<br>A10M-SDQCR/L 2<br>A12Q-SDQCR/L 2<br>A16R-SDQCR/L 2   | •       | •                      | •                    |                    |              | DC <input type="checkbox"/> T 21.5 <input type="checkbox"/><br>32.5 <input type="checkbox"/>                                |
|  |   |  |         |                        |                      |                    |              | P. E14  |
| <b>SDUCR</b><br><br>P. E70                               |  | S06M-SDUCR/L 2<br>S08M-SDUCR/L 2<br>S10R-SDUCR/L 3<br>S12S-SDUCR/L 3<br>S16T-SDUCR/L 3<br>S20U-SDUCR/L 3<br>A06H-SDUCR/L 2<br>A08K-SDUCR/L 2<br>A10M-SDUCR/L 2<br>A12Q-SDUCR/L 3<br>A16R-SDUCR/L 3<br>C06 SDUCR/L 2  | •       | •                      | •                    |                    |              | DC <input type="checkbox"/> T 21.5 <input type="checkbox"/><br>32.5 <input type="checkbox"/>                                |
|  |   |  |         |                        |                      |                    |              | P. E14  |
| <b>SDZCR/L</b><br><br>P. E71                             |  | S10R-SDZCR/L 2<br>S12R-SDZCR/L 2<br>S16T-SDZCR/L 3<br>S20U-SDZCR/L 3<br>S24V-SDZCR/L 3<br>A16R-SDZCR/L 3<br>A20S-SDZCR/L 3   | •       | •                      | •                    |                    |              | DC <input type="checkbox"/> T 43 <input type="checkbox"/>   |
|  |   |  |         |                        |                      |                    |              | P. E14  |
| <b>SSKCR/L</b><br><br>P. E71                             |  | S08M-SSKCR 3<br>S10R-SSKCR 3<br>S12S-SSKCR 3<br>S16T-SSKCR 4<br>S20U-SSKCR 4<br>A08K-SSKCR 3<br>A10M-SSKCR 3<br>A12Q-SSKCR 3<br>A16R-SSKCR 4<br>A20S-SSKCR 4   | •       | •                      | •                    |                    |              | SC <input type="checkbox"/> T 32.5 <input type="checkbox"/><br>43 <input type="checkbox"/>                                  |
|  |   |  |         |                        |                      |                    |              | P. E19  |

## Boring Bar Index



| Cutting Shape   | Cat. No.  | Facing                         | Copying  | Through Hole Machining         | Blind Hole Machining                                   | Copying and Relief | Back Copying | Available Inserts                      |  |                |
|---|---|--------------------------------|--|--------------------------------|--|--------------------|--------------|--|--|----------------|
| <b>STFCR/L</b><br><br><span style="background-color: #0056b3; color: white; padding: 2px;">Screw On System</span> | <br>S06M-STFCR/L 1.8<br>S08M-STFCR/L 1.8<br>S08M-STFCR/L 2<br>S10R-STFCR/L 2<br>S12S-STFCR/L 2<br>S12S-STFCR/L 3<br>S16T-STFCR/L 3<br>S20U-STFCR/L 3<br>S24V-STFCR/L 3<br>A06H-STFCR/L 1.8<br>A08K-STFCR/L 1.8<br>A08K-STFCR/L 2<br>A10M-STFCR/L 2<br>A12Q-STFCR/L 2<br>A16R-STFCR/L 3<br>A20S-STFCR/L 3<br>C06-STFCR/L 2<br>C08-STFCR/L 2<br>C10-STFCR/L-3 | •                              |  |                                |  |                    |              | TC □ T    1.81.5 □<br>21.5 □<br>32.5 □ |  |                |
|   |   | ▶ P. E72                       | ▶ P. E22-24  |                                |  |                    |              |  |  |                |
|   |   | <b>SVQBR</b><br><br>▶ P. E72   | <br>S20U-SVQBR/L 3<br>S24V-SVQBR /L 3<br>A20S-SVQBR /L 3                 |                                |  |                    |              | •                                      |  | VB □ T    33 □ |
|   |   |                                |  | ▶ P. E27                       |  |                    |              |  |  |                |
|   |   |                                |  | <b>SVUBR/L</b><br><br>▶ P. E73 | <br>S20U-SVUBR/L 3<br>S24V-SVUBR/L 3<br>A20S-SVUBR/L 3 |                    | •            | •                                      |  | •              |
|   |   | ▶ P. E27                       |  |                                |  |                    |              |  |  |                |
|   |   | <b>SWLCR/L</b><br><br>▶ P. E73 | <br>S16T-SWLCR/L 4<br>S20U-SWLCR/L 4<br>A16R-SWLCR/L 4<br>A20S-SWLCR/L 4 | •                              |  |                    |              |  |  | WCMT    43 □   |
|   |   |                                |  | ▶ P. E30                       |  |                    |              |  |  |                |

## MCLNR/L

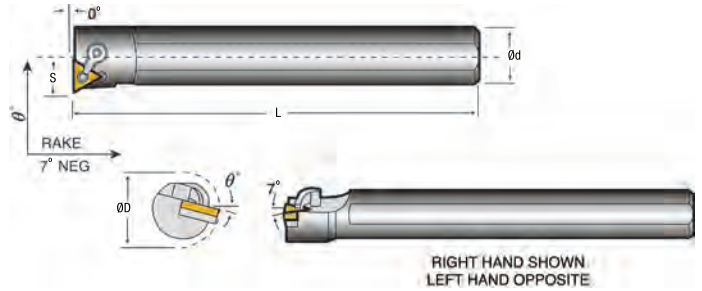


| Ref             | Holder Style                |        | Application                                |        |       |      |      |       |     | Inserts         | Parts   |             |         |     |
|-----------------|-----------------------------|--------|--|--------|-------|------|------|-------|-----|-----------------|---------|-------------|---------|-----|
| Comment         | L Style, Approach Angle 95° |        | Facing, Through Hole, Blind Hole Machining |        |       |      |      |       |     | <br>CN □ □ 43 □ |         |             |         |     |
| Designation     | Code #                      |        | Code #                                     |        | ØD    | Ød   | L    | S     | θ°  |                 | Clamp   | Clamp Screw | Shim    | Pin |
| S16T-MCLNR/L4   | 145872                      | 301.95 | 145871                                     | 244.28 | 1.280 | 1.00 | 12.0 | 0.640 | 14° | CL-20           | XNS-48  | ICSN-432    | NL-46   |     |
| S20U-MCLNR/L4   | 145874                      | 427.84 | 145873                                     | 363.16 | 1.530 | 1.25 | 14.0 | 0.765 | 14° | 146918          | 146922  | 146908      | 146912  |     |
| S24U-MCLNR/L4   | 145884                      | 563.14 | 145762                                     | 445.25 | 1.780 | 1.50 | 14.0 | 0.890 | 11° | \$ 10.00        | \$ 2.31 | \$ 10.96    | \$ 5.04 |     |
| S32V-MCLNR/L4   | 147270                      | 631.77 | -  | -      | 2.400 | 2.00 | 16.0 | 1.281 | 11° |                 |         |             |         |     |
| * A16T-MCLNR/L4 | 148363                      | 318.02 | 148364                                     | 325.74 | 1.280 | 1.00 | 12.0 | 0.640 |     | CL-20           | XNS-48  | ICSN-432    | NL-46   |     |
| * A20U-MCLNR/L4 | 148365                      | 354.56 | 148367                                     | 363.16 | 1.530 | 1.25 | 14.0 | 0.765 |     | 146918          | 146922  | 146908      | 146912  |     |
|                 |                             |        |  |        |       |      |      |       |     | \$ 10.00        | \$ 2.31 | \$ 10.96    | \$ 5.04 |     |

\* Coolant Hole Boring Bar

▶ P. E10-12, E38-39

## MTFNR/L

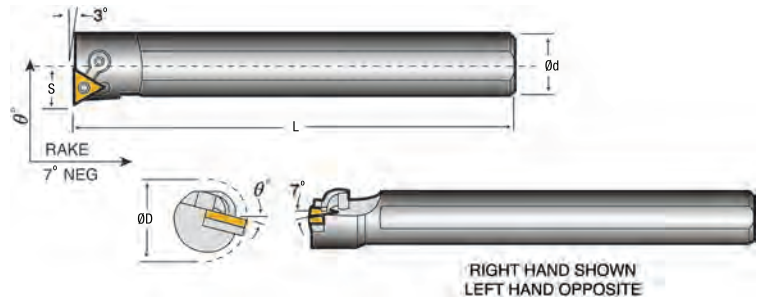


| Ref              | Holder Style                  |        | Application                                |        |       |      |      | Inserts |     |          |         | Parts   |          |         |  |
|------------------|-------------------------------|--------|--|--------|-------|------|------|---------|-----|----------|---------|---------|----------|---------|--|
| Comment          | F Style 90° End Cutting Angle |        | Facing, Through Hole, Blind Hole Machining |        |       |      |      |         |     |          |         |         |          |         |  |
| Designation      | Code #                        |        | Code #                                     |        | ØD    | Ød   | L    |         |     |          |         |         |          |         |  |
| S20U-MTFNR-4     | 147271                        | 331.95 |  |        | 1.470 | 1.25 | 14.0 | 0.765   | 10° | TNM□□43□ | CL-20   | XNS-48  | ITSN-432 | NL-46   |  |
| S32U-MTFNR-4     | 145882                        | 662.49 |  |        | 2.562 | 2.00 | 16.0 | 1.281   | 11° |          | 146918  | 146922  | 146901   | 146912  |  |
| ※ A16T-MTFNR/L-4 |                               |        | 148371                                     | 127.32 | 1.280 | 1.00 | 12.0 | 0.641   | 10° |          | CL-9    | XNS-59  | ITSN-432 | NL-46   |  |
|                  |                               |        |  |        |       |      |      |         |     |          | 146916  | 146921  | 146901   | 146912  |  |
|                  |                               |        |  |        |       |      |      |         |     |          | \$ 9.75 | \$ 2.38 | \$ 12.05 | \$ 5.04 |  |

※ Coolant Hole Boring Bar

► P. E24-27, E41

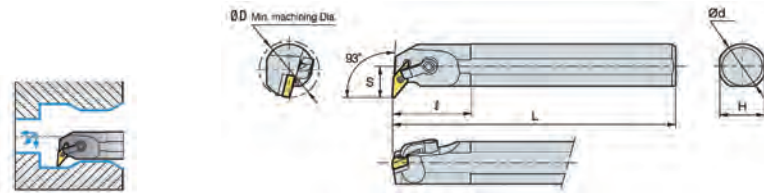
## MTUNR

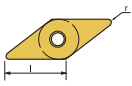






| Ref          | Holder Style                    |          | Application                                |  |       |      |      | Inserts |     |          |         | Parts   |          |         |  |
|--------------|---------------------------------|----------|--|--|-------|------|------|---------|-----|----------|---------|---------|----------|---------|--|
| Comment      | Neg. 3° Edge Cutting Edge Angle |          | Facing, Through Hole, Blind Hole Machining |  |       |      |      |         |     |          |         |         |          |         |  |
| Designation  | Code #                          |          | Code #                                     |  | ØD    | Ød   | L    |         |     |          |         |         |          |         |  |
| S24U-MTUNR-4 | 145772                          | 890.65   |  |  | 2.000 | 1.50 | 14.0 | 1.125   | 11° | TNM□□43□ | CL-20   | XNS-48  | ITSN-432 | NL-46   |  |
|              |                                 |          |  |  |       |      |      |         |     |          | 146918  | 146922  | 146901   | 146912  |  |
| S32U-MTUNR-4 | 145883                          | 1,246.14 |  |  | 2.562 | 2.00 | 14.0 | 1.281   | 11° |          | CL-9    | XNS-59  | ITSN-432 | NL-46   |  |
|              |                                 |          |  |  |       |      |      |         |     |          | 146916  | 146921  | 146901   | 146912  |  |
|              |                                 |          |  |  |       |      |      |         |     |          | \$ 9.75 | \$ 2.38 | \$ 12.05 | \$ 5.04 |  |

► P. E24-27, E41

## MVUNR/L

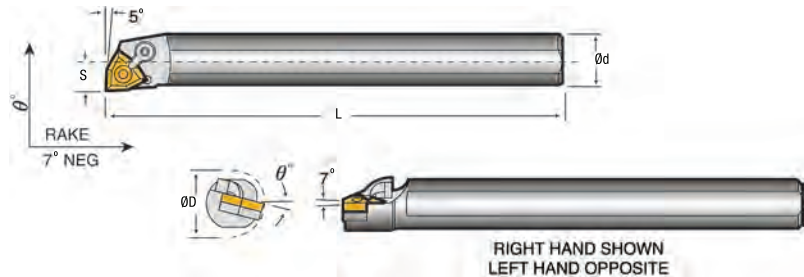







| Ref              | Holder Style                |          | Application                                 |          |       |    |     |       |       | Inserts  | Parts   |   |   |   |                            |
|------------------|-----------------------------|----------|---|----------|-------|----|-----|-------|-------|--|---|---|---|---|----------------------------|
| Comment          | U Style, Approach Angle 93° |          | Copying, Through Hole, Blind Hole Machining |          |       |    |     |       |       |  |  |  |  |  |                            |
| Designation      | Code #                      |          | Code #                                      |          | ØD    | Ød | L   | S     | H     |  | ℓ   | Clamp   | Clamp Screw   | Shim  | Pin                        |
|                  | Right                       | Price \$ | Left  | Price \$ |       |    |     |       |       |  |   |   |   |   |                            |
| * A16T-MVUNR/L-4 | 148361                      | 570.79   |   |          | 1.200 | 1  | 8.0 | 0.640 | 0.921 | 1.417  | VN□□43□   | CL-30<br>147214<br>\$ 17.69   | XNS-59<br>146921<br>\$ 2.38   | IVSN-433<br>148287<br>\$ 11.57  | NL-46<br>146912<br>\$ 5.04 |

\* Coolant Hole Boring Bar

► P. E29

## MWLNR/L

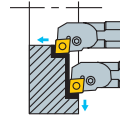


| Ref              | Holder Style                |          | Application                                |          |       |      |      |       |     | Inserts  | Parts   |   |   |   |
|------------------|-----------------------------|----------|--|----------|-------|------|------|-------|-----|--|---|---|---|---|
| Comment          | L Style, Approach Angle 95° |          | Facing, Through Hole, Blind Hole Machining |          |       |      |      |       |     |  |  |  |  |  |
| Designation      | Code #                      |          | Code #                                     |          | ØD    | Ød   | L    | S     | θ°  |  | Clamp   | Clamp Screw   | Shim  | Pin   |
|                  | Right                       | Price \$ | Left                                       | Price \$ |       |      |      |       |     |  |   |   |   |   |
| S16T-MWLNR/L-4   | 145881                      | 329.03   | 145879                                     | 407.97   | 1.280 | 1.00 | 12.0 | 0.640 | 14° | WNM□□43□   | CL-20<br>146918<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | -   | NL-44<br>146985<br>\$ 5.47  |
| S20U-MWLNR/L-4   | 145877                      | 359.93   | 145878                                     | 335.44   | 1.530 | 1.25 | 14.0 | 0.765 | 14° |  | CL-20<br>146918<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | IWSN-432<br>146906<br>\$ 15.58  | NL-46<br>146912<br>\$ 5.04  |
| S24U-MWLNR/L-4   | 145865                      | 412.98   | 145880                                     | 412.98   | 1.780 | 1.50 | 14.0 | 0.890 | 11° |  | CL-20<br>146918<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | IWSN-432<br>146906<br>\$ 15.58  | NL-46<br>146912<br>\$ 5.04  |
| * A16T-MWLNR/L-4 | 148353                      | 295.71   | 148354                                     | 302.88   | 1.280 | 1.00 | 12.0 | 0.640 |     |  | CL-20<br>146918<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | IWSN-432<br>146906<br>\$ 15.58  | NL-46<br>146912<br>\$ 5.04  |
| * A20U-MWLNR/L-4 | 148355                      | 568.35   | 148356                                     | 335.44   | 1.530 | 1.25 | 14.0 | 0.765 |     |  | CL-20<br>146918<br>\$ 10.00   | XNS-48<br>146922<br>\$ 2.31   | IWSN-432<br>146906<br>\$ 15.58  | NL-46<br>146912<br>\$ 5.04  |

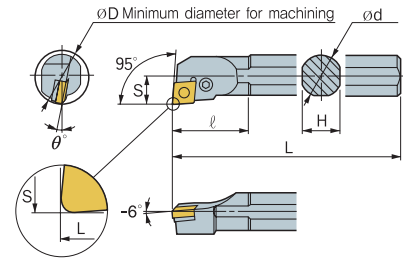
\* Coolant Hole Boring Bar

► P. E31-33

## PCLNR/L



Feed direction

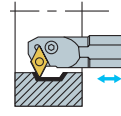


Right-hand shown

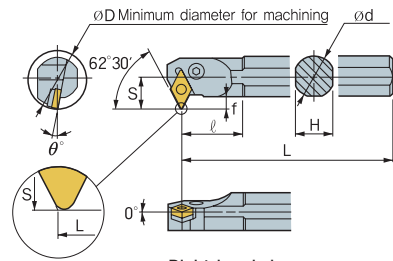
| Ref            | Holder Style                |          |        |          | Application                                |       |       |      |       |      |       | Inserts     | Parts                          |                            |                            |                             |                          |
|----------------|-----------------------------|----------|--------|----------|--|-------|-------|------|-------|------|-------|-------------|--------------------------------|----------------------------|----------------------------|-----------------------------|--------------------------|
| Comment        | L Style, Approach Angle 95° |          |        |          | Facing, Through Hole, Blind Hole Machining |       |       |      |       |      |       |             |                                |                            |                            |                             |                          |
| Designation    | Code #                      |          | Code # |          | ØD   | Ød    | H     | L    | S     | θ°   | l     |             |                                |                            |                            |                             |                          |
|                | Right                       | Price \$ | Left   | Price \$ |  |       |       |      |       |      |       |             |                                |                            |                            |                             |                          |
| S16T-PCLNR/L-4 | 145903                      | 219.48   | 145904 | 223.84   | 1.200                                      | 1.000 | 0.921 | 12.0 | 0.640 | -12° | 1.575 | CN □ □ 43 □ | VHX0613A<br>146941<br>\$ 19.57 | HW25L<br>146956<br>\$ 3.28 | LV4A<br>146942<br>\$ 26.71 | -                           | -                        |
| S20U-PCLNR/L-4 | 145905                      | 284.02   | -      | -        | 1.470                                      | 1.250 | 1.171 | 14.0 | 0.765 | -11° | 1.969 |             | VHX0821<br>146925<br>\$ 14.82  | HW30L<br>146953<br>\$ 3.73 | LV4<br>146924<br>\$ 22.57  | SC42B<br>146943<br>\$ 15.01 | SP4<br>146928<br>\$ 6.65 |
| S24V-PCLNR/L-4 | 145907                      | 358.15   | 145908 | 291.04   | 1.760                                      | 1.500 | 1.382 | 16.0 | 0.890 | -10° | 2.165 |             |                                |                            |                            |                             |                          |

► P. E10-12, E38-39

## PDSNR



Feed direction



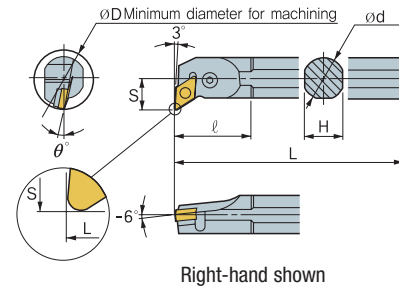
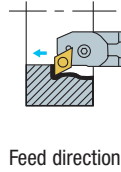
Right-hand shown

| Ref          | Holder Style                    |          |        |          | Application                     |       |       |      |       |      |       | Inserts     | Parts                         |                            |                           |                            |                          |
|--------------|---------------------------------|----------|--------|----------|---------------------------------|-------|-------|------|-------|------|-------|-------------|-------------------------------|----------------------------|---------------------------|----------------------------|--------------------------|
| Comment      | S Style, Approach Angle 62° 30' |          |        |          | Copying, Through Hole Machining |       |       |      |       |      |       |             |                               |                            |                           |                            |                          |
| Designation  | Code #                          |          | Code # |          | ØD                              | Ød    | H     | L    | S     | θ°   | l     |             |                               |                            |                           |                            |                          |
|              | Right                           | Price \$ | Left   | Price \$ |                                 |       |       |      |       |      |       |             |                               |                            |                           |                            |                          |
| S20U-PDSNR-4 | 145909                          | 284.02   |        |          | 1.705                           | 1.250 | 1.171 | 14.0 | 1.000 | -11° | 1.772 | DN □ □ 44 □ | VHX0821<br>146925<br>\$ 14.82 | HW30L<br>146953<br>\$ 3.73 | LV4<br>146924<br>\$ 22.57 | SD42<br>146927<br>\$ 18.57 | SP4<br>146928<br>\$ 6.65 |
| S24V-PDSNR-4 | 145910                          | 325.91   |        |          | 2.000                           | 1.500 | 1.382 | 16.0 | 1.125 | -11° | 1.693 |             |                               |                            |                           |                            |                          |

► P. E14-16, E39-40



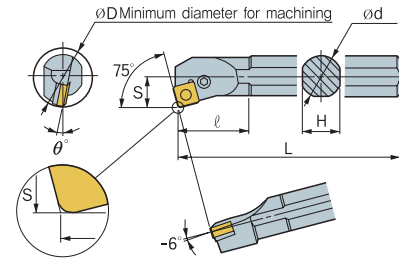
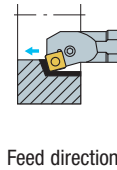
## PDUNR



| Ref          | Holder Style                |          | Application                                 |          | Inserts |       | Parts |      |       |      |       |                    |                   |                    |                    |                   |
|--------------|-----------------------------|----------|---|----------|---------|-------|-------|------|-------|------|-------|--------------------|-------------------|--------------------|--------------------|-------------------|
| Comment      | U Style, Approach Angle 93° |          | Copying, Through Hole, Blind Hole Machining |          |         |       |       |      |       |      |       |                    |                   |                    |                    |                   |
| Designation  | Code #                      |          | Code #                                      |          | ØD      | Ød    | H     | L    | S     | θ°   | l     | Screw              | Wrench            | Lever              | Shim               | Shim Pin          |
|              | Right                       | Price \$ | Left  | Price \$ |         |       |       |      |       |      |       |                    |                   |                    |                    |                   |
| S20U-PDUNR-4 | 145911                      | 284.02   |   |          | 1.705   | 1.250 | 1.171 | 14.0 | 1.000 | -16° | 1.969 | VHX0821            | HW30L             | LV4B               | SD42               | SP4               |
| S24V-PDUNR-4 | 145912                      | 358.15   |   |          | 2.000   | 1.500 | 1.382 | 16.0 | 1.125 | -11° | 1.969 | 146925<br>\$ 14.82 | 146953<br>\$ 3.73 | 145558<br>\$ 26.94 | 146927<br>\$ 18.57 | 146928<br>\$ 6.65 |

► P. E14-16, E39-40

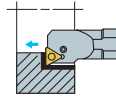
## PSKNR/L



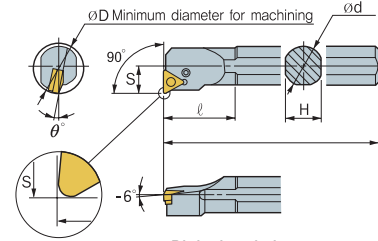
| Ref            | Holder Style                |          | Application            |          | Inserts |       | Parts |      |       |      |       |                    |                   |                    |                    |                   |
|----------------|-----------------------------|----------|------------------------|----------|---------|-------|-------|------|-------|------|-------|--------------------|-------------------|--------------------|--------------------|-------------------|
| Comment        | K Style, Approach Angle 75° |          | Through Hole Machining |          |         |       |       |      |       |      |       |                    |                   |                    |                    |                   |
| Designation    | Code #                      |          | Code #                 |          | ØD      | Ød    | H     | L    | S     | θ°   | l     | Screw              | Wrench            | Lever              | Shim               | Shim Pin          |
|                | Right                       | Price \$ | Left                   | Price \$ |         |       |       |      |       |      |       |                    |                   |                    |                    |                   |
| S16T-PSKNR/L 4 | 145913                      | 181.90   | 145914                 | 181.90   | 1.200   | 1.000 | 0.921 | 12.0 | 0.640 | -12° | 1.654 | VHX0613A           | HW25L             | LV4A               | -                  | -                 |
|                |                             |          |                        |          |         |       |       |      |       |      |       | 146941<br>\$ 19.57 | 146956<br>\$ 3.28 | 146942<br>\$ 26.71 |                    |                   |
| S20U-PSKNR/L 4 | 145915                      | 278.51   | 145916                 | 230.81   | 1.470   | 1.250 | 1.171 | 14.0 | 0.765 | -10° | 1.969 |                    |                   |                    |                    |                   |
| S24V-PSKNR/L 4 | 145917                      | 378.37   | 145918                 | 291.04   | 1.760   | 1.500 | 1.382 | 16.0 | 0.890 | -10° | 2.165 | VHX0821            | HW30L             | LV4                | SS42B              | SP4               |
|                |                             |          |                        |          |         |       |       |      |       |      |       | 146925<br>\$ 14.82 | 146953<br>\$ 3.73 | 146924<br>\$ 22.57 | 146973<br>\$ 13.65 | 146928<br>\$ 6.65 |

► P. E19-22, E38, E40

## PTFNR/L



Feed direction



Right-hand shown

| Ref            | Holder Style                |          |        |          | Application                                 |       |       |      |       |      |       | Inserts     | Parts                          |                            |                           |                              |                          |
|----------------|-----------------------------|----------|--------|----------|---|-------|-------|------|-------|------|-------|-------------|--------------------------------|----------------------------|---------------------------|------------------------------|--------------------------|
| Comment        | F Style, Approach Angle 90° |          |        |          | Copying, Through Hole, Blind Hole Machining |       |       |      |       |      |       |             |                                |                            |                           |                              |                          |
| Designation    | Code #                      |          | Code # |          | ØD  | Ød    | H     | L    | S     | θ°   | ℓ     |             |                                |                            |                           |                              |                          |
|                | Right                       | Price \$ | Left   | Price \$ |   |       |       |      |       |      |       |             |                                |                            |                           |                              |                          |
| S16T-PTFNR/L 3 | 145919                      | 181.90   | 145920 | 203.68   | 1.200                                       | 1.000 | 0.921 | 12.0 | 0.640 | -12° | 1.575 | TN □ □ 33 □ | VHX0512B<br>146976<br>\$ 25.32 | HW20L<br>146954<br>\$ 3.28 | LV3<br>146923<br>\$ 23.08 | -                            | -                        |
| S20U-PTFNR 3   | 145921                      | 284.02   |        |          | 1.470                                       | 1.250 | 1.171 | 14.0 | 0.765 | -10° | 1.969 |             | VHX0617<br>146926<br>\$ 13.34  | HW25L<br>146956<br>\$ 3.28 | LV3<br>146923<br>\$ 23.08 | ST317B<br>146974<br>\$ 14.86 | SP3<br>146929<br>\$ 6.05 |
| S24V-PTFNR 3   | 145923                      | 358.15   |        |          | 1.760                                       | 1.500 | 1.382 | 16.0 | 0.890 | -10° | 2.165 |             | VHX0617<br>146926<br>\$ 13.34  | HW20L<br>146954<br>\$ 3.28 | LV3<br>146923<br>\$ 23.08 | -                            | -                        |

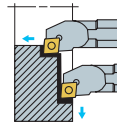
► P. E24-27, E38, E41

## SCLCR/L

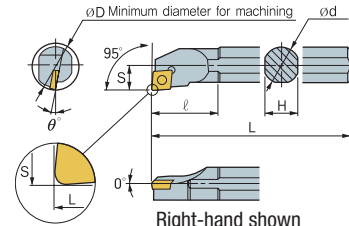


Kits Also Available

► P. E170



Feed direction



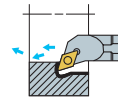
Right-hand shown

| Ref            | Holder Style                |          |        |          | Application                                 |        |       |      |       |      |       | Inserts                         | Parts                           |                             |                             |                                 |
|----------------|-----------------------------|----------|--------|----------|---|--------|-------|------|-------|------|-------|---------------------------------|---------------------------------|-----------------------------|-----------------------------|---------------------------------|
| Comment        | L Style, Approach Angle 95° |          |        |          | Copying, Through Hole, Blind Hole Machining |        |       |      |       |      |       |                                 |                                 |                             |                             |                                 |
| Designation    | Code #                      |          | Code # |          | ØD  | Ød     | H     | L    | S     | θ°   | ℓ     |                                 |                                 |                             |                             |                                 |
|                | Right                       | Price \$ | Left   | Price \$ |   |        |       |      |       |      |       |                                 |                                 |                             |                             |                                 |
| S06M-SCLCR 2   | 147978                      | 200.73   |        |          | 0.480                                       | 0.375  | 0.336 | 6.0  | 0.250 | -13° |       | CC □ T 21.5 □                   | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| S08M-SCLCR 2   | 147979                      | 90.58    |        |          | 0.600                                       | 0.500  | 0.461 | 6.0  | 0.312 | -10° |       |                                 | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| S08M-SCLCR 3   | 147203                      | 119.94   |        |          | 0.600                                       | 0.500  | 0.461 | 6.0  | 0.312 | -10° |       | CC □ T 32.5 □                   | FTGA03510<br>146957<br>\$ 13.86 | -                           | -                           |                                 |
| S10R-SCLCR/L 3 | 145925                      | 145.38   | 145928 | 117.61   | 0.770                                       | 0.625  | 0.586 | 8.0  | 0.406 | -12° | 1.280 |                                 | FTKA0411F<br>146944<br>\$ 13.62 | TW15P<br>146940<br>\$ 17.45 | SC42S<br>146936<br>\$ 14.86 | SHXN0610F<br>145998<br>\$ 23.08 |
| S12S-SCLCR/L 3 | 145926                      | 177.98   | 145929 | 173.76   | 0.930                                       | 0.750  | 0.671 | 10.0 | 0.500 | -8°  | 1.496 |                                 | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| S16T-SCLCR/L 3 | 145927                      | 219.48   | 145930 | 263.78   | 1.200                                       | 1.000  | 0.921 | 12.0 | 0.640 | -6°  | 1.772 | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45     | -                           | -                           |                                 |
| S16T-SCLCR/L 4 | 145931                      | 143.62   | 145934 | 185.27   | 1.200                                       | 1.000  | 0.921 | 12.0 | 0.640 | -6°  | 1.772 | CC □ T 43 □                     | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| S20U-SCLCR/L 4 | 145932                      | 158.90   | 145935 | 247.66   | 1.470                                       | 1.250  | 1.171 | 14.0 | 0.765 | -10° | 1.969 |                                 | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| S24V-SCLCR/L 4 | 145933                      | 202.84   | 145936 | 295.59   | 1.760                                       | 1.500  | 1.382 | 16.0 | 0.890 | -8°  | 2.362 | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73     | -                           | -                           |                                 |
| *A05F-SCLCR 2  | 146589                      | 145.88   |        |          | 0.415                                       | 0.3125 | 0.293 | 3.0  | 0.219 | -5°  |       | CC □ T 21.5 □                   | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| *A06H-SCLCR 2  | 146590                      | 133.55   |        |          | 0.480                                       | 0.375  | 0.355 | 4.0  | 0.250 | -13° |       |                                 | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| *A08K-SCLCR 2  | 146591                      | 144.54   |        |          | 0.600                                       | 0.500  | 0.480 | 5.0  | 0.312 | -10° |       |                                 | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| *A10M-SCLCR 2  | 147348                      | 154.77   |        |          | 0.770                                       | 0.625  | 0.605 | 6.0  | 0.406 | -10° |       | CC □ T 21.5 □                   | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| Carbide Shank  |                             |          |        |          |   |        |       |      |       |      |       |                                 |                                 |                             |                             |                                 |
| C06-SCLCR 2    | 147297                      | 588.04   |        |          | 0.480                                       | 0.375  | 0.355 | 4.0  | 0.250 | 13°  |       | CC □ T 21.5 □                   | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |
| C08-SCLCR 2    | 147298                      | 769.00   |        |          | 0.600                                       | 0.500  | 0.480 | 5.0  | 0.312 | 10°  |       |                                 | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| C10-SCLCR 3    | 147299                      | 1,123.54 |        |          | 0.770                                       | 0.625  | 0.605 | 6.0  | 0.406 | 12°  | 1.280 | CC □ T 32.5 □                   | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| C12-SCLCR/L 3  | 147300                      | 1,197.95 | 147347 | 1,070.83 | 0.930                                       | 0.750  | 0.711 | 7.0  | 0.500 | -8°  | 1.496 |                                 | FTKA02565<br>146930<br>\$ 14.61 | TW07P<br>146939<br>\$ 16.73 | -                           | -                               |

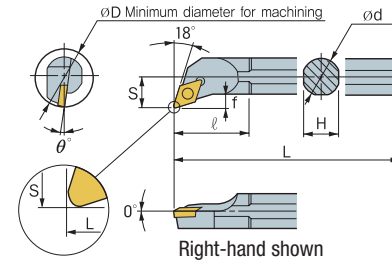
\* Coolant Hole Boring Bar

► P. E8-9

## SDQCR



Feed direction



| Ref          | Holder Style                 |          |        |          | Application                                |       |       |      |       |     |       | Inserts | Parts         |                                 |                    |
|--------------|------------------------------|----------|--------|----------|--|-------|-------|------|-------|-----|-------|---------|---------------|---------------------------------|--------------------|
| Comment      | Q Style, Approach Angle 108° |          |        |          | Facing, Through Hole, Blind Hole Machining |       |       |      |       |     |       |         |               |                                 |                    |
| Designation  | Code #                       |          | Code # |          | ØD   | Ød    | H     | L    | S     | θ°  | l     |         |               |                                 | f                  |
|              | Right                        | Price \$ | Left   | Price \$ |  |       |       |      |       |     |       |         |               |                                 |                    |
| S12S-SDQCR 3 | 145937                       | 173.76   |        |          | 0.980                                      | 0.750 | 0.671 | 10.0 | 0.562 | -6° | 1.260 | 0.177   | DC □ T 32.5 □ | FTGA03508<br>146931<br>\$ 14.82 | TW15P              |
| S16T-SDQCR 3 | 145938                       | 203.61   |        |          | 1.300                                      | 1.000 | 0.921 | 12.0 | 0.750 | -6° | 1.260 | 0.276   |               | FTGA03510<br>146957<br>\$ 13.86 | 146940<br>\$ 17.45 |

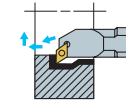
➤ P. E14

## SDUCR

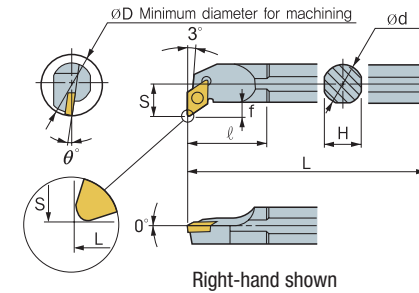


Kits Also Available

➤ P. E171



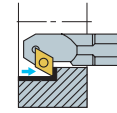
Feed direction



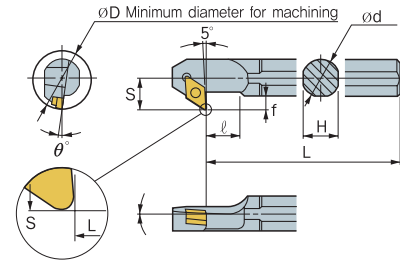
| Ref           | Holder Style                |          |        |          | Application                                |       |       |      |       |     |       | Inserts | Parts         |                                 |                    |
|---------------|-----------------------------|----------|--------|----------|--|-------|-------|------|-------|-----|-------|---------|---------------|---------------------------------|--------------------|
| Comment       | U Style, Approach Angle 93° |          |        |          | Facing, Through Hole, Blind Hole Machining |       |       |      |       |     |       |         |               |                                 |                    |
| Designation   | Code #                      |          | Code # |          | ØD   | Ød    | H     | L    | S     | θ°  | l     |         |               |                                 | f                  |
|               | Right                       | Price \$ | Left   | Price \$ |  |       |       |      |       |     |       |         |               |                                 |                    |
| S06M-SDUCR 2  | 145939                      | 108.02   |        |          | 0.600                                      | 0.375 | 0.336 | 6.0  | 0.375 | -8° |       | 0.098   | DC □ T 21.5 □ | FTKA02565<br>146930<br>\$ 14.61 | TW07P              |
| S08M-SDUCR 2  | 145940                      | 97.03    |        |          | 0.730                                      | 0.500 | 0.461 | 6.0  | 0.437 | -8° | 0.866 | 0.138   |               | 146939<br>\$ 16.73              |                    |
| S10R-SDUCR 2  | 145941                      | 117.61   |        |          | 0.850                                      | 0.625 | 0.586 | 8.0  | 0.500 | -6° | 1.063 | 0.157   |               |                                 |                    |
| S12S-SDUCR 3  | 145942                      | 173.76   |        |          | 0.980                                      | 0.750 | 0.671 | 10.0 | 0.562 | -6° | 1.575 | 0.169   | DC □ T 32.5 □ | FTGA03508<br>146931<br>\$ 14.82 | TW15P              |
| S16T-SDUCR 3  | 145943                      | 277.36   |        |          | 1.300                                      | 1.000 | 0.921 | 12.0 | 0.750 | -6° | 1.811 | 0.268   |               | FTGA03510<br>146957<br>\$ 13.86 | 146940<br>\$ 17.45 |
| Carbide Shank |                             |          |        |          |  |       |       |      |       |     |       |         | DC □ T 21.5 □ | FTKA02565<br>146930<br>\$ 14.61 | TW07P              |
| C06-SDUCR-2   | 147301                      | 651.17   |        |          | 0.600                                      | 0.375 | 0.336 | 6.0  | 0.375 | -8° |       | 0.098   |               | 146939<br>\$ 16.73              |                    |

➤ P. E14

## SDZCR/L



Feed direction

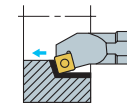


Right-hand shown

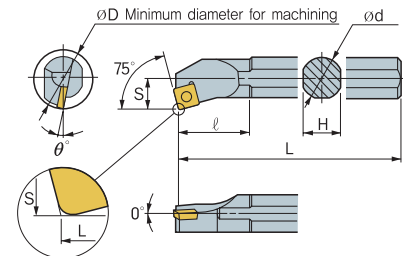
| Ref            | Holder Style                |          |        |          | Application                   |       |       |      |       |     |       |       | Inserts       | Parts                           |                             |                             |                                 |
|----------------|-----------------------------|----------|--------|----------|-------------------------------|-------|-------|------|-------|-----|-------|-------|---------------|---------------------------------|-----------------------------|-----------------------------|---------------------------------|
| Comment        | Z Style, Approach Angle 85° |          |        |          | Copying, Blind Hole Machining |       |       |      |       |     |       |       |               |                                 |                             |                             |                                 |
| Designation    | Code #                      |          | Code # |          | ØD                            | ød    | H     | L    | S     | θ°  | l     | f     |               |                                 |                             |                             |                                 |
|                | Right                       | Price \$ | Left   | Price \$ |                               |       |       |      |       |     |       |       |               |                                 |                             |                             |                                 |
| S16T-SDZCR/L 3 | 145944                      | 219.48   |        |          | 1.200                         | 1.000 | 0.921 | 12.0 | 0.640 | -6° | 1.181 | 0.272 | DC □ T 32.5 □ | FTGA03510<br>146957<br>\$ 13.86 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| S20U-SDZCR/L 3 | 145946                      | 272.30   | 145947 | 210.69   | 1.470                         | 1.250 | 1.171 | 14.0 | 0.765 | -6° | 1.535 | 0.331 | DC □ T 32.5 □ | FTGA03512<br>146933<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | SD32S<br>146937<br>\$ 15.01 | SHXN0509F<br>146935<br>\$ 22.72 |

➤ P. E14

## SSKCR/L



Feed direction

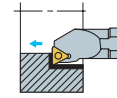


Right-hand shown

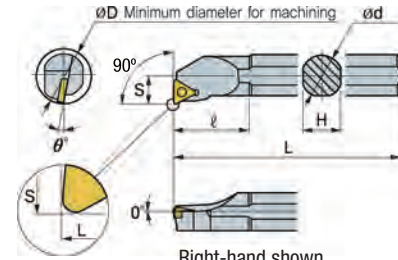
| Ref          | Holder Style                |          |        |          | Application            |       |       |      |       |      |       |  | Inserts       | Parts                           |                             |                             |                                 |
|--------------|-----------------------------|----------|--------|----------|------------------------|-------|-------|------|-------|------|-------|--|---------------|---------------------------------|-----------------------------|-----------------------------|---------------------------------|
| Comment      | K Style, Approach Angle 75° |          |        |          | Through Hole Machining |       |       |      |       |      |       |  |               |                                 |                             |                             |                                 |
| Designation  | Code #                      |          | Code # |          | ØD                     | ød    | H     | L    | S     | θ°   | l     |  |               |                                 |                             |                             |                                 |
|              | Right                       | Price \$ | Left   | Price \$ |                        |       |       |      |       |      |       |  |               |                                 |                             |                             |                                 |
| S08M-SSKCR 3 | 145948                      | 114.34   |        |          | 0.600                  | 0.500 | 0.461 | 6.0  | 0.312 | -10° | 1.024 |  | SC □ T 32.5 □ | FTGA03508<br>146931<br>\$ 14.82 | TW15P<br>146940<br>\$ 17.45 | -                           | -                               |
| S12S-SSKCR 3 | 145949                      | 177.98   |        |          | 0.930                  | 0.750 | 0.671 | 10.0 | 0.500 | -8°  | 1.358 |  |               |                                 |                             |                             |                                 |
| S16T-SSKCR 4 | 145950                      | 185.27   |        |          | 1.200                  | 1.000 | 0.921 | 12.0 | 0.640 | -8°  | 1.429 |  | SC □ T 43 □   | FTGA0411F<br>146944<br>\$ 13.62 | TW15P<br>146940<br>\$ 17.45 | SS42S<br>145997<br>\$ 15.01 | SHXN0610F<br>145998<br>\$ 23.08 |

➤ P. E19

## STFCR/L



Feed direction

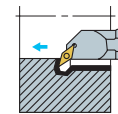


Right-hand shown

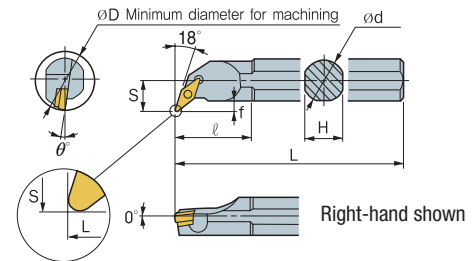
| Ref                  | Holder Style                |          |        |          | Application                                |       |       |      |       |      |       | Inserts       | Parts     |          |           |   |
|----------------------|-----------------------------|----------|--------|----------|--|-------|-------|------|-------|------|-------|---------------|-----------|----------|-----------|---|
| Comment              | F Style, Approach Angle 90° |          |        |          | Facing, Through Hole, Blind Hole Machining |       |       |      |       |      |       |               |           |          |           |   |
| Designation          | Code #                      |          | Code # |          | ØD   | Ød    | H     | L    | S     | θ°   | ℓ     |               |           |          |           |   |
|                      | Right                       | Price \$ | Left   | Price \$ |  |       |       |      |       |      |       |               |           |          |           |   |
| S06M-STFCR 2         | 146001                      | 61.77    |        |          | 0.480                                      | 0.375 | 0.336 | 6.0  | 0.250 | -13° | 0.906 | TC □ T 21.5 □ | FTKA02565 | TW07P    |           |   |
| S08M-STFCR 2         | 146022                      | 119.94   |        |          | 0.600                                      | 0.500 | 0.461 | 6.0  | 0.312 | -10° | 1.181 |               | 146930    | 146939   | -         | - |
| S10R-STFCR/L 2       | 145954                      | 129.26   | 147275 | 150.06   | 0.770                                      | 0.625 | 0.586 | 8.0  | 0.406 | -6°  | 1.378 |               | \$ 14.61  | \$ 16.73 |           |   |
| S12S-STFCR/L 2       | 145955                      | 147.50   |        |          | 0.930                                      | 0.750 | 0.671 | 10.0 | 0.500 | -3°  | 1.417 |               |           |          |           |   |
| S16T-STFCR 3         | 146042                      | 214.36   |        |          | 1.200                                      | 1.000 | 0.921 | 12.0 | 0.640 | -6°  | 1.929 | TC □ T 32.5 □ | FTGA03510 | TW15P    |           |   |
| S20U-STFCR 3         | 146818                      | 272.30   |        |          | 1.470                                      | 1.250 | 1.171 | 14.0 | 0.765 | -10° | 1.969 |               | 146957    | 146940   | -         | - |
|                      |                             |          |        |          |  |       |       |      |       |      |       | FTGA03512     | TW15P     | ST32S    | SHXN0509F |   |
|                      |                             |          |        |          |  |       |       |      |       |      |       | 146933        | 146940    | 145999   | 146935    |   |
|                      |                             |          |        |          |  |       |       |      |       |      |       | \$ 14.82      | \$ 17.45  | \$ 19.56 | \$ 22.72  |   |
| <b>Carbide Shank</b> |                             |          |        |          |  |       |       |      |       |      |       |               |           |          |           |   |
| C06-STFCR 2          | 147302                      | 558.65   |        |          | 0.480                                      | 0.375 | 0.461 | 6.0  | 0.312 | -10° | 1.102 | TC □ T 21.5 □ | FTKA02565 | TW07P    |           |   |
| C08-STFCR 2          | 147303                      | 606.58   |        |          | 0.600                                      | 0.500 | 0.461 | 6.0  | 0.312 | -10° | 1.181 |               | 146930    | 146939   | -         | - |
| C10-STFCR 2          | 147304                      | 867.51   |        |          | 0.770                                      | 0.625 | 0.586 | 8.0  | 0.406 | -6°  | 1.378 |               | \$ 14.61  | \$ 16.73 |           |   |

► P. E22-24

## SVQBR



Feed direction

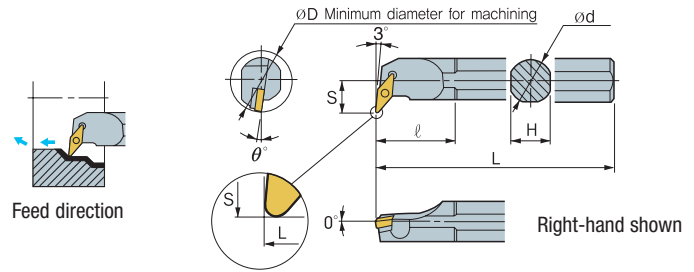


Right-hand shown

| Ref          | Holder Style                 |          |        |          | Application               |       |       |      |       |     |       | Inserts     | Parts     |          |          |           |
|--------------|------------------------------|----------|--------|----------|---------------------------|-------|-------|------|-------|-----|-------|-------------|-----------|----------|----------|-----------|
| Comment      | Q Style, Approach Angle 108° |          |        |          | Copying, Relief Machining |       |       |      |       |     |       |             |           |          |          |           |
| Designation  | Code #                       |          | Code # |          | ØD                        | Ød    | H     | L    | S     | θ°  | ℓ     |             |           |          |          |           |
|              | Right                        | Price \$ | Left   | Price \$ |                           |       |       |      |       |     |       |             |           |          |          |           |
| S20U-SVQBR 3 | 145977                       | 272.30   |        |          | 1.705                     | 1.250 | 1.171 | 14.0 | 1.000 | -8° | 2.205 | VB □ T 33 □ | FTGA03512 | TW15P    | SV32S    | SHXN0509F |
| S24V-SVQBR 3 | 145978                       | 316.24   |        |          | 2.000                     | 1.500 | 1.382 | 16.0 | 1.125 | -8° | 2.520 |             | 146933    | 146940   | 146950   | 146935    |
|              |                              |          |        |          |                           |       |       |      |       |     |       | \$ 14.82    | \$ 17.45  | \$ 17.32 | \$ 22.72 |           |

► P. E27

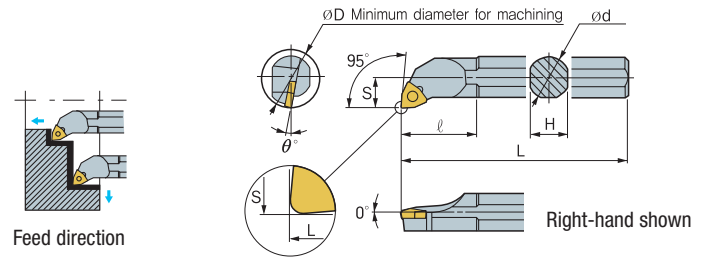
## SVUBR/L



| Ref            | Holder Style                |               | Application |               |       |       |       |      |       | Inserts | Parts |                           |                           |                           |                           |
|----------------|-----------------------------|---------------|-------------|---------------|-------|-------|-------|------|-------|---------|-------|---------------------------|---------------------------|---------------------------|---------------------------|
| Comment        | U Style, Approach Angle 93° |               | Copying     |               |       |       |       |      |       |         |       |                           |                           |                           |                           |
| Designation    | Code #                      |               | Code #      |               | ØD    | Ød    | H     | L    | S     |         | θ°    | l                         | Screw                     | Wrench                    | Shim                      |
| S20U-SVUBR 3   | 145979                      | <b>272.30</b> |             |               | 1.705 | 1.250 | 1.171 | 14.0 | 1.000 | -8°     | 1.929 | FTGA03512                 | TW15P                     | SV32S                     | SHXN0509F                 |
| S24V-SVUBR/L 3 | 145980                      | <b>347.56</b> | 146529      | <b>268.95</b> | 2.000 | 1.500 | 1.382 | 16.0 | 1.125 | -8°     | 1.224 | <b>146933</b><br>\$ 14.82 | <b>146940</b><br>\$ 17.45 | <b>146950</b><br>\$ 17.32 | <b>146935</b><br>\$ 22.72 |

➤ P. E27

## SWLCR/L



| Ref            | Holder Style                |               | Application                                |               |       |       |       |      |       | Inserts | Parts |                           |                           |
|----------------|-----------------------------|---------------|--|---------------|-------|-------|-------|------|-------|---------|-------|---------------------------|---------------------------|
| Comment        | L Style, Approach Angle 95° |               | Facing, Through Hole, Blind Hole Machining |               |       |       |       |      |       |         |       |                           |                           |
| Designation    | Code #                      |               | Code #                                     |               | ØD    | Ød    | H     | L    | S     |         | θ°    | l                         | Screw                     |
| S16T-SWLCR/L 4 | 145981                      | <b>203.61</b> | 145901                                     | <b>167.57</b> | 1.200 | 1.000 | 0.921 | 12.0 | 0.640 | -7°     | 1.835 | FTGA0411F                 | TW15P                     |
| S20U-SWLCR/L 4 | 145900                      | <b>276.08</b> | 145902                                     | <b>219.55</b> | 1.470 | 1.250 | 1.171 | 14.0 | 0.765 | -5°     | 2.031 | <b>146944</b><br>\$ 13.62 | <b>146940</b><br>\$ 17.45 |

➤ P. E30

## Indexable Boring Bars

- Chipbreaker eliminates long stringer chips. Round shanks allow the operator to set positive or negative rake
- A new cutting edge may be presented by simply indexing the insert. It is not necessary to remove the tool from chuck or tool post



| Shank Dia. | Length | Bore Depth | Min. Bore | Tool No. | Code No. | Price \$     | Set Code No. | Price \$      |
|------------|--------|------------|-----------|----------|----------|--------------|--------------|---------------|
| 1/2        | 2-3/4  | 1-1/4      | 7/16      | 7SB      | 145500   | <b>63.60</b> |              |               |
| 1/2        | 3-5/8  | 2-1/8      | 7/16      | 7LB      | 145502   | <b>64.80</b> | 145550       | <b>259.20</b> |
| 1/2        | 3      | 1-1/2      | 1/2       | 8SB      | 145504   | <b>64.80</b> | (IB500)      |               |
| 1/2        | 4      | 2-1/2      | 1/2       | 8LB      | 145506   | <b>66.08</b> |              |               |

| Shank Dia. | Length | Bore Depth | Min. Bore | Tool No. | Code No. | Price \$     | Set Code No. | Price \$      |
|------------|--------|------------|-----------|----------|----------|--------------|--------------|---------------|
| 5/8        | 3      | 1-1/4      | 7/16      | 7SD      | 145510   | <b>72.30</b> |              |               |
| 5/8        | 3-7/8  | 2-1/8      | 7/16      | 7LD      | 145512   | <b>73.58</b> |              |               |
| 5/8        | 3-1/4  | 1-1/2      | 1/2       | 8SD      | 145514   | <b>72.90</b> | 145560       | <b>370.05</b> |
| 5/8        | 4-1/4  | 2-1/2      | 1/2       | 8LD      | 145516   | <b>74.70</b> | (ID625)      |               |
| 5/8        | 3-1/2  | 1-3/4      | 9/16      | 9SD      | 145518   | <b>74.70</b> |              |               |
| 5/8        | 4-5/8  | 2-7/8      | 9/16      | 9LD      | 145520   | <b>75.98</b> |              |               |
| 3/4        | 3-3/8  | 1-3/8      | 7/16      | 7SC      | 145530   | <b>79.80</b> |              |               |
| 3/4        | 4-1/4  | 2-1/4      | 7/16      | 7LC      | 145532   | <b>81.00</b> |              |               |
| 3/4        | 3-5/8  | 1-5/8      | 1/2       | 8SC      | 145534   | <b>82.20</b> | 145570       | <b>670.20</b> |
| 3/4        | 4-5/8  | 2-5/8      | 1/2       | 8LC      | 145536   | <b>83.55</b> | (IC750)      |               |
| 3/4        | 3-7/8  | 1-7/8      | 9/16      | 9SC      | 145538   | <b>84.75</b> |              |               |
| 3/4        | 5      | 3          | 9/16      | 9LC      | 145540   | <b>85.95</b> |              |               |
| 3/4        | 4-1/4  | 2-1/4      | 11/16     | 11SC     | 145542   | <b>85.95</b> |              |               |
| 3/4        | 5-1/2  | 3-1/2      | 11/16     | 11LC     | 145544   | <b>87.15</b> |              |               |

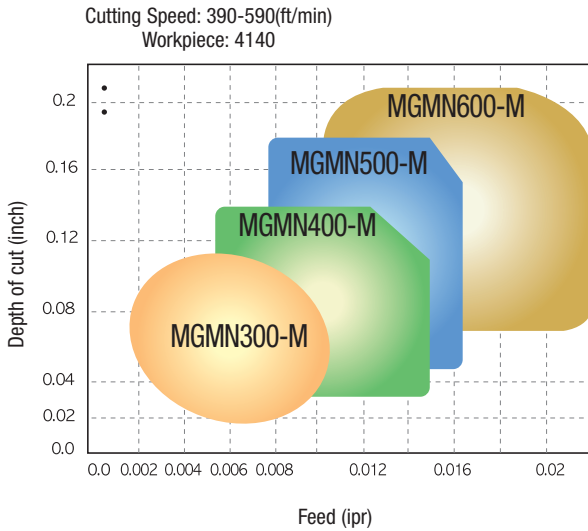
# BORITE

## Indexable Boring Bar Inserts & Screws

| Insert No. | Description | Code No. | Price \$     |
|------------|-------------|----------|--------------|
| TT-221     | C2 Insert   | 145575   | <b>12.03</b> |
| TT-221     | C5 Insert   | 145580   | <b>12.03</b> |
| TT-222     | C2 Insert   | 145585   | <b>12.03</b> |

| Insert No. | Description | Code No. | Price \$     |
|------------|-------------|----------|--------------|
| TT-222     | C5 Insert   | 145590   | <b>12.03</b> |
| ICS-2      | Set Screw   | 145595   | <b>2.88</b>  |

# BORITE



## ■ Depth of Cut, Feed and Width of Cutting Edge

- If the depth of cut and feed are greater than the width of cutting edge, the insert may break due to the increased cutting resistance of the insert
- If the depth of cut and feed are smaller than the width of cutting edge, it may lead to vibration or unstable machining due to no formation of the sub-cutting edge relief angle against no direct influence of tool deflection

## ■ Depth of Cut in Grooving Operation

- It can be performed as deep as T<sub>max</sub> of the holder

## ■ The Basis of Selection for Grades

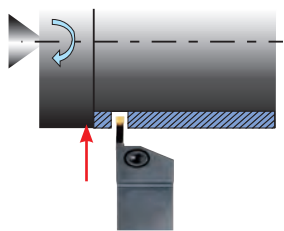
| Workpiece |                             |          | The Basis of Selection for Grades (Grooving, Turning) |       |       |           |    |
|-----------|-----------------------------|----------|---|-------|-------|-----------|----|
| ISO       | Material                    | Grade    | Wear Resistance                                       |       |       | Toughness |    |
|           |                             |          | 01  | 10    | 20    | 30        | 40 |
| P         | Carbon Steel<br>Alloy Steel | CVD      | PT10C   | PT25C | PT30C |           |    |
|           |                             | PVD      | PM30P   |       |       |           |    |
|           |                             | Cermet   | PT10S   | PM20S |       |           |    |
| M         | Stainless Steel             | CVD      | PT22C   | PT30C |       |           |    |
|           |                             | PVD      | PM30P   |       |       |           |    |
| K         | Cast Iron                   | CVD      | KM20C   |       |       |           |    |
|           |                             | PVD      | PC215K  |       |       |           |    |
|           | Aluminum                    | Uncoated | KTM10U  |       |       |           |    |

: Primary Recommendation

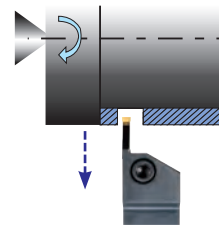
| Insert       | Steel |       |       |        |       | Stainless Steel |       | Cast Iron |         | Aluminum |
|--------------|-------|-------|-------|--------|-------|-----------------|-------|-----------|---------|----------|
|              | CVD   |       | PVD   | Cermet |       | CVD             | PVD   | CVD       | Carbide | Carbide  |
|              | PT20C | PT30C | PM30P | PM20S  | PT10S | PT30C           | PM30P | KM20C     | G10     | KTM10U   |
| MGMN200-G    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGMN300-G    | △     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGMN400-G    | △     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGMN500-G    | △     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGMN300-M    | ●     | ●     | ●     | -      | -     | ●               | ●     | ●         | △       | -        |
| MGMN400-M    | ●     | ●     | ●     | -      | -     | ●               | ●     | ●         | △       | -        |
| MGMN500-M    | ●     | △     | ●     | -      | -     | △               | ●     | △         | △       | -        |
| MGMN600-M    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGMN800-M    | △     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MGGN300-00-M | -     | -     | -     | △      | △     | -               | -     | -         | -       | -        |
| MGGN400-00-M | -     | -     | -     | △      | △     | -               | -     | -         | -       | -        |
| MGGN500-00-M | -     | -     | -     | △      | △     | -               | -     | -         | -       | -        |
| MGGN600-00-M | -     | -     | -     | △      | △     | -               | -     | -         | -       | -        |
| MRMN300-M    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MRMN400-M    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MRMN500-M    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MRMN600-M    | ●     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MRMN800-M    | △     | △     | △     | -      | -     | △               | △     | △         | △       | -        |
| MRGN600-A    | -     | -     | -     | -      | -     | -               | -     | -         | -       | ●        |
| MRGN800-A    | -     | -     | -     | -      | -     | -               | -     | -         | -       | ●        |

Note / ● : Stock △ : Order Made

## ■ M.T.G. Applications



Grooving



Grooving





| Feed by Cat. No.                          |             | Recommended Cutting Speed by Workpiece v(sfm) |       |                |                           |                |               |                |       |                |       |           |          |
|---|-------------|---|-------|----------------|---------------------------|----------------|---------------|----------------|-------|----------------|-------|-----------|----------|
| Cat. No.                                  | Feed (ipr)  | Carbon Steel                                  |       |                | High Hardened Alloy Steel |                |               | Hardened Steel |       |                | STS   | Cast Iron | Al       |
|   |             | PT25C   | PT30C | PM20S<br>PT10S | PT25C                     | PT30C<br>PM30P | PM20S<br>CT10 | PT25C          | PT30C | PM20S<br>PT10S | PM30P | PC215K    | KTM10U   |
| MGMN200-G                                 | 0.002       | 490   |       |                |                           |                |               |                |       |                |       |           |          |
|   | 0.004       | 425   |       |                |                           |                |               |                |       |                |       |           |          |
|   | 0.006       | 330   |       |                |                           |                |               |                |       |                |       |           |          |
| MGMN300-M(G)<br>MGGN300-00-M<br>MRMN300-M | 0.003       | 625   | 525   | 525            | 525                       | 425            | 425           | 400            | 300   | 300            | 525   | 650       |          |
|   | 0.006       | 550   | 450   | 450            | 450                       | 350            | 350           | 325            | 225   | 225            | 450   | 600       |          |
|   | 0.01        | 450   | 350   | 350            | 400                       | 300            | 300           | 200            | 125   | 125            | 400   | 500       |          |
| MGMN400-M(G)<br>MGGN400-00-M<br>MRMN400-M | 0.005       | 650   | 550   | 550            | 600                       | 500            | 500           | 425            | 325   | 325            | 525   | 700       |          |
|   | 0.01        | 550   | 450   | 450            | 525                       | 425            | 425           | 350            | 250   | 250            | 450   | 600       |          |
|   | 0.014       | 400   | 325   | 325            | 425                       | 325            | 325           | 225            | 175   | 175            | 400   | 425       |          |
| MGMN500-M(G)<br>MGGN500-00-M<br>MRMN500-M | 0.006-0.008 | 600   | 500   | 500            | 525                       | 425            | 425           | 400            | 300   | 300            | 500   | 600       |          |
|   | 0.012       | 500   | 400   | 400            | 425                       | 325            | 325           | 225            | 175   | 175            | 400   | 425       |          |
|   | 0.016       | 400   | 325   | 325            | 325                       | 250            | 250           | 200            | 125   | 125            | 325   | 400       |          |
| MGMN600-M(G)<br>MGGN600-00-M<br>MRMN600-M | 0.01        | 625   | 525   | 525            | 525                       | 425            | 425           | 325            | 225   | 225            | 525   | 625       |          |
|   | 0.014       | 500   | 400   | 400            | 325                       | 250            | 250           | 225            | 175   | 175            | 350   | 500       |          |
|   | 0.02        | 400   | 300   | 300            | 250                       | 175            | 175           | 175            | 100   | 100            | 250   | 400       |          |
| MRMN800-M                                 | 0.01        | 625   | 525   | 525            | 525                       | 425            | 425           | 325            | 225   | 225            | 525   | 625       |          |
|   | 0.014       | 500   | 400   | 400            | 325                       | 250            | 250           | 225            | 175   | 175            | 350   | 500       |          |
|   | 0.016       | 400   | 300   | 300            | 250                       | 175            | 175           | 175            | 100   | 100            | 250   | 400       |          |
| MRGN 300-A<br>400-A<br>500-A<br>600-A     | 0.004       |   |       |                |                           |                |               |                |       |                |       |           | 825~3275 |
|   | 0.01        |   |       |                |                           |                |               |                |       |                |       |           | 825~2625 |
|   | 0.016       |   |       |                |                           |                |               |                |       |                |       |           | 825~2300 |
| MRGN800-A                                 | 0.004       |   |       |                |                           |                |               |                |       |                |       |           | 825~3275 |
|   | 0.01        |   |       |                |                           |                |               |                |       |                |       |           | 825~2625 |
|   | 0.016       |   |       |                |                           |                |               |                |       |                |       |           | 825~2300 |

• Recommendations written above are subject to change as per machine, workpiece, etc.

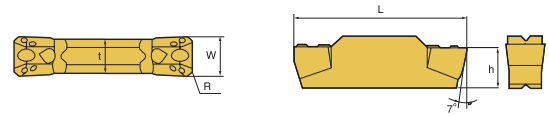
### ■ M.T.G. Applications



## MGMN-G(M) For Grooving & Turning

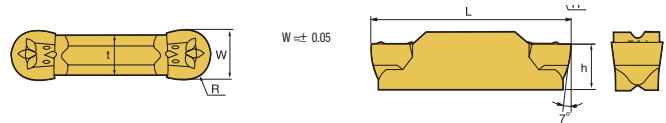


Note:  
**G** - Grooving only  
**M** - Grooving & Turning



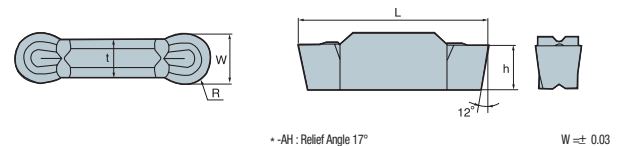
| Designation | Coated Carbide |       |                    |                    |                    |                    |                    |       |                    |       | Cermet |       | Uncoated Carbide   | (inch) |       |       |       |       | Applicable Holders |            |
|-------------|----------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|--------------------|-------|--------|-------|--------------------|--------|-------|-------|-------|-------|--------------------|------------|
|             | PT20C          | PT22C | PT25C              | PT30C              | PM30P              | PTM50P             | MT15C              | MT20C | MT30C              | KT15P | PT10S  | PT20S | KTM10U             | W      | R     | L     | t     | h     | Holder             | Page No.   |
| MGMN 200-G  |                |       | 149245<br>\$ 23.65 | 147365<br>\$ 23.65 |                    |                    |                    |       |                    |       |        |       |                    | 0.079  | 0.008 | 0.629 | 0.063 | 0.138 | MGEHR/L<br>MGEVR/L | E78<br>E79 |
| MGMN 300-G  |                |       |                    |                    |                    |                    |                    |       |                    |       |        |       | 148314<br>\$ 24.51 | 0.118  | 1/64  | 0.827 | 0.093 | 0.189 | MGIVR/L            | E80        |
| MGMN 300-M  |                |       | 149225<br>\$ 24.82 | 147363<br>\$ 24.82 |                    | 148837<br>\$ 19.83 | 149264<br>\$ 25.21 |       | 148782<br>\$ 24.82 |       |        |       |                    | 0.118  | 1/64  | 0.827 | 0.093 | 0.189 |                    |            |
| MGMN 400-G  |                |       |                    |                    |                    |                    |                    |       |                    |       |        |       | 148315<br>\$ 26.49 | 0.157  | 1/64  | 0.827 | 0.130 | 0.189 |                    |            |
| MGMN 400-M  |                |       | 149237<br>\$ 26.76 | 147364<br>\$ 26.76 | 146211<br>\$ 21.38 | 148843<br>\$ 26.02 |                    |       |                    |       |        |       |                    | 0.157  | 1/64  | 0.827 | 0.130 | 0.189 |                    |            |
| MGMN 600-M  |                |       | 149291<br>\$ 37.85 |                    |                    |                    |                    |       |                    |       |        |       |                    | 0.236  | 1/32  | 1.024 | 0.197 | 0.228 |                    |            |

## MRMN-M For Relief, Copying



| Designation | Coated Carbide |       |                    |                    |                    |       |       |       |       |       | Cermet |        | Uncoated Carbide | (inch) |       |       |       |                    | Applicable Holders |  |
|-------------|----------------|-------|--------------------|--------------------|--------------------|-------|-------|-------|-------|-------|--------|--------|------------------|--------|-------|-------|-------|--------------------|--------------------|--|
|             | PT10C          | PT20C | PT30C              | PM30P              | PM30.1P            | MT20C | MT30P | KT05C | KT15P | PT10S | PT20S  | KTM10U | W                | R      | L     | t     | h     | Holder             | Page No.           |  |
| MRMN-300-M  |                |       |                    |                    | 146106<br>\$ 24.82 |       |       |       |       |       |        |        | 0.118            | 0.059  | 0.827 | 0.093 | 0.189 | MGEHR/L<br>MGEVR/L | E78<br>E79         |  |
| MRMN 500-M  |                |       | 147245<br>\$ 34.28 |                    |                    |       |       |       |       |       |        |        | 0.197            | 0.098  | 1.024 | 0.161 | 0.228 | MGEVR/L<br>MGIUR/L | E79<br>E80         |  |
| MRMN 800-M  |                |       |                    | 147041<br>\$ 58.26 |                    |       |       |       |       |       |        |        | 0.315            | 0.157  | 1.220 | 0.236 | 0.256 | MGIVR/L            | E80                |  |

## MRGN-A For Aluminum Machining

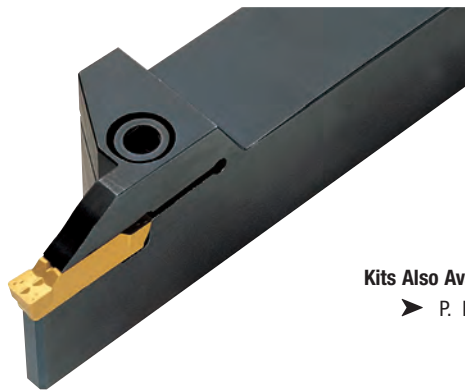


| Designation | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet |       | Uncoated Carbide   | (inch) |       |       |       |        | Applicable Holders |            |
|-------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|-------|-------|-------|--------|--------------------|------------|
|             | PT10C          | PT15C | PT20C | PT30C | PM30P | MT20C | MT30P | KT05C | KT15P | PT10S | PT20S  | KT10U | W                  | R      | L     | t     | h     | Holder | Page No.           |            |
| MRGN 300-A  |                |       |       |       |       |       |       |       |       |       |        |       | 148428<br>\$ 43.38 | 0.118  | 0.059 | 0.827 | 0.093 | 0.189  | MGEUR/L<br>MGIUR/L | E79<br>E80 |
| MRGN 400-A  |                |       |       |       |       |       |       |       |       |       |        |       | 148153<br>\$ 43.91 | 0.157  | 0.078 | 0.827 | 0.130 | 0.189  |                    |            |
| MRGN 500-A  |                |       |       |       |       |       |       |       |       |       |        |       | 148154<br>\$ 46.80 | 0.197  | 0.098 | 1.024 | 0.161 | 0.228  |                    |            |
| MRGN 600-A  |                |       |       |       |       |       |       |       |       |       |        |       | 148155<br>\$ 50.48 | 0.236  | 0.118 | 1.024 | 0.197 | 0.228  |                    |            |

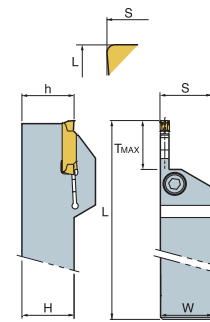
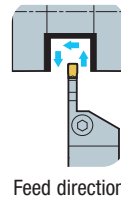
### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

### MGEHR/L



**Kits Also Available**  
 ➤ P. E172



Right-hand shown

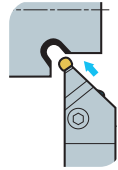
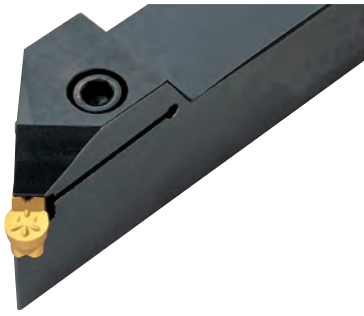
| Ref      | Holder Style |          |        |          | Application                |       |       |       |      | Inserts     | Parts           |                |
|----------|--------------|----------|--------|----------|----------------------------|-------|-------|-------|------|-------------|-----------------|----------------|
| Comment  |              |          |        |          | External Grooving, Turning |       |       |       |      |             |                 |                |
| MGEHR/L  | Code #       |          | Code # |          | H(h)                       | W     | L     | S     | TMAX |             |                 |                |
|          | Right        | Price \$ | Left   | Price \$ |                            |       |       |       |      |             |                 |                |
|          | (inch)       |          |        |          |                            |       |       |       |      |             |                 |                |
| 12-2     | 148244       | 227.93   |        |          | 0.750                      | 0.750 | 4.921 | 0.760 | 0.47 | MGMN200-G/M | MHA 0512        | HW 40L         |
| 16-2     | 148245       | 245.11   | 148587 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.010 | 0.47 |             | <b>147984</b>   | <b>148290</b>  |
|          |              |          |        |          |                            |       |       |       |      |             | <b>\$ 13.82</b> | <b>\$ 3.73</b> |
| 12-3     | 148062       | 227.93   | 148064 | 207.42   | 0.750                      | 0.750 | 4.921 | 0.764 | 0.70 | MGMN300-M   |                 |                |
| 12-3-T03 | 148063       | 227.93   | 148065 | 227.96   | 0.750                      | 0.750 | 4.921 | 0.764 | 0.39 |             |                 |                |
| 16-3     | 148066       | 245.11   | 148067 | 245.11   | 1.000                      | 1.000 | 5.906 | 1.014 | 0.70 | MRMN300-M   |                 |                |
| 16-3-T03 | 148068       | 245.11   | 148069 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.014 | 0.39 |             |                 |                |
| 20-3     | 148070       | 264.99   | 148071 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.264 | 0.70 |             |                 |                |
| 20-3-T03 | 148072       | 241.10   | 148073 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.264 | 0.39 |             |                 |                |
| 16-4     | 148074       | 223.02   | 148075 | 245.11   | 1.000                      | 1.000 | 5.906 | 1.016 | 0.70 | MGMN400-M   | BHA0616         | HW 50L         |
| 16-4-T03 | 148076       | 223.02   | 148077 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.016 | 0.39 | MRMN400-M   |                 |                |
| 20-4     | 148078       | 264.99   | 148079 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.264 | 0.70 |             |                 |                |
| 20-4-T03 | 148082       | 241.10   | 148083 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.264 | 0.39 |             |                 |                |
|          |              |          |        |          |                            |       |       |       |      |             | <b>146958</b>   | <b>148186</b>  |
|          |              |          |        |          |                            |       |       |       |      |             | <b>\$ 11.09</b> | <b>\$ 8.36</b> |
| 16-5     | 148080       | 245.11   | 148081 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.020 | 0.90 | MRMN500-M   |                 |                |
| 20-5     | 148084       | 241.10   | 148085 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.270 | 0.90 |             |                 |                |
| 16-6     | 148086       | 245.11   | 148087 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.024 | 0.90 | MGMN600-M   |                 |                |
| 20-6     | 148088       | 241.10   | 148089 | 241.10   | 1.250                      | 1.250 | 6.693 | 1.274 | 0.90 | MRMN600-M   |                 |                |
| 16-8     | 148090       | 245.11   | 148091 | 223.02   | 1.000                      | 1.000 | 5.906 | 1.043 | 1.10 | MGMN800-M   |                 |                |
| 20-8     | 148092       | 241.10   |        |          | 1.250                      | 1.250 | 6.693 | 1.293 | 1.10 | MRMN800-M   |                 |                |

➤ P. E77

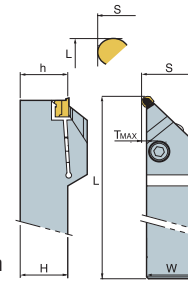
*Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.*

*Images are representational only and may not reflect actual product.*

MGEUR/L



Feed direction

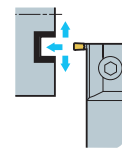


Right-hand shown

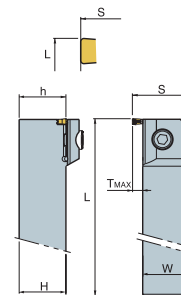
| Ref     | Holder Style |          | Application              |          |       |       |       |       |      | Inserts   | Parts                            |                                 |
|---------|--------------|----------|--------------------------|----------|-------|-------|-------|-------|------|-----------|----------------------------------|---------------------------------|
| Comment |              |          | External Relief Grooving |          |       |       |       |       |      |           |                                  |                                 |
| MGEUR/L | Code #       |          | Code #                   |          | H(h)  | W     | L     | S     | TMAX |           |                                  |                                 |
|         | Right        | Price \$ | Left                     | Price \$ |       |       |       |       |      |           |                                  |                                 |
| 12-3    | 148105       | 194.50   | 148106                   | 194.50   | 0.750 | 0.750 | 4.921 | 0.967 | 0.21 | MRMN300-M |                                  |                                 |
| 16-3    | 148107       | 210.88   | 148108                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.217 | 0.21 |           |                                  |                                 |
| 20-3    | 148109       | 227.21   | 148110                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.467 | 0.21 |           |                                  |                                 |
| 16-4    | 148111       | 231.75   | 148112                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.217 | 0.21 | MRMN400-M |                                  |                                 |
| 20-4    | 148113       | 227.21   | 148114                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.467 | 0.21 |           |                                  |                                 |
| 16-5    | 148115       | 210.88   | 148116                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.276 | 0.27 | MRMN500-M | BHA0616                          | HW 50L                          |
| 20-5    | 148117       | 227.21   | 148118                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.526 | 0.27 |           |                                  |                                 |
| 16-6    | 148119       | 231.75   | 148120                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.276 | 0.27 | MRMN600-M | <b>146958</b><br><b>\$ 11.09</b> | <b>148186</b><br><b>\$ 8.36</b> |
| 20-6    | 148121       | 227.21   | 148122                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.526 | 0.27 |           |                                  |                                 |
| 16-8    | 148123       | 210.88   | 148124                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.354 | 0.35 | MRMN800-M |                                  |                                 |
| 20-8    | 148125       | 227.21   | 148126                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.604 | 0.35 |           |                                  |                                 |
| 16-6A   | 148127       | 210.88   | 148128                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.276 | 0.27 | MRGN600-A |                                  |                                 |
| 16-8A   | 148129       | 210.88   | 148130                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.354 | 0.35 | MRGN800-A |                                  |                                 |

► P. E77

MGEVR/L



Feed direction

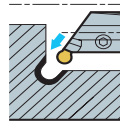


Right-hand shown

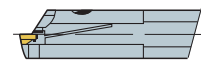
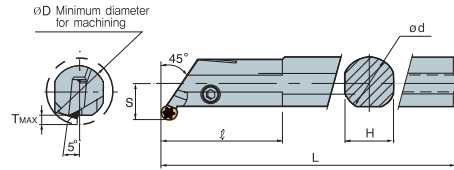
| Ref     | Holder Style |          | Application              |          |       |       |       |       |      | Inserts   | Parts                            |                                 |
|---------|--------------|----------|--------------------------|----------|-------|-------|-------|-------|------|-----------|----------------------------------|---------------------------------|
| Comment |              |          | Facial Grooving, Turning |          |       |       |       |       |      |           |                                  |                                 |
| MGEVR/L | Code #       |          | Code #                   |          | H(h)  | W     | L     | S     | TMAX |           |                                  |                                 |
|         | Right        | Price \$ | Left                     | Price \$ |       |       |       |       |      |           |                                  |                                 |
| 12-2    | 148266       | 194.50   | 148267                   | 194.50   | 0.750 | 0.750 | 4.921 | 0.868 | 0.11 | MGMN200-G | BHA0616                          | HW 50L                          |
| 16-2    | 148268       | 231.75   | 148269                   | 231.75   | 1.000 | 1.000 | 5.906 | 1.118 | 0.11 |           |                                  |                                 |
| 12-3    | 148270       | 213.76   | 148271                   | 194.50   | 0.750 | 0.750 | 4.921 | 0.967 | 0.21 | MRMN300-M | <b>146958</b><br><b>\$ 11.09</b> | <b>148186</b><br><b>\$ 8.36</b> |
| 16-3    | 148272       | 231.75   | 148273                   | 210.88   | 1.000 | 1.000 | 5.906 | 1.217 | 0.21 |           |                                  |                                 |
| 20-3    | 148274       | 227.21   | 148275                   | 227.21   | 1.250 | 1.250 | 6.693 | 1.467 | 0.21 | MRMN300-M |                                  |                                 |

► P. E77

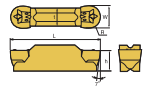


## MGIUR/L



Feed direction



Right-hand shown

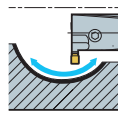
| Ref     | Holder Style |          | Application              |          |          |          |       |       |           |       |       | Inserts  | Parts   |   |
|---------|--------------|----------|--------------------------|----------|----------|----------|-------|-------|-----------|-------|-------|--|---|---|
| Comment |              |          | Internal Relief Grooving |          |          |          |       |       |           |       |       |  |   |   |
| MGIUR/L | Code #       |          | Code #                   |          | $\phi D$ | $\phi d$ | L     | $l$   | $T_{MAX}$ | H     | S     |  |  |  |
|         | Right        | Price \$ | Left                     | Price \$ |          |          |       |       |           |       |       |  |   |   |
| 2312-3  | 148131       | 217.02   |                          |          | 1.437    | 0.750    | 5.906 | 1.772 | 0.13      | 0.670 | 0.512 | MRMN300-M  | MHA0512<br>147984<br>\$ 13.82   | HW 40L<br>148290<br>\$ 3.73   |
| 2616-3  | 148133       | 218.80   |                          |          | 1.625    | 1.000    | 7.874 | 1.772 | 0.13      | 0.920 | 0.610 |  |   |   |
| 3220-3  | 148135       | 290.60   |                          |          | 2.000    | 1.250    | 9.843 | 2.559 | 0.13      | 1.170 | 0.748 |  |   |   |
| 3220-4  | 148139       | 290.60   |                          |          | 2.000    | 1.250    | 9.843 | 2.559 | 0.13      | 1.170 | 0.748 | MRMN400-M  |   |   |

► P. E77

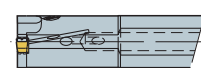
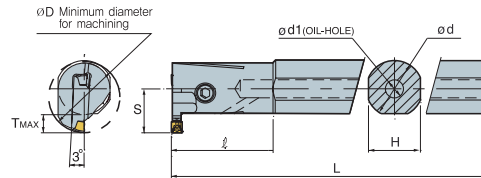
## MGIVR/L



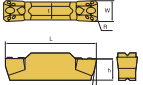


Coolant through



Feed direction



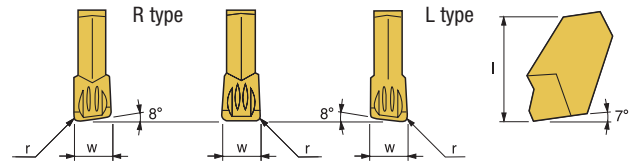
Right-hand shown

| Ref     | Holder Style |          | Application                |          |          |          |       |       |           |           |       | Inserts | Parts  |   |   |
|---------|--------------|----------|----------------------------|----------|----------|----------|-------|-------|-----------|-----------|-------|---------|--|---|---|
| Comment |              |          | Internal Grooving, Turning |          |          |          |       |       |           |           |       |         |  |   |   |
| MGIVR/L | Code #       |          | Code #                     |          | $\phi D$ | $\phi d$ | L     | $l$   | $T_{MAX}$ | $\phi d1$ | H     | S       |  |  |  |
|         | Right        | Price \$ | Left                       | Price \$ |          |          |       |       |           |           |       |         |  |   |   |
| 1210-2  | 148233       | 232.86   |                            |          | 0.750    | 0.625    | 4.921 | 1.378 | 0.15      | 0.236     | 0.630 | 0.476   | MGMN200-G  | MHB0310 148671 \$ 11.09   | HW25L 146956 \$ 3.28  |
| 1612-2  | 148234       | 273.93   |                            |          | 1.000    | 0.750    | 5.906 | 1.772 | 0.15      | 0.315     | 0.630 | 0.585   |  |   |   |
| 1612-3  | 148235       | 273.93   |                            |          | 1.000    | 0.750    | 5.906 | 1.772 | 0.23      | 0.236     | 0.670 | 0.614   | MGMN300-M  | MHA0512<br>147984<br>\$ 13.82   | HW 40L<br>148290<br>\$ 3.73   |
| 2016-3  | 148236       | 319.02   | 148237                     | 290.31   | 1.250    | 1.000    | 7.874 | 1.772 | 0.23      | 0.315     | 0.920 | 0.744   |  |   |   |
| 2420-3  | 148238       | 375.11   |                            |          | 1.500    | 1.250    | 9.843 | 2.559 | 0.23      | 0.315     | 1.170 | 0.846   | MGMN400-M  |   |   |
| 1612-4  | 148239       | 273.93   |                            |          | 1.000    | 0.750    | 5.906 | 1.772 | 0.23      | 0.315     | 0.670 | 0.614   |  |   |   |
| 2016-4  | 148240       | 319.02   | 148241                     | 290.31   | 1.250    | 1.000    | 7.874 | 1.772 | 0.23      | 0.315     | 0.920 | 0.744   |  |   |   |
| 2420-4  | 148242       | 375.11   |                            |          | 1.500    | 1.250    | 9.843 | 2.559 | 0.23      | 0.315     | 1.170 | 0.846   |  |   |   |

► P. E77

# Pro Part Inserts

## SP Inserts (For Parting Off)



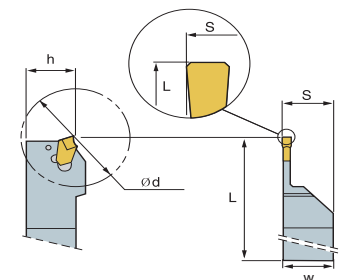
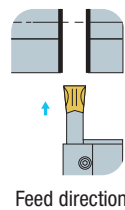
| Designation | Coated Carbide |       |       |                    |                    |       |                    |       |       | Cermet |       | Uncoated Carbide   | (inch) |       |       | Applicable Holders |            |
|-------------|----------------|-------|-------|--------------------|--------------------|-------|--------------------|-------|-------|--------|-------|--------------------|--------|-------|-------|--------------------|------------|
|             | PT10C          | PT20C | PT22C | PT30C              | MT15C              | MT20C | MT30P              | KT05C | KT15P | PT10S  | PM30S | PTM30U             | w      | l     | r     | Holder             | Page No.   |
| SP 200      |                |       |       | 146450<br>\$ 22.05 |                    |       |                    |       |       |        |       |                    | 0.087  | 0.366 | 0.008 | PP-B<br>PP-INT     | E82<br>E81 |
| SP 200R     |                |       |       | 146533<br>\$ 22.05 |                    |       | 146233<br>\$ 21.48 |       |       |        |       |                    | 0.087  | 0.366 | 0.008 |                    |            |
| SP 300      |                |       |       | 146452<br>\$ 22.36 | 149246<br>\$ 21.30 |       | 145617<br>\$ 22.36 |       |       |        |       | 146451<br>\$ 17.87 | 0.122  | 0.445 | 0.008 |                    |            |
| SP 300R     |                |       |       | 146446<br>\$ 22.36 |                    |       |                    |       |       |        |       |                    | 0.122  | 0.445 | 0.008 |                    |            |
| SP 300L     |                |       |       | 146447<br>\$ 22.36 |                    |       |                    |       |       |        |       |                    | 0.122  | 0.445 | 0.008 |                    |            |
| SP 400      |                |       |       | 146454<br>\$ 23.10 |                    |       |                    |       |       |        |       | 146453<br>\$ 18.39 | 0.161  | 0.445 | 0.009 |                    |            |
| SP 400R     |                |       |       | 146455<br>\$ 23.10 |                    |       |                    |       |       |        |       |                    | 0.161  | 0.445 | 0.009 |                    |            |
| SP 400L     |                |       |       | 146057<br>\$ 23.10 |                    |       |                    |       |       |        |       |                    | 0.161  | 0.445 | 0.009 |                    |            |
| SP 500      |                |       |       | 146456<br>\$ 24.23 |                    |       |                    |       |       |        |       |                    | 0.201  | 0.449 | 0.011 |                    |            |
| SP 500R     |                |       |       | 147373<br>\$ 23.55 |                    |       |                    |       |       |        |       |                    | 0.201  | 0.449 | 0.011 |                    |            |
| SP 500L     |                |       |       | 146058<br>\$ 23.55 |                    |       |                    |       |       |        |       |                    | 0.201  | 0.449 | 0.011 |                    |            |
| SP 600      |                |       |       | 146458<br>\$ 26.05 |                    |       |                    |       |       |        |       |                    | 0.252  | 0.449 | 0.014 |                    |            |

### Quick Choice Grade Selection

|                   |                             |                              |                                  |
|-------------------|-----------------------------|------------------------------|----------------------------------|
| <b>P</b><br>Steel | <b>M</b><br>Stainless Steel | <b>K</b><br>Cast Iron - Alum | <b>S</b><br>Heat Resistant Alloy |
|-------------------|-----------------------------|------------------------------|----------------------------------|

# Pro Part-Off Integral Shank Holder

## PP-INT



| Ref     | Holder Style | Application |       |       |       |       |       |               | Inserts           | Parts |
|---------|--------------|-------------|-------|-------|-------|-------|-------|---------------|-------------------|-------|
| Comment |              | Parting Off |       |       |       |       |       |               |                   |       |
|         |              | (inch)      |       |       |       |       |       |               |                   |       |
| PP-INT  | Code #       | Price \$    | h     | w     | L     | ød    | S     |               | Wrench            |       |
| 075-3   | 147433       | 201.69      | 0.750 | 0.750 | 4.724 | 1.575 | 0.750 | SP300, 300R/L |                   |       |
| 100-3   | 148231       | 201.69      | 1.000 | 1.000 | 5.906 | 2.362 | 1.000 | SP300, 300R/L | SW 50L            |       |
| 100-4   | 148232       | 201.69      | 1.000 | 1.000 | 5.906 | 2.756 | 1.000 | SP400, 400R/L | 146960<br>\$ 3.88 |       |

► P. E81

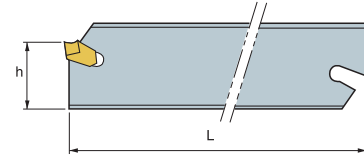
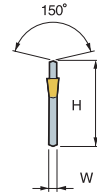
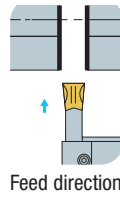
## Pro Part-Off Blades





### PP-B Pro Part-Off Blades



Kits Also Available  
➤ P. E172



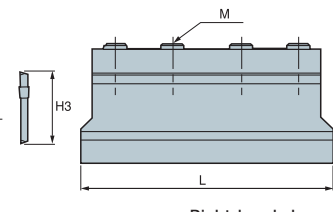
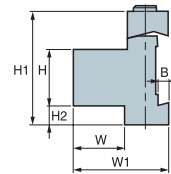
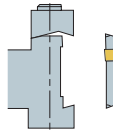
| Ref     | Holder Style |          | Application |       |       |       | Inserts   | Parts  |
|---------|--------------|----------|-------------|-------|-------|-------|---|--|
| Comment |              |          | Parting Off |       |       |       |  | <br>* Purchase separately |
|         |              |          | (inch)      |       |       |       |   |  |
| PP-B    | Code #       | Price \$ | H           | W     | L     | h     |   | Wrench   |
| 226S    | 146532       | 217.11   | 1.023       | 0.063 | 4.331 | 0.827 | SP200, 200R/L   | SW 15S<br><b>146771</b><br><b>\$ 40.34</b>   |
| 326S    | 146232       | 180.90   | 1.023       | 0.094 | 4.331 | 0.827 | SP300, 300R/L   |  |
| 232S    | 146717       | 206.72   | 1.259       | 0.063 | 5.906 | 0.984 | SP200, 200R/L   |  |
| 332S    | 146898       | 188.41   | 1.259       | 0.094 | 5.906 | 0.984 | SP300, 300R/L   |  |
| 432S    | 146899       | 197.87   | 1.259       | 0.126 | 5.906 | 0.984 | SP400, 400R/L   |  |
| 532S    | 146962       | 217.11   | 1.259       | 0.157 | 5.906 | 0.984 | SP500, 500R/L   |  |
| 632S    | 148538       | 206.75   | 1.259       | 0.205 | 5.906 | 0.984 | SP600, 600R/L   |  |

➤ P. E81



## Pro Part-Off Blocks



### P.O.B. Block For Pro Part-Off Blades



Right-hand shown

| Ref     | Holder Style |          | Application         |       |       |      |       |       |       |       |      | Inserts   | Parts   |
|---------|--------------|----------|---------------------|-------|-------|------|-------|-------|-------|-------|------|---|---|
| Comment |              |          | Saw-Man Blade Block |       |       |      |       |       |       |       |      |  |  |
|         |              |          | (inch)              |       |       |      |       |       |       |       |      |   |   |
| P.O.B.  | Code #       | Price \$ | H(h)                | W     | H3    | L    | H1    | H2    | W1    | B     | M    |   | Wrench  |
| 19-5    | 146510       | 222.06   | 0.750               | 0.750 | 1.023 | 3.50 | 2.10  | 0.354 | 1.375 | 0.209 | 3-M6 | PPB 226 & 326   | SW 50L  |
| 25;4-6  | 145895       | 226.19   | 1.000               | 0.875 | 1.259 | 4.50 | 2.125 | 0.157 | 1.500 | 0.209 | 4-M6 | PPB 232 - 532   | <b>146960</b><br><b>\$ 3.88</b>   |

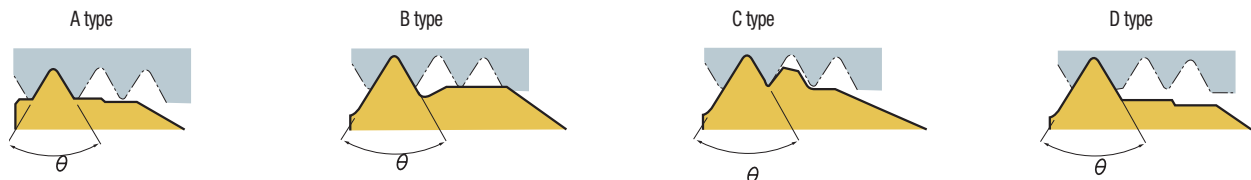
➤ P. E82

## Threading Insert

| Ref                     | for External   | Pitch  | for Internal  | Pitch  |
|-------------------------|--|--|---|--|
| Metric Thread<br>60°    | <b>3000type</b><br>ECTR3100~3300<br>ECTR3150F<br>ECTR3300F         | 1.0~3.0mm<br>0.5~1.5mm<br>1.5~3.0mm                      | <b>2000type</b><br>ICTR2050~2200<br>ICTR2150F<br><b>3000type</b><br>ICTR3100~3300<br>ICTR3150F<br>ICTR3300F               | 0.5~2.0mm<br>0.5~1.5mm<br>1.0~3.0mm<br>0.5~1.5mm<br>1.5~3.0mm                                    |
|                         | <b>4000type</b><br>ECTR4350~4500<br>ECTR4500F                      | 3.5~5.0mm<br>3.5~5.0mm                                   | <b>4000type</b><br>ICTR4350~4500<br>ICTR4500F   | 3.5~5.0mm<br>3.5~5.0mm   |
| Unified Thread<br>60°   | <b>3000type</b><br>ECTR3028UN~3008UN<br>ECTR3028UNF<br>ECTR3014UNF | 28~08 pitch/Inch<br>28~14 pitch/Inch<br>14~08 pitch/Inch | <b>2000type</b><br>ICTR2032UN~2014UN<br>ICTR2048UNF<br><b>3000type</b><br>ICTR3028UN~3008UN<br>ICTR3028UNF<br>ICTR3014UNF | 24~14 pitch/Inch<br>48~16 pitch/Inch<br>28~08 pitch/Inch<br>28~14 pitch/Inch<br>14~08 pitch/Inch |
|                         | <b>4000type</b><br>ECTR4007UN~4005UN<br>ECTR4007UNF                | 07~05 pitch/Inch<br>07~05 pitch/Inch                     | <b>4000type</b><br>ICTR4007UN~4005UN<br>ICTR4007UNF   | 07~05 pitch/Inch<br>07~05 pitch/Inch   |
| Whitworth Thread<br>55° | <b>3000type</b><br>ECTR3028W~3008W<br>ECTR3028WF<br>ECTR3014WF     | 28~08 pitch/Inch<br>28~14 pitch/Inch<br>14~08 pitch/Inch | <b>2000type</b><br>ICTR2020W~2014W<br>ICTR2048UNF<br><b>3000type</b><br>ICTR3028W~3008W<br>ICTR3028WF<br>ICTR3014WF       | 20~14 pitch/Inch<br>48~16 pitch/Inch<br>28~08 pitch/Inch<br>28~14 pitch/Inch<br>14~08 pitch/Inch |
|                         | <b>4000type</b><br>ECTR4007W~4005W<br>ECTR4007WF                   | 07~05 pitch/Inch<br>07~05 pitch/Inch                     | <b>4000type</b><br>ICTR4007W~4005W<br>CTR4007WF   | 07~05 pitch/Inch<br>07~05 pitch/Inch   |

| Workpiece                                   | Recommended Grade & Cutting Speed(sfm) |               |              |              |
|---|--|---------------|--------------|--------------|
|   | Coated Grade                           | Uncoated      |              | Cermet       |
|   | PM30P                                  | ST10          | PTM30U       | PM20S        |
| Carbon Steel                                | 400(250-500)                           | 325(300-400)  | 300(250-325) | 450(400-550) |
| Alloy Steel                                 | 325(250-425)                           | 300(250-375)  | 250(225-325) | 375(325-425) |
| Hardened Steel                              | 100(25-175)                            | 75(25-100)    |              |              |
| Heating Resistant Alloys                    | 125(75-200)                            | 100(25-100)   |              |              |
| Stainless Steel                             | 300(225-375)                           | 125(100-175)  | 225(200-300) | 325(300-400) |
| Cast Iron                                   | 400(325-425)                           | 250(225-300)  |              |              |
| Non-ferrous Metal<br>(Copper Alloy Plastic) | 975(325-1975)                          | 825(325-1650) |              |              |

### ■ Cutting Edge Type





## Effective Inclination and Relief Angle of Threading



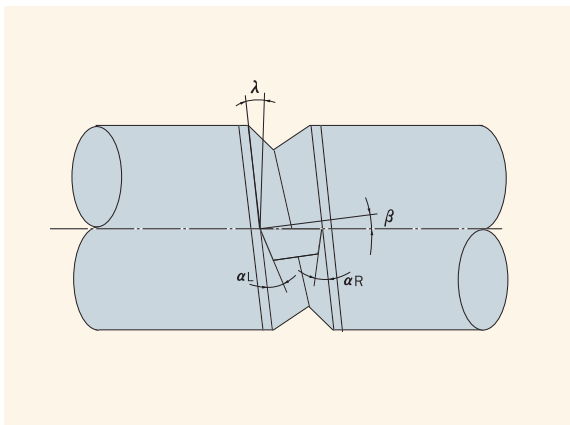
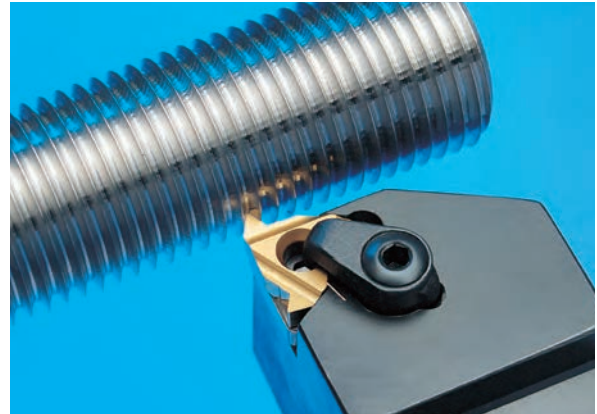
Inclination angle of the Thread ( $\beta$ ) in the figure is decided by effective diameter (d) and lead ( $\ell$ ) of thread

The angle of inclination of the Thread ( $\beta$ ) is calculated by using the formula.

$$\tan \beta = \frac{\ell}{\pi d}$$

$\ell$ : lead

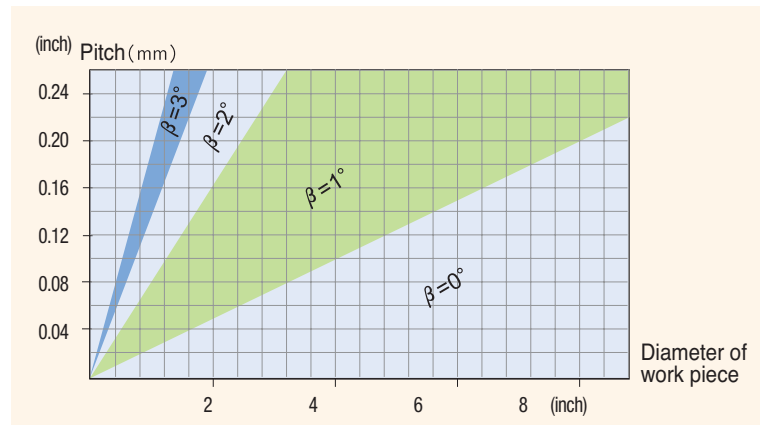
n:No.of Pitch,      p:Pitch,      d:Effective Diameter of Thread



$\alpha$  - Side Relief Angle ( $\alpha_L = \alpha_R$ )

$\lambda$  - Helix Angle

$\beta$  - Angle of Inclination



Effective Angle of Inclination of Each Cutting Condition

## Revision Method of Effective Inclination Angle



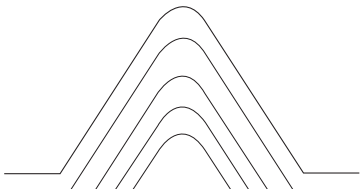
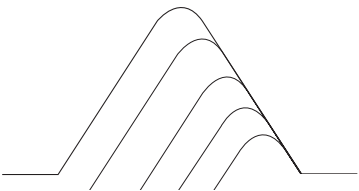
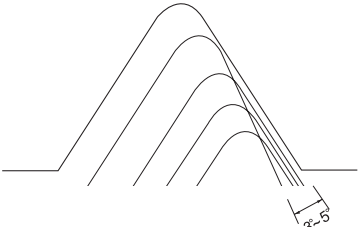
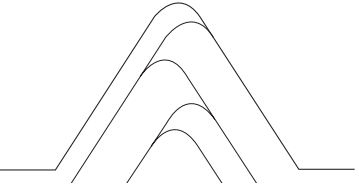
Threading holders (ETH, ITH) are drawn with revision of inclination angle,  $1^\circ \sim 2^\circ$  to be used for detailed threading.

But, shims are produced without revision of inclination angle (ST32C1, ST42C1).

If pitch of thread is bigger or diameter of thread is smaller, inclination angle of thread will be bigger and bigger inclination angle will make Insert relief angle (L, R) smaller.

This effects the shape of thread crest and tool life but revising inclination angle can solve it.

## Choosing Type of Infeed for Threading Operation

| Type of Infeed  | Features   |
|---|--|
|  <p>Radial infeed</p>            | <ul style="list-style-type: none"> <li>• Most commonly used</li> <li>• Suitable for relatively small pitch threading on soft material</li> <li>• Chattering may occur easily because of longer chip touch length and bigger load on nose of the insert</li> <li>• Bad chip control due to V type chip being produced</li> </ul>                           |
|  <p>Flank infeed</p>             | <ul style="list-style-type: none"> <li>• Suitable for bigger pitch thread or mild material, it can reduce chattering</li> <li>• Bigger wear may occur on right cutting edge</li> <li>• Good chip control either direction</li> </ul>  |
|  <p>Modified flank infeed</p> | <ul style="list-style-type: none"> <li>• Modified type of flank infeed</li> <li>• Suitable for bigger pitch thread or mild material, this method can reduce chattering</li> <li>• Good chip control with either way of chip flow</li> <li>• Wear can be reduced with infeeding right cutting edge</li> <li>• Recommended for 2 pitches thread</li> </ul> |
|  <p>Incremental infeed</p>   | <ul style="list-style-type: none"> <li>• Suitable for bigger pitch thread or mild material, it can reduce chattering</li> <li>• This method gives the insert even wear and longer tool life with using both side of cutting edge by turns</li> <li>• Coiling of chip from right and left may be occurred due to the chip flow in turn</li> </ul>        |

### ISO Metric 60° External

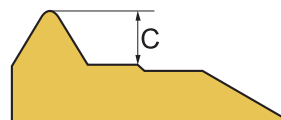
| Pitch            | 6.0  | 5.5  | 5.0  | 4.5  | 4.0  | 3.5  | 3.0  | 2.5  | 2.0  | 1.75 | 1.5  | 1.25 | 1.0  | 0.75 | 0.5  |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Infeed Value(mm) | 3.83 | 3.52 | 3.19 | 2.87 | 2.53 | 2.23 | 1.92 | 1.60 | 1.25 | 1.13 | 0.93 | 0.81 | 0.65 | 0.48 | 0.33 |
| Pass 1           | 0.46 | 0.43 | 0.41 | 0.37 | 0.34 | 0.34 | 0.28 | 0.27 | 0.24 | 0.22 | 0.22 | 0.21 | 0.18 | 0.16 | 0.11 |
| 2                | 0.43 | 0.40 | 0.39 | 0.34 | 0.32 | 0.31 | 0.26 | 0.24 | 0.22 | 0.20 | 0.20 | 0.17 | 0.16 | 0.14 | 0.09 |
| 3                | 0.35 | 0.32 | 0.32 | 0.28 | 0.25 | 0.25 | 0.21 | 0.20 | 0.18 | 0.17 | 0.17 | 0.14 | 0.12 | 0.11 | 0.07 |
| 4                | 0.30 | 0.28 | 0.27 | 0.24 | 0.22 | 0.21 | 0.18 | 0.17 | 0.16 | 0.14 | 0.14 | 0.11 | 0.11 | 0.07 | 0.06 |
| 5                | 0.29 | 0.26 | 0.24 | 0.22 | 0.20 | 0.18 | 0.16 | 0.15 | 0.14 | 0.12 | 0.12 | 0.10 | 0.08 |      |      |
| 6                | 0.26 | 0.24 | 0.24 | 0.22 | 0.18 | 0.18 | 0.15 | 0.15 | 0.12 | 0.10 | 0.08 | 0.08 |      |      |      |
| 7                | 0.24 | 0.21 | 0.22 | 0.20 | 0.17 | 0.16 | 0.14 | 0.12 | 0.11 | 0.10 |      |      |      |      |      |
| 8                | 0.23 | 0.20 | 0.20 | 0.18 | 0.15 | 0.15 | 0.13 | 0.11 | 0.08 | 0.08 |      |      |      |      |      |
| 9                | 0.22 | 0.19 | 0.19 | 0.17 | 0.14 | 0.14 | 0.12 | 0.11 |      |      |      |      |      |      |      |
| 10               | 0.19 | 0.18 | 0.18 | 0.16 | 0.13 | 0.12 | 0.11 | 0.08 |      |      |      |      |      |      |      |
| 11               | 0.18 | 0.17 | 0.16 | 0.14 | 0.12 | 0.11 | 0.10 |      |      |      |      |      |      |      |      |
| 12               | 0.16 | 0.15 | 0.15 | 0.13 | 0.12 | 0.08 | 0.08 |      |      |      |      |      |      |      |      |
| 13               | 0.15 | 0.14 | 0.12 | 0.12 | 0.11 |      |      |      |      |      |      |      |      |      |      |
| 14               | 0.14 | 0.13 | 0.10 | 0.10 | 0.08 |      |      |      |      |      |      |      |      |      |      |
| 15               | 0.13 | 0.12 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 16               | 0.10 | 0.10 |      |      |      |      |      |      |      |      |      |      |      |      |      |

### ISO Metric 60° Internal

| Pitch            | 6.0  | 5.5  | 5.0  | 4.5  | 4.0  | 3.5  | 3.0  | 2.5  | 2.0  | 1.75 | 1.5  | 1.25 | 1.0  | 0.75 | 0.5  |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Infeed Value(mm) | 3.54 | 3.25 | 2.96 | 2.65 | 2.33 | 2.05 | 1.78 | 1.48 | 1.17 | 1.05 | 0.85 | 0.75 | 0.60 | 0.46 | 0.31 |
| Pass 1           | 0.46 | 0.43 | 0.42 | 0.37 | 0.34 | 0.32 | 0.28 | 0.26 | 0.23 | 0.22 | 0.20 | 0.17 | 0.17 | 0.16 | 0.10 |
| 2                | 0.43 | 0.40 | 0.40 | 0.34 | 0.31 | 0.30 | 0.26 | 0.25 | 0.21 | 0.20 | 0.18 | 0.17 | 0.15 | 0.13 | 0.08 |
| 3                | 0.35 | 0.33 | 0.32 | 0.28 | 0.24 | 0.24 | 0.21 | 0.18 | 0.17 | 0.15 | 0.15 | 0.14 | 0.11 | 0.10 | 0.07 |
| 4                | 0.30 | 0.26 | 0.26 | 0.23 | 0.21 | 0.19 | 0.16 | 0.15 | 0.15 | 0.13 | 0.13 | 0.10 | 0.09 | 0.07 | 0.06 |
| 5                | 0.26 | 0.22 | 0.22 | 0.21 | 0.18 | 0.17 | 0.14 | 0.13 | 0.12 | 0.11 | 0.11 | 0.09 | 0.08 |      |      |
| 6                | 0.22 | 0.20 | 0.20 | 0.19 | 0.15 | 0.15 | 0.13 | 0.12 | 0.11 | 0.09 | 0.08 | 0.08 |      |      |      |
| 7                | 0.20 | 0.18 | 0.17 | 0.16 | 0.14 | 0.14 | 0.12 | 0.11 | 0.10 | 0.08 |      |      |      |      |      |
| 8                | 0.19 | 0.17 | 0.16 | 0.15 | 0.13 | 0.13 | 0.11 | 0.10 | 0.08 | 0.08 |      |      |      |      |      |
| 9                | 0.18 | 0.16 | 0.16 | 0.14 | 0.12 | 0.12 | 0.10 | 0.10 |      |      |      |      |      |      |      |
| 10               | 0.16 | 0.15 | 0.15 | 0.12 | 0.13 | 0.11 | 0.10 | 0.08 |      |      |      |      |      |      |      |
| 11               | 0.15 | 0.14 | 0.14 | 0.12 | 0.11 | 0.10 | 0.09 |      |      |      |      |      |      |      |      |
| 12               | 0.15 | 0.14 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 |      |      |      |      |      |      |      |      |
| 13               | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 |      |      |      |      |      |      |      |      |      |      |
| 14               | 0.13 | 0.12 | 0.10 | 0.10 | 0.08 |      |      |      |      |      |      |      |      |      |      |
| 15               | 0.12 | 0.12 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 16               | 0.10 | 0.10 |      |      |      |      |      |      |      |      |      |      |      |      |      |

### ■ Note

- 1) Above conditions are calculated upon using PM30P and PM20S grade.
- 2) Total D.O.C is based on C+ 0.05 ~ +0.08mm and no more excess is necessary.
- 3) D.O.C, 0.05 ~ 0.1mm is recommended for pass
- 4) To avoid breakage of the insert at the first pass, make chamfer of 0.3~0.5 on the corner of workpiece.
- 5) Using coolant helps improve insert tool life and surface finish.



## Cutting Depth and Passes — Unified

### Unified 60° External

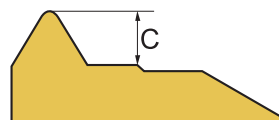
| Pitch            | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 14    | 16     | 18    | 19    | 20    | 24    | 28    | 32    |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| Infeed Value(mm) | 0.130 | 0.107 | 0.092 | 0.082 | 0.072 | 0.065 | 0.060 | 0.055 | 0.051 | 0.047  | 0.041 | 0.037 | 0.033 | 0.028 | 0.024 | 0.021 |
| Pass 1           | 0.017 | 0.014 | 0.014 | 0.012 | 0.011 | 0.011 | 0.011 | 0.011 | 0.010 | 0.00   | 0.009 | 0.009 | 0.008 | 0.007 | 0.007 | 0.007 |
| 2                | 0.016 | 0.013 | 0.013 | 0.011 | 0.010 | 0.010 | 0.010 | 0.010 | 0.009 | 0.009  | 0.008 | 0.008 | 0.007 | 0.007 | 0.006 | 0.006 |
| 3                | 0.014 | 0.011 | 0.010 | 0.010 | 0.008 | 0.008 | 0.008 | 0.008 | 0.007 | 0.007  | 0.006 | 0.006 | 0.006 | 0.006 | 0.004 | 0.005 |
| 4                | 0.012 | 0.009 | 0.009 | 0.008 | 0.008 | 0.007 | 0.007 | 0.007 | 0.007 | 0.0066 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.003 |
| 5                | 0.010 | 0.009 | 0.008 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005  | 0.005 | 0.005 | 0.005 | 0.004 | 0.003 | 0.003 |
| 6                | 0.009 | 0.008 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004  | 0.004 | 0.003 | 0.003 |       |       |       |
| 7                | 0.007 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.004 | 0.003 | 0.003 | 0.003  | 0.003 |       |       |       |       |       |
| 8                | 0.007 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.004 | 0.003 | 0.003 | 0.003  |       |       |       |       |       |       |
| 9                | 0.007 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.003 |       |       |        |       |       |       |       |       |       |
| 10               | 0.007 | 0.006 | 0.005 | 0.005 | 0.004 | 0.003 |       |       |       |        |       |       |       |       |       |       |
| 11               | 0.007 | 0.005 | 0.004 | 0.004 | 0.003 |       |       |       |       |        |       |       |       |       |       |       |
| 12               | 0.006 | 0.005 | 0.003 | 0.003 |       |       |       |       |       |        |       |       |       |       |       |       |
| 13               | 0.005 | 0.004 |       |       |       |       |       |       |       |        |       |       |       |       |       |       |
| 14               | 0.004 | 0.004 |       |       |       |       |       |       |       |        |       |       |       |       |       |       |

### Unified 60° Internal

| Pitch            | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 14    | 16    | 18    | 19    | 20    | 24    | 28    | 32    |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Infeed Value(mm) | 0.118 | 0.097 | 0.084 | 0.074 | 0.065 | 0.059 | 0.054 | 0.049 | 0.045 | 0.042 | 0.037 | 0.033 | 0.030 | 0.025 | 0.022 | 0.019 |
| Pass 1           | 0.017 | 0.014 | 0.013 | 0.012 | 0.011 | 0.011 | 0.011 | 0.011 | 0.010 | 0.009 | 0.009 | 0.009 | 0.008 | 0.007 | 0.007 | 0.007 |
| 2                | 0.015 | 0.013 | 0.013 | 0.011 | 0.010 | 0.010 | 0.009 | 0.009 | 0.008 | 0.007 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 |
| 3                | 0.013 | 0.010 | 0.009 | 0.009 | 0.007 | 0.007 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.004 |
| 4                | 0.011 | 0.008 | 0.008 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.003 |
| 5                | 0.009 | 0.007 | 0.007 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 |       |
| 6                | 0.008 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 |       |       |       |
| 7                | 0.007 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.006 |       |       |       |       |       |
| 8                | 0.007 | 0.006 | 0.005 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 | 0.003 |       |       |       |       |       |       |
| 9                | 0.006 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 | 0.006 |       |       |       |       |       |       |       |       |       |
| 10               | 0.006 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 |       |       |       |       |       |       |       |       |       |       |
| 11               | 0.006 | 0.005 | 0.004 | 0.004 | 0.003 |       |       |       |       |       |       |       |       |       |       |       |
| 12               | 0.006 | 0.004 | 0.003 | 0.003 |       |       |       |       |       |       |       |       |       |       |       |       |
| 13               | 0.005 | 0.004 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 14               | 0.004 | 0.004 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

### ■ Note

- 1) Above conditions are calculated upon using PM30P and PM20S grade.
- 2) Total D.O.C is based on C+ 0.05 ~ +0.08mm and no more excess is necessary.
- 3) D.O.C, 0.05 ~ 0.1mm is recommended for pass
- 4) To avoid breakage of the insert at the first pass, make chamfer of 0.3~0.5 on the corner of workpiece.
- 5) Using coolant helps improve insert tool life and surface finish.

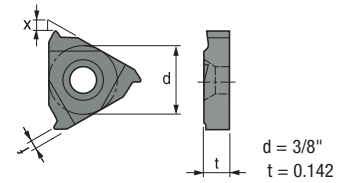
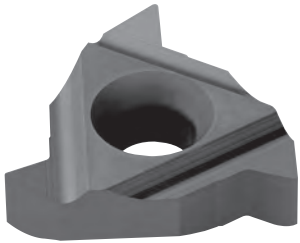


# Indexable Cutting Tools

## External Threading Inserts



### ECTR

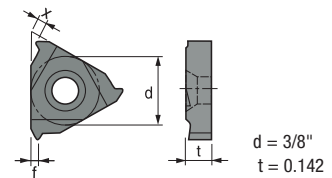
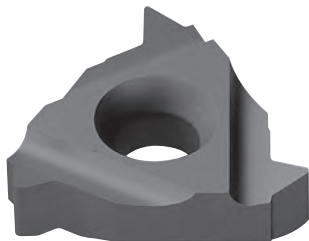


| Designation   | Coated Carbide |       |       |       |                    |       |       |       | Uncoated Carbide |       |        | (inch) |       |       |          |       | Applicable Holders |         |          |
|---------------|----------------|-------|-------|-------|--------------------|-------|-------|-------|------------------|-------|--------|--------|-------|-------|----------|-------|--------------------|---------|----------|
|               | PT10C          | PT15C | PT20C | PT30C | PM30P              | MT20C | MT30P | KT05C | KT15P            | PT10S | PTM30U | KTM10U | Pitch | f     | $\theta$ | x     | Cutting Edge       | Holder  | Page No. |
| ECTR 20UN     |                |       |       |       | 146524<br>\$ 51.36 |       |       |       |                  |       |        |        | 20    | 0.039 | 60°      | 0.051 | A                  | ETH3--- | E89      |
| ECTR 16UN     |                |       |       |       | 146489<br>\$ 41.55 |       |       |       |                  |       |        |        | 16    | 0.039 | 60°      | 0.051 | A                  |         |          |
| ECTR 12UN     |                |       |       |       | 146250<br>\$ 41.55 |       |       |       |                  |       |        |        | 12    | 0.047 | 60°      | 0.051 | A                  |         |          |
| ECTR 10UN     |                |       |       |       | 146249<br>\$ 51.36 |       |       |       |                  |       |        |        | 10    | 0.059 | 60°      | 0.059 | A                  |         |          |
| ECTR 08UN     |                |       |       |       | 146248<br>\$ 51.36 |       |       |       |                  |       |        |        | 08    | 0.059 | 60°      | 0.059 | A                  |         |          |
| ECTR 300 8-28 |                |       |       |       | 146597<br>\$ 52.87 |       |       |       |                  |       |        |        | 28-8  | 0.039 | 60°      | 0.051 | D                  |         |          |

## Internal Threading Inserts



### ICTR



| Designation   | Coated Carbide |       |       |       |                    |       |       |       | Uncoated Carbide |       |        | (inch) |       |       |          |       | Applicable Holders |         |          |
|---------------|----------------|-------|-------|-------|--------------------|-------|-------|-------|------------------|-------|--------|--------|-------|-------|----------|-------|--------------------|---------|----------|
|               | PT10C          | PT15C | PT20C | PT30C | PM30P              | MT20C | MT30P | KT05C | KT15P            | PT10S | PTM30U | KTM10U | Pitch | f     | $\theta$ | x     | Cutting Edge       | Holder  | Page No. |
| ICTR 16UN     |                |       |       |       | 146514<br>\$ 42.77 |       |       |       |                  |       |        |        | 16    | 0.039 | 60°      | 0.051 | A                  | ITH3--- | E89      |
| ICTR 12UN     |                |       |       |       | 146253<br>\$ 64.37 |       |       |       |                  |       |        |        | 12    | 0.047 | 60°      | 0.051 | A                  |         |          |
| ICTR 10UN     |                |       |       |       | 146252<br>\$ 51.36 |       |       |       |                  |       |        |        | 10    | 0.059 | 60°      | 0.059 | A                  |         |          |
| ICTR 300 8-28 |                |       |       |       | 146610<br>\$ 52.87 |       |       |       |                  |       |        |        | 28-8  | 0.039 | 60°      | 0.051 | D                  |         |          |

### ■ Cutting Edge Type

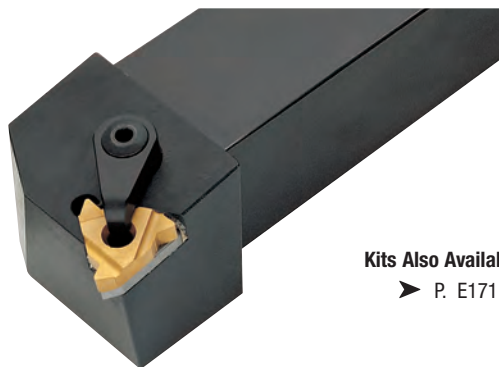


#### Quick Choice Grade Selection

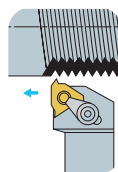
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

## External Threading Holders

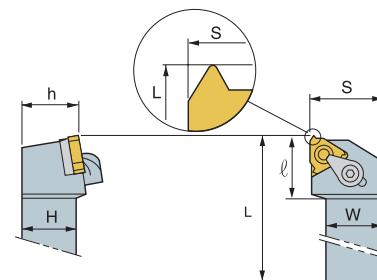
### ETH3



Kits Also Available  
➤ P. E171



Feed direction



| Ref     | Holder Style | Application        |       |       |       |       |       |        | Inserts            | Parts              |                    |                    |                   |                   |        |  |
|---------|--------------|--------------------|-------|-------|-------|-------|-------|--------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------------|--------|--|
| Comment |              | External Threading |       |       |       |       |       |        |                    |                    |                    |                    |                   |                   |        |  |
| ETH3    | Code #       | Price \$           | H=(h) | W     | L     | S     | l     | (inch) |                    | Clamp              | Clamp Screw        | Shim               | Screw             | C Ring            | Wrench |  |
| 3/4"    | 146708       | 222.01             | 0.750 | 0.750 | 6.000 | 1.205 | 1.100 |        |                    | CH5R3              | CHX0513            | ST32C1             | SHX0310           | CR04              | HW20L  |  |
| 1"      | 146290       | 150.48             | 1.000 | 1.000 | 6.000 | 1.205 | 1.100 | ECTR   | 146474<br>\$ 43.65 | 146475<br>\$ 24.53 | 146476<br>\$ 19.43 | 146155<br>\$ 11.76 | 146477<br>\$ 4.11 | 146954<br>\$ 3.28 |        |  |

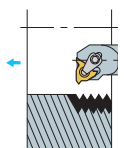
➤ P. E88

## Internal Threading Holders

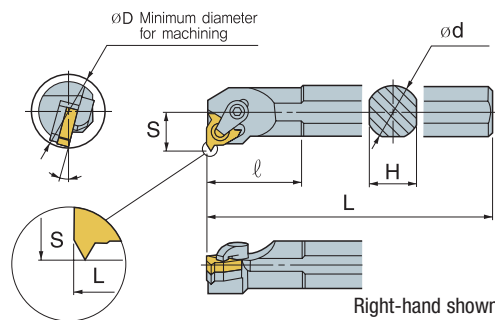
### ITH3



Kits Also Available  
➤ P. E171



Feed direction



| Ref     | Holder Style | Application        |       |       |       |       |      |       | Inserts | Parts |                    |                    |                    |                    |                   |                   |
|---------|--------------|--------------------|-------|-------|-------|-------|------|-------|---------|-------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------------|
| Comment |              | Internal Threading |       |       |       |       |      |       |         |       |                    |                    |                    |                    |                   |                   |
| ITH3    | Code #       | Price \$           | ØD    | Ød    | H     | L     | l    | S     | (inch)  |       | Clamp              | Clamp Screw        | Shim               | Screw              | C Ring            | Wrench            |
| 3/4"    | 146255       | 204.87             | 0.950 | 0.750 | 0.625 | 7.00  | 2.00 | 0.520 |         |       | CH5R3              | CHX0513            | ST32C1             | SHX0310            | CR04              | HW20L             |
| 1"      | 146254       | 243.47             | 1.150 | 1.000 | 0.750 | 8.00  | 2.50 | 0.650 |         |       | 146474<br>\$ 43.65 | 146475<br>\$ 24.53 | 146476<br>\$ 19.43 | 146155<br>\$ 11.76 | 146477<br>\$ 4.11 | 146954<br>\$ 3.28 |
| 1.25"   | 146256       | 323.19             | 1.460 | 1.250 | 1.250 | 10.00 | 2.50 | 0.780 |         |       |                    |                    |                    |                    |                   |                   |

➤ P. E88

## Milling Insert Code System

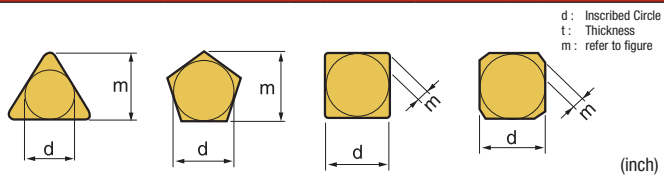


| 1 Insert Shape |          |          |          |
|----------------|----------|----------|----------|
|                |          |          |          |
| <b>C</b>       | <b>D</b> | <b>H</b> | <b>L</b> |
|                |          |          |          |
| <b>O</b>       | <b>R</b> | <b>S</b> | <b>T</b> |
|                |          |          |          |
| <b>V</b>       | <b>W</b> |          |          |

| 2 Clearance Angle |          |          |
|-------------------|----------|----------|
|                   |          |          |
| <b>A</b>          | <b>B</b> | <b>C</b> |
|                   |          |          |
| <b>D</b>          | <b>E</b> | <b>F</b> |
|                   |          |          |
| <b>G</b>          | <b>N</b> | <b>P</b> |



### 3 Tolerance



| class | d   | m                            | t                     |
|-------|---|------------------------------|-----------------------|
| A     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0002        | + <sub>-</sub> 0.0010 |
| C     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.0010 |
| H     | + <sub>-</sub> 0.0005                       | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.0010 |
| E     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.0010 |
| G     | + <sub>-</sub> 0.0010                       | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.005  |
| J     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0002        | + <sub>-</sub> 0.0010 |
| K     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0005        | + <sub>-</sub> 0.0010 |
| L     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.0010        | + <sub>-</sub> 0.0010 |
| M     | + <sub>-</sub> 0.002 - + <sub>-</sub> 0.006 | + <sub>-</sub> 0.003 - 0.008 | + <sub>-</sub> 0.005  |
| U     | + <sub>-</sub> 0.003 - + <sub>-</sub> 0.01  | + <sub>-</sub> 0.005 - 0.015 | + <sub>-</sub> 0.005  |

#### Tolerance on C, H, R, T, W class (exceptional)

| d   | Tolerance on d       |                      | Tolerance on m       |                      |
|-----|----------------------|----------------------|----------------------|----------------------|
|     | J, K, L, M, N        | U                    | M, N                 | U                    |
| 1/4 | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 |
| 3/8 | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 |
| 1/2 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.008 |
| 5/8 | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007 | + <sub>-</sub> 0.06  | + <sub>-</sub> 0.01  |
| 3/4 | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007 | + <sub>-</sub> 0.06  | + <sub>-</sub> 0.011 |
| 1   | + <sub>-</sub> 0.005 | + <sub>-</sub> 0.01  | + <sub>-</sub> 0.07  | + <sub>-</sub> 0.015 |

#### Tolerance on D class (exceptional)

| d   | Tolerance on d       | Tolerance on m        |
|-----|----------------------|-----------------------|
| 1/4 | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.0043 |
| 3/8 | + <sub>-</sub> 0.002 | + <sub>-</sub> 0.0043 |
| 1/2 | + <sub>-</sub> 0.003 | + <sub>-</sub> 0.006  |
| 5/8 | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007  |
| 3/4 | + <sub>-</sub> 0.004 | + <sub>-</sub> 0.007  |

### 4 Cross Section Type

|              |          |
|--------------|----------|
|              |          |
| <b>A</b>     | <b>B</b> |
|              |          |
| <b>C</b>     | <b>F</b> |
|              |          |
| <b>G</b>     | <b>H</b> |
|              |          |
| <b>J</b>     | <b>M</b> |
|              |          |
| <b>N</b>     | <b>Q</b> |
|              |          |
| <b>R</b>     | <b>T</b> |
|              |          |
| <b>U</b>     | <b>W</b> |
| Special Type |          |
| <b>X</b>     |          |

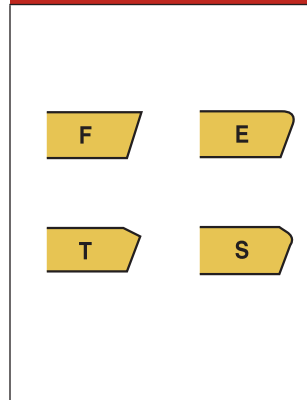
# Milling Insert Code System

## 6 Height of Cutting Edge

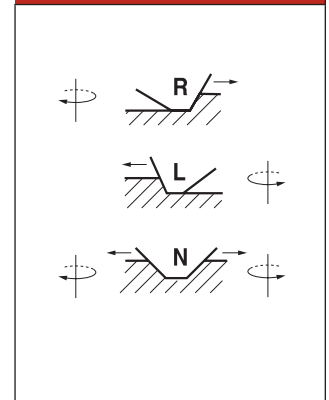
|  | Symbol |        | Height of Cutting Edge (t) |       |
|--|--------|--------|----------------------------|-------|
|  | Metric | Inch   | mm                         | Inch  |
|  | -      | 0.5(1) | 0.79                       | 1/32  |
|  | T0     | 0.6    | 1.00                       | 0.040 |
|  | 01     | 1(2)   | 1.59                       | 1/16  |
|  | T1     | 1.2    | 1.98                       | 5.64  |
|  | 02     | 1.5(3) | 2.38                       | 3/32  |
|  | 03     | 2      | 3.18                       | 1/8   |
|  | T3     | 2.5    | 3.97                       | 5/32  |
|  | 04     | 3      | 4.76                       | 3/16  |
|  | 05     | 3.5    | 5.56                       | 7/32  |
|  | 06     | 4      | 6.35                       | 1/4   |
|  | 07     | 5      | 7.94                       | 5/16  |
|  | 09     | 6      | 9.52                       | 3/8   |
|  | 11     | 7      | 11.11                      | 7/16  |
|  | 12     | 8      | 12.70                      | 1/2   |

\* ( ) Symbol for small size insert

## 8 Edge Preparation



## 9 Hand of Tool



## 5 Cutting Edge Length, Diameter of Inscribed Circle

Use 1/32" unit for an insert having smaller I.C. under 1/4"

Use 1/8" unit for an insert having larger I.C. over 1/4"

\* Indicate cutting edge length in case of tetragon & rhombus

### ■ Cross over chart for Metric and Inch system

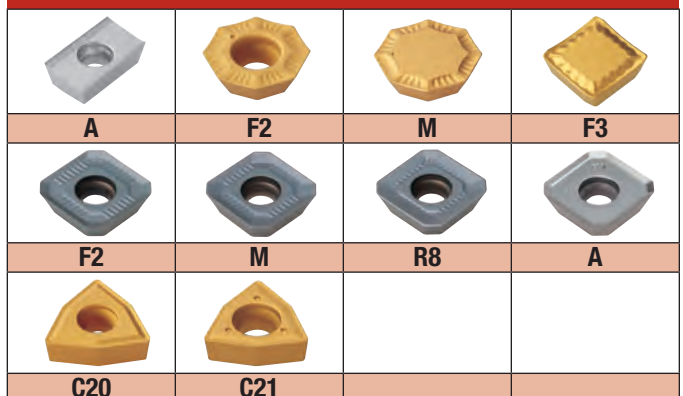
|                  |       |       |      |      |      |      |      |    |
|------------------|-------|-------|------|------|------|------|------|----|
|                  | 06    | 09    | 11   | 16   | 22   | 27   | 33   | 44 |
|                  | 03    | 05    | 06   | 09   | 12   | 15   | 19   | 25 |
|                  | 04    | 06    | 07   | 11   | 15   | 19   | 23   | 31 |
|                  | 03    | 05    | 06   | 09   | 12   | 16   | 19   | 25 |
| Inscribed Circle | 5/32" | 7/32" | 1/4" | 3/8" | 1/2" | 5/8" | 3/4" | 1" |
| Inch System      | 5     | 7     | 2(8) | 3    | 4    | 5    | 6    | 8  |

## 7 Nose Corner Radius (Nose R)

| r  |      | Symbol |      | r  |      | Symbol |      |
|----|------|--------|------|----|------|--------|------|
| mm | inch | mm     | inch | mm | inch | mm     | inch |
| 00 | 0    | 0.0    |      | 12 | 3    | 1.2    | 3/64 |
| 02 | 0.2  | 0.2    |      | 15 |      | 1.5    |      |
| 04 | 1    | 0.4    | 1/64 | 16 | 4    | 1.6    | 4/64 |
| 05 |      | 0.5    |      | 24 | 6    | 2.4    | 6/64 |
| 08 | 2    | 0.8    | 2/64 | 32 | 8    | 3.2    | 8/64 |
| 10 |      | 1.0    |      | 40 |      | 4.0    |      |

| Parallel Land |  | Relief Angle |       |
|---------------|--|--------------|-------|
| kr            |  | a'n          |       |
| A-45°         |  | A-3°         | F-25° |
| D-60°         |  | B-5°         | G-30° |
| E-75°         |  | C-7°         | N-0°  |
| F-85°         |  | D-15°        | P-11° |
| P-90°         |  | E-20°        |       |
| Z-Special     |  |              |       |

## 10 Chip Breaker for Milling



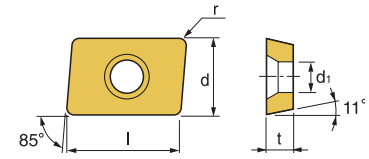




## APKT

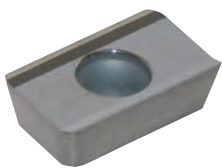


**Features**  
Strong edge geometry

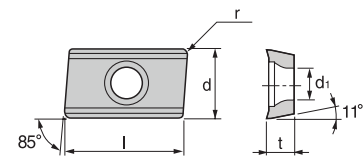


| Designation        | Coated Carbide |                    |                    |       |       |       |       |       |       |       | Uncoated Carbide |        | (inch) |     |      |      |       | Applicable Cutter |          |
|--------------------|----------------|--------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|------------------|--------|--------|-----|------|------|-------|-------------------|----------|
|                    | PM10C          | PM25C              | PM30C              | PM25P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U | l      | d   | t    | r    | d1    | Cutter            | Page No. |
| APKT 160416R PDR-A |                | 146010<br>\$ 32.20 |                    |       |       |       |       |       |       |       |                  |        | 0.646  | 3/8 | 3/16 | 1/32 | 0.173 | APFM16            | E131     |
| APKT 160432R PDR-A |                |                    | 146087<br>\$ 32.75 |       |       |       |       |       |       |       |                  |        | 0.646  | 3/8 | 3/16 | 1/32 | 0.173 |                   |          |

## APKT-A (For Aluminum & Plastic)



**Features**  
Excellent cutting geometry  
for aluminum and plastics

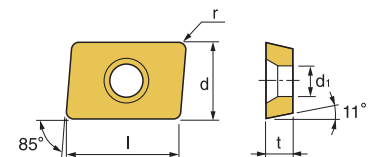


| Designation                    | Coated Carbide |       |       |       |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |     |      |       |       | Applicable Cutter |          |
|--------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-----|------|-------|-------|-------------------|----------|
|                                | PM10C          | PM25C | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U             | l      | d   | t    | r     | d1    | Cutter            | Page No. |
| APKT 160416R PDR-A             |                |       |       |       |       |       |       |       |       |       |                  | 146548<br>\$ 25.74 | 0.646  | 3/8 | 3/16 | 1/16  | 0.173 | APFM16            | E131     |
| APKT 160432R PDR-A             |                |       |       |       |       |       |       |       |       |       |                  | 146547<br>\$ 26.19 | 0.646  | 3/8 | 3/16 | 1/8   | 0.173 |                   |          |
| APKT 1604 PDR-A                |                |       |       |       |       |       |       |       |       |       |                  | 146006<br>\$ 25.74 | 0.646  | 3/8 | 3/16 | 0.008 | 0.173 |                   |          |
| APKT 1604 PDRF-AH<br>(Helical) |                |       |       |       |       |       |       |       |       |       |                  | 148496<br>\$ 25.74 | 0.646  | 3/8 | 3/16 | 0.031 | 0.173 |                   |          |

## APKT-X24

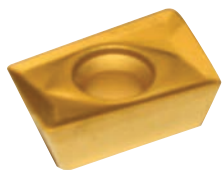


**Features**  
Free cutting geometry

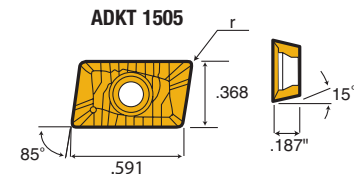
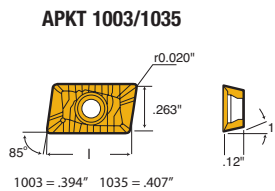


| Designation       | Coated Carbide |                    |       |       |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |     |      |      |       | Applicable Cutter |          |
|-------------------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-----|------|------|-------|-------------------|----------|
|                   | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U             | l      | d   | t    | r    | d1    | Cutter            | Page No. |
| APKT 1604 PDR-X24 |                | 147181<br>\$ 32.75 |       |       |       |       |       |       |       |       |                  | 146007<br>\$ 26.19 | 0.646  | 3/8 | 3/16 | 3/64 | 0.173 | APFM16            | E131     |

## APKT 1003 - ADKT 1505



**Features**  
Excellent general purpose geometry  
for a variety of applications

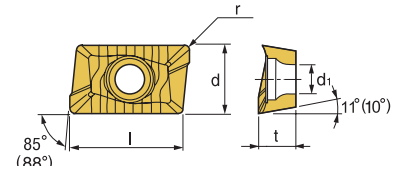


| Designation      | Coated Carbide |                    |       |       |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |       |       |       |       | Applicable Cutter |          |
|------------------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-------|-------|-------|-------|-------------------|----------|
|                  | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U             | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| APKT 1003 PDSR   |                |                    |       |       |       |       |       |       |       |       |                  | 147877<br>\$ 18.67 | 0.394  | 0.263 | 0.120 | 0.020 | 0.173 | AP 10             | E125     |
| ADKT 1505 PDRF-A |                |                    |       |       |       |       |       |       |       |       |                  | 147980<br>\$ 24.06 | 0.591  | 0.368 | 0.187 | 0.020 | 0.177 | AD 15             | E125     |
| ADKT 1505 PDSR   |                | 148358<br>\$ 29.70 |       |       |       |       |       |       |       |       |                  | 147879<br>\$ 23.77 | 0.591  | 0.368 | 0.187 | 0.020 | 0.177 |                   |          |

## APKT 1604



**Features**  
Excellent free cutting geometries  
for a variety of applications

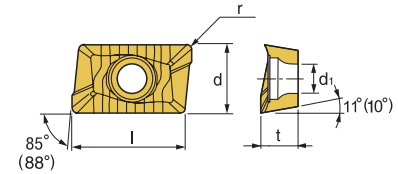


| Designation      | Coated Carbide |                    |       |       |                    |                    |                    |       |       | Uncoated Carbide   |        | (inch) |       |       |      |       | Applicable Cutter |          |
|------------------|----------------|--------------------|-------|-------|--------------------|--------------------|--------------------|-------|-------|--------------------|--------|--------|-------|-------|------|-------|-------------------|----------|
|                  | PM10C          | PM25C              | PM30C | PM30P | PM30.1P            | KM10P              | MM30P              | MT30P | SM20P | PM20U              | KTM10U | l      | d     | t     | r    | d1    | Cutter            | Page No. |
| APKT 1604 PDSR-M |                | 146530<br>\$ 32.20 |       |       |                    | 145637<br>\$ 32.20 | 147339<br>\$ 32.20 |       |       | 146755<br>\$ 25.06 |        | 0.650  | 0.376 | 0.227 | 1/32 | 0.175 | AP 16             | E130     |
| APKT 160416R-M   |                |                    |       |       |                    |                    | 148397<br>\$ 34.39 |       |       |                    |        | 0.650  | 0.376 | 0.227 | 1/16 | 0.175 |                   |          |
| APKT 160424R-M   |                |                    |       |       | 146105<br>\$ 32.75 |                    |                    |       |       |                    |        | 0.650  | 0.376 | 0.227 | 3/32 | 0.175 |                   |          |
| APKT 160432R-M   |                | 146149<br>\$ 32.20 |       |       |                    |                    | 148401<br>\$ 32.20 |       |       |                    |        | 0.650  | 0.376 | 0.227 | 1/8  | 0.175 |                   |          |
| APKT 160464R-M   |                |                    |       |       |                    |                    | 148403<br>\$ 31.82 |       |       | 146168<br>\$ 25.47 |        | 0.650  | 0.376 | 0.227 | 1/4  | 0.175 |                   |          |

## APMT



**Features**  
Excellent free cutting geometries  
for a variety of applications



| Designation      | Coated Carbide |                    |       |       |       |                    |       |                    |       | Uncoated Carbide |                    | (inch) |       |       |       |       | Applicable Cutter |                  |              |                  |              |
|------------------|----------------|--------------------|-------|-------|-------|--------------------|-------|--------------------|-------|------------------|--------------------|--------|-------|-------|-------|-------|-------------------|------------------|--------------|------------------|--------------|
|                  | PM10C          | PM25C              | PM10P | PM30P | PM35P | PTM50P             | KM10P | MM30P              | MT30P | SM20P            | PM20U              | KTM10U | l     | d     | t     | r     | d1                | Cutter           | Page No.     |                  |              |
| APMT0602PDR-A    |                |                    |       |       |       |                    |       |                    |       |                  | 148528<br>\$ 19.60 |        | 0.236 | 0.167 | 0.102 | 0.016 | 0.079             | APFM06M<br>A06M  | E128<br>E122 |                  |              |
| APMT0602PDSR-M   |                |                    |       |       |       | 147103<br>\$ 22.27 |       | 147104<br>\$ 22.96 |       |                  |                    |        | 0.236 | 0.167 | 0.102 | 0.016 | 0.079             |                  |              |                  |              |
| APMT11T3PDR-F2   |                | 148556<br>\$ 22.96 |       |       |       |                    |       |                    |       |                  |                    |        | 0.441 | 0.255 | 0.142 | 0.020 | 0.112             | APFM11M<br>AP11M | E129<br>E124 |                  |              |
| APMT11T3PDR-M    |                | 148547<br>\$ 23.65 |       |       |       | 148544<br>\$ 22.96 |       | 148555<br>\$ 23.65 |       |                  |                    |        | 0.441 | 0.255 | 0.142 | 0.020 | 0.112             |                  |              |                  |              |
| APMT11T3PDR-A    |                |                    |       |       |       |                    |       |                    |       |                  | 148543<br>\$ 20.13 |        | 0.441 | 0.255 | 0.142 | 0.047 | 0.112             | APFM16M<br>AP16M | E129<br>E124 |                  |              |
| APMT1604PDR-A    |                |                    |       |       |       |                    |       |                    |       |                  | 148584<br>\$ 25.06 |        | 0.646 | 0.370 | 0.227 | 0.031 | 0.177             |                  |              |                  |              |
| APMT1604PDR-M    |                |                    |       |       |       | 148588<br>\$ 28.46 |       |                    |       |                  |                    |        | 0.646 | 0.370 | 0.227 | 0.031 | 0.177             |                  |              |                  |              |
| APMT1604PDSR-F2  |                | 148597<br>\$ 23.37 |       |       |       | 148602<br>\$ 28.46 |       |                    |       |                  |                    |        | 0.646 | 0.370 | 0.227 | 0.031 | 0.177             |                  |              |                  |              |
| APMT1604PDSR-M   |                | 148589<br>\$ 29.26 |       |       |       | 149009<br>\$ 29.26 |       | 148595<br>\$ 28.46 |       |                  |                    |        | 0.646 | 0.370 | 0.227 | 0.031 | 0.177             |                  |              |                  |              |
| APMT160416PDSR-M |                | 148603<br>\$ 28.91 |       |       |       |                    |       |                    |       |                  |                    |        | 0.646 | 0.370 | 0.227 | 0.063 | 0.177             |                  |              |                  |              |
| APMT160432PDSR-M |                | 148605<br>\$ 28.46 |       |       |       |                    |       |                    |       |                  |                    |        | 0.646 | 0.370 | 0.227 | 0.126 | 0.177             |                  |              |                  |              |
| APMT1806PDR-M    |                |                    |       |       |       | 148610<br>\$ 38.16 |       |                    |       |                  |                    |        | 0.685 | 0.432 | 0.250 | 0.047 | 0.177             |                  |              | APFM18M<br>AP18M | E132<br>E127 |
| APMT1806PDSR-M   |                | 147105<br>\$ 38.73 |       |       |       | 145641<br>\$ 39.24 |       | 147106<br>\$ 38.16 |       |                  |                    |        | 0.685 | 0.432 | 0.250 | 0.047 | 0.177             |                  |              |                  |              |

### Quick Choice Grade Selection

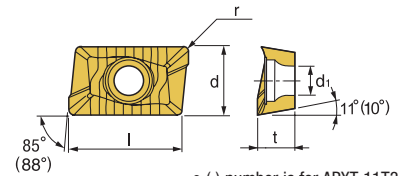
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



### APXT 11T3 & 1604

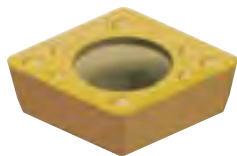


**Features**  
Excellent free cutting geometries  
for a variety of applications

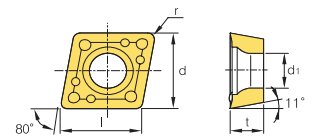


| Designation         | Coated Carbide |                    |                    |                    |                    |                    |                    |       |                    |                    | Uncoated Carbide |       | (inch) |       |       |       |                  | Applicable Cutter    |  |
|---------------------|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|--------------------|--------------------|------------------|-------|--------|-------|-------|-------|------------------|----------------------|--|
|                     | PM10C          | PM25C              | PM30C              | PM30.1P            | PM40P              | KM20C              | MM30P              | MT30P | SM20P              | PM20U              | KTM10U           | l     | d      | t     | r     | d1    | Cutter           | Page No.             |  |
| APXT 11T3 PDSR-F2   |                | 146796<br>\$ 24.02 |                    |                    |                    |                    | 148485<br>\$ 23.65 |       |                    |                    |                  | 0.445 | 0.260  | 0.142 | 0.020 | 0.112 | AP 11<br>APFM 11 | E122-123<br>E130-132 |  |
| APXT 11T3 PDSR-M    |                | 146356<br>\$ 23.65 |                    | 146110<br>\$ 24.01 |                    |                    | 147340<br>\$ 23.65 |       |                    | 146357<br>\$ 18.70 |                  | 0.445 | 0.260  | 0.142 | 0.020 | 0.112 |                  |                      |  |
| APXT 11T312R-M      |                | 146359<br>\$ 24.02 |                    |                    |                    |                    |                    |       |                    |                    |                  | 0.445 | 0.260  | 0.142 | 3/64  | 0.112 |                  |                      |  |
| APXT 11T316R-M      |                |                    |                    |                    | 147379<br>\$ 24.02 |                    |                    |       |                    |                    |                  | 0.445 | 0.260  | 0.142 | 1/16  | 0.112 |                  |                      |  |
| APXT 11T3 PDR-A     |                |                    |                    |                    |                    |                    |                    |       |                    | 146358<br>\$ 19.25 |                  | 0.445 | 0.260  | 0.142 | 0.020 | 0.112 |                  |                      |  |
| APXT 1604 PDSR-F2   |                |                    |                    |                    |                    | 147408<br>\$ 31.78 |                    |       | 148502<br>\$ 23.42 |                    |                  | 0.650 | 0.376  | 0.227 | 1/32  | 0.175 | AP 16<br>APFM 16 | E127-123<br>E130-132 |  |
| APXT 1604 PDSR-M    |                | 148178<br>\$ 29.28 | 148521<br>\$ 32.73 | 146388<br>\$ 32.73 |                    |                    | 147338<br>\$ 29.28 |       |                    |                    |                  | 0.650 | 0.376  | 0.227 | 1/32  | 0.175 |                  |                      |  |
| APXT 160416R-M      |                |                    | 147156<br>\$ 31.82 |                    |                    |                    |                    |       |                    | 146167<br>\$ 25.47 |                  | 0.650 | 0.376  | 0.227 | 1/16  | 0.175 |                  |                      |  |
| APXT 160416R PDSR-M |                | 146553<br>\$ 29.28 |                    |                    |                    | 147468<br>\$ 31.78 |                    |       |                    |                    |                  | 0.650 | 0.376  | 0.227 | 1/16  | 0.175 |                  |                      |  |
| APXT 160432R-M      |                | 147720<br>\$ 29.28 |                    |                    |                    |                    |                    |       |                    |                    |                  | 0.650 | 0.376  | 0.227 | 1/8   | 0.175 |                  |                      |  |

### CPMT-M

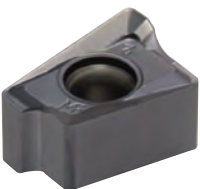


**Features**  
Stronger geometry for roughing  
applications in a variety of steels

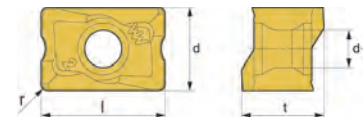


| Designation  | Coated Carbide |       |       |                    |       |        |       |       |        |       | Uncoated Carbide |        | (inch) |     |       |      |       | Applicable Cutter |          |
|--------------|----------------|-------|-------|--------------------|-------|--------|-------|-------|--------|-------|------------------|--------|--------|-----|-------|------|-------|-------------------|----------|
|              | PTM50P         | PM10P | PM25C | PM30P              | PM40P | PC210F | KM20C | MM30P | PC9530 | SM20P | PM20U            | KTM10U | l      | d   | t     | r    | d1    | Cutter            | Page No. |
| CPMT09T308-M |                |       |       | 147111<br>\$ 15.87 |       |        |       |       |        |       |                  |        | 0.381  | 3/8 | 0.156 | 1/32 | 0.173 | TSC               | E145     |

### LNEX-F2/M



**Features**  
Stronger geometry for roughing  
applications in a variety of steels



| Designation      | Coated Carbide |       |       |       |       |       |                    |       |        |       | Uncoated Carbide |        | (inch) |       |       |       |       | Applicable Cutter |          |
|------------------|----------------|-------|-------|-------|-------|-------|--------------------|-------|--------|-------|------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|                  | PTM50P         | PT30P | PM25C | PM30P | PM35P | PM40P | KM10P              | MM30P | PC9530 | SM20P | PM20U            | KTM10U | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| LNEX100605PNR-F2 |                |       |       |       |       |       | 148594<br>\$ 36.45 |       |        |       |                  |        | 0.391  | 0.258 | 0.258 | 3/128 | 0.318 | End Mill<br>DS4   | E128     |
| LNEX100605PNR-M  |                |       |       |       |       |       | 148612<br>\$ 36.45 |       |        |       |                  |        | 0.391  | 0.258 | 0.258 | 3/128 | 0.318 | Face Mill<br>DS4  | E135     |
| LNEX151008PNR-F2 |                |       |       |       |       |       | 148619<br>\$ 45.20 |       |        |       |                  |        | 0.594  | 0.391 | 0.391 | 1/32  | 0.177 |                   |          |

#### Quick Choice Grade Selection

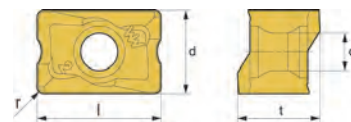
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



## LNMX-F2/M

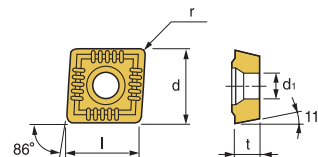


**Features**  
Stronger geometry for roughing applications in a variety of steels



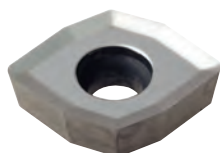
| Designation      | Coated Carbide |       |                    |       |                    |       |                    |                    |        |                    | Uncoated Carbide |        | (inch) |       |       |       |       | Applicable Cutter |          |
|------------------|----------------|-------|--------------------|-------|--------------------|-------|--------------------|--------------------|--------|--------------------|------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|                  | PTM50P         | PT30P | PM25C              | PM30P | PM40P              | PM45P | KM10P              | MM30P              | PC9530 | SM20P              | PM20U            | KTM10U | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| LNMX100605PNR-F2 |                |       |                    |       |                    |       | 146277<br>\$ 30.98 |                    |        | 146278<br>\$ 25.47 |                  |        | 0.391  | 0.258 | 0.258 | 3/128 | 0.318 | End Mill<br>DS4   | E128     |
| LNMX100605PNR-M  |                |       |                    |       |                    |       | 146281<br>\$ 30.98 | 146284<br>\$ 30.98 |        |                    |                  |        | 0.391  | 0.258 | 0.258 | 3/128 | 0.318 | Face Mill<br>DS4  | E135     |
| LNMX151008PNR-F2 |                |       | 145604<br>\$ 44.22 |       |                    |       | 148903<br>\$ 38.41 |                    |        | 145602<br>\$ 34.51 |                  |        | 0.594  | 0.391 | 0.391 | 1/32  | 0.177 |                   |          |
| LNMX151008PNR-M  |                |       | 145603<br>\$ 39.49 |       | 149351<br>\$ 39.49 |       |                    |                    |        |                    |                  |        | 0.594  | 0.391 | 0.391 | 1/32  | 0.177 |                   |          |

## MPMT

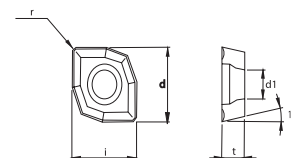


| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       |                    |       | Uncoated Carbide   |        | (inch) |     |      |      |       | Applicable Cutter |          |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------------|-------|--------------------|--------|--------|-----|------|------|-------|-------------------|----------|
|             |        | PM10C          | PM25C | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P              | SM20P | PTM30U             | KTM10U | l      | d   | t    | r    | d1    | Cutter            | Page No. |
| MPMT 322    | 090308 |                |       |       |       |       |       |       |       | 147761<br>\$ 21.66 |       | 146075<br>\$ 17.07 |        | 0.374  | 3/8 | 1/8  | 1/32 | 0.173 |                   |          |
| MPMT 432    | 120408 |                |       |       |       |       |       |       |       | 147762<br>\$ 25.34 |       |                    |        | 0.500  | 1/2 | 3/16 | 1/32 | 0.216 |                   |          |

## NPET-AD Drilling Insert



**Features**  
Excellent geometry for non-ferrous materials

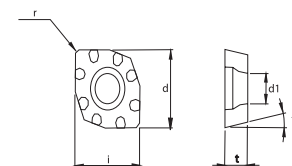


| Designation   | Coated Carbide |       |       |       |       |        |       |       |        |       | Uncoated Carbide |                    | (inch) |       |       |       |       | Applicable Cutter |          |
|---------------|----------------|-------|-------|-------|-------|--------|-------|-------|--------|-------|------------------|--------------------|--------|-------|-------|-------|-------|-------------------|----------|
|               | PTM50P         | PM10P | PM25C | PM30P | PM40P | PC210F | KM20C | MM30P | PC9530 | SM20P | PM20U            | KTM10U             | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| NPET222408-AD |                |       |       |       |       |        |       |       |        |       |                  | 147937<br>\$ 22.36 | 0.327  | 0.323 | 0.098 | 0.031 | 0.110 | PRO-NP Drill      | E149     |
| NPET252808-AD |                |       |       |       |       |        |       |       |        |       |                  | 147938<br>\$ 28.98 | 0.366  | 0.362 | 0.130 | 0.031 | 0.134 |                   |          |
| NPET293208-AD |                |       |       |       |       |        |       |       |        |       |                  | 147939<br>\$ 23.82 | 0.413  | 0.409 | 0.130 | 0.031 | 0.134 |                   |          |
| NPET334008-AD |                |       |       |       |       |        |       |       |        |       |                  | 147940<br>\$ 25.23 | 0.512  | 0.508 | 0.156 | 0.031 | 0.157 |                   |          |
| NPET415508-AD |                |       |       |       |       |        |       |       |        |       |                  | 147941<br>\$ 35.73 | 0.602  | 0.598 | 0.187 | 0.031 | 0.177 |                   |          |

## NPET-RD Drilling Insert



**Features**  
Stronger geometry for roughing applications in a variety of steels



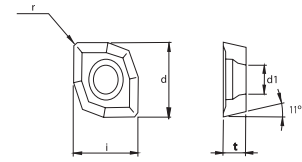
| Designation  | Coated Carbide |       |       |                    |       |        |       |       |        |       | Uncoated Carbide |        | (inch) |       |       |       |       | Applicable Cutter |          |
|--------------|----------------|-------|-------|--------------------|-------|--------|-------|-------|--------|-------|------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|              | PTM50P         | PM10P | PM25C | PM30P              | PM40P | PC210F | KM20C | MM30P | PC9530 | SM20P | PM20U            | KTM10U | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| NPMT33400-RD |                |       |       | 148337<br>\$ 25.52 |       |        |       |       |        |       |                  |        | 0.602  | 0.598 | 0.187 | 0.031 | 0.177 | PRO-NP Drill      | E149     |



### NPMT-MD Drilling Insert

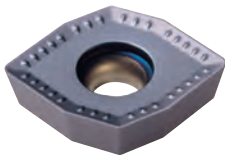


**Features**  
Excellent geometry for a variety of steels and cast iron

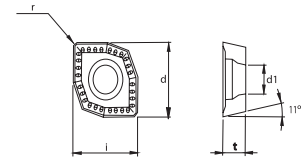


| Designation   | Coated Carbide |       |                    |       |       |        |       |       |        |       | Uncoated Carbide |        | (inch) |       |       |       |              | Applicable Cutter |          |
|---------------|----------------|-------|--------------------|-------|-------|--------|-------|-------|--------|-------|------------------|--------|--------|-------|-------|-------|--------------|-------------------|----------|
|               | PTM50P         | PM10P | PM25C              | PM30P | PM40P | PC210F | KM20C | MM30P | PC9530 | SM20P | PM20U            | KTM10U | l      | d     | t     | r     | d1           | Cutter            | Page No. |
| NPMT252808-MD |                |       | 147928<br>\$ 22.98 |       |       |        |       |       |        |       |                  | 0.366  | 0.362  | 0.130 | 0.031 | 0.134 | PRO-NP Drill | E149              |          |
| NPMT293208-MD |                |       | 147929<br>\$ 22.28 |       |       |        |       |       |        |       |                  | 0.413  | 0.409  | 0.130 | 0.031 | 0.134 |              |                   |          |

### NPMT-SD Drilling Insert



**Features**  
Excellent geometry for stainless steel

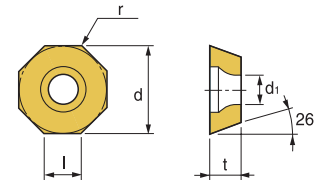


| Designation   | Coated Carbide |       |       |       |       |        |       |                    |        |       | Uncoated Carbide |        | (inch) |       |       |       |       | Applicable Cutter |          |
|---------------|----------------|-------|-------|-------|-------|--------|-------|--------------------|--------|-------|------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|               | PTM50P         | PM10P | PM25C | PM30P | PM40P | PC210F | KM20C | MM30P              | PC9530 | SM20P | PM20U            | KTM10U | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| NPMT252808-SD |                |       |       |       |       |        |       | 147933<br>\$ 22.98 |        |       |                  |        | 0.366  | 0.362 | 0.130 | 0.031 | 0.134 | PRO-NP Drill      | E149     |
| NPMT293208-SD |                |       |       |       |       |        |       | 147934<br>\$ 22.28 |        |       |                  |        | 0.413  | 0.409 | 0.130 | 0.031 | 0.134 |                   |          |
| NPMT334008-SD |                |       |       |       |       |        |       | 147935<br>\$ 23.16 |        |       |                  |        | 0.512  | 0.508 | 0.156 | 0.031 | 0.157 |                   |          |
| NPMT415508-SD |                |       |       |       |       |        |       | 147936<br>\$ 28.04 |        |       |                  |        | 0.602  | 0.598 | 0.187 | 0.031 | 0.177 |                   |          |

### OFCW



**Features**  
Flat top geometry for more difficult applications

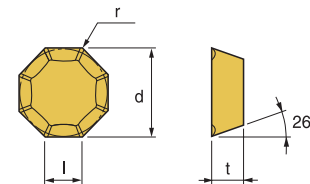


| Designation | Coated Carbide |                    |       |       |       |       |       |       |       |       | Cermet | Uncoated Carbide |       | (inch) |      |       |       |         | Applicable Cutter |  |
|-------------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|-------|--------|------|-------|-------|---------|-------------------|--|
|             | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | PT30S | PTM30U | KTM10U           | l     | d      | t    | r     | d1    | Cutter  | Page No.          |  |
| OFCW 05T3SN |                | 146841<br>\$ 30.72 |       |       |       |       |       |       |       |       |        |                  | 0.205 | 1/2    | 5/32 | 0.020 | 0.173 | OKT MAX | E134              |  |

### OFKR-F2, M, A



**Features**  
Excellent geometries for a variety of materials



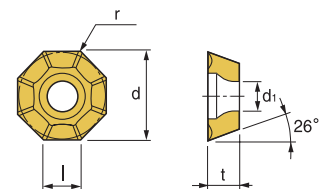
| Designation     | Coated Carbide |                    |       |       |       |       |                    |                    |       |       | Cermet             | Uncoated Carbide |       | (inch) |      |       |    |        | Applicable Cutter |  |
|-----------------|----------------|--------------------|-------|-------|-------|-------|--------------------|--------------------|-------|-------|--------------------|------------------|-------|--------|------|-------|----|--------|-------------------|--|
|                 | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C              | MM30P              | MT30P | PT30S | PTM30U             | KTM10U           | l     | d      | t    | r     | d1 | Cutter | Page No.          |  |
| OFKR 0704SN-F2  |                |                    |       |       |       |       | 147974<br>\$ 32.61 |                    |       |       |                    |                  | 0.291 | 0.709  | 3/16 | 0.020 |    |        |                   |  |
| OFKR 070408SN-M |                | 146417<br>\$ 36.69 |       |       |       |       |                    | 147759<br>\$ 35.68 |       |       |                    |                  | 0.291 | 0.709  | 3/16 | 0.031 |    |        |                   |  |
| OFKR 0704N-A    |                |                    |       |       |       |       |                    |                    |       |       | 146303<br>\$ 28.42 |                  | 0.291 | 0.709  | 3/16 | 0.020 |    |        |                   |  |



## OFKT-F2, M, A

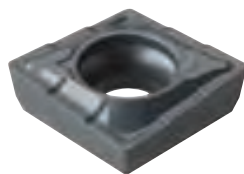


**Features**  
Excellent geometries for a variety of materials

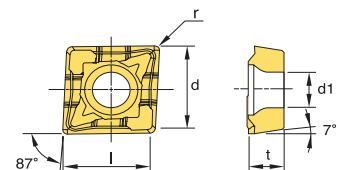


| Designation    | Coated Carbide |                    |       |       |       |       |                    |       |       |       | Cermet | Uncoated Carbide   |        | (inch) |      |       |       |         | Applicable Cutter |          |
|----------------|----------------|--------------------|-------|-------|-------|-------|--------------------|-------|-------|-------|--------|--------------------|--------|--------|------|-------|-------|---------|-------------------|----------|
|                | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C              | MM30P | MT30P | PT30S |        | PM20U              | KTM10U | l      | d    | t     | r     | d1      | Cutter            | Page No. |
| OFKT 05T3SN-F2 |                |                    |       |       |       |       | 147760<br>\$ 28.03 |       |       |       |        |                    | 0.205  | 1/2    | 5/32 | 0.020 | 0.173 | OKT MAX | E134              |          |
| OFKT 05T3SN-M  |                | 146843<br>\$ 28.42 |       |       |       |       |                    |       |       |       |        | 146676<br>\$ 22.18 | 0.205  | 1/2    | 5/32 | 0.020 | 0.173 |         |                   |          |
| OFKT 05T3FN-A  |                |                    |       |       |       |       |                    |       |       |       |        | 146559<br>\$ 22.81 | 0.205  | 1/2    | 5/32 | 0.020 | 0.173 |         |                   |          |

## QCMT



**Features**  
Excellent free cutting geometries for a variety of applications

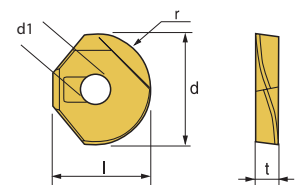


| Designation    | Coated Carbide |       |       |       |       |                    |       |       |        |       | Uncoated Carbide |       | (inch) |       |       |       |       | Applicable Cutter |          |
|----------------|----------------|-------|-------|-------|-------|--------------------|-------|-------|--------|-------|------------------|-------|--------|-------|-------|-------|-------|-------------------|----------|
|                | PT10C          | PT20C | PT22C | PT30C | PM10P | PTM50P             | KM20C | MM30P | PC9530 | SM20P | PM20U            | KT10C | l      | d     | t     | r     | d1    | Cutter            | Page No. |
| QCMT-050204-CM |                |       |       |       |       | 147241<br>\$ 28.38 |       |       |        |       |                  |       | 0.197  | 0.213 | 0.038 | 0.016 | 0.091 | CTD               | E150     |
| QCMT-060204-CM |                |       |       |       |       | 147436<br>\$ 28.38 |       |       |        |       |                  |       | 0.236  | 0.252 | 0.094 | 0.016 | 0.098 |                   |          |
| QCMT-070304-CM |                |       |       |       |       | 146364<br>\$ 28.38 |       |       |        |       |                  |       | 0.276  | 0.291 | 0.125 | 0.016 | 0.110 |                   |          |
| QCMT-080304-CM |                |       |       |       |       | 147044<br>\$ 28.97 |       |       |        |       |                  |       | 0.315  | 0.331 | 0.125 | 0.016 | 0.134 |                   |          |
| QCMT-10T304-CM |                |       |       |       |       | 147472<br>\$ 34.10 |       |       |        |       |                  |       | 0.394  | 0.409 | 0.156 | 0.016 | 0.157 |                   |          |

## RC



**Features**  
Excellent for contour milling in a variety of materials



| Designation | Coated Carbide |       |       |       |       |                     |       |       |       |       | Cermet | Uncoated Carbide |        | (inch) |       |       |       |           | Applicable Cutter |          |
|-------------|----------------|-------|-------|-------|-------|---------------------|-------|-------|-------|-------|--------|------------------|--------|--------|-------|-------|-------|-----------|-------------------|----------|
|             | PM10C          | PM25C | PM30C | PM30P | PM35P | PM10P               | KM20C | MM30P | MT30P | PT30S |        | PM20U            | KTM10U | l      | d     | t     | r     | d1        | Cutter            | Page No. |
| RC 5/8      |                |       |       |       |       | 147858<br>\$ 114.81 |       |       |       |       |        |                  | 0.622  | 0.625  | 0.138 | 0.315 | 0.228 | Mold Mill | E140              |          |
| RC 3/4      |                |       |       |       |       | 147859<br>\$ 133.43 |       |       |       |       |        |                  | 0.701  | 0.750  | 0.157 | 0.394 | 0.228 |           |                   |          |
| RC 1        |                |       |       |       |       | 147860<br>\$ 170.32 |       |       |       |       |        |                  | 0.866  | 1.000  | 0.197 | 0.492 | 0.268 |           |                   |          |
| RC 1-1/8    |                |       |       |       |       | 147861<br>\$ 223.43 |       |       |       |       |        |                  | 1.055  | 1.125  | 0.236 | 0.591 | 0.346 |           |                   |          |
| RC 1-1/4    |                |       |       |       |       | 147862<br>\$ 223.43 |       |       |       |       |        |                  | 1.094  | 1.250  | 0.236 | 0.630 | 0.346 |           |                   |          |

### Quick Choice Grade Selection

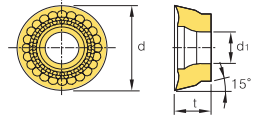
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



### RDKT-F2/M



**Features**  
Excellent geometries for a variety of materials

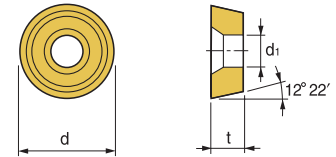


| Designation   | Coated Carbide     |                    |                    |                    |       |       |                    |                    |                    |       | Uncoated Carbide |        | (inch) |       |       | Applicable Cutter     |          |
|---------------|--------------------|--------------------|--------------------|--------------------|-------|-------|--------------------|--------------------|--------------------|-------|------------------|--------|--------|-------|-------|-----------------------|----------|
|               | PTM50P             | PM25C              | PM30C              | PM30P              | PM35P | PM40P | KM20C              | MM30P              | MT30P              | SM20P | PM20U            | KTM10U | d      | t     | d1    | Cutter                | Page No. |
| RDKT10T3MO-F2 |                    |                    |                    | 148340<br>\$ 18.36 |       |       |                    | 146896<br>\$ 17.88 |                    |       |                  |        | 25/64  | 0.156 | 0.152 | End Mill<br>BMSS E133 | E133     |
| RDKT1204MO-F2 |                    |                    |                    |                    |       |       | 146998<br>\$ 22.84 |                    |                    |       |                  |        | 15/32  | 0.187 | 0.177 |                       |          |
| RDKT10T3MO-M  |                    |                    | 147130<br>\$ 18.36 |                    |       |       | 146961<br>\$ 17.88 |                    | 146946<br>\$ 18.36 |       |                  |        | 25/64  | 0.156 | 0.152 |                       |          |
| RDKT1204MO-M  | 146552<br>\$ 22.84 | 145614<br>\$ 19.69 |                    |                    |       |       | 147072<br>\$ 22.84 |                    | 147070<br>\$ 23.45 |       |                  |        | 15/32  | 0.187 | 0.177 |                       |          |

### RPMM

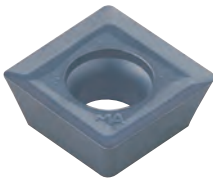


**Features**  
Excellent geometries for a variety of applications

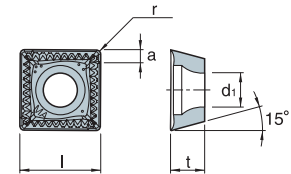


| Designation    | Coated Carbide |                    |                    |       |       |       |       |       |       |       | Uncoated Carbide |        | (inch) |      |       | Applicable Cutter |          |
|----------------|----------------|--------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|------------------|--------|--------|------|-------|-------------------|----------|
|                | PT20C          | PM25C              | PM30C              | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U | d      | t    | d1    | Cutter            | Page No. |
| RPMM 1204 ENN  |                | 147779<br>\$ 25.53 | 146127<br>\$ 25.53 |       |       |       |       |       |       |       |                  |        | 1/2    | 3/16 | 0.216 | Mold Max E142     | E142     |
| RPMM 1204 X165 |                | 146147<br>\$ 25.96 |                    |       |       |       |       |       |       |       |                  |        | 1/2    | 3/16 | 0.216 |                   |          |

### SDXT-A



**Features**  
Aluminum geometry

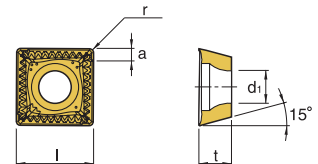


| Designation    | Coated Carbide |       |       |       |       |       |       |       |       |       | Uncoated Carbide   |        | (inch) |       |       |       |       | Applicable Cutter |          |
|----------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|                | PM20C          | PM25C | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U              | KTM10U | l      | t     | r     | a     | d1    | Cutter            | Page No. |
| SDXT 09M405R-A |                |       |       |       |       |       |       |       |       |       | 146803<br>\$ 15.83 |        | 0.375  | 0.157 | 0.011 | 0.047 | 0.157 | MM90°FM E135      | E135     |

### SDXT-F2, M



**Features**  
General purpose geometries for a variety of materials



| Designation     | Coated Carbide |                    |                    |       |       |       |                    |                    |       |       | Uncoated Carbide |        | (inch)             |       |       |       |       | Applicable Cutter |          |       |  |  |
|-----------------|----------------|--------------------|--------------------|-------|-------|-------|--------------------|--------------------|-------|-------|------------------|--------|--------------------|-------|-------|-------|-------|-------------------|----------|-------|--|--|
|                 | PM20C          | PM25C              | PM30C              | PM30P | PM35P | PM40P | KM20C              | MM30P              | MT30P | SM20P | PM20U            | KTM10U | l                  | t     | r     | a     | d1    | Cutter            | Page No. |       |  |  |
| SDXT 09M405R-F2 |                | 147085<br>\$ 20.09 |                    |       |       |       | 147410<br>\$ 15.76 |                    |       |       |                  |        | 0.375              | 0.157 | 0.011 | 0.047 | 0.157 | MM90°FM E135      | E135     |       |  |  |
| SDXT 130508R-F2 |                | 146810<br>\$ 23.16 |                    |       |       |       |                    |                    |       |       |                  |        | 0.531              | 0.219 | 0.031 | 0.087 | 0.219 |                   |          |       |  |  |
| SDXT 09M405R-M  |                | 147089<br>\$ 20.09 | 146802<br>\$ 19.76 |       |       |       | 147718<br>\$ 19.50 | 147719<br>\$ 19.76 |       |       |                  |        | 0.375              | 0.157 | 0.011 | 0.047 | 0.157 |                   |          |       |  |  |
| SDXT 130508R-M  |                | 146812<br>\$ 23.84 | 146813<br>\$ 23.16 |       |       |       | 148319<br>\$ 23.50 | 147721<br>\$ 23.84 |       |       |                  |        | 146815<br>\$ 18.60 | 0.531 | 0.219 | 0.031 | 0.087 |                   |          | 0.219 |  |  |
|                 |                |                    |                    |       |       |       |                    |                    |       |       |                  |        |                    |       |       |       |       |                   |          |       |  |  |

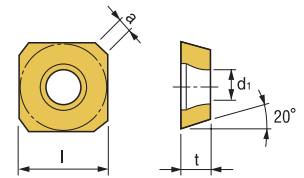


## SECA/SEHT



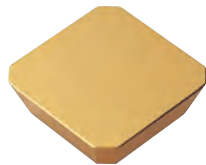
SECA

**Features**  
Flat top geometry for more difficult applications

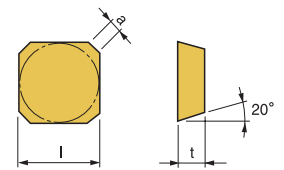


| Designation      | ISO  | Coated Carbide |                    |       |       |       |       |       |       |       | Cermet             | Uncoated Carbide |                    | (inch)             |     |      |       | Applicable Cutter |        |          |  |
|------------------|------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|--------------------|------------------|--------------------|--------------------|-----|------|-------|-------------------|--------|----------|--|
|                  |      | PM20C          | PM25C              | PM35C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P |                    | PT30S            | PM20U              | KTM10U             | l   | t    | a     | d1                | Cutter | Page No. |  |
| SECA 43 AFTN     | 1204 |                | 146749<br>\$ 28.02 |       |       |       |       |       |       |       | 147780<br>\$ 28.02 |                  | 146750<br>\$ 21.78 | 146751<br>\$ 22.14 |     | 1/2  | 3/16  | 0.105             | 0.219  |          |  |
| SECA 43 AFFN     | 1204 |                |                    |       |       |       |       |       |       |       |                    |                  |                    | 146036<br>\$ 22.41 | 1/2 | 3/16 | 0.105 | 0.219             |        |          |  |
| SEHT 43 AFN-A    | 1204 |                |                    |       |       |       |       |       |       |       |                    |                  |                    | 146747<br>\$ 25.53 | 1/2 | 3/16 | 0.105 | 0.219             |        |          |  |
| SEHT 43 AFTN X45 | 1204 |                | 146130<br>\$ 30.89 |       |       |       |       |       |       |       |                    |                  |                    |                    | 1/2 | 3/16 | 0.105 | 0.219             |        |          |  |

## SECN

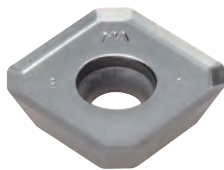


**Features**  
Flat top geometry for a variety of applications

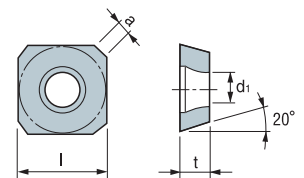


| Designation  | ISO  | Coated Carbide |                    |       |       |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |     |      | Applicable Cutter |          |  |
|--------------|------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-----|------|-------------------|----------|--|
|              |      | PM20C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U            | KTM10U             | l      | t   | a    | Cutter            | Page No. |  |
| SECN 43 AFFN | 1203 |                |                    |       |       |       |       |       |       |       |       |                  | 146666<br>\$ 20.36 |        | 1/2 | 1/8  | 0.091             |          |  |
| SECN 53 AFTN | 1504 |                | 146661<br>\$ 35.86 |       |       |       |       |       |       |       |       |                  |                    |        | 5/8 | 3/16 | 0.094             |          |  |

## SEET-A



**Features**  
Excellent geometry for softer materials such as aluminum



| Designation     | Coated Carbide |       |       |       |       |       |       |       |       | Cermet | Uncoated Carbide |                    | (inch) |       |       |       | Applicable Cutter |        |
|-----------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|--------------------|--------|-------|-------|-------|-------------------|--------|
|                 | PM20C          | PM25C | PM35C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P |        | PT30S            | PM20U              | KTM10U | l     | t     | a     | d1                | Cutter |
| SEET 0903AGFN-A |                |       |       |       |       |       |       |       |       |        |                  | 147727<br>\$ 18.91 | 3/8    | 1/8   | 0.083 | 0.134 | MM45°FM           | E137   |
| SEET 14M4AGFN-A |                |       |       |       |       |       |       |       |       |        |                  | 147732<br>\$ 23.65 | 0.551  | 0.157 | 0.104 | 0.173 |                   |        |

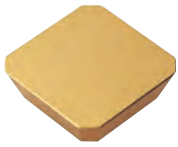
### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

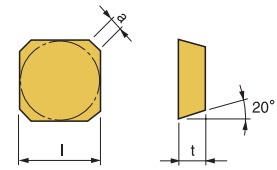




## SEK(T)

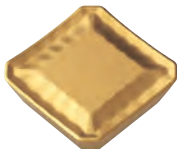


**Features**  
Excellent general purpose geometry

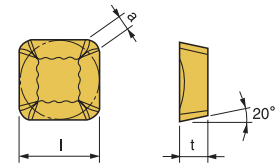


| Designation      | ISO  | Coated Carbide |                    |                    |       |       |                    |                    | Cermet |       | Ceramic            | Uncoated Carbide   |                    | (inch)             |       |       | Applicable Cutter |          |  |
|------------------|------|----------------|--------------------|--------------------|-------|-------|--------------------|--------------------|--------|-------|--------------------|--------------------|--------------------|--------------------|-------|-------|-------------------|----------|--|
|                  |      | PM10C          | PM25C              | PM30C              | PM30P | PM35P | KM20C              | MM30P              | PT20S  | PT30S | S300               | PM20U              | PTM30U             | l                  | t     | a     | Cutter            | Page No. |  |
| SEK 42 AFTN      | 1203 |                | 146340<br>\$ 26.05 | 146318<br>\$ 26.43 |       |       |                    | 147733<br>\$ 26.43 |        |       | 146322<br>\$ 18.28 | 149556<br>\$ 35.89 | 146317<br>\$ 21.31 | 146320<br>\$ 21.31 | 1/2   | 1/8   | 0.091             |          |  |
| SEK 42 AFEN      | 1203 |                |                    |                    |       |       | 147734<br>\$ 20.81 |                    |        |       |                    |                    |                    |                    | 1/2   | 1/8   | 0.091             |          |  |
| SEK 43 AFTN      | 1204 |                | 146380<br>\$ 28.56 |                    |       |       |                    |                    |        |       |                    |                    | 146360<br>\$ 26.01 | 1/2                | 3/16  | 0.094 |                   |          |  |
| SEK 53 AFTN      | 1504 |                | 146385<br>\$ 32.61 |                    |       |       |                    | 147735<br>\$ 35.86 |        |       |                    |                    | 146386<br>\$ 28.86 | 5/8                | 3/16  | 0.094 |                   |          |  |
| SEKT 13T3AGSN-M  |      |                | 148586<br>\$ 30.60 |                    |       |       |                    |                    |        |       |                    |                    |                    | 0.531              | 0.156 | 0.060 |                   |          |  |
| SEKT 13T3AGSN-R8 |      |                | 148585<br>\$ 30.60 |                    |       |       |                    |                    |        |       |                    |                    |                    | 0.531              | 0.156 | 0.060 |                   |          |  |

## SEKR-F3



**Features**  
Excellent geometry for a variety of steels including stainless

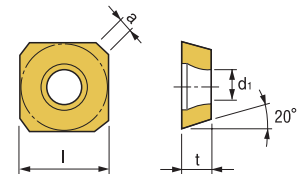


| Designation     | ISO  | Coated Carbide |                    |                    |       |       |       |                    | Cermet |       | Ceramic | Uncoated Carbide |                    | (inch) |      |       | Applicable Cutter |          |
|-----------------|------|----------------|--------------------|--------------------|-------|-------|-------|--------------------|--------|-------|---------|------------------|--------------------|--------|------|-------|-------------------|----------|
|                 |      | PM10C          | PM25C              | PM30C              | PM30P | PM35P | KM20C | MM30P              | PT20S  | PT30S | S300    | PM20U            | PTM30U             | l      | t    | a     | Cutter            | Page No. |
| SEKR 42 AFSN-F3 | 1203 |                | 146347<br>\$ 26.05 | 145674<br>\$ 25.68 |       |       |       | 147770<br>\$ 26.05 |        |       |         |                  | 146348<br>\$ 20.93 | 1/2    | 1/8  | 0.091 |                   |          |
| SEKR 42 AFTN-F3 | 1203 |                | 146346<br>\$ 27.73 |                    |       |       |       |                    |        |       |         |                  |                    | 1/2    | 1/8  | 0.091 |                   |          |
| SEKR 43 AFSN-F3 | 1204 |                | 146351<br>\$ 26.84 |                    |       |       |       | 147989<br>\$ 26.84 |        |       |         |                  |                    | 1/2    | 3/16 | 0.094 |                   |          |

## SEXT-F2

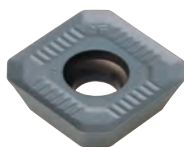


**Features**  
Excellent general purpose geometry

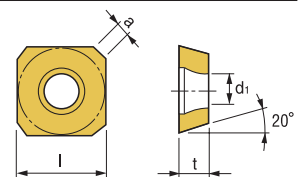


| Designation      | Coated Carbide |                    |                    |       |       |       |                    |                    |                    |       | Cermet |        | Uncoated Carbide |       | (inch) |       |         |          | Applicable Cutter |  |
|------------------|----------------|--------------------|--------------------|-------|-------|-------|--------------------|--------------------|--------------------|-------|--------|--------|------------------|-------|--------|-------|---------|----------|-------------------|--|
|                  | PM20C          | PM25C              | PM30C              | PM30P | PM35P | PT30P | KM20C              | MM30P              | SM20P              | PT30S | PM20U  | KTM10U | l                | t     | a      | d1    | Cutter  | Page No. |                   |  |
| SEXT 0903AGSN-F2 |                |                    | 148183<br>\$ 21.18 |       |       |       | 147724<br>\$ 20.51 |                    |                    |       |        |        | 3/8              | 1/8   | 0.083  | 0.134 | MM45°FM | E137     |                   |  |
| SEXT 14M4AGSN-F2 |                | 147728<br>\$ 24.93 | 148184<br>\$ 25.35 |       |       |       |                    | 148506<br>\$ 24.93 | 148500<br>\$ 24.60 |       |        |        | 0.551            | 0.157 | 0.104  | 0.173 |         |          |                   |  |

## SEXT-M



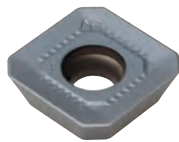
**Features**  
Excellent general purpose geometry



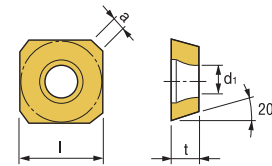
| Designation     | Coated Carbide |                    |       |       |       |       |                    |                    |       |       | Cermet |        | Uncoated Carbide |       | (inch) |       |         |          | Applicable Cutter |  |
|-----------------|----------------|--------------------|-------|-------|-------|-------|--------------------|--------------------|-------|-------|--------|--------|------------------|-------|--------|-------|---------|----------|-------------------|--|
|                 | PM20C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C              | MM30P              | SM20P | PT30S | PM20U  | KTM10U | l                | t     | a      | d1    | Cutter  | Page No. |                   |  |
| SEXT 0903AGSN-M |                | 147725<br>\$ 20.84 |       |       |       |       |                    |                    |       |       |        |        | 3/8              | 1/8   | 0.083  | 0.134 | MM45°FM | E137     |                   |  |
| SEXT 14M4AGSN-M |                | 147730<br>\$ 24.93 |       |       |       |       | 148307<br>\$ 24.19 | 148507<br>\$ 24.93 |       |       |        |        | 0.551            | 0.157 | 0.104  | 0.173 |         |          |                   |  |



## SEXT-R8



**Features**  
Geometry designed for medium to roughing applications

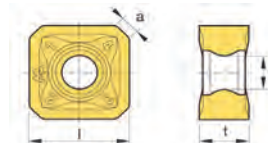


| Designation      | Coated Carbide |                    |       |       |       |       |                    | Cermet             | Ceramic | Uncoated Carbide |       | (inch) |       |        |       | Applicable Cutter |         |      |
|------------------|----------------|--------------------|-------|-------|-------|-------|--------------------|--------------------|---------|------------------|-------|--------|-------|--------|-------|-------------------|---------|------|
|                  | PM10C          | PM25C              | PM30C | PM30P | PM35P | KM10P | KM20C              |                    |         | PT20S            | PT30S | S300   | PM20U | PTM30U | l     | t                 | a       | d1   |
| SEXT 14M4AGSN-R8 |                | 147731<br>\$ 24.93 |       |       |       |       | 148926<br>\$ 24.19 | 148308<br>\$ 24.60 |         |                  |       |        | 0.551 | 0.157  | 0.104 | 0.173             | MM45°FM | E137 |

## SNEX-A



**Features**  
Aluminum geometry

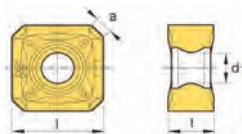


| Designation   | Coated Carbide |       |       |       |       |       |       |       |        |       | Uncoated Carbide   |        | (inch) |     |       |       | Applicable Cutter |          |
|---------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------------|--------|--------|-----|-------|-------|-------------------|----------|
|               | PTM50P         | PT30P | PM25C | PM30P | PM35P | PM40P | KM20C | MM30P | PC9530 | SM20P | PM20U              | KTM10U | d      | t   | a     | d1    | Cutter            | Page No. |
| SNEX1206ANN-A |                |       |       |       |       |       |       |       |        |       | 148969<br>\$ 27.17 |        | 1/2    | 1/4 | 0.093 | 0.177 | Face Mill<br>DS8  | E136     |

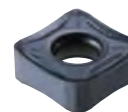
## SNEX-F2/M



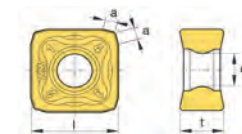
SNEX-F2



**Features**  
Excellent geometries for a variety of materials



SNEX-M

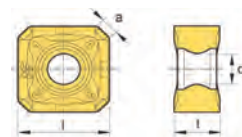


| Designation    | Coated Carbide |       |       |       |       |       |       |                    |        |       | Uncoated Carbide |        | (inch) |     |       |       | Applicable Cutter |          |
|----------------|----------------|-------|-------|-------|-------|-------|-------|--------------------|--------|-------|------------------|--------|--------|-----|-------|-------|-------------------|----------|
|                | PTM50P         | PT30P | PM25C | PM30P | PM35P | PM40P | KM20C | MM30P              | PC9530 | SM20P | PM20U            | KTM10U | d      | t   | a     | d1    | Cutter            | Page No. |
| SNEX1206ANN-F2 |                |       |       |       |       |       |       | 148835<br>\$ 33.99 |        |       |                  |        | 1/2    | 1/4 | 0.093 | 0.177 | Face Mill<br>DS8  | E136     |

## SNMX-M

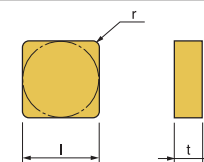
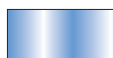
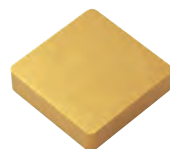


**Features**  
General purpose geometries for a variety of materials



| Designation   | Coated Carbide     |       |                    |       |       |       |                    |                    |        |       | Uncoated Carbide |        | (inch) |     |       |       | Applicable Cutter |          |
|---------------|--------------------|-------|--------------------|-------|-------|-------|--------------------|--------------------|--------|-------|------------------|--------|--------|-----|-------|-------|-------------------|----------|
|               | PTM50P             | PT30P | PM25C              | PM30P | PM35P | PM40P | KM10P              | MM30P              | PC9530 | SM20P | PM20U            | KTM10U | l      | t   | a     | d1    | Cutter            | Page No. |
| SNMX1206ANN-M | 145673<br>\$ 29.75 |       | 148796<br>\$ 29.75 |       |       |       | 148791<br>\$ 28.89 | 148904<br>\$ 29.75 |        |       |                  |        | 1/2    | 1/4 | 0.093 | 0.177 | Face Mill<br>DS8  | E136     |

## SNU



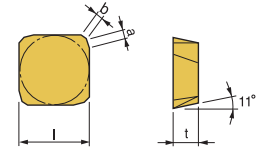
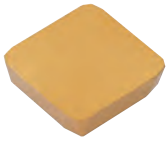
| Designation | Coated Carbide |       |       |       |       |       |       |       |       |       | Cermet             | Uncoated Carbide   |        |        | (inch) |      |   |
|-------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|--------|--------|--------|------|---|
|             | PM20C          | PM25C | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | PT30S |                    | PM20U              | PTM30U | KTM10U | l      | t    | r |
| SNU 433     |                |       |       |       |       |       |       |       |       |       | 146457<br>\$ 16.94 | 146449<br>\$ 17.19 |        | 1/2    | 3/16   | 3/64 |   |

Quick Choice Grade Selection



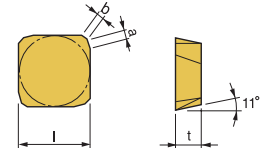
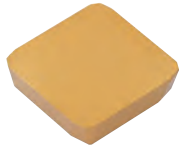


## SPC



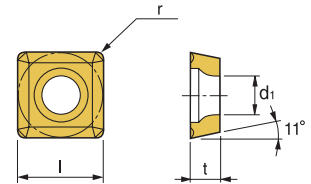
| Designation | ISO  | Coated Carbide |                    |       |       |       |       |       |       | Cermet | Ceramic | Uncoated Carbide |      | (inch) |        |       |       |
|-------------|------|----------------|--------------------|-------|-------|-------|-------|-------|-------|--------|---------|------------------|------|--------|--------|-------|-------|
|             |      | PM10C          | PM25C              | PM30C | PM30P | PM35P | KM20C | MM30P | PT20S |        |         | PT30S            | S300 | PM20U  | PTM30U | l     | t     |
| SPC 42 EDR  | 1203 |                | 147731<br>\$ 24.93 |       |       |       |       |       |       |        |         |                  |      | 1/2    | 1/8    | 0.055 | 0.039 |

## SPK



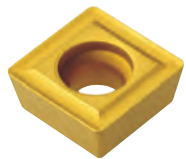
| Designation | ISO  | Coated Carbide |                    |       |       |       |       |       |       |       |       |                    | Uncoated Carbide |     | (inch) |       |       |        | Applicable Cutter |  |
|-------------|------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|------------------|-----|--------|-------|-------|--------|-------------------|--|
|             |      | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U              | PTM30U           | l   | t      | a     | b     | Cutter | Page No.          |  |
| SPK 42 EDR  | 1203 |                | 146480<br>\$ 24.95 |       |       |       |       |       |       |       |       |                    |                  | 1/2 | 1/8    | 0.055 | 0.039 |        |                   |  |
| SPK 43 EDR  | 1204 |                |                    |       |       |       |       |       |       |       |       | 146485<br>\$ 21.59 |                  | 1/2 | 3/16   | 0.055 | 0.039 |        |                   |  |

## SPMT

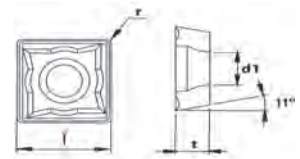


| Designation | ISO    | Coated Carbide |                    |       |       |       |       |       |       | Cermet | Uncoated Carbide   |       |        | (inch) |      |      |       |
|-------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|--------|--------------------|-------|--------|--------|------|------|-------|
|             |        | PM20C          | PM25C              | PM30C | PM35P | PM40P | KM20C | MM30P | MT30P |        | PT30S              | PM20U | PTM30U | KTM10U | l    | t    | r     |
| SPMT 432    | 120408 |                | 146145<br>\$ 24.47 |       |       |       |       |       |       |        | 146143<br>\$ 19.30 |       |        | 1/2    | 3/16 | 1/32 | 0.220 |

## SPMT-MD Drilling Insert

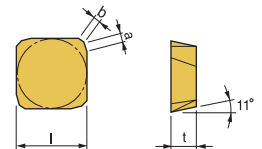
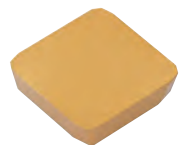


**Features**  
Suitable geometry for a variety of steels



| Designation   | ISO | Coated Carbide |       |       |                    |       |       |       |        |       |       | Uncoated Carbide |   | (inch) |       |       |        | Applicable Cutter |      |
|---------------|-----|----------------|-------|-------|--------------------|-------|-------|-------|--------|-------|-------|------------------|---|--------|-------|-------|--------|-------------------|------|
|               |     | PTM50P         | PM10P | PM25C | PM30P              | PM40P | KM20C | MM30P | PC9530 | SM20P | PM20U | KTM10U           | l | t      | r     | d1    | Cutter | Page No.          |      |
| SPMT070204-MD |     |                |       |       | 146378<br>\$ 21.16 |       |       |       |        |       |       |                  |   | 0.28   | 0.100 | 0.020 | 0.110  | PRO-SP Drill      | E149 |

## SPU



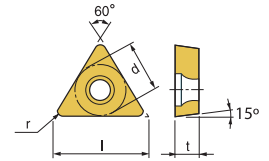
| Designation | ISO    | Coated Carbide |       |       |       |       |       |       |       | Cermet | Ceramic | Uncoated Carbide   |                    | (inch) |        |       |       |
|-------------|--------|----------------|-------|-------|-------|-------|-------|-------|-------|--------|---------|--------------------|--------------------|--------|--------|-------|-------|
|             |        | PM10C          | PM25C | PM30C | PM30P | PM35P | KM20C | MM30P | PT20S |        |         | PT30S              | S300               | PM20U  | PTM30U | l     | t     |
| SPU 422     | 120308 |                |       |       |       |       |       |       |       |        |         |                    | 146493<br>\$ 13.16 | 1/2    | 1/8    | 0.055 | 0.039 |
| SPU 633     | 190412 |                |       |       |       |       |       |       |       |        |         | 146495<br>\$ 22.56 | 3/4                | 3/16   | 0.079  | 0.039 |       |

### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

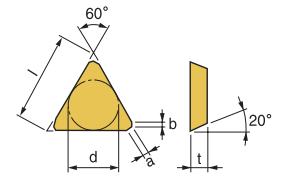


## TDGW



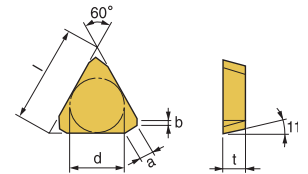
| Designation | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       | Cermet | Uncoated Carbide |        | (inch) |     |      |      |
|-------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|--------|--------|-----|------|------|
|             |        | PM20C          | PM25C              | PM35C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P |        | PT30S            | PTM30U | KTM10U | l   | d    | t    |
| TDGW 21.51  | 110204 |                | 147177<br>\$ 21.95 |       |       |       |       |       |       |       |        |                  |        | 0.433  | 1/4 | 3/32 | 1/64 |
| TDGW 321    | 160304 |                | 147178<br>\$ 18.61 |       |       |       |       |       |       |       |        |                  |        | 0.650  | 3/8 | 1/8  | 1/64 |
| TDGW 432    | 220408 |                | 147179<br>\$ 30.61 |       |       |       |       |       |       |       |        |                  |        | 0.866  | 1/2 | 3/16 | 1/32 |

## TEC(E)(K)N



| Designation | ISO | Coated Carbide |       |       |       |       |       |       | Cermet | Uncoated Carbide |       |                    | (inch) |     |       |       |       |      |   |
|-------------|-----|----------------|-------|-------|-------|-------|-------|-------|--------|------------------|-------|--------------------|--------|-----|-------|-------|-------|------|---|
|             |     | PM10C          | PM25C | PM30C | PM30P | PM35P | KM20C | MM30P |        | PT30S            | ST30A | PM20U              | PTM30U | l   | d     | t     | a     | b    | r |
| TECN 32TR   |     |                |       |       |       |       |       |       |        |                  |       | 146071<br>\$ 19.50 | 0.649  | 3/8 | 1/8   | 0.039 | -     | 1/32 | R |
| TEEN 43TR   |     |                |       |       |       |       |       |       |        |                  |       | 146561<br>\$ 26.62 | 0.866  | 1/2 | 0.187 | 0.059 | -     | 1/32 | - |
| TEKN 43TR   |     |                |       |       |       |       |       |       |        |                  |       | 146564<br>\$ 27.07 | 0.866  | 1/2 | 0.187 | 0.020 | 0.075 | 1/32 | R |

## TPK



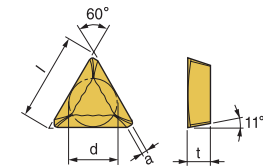
| Designation | ISO  | Coated Carbide |                    |       |       |       |       |       | Cermet |       | Ceramic | Uncoated Carbide |                    | (inch)             |       |     |       |             |           |
|-------------|------|----------------|--------------------|-------|-------|-------|-------|-------|--------|-------|---------|------------------|--------------------|--------------------|-------|-----|-------|-------------|-----------|
|             |      | PM10C          | PM25C              | PM30C | PM30P | PM35P | KM20C | MM30P | PT20S  | PT30S |         | S300             | PM20U              | PTM30U             | l     | d   | t     | a           | b         |
| TPK 32 PPR  | 1603 |                |                    |       |       |       |       |       |        |       |         |                  | 146724<br>\$ 14.89 | 0.650              | 3/8   | 1/8 | 0.047 | 0.039~0.047 |           |
| TPK 32 PDR  | 1603 |                | 146680<br>\$ 21.11 |       |       |       |       |       |        |       |         |                  |                    | 0.650              | 3/8   | 1/8 | 0.047 | 0.039~0.047 |           |
| TPK 43 PDR  | 2204 |                | 146720<br>\$ 30.13 |       |       |       |       |       |        |       |         |                  | 146695<br>\$ 22.29 | 146700<br>\$ 21.66 | 0.866 | 1/2 | 3/16  | 0.05~0.055  | 0.28~0.05 |

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Images are representational only and may not reflect actual product.

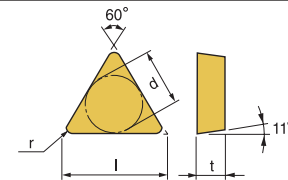


## TPKR-F3



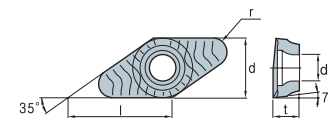
| Designation     | ISO  | Coated Carbide |        |       |       |       |       | Cermet |       | Ceramic | Uncoated Carbide |       | (inch) |     |      |       |       |   |
|-----------------|------|----------------|--------|-------|-------|-------|-------|--------|-------|---------|------------------|-------|--------|-----|------|-------|-------|---|
|                 |      | PM10C          | PM25C  | PM30C | PM30P | PM35P | KM20C | MM30P  | PT20S | PT30S   | S300             | PM20U | PTM30U | l   | d    | t     | r     | a |
| TPKR 43 PDSR-F3 | 2204 |                |        |       |       |       |       |        |       |         | 146129           |       | 0.866  | 1/2 | 3/16 | 0.039 | 0.055 |   |
| TPKR 43 PDR-F3  | 2204 |                | 146128 |       |       |       |       |        |       |         |                  |       | 0.866  | 1/2 | 3/16 | 0.039 | 0.055 |   |

## TPU



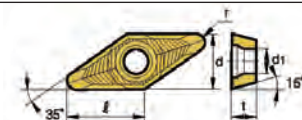
| Designation | ISO    | Coated Carbide |        |       |       |       |       | Cermet |       | Ceramic | Uncoated Carbide |        | (inch) |       |     |      |      | Cutter      | Page No. |
|-------------|--------|----------------|--------|-------|-------|-------|-------|--------|-------|---------|------------------|--------|--------|-------|-----|------|------|-------------|----------|
|             |        | PM10C          | PM25C  | PM30C | PM30P | PM35P | KM20C | MM30P  | PT20S | PT30S   | S300             | PM20U  | PTM30U | l     | d   | t    | r    |             |          |
| TPU 212     | 110208 |                |        |       |       |       |       |        |       |         |                  | 146631 |        | 0.433 | 1/4 | 3/32 | 1/32 | STM Cutters | E148     |
| TPU 221     | 110304 |                |        |       |       |       |       |        |       |         |                  | 146740 |        | 0.433 | 1/4 | 1/8  | 1/64 |             |          |
| TPU 222     | 110308 |                | 147267 |       |       |       |       |        |       |         |                  | 146741 |        | 0.433 | 1/4 | 1/8  | 1/32 |             |          |
| TPU 321     | 160304 |                |        |       |       |       |       |        |       |         |                  | 146760 |        | 0.650 | 3/8 | 1/8  | 1/64 |             |          |
| TPU 322     | 160308 |                | 146709 |       |       |       |       |        |       |         |                  | 146780 |        | 0.650 | 3/8 | 1/8  | 1/32 |             |          |
| TPU 323     | 160312 |                | 145545 |       |       |       |       |        |       |         | 146421           |        | 0.650  | 3/8   | 1/8 | 3/64 |      |             |          |
| TPU 431     | 220404 |                |        |       |       |       |       |        |       |         |                  | 146800 |        | 0.866 | 1/2 | 3/16 | 1/64 |             |          |
| TPU 432     | 220408 |                | 146711 |       |       |       |       |        |       |         |                  | 146820 |        | 0.866 | 1/2 | 3/16 | 1/32 |             |          |
| TPU 433     | 220412 |                | 146712 |       |       |       |       |        |       |         |                  | 146840 |        | 0.866 | 1/2 | 3/16 | 3/64 |             |          |
| TPU 434     | 220416 |                |        |       |       |       |       |        |       |         |                  | 146845 |        | 0.866 | 1/2 | 3/16 | 1/16 |             |          |

## VCKT-A



| Designation     | ISO    | Coated Carbide |       |       |       |       |       | Cermet |       | Ceramic | Uncoated Carbide |          | (inch) |       |     |      |       | Applicable Holder |            |          |
|-----------------|--------|----------------|-------|-------|-------|-------|-------|--------|-------|---------|------------------|----------|--------|-------|-----|------|-------|-------------------|------------|----------|
|                 |        | PM10C          | PM25C | PM30C | PM30P | PM35P | KM20C | MM30P  | PT20S | PT30S   | S300             | PM20U    | KT10U  | l     | d   | t    | r     | d1                | Cutter     | Page No. |
| VCKT 43.57.5N-A | 220530 |                |       |       |       |       |       |        |       |         |                  | 147425   |        | 0.790 | 1/2 | 7/32 | 0.118 | 0.220             | Alumi Mill |          |
|                 |        |                |       |       |       |       |       |        |       |         |                  | \$ 51.15 |        |       |     |      |       |                   | AME        | E145     |
|                 |        |                |       |       |       |       |       |        |       |         |                  |          |        |       |     |      |       |                   | AMFM       | E146     |

## VDKT-MA



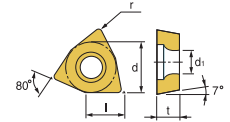
| Designation    | ISO | Coated Carbide |       |       |       |       |       | Cermet |       | Ceramic | Uncoated Carbide |          | (inch) |       |     |       |       | Applicable Holder |            |          |
|----------------|-----|----------------|-------|-------|-------|-------|-------|--------|-------|---------|------------------|----------|--------|-------|-----|-------|-------|-------------------|------------|----------|
|                |     | PM10C          | PM25C | PM30C | PM30P | PM35P | KM20C | MM30P  | PT20S | PT30S   | S300             | PM20U    | KT10U  | l     | d   | t     | r     | d1                | Cutter     | Page No. |
| VDKT11T210N-MA |     |                |       |       |       |       |       |        |       |         |                  | 148936   |        | 0.346 | 1/4 | 0.113 | 0.039 | 0.110             | Alumi Mill |          |
|                |     |                |       |       |       |       |       |        |       |         |                  | \$ 37.67 |        |       |     |       |       |                   | AME        | E145     |

### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

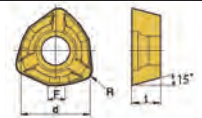


## WCMT-C20/G21 Drilling Insert



| Designation      | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       |       | Uncoated Carbide   |        | (inch) |      |      |       |                       | Applicable Cutter |          |
|------------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|--------|--------|------|------|-------|-----------------------|-------------------|----------|
|                  |        | PM10C          | PM25C              | PM30C | PM30P | PM35P | PM40P | KM20C | MM30P | MT30P | SM20P | PM20U              | KTM10U | l      | d    | t    | r     | d1                    | Cutter            | Page No. |
| WCMT 1.81.52-C20 | 030208 |                | 146242<br>\$ 21.11 |       |       |       |       |       |       |       |       | 146537<br>\$ 16.44 | 0.149  | 7/32   | 3/32 | 1/32 | 0.110 | MAX DRILL<br>E156-160 |                   |          |
| WCMT 21.52-C20   | 040208 |                | 146237<br>\$ 21.16 |       |       |       |       |       |       |       |       |                    | 0.169  | 1/4    | 3/32 | 1/32 | 0.118 |                       |                   |          |
| WCMT 2.522-C20   | 050308 |                | 146236<br>\$ 22.56 |       |       |       |       |       |       |       |       |                    | 0.212  | 5/16   | 5/16 | 1/32 | 0.134 |                       |                   |          |
| WCMT 32.52-C20   | 06T308 |                | 146235<br>\$ 22.56 |       |       |       |       |       |       |       |       | 146539<br>\$ 17.52 | 0.256  | 3/8    | 5/32 | 1/32 | 0.157 |                       |                   |          |
| WCMT 432-C20     | 080408 |                | 146855<br>\$ 27.58 |       |       |       |       |       |       |       |       |                    | 0.342  | 1/2    | 3/16 | 1/32 | 0.169 |                       |                   |          |
| WCMT 433-C20     | 080412 |                | 146000<br>\$ 27.58 |       |       |       |       |       |       |       |       | 146563<br>\$ 21.48 | 0.342  | 1/2    | 3/16 | 3/64 | 0.169 |                       |                   |          |

## WDKT

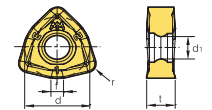


| Designation         | Coated Carbide |       |       |       |       |                    | Cermet             |       | Ceramic | Uncoated Carbide |       | (inch) |       |      |       |       | Applicable Cutter |              |
|---------------------|----------------|-------|-------|-------|-------|--------------------|--------------------|-------|---------|------------------|-------|--------|-------|------|-------|-------|-------------------|--------------|
|                     | PM10C          | PM25C | PM30P | PM35P | PM40P | KM10P              | MM30P              | PT20S | PT30S   | S300             | PM20U | PTM30U | d     | t    | F     | r     | Cutter            | Page No.     |
| WDKT 080316 ZDSR-MH |                |       |       |       |       | 146261<br>\$ 18.94 | 146267<br>\$ 18.94 |       |         |                  |       |        | 0.315 | 1/8  | 3/64  | 1/16  | HFPA<br>HFPC      | E118<br>E118 |
| WDKT 10T320 ZDSR-MH |                |       |       |       |       | 146271<br>\$ 26.84 | 146274<br>\$ 26.84 |       |         |                  |       |        | 0.394 | 3/32 | 0.059 | 0.079 |                   |              |
| WDKT 130520 ZDSR-MH |                |       |       |       |       | 146275<br>\$ 37.57 | 148623<br>\$ 37.57 |       |         |                  |       |        | 0.531 | 7/32 | 0.083 | 0.079 |                   |              |

## WNMX

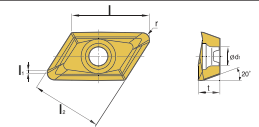
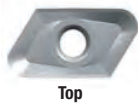


**Features**  
Excellent geometries for a variety of materials



| Designation     | Coated Carbide     |       |       |       |       |       |                    |        | Uncoated Carbide |                    | (inch) |       |       |       |       | Applicable Cutter |        |          |
|-----------------|--------------------|-------|-------|-------|-------|-------|--------------------|--------|------------------|--------------------|--------|-------|-------|-------|-------|-------------------|--------|----------|
|                 | PTM50P             | PM25C | PM30P | PM35P | PM40P | KM20C | MM30P              | PC9530 | SM20P            | PM20U              | KTM10U | d     | t     | r     | d1    | f                 | Cutter | Page No. |
| WNMX09T316ZNN-M | 145640<br>\$ 29.55 |       |       |       |       |       | 146891<br>\$ 28.75 |        |                  |                    |        | 0.375 | 0.156 | 0.063 | 0.142 | 0.067             | HFNA   | E120     |
| WNMX130520ZNN-M | 145675<br>\$ 46.38 |       |       |       |       |       |                    |        |                  | 147080<br>\$ 37.04 |        | 0.500 | 0.219 | 0.079 | 0.185 | 0.098             | HFNC   | E121     |





## XEKT-MA










| Designation      |   | Coated Carbide |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |       |       |       |       | Applicable Cutter |                     |        |
|------------------|---|----------------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-------|-------|-------|-------|-------------------|---------------------|--------|
|                  |   | PT10C          | PT20C | PT30C | PM10P | MT20C | MT30P | KT05C | KT10C            | PT20U              | KTM10U | l     | l2    | l1    | t     | r                 | d1                  | Cutter |
| XEKT 19M504FR-MA | A |                |       |       |       |       |       |       |                  | 145610<br>\$ 49.56 | 0.709  | 0.646 | 0.055 | 0.197 | 1/64  | 0.173             | End Mill<br>AME-X   | E147   |
| XEKT 19M508FR-MA | A |                |       |       |       |       |       |       |                  | 145611<br>\$ 49.56 | 0.709  | 0.646 | 0.039 | 0.197 | 1/32  | 0.173             | Face Mill<br>AMFM-X | E147   |
| XEKT 19M512FR-MA | A |                |       |       |       |       |       |       |                  | 146367<br>\$ 48.17 | 0.709  | 0.646 | 0.024 | 0.197 | 3/64  | 0.173             |                     |        |
| XEKT 19M516FR-MA | A |                |       |       |       |       |       |       |                  | 145612<br>\$ 48.17 | 0.689  | 0.646 | 0.020 | 0.197 | 1/16  | 0.173             |                     |        |
| XEKT 19M520FR-MA | A |                |       |       |       |       |       |       |                  | 146368<br>\$ 48.17 | 0.689  | 0.646 | 0.020 | 0.197 | 0.079 | 0.173             |                     |        |
| XEKT 19M530FR-MA | A |                |       |       |       |       |       |       |                  | 146369<br>\$ 49.56 | 0.689  | 0.646 | 0.028 | 0.197 | 0.118 | 0.173             |                     |        |
| XEKT 19M532FR-MA | A |                |       |       |       |       |       |       |                  | 145613<br>\$ 48.17 | 0.689  | 0.646 | 0.020 | 0.197 | 1/8   | 0.173             |                     |        |
| XEKT 19M540FR-MA | B |                |       |       |       |       |       |       |                  | 146370<br>\$ 48.17 | 0.650  | 0.646 | 0.020 | 0.197 | 0.157 | 0.173             |                     |        |
| XEKT 19M550FR-MA | B |                |       |       |       |       |       |       |                  | 146375<br>\$ 48.17 | 0.630  | 0.646 | 0.016 | 0.197 | 0.197 | 0.173             |                     |        |

## Cutter Index



| Shape  | Features   | Cutter Diameter | Available Inserts   |
|--|--|-----------------|---|
| <b>High Feed Mills</b><br><b>HFPA &amp; HFPC High Feed Mills</b><br><br>▶ P. E118 | <ul style="list-style-type: none"> <li>Powerful and economic milling tool with double clamping and 3 corner-use insert</li> <li>Longer tool life with various insert grades</li> <li>Shortened machining cycle time</li> <li>Long tool life by low cutting resistant chip breaker</li> <li>Decrease cutting resistance and realization of high feed cutting (Max. fz=3.5 mm/tooth, 0.14 ipt)</li> </ul>  | 0.750 ~ 3.0     | WDKT 080316 ZDSR-MH<br>10T320 ZDSR-MH<br>130520 ZDSR-MH<br>▶ P. E105, 119   |
| <b>HFNA &amp; HFNC High Feed Mills</b><br><br>▶ P. E120-121                       | <ul style="list-style-type: none"> <li>Powerful and economic milling tool with simple screw on system and double sided insert (6 corners)</li> <li>Negative geometry designed for rigidity of cutting edge</li> <li>Symmetrical cutting edge good for R and L type tooling</li> <li>Long tool life by low cutting resistance chip breaker</li> <li>High rake angle cutting edge reduces cutting load making this excellent for high feed and multi-functional machining</li> </ul> | 1.00 ~ 4.00     | WNMX 90T316ZNN-M<br>130520ZNN-M<br>▶ P. E105, E121  |
| <b>AP / AD Mills</b><br><b>AP 06 - 90° End Mills</b><br><br>▶ P. E122            | <ul style="list-style-type: none"> <li>Multi-functional indexable end mill for facing, slotting, square shoulder milling, etc</li> <li>Excellent performance at large depth of cut due to strong cutting edge and low cutting resistance</li> </ul>  | 0.5 ~ 1.25      | APMT 0602PDSR-M<br>▶ P. E93   |
| <b>AP 11/16 - 90 End° Mills</b><br><br>▶ P. E122-123                            | <ul style="list-style-type: none"> <li>Indexable end mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>   | 0.5 ~ 2.0       | APXT 11T3PDSR-F2<br>11T3PDSR-M<br>11T3PDR-A<br>1604PDSR-F2<br>1604PDSR-M<br>APKT 1604PDFR-A<br>▶ P. E94   |
| <b>AP 11M/16M - 90° End Mills</b><br><br>▶ P. E124                              | <ul style="list-style-type: none"> <li>Indexable end mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>   | 0.5 ~ 2.0       | APMT 11T3PDER<br>11T3PDER-F2<br>11T3PDER-M<br>11T3PDFR-A<br>11T3PDSR-M<br>1604PDFR-A<br>1604PDFR-M<br>1604PDSR-F2<br>1604PDSR-M<br>160416PDSR-M<br>160432PDSR-M<br>▶ P. E93 |








## Cutter Index

| Shape  | Features   | Cutter Diameter | Available Inserts   |
|--|--|-----------------|---|
| <b>AP 10 &amp; AD 15 - 90° End Mills</b><br><br>▶ P. E125 | <ul style="list-style-type: none"> <li>• Indexable end mill for slotting, shoulder milling, and plane milling</li> <li>• Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul> | 0.375 ~ 1.25    | <b>APKT 1003</b><br><b>ADKT 1505</b><br>▶ P. E92  |
| <b>AP 11 - 15° End Mills</b><br><br>▶ P. E125             | <ul style="list-style-type: none"> <li>• Indexable end mill for slotting, shoulder milling, and plane milling</li> <li>• Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul> | 1.0 ~ 1.5       | <b>APXT 11T3PDSR-F2</b><br><b>11T3PDSR-M</b><br><b>11T3PDR-A</b><br>▶ P. E94  |
| <b>AP 16 Chamfer Mills 30° to 60°</b><br><br>▶ P. E126    | <ul style="list-style-type: none"> <li>• Indexable Chamfering</li> <li>• Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance</li> </ul>   | 0.5 ~ 1.5       | <b>APLT 347</b><br>▶ P. E126  |
| <b>AP 18 - 90° End Mills</b><br><br>▶ P. E127           | <ul style="list-style-type: none"> <li>• Multi-functional indexable end mill for facing, slotting, square shoulder milling, etc</li> <li>• Excellent performance at large depth of cut due to strong cutting edge and low cutting resistance</li> </ul>  | 1.25 ~ 2.5      | <b>APMT 1806PDSR-M</b><br>▶ P. E93  |
| <b>APCC - Centre Cut</b><br><br>▶ P. E127               | <ul style="list-style-type: none"> <li>• Indexable end mill for slotting, shoulder milling, and plane milling</li> <li>• Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul> | 1.0 ~ 1.5       | <b>APXT 11T3PDSR-F2</b><br><b>11T3PDSR-M</b><br><b>11T3PDR-A</b><br><b>1604PDSR-F2</b><br><b>1604PDSR-M</b><br>▶ P. E94 |
| <b>DS4 End Mills</b><br><br>▶ P. E128                   | <ul style="list-style-type: none"> <li>• Double sided insert with 4 usable cutting edges</li> <li>• Strong negative insert with high rake angle cutting edges</li> <li>• Multi-functional tool covers facing, side cutting, shouldering, slotting, ramping, and helical cutting</li> </ul>                 | 0.625 ~ 2.00    | <b>LNMX 100605PNR-M</b><br>▶ P. E94-95  |
| <b>APFM 06 - 90°</b><br><br>▶ P. E128                   | <ul style="list-style-type: none"> <li>• Multi-functional indexable face mill for facing, slotting, square shoulder milling, etc</li> <li>• Excellent performance at large depth of cut due to strong cutting edge and low cutting resistance</li> </ul>   | 1.5 ~ 2.5       | <b>APMT 0602PDSR-M</b><br>▶ P. E93  |



## Cutter Index










| Shape  | Features  | Cutter Diameter | Available Inserts  |
|--|---|-----------------|--|
| <b>APFM 11M/16M - 90° Face Mills</b><br><br>▶ P. E129   | <ul style="list-style-type: none"> <li>Indexable face mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>                 | 1.5 ~ 4.0       | <b>APMT</b> 11T3PDER<br>11T3PDER-F2<br>11T3PDER-M<br>11T3PDFR-A<br>11T3PDSR-M<br>1604PDFR-A<br>1604PDFR-M<br>1604PDSR-F2<br>1604PDSR-M<br>160416PDSR-M<br>160432PDSR-M<br>▶ P. E93 |
| <b>APFM 11/16 - 90° Face Mills</b><br><br>▶ P. E130-131 | <ul style="list-style-type: none"> <li>Indexable face mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>                 | 2.0 ~ 6.0       | <b>APXT</b> 11T3PDSR-F2<br>11T3PDSR-M<br>11T3PDR-A<br>1604PDSR-F2<br>1604PDSR-M<br><b>APKT</b> 1604<br>▶ P. E93-94   |
| <b>AP(D)FM 10/15 - 90° Face Mills</b><br><br>▶ P. E131 | <ul style="list-style-type: none"> <li>Indexable face mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>                 | 2.0 ~ 4.0       | <b>APKT</b> 1003<br><b>ADKT</b> 1505<br>▶ P. E92   |
| <b>APFM 11/16 - 15° Face Mills</b><br><br>▶ P. E132   | <ul style="list-style-type: none"> <li>Indexable face mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>                 | 2.5 ~ 5.0       | <b>APXT</b> 11T3PDSR-F2<br>11T3PDSR-M<br>11T3PDR-A<br>1604PDSR-F2<br>1604PDSR-M<br>▶ P. E94  |
| <b>APFM 18 - 90° Face Mills</b><br><br>▶ P. E132      | <ul style="list-style-type: none"> <li>Indexable face mill for slotting, shoulder milling, and plane milling</li> <li>Outstanding chip control and prominent machining in Medium and Roughing by coated insert combined toughness with wear resistance and designed 3 dimension chip breaker</li> </ul>                 | 2.0 ~ 5.0       | <b>APMT</b> 1806PDSR-M<br>▶ P. E93   |
| <b>Button Mills</b><br><br>▶ P. E133                  | <ul style="list-style-type: none"> <li>High tensile aluminum body can be used for high speed cutting, tapping centre, and on low power machines</li> <li>Due to the high rake angle, it provides low cutting loads and good surface finish</li> <li>Wide chip pocket area provides excellent chip evacuation</li> </ul> | 0.75 ~ 5.0      | <b>RDKT</b> 10T3M0-F2<br>10T3M0-M<br>1204M0-A<br>1204M0-F2<br>1204M0-M<br>▶ P. E98   |
| <b>OKT-MAX</b><br><br>▶ P. E134                       | <ul style="list-style-type: none"> <li>High rake angle</li> <li>8 corner, economical insert</li> <li>45° angle of cut</li> <li>Good for Steel, Alloy Steel, Cast Iron</li> </ul>  | 1.5 ~ 6.00      | <b>OFCW</b> 05T3SN<br><b>OFKT</b> 05T3SN-F2<br><b>OFKT</b> 05T3SN-M<br><b>OFKT</b> 05T3SN-A<br>▶ P. E96-97   |

## Cutter Index

| Shape  | Features  | Cutter Diameter | Available Inserts   |
|--|---|-----------------|---|
| <b>Max Mill Face Mills - 90°</b><br><br>➤ P. E135   | <ul style="list-style-type: none"> <li>• Square shouldering cutter can do square shouldering, slotting and facing with 4 corner insert</li> <li>• Tool life has been increased through 3 dimensional chip breakers and superb coating grades having optimal wear resistance and toughness</li> <li>• Combination of tough cutting edge and low cutting force design provides excellent cutting performance</li> </ul> | 2.5 ~ 6.0       | <b>SDXT130508R-A</b><br><b>SDXT130508R-F2</b><br><b>SDXT130508R-M</b><br>➤ P. E98   |
| <b>DS4 Face Mills</b><br><br>➤ P. E135              | <ul style="list-style-type: none"> <li>• Double sided insert with 4 usable cutting edges</li> <li>• Strong negative insert with high rake angle cutting edges</li> <li>• Multi-functional tool covers facing, side cutting, shouldering, slotting, ramping, and helical cutting</li> </ul>  | 1.5 ~ 6.0       | <b>LNMX 100605PNR-F2</b><br><b>100605PNR-M</b><br><b>151008PNR-F2</b><br><b>151008PNR-M</b><br>➤ P. E94-95  |
| <b>DS8 Face Mills - 45°</b><br><br>➤ P. E136        | <ul style="list-style-type: none"> <li>• Innovative double-sided, high rake angle insert makes it possible to use 8 cutting edges</li> <li>• Low cutting load due to the positive setting and high rake angle chip breaker</li> <li>• Designed wiper technology in minor cutting edge provides excellent surface finish</li> <li>• Smooth and stable chip control</li> </ul>  | 2.0 ~ 8.0       | <b>SNEX 1206ANN-A</b><br><b>1206ANN-F2</b><br><b>1206ANN-M</b><br><b>1206ANN-W</b><br><b>SNMX 1206ANN-M</b><br>➤ P. E101  |
| <b>Max Mill Face Mills - 45°</b><br><br>➤ P. E137 | <ul style="list-style-type: none"> <li>• High quality machining with precise design of insert and cutter</li> <li>• Various choice can be offered through variety of combination of insert and cutter</li> <li>• Excellent machining performance with light cutter and smooth chip control</li> </ul>   | 1.5 ~ 8.0       | <b>SEET14M4AGFN-A</b><br><b>SEET14M4AGSN-F2</b><br><b>SEET14M4AGSN-M</b><br><b>SEXT14M4AGSN-F2</b><br><b>SEXT14M4AGSN-M</b><br><b>SEXT14M4AGSN-R8</b><br>➤ P. E99-101 |
| <b>Jet Mill</b><br><br>➤ P. E139                  | <ul style="list-style-type: none"> <li>• Indexable end mill for mold finishing</li> <li>• Easy clamping with simple screw on system</li> <li>• MQL System provides improved chip control, prolonged tool life, and increased surface quality</li> </ul>   | 0.312 ~ 1.25    | <b>JMCF 5/8 ~ 1</b><br><b>JMFH 3/8 ~ 1-1/4</b><br><b>JMBH 3/8 ~ 1-1/4</b><br><b>JMBS 5/16 ~ 1-1/4</b>   |
| <b>Mold Mill</b><br><br>➤ P. E140                 | <ul style="list-style-type: none"> <li>• Distinguished cutting performance by S type edge and optimal design</li> <li>• High accuracy in finish machining by the cutting edge designed after Solid Ball End Mill</li> <li>• Simple assembly and hard clamping with two screws</li> </ul>  | 0.625 ~ 1.250   | <b>RC 5/8</b><br><b>RC 3/4</b><br><b>RC 1"</b><br><b>RC 1-1/8</b><br><b>RC 1-1/4</b><br>➤ P. E97  |
| <b>Mold Max</b><br><b>MMEM</b><br><br>➤ P. E141   | <ul style="list-style-type: none"> <li>• High strength of cutting edge and excellent surface finish by R type inserts</li> <li>• Outstanding efficiency in cutting performance with difficult-to-cut material of high degree of hardness</li> <li>• Suitable to curved surface of moulds</li> <li>• Economical cutter body assembling with screw</li> </ul>   | 1.25 ~ 2.0      | <b>RPMM 120400</b><br>➤ P. E98  |

## Cutter Index



| Shape  | Features  | Cutter Diameter               | Available Inserts  |
|--|---|-------------------------------|--|
| <b>Mold Max</b><br><b>MMFM</b><br><br>▶ P. E142                 | <ul style="list-style-type: none"> <li>High strength of cutting edge and excellent surface finish by R type inserts</li> <li>Outstanding efficiency in cutting performance with difficult-to-cut material of high degree of hardness</li> <li>Suitable to curved surface of moulds</li> <li>Economical cutter body assembling with screw</li> </ul>                             | 1.969 ~ 6.299<br>(50 ~ 160mm) | <b>RPMM 120400</b><br><br>▶ P. E98   |
| <b>Multi-functional 45° Chamfer Tool</b><br><br>▶ P. E143       | <ul style="list-style-type: none"> <li>For centering, grooving, and chamfering</li> <li>Up to 1.14" chamfering is available</li> </ul>  | ∅0 ~ ∅1.14                    | <b>TWX 16R-KC</b><br><b>22R-KC</b>   |
| <b>Chamfer-Mill 45°</b><br><br>▶ P. E142                        | <ul style="list-style-type: none"> <li>Triangular positive insert provides smooth machining</li> <li>General milling is available as well</li> </ul>  | 0.125 ~ 1.125                 | <b>TC_T 21.5</b><br><b>32.5</b><br><br>▶ P. E22-24   |
| <b>Alumi Mills</b><br><b>Alumi-Mills</b><br><br>▶ P. E145-146 | <ul style="list-style-type: none"> <li>Buffing treatment on top face of insert provides smooth chip flow and prevention of build-up-edge</li> <li>Fine surface finish of workpiece due to high rake angle of insert which lead low cutting force</li> <li>Square shouldering and contouring is possible</li> <li>High rigidity of cutter allows high speed machining</li> </ul> | 1.25 ~ 4.0                    | <b>VCKT 43.57.5N-MA</b><br><br>▶ P. 104  |
| <b>Alumi-X Mills</b><br><br>▶ P. E147                         | <ul style="list-style-type: none"> <li>Buffed mirror face provides outstanding chip control and prevents edge build-up</li> <li>Multi-functional aluminum milling tool for shouldering, slotting, helical ramping, and copying</li> <li>Multi-dimensional clamping surface prevents micro-vibrations at during high speed machining</li> </ul>                                  | 1.25 ~ 4.0                    | <b>XEKT 19M5-FR-A</b><br><b>19M5-FR-MA</b><br><br>▶ P. E105  |
| <b>T-Slot Cutter</b><br><br>▶ P. E145                         | <ul style="list-style-type: none"> <li>Indexable T-Slot cutter</li> </ul>   | 0.83 ~ 1.97                   | <b>CPMT 060204-M</b><br><b>080308-M</b><br><b>09T308-M</b><br><b>CPMH 432-M</b><br><br>▶ P. E94  |
| <b>GP Indexable Drill</b><br><br>▶ P. E149                    | <ul style="list-style-type: none"> <li>GP (Indexable Drill)</li> <li>Indexable drill using indexable insert</li> <li>5~6 times higher machining speed provides higher productivity</li> <li>Available for turning and milling</li> </ul>  | 0.625 ~ 2.00                  | <b>WCMT 030208-C20</b><br><b>040208-C20</b><br><b>050308-C20</b><br><b>06T308-C20</b><br><b>080408-C20</b><br><b>080412-C20</b><br><br>▶ P. E105 |

## Cutter Index

| Shape   | Features  | Cutter Diameter | Available Inserts   |
|---|---|-----------------|---|
| <b>Pro SP/NP Drill</b><br><br>▶ P. E149                      | <ul style="list-style-type: none"> <li>• High rigidity drills</li> <li>• Excellent chip evacuation due to the specially designed flute</li> <li>• Strengthened drill body and shank for better performance even in difficult cutting conditions</li> <li>• Available for turning and milling</li> </ul>   | 0.50 ~ 2.0      | <b>NPET-AD</b><br><b>NPET-RD</b><br><b>NPMT-MD</b><br><b>SPMT-MD</b><br>▶ P. E195-96, E102  |
| <b>Combo Turning &amp; Drilling Tool</b><br><br>▶ P. E150    | <ul style="list-style-type: none"> <li>• For external/internal turning, facing, and drilling</li> <li>• Double coolant system provides excellent chip evacuation and extended tool life</li> <li>• Ideal flute design minimizes stress concentrations</li> </ul>  | 0.394 ~ 0.787   | <b>QCMT 050204-CM</b><br><b>060204-CM</b><br><b>070204-CM</b><br><b>070304-CM</b><br><b>080204-CM</b><br><b>080304-CM</b><br><b>10T304-CM</b><br>▶ P. E97 |
| <b>Max Drill Deep Hole Drilling</b><br><br>▶ P. E156-160    |    | 1.77 ~ 7.09     | <b>WCMT 030208-C20</b><br><b>040208-C20</b><br><b>050308-C20</b><br><b>06T308-C20</b><br><b>080408-C20</b><br><b>080412-C20</b><br>▶ P. 105, E157         |
|    |   |                 |   |
| <b>NC Spot Drills - 90°, 82°, 60°</b><br><br>▶ P. E151-153 | <ul style="list-style-type: none"> <li>• Spotting produces better hole position and geometrically uniform holes</li> <li>• Long tool life</li> <li>• Up to 4 cutting edges per insert</li> <li>• Suitable for spotting, chamfering, grooving, and engraving</li> </ul>  | 6mm ~ 14mm      | <b>N9MT0802</b><br><b>N9MT11T3CT</b><br><b>V0820802</b><br><b>V08212T3</b><br><b>V9MT08</b><br><b>V9MT12</b><br>▶ P. E151-153                             |
| <b>Engraving - 45°, 60°</b><br><br>▶ P. E155               | <ul style="list-style-type: none"> <li>• High positive rake angle suitable for all types of materials, such as plastic, non-ferrous metals, aluminum, copper, carbon steel, and stainless steel</li> <li>• Multi-side grinding - performs excellently without producing burrs</li> <li>• High speed, high feed rate - designed to run at speeds up to 40,000rpm. Feed rate 0.08mm (0.003")/rev apply to aluminum; 0.05mm (0.002")/rev apply to stainless steel</li> </ul> | 0 ~ 2.1mm       | <b>V04506T1W06</b><br><b>V06006T1W06</b><br>▶ P. E155   |

## AP/AD Multifunctional Insert

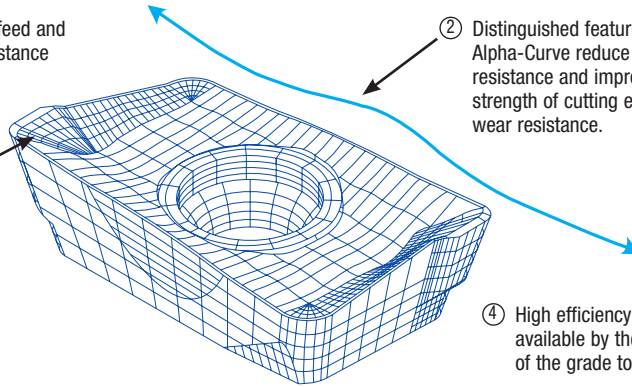


① Long tool life at high speed, high feed and deeper cutting by low cutting resistance and strong cutting edge.

② Distinguished features of Alpha-Curve reduce cutting resistance and improve the strength of cutting edge and wear resistance.

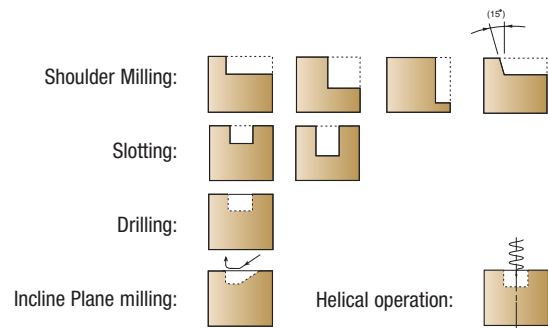
③ Low cutting resistance is realized by unique design i.e Alpha-Curve cutting edge and optimal convex and concave design.

④ High efficiency machining is available by the ideal application of the grade to material.



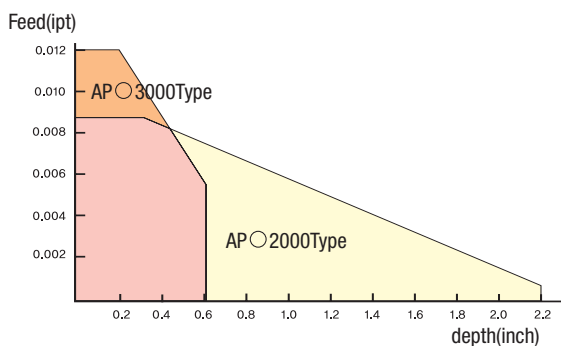
### Inserts Feature & Application

- Innovative curve cutting edge and chip-breaker design ensures ideal 90 degree cutting and lower cutting resistance
- Various applications are available with multi-functional cutters (Facing, Slotting, Square Shoulder Milling, etc.)
- Application specific optimization improves insert life
- Excellent performance ensured at large depth of cutting operations due to strong cutting edge and low cutting resistance



| Chip Breaker | Cutting Edge Shape |                              | Recommendation C/B and Grades ( ● : 1 <sup>st</sup> Choice) |                               |                                 |                               |                  |                               |            |         |                 |          |
|--------------|--------------------|------------------------------|---|-------------------------------|---------------------------------|-------------------------------|------------------|-------------------------------|------------|---------|-----------------|----------|
|              |                    |                              | Low Carbon Steels Soft Steels                               |                               | High Carbon Steels Alloy Steels |                               | Stainless Steels |                               | Cast Irons |         | Aluminum Alloys |          |
|              |                    |                              | C/B   | Grade                         | C/B                             | Grade                         | C/B              | Grade                         | C/B        | Grade   | C/B             | Grade    |
| F2           |                    | Low Cutting Resistance Type  | ●   | ○ PM25C<br>○ PM30P<br>● PM30C | -                               | ● PM25C<br>○ PM30P<br>○ PM30C | ●                | ○ PM25C<br>○ PM30P<br>● PM30C | ●          | ● KM20C | -               | -        |
| M            |                    | Reinforced Cutting Edge Type | -   | ○ PM25C<br>○ PM30P<br>● PM30C | ●                               | ● PM25C<br>○ PM30P<br>○ PM30C | ●                | ○ PM25C<br>○ PM30P<br>● PM30C | ●          | ● KM20C | -               | -        |
| A            |                    | Sharp Cutting Edge Type      | -   | -                             | -                               | -                             | -                | -                             | -          | -       | ●               | ● KTM10U |

### AP / AD Mill Application Range

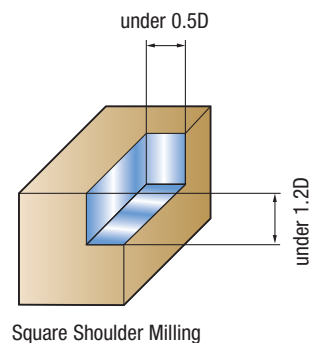
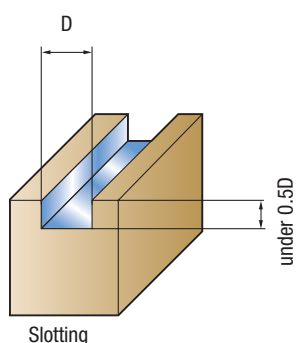


### Tips

1. The cutting speed and feed can be adjusted in accordance with the machine's power and conditions of workpiece.
2. We recommend you operate them with small radial depth (RD) and large axial depth (AD) at the square shoulder milling applications.
3. We recommend you use compressed air during the slotting and pocket milling applications for better chip removal.
4. When encountering chattering during the operation, decrease the cutting speed.

## AP/AD Recommended Depth of Cuts

(D : Cutting Diameter)



### Recommended Cutting Conditions (for Single-Edge Type)

(Standard for side cutting, reduce condition 20~30% for slotting)

| Workpiece Material                  | Grade          | Cutting Diameter |             |                          |             |                        |             |                          |             |
|-------------------------------------|----------------|------------------|-------------|--------------------------|-------------|------------------------|-------------|--------------------------|-------------|
|                                     |                | ~ $\phi 0.625$   |             | $\phi 0.625, \phi 1.000$ |             | $\phi 1.25, \phi 1.50$ |             | $\phi 3.000, \phi 4.000$ |             |
|                                     |                | V(sfm)           | fz(ipf)     | V(sfm)                   | fz(ipf)     | V(sfm)                 | fz(ipf)     | V(sfm)                   | fz(ipf)     |
| Low Carbon Steels,<br>Soft Steels   | PM25C<br>PM30P | 195~395          | 0.002~0.006 | 260~590                  | 0.004~0.006 | 395~820                | 0.001~0.006 | 490~820                  | 0.004~0.006 |
| High Carbon Steels,<br>Alloy Steels | PM25C<br>PM30P | 165~330          | 0.002~0.006 | 260~490                  | 0.002~0.006 | 330~655                | 0.004~0.06  | 330~655                  | 0.004~0.006 |
| Stainless Steel                     | PM30C<br>MM30P | 165~330          | 0.002~0.006 | 260~490                  | 0.002~0.006 | 330~590                | 0.004~0.006 | 330~590                  | 0.004~0.006 |
| Cast Iron                           | KM20C          | 260~395          | 0.003~0.008 | 330~425                  | 0.006~0.008 | 395~655                | 0.002~0.008 | 395~655                  | 0.006~0.008 |
| Aluminum Alloy                      | KTM10U         | 855~2955         | 0.006~0.012 | 985~3120                 | 0.006~0.012 | 1310~3280              | 0.004~0.016 | 1310~3280                | 0.004~0.016 |



## Max Mill Technical Information

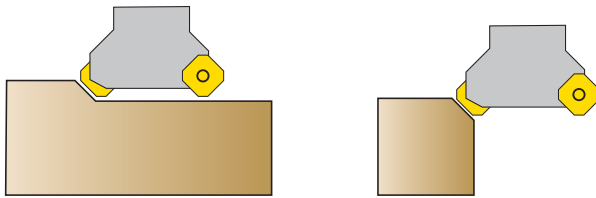


### Comprehensive Milling Cutter with High Productivity

1. Adjustable pitch of cutter by changing the number of inserts for the specific cutter diameter, and several chip breakers offer a wide application range.
2. Light cutter body allows high speed machining without chattering, thus it is possible to use a low horse power machine.
3. Smooth cutting with low cutting force accomplished with high rake angle.



#### ■ Machining Example



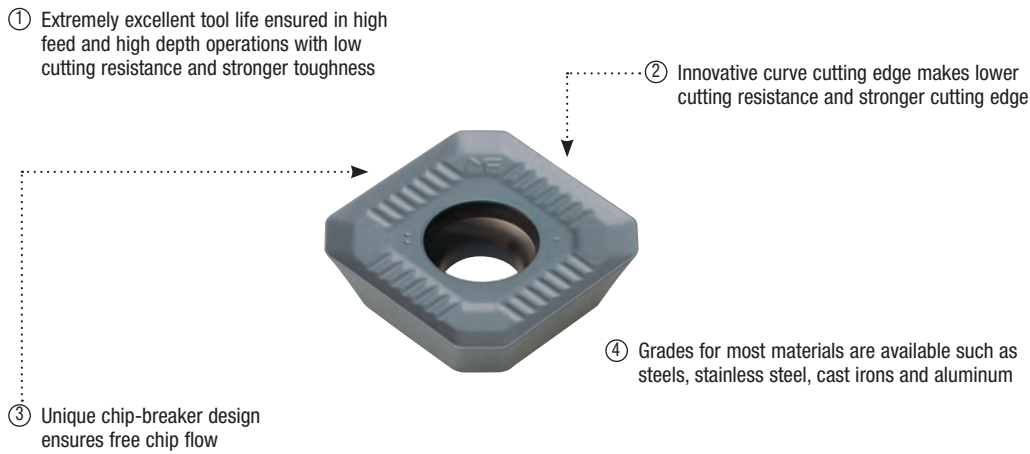
#### ■ Chip-Breakers

|                 | Chip-Breakers | Cutting Edge Shape | Use and Features of Chip-Breakers   |
|-----------------|---------------|--------------------|---|
| Light Cutting   | Non C/B       |                    | Superior surface roughness at finishing due to ground-type cermet insert.   |
|                 | F2            |                    | Superior cutting quality for light and difficult-to-cut material cutting through the low-cutting-resistance type of chip breaker. |
| General Cutting | M             |                    | Suitable for wide range of cutting due to special shape design for general cutting.   |
| Roughing        | R8            |                    | Tough cutting edge provides stable and consistent cutting performance even at severe intermittent cutting.                        |
| For Aluminum    | A             |                    | Superior quality for aluminum cutting resulting from applying proper cutting-edge treatment and buffing of surface.               |

#### ■ Recommended Cutting Condition

| ISO      | Grade   | C/B | F2       |             | M        |             | R8      |             | A         |             |
|----------|---------|-----|----------|-------------|----------|-------------|---------|-------------|-----------|-------------|
|          |         |     | V(sfm)   | fz(ipt)     | V(sfm)   | fz(ipt)     | V(sfm)  | fz(ipt)     | V(sfm)    | fz(ipt)     |
| P        | PM25C   |     | 650~1000 | 0.002~0.008 | 500~1000 | 0.004~0.012 | 500~800 | 0.004~0.012 | -         | -           |
|          | PM30P   |     | 650~1000 | 0.002~0.008 | 500~1000 | 0.004~0.012 | 330~800 | 0.004~0.012 | -         | -           |
| M        | MM30P   |     | 330~600  | 0.002~0.006 | 390~600  | 0.004~0.012 | -       | -           | -         | -           |
|          | PM30C   |     | 390~650  | 0.002~0.006 | 390~650  | 0.004~0.012 | -       | -           | -         | -           |
| K        | NCM320K |     | 500~800  | 0.002~0.008 | 500~800  | 0.004~0.012 | -       | -           | -         | -           |
|          | -       |     | -        | -           | -        | -           | -       | -           | -         | -           |
|          | -       |     | -        | -           | -        | -           | -       | -           | -         | -           |
| Aluminum | KTM10U  |     | -        | -           | -        | -           | -       | -           | 1150~3300 | 0.004~0.014 |

## Features of Max Mill Insert



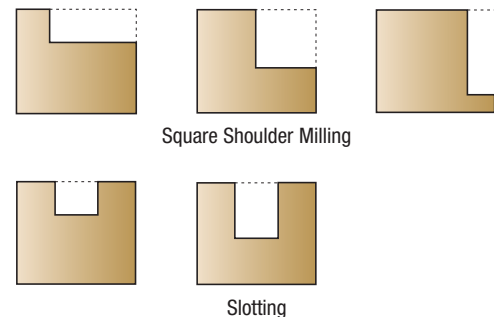
### ■ Inserts Feature & Application

- Innovative curve cutting edge and chip-breaker design ensures ideal 90 degree cutting and lower cutting resistance
- Various applications are available with multi-functional cutters (Facing, Slotting, Square Shoulder Milling, etc.)
- Application specific optimization improves insert life
- Excellent performance ensured at large depth of cutting operations due to strong cutting edge and low cutting resistance

| Chip-Breaker | Cutting Edge Sharp |                              | Recommendation C/B and Grades (:1 <sup>st</sup> Choice) |                               |                                    |                               |                  |                               |            |         |                 |          |
|--------------|--------------------|------------------------------|---|-------------------------------|------------------------------------|-------------------------------|------------------|-------------------------------|------------|---------|-----------------|----------|
|              |                    |                              | Low Carbon Steels<br>Soft Steels                        |                               | High Carbon Steels<br>Alloy Steels |                               | Stainless Steels |                               | Cast Irons |         | Aluminum Alloys |          |
|              |                    |                              | C/B   | Grade                         | C/B                                | Grade                         | C/B              | Grade                         | C/B        | Grade   | C/B             | Grade    |
| F2           |                    | Low Cutting Resistance Type  | ●   | ○ PM25C<br>○ PM30P<br>● PM30C | -                                  | ● PM25C<br>○ PM30P<br>○ PM30C | -                | ○ PM25C<br>○ PM30P<br>● PM30C | ●          | ● KM20C | -               | -        |
| M            |                    | Reinforced Cutting Edge Type | -   | ○ PM25C<br>○ PM30P<br>● PM30C | ●                                  | ● PM25C<br>○ PM30P<br>○ PM30C | -                | ○ PM25C<br>○ PM30P<br>● PM30C | ●          | ● KM20C | -               | -        |
| A            |                    | Sharp Cutting Edge Type      | -   | -                             | -                                  | -                             | -                | -                             | -          | -       | -               | ● KTM10U |

### ■ Advice

1. The cutting speed and feed can be adjusted in accordance with the machine's power and conditions of workpiece.
2. We recommend you operate them with small radial depth (RD) and large axial depth (AD) on square shoulder milling applications.
3. We recommend you use compressed air during the slotting and pocket milling applications for the better chip removal.
4. For chattering during the operation, decrease the cutting speed.



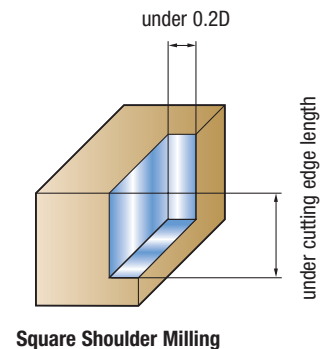
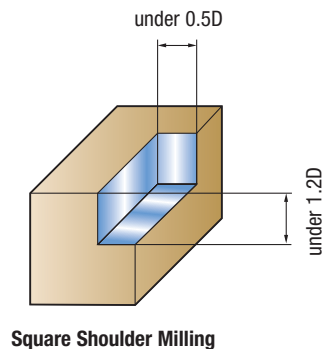
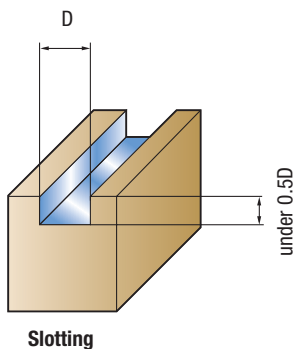


## Insert Choice(Chip Breaker/Grade)

| ISO(Workpiece) | Low Cutting Resistance Type | General Type | Stronger Cutting Edge Type |
|----------------|-----------------------------|--------------|----------------------------|
| P              | F2 / PM25C                  | M / PM25C    | M / PM30P                  |
| M              | F2 / PM30C                  | F2 / PM30C   | M / PM30C                  |
| K              | F2 / KM20C                  | F2 / KM20C   | F2 / KM20C                 |
| Al             | KTM10U                      | KTM10U       | KTM10U                     |

### Recommended Cutting Conditions

| Workpiece | Insert Grade | Cutter Diameter (ø) | ø1.25 ~ 2.50 |               | ø3.150 ~ 4.921 |               |
|-----------|--------------|---------------------|--------------|---------------|----------------|---------------|
|           |              |                     | V(sfm)       | fz(ipt)       | V(sfm)         | fz(ipt)       |
| P         | PM25C        |                     | 325 ~ 825    | 0.002 ~ 0.012 | 400 ~ 825      | 0.003 ~ 0.012 |
|           | PM30C        |                     | 325 ~ 725    | 0.002 ~ 0.01  | 400 ~ 725      | 0.003 ~ 0.01  |
|           | PM30P        |                     | 325 ~ 725    | 0.002 ~ 0.01  | 325 ~ 725      | 0.004 ~ 0.01  |
| M         | PM30C        |                     | 250 ~ 600    | 0.002 ~ 0.008 | 250 ~ 600      | 0.004 ~ 0.001 |
| K         | KM20C        |                     | 600 ~ 825    | 0.003 ~ 0.01  | 600 ~ 825      | 0.004 ~ 0.001 |
| Aluminum  | KTM10U       |                     | 1300 ~ 3275  | 0.002 ~ 0.016 | 1300 ~ 3275    | 0.004 ~ 0.016 |

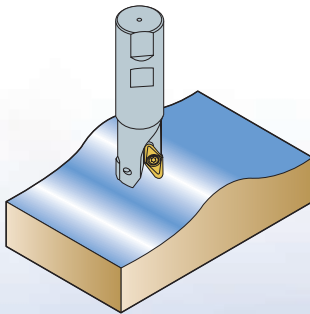


## Special Features of Alumi Mill

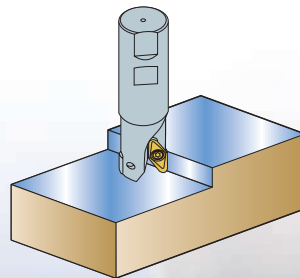
1. Mirror face of insert top provides smooth chip flow and prevent edge build-up.
2. High rake angle of cutting edge provides high quality surface finish through reduce cutting force.
3. Square shouldering and contouring is available.
4. Rigid cutter allows high speed machining.
5. Suitable for high speed machining which provides high productivity.
6. Precise ground insert and high rake angle reduces cutting force significantly.



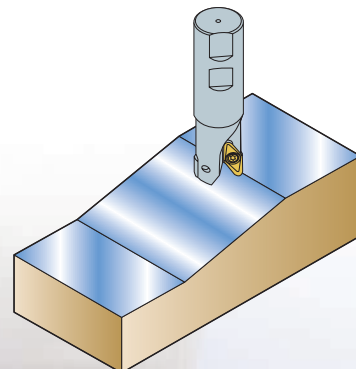
## Machining Examples of Alumi Mill



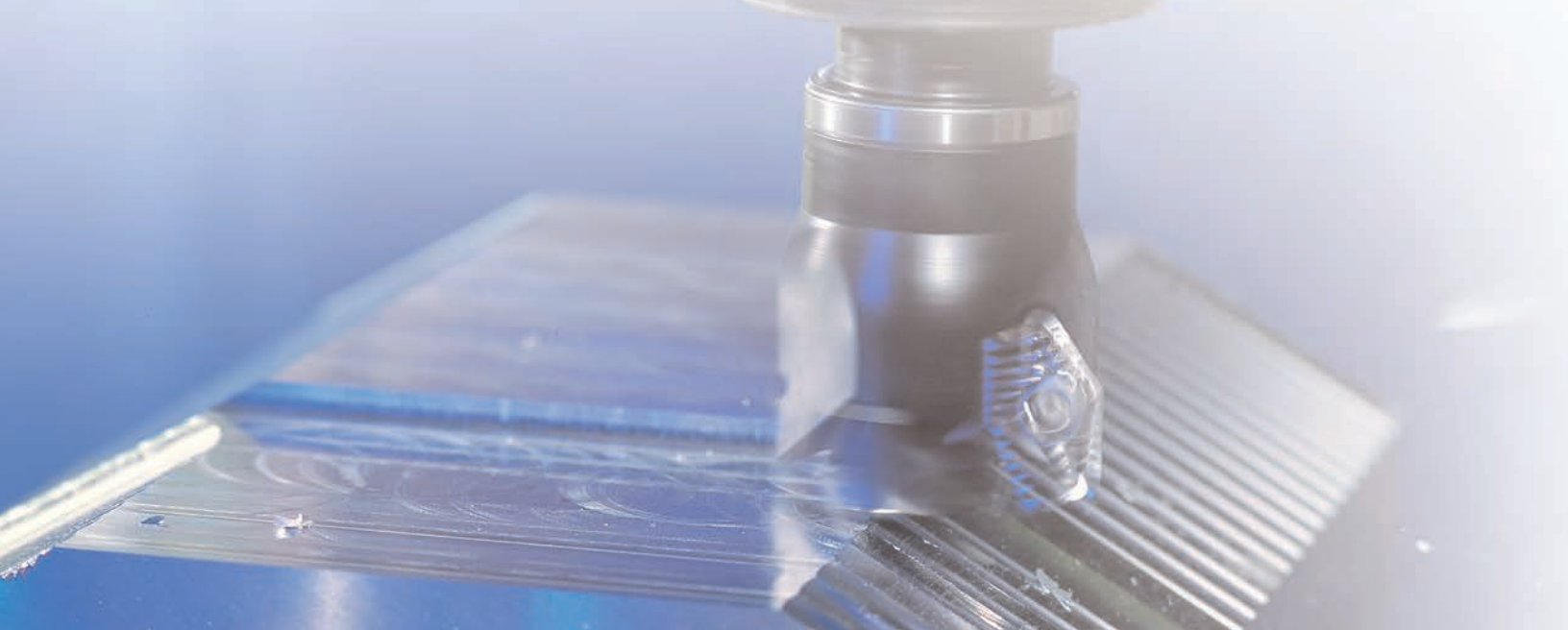
Contouring



Square Shouldering



Ramping

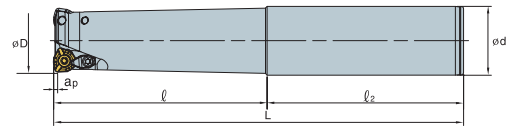




## HFPA High Feed End Mills



Kits Also Available  
➤ P. E162



(inch)

| Designation | Code No. | Price \$ | ØD     | Ød    | l     | l2    | L     | No. of Inserts | Insert              |                     |
|-------------|----------|----------|--------|-------|-------|-------|-------|----------------|---------------------|---------------------|
| HFPA        | 3/4      | 148642   | 497.39 | 0.750 | 0.750 | 1.969 | 3.150 | 5.119          | 2                   | WDKT 080316 ZDSR-MH |
|             | 1        | 148644   | 583.66 | 1.000 | 1.000 | 2.363 | 3.150 | 5.512          | 2                   | WDKT 10T320 ZDSR-MH |
|             | 1        | 148645   | 548.74 | 1.000 | 1.000 | 4.725 | 3.150 | 7.874          | 2                   | WDKT 10T320 ZDSR-MH |
|             | 1-1/4    | 148646   | 572.60 | 1.250 | 1.250 | 2.756 | 3.150 | 5.906          | 2                   | WDKT 130520 ZDSR-MH |
|             | 1-1/4    | 148647   | 589.73 | 1.250 | 1.250 | 4.725 | 3.150 | 7.874          | 2                   | WDKT 130520 ZDSR-MH |
|             | 1-1/2    | 148648   | 589.73 | 1.500 | 1.500 | 2.363 | 3.544 | 5.906          | 3                   | WDKT 130520 ZDSR-MH |
| 1-1/2       | 148649   | 962.97   | 1.500  | 1.500 | 5.119 | 4.725 | 9.843 | 3              | WDKT 130520 ZDSR-MH |                     |

➤ P. E115

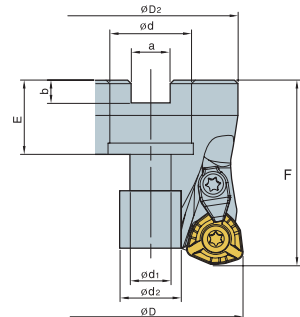
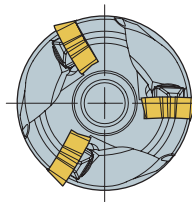
### Parts

| Cutter | Screw                          | Clamp                       | Clamp Screw                  | C-Ring                 | Wrench                   | Wrench                   |
|--------|--------------------------------|-----------------------------|------------------------------|------------------------|--------------------------|--------------------------|
| 3/4    | FTNA 0306<br>145548 \$ 9.23    | -                           | -                            | -                      | TW09P<br>146951 \$ 16.73 | -                        |
| 1.000  | FTKA 0408<br>146968 \$ 12.90   | CHH3.5R1<br>145552 \$ 35.01 | CTX03510<br>145554 \$ 13.85  | CR03<br>145556 \$ 3.74 | -                        | TW15S<br>146801 \$ 47.64 |
| 1-1/4  | FTGA 0510-P<br>145549 \$ 12.61 | CCH4.541<br>145553 \$ 35.33 | CTX04513H<br>145555 \$ 13.95 | CR03<br>145556 \$ 3.74 | -                        | TW20<br>148291 \$ 23.08  |
| 1-1/2  | FTGA 0512-P<br>145551 \$ 13.52 | CCH4.5R1<br>145553 \$ 35.33 | CTX04513H<br>145555 \$ 13.95 | CR03<br>145556 \$ 3.74 | -                        | TW20<br>148291 \$ 23.08  |

## HFPC High Feed Face Mills



Kits Also Available  
➤ P. E162



(inch)

| Designation | Code No. | Price \$ | ØD       | Ød    | ØD2   | Ød2   | a     | b     | E     | F     | No. of Inserts | Insert |                     |
|-------------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|----------------|--------|---------------------|
| HFPC        | 13200R-4 | 148637   | 1,176.22 | 2.000 | 0.750 | 1.772 | 0.630 | 0.321 | 0.221 | 0.778 | 1.969          | 4      | WDKT 130520 ZDSR-MH |
|             | 13250R-4 | 148639   | 1,207.35 | 2.500 | 0.750 | 1.772 | 0.630 | 0.321 | 0.221 | 0.778 | 1.969          | 4      | WDKT 130520 ZDSR-MH |
|             | 13300R-5 | 148641   | 1,536.14 | 3.000 | 1.000 | 2.205 | 0.827 | 0.384 | 0.248 | 0.985 | 2.756          | 5      | WDKT 130520 ZDSR-MH |

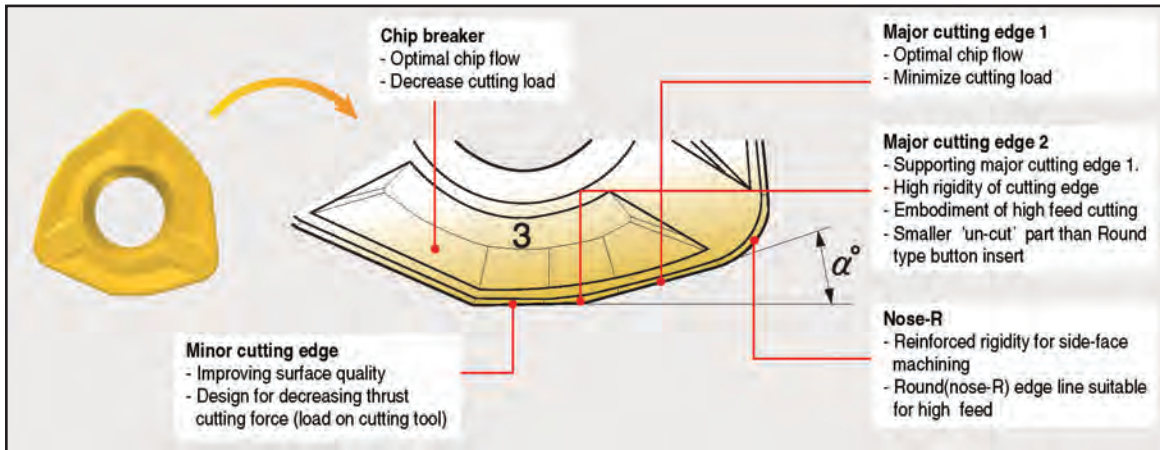
➤ P. E115

### Parts

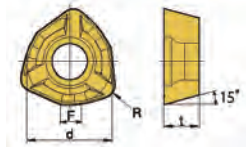
| Cutter      | Screw                         | Clamp                       | Clamp Screw                  | C-Ring                 | Wrench                      | Wrench |
|-------------|-------------------------------|-----------------------------|------------------------------|------------------------|-----------------------------|--------|
| 2, 2-1/2, 3 | FTGA0513-P<br>148194 \$ 14.30 | CCH4.5R1<br>145553 \$ 35.33 | CTX04513H<br>145555 \$ 13.95 | CR03<br>145556 \$ 3.74 | TW20-100<br>145557 \$ 41.20 | -      |



## HIGH FEED MILLING INSERTS



## WDKT



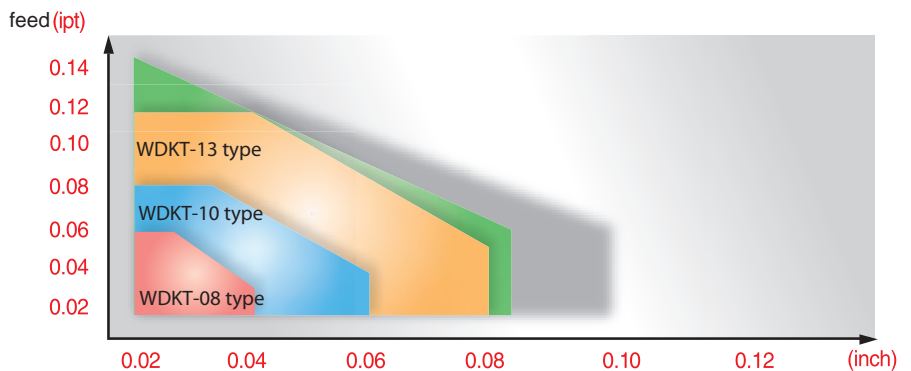
| Designation         | Coated Carbide |       |       |       |                    |                    |       | Cermet |       | Ceramic | Uncoated Carbide |        | (inch) |      |       |       |    | Applicable Cutter |              |
|---------------------|----------------|-------|-------|-------|--------------------|--------------------|-------|--------|-------|---------|------------------|--------|--------|------|-------|-------|----|-------------------|--------------|
|                     | PM10C          | PM25C | PM30C | PM30P | PM35P              | KM20C              | MM30P | PT20S  | PT30S | S300    | PM20U            | PTM30U | d      | t    | F     | r     | a° | Cutter            | Page No.     |
| WDKT 080316 ZDSR-MH |                |       |       |       | 148563<br>\$ 18.94 |                    |       |        |       |         |                  |        | 0.315  | 1/8  | 3/64  | 1/16  | 15 | HFPA<br>HFPC      | E128<br>E128 |
| WDKT 130520 ZDSR-MH |                |       |       |       |                    | 148623<br>\$ 37.57 |       |        |       |         |                  |        | 0.531  | 7/32 | 0.083 | 0.079 | 15 |                   |              |

## Application

### S.F.M.

**PM10C** - Die Steels 300-500 sfm  
(P05-P15) - Alloy Steels 400-650 sfm

**PM35P** - Die Steels 300-400 sfm  
(P05-P15) - Alloy Steel 350-500 sfm  
- Stainless Steel 300-400 sfm



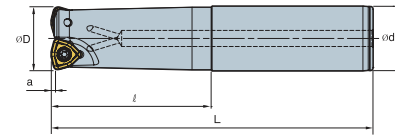
- Information for uncut part by using Input.R for CAM program.
- Uncut can be changed by poor machine condition or weak clamp of workpiece, etc.

| Designation       | Condition     |              | Approx. R(inch) |        | Configuration |
|-------------------|---------------|--------------|-----------------|--------|---------------|
|                   | Max ad (inch) | Max fz (ipt) | Input.R         | Uncut  |               |
| WDKT080316ZDSR-MH | 0.048         | 0.08         | 0.08            | 0.0152 |               |
| WDKT10T320ZDSR-MH | 0.06          | 0.08         | 0.1             | 0.0188 |               |
| WDKT130520ZDSR-MH | 0.08          | 0.12         | 0.12            | 0.0288 |               |
| WDKT150625ZDSR-MH | 0.1           | 0.12         | 0.12            | 0.0352 |               |

### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

## HFNA High Feed End Mills



(inch)

| Designation        | Code No. | Price \$ | ØD     | Ød    | a    | l     | L      | No. of Inserts | Insert          |
|--------------------|----------|----------|--------|-------|------|-------|--------|----------------|-----------------|
| HFNA 09100HR-2S100 | 148930   | 522.87   | 1.0000 | 1.00  | 0.06 | 2.362 | 5.512  | 2              | WNMX09T316ZNN-M |
| 09100HR-2M100      | 148946   | 548.74   | 1.0000 | 1.00  | 0.06 | 4.724 | 7.874  | 2              |                 |
| 09118HR-3S125      | 148982   | 608.44   | 1.1875 | 1.25  | 0.06 | 2.756 | 5.906  | 3              |                 |
| 09118HR-3M125      | 149035   | 627.12   | 1.1875 | 1.25  | 0.06 | 4.724 | 7.874  | 3              |                 |
| 09125HR-3S125      | 148983   | 608.44   | 1.2500 | 1.25  | 0.06 | 2.756 | 5.906  | 3              |                 |
| 09125HR-3M125      | 148984   | 689.19   | 1.2500 | 1.25  | 0.06 | 4.724 | 7.874  | 3              |                 |
| 09137HR-4S125      | 148985   | 772.75   | 1.3750 | 1.25  | 0.06 | 1.969 | 5.906  | 4              |                 |
| 09150HR-4S125      | 148990   | 782.83   | 1.5000 | 1.25  | 0.06 | 1.969 | 5.906  | 4              |                 |
| 09150HR-4M125      | 148991   | 796.44   | 1.5000 | 1.25  | 0.06 | 1.969 | 9.843  | 4              |                 |
| 13125HR-2S125      | 149028   | 572.60   | 1.250  | 1.250 | 0.08 | 2.756 | 5.906  | 2              |                 |
| 13125HR-2M125      | 149029   | 589.73   | 1.250  | 1.250 | 0.08 | 4.724 | 7.874  | 2              |                 |
| 13131HR-2L125      | 145599   | 704.61   | 1.313  | 1.250 | 0.08 | 2.756 | 11.811 | 2              |                 |
| 13131HR-2M125      | 145598   | 616.71   | 1.313  | 1.250 | 0.08 | 2.874 | 7.874  | 2              |                 |
| 13131HR-2S125      | 145597   | 572.79   | 1.313  | 1.250 | 0.08 | 2.756 | 5.906  | 2              |                 |
| 13137HR-2L125      | 146798   | 727.30   | 1.375  | 1.250 | 0.08 | 1.969 | 11.811 | 2              |                 |
| 13137HR-2M125      | 146759   | 635.60   | 1.375  | 1.250 | 0.08 | 1.969 | 7.874  | 2              |                 |
| 13137HR-2S125      | 146630   | 589.82   | 1.375  | 1.250 | 0.08 | 1.969 | 5.906  | 2              |                 |
| 13150HR-3M150      | 149033   | 962.97   | 1.500  | 1.500 | 0.08 | 5.118 | 9.843  | 3              |                 |
| 13150HR-3S150      | 149032   | 800.29   | 1.500  | 1.500 | 0.08 | 2.362 | 5.906  | 3              |                 |
| 13150HR-3L150      | 146400   | 962.97   | 1.500  | 1.500 | 0.08 | 7.087 | 11.811 | 3              |                 |
| 13162HR-3L125      | 146868   | 901.23   | 1.625  | 1.250 | 0.08 | 1.969 | 11.811 | 3              |                 |
| 13162HR-3L150      | 146871   | 1,025.94 | 1.625  | 1.500 | 0.08 | 1.969 | 11.811 | 3              |                 |
| 13162HR-3M125      | 146859   | 858.60   | 1.625  | 1.250 | 0.08 | 1.969 | 9.843  | 3              |                 |
| 13162HR-3M150      | 146870   | 962.97   | 1.625  | 1.500 | 0.08 | 1.969 | 9.843  | 3              |                 |
| 13162HR-3S125      | 146856   | 800.29   | 1.625  | 1.250 | 0.08 | 1.969 | 5.906  | 3              |                 |
| 13162HR-3S150      | 146869   | 934.07   | 1.625  | 1.500 | 0.08 | 1.969 | 5.906  | 3              |                 |

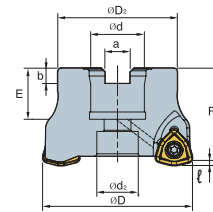
### Parts

| Designation  | Insert          | Screw                            | Wrench                       |
|--------------|-----------------|----------------------------------|------------------------------|
|              |                 |                                  |                              |
| HFNA 09xxxHR | WNMX09T316ZNN-M | FTKA0307 148210 <b>\$ 16.02</b>  | TW09S 146951 <b>\$ 16.73</b> |
| HFNA 13xxxHR | WNMX130520ZNN-M | FTKA0412B 146969 <b>\$ 12.90</b> | TW15S 146801 <b>\$ 47.64</b> |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## HFNC High Feed Face Mills



| Designation | Code No.  | Price \$ | ØD              | Ød  | ØD2   | Ød2   | a     | b     | E     | F     | ℓ     | No. of Inserts | Insert |                  |
|-------------|-----------|----------|-----------------|-----|-------|-------|-------|-------|-------|-------|-------|----------------|--------|------------------|
| HFNC        | 09250HR-6 | 148798   | <b>1,392.70</b> | 2.5 | 0.750 | 2.205 | 0.630 | 0.315 | 0.220 | 0.787 | 1.750 | 0.06           | 6      | WNMX09T316ZNN-M  |
|             | 09300HR-7 | 148813   | <b>1,590.63</b> | 3.0 | 1.000 | 2.205 | 0.827 | 0.374 | 0.236 | 0.866 | 2.000 | 0.06           | 7      |                  |
|             | 09400HR-8 | 148815   | <b>1,786.88</b> | 4.0 | 1.250 | 2.874 | 1.024 | 0.500 | 0.315 | 0.866 | 2.000 | 0.06           | 8      |                  |
|             | 13200HR-3 | 146872   | <b>938.08</b>   | 2.0 | 0.75  | 1.772 | 0.630 | 0.315 | 0.220 | 0.787 | 1.75  | 0.08           | 3      | WNMX130520-ZNN-M |
|             | 13200HR-4 | 146873   | <b>1,292.68</b> | 2.0 | 0.75  | 1.772 | 0.630 | 0.315 | 0.220 | 0.787 | 1.75  | 0.08           | 4      |                  |
|             | 13250HR-4 | 146881   | <b>1,207.35</b> | 2.5 | 0.75  | 1.772 | 0.630 | 0.315 | 0.220 | 0.787 | 1.75  | 0.08           | 4      |                  |
|             | 13250HR-5 | 146882   | <b>1,509.20</b> | 2.5 | 0.75  | 1.772 | 0.630 | 0.315 | 0.220 | 0.787 | 1.75  | 0.08           | 5      |                  |
|             | 13300HR-5 | 146883   | <b>1,536.14</b> | 3.0 | 1.00  | 2.205 | 0.827 | 0.374 | 0.236 | 0.866 | 2.0   | 0.08           | 5      |                  |
|             | 13300HR-6 | 146884   | <b>1,663.11</b> | 3.0 | 1.00  | 2.205 | 0.827 | 0.374 | 0.236 | 0.866 | 2.0   | 0.08           | 6      |                  |
|             | 13400HR-6 | 146885   | <b>1,663.11</b> | 4.0 | 1.25  | 2.874 | 1.024 | 0.500 | 0.315 | 0.866 | 2.0   | 0.08           | 6      |                  |
|             | 13400HR-7 | 146886   | <b>1,912.57</b> | 4.0 | 1.25  | 2.874 | 1.024 | 0.500 | 0.315 | 0.866 | 2.0   | 0.08           | 7      |                  |

AA:76°, AR:-7°, RR:-12° ~ -4°

### Parts

| Designation          | Insert           | Screw           | Wrench          |
|----------------------|------------------|-----------------|-----------------|
|                      |                  |                 |                 |
| HFNC 09250 - 09400HR | WNMX09T316ZNN-M  | FTKA0307        | TW09S           |
| HFNC 13200 - 13400HR | WNMX130520-ZNN-M | FTKA0412B       | TW15S           |
|                      |                  | 148210          | 146951          |
|                      |                  | <b>\$ 16.02</b> | <b>\$ 16.73</b> |
|                      |                  | 146969          | 146801          |
|                      |                  | <b>\$ 12.90</b> | <b>\$ 47.64</b> |

## Double Sided High Feed Milling Inserts

- High rake angle cutting edge reduces cutting load making this insert excellent for high feed and multi-functional machining
- Double sided design makes this a very economical insert
- Negative geometry has been designed for rigidity of cutting edge and double sided function
- Symmetrical cutting edge is applicable for both R and L type tools

**Nose-R**

- Security of rigid edge in ramping, pocket machining
- Round edge line suitable for high lead
- Insert geometry extrinsic to R/L type machining

**Chip breaker**

- Reduction of cutting load due to high rake angle
- Improvement of chip flow
- Prevention of damage on clamping face of insert

**Minor cutting edge**

- Improvement of surface roughness.
- Design for decreasing thrust force

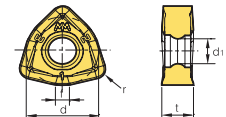
**Major cutting edge**

- High feed by application of high rake cutting edge
- Realization of low cutting resistance in high feed
- Symmetrical insert design for R/L type tool

## WNMX



**Features**  
Excellent geometries for a variety of materials



| Designation     | Coated Carbide     |       |       |       |       |       |       |                    |                    |       | Uncoated Carbide |        | (inch) |       |       |       |       | Applicable Cutter |          |
|-----------------|--------------------|-------|-------|-------|-------|-------|-------|--------------------|--------------------|-------|------------------|--------|--------|-------|-------|-------|-------|-------------------|----------|
|                 | PTM50P             | PT30P | PM25C | PM30P | PM35P | PM40P | KM20C | MM30P              | PC9530             | SM20P | PM20U            | KTM10U | d      | t     | r     | d1    | f     | Cutter            | Page No. |
| WNMX09T316ZNN-M | 145640<br>\$ 29.55 |       |       |       |       |       |       | 146891<br>\$ 28.75 |                    |       |                  |        | 0.375  | 0.156 | 0.063 | 0.142 | 0.067 | HFNA              | E120     |
| WNMX130520ZNN-M | 145675<br>\$ 46.38 |       |       |       |       |       |       |                    | 147080<br>\$ 37.04 |       |                  |        | 0.500  | 0.219 | 0.079 | 0.185 | 0.098 | HFNC              | E121     |

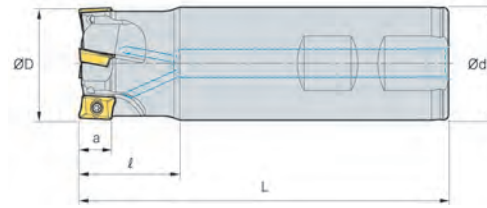
### Quick Choice Grade Selection

|                   |                             |                              |                                  |
|-------------------|-----------------------------|------------------------------|----------------------------------|
| <b>P</b><br>Steel | <b>M</b><br>Stainless Steel | <b>K</b><br>Cast Iron - Alum | <b>S</b><br>Heat Resistant Alloy |
|-------------------|-----------------------------|------------------------------|----------------------------------|

## AP 06 - 90° End Mills



- Features**
- Lower cutting resistance
  - Better chip control
  - Longer tool life


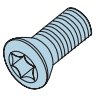
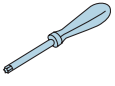


AR: 7.5° ~ 13°

(inch)

| Designation      | Code No. | Price \$ | ØD    | Ød    | a     | l     | L     | No. of Inserts | Insert           |
|------------------|----------|----------|-------|-------|-------|-------|-------|----------------|------------------|
| AP06-90 1050HS-3 | 145568   | 215.91   | 0.500 | 0.500 | 0.220 | 0.984 | 3.150 | 3              | APMT 0602 PDSR-M |
| AP06-90 1063HS-3 | 145569   | 263.84   | 0.625 | 0.625 | 0.220 | 0.984 | 3.543 | 3              |                  |
| AP06-90 1075HS-4 | 145572   | 287.84   | 0.750 | 0.750 | 0.220 | 1.181 | 4.331 | 4              |                  |

### Parts

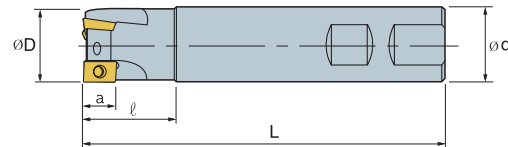
| Designation | Insert   | Screw  | Wrench  |
|-------------|--|--|---|
| AP 06-09    | <br>APMT 0602 PDSR-M<br>▶ P.E93 | <br>FTKA 01842<br>148717 \$ 15.60 | <br>TW 06S-A<br>147186 \$43.39 |

## AP 11/16 - 90° End Mill H13 Hardened Bodies 48HRC



### H13 HARDENED CUTTER BODIES 48HRC

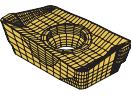

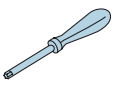
- Features**
- Longer insert life
  - Longer body life
  - Higher rigidity
  - Better feed rates



(inch)

| Designation              | Code No. | Price \$ | ØD    | Ød    | a     | l     | L     | No. of Inserts | AR | Insert    |
|--------------------------|----------|----------|-------|-------|-------|-------|-------|----------------|----|-----------|
| AP 11-90 2075S           | 148822   | 43.39    | 0.750 | 0.750 | 0.433 | 1.181 | 3.937 | 2              | 9° | APXT 11T3 |
| 3100S                    | 148812   | 210.87   | 1.000 | 1.000 | 0.630 | 1.378 | 4.528 | 2              | 9° | AP_T 1604 |
| 3125S                    | 148814   | 264.96   | 1.250 | 1.000 | 0.630 | 1.574 | 4.921 | 3              | 9° |           |
| AP 16-90 3125S 1 1/4 SHK | 148816   | 264.96   | 1.250 | 1.250 | 0.630 | 1.575 | 4.921 | 3              | 9° |           |
| 3150S                    | 148818   | 264.96   | 1.500 | 1.250 | 0.630 | 1.575 | 5.125 | 3              | 9° |           |

### Parts

| Designation | Insert   | Screw   | Wrench   |
|-------------|--|---|--|
| AP 11 90°   | <br>APXT 11T3~<br>▶ P.E94 | <br>FTKA 02565S<br>146595 \$ 16.02 | <br>TW 08S<br>146728 \$ 47.64 |
| AP 13 90°   | AP_T 1604~<br>FTKA 0410<br>146969 \$ 12.90   | TW 15S<br>146801 \$ 47.64   |  |

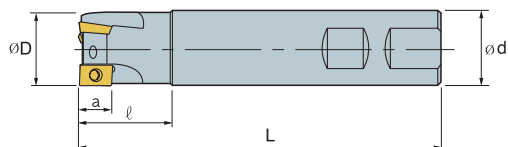


## AP 11/16 - 90° End Mills



**Kits Also Available**

➤ P. E162, E163



(inch)

| Designation              | Code No.        | Price \$ | ØD     | Ød    | a     | l     | L     | No. of Inserts | AR | Insert |           |
|--------------------------|-----------------|----------|--------|-------|-------|-------|-------|----------------|----|--------|-----------|
| AP 11-90<br>Short Length | 2050S           | 146371   | 166.47 | 0.500 | 0.625 | 0.433 | 0.984 | 3.346          | 1  | 5°     | APXT 11T3 |
|                          | 2062S           | 146372   | 166.47 | 0.625 | 0.625 | 0.433 | 0.984 | 3.543          | 2  | 7°     |           |
|                          | 2075S           | 146373   | 166.47 | 0.750 | 0.750 | 0.433 | 1.181 | 3.937          | 2  | 9°     |           |
|                          | 2075S 3 Flute   | 147376   | 198.35 | 0.750 | 0.750 | 0.433 | 1.181 | 3.937          | 3  | 9°     |           |
|                          | 2100S 3/4 Shank | 146374   | 191.74 | 1.000 | 0.750 | 0.433 | 1.378 | 3.500          | 3  | 9°     |           |
|                          | 2100S 1" Shank  | 148414   | 191.74 | 1.000 | 1.000 | 0.433 | 1.378 | 4.528          | 3  | 9°     |           |
| Medium Length            | 2125M           | 147131   | 223.62 | 1.250 | 1.250 | 0.433 | 1.575 | 4.921          | 4  | 9°     | APXT 11T3 |
|                          | 2150M           | 147132   | 255.73 | 1.500 | 1.250 | 0.433 | 1.654 | 5.118          | 5  | 9°     |           |
|                          | 2200M           | 147133   | 357.32 | 2.000 | 1.250 | 0.433 | 1.772 | 5.315          | 6  | 9°     |           |
| Long Length              | 2062L           | 147284   | 166.47 | 0.625 | 0.625 | 0.433 | 0.984 | 6.500          | 2  | 7°     | APXT 11T3 |
|                          | 2075L           | 147285   | 166.47 | 0.750 | 0.750 | 0.433 | 1.181 | 6.500          | 2  | 9°     |           |
|                          | 2100L           | 147286   | 191.74 | 1.000 | 1.000 | 0.433 | 1.378 | 6.500          | 3  | 9°     |           |
| AP 16-90<br>Short Length | 3100S           | 145705   | 191.74 | 1.000 | 1.000 | 0.630 | 1.378 | 4.528          | 2  | 9°     | AP_T 1604 |
|                          | 3125S           | 145706   | 223.62 | 1.250 | 1.000 | 0.630 | 1.574 | 4.921          | 3  | 9°     |           |
|                          | 3125S 1 1/4 SHK | 146866   | 494.50 | 1.250 | 1.250 | 0.630 | 1.575 | 4.921          | 3  | 9°     |           |
|                          | 3150S           | 145707   | 255.73 | 1.500 | 1.250 | 0.630 | 1.575 | 5.125          | 3  | 9°     |           |
|                          | 3200S           | 145708   | 303.45 | 2.000 | 1.250 | 0.630 | 1.772 | 5.315          | 5  | 9°     |           |
| Medium Length            | 3100M           | 147282   | 223.62 | 1.000 | 1.000 | 0.630 | 1.378 | 6.500          | 2  | 9°     | AP_T 1604 |
|                          | 3125M           | 147283   | 223.62 | 1.250 | 1.250 | 0.630 | 1.574 | 6.500          | 3  | 9°     |           |
| Long Length              | 3100L           | 147136   | 287.61 | 1.000 | 1.000 | 0.630 | 1.378 | 8.000          | 2  | 9°     | AP_T 1604 |
|                          | 3125L           | 147137   | 383.25 | 1.250 | 1.250 | 0.630 | 1.574 | 8.500          | 3  | 9°     |           |

\*AA:0°

### Parts

| Designation | Insert     | Screw                       | Wrench                 |
|-------------|------------|-----------------------------|------------------------|
|             |            |                             |                        |
| AP 11 90°   | APXT 11T3~ | FTKA 02565S 146595 \$ 16.02 | TW 08S 146728 \$ 47.64 |
| AP 13 90°   | AP_T 1604~ | FTKA 0410 146969 \$ 12.90   | TW 15S 146801 \$ 47.64 |

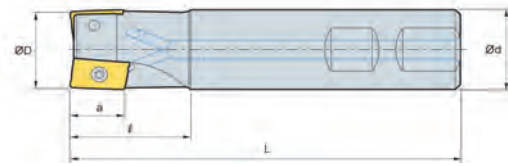
➤ P. E94

### Recommended Cutting Condition

| Workpiece | Cutting Condition                  |             | Grade                                      |
|-----------|------------------------------------|-------------|--|
|           | V(sfm)                             | f(ipf)      |  |
| P         | 320~980                            | 0.003~0.010 | Coated (PM10, 20, 30C)<br>Uncoated (PM20U) |
| M         | 160~600                            | 0.002~0.008 | Coated (MM30P)                             |
| K         | Cast Iron 490~820<br>Alum 500~1000 | 0.003~0.012 | Coated (KM20C)<br>Uncoated (KTM10U)        |



## AP11M/16M-90 End Mills



(inch)

| Designation | Code No. | Price \$ | ØD            | Ød    | a     | l     | L     | No. of Inserts | AR | Insert |           |
|-------------|----------|----------|---------------|-------|-------|-------|-------|----------------|----|--------|-----------|
| AP11M-90    | 2050S    | 146889   | <b>215.24</b> | 0.500 | 0.625 | 0.433 | 1.181 | 3.346          | 1  | 3°-14° | APMT 11T3 |
|             | 2062S    | 147001   | <b>239.28</b> | 0.625 | 0.625 | 0.433 | 0.984 | 3.543          | 2  | 3°-14° |           |
|             | 2062L    | 147003   | <b>274.20</b> | 0.625 | 0.625 | 0.433 | 1.181 | 7.087          | 2  | 3°-14° |           |
|             | 2075S    | 147005   | <b>261.06</b> | 0.750 | 0.750 | 0.433 | 1.181 | 3.937          | 2  | 3°-14° |           |
|             | 2075M    | 147010   | <b>319.06</b> | 0.750 | 0.750 | 0.433 | 1.181 | 8.268          | 2  | 3°-14° |           |
|             | 2100S    | 147012   | <b>334.86</b> | 1.000 | 1.000 | 0.433 | 1.378 | 4.528          | 3  | 3°-14° |           |
|             | 2100L    | 147014   | <b>338.19</b> | 1.000 | 1.000 | 0.433 | 1.575 | 7.087          | 3  | 3°-14° |           |
|             | 2125S    | 147016   | <b>406.13</b> | 1.250 | 1.250 | 0.433 | 1.575 | 4.921          | 4  | 3°-14° |           |
|             | 2150S    | 147020   | <b>478.64</b> | 1.500 | 1.250 | 0.433 | 1.654 | 5.118          | 5  | 3°-14° |           |
|             | 2200S    | 147022   | <b>671.67</b> | 2.000 | 1.250 | 0.433 | 1.250 | 5.315          | 6  | 3°-14° |           |
| AP16M-90    | 3100S    | 147024   | <b>365.50</b> | 1.000 | 1.000 | 0.630 | 1.378 | 4.528          | 2  | 3°-14° | APMT 1604 |
|             | 3100M    | 147046   | <b>405.72</b> | 1.000 | 1.000 | 0.630 | 1.378 | 7.087          | 2  | 3°-14° |           |
|             | 3100L    | 147050   | <b>391.14</b> | 1.000 | 1.000 | 0.630 | 2.362 | 8.661          | 2  | 3°-14° |           |
|             | 3125S    | 147074   | <b>494.99</b> | 1.250 | 1.250 | 0.630 | 1.575 | 4.921          | 3  | 3°-14° |           |
|             | 3125M    | 148387   | <b>403.87</b> | 1.250 | 1.250 | 0.630 | 1.575 | 7.874          | 2  | 3°-14° |           |
|             | 3125L    | 148388   | <b>564.37</b> | 1.250 | 1.250 | 0.630 | 2.559 | 10.236         | 2  | 3°-14° |           |
|             | 3150S    | 148411   | <b>539.04</b> | 1.500 | 1.250 | 0.630 | 1.654 | 5.118          | 4  | 3°-14° |           |
|             | 3200S    | 148415   | <b>624.04</b> | 2.000 | 1.250 | 0.630 | 1.772 | 5.315          | 5  | 3°-14° |           |

AP11M: AA:0°, AR:3°~14°, RR:-25°~-18°

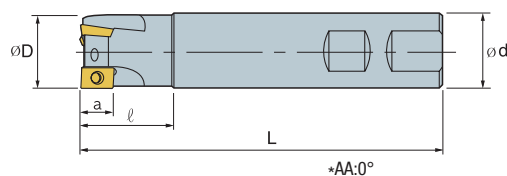
AP16M: AA:0°, AR:3°~14°, RR:-18°~-10°

### Parts

| Designation          | Insert     | Screw       | Wrench          |
|----------------------|------------|-------------|-----------------|
|                      |            |             |                 |
| AP11M-90 2050S       | APMT 11T3~ | FTKA 02555S | TW 08S          |
| AP11M-90 2062S~2200S |            | FTKA 02565S | 146728          |
| AP16M-90 3100        | APMT 1604  | FTKA 0408   | TW 15S          |
| AP16M-90 3125~3200   |            | FTKA 0410   | 146801          |
|                      |            | 148624      | <b>\$ 14.19</b> |
|                      |            | 146595      | <b>\$ 16.02</b> |
|                      |            | 146968      | <b>\$ 12.90</b> |
|                      |            | 146969      | <b>\$ 12.90</b> |
|                      |            |             | <b>\$ 47.64</b> |
|                      |            |             | <b>\$ 47.64</b> |



## AP 10/AD 15 - 90° End Mills



(inch)

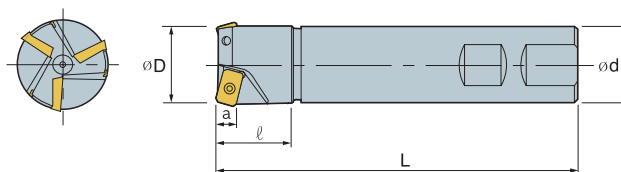
| Designation | Code No. | Price \$ | ∅D            | ∅d    | a     | l     | L     | No. of Inserts | AR | Insert |           |
|-------------|----------|----------|---------------|-------|-------|-------|-------|----------------|----|--------|-----------|
| AP 10 90°   | 3/8      | 147835   | <b>166.47</b> | 0.375 | 0.375 | 0.394 | 0.984 | 3.375          | 1  | -      | AP_T 1003 |
|             | 1/2      | 147836   | <b>166.47</b> | 0.500 | 0.625 | 0.394 | 0.984 | 3.346          | 1  | 5°     | AP_T 1003 |
|             | 5/8      | 147837   | <b>166.47</b> | 0.625 | 0.625 | 0.394 | 0.984 | 3.543          | 2  | 7°     | AP_T 1003 |
|             | 3/4      | 147838   | <b>166.47</b> | 0.750 | 0.750 | 0.394 | 1.181 | 3.937          | 2  | 9°     | AP_T 1003 |
|             | 1"       | 147839   | <b>191.74</b> | 1.000 | 1.000 | 0.394 | 1.378 | 4.528          | 3  | 9°     | AP_T 1003 |
|             | 1 1/2"   | 147841   | <b>255.73</b> | 1.500 | 1.250 | 0.394 | 1.654 | 5.118          | 5  | 9°     | AP_T 1003 |
| AD 15 90°   | 3/4      | 147845   | <b>166.47</b> | 0.750 | 0.750 | 0.591 | 1.181 | 3.940          | 1  | 9°     | ADKT 1505 |
|             | 1"       | 147846   | <b>191.74</b> | 1.000 | 1.000 | 0.591 | 1.378 | 4.528          | 2  | 9°     | ADKT 1505 |
|             | 1 1/2"   | 147848   | <b>239.45</b> | 1.500 | 1.250 | 0.591 | 1.575 | 4.921          | 4  | 14°    | ADKT 1505 |

### Parts

| Designation | Insert            | Screw           | Wrench          |
|-------------|-------------------|-----------------|-----------------|
|             |                   |                 |                 |
| AP 10 90°   | APKT / APXT 1003~ | FTKA 02565S     | TW 08S          |
| AD 15 90°   | ADKT 1505~        | FTKA 0410       | TW 15S          |
|             |                   | 146595 \$ 16.02 | 146728 \$ 47.64 |
|             |                   | 146969 \$ 12.90 | 146801 \$ 47.64 |

➤ P. E92

## AP 11 15° End Mills



(inch)

| Designation | Code No. | Price \$ | ∅D            | ∅d    | a     | l     | L     | No. of Inserts | AR |     |
|-------------|----------|----------|---------------|-------|-------|-------|-------|----------------|----|-----|
| AP11 15°    | 2100SE   | 147134   | <b>204.50</b> | 1.000 | 1.000 | 0.157 | 1.181 | 4.528          | 2  | -1° |

\*AA:0°

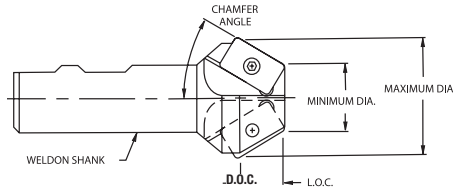
### Parts

| Designation     | Insert     | Screw           | Wrench          |
|-----------------|------------|-----------------|-----------------|
|                 |            |                 |                 |
| AP11 15° 2000SE | APXT 11T3~ | FTKA 02565S     | TW 08S          |
|                 |            | 146595 \$ 16.02 | 146728 \$ 47.64 |

➤ P. E94





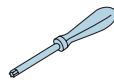
## AP 16 Chamfer Mills



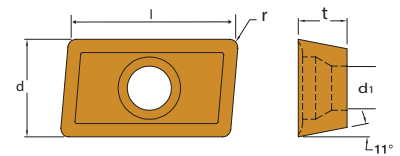
(inch)

| Designation | Code No. | Price \$ | Min. Dia. | Max. Dia. | Weldon Shank | Chamfer Angle | No. of Inserts | Depth of Cut |
|-------------|----------|----------|-----------|-----------|--------------|---------------|----------------|--------------|
| AP 16 CHM   | 750-30   | 147187   | 279.18    | 0.750     | 1.303        | 3/4"          | 2              | 0.479        |
|             | 688-41   | 147188   | 279.18    | 0.688     | 1.414        | 3/4"          |                | 0.418        |
|             | 688-45   | 147189   | 279.18    | 0.688     | 1.471        | 3/4"          |                | 0.391        |
|             | 500-60   | 147190   | 279.16    | 0.500     | 1.458        | 3/4"          |                | 0.277        |
| 1.000-30    | 938-41   | 147191   | 304.84    | 1.000     | 1.553        | 1"            | 3              | 0.479        |
|             | 938-45   | 147192   | 304.84    | 0.938     | 1.664        | 1"            |                | 0.418        |
|             | 938-45   | 147193   | 304.84    | 0.938     | 1.721        | 1"            |                | 0.391        |
|             | 750-60   | 147194   | 304.84    | 0.750     | 1.708        | 1"            |                | 0.277        |
| 1.250-30    | 1.188-41 | 147195   | 373.19    | 1.250     | 1.803        | 1 1/4"        | 3              | 0.479        |
|             | 1.188-45 | 147196   | 373.19    | 1.188     | 1.914        | 1 1/4"        |                | 0.418        |
|             | 1.188-45 | 147197   | 373.19    | 1.188     | 1.971        | 1 1/4"        |                | 0.391        |
|             | 1.000-60 | 147198   | 373.19    | 1.000     | 1.958        | 1 1/4"        |                | 0.277        |
| 1.500-30    | 1.438-41 | 147199   | 478.49    | 1.500     | 2.053        | 1 1/2"        | 3              | 0.479        |
|             | 1.438-41 | 147200   | 478.49    | 1.438     | 2.164        | 1 1/2"        |                | 0.418        |
|             | 1.438-45 | 147201   | 478.49    | 1.438     | 2.221        | 1 1/2"        |                | 0.391        |
|             | 1.250-60 | 147202   | 478.49    | 1.250     | 2.208        | 1 1/2"        |                | 0.277        |

### Parts

| Designation | Insert  | Screw  | Wrench  |
|-------------|---|--|---|
| AP16 CHM    | <br>APLT 347 | <br>FTKA 0410 | <br>TW 15S |
|             |   | 146969 \$ 12.90  | 146801 \$ 47.64   |

### APLT-347



| Designation | Coated Carbide |                    |                    |       |       |       |       |       |       |       | Uncoated Carbide |                    | (inch) |     |       |       |       | Applicable Cutter |          |
|-------------|----------------|--------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|------------------|--------------------|--------|-----|-------|-------|-------|-------------------|----------|
|             | PM10C          | PM25C              | PM30C              | PM25P | PM35P | PM40P | KM30P | MM30P | MT30P | SM20P | PM20U            | KTM20U             | l      | d   | t     | r     | d1    | Cutter            | Page No. |
| APLT 347    |                | 149195<br>\$ 40.91 | 149194<br>\$ 41.78 |       |       |       |       |       |       |       |                  | 149196<br>\$ 34.66 | 0.591  | 3/8 | 0.187 | 0.015 | 0.173 | AP16 CHM          |          |

### Quick Choice Grade Selection

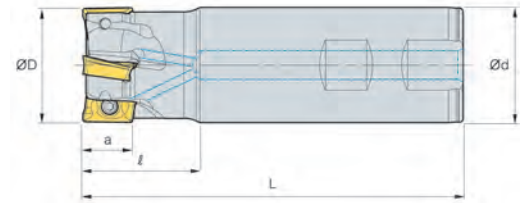
|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|



## AP 18 - 90° End Mills



- Features**
- Lower cutting resistance
  - Better chip control
  - Longer tool life


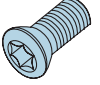
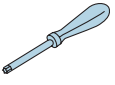


AR: 7° ~ 13°

(inch)

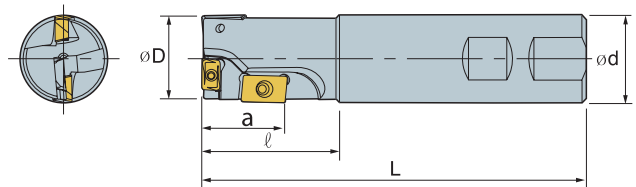
| Designation | Code No. | Price \$ | ØD     | Ød    | a     | l     | L     | No. of Inserts | Insert |                  |
|-------------|----------|----------|--------|-------|-------|-------|-------|----------------|--------|------------------|
| AP 18-90    | 4125HS   | 145577   | 472.92 | 1.250 | 1.250 | 0.669 | 1.575 | 4.921          | 3      | APMT 1806 PDSR-M |
| AP 18-90    | 4150HS   | 145578   | 566.22 | 1.500 | 1.250 | 0.669 | 1.575 | 5.118          | 4      |                  |
| AP 18-90    | 4200HS   | 145579   | 655.25 | 2.000 | 1.250 | 0.669 | 1.575 | 5.315          | 5      |                  |
| AP 18-90    | 4250HS   | 145581   | 831.70 | 2.500 | 1.250 | 0.669 | 1.575 | 5.315          | 9      |                  |

### Parts

| Designation | Insert  | Screw   | Wrench  |
|-------------|---|---|---|
| AP 18-90    | <br>APMT 1806 PDSR-M | <br>FTKA 0410 | <br>TW 15S |
|             |   | 146969 \$ 12.90   | 146801 \$ 47.64   |

► P. E93

## APCC Centre Cut End Mills

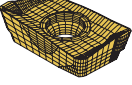
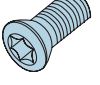
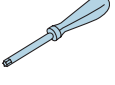


(inch)

| Designation | Code No. | Price \$ | ØD    | Ød    | a     | l     | L     | No. of Inserts | APXT11T3~ | APXT1604~ |
|-------------|----------|----------|-------|-------|-------|-------|-------|----------------|-----------|-----------|
| APCC 2100MH | 148246   | 347.21   | 1.000 | 1.000 | 0.787 | 1.575 | 5.118 | 3              | 3         | -         |
| APCC 2125MH | 148247   | 428.79   | 1.250 | 1.250 | 1.181 | 1.969 | 5.512 | 3              | 1         | 2         |
| APCC 3150MH | 148248   | 510.80   | 1.500 | 1.250 | 1.575 | 2.362 | 5.906 | 4              | -         | 4         |

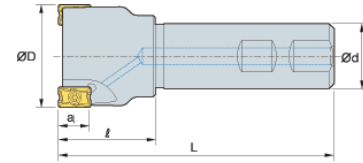
\*AA:0°, AR:9°~7°, RR-12°~10°

### Parts

| Designation | Insert  | Screw   | Wrench  |
|-------------|---|---|---|
| APCC 2100MH | <br>APXT 11T3~ | <br>FTKA 02565S | <br>TW 08S |
| APCC 2125MH | APXT 1604~  | FTKA 0410   | TW 15S  |
|             |   | 146969 \$ 12.90   | 146801 \$ 47.64   |
|             |   | 146595 \$ 16.02   | 146728 \$ 47.64   |

► P. E94

## DS4 End Mills



(inch)

| Designation | Code No. | Price \$ | ØD     | Ød    | ℓ     | L     | a     | No. of Inserts | Insert |             |
|-------------|----------|----------|--------|-------|-------|-------|-------|----------------|--------|-------------|
| DS4         | 3062HR   | 148614   | 253.61 | 0.625 | 0.625 | 0.984 | 3.543 | 0.354          | 1      | LNMX 100605 |
|             | 3075HR   | 146379   | 362.18 | 0.750 | 0.750 | 1.181 | 3.937 | 0.354          | 2      |             |
|             | 3075HR   | 146381   | 446.34 | 0.750 | 0.750 | 1.181 | 3.937 | 0.354          | 3      |             |
|             | 3100HR   | 146384   | 706.54 | 1.000 | 1.000 | 1.378 | 4.528 | 0.354          | 2      |             |
|             | 3100HR   | 146389   | 502.83 | 1.000 | 1.000 | 1.378 | 4.528 | 0.354          | 3      |             |

AR: -6°, RR -39° ~ -16°

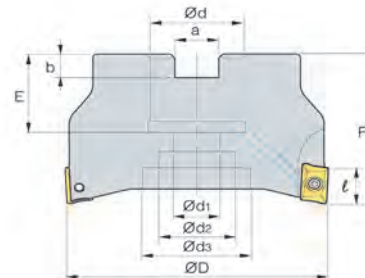
### Parts

| Designation      | Insert             | Screw    | Wrench |                 |
|------------------|--------------------|----------|--------|-----------------|
|                  |                    |          |        |                 |
| LNMX 100605PNR-M | LNE X<br>P. E94-95 | FTKA0307 | 148210 | \$ 16.02        |
|                  |                    |          | TW09S  | 148191 \$ 43.35 |

## APFM 06 - 90° Face Mills



- Features:
- Lower cutting resistance
  - Better chip control
  - Longer tool life



| Designation | Code No. | Price \$ | ØD       | Ød   | Ød <sub>1</sub> | Ød <sub>2</sub> | a     | b     | E     | F     | ℓ     | No. of Inserts |    |
|-------------|----------|----------|----------|------|-----------------|-----------------|-------|-------|-------|-------|-------|----------------|----|
| APFM 06-90  | 1150HS   | 145582   | 703.91   | 1.50 | 0.500           | 0.287           | 0.433 | 0.252 | 0.169 | 0.630 | 1.500 | 0.220          | 10 |
|             | 1200HS   | 145583   | 830.89   | 2.00 | 0.750           | 0.433           | 0.630 | 0.321 | 0.220 | 0.787 | 1.750 | 0.220          | 12 |
|             | 1250HS   | 145584   | 1,062.85 | 2.50 | 0.750           | 0.433           | 0.630 | 0.321 | 0.220 | 0.787 | 1.750 | 0.220          | 14 |

\*AA:0°, AR:9°-13°, RR:-14 ~ 5°

### Parts

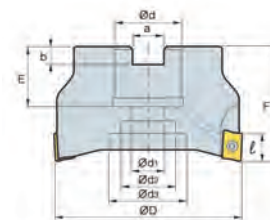
| Designation | Insert                     | Screw      | Wrench   |                 |
|-------------|----------------------------|------------|----------|-----------------|
|             |                            |            |          |                 |
| APFM 06 90° | APMT 0602 PDSR-M<br>P. E93 | FTKA 01842 | 148717   | \$ 15.60        |
|             |                            |            | TW 06S-A | 147186 \$ 43.39 |



## APFM 11M/16M - 90° Face Mills



Coolant through



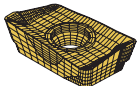

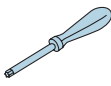
(inch)

| Designation | Code No. | Price \$ | ØD       | Ød    | Ød1   | Ød2   | Ød3   | a     | b     | E     | F     | ℓ     | No. of Inserts | Insert |           |
|-------------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|--------|-----------|
| APFM 11M-90 | 2150     | 148416   | 615.05   | 1.500 | 0.500 | 0.287 | 0.433 | -     | 0.252 | 0.169 | 0.630 | 1.500 | 0.433          | 5      | APMT 11T3 |
|             | 2200     | 148434   | 725.99   | 2.000 | 0.750 | 0.433 | 0.630 | -     | 0.321 | 0.220 | 0.787 | 1.750 | 0.433          | 6      |           |
|             | 2250     | 148445   | 928.68   | 2.500 | 1.000 | 0.433 | 0.630 | -     | 0.321 | 0.220 | 0.787 | 1.750 | 0.433          | 8      |           |
|             | 2300     | 148446   | 1,019.07 | 3.000 | 1.000 | 0.551 | 1.260 | 1.378 | 0.384 | 0.248 | 0.866 | 2.000 | 0.433          | 10     |           |
|             | 2400     | 148469   | 1,392.97 | 4.000 | 1.250 | 0.709 | 1.024 | 1.575 | 0.510 | 0.319 | 0.866 | 2.000 | 0.433          | 12     |           |
| APFM 16M-90 | 3150     | 148510   | 615.05   | 1.500 | 0.500 | 0.287 | 0.433 | -     | 0.250 | 0.169 | 0.630 | 1.500 | 0.630          | 4      | APMT 1604 |
|             | 3200     | 148513   | 723.92   | 2.000 | 0.750 | 0.413 | 0.630 | -     | 0.313 | 0.220 | 0.787 | 1.750 | 0.630          | 5      |           |
|             | 3250     | 148514   | 853.53   | 2.500 | 1.000 | 0.551 | 0.827 | -     | 0.375 | 0.248 | 0.787 | 1.750 | 0.630          | 6      |           |
|             | 3300     | 148517   | 984.40   | 3.000 | 1.000 | 0.551 | 0.827 | -     | 0.375 | 0.248 | 0.866 | 2.000 | 0.630          | 7      |           |
|             | 3400     | 148518   | 1,136.98 | 4.000 | 1.250 | -     | 1.722 | -     | 0.500 | 0.319 | 0.866 | 2.000 | 0.630          | 8      |           |

APFM 11M: AA:0°, AR:9°~13°, RR:-14°~5°

APFM 16M: AA:0°, AR:14°, RR:-12°~8°

### Parts

| Designation  | Insert  | Screw  | Wrench  |
|--------------|---|--|---|
|              |  |  |  |
| APFM 11M 90° | APMT 11T3   | FTKA 02565S  | TW 08S  |
| APFM 16M 90° | APMT 1604   | FTKA 0410  | TW 15S  |
|              |   | 146595   | 146728  |
|              |   | \$ 16.02   | \$ 47.64  |
|              |   | 146969   | 146801  |
|              |   | \$ 12.90   | \$ 47.64  |

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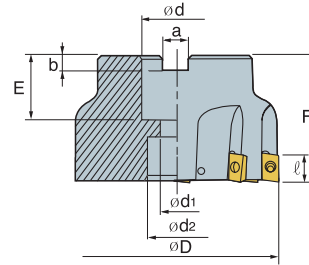
Images are representational only and may not reflect actual product.

## APFM 11/16 - 90° Face Mill



Kits Also Available

➤ P. E163



(inch)

| Designation | Code No. | Price \$ | $\phi D$ | $\phi d$ | $\phi d_1$ | $\phi d_2$ | a     | b     | E     | F     | $\ell$ | No. of Inserts |   |
|-------------|----------|----------|----------|----------|------------|------------|-------|-------|-------|-------|--------|----------------|---|
| APFM 11-90  | 2.00     | 147138   | 367.87   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.433          | 5 |
|             | 2.50     | 148249   | 428.79   | 2.500    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.787 | 1.750  | 0.433          | 8 |
|             | 3.00     | 148250   | 537.40   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.433          | 8 |
| APFM 16-90  | 2.00C    | 147009   | 367.87   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.630          | 4 |
|             | 2.00     | 147117   | 428.79   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.630          | 5 |
|             | 2.50C    | 147011   | 478.69   | 2.500    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.787 | 1.750  | 0.630          | 5 |
|             | 2.50     | 147118   | 478.69   | 2.500    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.787 | 1.750  | 0.630          | 6 |
|             | 3.00C    | 147013   | 551.48   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.630          | 5 |
|             | 3.00     | 147119   | 551.48   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.630          | 7 |
|             | 4.00C    | 147000   | 670.21   | 4.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 6 |
|             | 4.00     | 147120   | 670.21   | 4.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 8 |
|             | 5.00C    | 147015   | 668.82   | 5.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 6 |
|             | 5.00     | 147121   | 1,611.73 | 5.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 9 |
|             | 6.00C    | 147017   | 2,175.81 | 6.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 7 |
|             | 6.00     | 147122   | 2,365.16 | 6.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 9 |

\*AA:0°, AR:9°, RR:-10 ~ -5°

C = Coarse Pitch

### Parts

| Designation | Insert     | Screw           | Wrench          |
|-------------|------------|-----------------|-----------------|
|             |            |                 |                 |
| APFM 11 90° | APXT 11T3~ | FTKA 02565S     | TW 08S          |
| APFM 16 90° | APKT 1604~ | FTKA 0410       | TW 15S          |
|             |            | 146595 \$ 16.02 | 146728 \$ 47.64 |
|             |            | 146969 \$ 12.90 | 146801 \$ 47.64 |

➤ P. E94

### Recommended Cutting Condition

| Workpiece | Cutting Condition |             | Grade   |
|-----------|-------------------|-------------|---|
|           | V(sfm)            | f(ipf)      |   |
| P         | 490~980           | 0.003~0.010 | Coated (PM10, 20, 30C, PM30P)<br>Uncoated (PM20U) |
| M         | 320~480           | 0.003~0.008 | Coated (MM30P)                                    |
| K         | Alum 500~1000     | 0.003~0.012 | Coated (KM20C)<br>Uncoated (KTM10U)               |

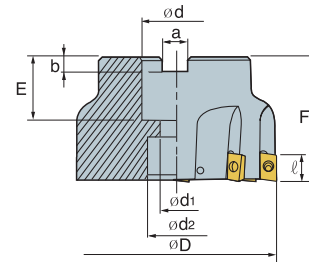


## APFM 16 - 90° Face Mill H13 Hardened Bodies 48HRC



### H13 HARDENED CUTTER BODIES 48HRC

- Features:**
- Longer insert life
  - Longer body life
  - Higher rigidity
  - Better feed rates



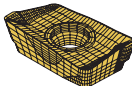

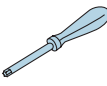
(inch)

| Designation | Code No. | Price \$ | $\phi D$ | $\phi d$ | $\phi d_1$ | $\phi d_2$ | a     | b     | E     | F     | $\ell$ | No. of Inserts |   |
|-------------|----------|----------|----------|----------|------------|------------|-------|-------|-------|-------|--------|----------------|---|
| APFM 16-90  | 2.00C    | 148809   | 367.20   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.630          | 4 |
|             | 2.00     | 148805   | 367.20   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.630          | 5 |
| 3.00C       | 148804   | 551.92   | 3.000    | 1.000    | 0.551      | 0.827      | 0.384 | 0.248 | 0.866 | 2.000 | 0.630  | 5              |   |
|             | 3.00     | 148806   | 551.92   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.630          | 7 |
| 4.00C       | 148808   | 689.13   | 4.000    | 1.500    | -          | 2.205      | 0.636 | 0.394 | 1.181 | 2.500 | 0.630  | 6              |   |
|             | 4.00     | 148810   | 689.13   | 4.000    | 1.500      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.500  | 0.630          | 8 |

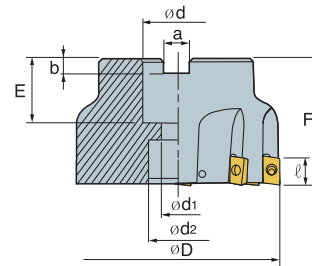
\*AA:0°, AR:9°, RR:-10 ~ -5°

C = Coarse Pitch

### Parts

| Designation | Insert  | Screw  | Wrench  |
|-------------|---|--|---|
|             |  |  |  |
| APFM 16 90° | APKT 1604~<br>P. E93  | FTKA 0410<br>146969<br>\$ 12.90  | TW 15S<br>146801<br>\$ 47.64  |

## AP(D)FM 10/15 90° Face Mill

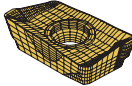

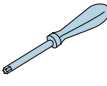


(inch)

| Designation | Code No. | Price \$ | $\phi D$ | $\phi d$ | $\phi d_1$ | $\phi d_2$ | a     | b     | E     | F     | $\ell$ | No. of Inserts | Insert |           |
|-------------|----------|----------|----------|----------|------------|------------|-------|-------|-------|-------|--------|----------------|--------|-----------|
| APFM 10-90  | 2.00     | 147842   | 367.87   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.394          | 5      | AP_T 1003 |
|             | 2.50     | 147843   | 428.79   | 2.500    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.787 | 1.750  | 0.394          | 8      |           |
|             | 3.00     | 147844   | 553.24   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.394          | 8      |           |
| ADFM 15-90  | 2.00     | 147849   | 367.87   | 2.000    | 0.750      | 0.413      | 0.630 | 0.321 | 0.220 | 0.787 | 1.750  | 0.591          | 5      | ADKT 1505 |
|             | 2.50     | 147850   | 428.79   | 2.500    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.787 | 1.750  | 0.591          | 6      |           |
|             | 3.00     | 147851   | 551.48   | 3.000    | 1.000      | 0.551      | 0.827 | 0.384 | 0.248 | 0.866 | 2.000  | 0.591          | 7      |           |
|             | 4.00     | 147852   | 691.98   | 4.000    | 1.250      | -          | 2.205 | 0.636 | 0.394 | 1.181 | 2.000  | 0.591          | 8      |           |

\*AA:0°, AR:9°, RR:-10 ~ -5°

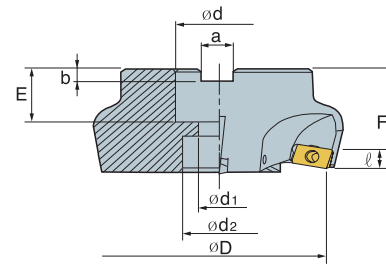
### Parts

| Designation      | Insert  | Screw  | Wrench  |
|------------------|---|--|---|
|                  |  |  |  |
| APFM 10 90° 1003 | APKT / APXT 1003  | FTKA 02565S<br>146595<br>\$ 16.02  | TW 08S<br>146728<br>\$ 47.64  |
| ADFM 15 90° 1505 | ADKT 1505   | FTKA 0410<br>146969<br>\$ 12.90  | TW 15S<br>146801<br>\$ 47.64  |

P. E92



## APFM 11/16 - 15° Face Mill



(inch)

| Designation     | Code No. | Price \$ | $\varnothing D$ | $\varnothing d$ | $\varnothing d_1$ | $\varnothing d_2$ | a     | b     | E     | F     | $\ell$ | No. of Inserts |
|-----------------|----------|----------|-----------------|-----------------|-------------------|-------------------|-------|-------|-------|-------|--------|----------------|
| APFM 11-15 2.50 | 147123   | 428.79   | 2.50            | 1.000           | 0.551             | 0.827             | 0.384 | 0.248 | 0.787 | 1.750 | 0.157  | 6              |
| APFM 16-15 3.00 | 147124   | 551.48   | 3.00            | 1.000           | 0.551             | 0.827             | 0.384 | 0.248 | 0.866 | 2.000 | 0.236  | 5              |
| 4.00            | 147371   | 691.98   | 4.00            | 1.500           | -                 | 2.205             | 0.636 | 0.394 | 1.181 | 2.000 | 0.236  | 6              |
| 5.00            | 147372   | 893.40   | 5.00            | 1.500           | -                 | 2.205             | 0.636 | 0.394 | 1.181 | 2.500 | 0.236  | 6              |

### Parts

| Designation | Insert     | Screw       | Wrench |
|-------------|------------|-------------|--------|
|             |            |             |        |
| APFM 11 15° | APXT 11T3~ | FTKA 02565S | TW 08S |
| APFM 16 15° | APKT 1604~ | FTKA 0410   | TW 15S |

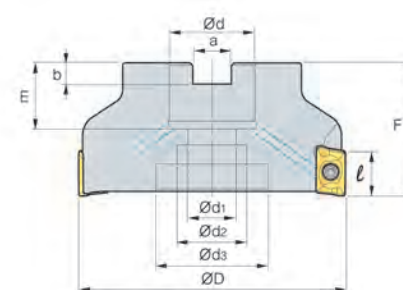
► P. E94

## APFM 18 - 90° Face Mill



#### Features:

- Lower cutting resistance
- Better chip control
- Longer tool life



(inch)

| Designation       | Code No. | Price \$ | $\varnothing D$ | $\varnothing d$ | $\varnothing d_1$ | $\varnothing d_2$ | a     | b     | E     | F     | $\ell$ | No. of Inserts |
|-------------------|----------|----------|-----------------|-----------------|-------------------|-------------------|-------|-------|-------|-------|--------|----------------|
| APFM 18-90 4200HS | 145586   | 835.36   | 2.00            | 0.750           | 0.433             | 0.630             | 0.321 | 0.220 | 0.827 | 1.750 | 0.669  | 5              |
| APFM 18-90 4250HS | 145587   | 896.23   | 2.50            | 0.750           | 0.433             | 0.630             | 0.321 | 0.220 | 0.827 | 1.750 | 0.669  | 6              |
| APFM 18-90 4300HS | 145588   | 1,033.62 | 3.00            | 1.000           | 0.551             | 0.827             | 0.384 | 0.248 | 0.866 | 2.000 | 0.669  | 7              |
| APFM 18-90 4500HS | 145591   | 1,300.77 | 5.00            | 1.500           | 0.827             | 1.142             | 0.636 | 0.394 | 1.181 | 2.000 | 0.669  | 9              |

### Parts

| Designation | Insert           | Screw     | Wrench |
|-------------|------------------|-----------|--------|
|             |                  |           |        |
| AP 18 90°   | APMT 1806 PDSR-M | FTKA 0410 | TW 15S |

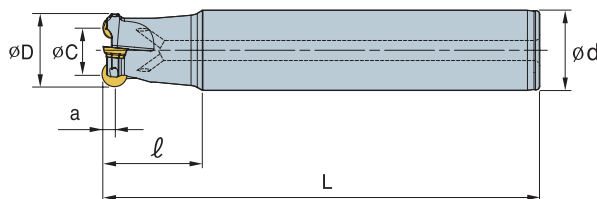
► P. E93



## Button End Mill



Coolant through



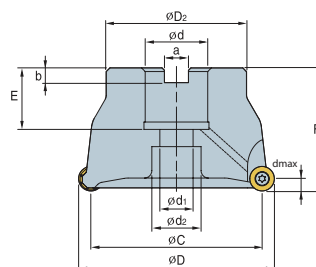
(inch)

| Designation    | Code No. | Price \$ | ØD    | Ød    | ØC    | l     | L     | a     | No. of Inserts | Insert      |
|----------------|----------|----------|-------|-------|-------|-------|-------|-------|----------------|-------------|
| BMSS 3075HRD-M | 147028   | 172.82   | 0.750 | 0.750 | 0.358 | 1.575 | 5.906 | 0.197 | 1              | RDKT 10T3M0 |
| BMSS 3100HRD-M | 147030   | 419.66   | 1.000 | 1.000 | 0.606 | 2.756 | 7.874 | 0.197 | 2              |             |
| BMSS 3125HRD-M | 147032   | 512.84   | 1.250 | 1.250 | 0.858 | 2.756 | 7.874 | 0.197 | 3              |             |
| BMSS 3150HRD-M | 147034   | 652.69   | 1.500 | 1.250 | 1.106 | 2.756 | 7.874 | 0.197 | 4              |             |
| BMSS 4125HRD-M | 147036   | 419.66   | 1.250 | 1.250 | 0.780 | 2.756 | 7.874 | 0.236 | 2              | RDKT 1204M0 |
| BMSS 4150HRD-M | 147038   | 522.34   | 1.500 | 1.250 | 1.028 | 2.756 | 7.874 | 0.236 | 3              |             |
| BMSS 4200HRD-M | 147040   | 975.62   | 2.000 | 1.500 | 1.528 | 1.969 | 9.843 | 0.236 | 4              |             |

## Button Face Mill



Coolant through



(inch)

| Designation    | Code No. | Price \$ | ØD  | Ød   | ØC   | Ød1   | Ød2   | a     | b     | E     | F    | No. of Inserts | d max | Insert    |
|----------------|----------|----------|-----|------|------|-------|-------|-------|-------|-------|------|----------------|-------|-----------|
| BMSC 3200HRD   | 147048   | 462.45   | 2.0 | 0.75 | 1.61 | 0.433 | 0.630 | 0.313 | 0.220 | 0.787 | 1.75 | 4              | 0.196 | RDKT 10T3 |
| BMSC 3200HRD-H | 147052   | 512.80   | 2.0 | 0.75 | 1.61 | 0.433 | 0.630 | 0.313 | 0.220 | 0.787 | 1.75 | 5              | 0.196 |           |
| BMSC 3300HRD-H | 147058   | 683.81   | 3.0 | 1.00 | 2.61 | 0.551 | 0.827 | 0.375 | 0.248 | 0.866 | 2.00 | 7              | 0.196 |           |
| BMSC 4200HRD   | 149007   | 518.95   | 2.0 | 0.75 | 1.53 | 0.433 | 0.630 | 0.313 | 0.220 | 0.787 | 1.75 | 4              | 0.236 | RDKT 1204 |
| BMSC 4300HRD-M | 147064   | 799.32   | 3.0 | 1.00 | 2.53 | 0.551 | 0.827 | 0.375 | 0.248 | 0.866 | 2.00 | 6              | 0.236 |           |
| BMSC 4400HRD-M | 147066   | 940.20   | 4.0 | 1.25 | 3.53 | 0.709 | 1.024 | 0.500 | 0.319 | 0.827 | 2.00 | 7              | 0.236 |           |
| BMSC 4500HRD-M | 147068   | 1,111.15 | 5.0 | 1.50 | 4.53 | 0.827 | 1.220 | 0.626 | 0.394 | 1.063 | 2.50 | 8              | 0.236 |           |

## Inserts / Parts

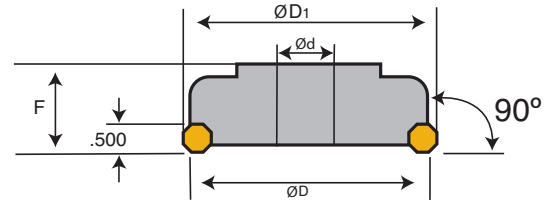
| Designation        | Available Insert | Screw                         | Wrench                    |
|--------------------|------------------|-------------------------------|---------------------------|
|                    |                  |                               |                           |
| BMSS/C 3000 Series | RDKT 10T3M0      | FTGA 03508<br>146931 \$ 14.82 | TW 15S<br>146801 \$ 47.64 |
| BMSS/C 4000 Series | RDKT 1204M0      | FTKA 0410<br>146969 \$ 12.90  |                           |

➤ P. E98

## OKT-MAX - 45° Face Mill



Kits Also Available  
 ➤ P. E166



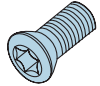
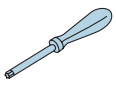
| Designation | Code No. | Price \$ | $\varnothing D$ | $\varnothing d$ | $\varnothing d_1$ | F     | No. of Inserts |   |
|-------------|----------|----------|-----------------|-----------------|-------------------|-------|----------------|---|
| OKT-Max     | 2"R      | 147019   | 730.86          | 2.0             | 0.750             | 2.319 | 1.57           | 4 |
|             | 3"R      | 147021   | 1,009.63        | 3.0             | 1.000             | 3.315 | 2.00           | 6 |
|             | 4"R      | 147023   | 1,048.69        | 4.0             | 1.500             | 4.315 | 2.00           | 7 |
|             | 5"R      | 147025   | 1,304.42        | 5.0             | 1.500             | 5.307 | 2.00           | 8 |
|             | 6"R      | 147027   | 1,668.63        | 6.0             | 1.500             | 6.307 | 2.00           | 9 |

### Available Inserts

| Designation   | Designation |
|---------------|-------------|
| OFCW          | O5T3SN      |
|               | O5T3FN      |
|               | O5T308FN    |
| OFKT F2, M, A | O5T3SN-F2   |
|               | O5T308SN-F2 |
|               | O5T3SN-M    |
|               | O5T308SN-M  |
|               | O5T3FN-A    |
| O5T3EN-A      |             |

➤ P. E96,97

### Parts

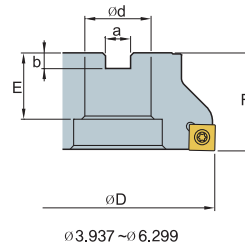
|   |  |          |       |        |          |
|---|--|----------|-------|--------|----------|
|  |  |          |       |        |          |
| FTKA0408  | 146968   | \$ 12.90 | TW15S | 146801 | \$ 47.64 |

### Recommended Cutting Condition

| Workpiece | Cutting Condition |             | Grade   |
|-----------|-------------------|-------------|---|
|           | V(sfm)            | f(ipf)      |   |
| P         | 490~980           | 0.003~0.010 | Coated (PM10, 20, 30C, PM30P)<br>Uncoated (PM20U) |
| M         | 320~480           | 0.003~0.008 | Coated (MM30P)                                    |
| K         | Alum 500~1000     | 0.003~0.012 | Coated (KM20C)<br>Uncoated (KTM10U)               |



## Max Mill 90° Face Mill



(inch)

| Designation   | Code No. | Price \$        | ØD    | Ød    | Ød <sub>1</sub> | a     | b     | E     | F     | No. of Inserts | Insert   |
|---------------|----------|-----------------|-------|-------|-----------------|-------|-------|-------|-------|----------------|----------|
| MM 90° 4250FM | 146805   | <b>740.01</b>   | 2.500 | 1.000 | 0.551           | 0.370 | 0.248 | 0.787 | 1.575 | 4              | SDXT1305 |
| 4300FM        | 146806   | <b>808.32</b>   | 3.000 | 1.000 | 0.551           | 0.384 | 0.248 | 0.866 | 1.969 | 5              |          |
| 4400FM        | 146807   | <b>944.99</b>   | 4.000 | 1.250 | -               | 0.510 | 0.319 | 0.866 | 1.969 | 6              |          |
| 4500FM        | 146808   | <b>1,146.21</b> | 5.000 | 1.500 | -               | 0.636 | 0.394 | 1.181 | 2.480 | 8              |          |
| 4600FM        | 146809   | <b>2,727.88</b> | 6.000 | 2.000 | -               | 0.758 | 0.433 | 1.181 | 2.480 | 8              |          |

### Available Insert

| SDXT | Designation               |
|------|---------------------------|
|      | SDXT130508R- F2<br>M<br>A |

➤ P. E98

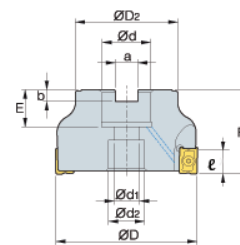
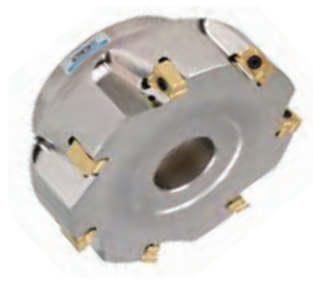
### Parts

| Screw                            | Wrench                       | Assembling |
|----------------------------------|------------------------------|------------|
|                                  |                              |            |
| FTNC 04511 146424 <b>\$ 8.76</b> | TW20S 147216 <b>\$ 43.35</b> |            |

See pages E124 through E126 for Cutting Conditions

Indexable Cutting Tools

## DS4 Face Mill



\*AR:-6°, RR:-19° ~ 13°

(inch)

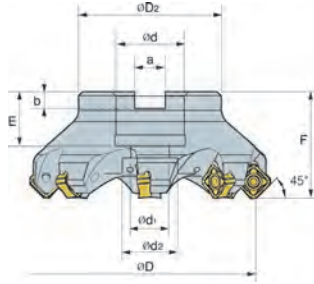
| Designation | Code No. | Price \$        | ØD   | ØD2   | Ød   | Ød <sub>1</sub> | Ød <sub>2</sub> | a     | b     | E     | F    | No. of Inserts | ℓ     | Insert        |
|-------------|----------|-----------------|------|-------|------|-----------------|-----------------|-------|-------|-------|------|----------------|-------|---------------|
| DS4 3200HR  | 148373   | <b>1,094.30</b> | 2.00 | 1.772 | 0.75 | 0.413           | 0.630           | 0.313 | 0.220 | 0.787 | 1.75 | 7              | 0.354 | LNMX100605PNR |
| 3400HR      | 148391   | <b>2,098.89</b> | 4.00 | 2.874 | 1.25 | 0.709           | 1.024           | 0.500 | 0.319 | 0.866 | 2.00 | 12             | 0.354 |               |
| 4250HR-M    | 148876   | <b>1,275.14</b> | 2.50 | 2.205 | 1.00 | 0.551           | 0.827           | 0.375 | 0.248 | 0.866 | 1.75 | 6              | 0.551 | LNMX151008PNR |
| 4300HR      | 148877   | <b>1,344.29</b> | 3.00 | 2.205 | 1.00 | 0.551           | 0.827           | 0.375 | 0.248 | 0.866 | 2.00 | 5              | 0.551 |               |

### Inserts / Parts

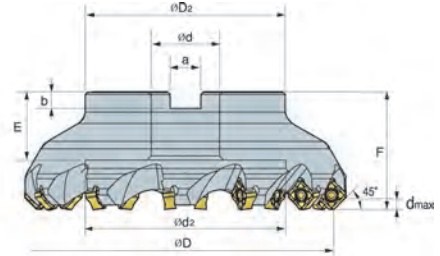
| Designation      | Available Insert | Screw                             | Wrench                        |
|------------------|------------------|-----------------------------------|-------------------------------|
|                  |                  |                                   |                               |
| LNMX100605PNR-F2 | LNMX             | FTKA 0307 148210 <b>\$ 16.02</b>  | TW09S 148191 <b>\$ 43.35</b>  |
| LNMX151008PNR-M  |                  | FTKA 0421B 146969 <b>\$ 12.90</b> | TW 15S 146801 <b>\$ 47.64</b> |

➤ P. E94-95

## DS8 45° Face Mill



2" - 5" (coolant hole)



6" - 8" (no coolant hole)



Coolant through

### Features:

- Innovative double-sided, high rake angle insert makes it possible to use 8 cutting edges
- Low cutting load due to the positive setting and high rake angle chip breaker
- Designed wiper technology in minor cutting edge provides excellent surface finish
- Smooth and stable chip control

### Kits Also Available

➤ P. E164

(inch)

| Designation | Code No. | Price \$ | ØD       | ØD2  | Ød    | Ød <sub>1</sub> | Ød <sub>2</sub> | a     | b     | E     | F     | No. of Inserts | d <sub>max</sub> |       |
|-------------|----------|----------|----------|------|-------|-----------------|-----------------|-------|-------|-------|-------|----------------|------------------|-------|
| DS8-45      | 4200HR-M | 148979   | 827.41   | 2.00 | 1.772 | 0.750           | 0.413           | 0.630 | 0.313 | 0.220 | 0.787 | 1.75           | 4                | 0.236 |
|             | 4250HR-M | 148980   | 1,035.32 | 2.50 | 2.205 | 1.00            | 0.551           | 0.827 | 0.375 | 0.248 | 0.866 | 1.75           | 6                | 0.236 |
|             | 4300HR   | 148885   | 1,139.98 | 3.00 |       |                 |                 |       |       |       |       |                | 5                |       |
|             | 4300HR-M | 148886   | 1,265.36 | 3.00 | 2.205 | 1.00            | 0.551           | 0.827 | 0.384 | 0.248 | 0.866 | 2.00           | 7                | 0.236 |
|             | 4300HR-H | 148887   | 1,708.22 | 3.00 |       |                 |                 |       |       |       |       |                | 10               |       |
|             | 4400HR   | 148888   | 1,349.94 | 4.00 |       |                 |                 |       |       |       |       |                | 6                |       |
|             | 4400HR-M | -        | -        | 4.00 | 2.874 | 1.25            | 0.709           | 1.024 | 0.510 | 0.319 | 0.866 | 2.00           | 8                | 0.236 |
|             | 4400HR-H | 148890   | 2,022.92 | 4.00 |       |                 |                 |       |       |       |       |                | 12               |       |
|             | 4500HR   | 148891   | 1,846.82 | 5.00 |       |                 |                 |       |       |       |       |                | 8                |       |
|             | 4500HR-M | 148892   | 1,994.55 | 5.00 | 3.386 | 1.50            | 0.827           | 1.220 | 0.636 | 0.394 | 1.181 | 2.50           | 10               | 0.236 |
|             | 4500HR-H | 148893   | 2,692.72 | 5.00 |       |                 |                 |       |       |       |       |                | 16               |       |
|             | 4600HR   | 148894   | 2,145.25 | 6.00 |       |                 |                 |       |       |       |       |                | 10               |       |
|             | 4600HR-M | 148895   | 2,145.25 | 6.00 | 4.882 | 2.00            | -               | 4.213 | 0.758 | 0.433 | 1.181 | 2.50           | 12               | 0.236 |
|             | 4600HR-H | 148896   | 3,388.39 | 6.00 |       |                 |                 |       |       |       |       |                | 18               |       |
|             | 4800HR-M | 148897   | 3,294.44 | 8.00 |       |                 |                 |       |       |       |       |                | 14               |       |
|             | 4800HR-H | 148898   | 4,447.55 | 8.00 | 5.118 | 2.50            | -               | 5.315 | 1.012 | 0.551 | 1.496 | 2.50           | 24               | 0.236 |

### Available Insert

| SNEX / SNMX | Designation     |
|-------------|-----------------|
|             | SNEX 1206ANN-A  |
|             | SNEX 1206ANN-F2 |
|             | SNEX 1206ANN-M  |
|             | SNEX 1206ANN-W  |
|             | SNMX 1206ANN-M  |

➤ P. E100-101

### Parts

|                          |                       |
|--------------------------|-----------------------|
|                          |                       |
| FTKA0410 146969 \$ 12.90 | TW15S 146801 \$ 47.64 |

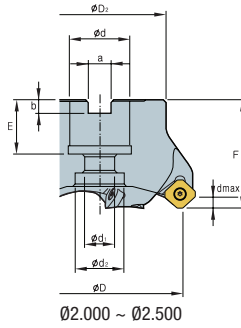


## Max Mill 45° Face Mill

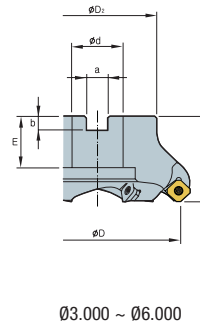


Kits Also Available

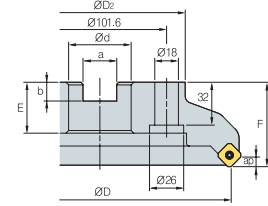
➤ P. E166



Ø2.000 ~ Ø2.500



Ø3.000 ~ Ø6.000



Ø8.000

(inch)

| Designation                | Code No. | Price \$ | ØD    | Ød    | ØD2   | ØD1   | ØD2    | a     | b     | E     | F     | No. of Inserts | d max | Insert  |  |  |
|----------------------------|----------|----------|-------|-------|-------|-------|--------|-------|-------|-------|-------|----------------|-------|---------|--|--|
| <b>MM 45° Coarse Pitch</b> |          |          |       |       |       |       |        |       |       |       |       |                |       |         |  |  |
| 4200FM                     | 147811   | 475.08   | 2.000 | 0.750 | 1.654 | 0.413 | 0.630  | 0.321 | 0.220 | 0.787 | 1.750 | 3              | 0.256 | SE_14M4 |  |  |
| 4250FM                     | 147812   | 609.84   | 2.500 | 0.750 | 1.654 | 0.413 | 0.630  | 0.321 | 0.220 | 0.787 | 1.750 | 4              |       |         |  |  |
| 4300FM                     | 147813   | 912.80   | 3.000 | 1.000 | 1.969 | 0.551 | 0.827  | 0.384 | 0.248 | 0.866 | 2.000 | 5              |       |         |  |  |
| 4400FM                     | 147814   | 1,123.89 | 4.000 | 1.250 | 2.362 | -     | 1.772  | 0.510 | 0.319 | 0.866 | 2.000 | 5              |       |         |  |  |
| 4500FM                     | 147815   | 1,385.62 | 5.000 | 1.500 | 3.425 | -     | 2.205  | 0.636 | 0.394 | 1.181 | 2.500 | 6              |       |         |  |  |
| 4600FM                     | 147816   | 1,450.46 | 6.000 | 2.000 | 3.937 | -     | 2.953  | 0.758 | 0.433 | 1.181 | 2.500 | 7              |       |         |  |  |
| 4800FM                     | 147817   | 1,894.48 | 8.000 | 2.500 | 5.197 | -     | -      | 1.012 | 0.551 | 1.496 | 2.500 | 8              |       |         |  |  |
| <b>Medium Pitch</b>        |          |          |       |       |       |       |        |       |       |       |       |                |       |         |  |  |
| 4300M                      | 148276   | 1,004.00 | 3.000 | 1.000 | 2.244 | 0.551 | 0.8271 | 0.384 | 0.248 | 0.866 | 2.000 | 6              |       |         |  |  |
| 4400M                      | 148277   | 1,236.29 | 4.000 | 1.250 | 2.638 | -     | 1.772  | 0.510 | 0.315 | 0.866 | 2.000 | 7              |       |         |  |  |
| 4500M                      | 148278   | 1,386.86 | 5.000 | 1.500 | 3.425 | -     | 2.205  | 0.636 | 0.394 | 1.181 | 2.500 | 8              |       |         |  |  |
| 4600M                      | 148279   | 1,595.51 | 6.000 | 2.000 | 4.213 | -     | 2.953  | 0.758 | 0.433 | 1.181 | 2.500 | 10             |       |         |  |  |
| 4800M                      | 148280   | 2,085.97 | 8.000 | 2.500 | 5.118 | -     | -      | 1.012 | 0.551 | 1.496 | 2.500 | 12             |       |         |  |  |
| <b>Fine Pitch</b>          |          |          |       |       |       |       |        |       |       |       |       |                |       |         |  |  |
| 4300H                      | 148281   | 1,137.84 | 3.000 | 1.000 | 2.244 | 0.551 | 0.827  | 0.384 | 0.248 | 0.866 | 2.000 | 8              |       |         |  |  |
| 4400H                      | 148282   | 1,406.20 | 4.000 | 1.250 | 2.638 | -     | 1.772  | 0.510 | 0.315 | 0.866 | 2.000 | 10             |       |         |  |  |
| 4500H                      | 148283   | 1,905.26 | 5.000 | 1.500 | 3.425 | -     | 2.205  | 0.636 | 0.394 | 1.181 | 2.500 | 12             |       |         |  |  |
| 4600H                      | 148284   | 1,994.38 | 6.000 | 2.000 | 4.213 | -     | 2.953  | 0.758 | 0.433 | 1.181 | 2.500 | 16             |       |         |  |  |
| 4800H                      | 148285   | 2,607.53 | 8.000 | 2.500 | 5.118 | -     | -      | 1.012 | 0.551 | 1.496 | 2.500 | 18             |       |         |  |  |

### Available Insert

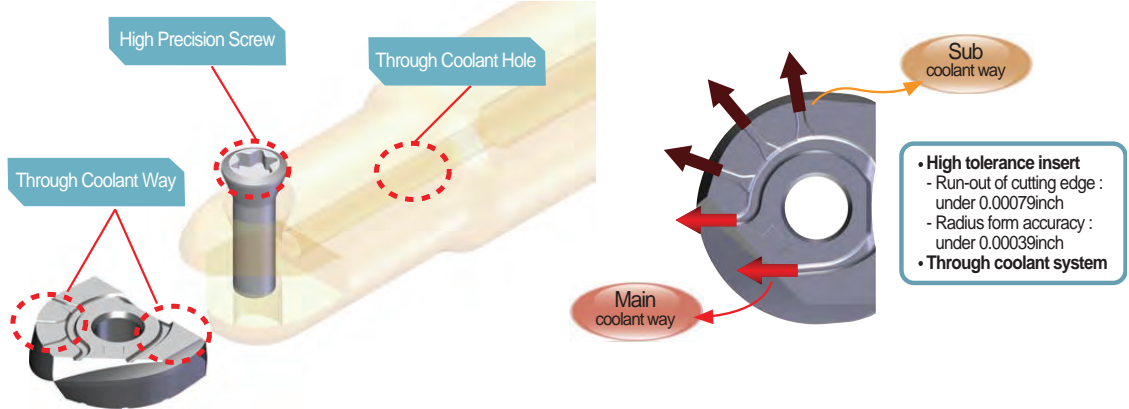
| SEET / SEXT | Designation     |
|-------------|-----------------|
|             | SEET14M4AGFN-A  |
|             | SEET14M4AGSN-F2 |
|             | SEET14M4AGSN-M  |
|             | SEXT14M4AGSN-FN |
|             | SEXT14M4AGSN-M  |
|             | SEXT14M4AGSN-R8 |

### Parts

➤ P. E99-100

| Screw                     | Wrench                | Wrench for Shim      | Shim Screw                | Shim                    |
|---------------------------|-----------------------|----------------------|---------------------------|-------------------------|
|                           |                       |                      |                           |                         |
| FTGA03512 146933 \$ 14.82 | TW15S 146801 \$ 47.64 | HW35L 148192 \$ 4.11 | SHXN0509F 146935 \$ 22.72 | SS42SAF 148193 \$ 15.01 |

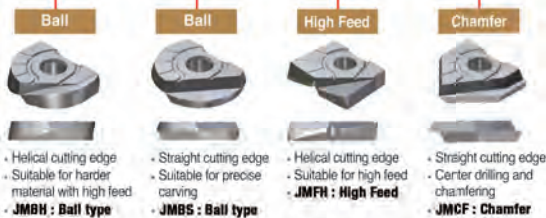
See pages E124 through E126 for Cutting Conditions



### JMBE

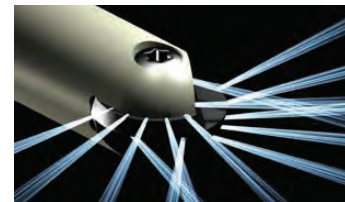


- Four types of inserts are available with one holder
- Single screw for clamping : Simple clamping system
- MQL system - Suitable for longer tool life & improving surface quality



### Advantages of MQL system

(Minimum quantity lubricant)



- Environmental friendly system
- Decreased coolant cost
- Lubrication of cutting edge
- Improved chip control  
(Injection of coolant directly to the cutting edge)
- Increased tool life & improved surface quality

### JMBE Jet Mill Cutting Conditions

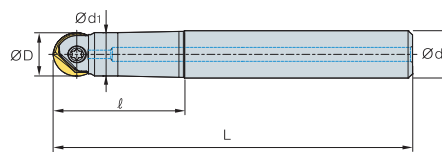
| Workpiece                          | Hardness (HRC) | vc (stm)   | fz (ipt)      | ap (inch) | ae (inch) |
|------------------------------------|----------------|------------|---------------|-----------|-----------|
| Carbon & Alloy Steel               | Under 30       | 350 ~ 800  | 0.008 ~ 0.01  | 0.0028D   | 0.0028D   |
| Carbon & Alloy Steel               | 30 ~ 40        | 250 ~ 500  | 0.004 ~ 0.01  | 0.0028D   | 0.0028D   |
| Die Tool Steel, Pre-hardened Steel | 30 ~ 40        | 250 ~ 500  | 0.004 ~ 0.008 | 0.002D    | 0.002D    |
| GC, GCD                            | -              | 350 ~ 650  | 0.01 ~ 0.015  | 0.0028D   | 0.0028D   |
| Hardened Steel                     | 50 ~ 60        | 350 ~ 500  | 0.004 ~ 0.01  | 0.0012D   | 0.0012D   |
| Stainless Steel                    | -              | 250 ~ 500  | 0.004 ~ 0.01  | 0.002D    | 0.002D    |
| Aluminum Alloy                     | -              | 650 ~ 1000 | 0.006 ~ 0.020 | 0.006D    | 0.006D    |

# Jet Mill



### Features:

- High accuracy indexable end mill for mold finishing
- Optimum machining of mold has been achieved due to the MQL system
- Easy clamping with simple screw on system



(inch)

| Designation      | Code No. | Price \$ | ØD    | Ød    | l     | L     | d1    | Clamp Screw | Wrench | Insert Size ø |
|------------------|----------|----------|-------|-------|-------|-------|-------|-------------|--------|---------------|
| JMBE031138T-S050 | 148777   | 456.15   | 5/16  | 1/2   | 1.378 | 3.583 | 0.283 | ETND02506F  | TWP07S | 5/16          |
| JMBE031217T-S050 | 147430   | 472.60   | 5/16  | 1/2   | 2.165 | 4.370 | 0.283 | ETND02506F  | TWP07S | 5/16          |
| JMBE031295T-S050 | 147431   | 489.11   | 5/16  | 1/2   | 2.953 | 5.157 | 0.283 | ETND02506F  | TWP07S | 5/16          |
| JMBE037138T-S050 | 147883   | 456.15   | 3/8   | 1/2   | 1.378 | 3.583 | 0.335 | ETND0307F   | TWP08S | 3/8           |
| JMBE037217T-S050 | 147442   | 472.60   | 3/8   | 1/2   | 2.165 | 4.370 | 0.335 | ETND0307F   | TWP08S | 3/8           |
| JMBE050217T-S050 | 147637   | 472.60   | 1/2   | 1/2   | 2.165 | 4.370 | 0.433 | ETND03509   | TWP10S | 1/2           |
| JMBE062256T-S062 | 147638   | 505.62   | 5/8   | 5/8   | 2.559 | 4.921 | 0.571 | ETND0413    | TWP15S | 5/8           |
| JMBE062394T-S075 | 147663   | 559.46   | 5/8   | 3/4   | 3.937 | 6.693 | 0.571 | ETND0413    | TWP15S | 5/8           |
| JMBE075453T-S100 | 147664   | 799.69   | 3/4   | 1     | 4.528 | 7.677 | 0.689 | ETKD0516    | TWP20  | 3/4           |
| JMBE100354T-S100 | 147722   | 716.63   | 1     | 1     | 3.543 | 6.693 | 0.906 | ETKD0620    | TWP25  | 1             |
| JMBE100532T-S125 | 147723   | 777.10   | 1     | 1-1/4 | 5.315 | 8.858 | 0.906 | ETKD0620    | TWP25  | 1             |
| JMBE125413T-S125 | 147776   | 741.96   | 1-1/4 | 1-1/4 | 4.134 | 7.677 | 1.142 | ETGD0825    | TWP40  | 1-1/4         |
| JMBE125630T-S125 | 147777   | 812.22   | 1-1/4 | 1-1/4 | 6.299 | 9.843 | 1.142 | ETGD0825    | TWP40  | 1-1/4         |

## Parts

| Clamp Screw | ETND02506F | ETND0307F | ETND03509 | ETND0413 | ETKD0516 | ETKD0620 | ETGD0825 |
|-------------|------------|-----------|-----------|----------|----------|----------|----------|
|             | 147332     | 147334    | 147378    | 147385   | 147392   | 147395   | 147421   |
|             | \$ 16.54   | \$ 16.54  | \$ 14.41  | \$ 16.54 | \$ 19.17 | \$ 19.16 | \$ 19.17 |
| Wrench      | TWP07S     | TWP08S    | TWP10S    | TWP15S   | TWP20    | TWP25    | TWP40    |
|             | 147224     | 147246    | 147249    | 147295   | 147318   | 147321   | 147330   |
|             | \$ 43.39   | \$ 43.39  | \$ 43.39  | \$ 43.39 | \$ 23.68 | 28.57    | \$ 34.33 |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.





## Mold Mill



Kits Also Available

➤ P. E167

Figure 1

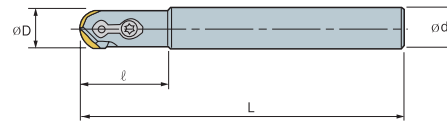
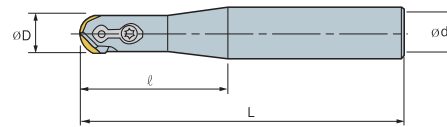


Figure 2



(inch)

| Designation | Code No. | Price \$ | Figure          | ØD | ød    | ℓ     | L     | Available Insert | Parts    |          |             |          |        |      |
|-------------|----------|----------|-----------------|----|-------|-------|-------|------------------|----------|----------|-------------|----------|--------|------|
|             |          |          |                 |    |       |       |       |                  | Screw    | Clamp    | Clamp Screw | C-Ring   | Wrench |      |
| <b>MM</b>   | 5/8"-S   | 148094   | <b>748.31</b>   | 1  | 0.625 | 0.625 | 1.417 | 5.51             | RC 5/8   | FTGA0513 | CBH4.5R1    | CTX04513 | ER03   | TW20 |
|             | 5/8"-M   | 147853   | <b>782.26</b>   | 2  | 0.625 | 0.625 | 2.559 | 6.69             |          |          |             |          |        |      |
|             | 5/8"-L   | 148095   | <b>823.87</b>   | 2  | 0.625 | 0.625 | 2.559 | 7.87             |          |          |             |          |        |      |
|             | 3/4"-S   | 148096   | <b>801.21</b>   | 1  | 0.750 | 0.750 | 1.772 | 6.30             | RC 3/4   | FTGA0517 | CBH4.5R2    | CTX04513 | ER03   | TW20 |
|             | 3/4"-M   | 147854   | <b>847.18</b>   | 2  | 0.750 | 0.750 | 3.150 | 7.87             |          |          |             |          |        |      |
|             | 3/4"-L   | 148097   | <b>893.42</b>   | 2  | 0.750 | 0.750 | 3.150 | 9.84             |          |          |             |          |        |      |
|             | 1"-S     | 148098   | <b>948.06</b>   | 1  | 1.000 | 1.000 | 1.772 | 6.30             | RC 1     | FTGA0621 | CBH5R1      | CTX0517  | ER04   | TW20 |
|             | 1"-M     | 147855   | <b>1,016.77</b> | 2  | 1.000 | 1.000 | 3.543 | 8.27             |          |          |             |          |        |      |
|             | 1"-L     | 148099   | <b>1,012.05</b> | 2  | 1.000 | 1.000 | 3.543 | 11.81            |          |          |             |          |        |      |
|             | 1-1/8"-S | 148100   | <b>894.14</b>   | 1  | 1.125 | 1.125 | 2.559 | 6.89             | RC 1-1/8 | FTGA0826 | CBH6R1      | CTX0621  | ER05   | TW25 |
|             | 1-1/8"-M | 147856   | <b>1,275.98</b> | 2  | 1.125 | 1.125 | 3.937 | 9.84             |          |          |             |          |        |      |
|             | 1-1/4"-S | 148103   | <b>925.50</b>   | 1  | 1.250 | 1.250 | 2.205 | 6.89             | RC 1-1/4 | FTGA0826 | CBH6R1      | CTX0621  | ER05   | TW25 |
|             | 1-1/4"-M | 147857   | <b>1,009.64</b> | 1  | 1.250 | 1.250 | 3.937 | 9.84             |          |          |             |          |        |      |
|             | 1-1/4"-L | 148104   | <b>1,105.76</b> | 1  | 1.250 | 1.250 | 3.937 | 13.78            |          |          |             |          |        |      |

### Available Insert

| RC | Designation |
|----|-------------|
|    | RC 5/8      |
|    | RC 3/4      |
|    | RC 1        |
|    | RC 1-1/8    |
|    | RC 1-1/4    |

➤ P. E97

### Recommended Cutting Condition

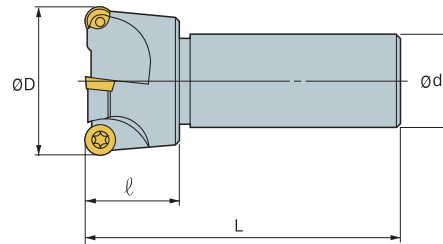
| Workpiece  | V(sfm)   | f(ipf)      |
|--|----------|-------------|
| Steel HB over 180, Steel (SS41, SM25C)             | 600~1000 | 0.004~0.012 |
| Alloy Steel HB under 300, Alloy Steel (SM55C, SCM) | 400~800  | 0.004~0.008 |
| Cast Iron HB under 300<br>Cast Iron                | 400~800  | 0.004~0.012 |

### Parts

| Screw           |                 | Clamp           |                 | Clamp Screw     |                 | C-Ring         |                | Wrench          |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|
|                 |                 |                 |                 |                 |                 |                |                |                 |                 |
| FTGA0513        | FTGA0621        | CBHR.5R1        | CBH5R1          | CTX04513        | CTX0517         | ER03           | ER04           | TW20            | TW25            |
| 148194          | 148196          | 148198          | 148214          | 148217          | 148218          | 148220         | 148221         | 148291          | 148223          |
| <b>\$ 14.30</b> | <b>\$ 16.50</b> | <b>\$ 54.01</b> | <b>\$ 54.01</b> | <b>\$ 13.85</b> | <b>\$ 12.99</b> | <b>\$ 2.31</b> | <b>\$ 2.31</b> | <b>\$ 23.08</b> | <b>\$ 25.33</b> |
| FTGA0517        | FTGA0826        | CBH4.5R2        | CBH6R1          |                 | CTX0621         |                | ER05           |                 |                 |
| 148195          | 148197          | 148213          | 148215          | -               | 148219          | -              | 148222         | -               | -               |
| <b>\$ 12.86</b> | <b>\$ 13.85</b> | <b>\$ 54.01</b> | <b>\$ 54.01</b> |                 | <b>\$ 16.32</b> |                | <b>\$ 2.31</b> |                 |                 |



## Mold Max



| Designation | Code No. | Price \$ | ØD    | Ød    | l     | L     | No. of Inserts | Maximum Depth of Cut | Approach Angle | Axial Rake Angle | Radial Rake Angle |
|-------------|----------|----------|-------|-------|-------|-------|----------------|----------------------|----------------|------------------|-------------------|
| MMEM 4125R  | 147830   | 255.73   | 1.250 | 1.250 | 1.575 | 4.724 | 2              | 0.197                |                | 6°               | -3°               |
| 4150R       | 147831   | 319.49   | 1.500 |       |       |       | 3              |                      |                |                  |                   |
| 4200R       | 147832   | 383.25   | 2.000 |       |       |       | 4              |                      |                |                  |                   |

(inch)

### Available Insert

|             |             |
|-------------|-------------|
| <p>RPMM</p> | Designation |
|             | RPMM 120400 |

### Parts

➤ P. E98

| Screw                           | Wrench                      | Assembling |
|---------------------------------|-----------------------------|------------|
|                                 |                             |            |
| FTNC 04511    146424    \$ 8.76 | TW20S    147216    \$ 43.35 |            |

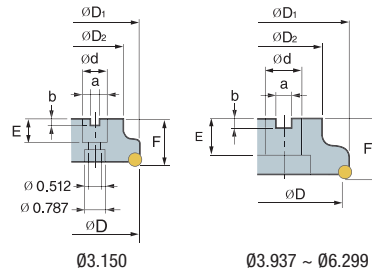
### Recommended Cutting Condition

| Workpiece | Cutting Condition  |             | Grade                                     |
|-----------|--------------------|-------------|---|
|           | V(sfm)             | f(ipf)      |   |
| P         | 490~980<br>230~590 | 0.003~0.012 | Coated (PM25C, PM30P)<br>Uncoated (PM20U) |
| M         |                    |             |   |
| K         |                    |             |   |

M & K Class grades available, none are stock standard



### Mold Max Face Mill



(inch)

| Designation  | Code No. |                 |   |          | ØD         | Ød    | ØD <sub>1</sub> | ØD <sub>2</sub> | a     | b     | E     | F     | No. of Inserts |
|--------------|----------|-----------------|---|----------|------------|-------|-----------------|-----------------|-------|-------|-------|-------|----------------|
|              | R        | Price \$        | L | Price \$ |            |       |                 |                 |       |       |       |       |                |
| MMFM 4050R/L | 146997   | <b>384.97</b>   |   |          | 1.969(50)  | 0.750 | -               | 1.750           | 0.321 | 0.220 | 0.750 | 1.620 | 4              |
| 4080R/L      | 146125   | <b>625.35</b>   |   |          | 3.150(80)  | 1.000 | 3.646           | 2.126           | 0.384 | 0.248 | 0.984 | 1.969 | 5              |
| 4100R/L      | 146126   | <b>806.71</b>   |   |          | 3.937(100) | 1.250 | 4.433           | 2.756           | 0.500 | 0.315 | 1.260 | 1.969 | 6              |
| 4125R/L      | 148259   | <b>791.64</b>   |   |          | 4.921(125) | 1.500 | 5.417           | 2.953           | 0.626 | 0.394 | 1.496 | 2.480 | 7              |
| 4160R/L      | 148260   | <b>1,025.82</b> |   |          | 6.299(160) | 2.000 | 6.795           | 3.937           | 0.748 | 0.433 | 1.496 | 2.480 | 8              |

#### Available Insert

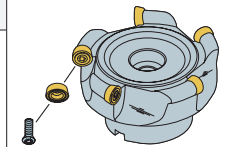
| RPMM | Designation |
|------|-------------|
|      | RPMM 120400 |

➤ P. E98

#### Parts

| Screw                            | Wrench                       |
|----------------------------------|------------------------------|
|                                  |                              |
| FTNC 04511 146424 <b>\$ 8.76</b> | TW20S 147216 <b>\$ 43.35</b> |

#### Assembling



### 45° Chamfer Mill



Kits Also Available

➤ P. E167

| Designation   | Chamfer Range       | Code No. | Price \$      | Shank | No. of Inserts | Insert     |
|---------------|---------------------|----------|---------------|-------|----------------|------------|
| CT 45 - 0.625 | 0.125" - 0.625" 45° | 147113   | <b>425.39</b> | 3/4   | 1              | TC_T 21.5_ |
| CT 45 - 1.125 | 0.470" - 1.125" 45° | 147112   | <b>239.41</b> | 3/4   | 2              | TC_T 32.5_ |

➤ P. E22-24

#### Parts

| Screw                             | Wrench                        |
|-----------------------------------|-------------------------------|
|                                   |                               |
| FTKA02565 146930 <b>\$ 14.61</b>  | TW08P 146596 <b>\$ 15.11</b>  |
| *FTGA03510 146957 <b>\$ 13.86</b> | *TW15P 146940 <b>\$ 17.45</b> |

#### Recommended Cutting Condition

| Workpiece | Cutting Condition  |             | Grade                                     |
|-----------|--------------------|-------------|---|
|           | V(sfm)             | f(ipf)      |   |
| P         | 490~980<br>230~590 | 0.003~0.012 | Coated (PM25C, PM30P)<br>Uncoated (PM20U) |
| M         |                    |             |   |
| K         |                    |             |   |

M & K Class grades available, none are stock standard



## Multi-functional 45° Chamfer Tool



- Uses**
- Centering
  - Grooving
  - Chamfering

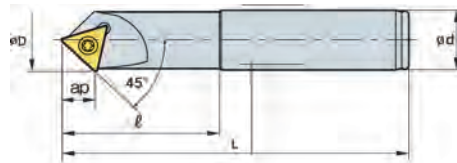


Fig. 1

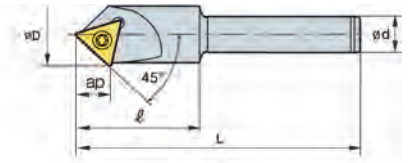



Fig. 2


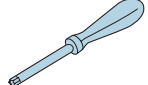
\*AR: -12~15° (inch)

| Designation      | Code No. | Price \$ | ØD   | Ød   | ℓ   | L   | ap  | Fig. | Insert    |
|------------------|----------|----------|------|------|-----|-----|-----|------|-----------|
| CTP45 1600R-S050 | 147543   | 241.09   | 0.87 | 0.50 | 1.6 | 3.5 | 0.4 | 2    |           |
| CTP45 1600R-S075 | 147548   | 208.11   | 0.87 | 0.75 | 2.0 | 4.5 | 0.4 | 1    | TWX16R-KC |
| CTP45 1600R-L075 | 147552   | 197.92   | 0.87 | 0.75 | 2.4 | 8.0 | 0.4 | 1    |           |
| CTP45 2200R-S050 | 147930   | 275.58   | 1.14 | 0.50 | 1.6 | 3.5 | 0.6 | 2    |           |
| CTP45 2200R-S100 | 147931   | 231.81   | 1.14 | 1.00 | 2.0 | 4.5 | 0.6 | 1    | TWX22R-KC |
| CTP45 2200R-L100 | 147932   | 232.45   | 1.14 | 1.00 | 2.4 | 8.0 | 0.6 | 1    |           |

### Available Insert

| TWX   | Designation            |
|---|------------------------|
|  | TWX16R-KC<br>TWX22R-KC |

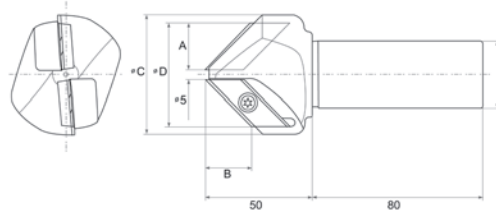
### Parts

| Screw  | Wrench  |
|--|---|
|  |  |
| FTNA0408 146948 \$ 9.04  | TW15L 148225 \$ 3.39  |

## Indexable Chamfer Tool



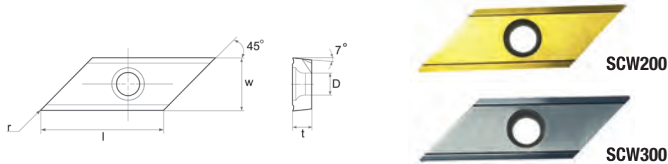
- Designed for large chamfers and countersinking
- 1" shank



| Model No.      | Angle | Dia. Range (mm) | A (mm) | B (mm) | ØC (mm) | ØD (mm) | d (mm) | Inserts | Code No. | Price \$ |
|----------------|-------|-----------------|--------|--------|---------|---------|--------|---------|----------|----------|
| CSC05031R-41-A | 82°   | 6-42.9          | 19.0   | 21.8   | 56      | 42.9    | 25.4   | 2       | 149096   | 589.06   |
| CSC05031R-45-A | 90°   | 6-46.9          | 21.0   | 21.0   | 56      | 46.9    | 25.4   | 2       | 149097   | 589.06   |

### Insert

- SCW200 - TiN coated carbide grade for heavier duty applications  
 SCW300 - TiAlN coated carbide for higher speed applications



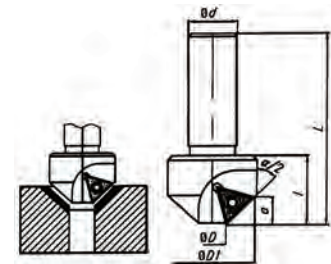
| Model No.            | l (mm) | w (mm) | t (mm) | D (mm) | r (mm) | Code No. | Price \$ |
|----------------------|--------|--------|--------|--------|--------|----------|----------|
| XCET310404 ER SCW200 | 22.0   | 12.70  | 4.50   | 5.60   | 0.4    | 149094   | 118.73   |
| XCET310404 ER SCW300 | 22.0   | 12.70  | 4.50   | 5.60   | 0.4    | 149095   | 127.85   |

# Indexable Cutting Tools

## Indexable Countersink End Mills



45°, 60°, 82° and 90°,  
RH Cut with Weldon Shank



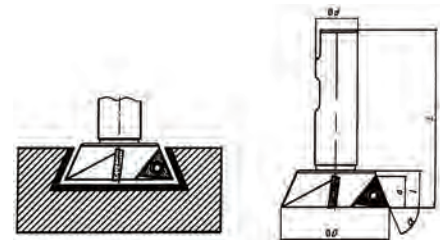
| Cutter Body |          | Shank Dia. Ød | a     | l     | L     | Angle | No. of Inserts | Insert Style | Cutter Code No. | Cutter Price \$ | Locking Screw Code No. | Locking Screw Price \$ | Torx Key Code No. | Torx Key Price \$ |
|-------------|----------|---------------|-------|-------|-------|-------|----------------|--------------|-----------------|-----------------|------------------------|------------------------|-------------------|-------------------|
| ØD Min.     | ØD1 Max. |               |       |       |       |       |                |              |                 |                 |                        |                        |                   |                   |
| 1/2         | 31/32    | 1/2           | 0.559 | 1     | 2-1/2 | 45°   | 1              | TDGW-321     | 143768          | <b>163.26</b>   | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 3/4         | 1-15/64  | 3/4           | 0.559 | 1-1/4 | 3-1/2 | 45°   | 1              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 1/4         | 21/32    | 3/8           | 0.335 | 1     | 2-1/4 | 60°   | 1              | TDGW-21.51   | -               | -               | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 1/2         | 1-1/8    | 1/2           | 0.524 | 1     | 2-1/2 | 60°   | 1              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 3/4         | 1-3/8    | 3/4           | 0.524 | 1-1/4 | 3-1/2 | 60°   | 3              | TDGW-321     | 143776          | <b>294.13</b>   | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 1/4         | 51/64    | 3/8           | 0.291 | 1     | 2-1/4 | 82°   | 1              | TDGW-21.51   | -               | -               | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 1/2         | 1-11/32  | 1/2           | 0.453 | 1     | 2-1/2 | 82°   | 1              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 3/4         | 1-9/16   | 3/4           | 0.453 | 1-1/4 | 3-1/2 | 82°   | 3              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 1/4         | 53/64    | 3/8           | 0.272 | 1     | 2-1/4 | 90°   | 1              | TDGW-21.51   | -               | -               | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 1/2         | 1-25/64  | 1/2           | 0.425 | 1     | 2-1/2 | 90°   | 1              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 3/4         | 1-41/64  | 3/4           | 0.425 | 1-1/4 | 3-1/2 | 90°   | 3              | TDGW-321     | -               | -               | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |

► P.E103

## 60° Indexable Dovetail Milling Cutter



RH Cut with Weldon Shank  
Note: Cutters are furnished without inserts.



| Cutting Dia. ØD | Shank Dia. Ød | Cutting Length a | l     | Overall Length L | No. of Inserts | Insert Style | Locking Screw Code No. | Locking Screw Price \$ | Torx Key Code No. | Torx Key Price \$ |
|-----------------|---------------|------------------|-------|------------------|----------------|--------------|------------------------|------------------------|-------------------|-------------------|
| 1/2             | 3/8           | 0.325            | 0.142 | 2.300            | 1              | TDGW-21.5    | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 3/4             | 3/8           | 0.325            | 0.202 | 2.390            | 2              | TDGW-21.5    | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 1               | 1/2           | 0.325            | 0.375 | 2-5/8            | 3              | TDGW-21.5    | 143790                 | <b>39.74</b>           | 143792            | <b>13.44</b>      |
| 1-3/8           | 5/8           | 0.510            | 0.550 | 2.862            | 3              | TDGW-32      | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 1-7/8           | 7/8           | 0.510            | 0.550 | 3                | 3              | TDGW-32      | 143762                 | <b>2.12</b>            | 143752            | <b>14.57</b>      |
| 2-1/4           | 1             | 0.700            | 0.750 | 3-1/2            | 3              | TDGW-43      | -                      | -                      | 143752            | <b>14.57</b>      |

► P.E103

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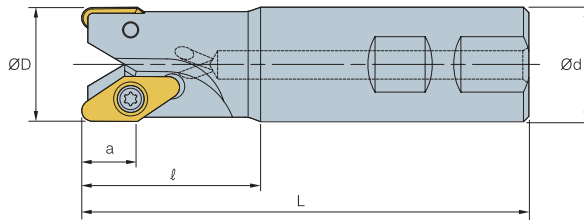
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## Alumi Mill End Mill



- High rake angle ensures excellent finish and reduces cutting resistance
- For shouldering, curved surface, and slanted shouldering
- Buffed mirror finish of inserts allows outstanding chip control and prevents edge build up



(inch)

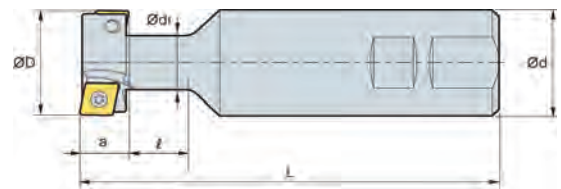
| Designation | Code No. | Price \$ | ØD    | Ød    | a     | l     | L     | No. of Inserts | Insert          |
|-------------|----------|----------|-------|-------|-------|-------|-------|----------------|-----------------|
| AME 2050HR  | 146887   | 400.47   | 0.500 | 0.625 | 0.315 | 0.984 | 3.346 | 1              | VDKT 11T210N-MA |
| AME 4125HR  | -        | -        | 1.250 | 1.250 | 0.590 | 1.969 | 4.921 | 2              | VCKT 43.57.5N-A |
| AME 4150HR  | -        | -        | 1.500 | 1.250 | 0.590 | 1.969 | 5.512 | 3              |                 |

## Inserts / Parts

| Designation     | Available Insert | Screw      | Wrench          |
|-----------------|------------------|------------|-----------------|
|                 |                  |            |                 |
| AME 2050 & 2062 | VDKT 11T210N-MA  | ETNA 02505 | 147870 \$ 16.11 |
| AME 2075 -2150  |                  | ETNA 02506 | 147596 \$ 14.70 |
| AME 4000 type   | VCKT 43.57.5N-A  | FTNC 04509 | 146752 \$ 8.72  |

➤ P.E104

## TSC



(inch)

| Designation | Code No. | Price \$ | ØD   | Ød   | Ød <sub>1</sub> | a    | l    | L    | No. of Inserts | Insert       |
|-------------|----------|----------|------|------|-----------------|------|------|------|----------------|--------------|
| TSC 083100R | 147892   | 663.57   | 0.83 | 1.00 | 0.41            | 0.35 | 0.79 | 4.25 | 2              | CPMT060204-M |
| TSC 098100R | 147925   | 764.39   | 0.98 | 1.00 | 0.49            | 0.43 | 0.83 | 4.50 | 2              | CPMT080308-M |
| TSC 126125R | 147973   | 812.17   | 1.26 | 1.25 | 0.65            | 0.55 | 1.02 | 5.00 | 2              | CPMT09T308-M |
| TSC 157125R | 147982   | 942.78   | 1.57 | 1.25 | 0.81            | 0.71 | 1.26 | 5.25 | 2              |              |
| TSC 197125R | 147985   | 1,249.67 | 1.97 | 1.25 | 1.00            | 1.30 | 1.50 | 5.50 | 4              | CPMH432-M    |

AA:0°, AR:5°, RR:-5°

## Parts

| Designation  | Insert | Screw     | Wrench          |
|--------------|--------|-----------|-----------------|
|              |        |           |                 |
| CPMT 083100R | CPMT   | FTNA02555 | 147769 \$ 9.23  |
| CPMT 098100R |        | FTNA0306  | 145548 \$ 9.23  |
| CPMT 126125R |        | FTNA0407  | 148006 \$ 11.38 |
| CPMT 157125R |        | PTMA0511A | 147235 \$ 13.52 |
| CPMH 197125R | CPMH   | PTMA0511A | 147235 \$ 13.52 |

➤ P.E94



## Alumi Mill Face Mill

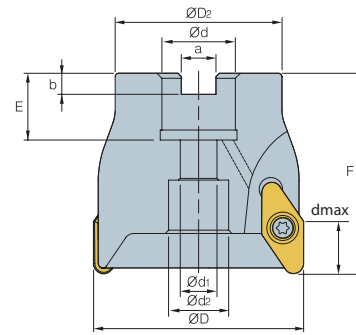


Coolant through

- High rake angle ensures excellent finish and reduces cutting resistance
- For shouldering, curved surface, and slanted shouldering
- Buffed mirror finish of inserts allows outstanding chip control and prevents edge build up

Kits Also Available

► P. E180



(inch)

| Designation | Code No. | Price \$ | ØD    | Ød    | ØD <sub>2</sub> | a     | b     | E     | F     | dmax | No. of Inserts |
|-------------|----------|----------|-------|-------|-----------------|-------|-------|-------|-------|------|----------------|
| AMFM 4150R  | 147833   | 687.25   | 1.500 | 0.500 | 1.417           | 0.252 | 0.169 | 0.630 | 2.165 | 0.59 | 3              |
| 4200R       | 147424   | 698.15   | 2.000 | 0.750 | 1.772           | 0.321 | 0.220 | 0.787 | 2.165 | 0.59 | 3              |
| 4250R       | 147834   | 857.21   | 2.500 | 0.750 | 1.970           | 0.321 | 0.220 | 0.787 | 2.362 | 0.59 | 4              |
| 4300R       | 147470   | 901.91   | 3.000 | 1.000 | 2.205           | 0.384 | 0.248 | 0.866 | 2.362 | 0.59 | 4              |
| 4400R       | 147471   | 1,005.18 | 4.000 | 1.250 | 2.874           | 0.510 | 0.319 | 1.260 | 2.362 | 0.59 | 5              |

### Inserts / Parts

| Designation |                     | Available Insert | Screw       |                | Wrench    |                |
|-------------|---------------------|------------------|-------------|----------------|-----------|----------------|
|             |                     |                  |             |                |           |                |
| AMFM        | 4150<br>4200 - 4400 | VCKT 43.57.5N-MA | *FTNC04509  | 146752 \$ 8.72 | FTNC04511 | 146424 \$ 8.76 |
|             |                     | ► P. E104        | * For 4150R |                |           |                |

### Recommended Cutting Condition

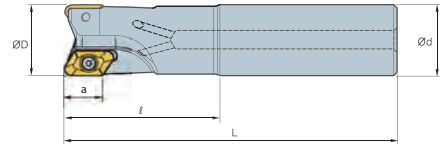
| Workpiece | Cutting Condition |             | Grade             |
|-----------|-------------------|-------------|-------------------|
|           | V(sfm)            | f(ipf)      |                   |
| P         |                   |             |                   |
| M         |                   |             |                   |
| K         | Aluminum 750~2000 | 0.002~0.010 | Uncoated (KTM10U) |

## Alumi Mill-X End Mill



Coolant through

- Multi-dimensional clamping face prevents micro-vibrations during high speed machining
- Buffed mirror finish of inserts allows outstanding chip control and prevents edge build up
- Multi-functional aluminum milling tool: Shouldering, Slotting, Helical Ramping, and Copying



(inch)

| Designation    | Code No. | Price \$ | ØD   | Ød   | a     | l     | L     | No. of Inserts | Insert    |
|----------------|----------|----------|------|------|-------|-------|-------|----------------|-----------|
| AME-X 5100HR-A | 146411   | 517.49   | 1.00 | 1.00 | 0.669 | 2.362 | 5.512 | 2              | XEKT 19M5 |
| AME-X 5100HR-B | 146413   | 517.49   | 1.00 | 1.00 | 0.669 | 2.362 | 5.512 | 2              |           |
| AME-X 5125HR-A | 146419   | 552.08   | 1.25 | 1.25 | 0.669 | 2.756 | 5.901 | 2              |           |
| AME-X 5125HR-B | 146423   | 552.08   | 1.25 | 1.25 | 0.669 | 2.756 | 5.901 | 2              |           |
| AME-X 5150HR-A | 146431   | 749.75   | 1.50 | 1.50 | 0.669 | 2.756 | 6.229 | 3              |           |
| AME-X 5150HR-B | 146432   | 749.75   | 1.50 | 1.50 | 0.669 | 2.756 | 6.229 | 3              |           |

\* Type A: Insert Nose R 1/64"~1/8" Type B: Insert Nose R 0.157"~0.197

### Inserts / Parts

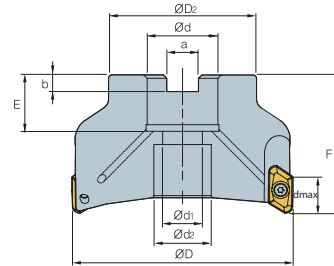
| Designation              | Available Insert                                       | Screw                        | Wrench                   |
|--------------------------|--|------------------------------|--------------------------|
|                          |  |                              |                          |
| AME-X HR-A<br>AME-X HR-B | XEKT 19M50 to 19M53<br>XEKT 19M54 to 19M55<br>▶ P.E105 | PTKA 0408<br>148716 \$ 10.16 | TW15S<br>146801 \$ 47.64 |

## Alumi Mill-X Face Mill



Coolant through

- Multi-dimensional clamping face prevents micro-vibrations during high speed machining
- Buffed mirror finish of inserts allows outstanding chip control and prevents edge build up
- Multi-functional aluminum milling tool: Shouldering, Slotting, Helical Ramping, and Copying



(inch)

| Designation     | Code No. | Price \$ | ØD   | Ød   | ØD2   | a     | b     | E     | F    | dmax | No. of Inserts |
|-----------------|----------|----------|------|------|-------|-------|-------|-------|------|------|----------------|
| AMFM-X 5150HR-A | 146434   | 713.92   | 1.50 | 0.50 | 1.417 | 0.252 | 0.169 | 0.630 | 1.50 | 0.67 | 3              |
| AMFM-X 5150HR-B | 146445   | 713.92   | 1.50 | 0.50 | 1.417 | 0.252 | 0.169 | 0.630 | 1.50 | 0.67 | 3              |
| AMFM-X 5200HR-A | 146467   | 836.76   | 2.00 | 0.75 | 1.772 | 0.321 | 0.220 | 0.787 | 1.75 | 0.67 | 4              |
| AMFM-X 5200HR-B | 146469   | 761.40   | 2.00 | 0.75 | 1.772 | 0.321 | 0.220 | 0.787 | 1.75 | 0.67 | 4              |
| AMFM-X 5250HR-A | 146481   | 852.43   | 2.50 | 0.75 | 1.772 | 0.321 | 0.220 | 0.787 | 1.75 | 0.67 | 5              |
| AMFM-X 5250HR-B | 146490   | 852.43   | 2.50 | 0.75 | 1.772 | 0.321 | 0.220 | 0.787 | 1.75 | 0.67 | 5              |
| AMFM-X 5300HR-A | 146525   | 884.47   | 3.00 | 1.00 | 2.205 | 0.384 | 0.248 | 0.866 | 2.00 | 0.67 | 5              |
| AMFM-X 5300HR-B | 146526   | 884.47   | 3.00 | 1.00 | 2.205 | 0.384 | 0.248 | 0.866 | 2.00 | 0.67 | 5              |
| AMFM-X 5400HR-A | 146534   | 1,008.25 | 4.00 | 1.50 | 3.386 | 0.636 | 0.394 | 1.181 | 2.50 | 0.67 | 6              |
| AMFM-X 5400HR-B | 146535   | 1,008.25 | 4.00 | 1.50 | 3.386 | 0.636 | 0.394 | 1.181 | 2.50 | 0.67 | 6              |
| AMFM-X 5500HR-A | 146544   | 1,302.55 | 5.00 | 1.50 | 3.386 | 0.636 | 0.394 | 1.181 | 2.50 | 0.67 | 7              |
| AMFM-X 5500HR-B | 146550   | 1,302.55 | 5.00 | 1.50 | 3.386 | 0.636 | 0.394 | 1.181 | 2.50 | 0.67 | 7              |

\* Type A: Insert Nose R 1/64"~1/8" Type B: Insert Nose R 0.157"~0.197

### Inserts / Parts

| Designation                | Available Insert                                       | Screw                        | Wrench                   |
|----------------------------|--|------------------------------|--------------------------|
|                            |  |                              |                          |
| AMFM-X HR-A<br>AMFM-X HR-B | XEKT 19M50 to 19M53<br>XEKT 19M54 to 19M55<br>▶ P.E105 | PTKA 0408<br>148716 \$ 10.16 | TW15S<br>146801 \$ 47.64 |





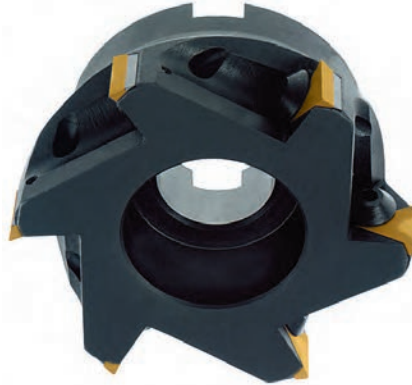
## Square Shoulder Milling Cutters 90°

### Positive Rake 90° Right Hand Cut

**Note:** Square shoulder milling cutters are furnished without cutting inserts. Precision and utility inserts can be used.

#### Tool Angles

- Cutting rake 0°
- Setting angle 90°
- Axial rake 0°



| Cutting Dia. | Shank Arbor Hole | No. of Inserts | Insert | Code No. | Price \$ |
|--------------|------------------|----------------|--------|----------|----------|
| 2            | 3/4              | 3              | TPG    | 141220   | 703.95   |
| 2-1/2        | 1                | 3              | TPU 43 | 141200   | 1,027.14 |
| 3            | 1                | 4              | TPU 43 | 141202   | 1,475.35 |
| 4            | 1-1/2            | 5              | TPU 43 | 141204   | 1,746.16 |
| 5            | 1-1/2            | 6              | TPU 43 | 141206   | 2,379.89 |
| 6            | 2                | 7              | TPU 43 | 141208   | 3,341.91 |

► P.E104

### Spare Parts

| Cutting Dia. | For 2" Cutters |          | For 2-1/2" to 6" Cutters |          |
|--------------|----------------|----------|--------------------------|----------|
|              | Code No.       | Price \$ | Code No.                 | Price \$ |
| Clamp Screw  | 141061         | 19.18    | 141210                   | 41.05    |
| Shim         | -              | -        | 141212                   | 14.74    |
| Shim Screw   | -              | -        | 141214                   | 15.02    |
| Hex Key      | -              | -        | -                        | -        |

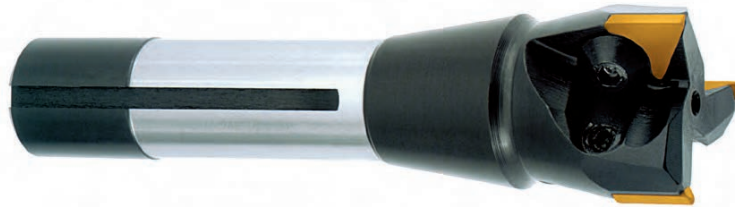
## Carbide Insert End Mills 90°

**Note:** Insert End Mills are furnished without cutting inserts. Precision and utility inserts can be used.



#### Tool Angles

- Cutting rake 0°
- Setting angle 90°
- Axial rake 0°



| Cutting Dia. | Shank                 | No. of Inserts | Insert         | Code No. | Price \$ |
|--------------|-----------------------|----------------|----------------|----------|----------|
| 1/2          | 1/2" Str. Shk. Weldon | 1              | TPG/TPU-21     | 141000   | 279.43   |
| 3/4          | 3/4" Str. Shk. Weldon | 2              | TPG/TPU-21     | 141002   | 269.17   |
| 1            | 3/4" Str. Shk. Weldon | 2              | TPG/TPU-22     | 141003   | 332.03   |
| 1-1/4        | 3/4" Str. Shk. Weldon | 2              | TPG/TPU/TPC-32 | 141004   | 454.47   |
| 1-1/2        | 3/4" Str. Shk. Weldon | 3              | TPG/TPU/TPC-32 | 141005   | 603.01   |
| 1-3/4        | 3/4" Str. Shk. Weldon | 3              | TPG/TPU/TPC-32 | 141006   | 324.59   |
| 2            | 3/4" Str. Shk. Weldon | 3              | TPG/TPU/TPC-32 | 141007   | 760.68   |
| 1            | 1" Str. Shk. Weldon   | 2              | TPG/TPU-22     | 141008   | 248.51   |
| 1-1/4        | 1" Str. Shk. Weldon   | 2              | TPG/TPU/TPC-32 | 141009   | 275.49   |
| 1-1/2        | 1" Str. Shk. Weldon   | 3              | TPG/TPU/TPC-32 | 141010   | 555.60   |
| 2            | 1" Str. Shk. Weldon   | 3              | TPG/TPU/TPC-32 | 141012   | 730.72   |
| 1-1/4        | R-8 Bridgeport        | 2              | TPG/TPU/TPC-32 | 141013   | 556.28   |
| 1-1/2        | R-8 Bridgeport        | 3              | TPG/TPU/TPC-32 | 141014   | 671.78   |
| 1-3/4        | R-8 Bridgeport        | 3              | TPG/TPU/TPC-32 | 141015   | 695.12   |
| 2            | R-8 Bridgeport        | 3              | TPG/TPU/TPC-32 | 141016   | 864.38   |

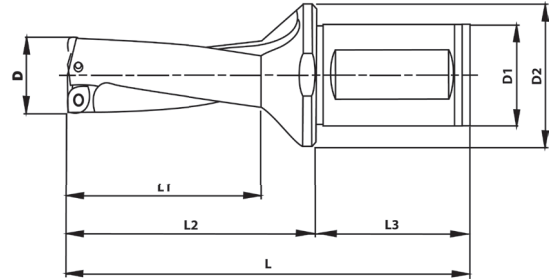
► P.E104

### Spare Parts

| Description              | Code No. | Price \$ |
|--------------------------|----------|----------|
| Screw for 1/2"           | 141244   | 28.36    |
| Screw for 3/4", 7/8", 1" | 141060   | 18.18    |
| Screw for 1-1/2"         | 141064   | 15.93    |
| All other sizes          | 141061   | 19.18    |

## Pro SP/NP Drill (3XD)

- Strong shank and excellent design optimizes the performance of hole-making
- Special abrasive wear resistant surface treatment protects the shank from machined chips, increasing tool life
- Strengthened drill body provides better performance even in difficult cutting conditions
- Specially designed flute guarantees excellent chip evacuation and long durability



(inch)

| Designation    | Code No.       | Price \$ | D        | D1    | D2   | L     | L1   | L2   | L3   | Insert      | Screw          | Wrench      |          |
|----------------|----------------|----------|----------|-------|------|-------|------|------|------|-------------|----------------|-------------|----------|
| PRO-SP         | 0500 - 1/2     | 147894   | 790.95   | 0.500 | 0.75 | -     | 4.14 | 1.50 | 1.97 | 2.17        | SPMT 050203-MD | FTNA 0204   | TW06P    |
|                | 0531 - 17/32   | 147895   | 719.67   | 0.531 | 0.75 | -     | 4.23 | 1.59 | 1.97 | 2.26        |                | 148207      | 147222   |
|                | 0562 - 9/16    | 147896   | 719.67   | 0.562 | 0.75 | -     | 4.36 | 1.69 | 1.97 | 2.39        | \$ 14.24       | \$ 15.21    |          |
|                | 0625 - 5/8     | 147897   | 790.95   | 0.625 | 1.00 | -     | 4.59 | 1.88 | 1.97 | 2.62        | SPMT 060204-MD | FTKA 02206S | TW07S    |
|                | 0687 - 11/16   | 147898   | 719.67   | 0.687 | 1.00 | 1.40  | 5.01 | 2.07 | 2.20 | 2.81        |                | 148208      |          |
|                | 0750 - 3/4     | 147899   | 790.95   | 0.750 | 1.00 | 1.40  | 5.24 | 2.25 | 2.20 | 3.04        | SPMT 070204-MD | FTKA 02565  | \$ 43.35 |
|                | 0812 - 13/16   | 147900   | 828.24   | 0.812 | 1.00 | 1.40  | 5.50 | 2.44 | 2.20 | 3.30        |                | 146930      |          |
|                | 0875 - 7/8     | 147901   | 910.22   | 0.875 | 1.00 | 1.40  | 5.69 | 2.63 | 2.20 | 3.49        | NPMT 222408-00 | \$ 14.61    |          |
| PRO-NP         | 0937 - 15/16   | 147902   | 828.23   | 0.937 | 1.25 | 1.80  | 6.12 | 2.81 | 2.36 | 3.76        | NPMT 252808-00 | FTKA 0307   | TW15S    |
|                | 1000 - 1"      | 147903   | 985.51   | 1.000 | 1.25 | 1.80  | 6.34 | 3.00 | 2.36 | 3.98        |                | 148210      |          |
|                | 1031 - 1-1/32  | 147904   | 896.76   | 1.031 | 1.25 | 1.80  | 6.44 | 3.09 | 2.36 | 4.08        | NPMT 293208-00 | \$ 16.02    | \$ 47.64 |
|                | 1062 - 1-1/16  | 147905   | 896.76   | 1.062 | 1.25 | 1.80  | 6.53 | 3.19 | 2.36 | 4.17        |                |             |          |
|                | 1125 - 1-1/8   | 147906   | 985.51   | 1.125 | 1.25 | 1.80  | 6.80 | 3.38 | 2.36 | 4.44        | NPMT 334008-00 | FTKA 03508  | TW15S    |
|                | 1187 - 1-3/16  | 147907   | 896.76   | 1.187 | 1.25 | 1.80  | 7.06 | 3.56 | 2.36 | 4.70        |                | 148212      |          |
|                | 1250 - 1-1/4   | 147908   | 1,012.16 | 1.250 | 1.25 | 1.80  | 7.25 | 3.75 | 2.36 | 4.89        | NPMT 415008    | \$ 14.58    | \$ 47.64 |
|                | 1312 - 1-5/16  | 147909   | 1,012.16 | 1.312 | 1.50 | 2.00  | 7.92 | 3.94 | 2.76 | 5.16        |                |             |          |
|                | 1375 - 1-3/8   | 147910   | 1,112.34 | 1.375 | 1.50 | 2.00  | 8.17 | 4.16 | 2.76 | 5.41        | NPMT 415008    | FTKA 0410   | TW15S    |
|                | 1500 - 1-1/2   | 147912   | 1,067.11 | 1.500 | 1.50 | 2.00  | 8.60 | 4.50 | 2.76 | 5.84        |                | 146969      |          |
|                | 1562 - 1-9/16  | 147913   | 1,067.11 | 1.562 | 1.50 | 2.00  | 8.78 | 4.69 | 2.76 | 6.02        | NPMT 415008    | \$ 12.90    | \$ 47.64 |
|                | 1625 - 1-5/8   | 147914   | 1,146.56 | 1.625 | 1.50 | 2.00  | 9.09 | 4.88 | 2.76 | 6.33        |                |             |          |
|                | 1687 - 1-11/16 | 147915   | 1,146.56 | 1.687 | 1.50 | 2.00  | 9.32 | 5.06 | 2.76 | 6.56        | NPMT 415008    | FTKA 0410   | TW15S    |
|                | 1750 - 1-3/4   | 147916   | 1,146.56 | 1.750 | 1.50 | 2.00  | 9.51 | 5.25 | 2.76 | 6.75        |                | 146969      |          |
| 1812 - 1-13/16 | 147917         | 1,213.14 | 1.812    | 1.50  | 2.00 | 9.73  | 5.44 | 2.76 | 6.97 | NPMT 415008 | \$ 12.90       | \$ 47.64    |          |
| 1875 - 1-7/8   | 147918         | 1,213.14 | 1.875    | 1.50  | 2.00 | 9.96  | 5.63 | 2.76 | 7.20 |             |                |             |          |
| 1937 - 1-15/16 | 147919         | 1,213.14 | 1.937    | 1.50  | 2.00 | 10.22 | 5.81 | 2.76 | 7.46 | NPMT 415008 | FTKA 0410      | TW15S       |          |
| 2000 - 2"      | 147920         | 1,213.14 | 2.000    | 1.50  | 2.60 | 10.41 | 6.00 | 2.76 | 7.65 |             | 146969         |             | 146801   |

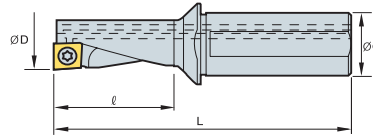
➤ P. E95-96

### Recommended Cutting Condition

| Workpiece            | Cutting Condition |             |
|----------------------|-------------------|-------------|
|                      | V(sfm)            | f(ipr)      |
| P                    | 250~720           | 0.004~0.010 |
| M<br>Stainless Steel | 120~500           | 0.004~0.008 |
| K                    | 250~750           | 0.004~0.016 |



## Combo Turning & Drilling Tool



### Features

- Double coolant system
- Excellent chip evacuation and tool life
- Ideal flute design minimizing stress concentrations

### Uses

- External/Internal turning
- Facing
- Drilling

(inch)

| Designation  | Code No. | Price \$ | ØD    | Ød    | ℓ     | L     | Insert         |
|--------------|----------|----------|-------|-------|-------|-------|----------------|
| CTD10R-2.25D | 147993   | 510.16   | 0.394 | 0.472 | 0.886 | 2.736 | QCMT 050204-CM |
| CTD12R-2.25D | 147243   | 525.91   | 0.472 | 0.630 | 1.063 | 1.890 | QCMT 060204-CM |
| CTD14R-2.25D | 147698   | 536.67   | 0.551 | 0.630 | 1.240 | 3.287 | QCMT 070304-CM |
| CTD16R-2.25D | 147008   | 547.61   | 0.630 | 0.787 | 1.417 | 3.701 | QCMT 080304-CM |
| CTD20R-2.25D | 147061   | 644.25   | 0.787 | 0.984 | 1.772 | 4.370 | QCMT 10T304-CM |

### Available Insert

| QCMT-CM | Tool Designation | Insert         |            |        |          |       |        |          |
|---------|------------------|----------------|------------|--------|----------|-------|--------|----------|
|         |                  | Designation    | Screw      |        | Wrench   |       |        |          |
|         | CTD10R-2.25D     | QCMT 050204-CM | FTNA0204S  | 147736 | \$ 13.17 | TW06P | 147222 | \$ 15.21 |
|         | CTD12R-2.25D     | QCMT 060204-CM | FTNA02205S | 147756 | \$ 14.12 | TW06P | 147222 | \$ 15.21 |
|         | CTD14R-2.25D     | QCMT 070304-CM | FTNA02555  | 147769 | \$ 9.23  | TW07P | 146939 | \$ 16.73 |
|         | CTD16R-2.25D     | QCMT 080304-CM | FTNA0306   | 145548 | \$ 9.23  | TW09P | 146951 | \$ 16.73 |
|         | CTD20R-2.25D     | QCMT 10T304-CM | FTNA03508  | 147771 | \$ 10.15 | TW15P | 146940 | \$ 17.45 |

➤ P.E97



Store and organize all your Indexables in a chest that is just the right size for you and your shop.

Find them in Chapter L

## NC Spot Drills

**NC Spot Drill with indexable carbide insert.**  
**High efficiency! Low cost!**  
**CNC lathes, CNC turning centres, and machining centres.**

### Features

- Spotting produces better hole position and geometrically uniform holes
- Available in a variety of shank diameters
- One tool will perform multiple applications
- Long tool life
- Each insert has 2 cutting or 4 cutting edges
- Suitable for spotting, chamfering, grooving, and engraving
- 45°, 60°, 82°, 90°, 100°, 120°, 142° angle for different applications
- Increase cutting speed with coated carbide inserts



- a Engraving
- b Spotting
- c Chamfering
- d Grooving

## Inserts

- NC10**
- High positive angle and fully ground cutting edge and relief angle
  - Universal grade for non-ferrous metal, cast iron, and stainless steel
- NC40**
- General purpose, universal grade for all unhardened steel
  - Fully ground cutting edge and relief angle
- NC60**
- Cermet insert, for hardened steel up to 56HRC
  - Reduces heat and low tool wearing at the cutting edge

- NC9076**
- High positive geometry and sharp edge
  - For non-ferrous material such as aluminum, titanium, brass, copper, and long cutting chip metal
  - Produces excellent surface finish on non-ferrous metal
- NC2071**
- Universal grade for all unhardened steel, free cutting steel and tool steel up to 750N/mm<sup>2</sup>
  - Cutting geometry has been designed to optimize the tool's performance and to use in high speed machining

| Grade  | Coating | P     | M               | K         | N           | H                    | S        |
|--------|---------|-------|-----------------|-----------|-------------|----------------------|----------|
|        |         | Steel | Stainless Steel | Cast Iron | Non-Ferrous | Hardened Up to 56HRC | Titanium |
| NC10   | TiAlN   | •••   | •••             | •••       | ••          |                      |          |
| NC40   | TiN     | •••   | •               | ••        | ••          |                      |          |
| NC2071 | TiN     | •••   | ••              | •         | ••          |                      |          |
| NC9076 | DLC     |       | ••              |           | •••         |                      | ••       |
| NC60   | Cermet  | ••    |                 |           |             | •••                  |          |

••• Best    •• Suited    • Possible

## 90° NC Spot Drills

### Mini Spotting Drill — N9MT05T1 Insert




Insert not included

- Smallest indexable spotting drill holder
- Single cutting edge design gives higher precision when spotting
- Applications:
  - Spotting, engraving, and chamfering on milling machines, machining centres
  - Spotting, facing on CNC lathes



| Shank | Model No.     | Length | Insert           | Max Depth | Max Dia. | Application | Code No. | Price \$ |
|-------|---------------|--------|------------------|-----------|----------|-------------|----------|----------|
| 6mm   | 00-99616-06-6 | 35mm   | N9MT05T1CT-N2071 | 2.8mm     | 6mm      | Universal   | 612514   | 92.00    |

### Available Insert

| Insert  | Coating | Cutting Edges | Application | Code No. | Price \$ |
|---|---------|---------------|-------------|----------|----------|
|  | TiN     | 2             | Universal   | 612516   | 39.67    |

# Indexable Cutting Tools

## 90° NC Spot Drills

### NC Spotting Drill — N9MT0802 Inserts



- Single cutting edge design gives higher precision when spotting
- Applications:
  - Spotting, engraving, grooving, and chamfering on milling machines, machine centres
  - Spotting, facing, on CNC lathes



Insert not included

| Shank | Model No.       | Length | Insert   | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|-----------------|--------|----------|-----------|----------|----------|----------|
| 3/8"  | 00-99616-10-3/8 | 90mm   | N9MT0802 | 4.5mm     | 10mm     | 612518   | 101.00   |

#### Available Inserts



| Insert                | Coating | Cutting Edges | Application                       | Code No. | Price \$ |
|-----------------------|---------|---------------|-----------------------------------|----------|----------|
| N9MT080208CT-NC40     | TiN     | 4             | Unhardened Steel                  | 612036   | 38.00    |
| N9MT080204CT-NC40     | TiN     | 4             | Unhardened Steel                  | 612520   | 34.00    |
| N9MT080204CT-NC10     | TiAlN   | 4             | Non-Ferrous, Cast Iron, Stainless | 612034   | 38.00    |
| N9MT0802CT2T-H-NC40   | TiN     | 2             | Universal                         | 612038   | 36.00    |
| N9MT0802CT2T-H-NC9076 | DLC     | 2             | Non-Ferrous                       | 612522   | 43.00    |

#### Single Sets

User friendly, each set is fitted with one complimentary insert.

| Model               | Shank | Insert            | Code No. | Price \$ |
|---------------------|-------|-------------------|----------|----------|
| 00-99616-10-3/8-02S | 3/8"  | N9MT080208CT-NC40 | 612084   | 127.00   |

#### Starter Packages

Selected package for starter who wants to try NC Spot Drill

- Includes 6 inserts, 1 toolholder, and 1 key

| Model           | Shank | Insert            | Code No. | Price \$ |
|-----------------|-------|-------------------|----------|----------|
| 00-99616-10-IN6 | 3/8"  | N9MT080204CT-NC40 | 612524   | 319.00   |

### NC Spotting Drill — N9MT11T3 Inserts



- Single cutting edge design gives higher precision when spotting
- Applications:
  - Spotting, engraving, grooving, and chamfering on milling machines, machine centres
  - Spotting, facing, on CNC lathes



Insert not included

| Shank | Model No.        | Length | Insert   | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|------------------|--------|----------|-----------|----------|----------|----------|
| 16mm  | 00-99616-14-150L | 150mm  | N9MT11T3 | 7mm       | 14mm     | 612526   | 179.00   |
| 1/2"  | 00-99616-14-1/2  | 100mm  | N9MT11T3 | 7mm       | 14mm     | 612528   | 101.00   |
| 5/8"  | 00-99616-14-5/8  | 100mm  | N9MT11T3 | 7mm       | 14mm     | 612530   | 101.00   |

#### Available Inserts



| Insert              | Coating | Cutting Edges | Application                       | Code No. | Price \$ |
|---------------------|---------|---------------|-----------------------------------|----------|----------|
| N9MT11T3CT2T-NC40   | TiN     | 4             | Unhardened Steel                  | 612040   | 36.00    |
| N9MT11T3CT2T-NC10   | TiAlN   | 4             | Non-Ferrous, Cast Iron, Stainless | 612042   | 36.00    |
| N9MT11T3CT-NC60     | Cermet  | 4             | Hardened Steel Up To 56HRC        | 612044   | 46.00    |
| N9MT11T3CT-H-NC40   | TiN     | 2             | -                                 | -        | -        |
| N9MT11T3CT-H-NC9076 | DLC     | 2             | Non-Ferrous                       | 612534   | 41.00    |

#### Single Sets

User friendly, each set is fitted with one complimentary insert.

| Model                 | Shank | Insert          | Code No. | Price \$ |
|-----------------------|-------|-----------------|----------|----------|
| 00-99616-14-5/8-02S   | 5/8"  | N9MT11T3CT-NC40 | 612010   | 132.00   |
| 00-99616-14-5/8-02SAL | 5/8"  | N9MT11T3CT-NC10 | 612536   | 138.27   |

#### Starter Packages

Selected package for starter who wants to try NC Spot Drill

- Includes 6 inserts, 1 toolholder, and 1 key

| Model             | Shank | Insert          | Code No. | Price \$ |
|-------------------|-------|-----------------|----------|----------|
| 00-99616-14-IN6   | 5/8"  | N9MT11T3CT-NC40 | 612058   | 319.00   |
| 00-99616-14-IN6AL | 5/8"  | N9MT11T3CT-NC10 | 612060   | 319.00   |

## 82° NC Spot Drills

### NC Spotting Drill — V0820802/V08212T3 Inserts



- Single cutting edge design gives higher precision when spotting
- Applications:
  - Spotting, engraving, grooving, and chamfering on milling machines, machine centres
  - Spotting, facing, on CNC lathes



Insert not included

| Shank | Model No.         | Length | Insert   | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|-------------------|--------|----------|-----------|----------|----------|----------|
| 3/8"  | 00-99619-V082-3/8 | 90mm   | V0820802 | 4.8mm     | 9mm      | 612538   | 101.00   |
| 5/8"  | 00-99619-V082-5/8 | 100mm  | V08212T3 | 7.5mm     | 14mm     | 612151   | 98.00    |

#### Available Inserts

- Match the geometry of American standard flat head screw hole
- Special geometry with supporting edges for use in high speed machining



| Insert          | Coating | Cutting Edges | Application | Code No. | Price \$ |
|-----------------|---------|---------------|-------------|----------|----------|
| V0820802-NC2071 | TiN     | 2             | Universal   | 612540   | 43.00    |
| V08212T3-NC2071 | TiN     | 2             | Universal   | 612085   | 58.00    |

## 60° NC Spot Drills

### NC Spotting Drill — V9MT0802/V9MT12T3 Inserts



- Single cutting edge design gives higher precision when spotting
- Applications:
  - Spotting, engraving, grooving, and chamfering on milling machines, machine centres
  - Spotting, facing, on CNC lathes



Insert not included

| Shank | Model No.        | Length | Insert | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|------------------|--------|--------|-----------|----------|----------|----------|
| 8mm   | 00-99616-09V     | 60mm   | V9MT08 | 7.3mm     | 9mm      | 612544   | 97.00    |
| 5/8"  | 00-99616-13V-5/8 | 100mm  | V9MT12 | 10.3mm    | 13mm     | 612546   | 101.00   |

#### Available Inserts

- Special geometry with supporting edges for use in high speed machining
- Excellent tool for grooving



| Insert            | Coating | Cutting Edges | Application | Code No. | Price \$ |
|-------------------|---------|---------------|-------------|----------|----------|
| V9MT0802CT-NC2071 | TiN     | 2             | Universal   | 612548   | 43.00    |
| V9MT12T3CT-NC2071 | TiN     | 2             | Universal   | 612550   | 59.00    |

# Indexable Cutting Tools

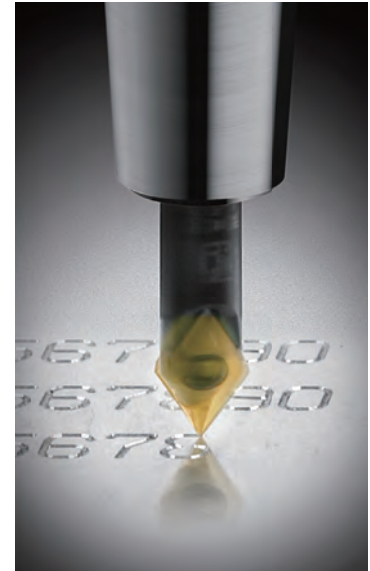
## Engraving 45°/60°

This is a revolutionary new concept of engraving tools with indexable carbide inserts. They offer the ability to produce **HIGH QUALITY ENGRAVING** in most materials. The latest coated carbide grades help you to obtain higher speed and feed rate, dramatically reducing your cycle time.



### Features

- High Positive Rake Angle - suitable for engraving all types of materials, such as plastic, non-ferrous metals, aluminum, copper, carbon steel, stainless steel
- Multi-Side grinding - full peripherally ground insert to ensure efficient repeatability. It performs excellently without producing burrs, especially in copper, aluminum, and stainless steel
- High Speed, High Feed Rate - Designed to run at speeds up to 40,000rpm. Feed rate 0.08mm (0.003")/rev apply to aluminum; 0.05mm (0.002")/rev apply to stainless steel
- Economical - Each insert has 2 cutting edges. No sharpening required. Tool length is unchanged. No need to reset after changing insert or cutting edge. Excellent repeatability.



### Inserts

- NC2032**
- For all kinds of steel from 30~50 HRC, carbon steel, alloy steel and cast iron
  - TiAIN coating provides longer tool life
- NC2071**
- Universal grade for all kinds of steel <30HRC, non-ferrous metal, and stainless steel
  - The cutting geometry of this insert has been designed with a strong cutting edge

- NC9031**
- For non-ferrous metal, aluminum, brass, copper, plastic, acrylic, and stainless steel
  - Very sharp edge for shallow engraving
- NC2035**
- For steel with heat treatment up to 56HRC
  - Latest ALDURA coating to reduce heat and tool wear

| Grade  | Coating | P     | M               | K         | N           | H                    | S        |
|--------|---------|-------|-----------------|-----------|-------------|----------------------|----------|
|        |         | Steel | Stainless Steel | Cast Iron | Non-Ferrous | Hardened Up to 56HRC | Titanium |
| NC2032 | TiAIN   | •••   | •               | •••       |             |                      |          |
| NC2071 | TiN     | ••    | •••             |           | ••          |                      |          |
| NC9031 | TiN     | ••    | ••              |           | •••         |                      |          |
| NC2035 | ALDURA  | ••    |                 | •         |             | •••                  |          |

••• Best    •• Suited    • Possible

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## Engraving Tool 45°



- \* Carbide shank holders designed for shrink fit holders, engraving machines, high speed cutting
- \*\* XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm

Insert not included

| Shank | Model No.            | Length | Insert      | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|----------------------|--------|-------------|-----------|----------|----------|----------|
| 6mm   | 00-99619-V045-06     | 40mm   | V04506T1W06 | 2.0mm     | 2.1mm    | 612552   | 92.00    |
| 6mm   | *00-99619-V045-06L   | 60mm   | V04506T1W06 | 2.0mm     | 2.1mm    | 612554   | 185.00   |
| 6mm   | **00-99619-V045-06XL | 100mm  | V04506T1W06 | 2.0mm     | 2.1mm    | 612556   | 245.00   |

### Available Inserts

| Insert             | Coating | Cutting Edges | Application     | Code No. | Price \$ |
|--------------------|---------|---------------|-----------------|----------|----------|
| V04506T1W06-NC2071 | TiN     | 2             | Universal       | 612558   | 39.00    |
| V04506T1W06-NC2032 | TiAlN   | 2             | Steel 30-50 HRC | 612560   | 43.00    |
| V04506T1W06-NC9031 | TiN     | 2             | Non-Ferrous     | 612562   | 43.00    |

### Starter Packages

- Includes 3 inserts, 1 toolholder, and 1 T7 key

| Model                | Shank | Insert             | Code No. | Price \$ |
|----------------------|-------|--------------------|----------|----------|
| 00-99619-V045-03K-71 | 6mm   | V04506T1W06-NC2071 | 612564   | 187.00   |
| 00-99619-V045-03K-32 | 6mm   | V04506T1W06-NC2032 | 612566   | 219.00   |
| 00-99619-V045-03K-31 | 6mm   | V04506T1W06-NC9031 | 612568   | 219.00   |



## Engraving Tool 60°



- \* Carbide shank holders designed for shrink fit holders, engraving machines, high speed cutting
- \*\* XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm

Insert not included

| Shank | Model No.            | Length | Insert      | Max Depth | Max Dia. | Code No. | Price \$ |
|-------|----------------------|--------|-------------|-----------|----------|----------|----------|
| 6mm   | 00-99619-V060-06     | 40mm   | V06006T1W06 | 2.0mm     | 2.7mm    | 612570   | 92.00    |
| 6mm   | *00-99619-V060-06L   | 60mm   | V06006T1W06 | 2.0mm     | 2.7mm    | 612572   | 185.00   |
| 6mm   | **00-99619-V060-06XL | 100mm  | V06006T1W06 | 2.0mm     | 2.7mm    | 612574   | 245.00   |

### Available Inserts

| Insert             | Coating | Cutting Edges | Application                    | Code No. | Price \$ |
|--------------------|---------|---------------|--------------------------------|----------|----------|
| V06006T1W06-NC2071 | TiN     | 2             | Universal                      | 612576   | 39.00    |
| V06006T1W06-NC2032 | TiAlN   | 2             | Steel 30-50 HRC                | 612578   | 43.00    |
| V06006T1W06-NC2035 | ALDURA  | 2             | Heat treated steel up to 56HRC | 612580   | 49.00    |
| V06006T1W06-NC9031 | TiN     | 2             | Non-Ferrous                    | 612582   | 43.00    |

### Starter Packages

- Includes 3 inserts, 1 toolholder, and 1 T7 key

| Model                | Shank | Insert             | Code No. | Price \$ |
|----------------------|-------|--------------------|----------|----------|
| 00-99619-V060-03K-71 | 6mm   | V06006T1W06-NC2071 | 612584   | 209.00   |
| 00-99619-V060-03K-32 | 6mm   | V06006T1W06-NC2032 | 612586   | 219.00   |
| 00-99619-V060-03K-35 | 6mm   | V06006T1W06-NC2035 | 612588   | 239.00   |
| 00-99619-V060-03K-31 | 6mm   | V06006T1W06-NC9031 | 612590   | 219.00   |

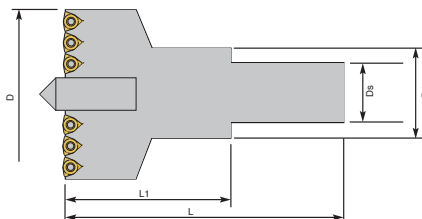




## Milling Cutters



### VMD Max Drill - MX Modular Shank Type



Note: Drill head complete with cartridges - Pilot Drill not included

(mm)

| Model      | Code No. | Price \$ | D         | Ds | D1 | L1  | L   | Pilot Drill    | Cartridge     |
|------------|----------|----------|-----------|----|----|-----|-----|----------------|---------------|
| VMD-045050 | 156000   | 1,261.96 | 1.77-1.97 | 13 | 28 | 50  | 85  | PLD-1035 Tin-H | VMC-045050N/T |
| VMD-050055 | 156002   | 1,261.96 | 1.97-2.17 | 13 | 28 | 50  | 85  | PLD-1035 Tin-H | VMC-050055N/T |
| VMD-055060 | 156004   | 1,321.79 | 2.17-2.36 | 16 | 32 | 60  | 100 | PLD-1238 Tin-H | VMC-055060N/T |
| VMD-060065 | 156006   | 1,321.79 | 2.36-2.56 | 16 | 32 | 60  | 100 | PLD-1238 Tin-H | VMC-060065N/T |
| VMD-065070 | 156008   | 1,447.62 | 2.56-2.76 | 16 | 32 | 60  | 100 | PLD-1238 Tin-H | VMC-065070N/T |
| VMD-070075 | 156010   | 1,447.62 | 2.76-2.95 | 22 | 40 | 70  | 115 | PLD-1238 Tin-H | VMC-070075N/T |
| VMD-075080 | 156012   | 1,507.94 | 2.95-3.15 | 22 | 40 | 70  | 115 | PLD-1645 Tin-H | VMC-075080N/T |
| VMD-080085 | 156014   | 1,598.42 | 3.15-3.35 | 22 | 40 | 70  | 115 | PLD-1645 Tin-H | VMC-080085N/T |
| VMD-085090 | 156016   | 1,401.52 | 3.35-3.54 | 27 | 48 | 70  | 120 | PLD-1645 Tin-H | VMC-085090N/T |
| VMD-090095 | 156018   | 1,598.42 | 3.54-3.74 | 27 | 48 | 70  | 120 | PLD-1645 Tin-H | VMC-090095N/T |
| VMD-095100 | 156020   | 1,719.04 | 3.74-3.94 | 27 | 48 | 70  | 120 | PLD-1645 Tin-H | VMC-095100N/T |
| VMD-100105 | 156022   | 1,719.04 | 3.94-4.13 | 32 | 58 | 80  | 130 | PLD-2045 Tin-H | VMC-100105N/T |
| VMD-105110 | 156024   | 1,719.04 | 4.13-4.33 | 32 | 58 | 80  | 130 | PLD-2045 Tin-H | VMC-105110N/T |
| VMD-110115 | 156026   | 1,719.04 | 4.33-4.53 | 32 | 58 | 80  | 130 | PLD-2045 Tin-H | VMC-110115N/T |
| VMD-115120 | 156028   | 2,050.82 | 4.53-4.72 | 40 | 70 | 90  | 145 | PLD-2045 Tin-H | VMC-115120N/T |
| VMD-120125 | 156030   | 2,292.09 | 4.72-4.92 | 40 | 70 | 90  | 145 | PLD-2556 Tin-H | VMC-120125N/T |
| VMD-125130 | 156032   | 1,961.20 | 4.92-5.12 | 40 | 70 | 90  | 145 | PLD-2556 Tin-H | VMC-125130N/T |
| VMD-130135 | 156034   | 2,292.09 | 5.12-5.32 | 40 | 70 | 90  | 145 | PLD-2556 Tin-H | VMC-130135N/T |
| VMD-135140 | 156036   | 2,292.09 | 5.32-5.51 | 40 | 70 | 90  | 145 | PLD-2556 Tin-H | VMC-135140N/T |
| VMD-140150 | 156038   | 2,774.61 | 5.51-5.91 | 50 | 80 | 100 | 160 | PLD-2556 Tin-H | VMC-140150N/T |
| VMD-150160 | 156040   | 2,774.61 | 5.91-6.30 | 50 | 80 | 100 | 160 | PLD-2556 Tin-H | VMC-150160N/T |
| VMD-160170 | 156042   | 2,834.93 | 6.30-6.69 | 50 | 80 | 100 | 160 | PLD-3068 Tin-H | VMC-160170N/T |
| VMD-170180 | 156043   | 3,619.04 | 6.69-7.09 | 50 | 80 | 100 | 160 | PLD-3068 Tin-H | VMC-170180N/T |

➤ P. E157      ➤ P. E158

### Recommended Speed & Feeds for VMD Max Drill

| Material                      | Cutting Speed | Feed F (mm/rev) For Drill Diameter D (mm) |             |             |             |             |             |             |             |
|-------------------------------|---------------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                               |               | ø45~ø55                                   | ø55~ø60     | ø60~ø75     | ø75~ø100    | ø100~ø105   | ø105~ø150   | ø150~ø180   |             |
| Low Alloy Steel               | <0.25%        | 120-180                                   | 0.06 - 0.10 | 0.07 - 0.11 | 0.08 - 0.12 | 0.1 - 0.14  | 0.14 - 0.2  | 0.08 - 0.12 | 0.1 - 0.14  |
| High Alloy Steel              | >0.25%        | 110-170                                   | 0.06 - 0.10 | 0.07 - 0.11 | 0.08 - 0.12 | 0.1 - 0.14  | 0.12 - 0.18 | 0.08 - 0.12 | 0.1 - 0.14  |
| Low Alloy Steel               | <300HRB       | 90-130                                    | 0.06 - 0.10 | 0.07 - 0.11 | 0.08 - 0.12 | 0.1 - 0.14  | 0.12 - 0.18 | 0.08 - 0.12 | 0.1 - 0.14  |
| High Alloy Steel              | >300HRB       | 60-100                                    | 0.05 - 0.07 | 0.05 - 0.07 | 0.06 - 0.08 | 0.06 - 0.1  | 0.09 - 0.13 | 0.06 - 0.08 | 0.06 - 0.1  |
| Stainless Steel               |               | 60-110                                    | 0.04 - 0.07 | 0.04 - 0.11 | 0.06 - 0.12 | 0.08 - 0.14 | 0.1 - 0.18  | 0.06 - 0.12 | 0.08 - 0.14 |
| Grey Cast Iron                |               | 120-180                                   | 0.07 - 0.13 | 0.07 - 0.15 | 0.08 - 0.16 | 0.1 - 0.18  | 0.12 - 0.22 | 0.08 - 0.16 | 0.1 - 0.18  |
| Cast Iron & Nodular Cast Iron |               | 100-180                                   | 0.04 - 0.13 | 0.07 - 0.15 | 0.08 - 0.16 | 0.1 - 0.25  | 0.12 - 0.26 | 0.08 - 0.16 | 0.1 - 0.25  |
| Aluminum Forging Alloys       |               | 180-280                                   | 0.04 - 0.06 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.12 - 0.2  | 0.08 - 0.13 | 0.09 - 0.15 |
| Aluminum Cast Alloys          |               | 120-270                                   | 0.04 - 0.06 | 0.06 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.12 - 0.2  | 0.08 - 0.13 | 0.09 - 0.15 |

**Conversion examples:**  
 0.08mm= 0.0031 In/Rev  
 0.12mm= 0.00472 In/Rev  
 0.16mm= 0.0063 In/Rev

**Conversion examples:**  
 60-100 (195-325 sfm)  
 120-180 (390-585 sfm)



## Milling Cutters



### Cartridges for VMD Max Drill

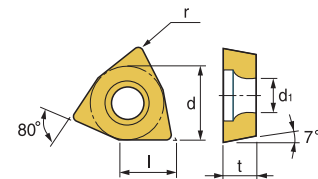


Specify Inner or Outer when ordering

| Drilling Range (mm) | Inner Cartridge | Inner Code No. | Inner Price \$ | Outer Cartridge | Outer Code No. | Outer Price \$ | Screw     | No. of Inserts | Insert       |           |   |          |
|---------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------|----------------|--------------|-----------|---|----------|
| 45-50               | VMC-045050N     | 156044         | 176.94         | VMC-045050T     | 156090         | 176.94         | TSB-22045 | 2              | WCMT 1.81.51 |           |   |          |
| 50-55               | VMC-050055N     | 156046         | 221.51         | VMC-050055T     | 156092         | 221.75         |           |                |              |           |   |          |
| 55-60               | VMC-055060N     | 156048         | 238.78         | VMC-055060T     | 156094         | 240.15         | TSB-25055 | 2              | WCMT 21.52   |           |   |          |
| 60-65               | VMC-060065N     | 156050         | 240.18         | VMC-060065T     | 156096         | 238.68         | TSB-30070 | 2              | WCMT 2.522   |           |   |          |
| 65-70               | VMC-065070N     | 156052         | 194.63         | VMC-065070T     | 156098         | 194.63         |           |                |              |           |   |          |
| 70-75               | VMC-070075N     | 156054         | 194.63         | VMC-070075T     | 156100         | 194.63         |           |                |              |           |   |          |
| 75-80               | VMC-075080N     | 156056         | 300.48         | VMC-075080T     | 156102         | 302.44         |           |                |              |           |   |          |
| 80-85               | VMC-080085N     | 156058         | 212.32         | VMC-080085T     | 156104         | 212.32         | TSB-35090 | 2              | WCMT 32.52   |           |   |          |
| 85-90               | VMC-085090N     | 156060         | 212.32         | VMC-085090T     | 156106         | 212.32         |           |                |              |           |   |          |
| 90-95               | VMC-090095N     | 156062         | 300.48         | VMC-090095T     | 156108         | 300.85         |           |                |              |           |   |          |
| 95-100              | VMC-095100N     | 156064         | 212.32         | VMC-095100T     | 156110         | 212.32         |           |                |              |           |   |          |
| 100-105             | VMC-100105N     | 156066         | 439.83         | VMC-100105T     | 156112         | 440.02         |           |                |              |           |   |          |
| 105-110             | VMC-105110N     | 156068         | 265.36         | VMC-105110T     | 156114         | 265.36         |           |                |              |           |   |          |
| 110-115             | VMC-110115N     | 156070         | 265.36         | VMC-110115T     | 156116         | 265.36         | TSB-35090 | 3              | WCMT 32.52   |           |   |          |
| 115-120             | VMC-115120N     | 156072         | 265.36         | VMC-115120T     | 156118         | 265.36         |           |                |              |           |   |          |
| 120-125             | VMC-120125N     | 156074         | 265.36         | VMC-120125T     | 156120         | 265.36         |           |                |              |           |   |          |
| 125-130             | VMC-125130N     | 156076         | 440.41         | VMC-125130T     | 156122         | 265.36         |           |                |              |           |   |          |
| 130-135             | VMC-130135N     | 156078         | 265.36         | VMC-130135T     | 156124         | 265.36         |           |                |              |           |   |          |
| 135-140             | VMC-135140N     | 156080         | 439.47         | VMC-135140T     | 156126         | 439.83         |           |                |              |           |   |          |
| 140-150             | VMC-140150N     | 156082         | 283.10         | VMC-140150T     | 156128         | 283.10         |           |                |              | TSB-40110 | 3 | WCMT 432 |
| 150-160             | VMC-150160N     | 156084         | 283.10         | VMC-150160T     | 156130         | 283.10         |           |                |              |           |   |          |
| 160-170             | VMC-160170N     | 156086         | 439.83         | VMC-160170T     | 156132         | 283.10         |           |                |              |           |   |          |
| 170-180             | VMC-170180N     | 156088         | 283.10         | VMC-170180T     | 156134         | 283.10         |           |                |              |           |   |          |

• Outer cartridge can be ground to achieve the size in the range of head

### WCMT-C20/C21 Drilling Inserts for VMD Max Drill



| Designation      | ISO    | Coated Carbide |                    |       |       |       |       |       |       |       |                    | Uncoated Carbide |      | (inch) |      |       |           |          | Applicable Cutter |  |
|------------------|--------|----------------|--------------------|-------|-------|-------|-------|-------|-------|-------|--------------------|------------------|------|--------|------|-------|-----------|----------|-------------------|--|
|                  |        | PM10C          | PM25C              | PM30C | PM30P | PM35P | KM20C | MM30P | MT30P | SM20P | PM20U              | KTM10U           | l    | d      | t    | r     | d1        | Cutter   | Page No.          |  |
| WCMT 1.81.52-C20 | 030208 |                | 146242<br>\$ 21.11 |       |       |       |       |       |       |       | 146537<br>\$ 16.44 | 0.149            | 7/32 | 3/32   | 1/32 | 0.110 | MAX DRILL | E156-160 |                   |  |
| WCMT 21.52-C20   | 040208 |                | 146237<br>\$ 21.16 |       |       |       |       |       |       |       | 147155<br>\$ 16.46 | 0.169            | 1/4  | 3/32   | 1/32 | 0.118 |           |          |                   |  |
| WCMT 2.522-C20   | 050308 |                | 146236<br>\$ 22.56 |       |       |       |       |       |       |       |                    | 0.212            | 5/16 | 5/16   | 1/32 | 0.134 |           |          |                   |  |
| WCMT 32.52-C20   | 06T308 |                | 146235<br>\$ 22.56 |       |       |       |       |       |       |       | 146539<br>\$ 17.52 | 0.256            | 3/8  | 5/32   | 1/32 | 0.157 |           |          |                   |  |
| WCMT432-C20      | 080408 |                | 146855<br>\$ 27.58 |       |       |       |       |       |       |       |                    | 0.342            | 1/2  | 3/16   | 1/32 | 0.169 |           |          |                   |  |
| WCMT 433-C20     | 080412 |                | 146000<br>\$ 27.58 |       |       |       |       |       |       |       | 146563<br>\$ 21.48 | 0.342            | 1/2  | 3/16   | 3/64 | 0.169 |           |          |                   |  |

#### Quick Choice Grade Selection

|            |                      |                       |                           |
|------------|----------------------|-----------------------|---------------------------|
| P<br>Steel | M<br>Stainless Steel | K<br>Cast Iron - Alum | S<br>Heat Resistant Alloy |
|------------|----------------------|-----------------------|---------------------------|

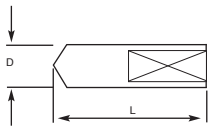
## Milling Cutters



### Parts for VMD Max Drill

(mm)

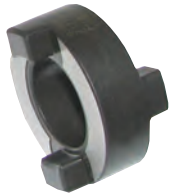
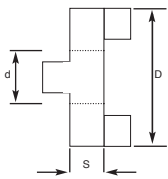
#### PILOT DRILL



| Model          | Code No. | Price \$ | D  | L  |
|----------------|----------|----------|----|----|
| PLD-1035 TiN-H | 156146   | 79.82    | 10 | 35 |
| PLD-1238 TiN-H | 156148   | 79.82    | 12 | 38 |
| PLD-1645 TiN-H | 156150   | 123.61   | 16 | 45 |
| PLD-2045 TiN-H | 156152   | 145.25   | 20 | 45 |
| PLD-2556 TiN-H | 156154   | 175.27   | 25 | 56 |
| PLD-3068 TiN-H | 156156   | 221.13   | 30 | 68 |

(mm)

#### DRIVE RING



| Model      | Code No. | Price \$ | D  | d  | S  |
|------------|----------|----------|----|----|----|
| DVR-281310 | 156158   | 90.97    | 28 | 13 | 10 |
| DVR-321610 | 156160   | 74.11    | 32 | 16 | 10 |
| DVR-402212 | 156162   | 94.38    | 40 | 22 | 12 |
| DVR-482712 | 156164   | 107.89   | 48 | 27 | 12 |
| DVR-583214 | 156166   | 183.77   | 58 | 32 | 14 |
| DVR-704014 | 156168   | 171.87   | 70 | 40 | 14 |
| DVR-805016 | 156170   | 212.32   | 80 | 50 | 16 |

(mm)

#### SET SCREW



| Model     | Code No. | Price \$ | Size         | Hex Driver |
|-----------|----------|----------|--------------|------------|
| MTB-08115 | 156206   | 8.44     | M8 x 11.5mm  | 4          |
| MTB-10145 | 156208   | 8.44     | M10 x 14.5mm | 5          |
| MTB-12175 | 156210   | 8.44     | M12 x 17.5mm | 6          |
| MTB-12195 | 156212   | 8.44     | M12 x 19.5mm | 6          |
| MTB-16260 | 156214   | 10.11    | M16 x 26.5mm | 8          |

(mm)

#### INSERT SCREW



| Model     | Code No. | Price \$ | Size         | Torx Driver |
|-----------|----------|----------|--------------|-------------|
| TSB-22045 | 156136   | 5.25     | M2.2 x 4.5mm | T-6         |
| TSB-25055 | 156138   | 5.21     | M2.5 x 5.5mm | T-8         |
| TSB-30070 | 156140   | 5.21     | M3 x 7.0mm   | T-8         |
| TSB-35090 | 156142   | 5.68     | M3.5 x 9.0mm | T-15        |
| TSB-40110 | 156144   | 5.68     | M4 x 11.0mm  | T-15        |

### Assembly for VMD Max Drill

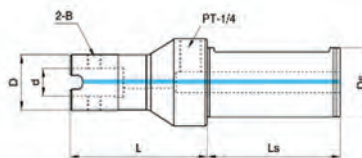




## Milling Cutters



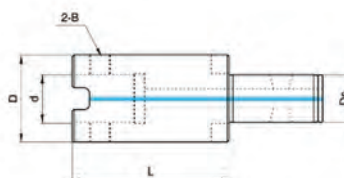
### MX Holders for VMD Max Drill — Cylindrical Shank Type



(mm)

| Model       | Code No. | Price \$ | Ds | d  | L   | D  | Ls  | Screw (B) | Drive Ring |
|-------------|----------|----------|----|----|-----|----|-----|-----------|------------|
| MXA-3213115 | 156172   | 269.60   | 32 | 13 | 115 | 28 | 70  | MTB-08115 | DVR-281310 |
| MXA-3213200 | 156174   | 404.42   | 32 | 13 | 200 | 28 | 70  | MTB-08115 | DVR-281310 |
| MXA-3213300 | 156176   | 404.42   | 32 | 13 | 300 | 28 | 70  | MTB-08115 | DVR-281310 |
| MXA-4016125 | 156178   | 303.32   | 40 | 16 | 125 | 32 | 80  | MTB-08115 | DVR-321610 |
| MXA-4016200 | 156180   | 337.03   | 40 | 16 | 200 | 32 | 80  | MTB-08115 | DVR-321610 |
| MXA-4016300 | 156182   | 437.18   | 40 | 16 | 300 | 32 | 80  | MTB-08115 | DVR-321610 |
| MXA-4022148 | 156184   | 337.03   | 40 | 22 | 148 | 40 | 80  | MTB-10145 | DVR-402212 |
| MXA-4022200 | 156186   | 404.42   | 40 | 22 | 200 | 40 | 80  | MTB-10145 | DVR-402212 |
| MXA-4022300 | 156188   | 471.86   | 40 | 22 | 300 | 40 | 80  | MTB-10145 | DVR-402212 |
| MXA-4027168 | 156190   | 404.42   | 40 | 27 | 168 | 48 | 80  | MTB-12175 | DVR-482712 |
| MXA-4027300 | 156192   | 539.25   | 40 | 27 | 300 | 48 | 80  | MTB-12175 | DVR-482712 |
| MXA-4032186 | 156194   | 471.86   | 40 | 32 | 186 | 58 | 80  | MTB-12195 | DVR-583214 |
| MXA-4032300 | 156196   | 539.25   | 40 | 32 | 300 | 58 | 80  | MTB-12195 | DVR-583214 |
| MXA-5040186 | 156198   | 539.25   | 50 | 40 | 186 | 70 | 100 | MTB-16260 | DVR-704014 |
| MXA-5040300 | 156200   | 674.02   | 50 | 40 | 300 | 70 | 100 | MTB-16260 | DVR-704014 |
| MXA-5050184 | 156202   | 606.63   | 50 | 50 | 184 | 80 | 100 | MTB-16260 | DVR-805016 |
| MXA-5050300 | 156204   | 775.17   | 50 | 50 | 300 | 80 | 100 | MTB-16260 | DVR-805016 |

### MXB Extension Holders for VMD Max Drill



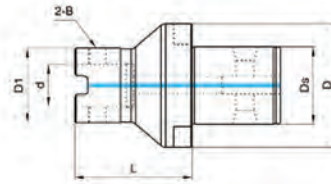
(mm)

| Model       | Code No. | Price \$ | Ds | d  | L   | D  | Screw (B) | Drive Ring |
|-------------|----------|----------|----|----|-----|----|-----------|------------|
| MXB-2813115 | 156216   | 269.60   | 13 | 13 | 115 | 28 | MTB-08115 | DVR-281310 |
| MXB-2813150 | 156218   | 286.42   | 13 | 13 | 150 | 28 | MTB-08115 | DVR-281310 |
| MXB-2813200 | 156220   | 286.42   | 13 | 13 | 200 | 28 | MTB-08115 | DVR-281310 |
| MXB-2813300 | 156222   | 337.03   | 13 | 13 | 300 | 28 | MTB-08115 | DVR-281310 |
| MXB-3216115 | 156224   | 286.33   | 16 | 16 | 115 | 32 | MTB-08115 | DVR-321610 |
| MXB-3216200 | 156226   | 303.32   | 16 | 16 | 200 | 32 | MTB-08115 | DVR-321610 |
| MXB-3216300 | 156228   | 370.70   | 16 | 16 | 300 | 32 | MTB-08115 | DVR-321610 |
| MXB-4022113 | 156230   | 303.32   | 22 | 22 | 113 | 40 | MTB-10145 | DVR-402212 |
| MXB-4022200 | 156232   | 337.03   | 22 | 22 | 200 | 40 | MTB-10145 | DVR-402212 |
| MXB-4022300 | 156234   | 404.42   | 22 | 22 | 300 | 40 | MTB-10145 | DVR-402212 |
| MXB-4827113 | 156236   | 337.03   | 27 | 27 | 113 | 48 | MTB-12175 | DVR-482712 |
| MXB-1827200 | 156238   | 404.42   | 27 | 27 | 200 | 48 | MTB-12175 | DVR-482712 |
| MXB-4827300 | 156240   | 471.86   | 27 | 27 | 300 | 48 | MTB-12175 | DVR-482712 |
| MXB-5832186 | 156242   | 438.08   | 32 | 32 | 186 | 58 | MTB-12195 | DVR-583214 |
| MXB-5832300 | 156244   | 539.25   | 32 | 32 | 300 | 58 | MTB-12195 | DVR-583214 |
| MXB-7040186 | 156246   | 471.86   | 40 | 40 | 186 | 70 | MTB-16260 | DVR-704014 |
| MXB-7040300 | 156248   | 606.63   | 40 | 40 | 300 | 70 | MTB-16260 | DVR-704014 |
| MXB-7040500 | 156250   | 842.55   | 40 | 40 | 500 | 70 | MTB-16260 | DVR-704014 |
| MXB-8050204 | 156252   | 539.25   | 50 | 50 | 204 | 80 | MTB-16260 | DVR-805016 |
| MXB-8050300 | 156254   | 741.40   | 50 | 50 | 300 | 80 | MTB-16260 | DVR-805016 |
| MXB-8050500 | 156256   | 1,011.05 | 50 | 50 | 500 | 80 | MTB-16260 | DVR-805016 |

## Milling Cutters



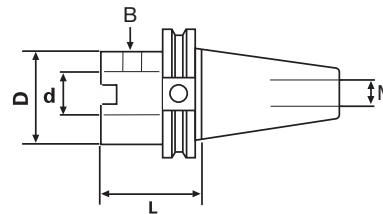
### Reducers for VMD Max Drill



(mm)

| Model       | Code No. | Price \$ | Ds | d  | L   | D  | D1 | Screw (B) | D1/Drive Ring | D/Drive Ring |
|-------------|----------|----------|----|----|-----|----|----|-----------|---------------|--------------|
| MXR-1613100 | 156270   | 269.60   | 16 | 13 | 100 | 32 | 28 | MTB-08115 | DVR-28130     | DVR-32610    |
| MXR-2216100 | 156272   | 269.60   | 22 | 16 | 100 | 40 | 32 | MTB-08115 | DVR-321610    | DVR-402212   |
| MXR-2722100 | 156274   | 269.60   | 27 | 22 | 100 | 48 | 40 | MTB-10145 | DVR-402212    | DVR-482712   |
| MXR-3227100 | 156276   | 337.03   | 32 | 27 | 100 | 58 | 48 | MTB-12175 | DVR-482712    | DVR-583214   |

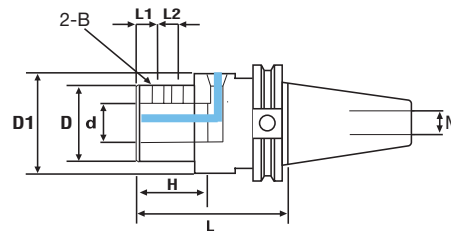
### SK MXA Holders for VMD Max Drill



(mm)

| Model          | Code No. | Price \$ | d  | L  | D  | M   | Screw (B) |
|----------------|----------|----------|----|----|----|-----|-----------|
| SK40-MXA-32065 | 156258   | 336.98   | 32 | 65 | 58 | M16 | MTB-12195 |
| SK50-MXA-32070 | 156260   | 505.52   | 32 | 70 | 58 | M24 | MTB-12195 |
| SK50-MXA-50070 | 156262   | 606.63   | 50 | 70 | 80 | M24 | MTB-16260 |

### SK OMS Side Lock Coolant Feed Holders for VMD Max Drill



(mm)

| Model          | Code No. | Price \$ | d  | L   | D  | D1 | H  | L1 | L2 | Screw (B) | M   |
|----------------|----------|----------|----|-----|----|----|----|----|----|-----------|-----|
| SK40-OMS-20110 | 156201   | 943.66   | 20 | 110 | 50 | 78 | 50 | 20 | -  | M12       | M16 |
| SK40-OMS-25125 | 156203   | 943.66   | 25 | 125 | 50 | 78 | 60 | 20 | 20 | M12       | M16 |
| SK40-OMS-32130 | 156205   | 943.66   | 32 | 130 | 65 | 88 | 70 | 20 | 20 | M14       | M16 |
| SK50-OMS-20105 | 156207   | 1,078.44 | 20 | 105 | 50 | 78 | 50 | 20 | -  | M12       | M24 |
| SK50-OMS-25120 | 156209   | 1,078.44 | 25 | 120 | 50 | 78 | 60 | 20 | 20 | M12       | M24 |
| SK50-OMS-32125 | 156211   | 1,078.44 | 32 | 125 | 65 | 98 | 70 | 20 | 20 | M14       | M24 |
| SK50-OMS-40135 | 156213   | 1,078.44 | 40 | 135 | 65 | 98 | 80 | 20 | 25 | M16       | M24 |



# **Sowa**

## **INDEXABLE KITS**

**MILLING KITS**  
PAGES E162-167

**TURNING  
KITS**  
PAGES E168-169

**BORING  
KITS**  
PAGES E170-171

**THREADING  
KITS**  
PAGE E171

**PARTING &  
GROOVING KITS**  
PAGE E172

**ASK ABOUT OUR GUARANTEED TEST POLICY**



# Indexable Cutting Tools

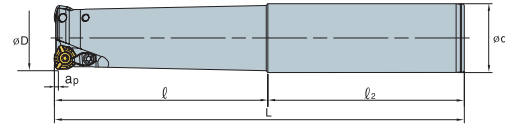
## HFPA End Mill Kits



  
Coolant through



Consists of:  
1 - HFPA End Mill  
10 - WDKT 130520 Inserts (Coated)



| Model No.           | Cutting Dia. (ØD) | Shank Dia.(Ød) | L     | L <sub>1</sub> | L <sub>2</sub> | Insert                             | No. of Inserts | Kit Code No. | Price \$ |
|---------------------|-------------------|----------------|-------|----------------|----------------|------------------------------------|----------------|--------------|----------|
| HFPA 1-1/4 (148646) | 1-1/4             | 1.000          | 2.756 | 3.150          | 5.906          | WDKT 130520 ZDSR-MH PM10C (148653) | 10             | 149990       | 711.85   |
| HFPA 1-1/4 (148647) | 1-1/4             | 1.000          | 4.725 | 3.150          | 7.874          | WDKT 130520 ZDSR-MH PM10C (148653) | 10             | 149991       | 965.43   |

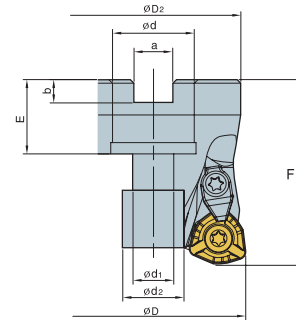
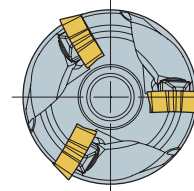
## HFPC Face Mill Kits



  
Coolant through

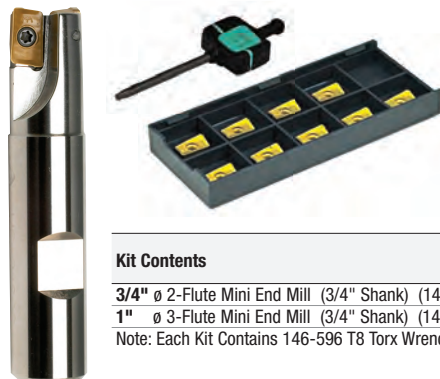


Consists of:  
1 - HFPC Face Mill  
10 - WDKT 130520 Inserts (Coated)



| Model No.              | Cutting Dia. (ØD) | Bore Dia.(Ød) | ØD <sub>2</sub> | Ød <sub>2</sub> | a     | b     | E     | F     | Insert                             | No. of Inserts | Kit Code No. | Price \$ |
|------------------------|-------------------|---------------|-----------------|-----------------|-------|-------|-------|-------|------------------------------------|----------------|--------------|----------|
| HFPC 13200R-3 (148636) | 2.000             | 0.750         | 1.772           | 0.630           | 0.321 | 0.221 | 0.778 | 1.969 | WDKT 130520 ZDSR-MH PM10C (148653) | 10             | 149992       | 1,312.87 |
| HFPC 13250R-4 (148639) | 2.500             | 0.750         | 1.772           | 0.630           | 0.321 | 0.221 | 0.778 | 1.969 | WDKT 130520 ZDSR-MH PM10C (148653) | 10             | 149993       | 1,071.66 |
| HFPC 13300R-5 (148641) | 3.000             | 1.000         | 2.205           | 0.827           | 0.384 | 0.248 | 0.985 | 2.756 | WDKT 130520 ZDSR-MH PM10C (148653) | 10             | 149994       | 1,911.84 |

## AP11 End Mill Kits



Consists of:  
1 - AP11-90 End Mill  
10 - APXT 11T3 Inserts (Coated)

| Kit Contents                                       | Insert                                 | Kit Code No. | Price \$ |
|--|--|--------------|----------|
| 3/4" ø 2-Flute Mini End Mill (3/4" Shank) (146373) | 10 - APXT 11T3 Coated Inserts (146356) | 149864       | 391.22   |
| 1" ø 3-Flute Mini End Mill (3/4" Shank) (146374)   | 10 - APXT 11T3 Coated Inserts (146356) | 149865       | 415.76   |

Note: Each Kit Contains 146-596 T8 Torx Wrench

## AP11 Master End Mill Kit



**Consists of:**

- 1 - Each 1/2", 5/8", 3/4", 1" AP11-90 End Mills
- 20 - APXT 11T3 Inserts (Coated)

| Kit Contents  | Insert                                | Kit Code No. | Price \$ |
|---|---------------------------------------|--------------|----------|
| 1/2" $\phi$ , 5/8" $\phi$ , 3/4" $\phi$ , and 1" $\phi$ Mini-Mill<br>(146371, 146372, 146373, 146374) | 20 - APXT 11T3 PM25C Inserts (146356) | 149866       | 1,130.22 |

Note: Each Kit Contains 146596 T8 Torx Wrench

## AP16 End Mill Kits



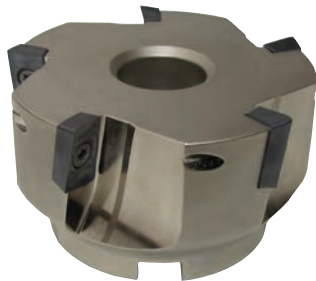
**Consists of:**

- 1 - AP16-90 Endmills
- 10 - APKT 1604 Inserts (Coated)

| Kit Contents                                  | Insert   | Kit Code No. | Price \$ |
|---|--|--------------|----------|
| 1" 2-Fl. End Mill (1" Shank) (145705)         | 10 - APKT 1604PDSR M PM30P Coated Inserts (147333) | 149900       | 499.06   |
| 1-1/4" 3-Fl. End Mill (1" Shank) (145706)     | 10 - APKT 1604PDSR M PM30P Coated Inserts (147333) | 149901       | 530.01   |
| 1-1/2" 3-Fl. End Mill (1-1/4" Shank) (145707) | 10 - APKT 1604PDSR M PM30P Coated Inserts (147333) | 149902       | 561.18   |

Note: Each Kit Contains 146-596 T8 Torx Wrench

## APFM Face Mill Kits



**Consists of:**

- 1 - APFM 16-90 Face Mill
- 10 - APKT 1604 Inserts (Coated)

| Kit Contents              | Insert   | Kit Code No. | Price \$ |
|---------------------------|--|--------------|----------|
| 2" Face Mill (147009)     | c/w 10 inserts (147333) APKT 1604 PDSR M PM30P | 149907       | 660.56   |
| 2-1/2" Face Mill (147011) | c/w 10 inserts (147333) APKT 1604 PDSR M PM30P | 149908       | 848.32   |
| 3" Face Mill (147013)     | c/w 10 inserts (147333) APKT 1604 PDSR M PM30P | 149909       | 838.82   |
| 4" Face Mill (147000)     | c/w 10 inserts (147333) APKT 1604 PDSR M PM30P | 149910       | 963.59   |
| 5" Face Mill (147015)     | c/w 10 inserts (147333) APKT 1604 PDSR M PM30P | 149911       | 981.72   |

## R8 Milling Cutter & Insert Kit



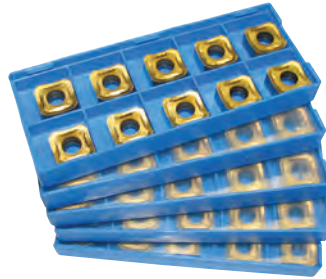
| Kit Contents                               | Insert   | Kit Code No. | Price \$ |
|--|--|--------------|----------|
| 2" R8 (Bridgeport shank) End Mill (141016) | c/w 10 inserts (146709) TPU 322 PM25C Inserts (Coated) | 500732       | 1,095.77 |

**Consists of:**

- 1 - R8 Shank End Mill 2" Dia.
- 10 - TPU 322 Inserts (Coated)



## DS8 45° Milling Kits



**Consists of:**  
 1 - DS8 45° Face Mill  
 20-80 SNMX 1206ANN-M Inserts

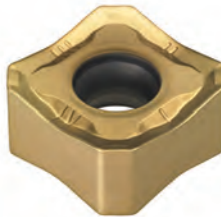


Coolant through

| Kit Contents                       | Insert                  | Kit Code No.         | Price \$               |
|------------------------------------|-------------------------|----------------------|------------------------|
| 2" (Z=4) DS8 4200HR-M (148979)     | c/w 20 inserts (145679) | SNMX 1206ANN-M PM30P | 149779 <b>642.14</b>   |
| 2-1/2" (Z=6) DS8 4250HR-M (148980) | c/w 20 inserts (145679) | SNMX 1206ANN-M PM30P | 149778 <b>1,033.47</b> |
| 3" (Z=5) DS8 4300HR (148885)       | c/w 30 inserts (145679) | SNMX 1206ANN-M PM30P | 149777 <b>2,006.68</b> |
| 3" (Z=7) DS8 4300HR-M (148887)     | c/w 30 inserts (145679) | SNMX 1206ANN-M PM30P | 149776 <b>1,641.70</b> |
| 3" (Z=10) DS8 4300HR-H (148886)    | c/w 30 inserts (145679) | SNMX 1206ANN-M PM30P | 149775 <b>2,132.06</b> |
| 4" (Z=6) DS8 4400HR (148888)       | c/w 40 inserts (145679) | SNMX 1206ANN-M PM30P | 149774 <b>1,535.54</b> |
| 4" (Z=8) DS8 4400HR-M (148890)     | c/w 40 inserts (145679) | SNMX 1206ANN-M PM30P | 149773 <b>2,009.50</b> |
| 4" (Z=12) DS8 4400HR-H (148889)    | c/w 40 inserts (145679) | SNMX 1206ANN-M PM30P | 149772 <b>1,639.95</b> |
| 5" (Z=8) DS8 4500HR (148891)       | c/w 50 inserts (145679) | SNMX 1206ANN-M PM30P | 149771 <b>4,137.22</b> |
| 5" (Z=10) DS8 4500HR-M (148893)    | c/w 50 inserts (145679) | SNMX 1206ANN-M PM30P | 149764 <b>2,534.34</b> |
| 5" (Z=16) DS 4500HR-H (148892)     | c/w 50 inserts (145679) | SNMX 1206ANN-M PM30P | 149770 <b>2,135.56</b> |
| 6" (Z=10) DS8 4600HR (148894)      | c/w 60 inserts (145679) | SNMX 1206ANN-M PM30P | 149769 <b>2,387.91</b> |
| 6" (Z=12) DS8 4600HR-M (148896)    | c/w 60 inserts (145679) | SNMX 1206ANN-M PM30P | 149768 <b>5,121.79</b> |
| 6" (Z=18) DS8 4600HR-H (148895)    | c/w 60 inserts (145679) | SNMX 1206ANN-M PM30P | 149767 <b>1,936.73</b> |
| 8" (Z=14) DS8 4800HR-M (148898)    | c/w 80 inserts (145679) | SNMX 1206ANN-M PM30P | 149766 <b>4,301.66</b> |
| 8" (Z=24) DS8 4800HR-H (148897)    | c/w 80 inserts (145679) | SNMX 1206ANN-M PM30P | 149765 <b>3,489.56</b> |

2" - 5" With Coolant hole  
 6" - 8" No Coolant Hole

### Features of the DS8 Insert



- Innovative double-sided high rake angle insert makes it possible to use 8 cutting edges
- Smooth cutting with low cutting load that has been acquired from the unique geometry and high rake angle of cutting edge guarantees excellent surface finish
- The combination of the innovative geometries and the variety of grades provides wide coverage for milling applications
- Applicable for various workpieces including Steel, Cast Iron and Stainless Steel

## DS4 End Mill Kits



Coolant through

### Consists of:

- 1 - DS4 90° End Mill
- 10-20 LNMX100605PNR-F2 Inserts or
- 10-20 LNMX151008PNR-M Inserts

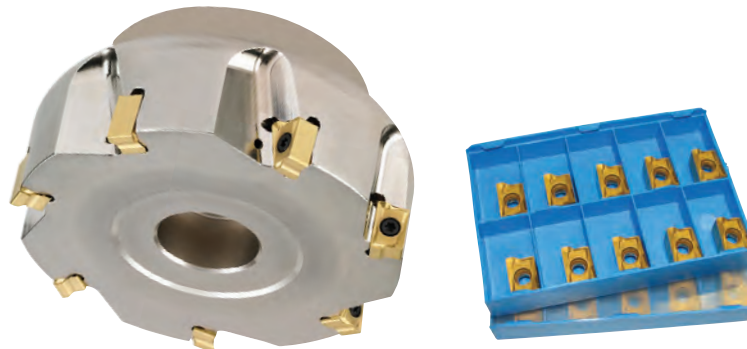


### Features of the DS4 Insert

- Chip breaker has a high rake angle for smooth chip control
- Step design improves chip control by reducing the cutting load
- Major cutting edge for low cutting
- Concave design to avoid interference between each cutting edge
- Specially designed minor cutting edge improves surface finish
- Periphery face has a strong and negative face (Clearance angle 0°).

| Kit Contents                           | Insert                  | Kit Code No.           | Price \$               |
|--|-------------------------|------------------------|------------------------|
| 1-1/4" (Z=3) DS4 3125HR-S125 (146390)  | c/w 10 inserts (145636) | LNMX100605PNR-F2 PM30P | 149763 <b>860.27</b>   |
| 1-1/4" (Z=4) DS4 3125HR-S125M (146391) | c/w 10 inserts (145636) | LNMX100605PNR-F2 PM30P | 149780 <b>697.30</b>   |
| 1-1/4" (Z=2) DS4 4125HR-S125 (148870)  | c/w 10 inserts (145678) | LNMX151008PNR-M PM30P  | 149781 <b>937.20</b>   |
| 1-1/2" (Z=3) DS4 4150HR-S125 (148871)  | c/w 10 inserts (145678) | LNMX151008PNR-M PM30P  | 149782 <b>723.78</b>   |
| 2" (Z=4) DS4 4200HR-S125M (148872)     | c/w 10 inserts (145678) | LNMX151008PNR-M PM30P  | 149783 <b>856.30</b>   |
| 1-1/2" (Z=4) DS4 3150HR-S125 (146392)  | c/w 20 inserts (145636) | LNMX100605PNR-F2 PM30P | 149784 <b>737.13</b>   |
| 2" (Z=5) DS4 3200HR-S125 (146394)      | c/w 20 inserts (145636) | LNMX100605PNR-F2 PM30P | 149786 <b>1,471.31</b> |
| 2" (Z=7) DS4 3200HR-S125M (146395)     | c/w 20 inserts (145636) | LNMX100605PNR-F2 PM30P | 149787 <b>1,169.39</b> |

## DS4 Face Mill Kits



Coolant through

### Consists of:

- 1 - DS4 90° Face Mill
- 20-30 LNMX100605PNR-F2 Inserts or
- 20-60 LNMX151008PNR-M Inserts



| Kit Contents                       | Insert                  | Kit Code No.           | Price \$               |
|------------------------------------|-------------------------|------------------------|------------------------|
| 1-1/2" (Z=5) DS4 3150HR-M (146393) | c/w 20 inserts (145636) | LNMX100605PNR-F2 PM30P | 149788 <b>1,007.21</b> |
| 2-1/2" (Z=9) DS4 3250HR-M (148374) | c/w 30 inserts (145636) | LNMX100605PNR-F2 PM30P | 149789 <b>2,023.70</b> |
| 3" (Z=10) DS4 3300HR-M (148376)    | c/w 30 inserts (145636) | LNMX100605PNR-F2 PM30P | 149790 <b>2,598.05</b> |
| 4" (Z=12) DS4 3400HR-M (148391)    | c/w 30 inserts (145636) | LNMX100605PNR-F2 PM30P | 149791 <b>2,245.00</b> |
| 2-1/2" (Z=4) DS4 4250HR (148875)   | c/w 20 inserts (145678) | LNMX151008PNR-M PM30P  | 149792 <b>1,139.51</b> |
| 2-1/2" (Z=6) DS4 4250HR-M (148876) | c/w 20 inserts (145678) | LNMX151008PNR-M PM30P  | 149793 <b>2,043.34</b> |
| 3" (Z=5) DS4 4300HR (148877)       | c/w 30 inserts (145678) | LNMX151008PNR-M PM30P  | 149794 <b>1,576.91</b> |
| 4" (Z=8) DS4 4400HR-M (146880)     | c/w 40 inserts (145678) | LNMX151008PNR-M PM30P  | 149795 <b>3,472.34</b> |
| 5" (Z=7) DS4 4500HR (148881)       | c/w 50 inserts (125678) | LNMX151008PNR-M PM30P  | 149796 <b>2,570.45</b> |
| 5" (Z=10) DS4 4500HR-M (148882)    | c/w 50 inserts (145678) | LNMX151008PNR-M PM30P  | 149797 <b>2,955.32</b> |
| 6" (Z=8) DS4 4600HR (148883)*      | c/w 60 inserts (145678) | LNMX151008PNR-M PM30P  | 149798 <b>2,914.93</b> |
| 6" (Z=11) DS4 4600HR-M (148884)*   | c/w 60 inserts (145678) | LNMX151008PNR-M PM30P  | 149799 <b>3,332.20</b> |

\* non-coolant through

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

# Indexable Cutting Tools

## OKT-MAX Face Mill Kits



Consists of:  
 1 - OKT-MAX Face Mill  
 10 - OFKT 05T3 Inserts (Coated)

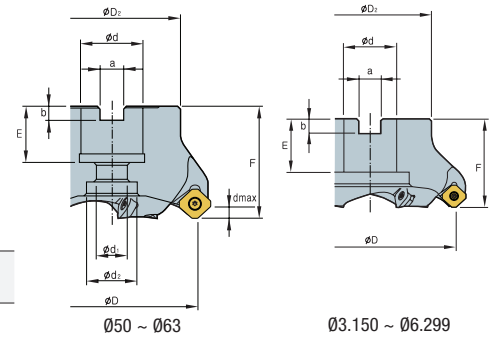
| Kit Contents  | Insert                           | Kit Code No. | Price \$ |
|---|----------------------------------|--------------|----------|
| 2" OKT-MAX Face Mill (147019) c/w 10 inserts (146843) | OFKT 05T3 PM25C Inserts (Coated) | 149863       | 941.22   |

Note: Each Kit Contains 146940 T15 Torx Wrench

## 45° Max Mill Kits



Consists of:  
 1 - MM 45° Face Mill  
 10 - SEXT 14M4 Inserts (Coated)



| Designation         | Cutter No. | $\phi D$ | $\phi d$ | $\phi D_2$ | $\phi d_1$ | $\phi d_2$ | a     | b     | E     | F     | No. of Inserts | d max |
|---------------------|------------|----------|----------|------------|------------|------------|-------|-------|-------|-------|----------------|-------|
| MM 45° Coarse Pitch |            |          |          |            |            |            |       |       |       |       |                |       |
| 4200FM              | 147811     | 2.000    | 0.750    | 1.654      | 0.433      | 0.709      | 0.321 | 0.181 | 0.787 | 1.575 | 3              | 0.256 |
| 4250FM              | 147812     | 2.500    | 0.750    | 1.654      | 0.433      | 0.709      | 0.321 | 0.181 | 0.787 | 1.575 | 4              |       |
| 4300FM              | 147813     | 3.000    | 1.000    | 1.969      | 0.551      | 0.827      | 0.384 | 0.248 | 0.866 | 1.969 | 5              |       |
| 4400FM              | 147814     | 4.000    | 1.250    | 2.362      | -          | 1.772      | 0.510 | 0.319 | 0.866 | 1.969 | 5              |       |

| Kit Contents                                   | Insert               | Kit Code No. | Price \$ |
|--|----------------------|--------------|----------|
| 2" Cutter (147811) c/w 10 inserts (147730)     | SEXT 14M4 AGSN PM25C | 149932       | 674.20   |
| 2" Cutter (147811) c/w 10 inserts (148182)     | SEXT 14M4 AGSN PM30P | 149933       | 674.20   |
| 2 1/2" Cutter (147812) c/w 10 inserts (147730) | SEXT 14M4 AGSN PM25C | 149934       | 796.78   |
| 2 1/2" Cutter (147812) c/w 10 inserts (148182) | SEXT 14M4 AGSN PM30P | 149935       | 796.78   |
| 3" Cutter (147813) c/w 10 inserts (147730)     | SEXT 14M4 AGSN PM25C | 149936       | 1,072.45 |
| 3" Cutter (147813) c/w 10 inserts (148182)     | SEXT 14M4 AGSN PM30P | 149937       | 1,072.45 |
| 4" Cutter (147814) c/w 10 inserts (147730)     | SEXT 14M4 AGSN PM25C | 149938       | 1,264.54 |
| 4" Cutter (147814) c/w 10 inserts (148182)     | SEXT 14M4 AGSN PM30P | 149939       | 1,264.54 |

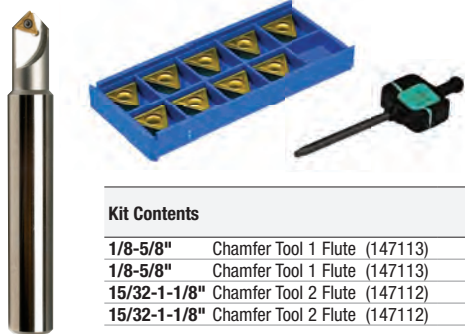
## Alumimill Kits



Consists of:  
 1 - AMFM Face Mill Complete With  
 VCKT 43.57.5 Inserts (Polished)

| Kit Contents                                     | Insert                | Kit Code No. | Price \$ |
|--|-----------------------|--------------|----------|
| 2" Face Mill (147424) c/w 3 inserts (147425)     | VCKT 43.57.5 NA KT10U | 149927       | 784.42   |
| 2-1/2" Face Mill (147834) c/w 4 inserts (147425) | VCKT 43.57.5 NA KT10U | 149928       | 978.87   |
| 3" Face Mill (147470) c/w 4 inserts (147425)     | VCKT 43.57.5 NA KT10U | 149929       | 1,019.51 |
| 4" Face Mill (147471) c/w 5 inserts (147425)     | VCKT 43.57.5 NA KT10U | 149930       | 1,253.78 |

## Chamfer Tool Kits



**Consists of:**  
 1 - CT 45° Chamfer Tool  
 10 - TCMT/TCGT Inserts

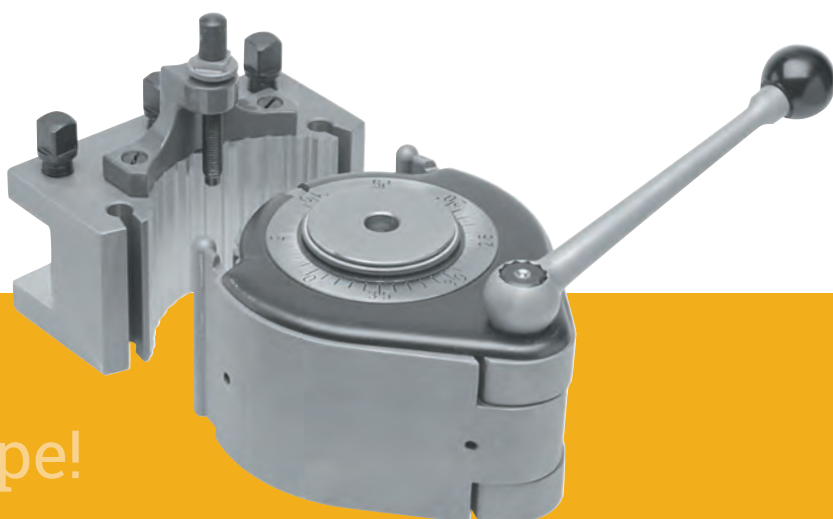
| Kit Contents |                               |                         | Insert                                 | Kit Code No. | Price \$ |
|--------------|-------------------------------|-------------------------|--|--------------|----------|
| 1/8-5/8"     | Chamfer Tool 1 Flute (147113) | c/w 10 inserts (148811) | TCMT 21.51 Inserts (Coated)            | 149853       | 526.08   |
| 1/8-5/8"     | Chamfer Tool 1 Flute (147113) | c/w 10 inserts (146506) | TCGT 21.52 Inserts For <b>Aluminum</b> | 149854       | 591.68   |
| 15/32-1-1/8" | Chamfer Tool 2 Flute (147112) | c/w 10 inserts (148707) | TCMT 32.52 Inserts (Coated)            | 149855       | 385.28   |
| 15/32-1-1/8" | Chamfer Tool 2 Flute (147112) | c/w 10 inserts (146508) | TCGT 32.52 Inserts For <b>Aluminum</b> | 149856       | 476.88   |

## Mold Mill Kits



**Consists of:**  
 1 - Mold Mill  
 2 - RC Inserts (Coated)

| Kit Contents |                                   |                                    | Kit Code No. | Price \$ |
|--------------|-----------------------------------|------------------------------------|--------------|----------|
| 5/8"         | Standard Length Moldmill (148094) | c/w 2pcs RC-5/8 Inserts (147858)   | 149912       | 977.93   |
| 5/8"         | Medium Length Moldmill (147853)   | c/w 2pcs RC-5/8 Inserts (147858)   | 149913       | 1,048.03 |
| 5/8"         | Long Length Moldmill (148095)     | c/w 2pcs RC-5/8 Inserts (147858)   | 149914       | 1,053.49 |
| 3/4"         | Standard Length Moldmill (148096) | c/w 2pcs RC-3/4 Inserts (147859)   | 149915       | 717.87   |
| 3/4"         | Medium Length Moldmill (147854)   | c/w 2pcs RC-3/4 Inserts (147859)   | 149916       | 751.58   |
| 3/4"         | Long Length Moldmill (148097)     | c/w 2pcs RC-3/4 Inserts (147859)   | 149917       | 785.40   |
| 1"           | Standard Length Moldmill (148098) | c/w 2pcs RC-1 Inserts (147860)     | 149918       | 1,193.66 |
| 1"           | Medium Length Moldmill (147855)   | c/w 2pcs RC-1 Inserts (147860)     | 149919       | 840.00   |
| 1"           | Long Length Moldmill (148099)     | c/w 2pcs RC-1 Inserts (147860)     | 149920       | 1,343.07 |
| 1-1/8"       | Standard Length Moldmill (148100) | c/w 2pcs RC-1-1/8 Inserts (147861) | 149923       | 1,328.36 |
| 1-1/8"       | Medium Length Moldmill (147856)   | c/w 2pcs RC-1-1/8 Inserts (147861) | 149924       | 756.72   |
| 1-1/8"       | Long Length Moldmill (148102)     | c/w 2pcs RC-1-1/8 Inserts (147861) | 149925       | 1,831.70 |
| 1-1/4"       | Standard Length Moldmill (148103) | c/w 2pcs RC-1-1/4 Inserts (147862) | 149921       | 1,359.72 |
| 1-1/4"       | Medium Length Moldmill (147857)   | c/w 2pcs RC-1-1/4 Inserts (147862) | 149922       | 952.61   |
| 1-1/4"       | Long Length Moldmill (148104)     | c/w 2pcs RC-1-1/4 Inserts (147862) | 149926       | 1,022.75 |



We've got your type!

No matter your machine or preference,  
 we've got the tool post and holders you need.

See Pages H132-135

## MCLNR/L Turning Kits



Consists of:  
1 - MCLNR/L Toolholder  
10 - CNMG 432 Inserts (Coated)

| Application      | Material        | Kit Contents  | Right Hand Kit Code No. | Price \$      | Left Hand Kit Code No. | Price \$      |
|------------------|-----------------|---|-------------------------|---------------|------------------------|---------------|
| Finishing        | Steel           | 1pc MCLNR 16-4D (145828) 10pcs CNMG 432 F2 PT15C (149390)                       | 149348                  | <b>394.55</b> | -                      | -             |
| Medium/Finishing | Steel           | 1pc MCLNR 16-4D (145828) 10pcs CNMG 432 M PT25C (149231)                        | 149363                  | <b>394.55</b> | -                      | -             |
| Medium           | Steel           | 1pc MCLNR 16-4D (145828)/MCLNL 16-4D (145-829) 10pcs CNMG 432 MM PT25C (149256) | 149374                  | <b>398.05</b> | 149379                 | <b>392.77</b> |
| Roughing         | Steel           | 1pc MCLNR 16-4D (145828) 10pcs CNMG 432 R1 PT25C (149254)                       | 149395                  | <b>394.55</b> | -                      | -             |
| Medium           | Stainless Steel | 1pc MCLNR 16-4D (145828) 10pcs CNMG 432 MM MT20C (146765)                       | 149803                  | <b>394.55</b> | -                      | -             |
| Medium           | Cast Iron       | 1pc MCLNR 16-4D (145828) 10pcs CNMA 432 KT10C (147473)                          | 149804                  | <b>394.55</b> | -                      | -             |

## MDJNR/L Turning Kits



Consists of:  
1 - MDJNR/L Toolholder  
10 - DNMG 432 Inserts (Coated)

| Application      | Material        | Kit Contents  | Right Hand Kit Code No. | Price \$      | Left Hand Kit Code No. | Price \$      |
|------------------|-----------------|---|-------------------------|---------------|------------------------|---------------|
| Finishing        | Steel           | 1pc MDJNR 16-4D (145845) 10pcs DNMG 432 F2 PT15C (149435)                       | 149396                  | <b>327.20</b> | -                      | -             |
| Medium/Finishing | Steel           | 1pc MDJNR 16-4D (145845) 10pcs DNMG 432 M PT25C (149233)                        | 149397                  | <b>428.27</b> | -                      | -             |
| Medium           | Steel           | 1pc MDJNR 16-4D (145845)/MDJNL 16-4D (145-846) 10pcs DNMG 432 MM PT25C (149279) | 149429                  | <b>431.97</b> | 149431                 | <b>431.97</b> |
| Medium           | Stainless Steel | 1pc MDJNR 16-4D (145845) 10pcs DNMG 432 MM MT20C (146768)                       | 149810                  | <b>428.27</b> | -                      | -             |

## MTGNR Turning Kits



Consists of:  
1 - MTGNR Toolholder  
10 - TNMG 432 Inserts (Coated)

| Application      | Material | Kit Contents  | Right Hand Kit Code No. | Price \$      |
|------------------|----------|---|-------------------------|---------------|
| Medium/Finishing | Steel    | 1pc MTGNR 16-4D (145814) 10pcs TNMG 432 M PT25C (149228)  | 149433                  | <b>440.15</b> |
| Roughing         | Steel    | 1pc MTGNR 16-4D (145814) 10pcs TNMG 432 MM PT25C (149234) | 149443                  | <b>440.15</b> |

## MTJNR/L Turning Kits



**Consists of:**  
 1 - MTJNR/L Toolholder  
 10 - TNMG 432 Inserts (Coated)

| Application      | Material | Kit Contents   | Right Hand Kit Code No. | Price \$      | Left Hand Kit Code No. | Price \$      |
|------------------|----------|--|-------------------------|---------------|------------------------|---------------|
| Medium Finishing | Steel    | 1pc MTJNR 16-4D (145757) 10pcs TNMG 432 M PT25C (149228)                                 | 149447                  | <b>426.53</b> | -                      | -             |
| Medium           | Steel    | 1pc MTJNR 16-4D 1" Shank (145757)/MTJNL 16-4D (145756) 10pcs TNMG 432 MM PT25C (149234)  | 149451                  | <b>426.53</b> | 149453                 | <b>426.53</b> |
| Medium           | Steel    | 1pc MTJNR 12-3D 3/4" Shank (145887)/MTJNL 12-3B (145888) 10pcs TNMG 322 G PT30C (146093) | 149818                  | <b>327.91</b> | 149821                 | <b>327.91</b> |
| Medium           | Steel    | 1pc MTJNR 10-3B 5/8" Shank (145891)/MTJNL 10-3B (145892) 10pcs TNMG 322 G PT30C (146093) | 149819                  | <b>319.68</b> | 149822                 | <b>319.68</b> |

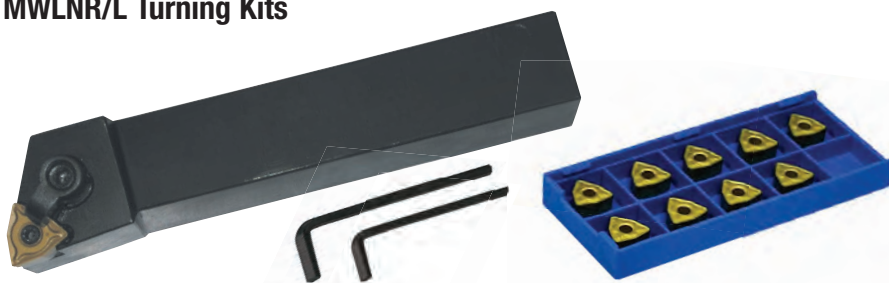
## MVJNR/L Turning Kits



**Consists of:**  
 1 - MVJNR/L Toolholder  
 10 - VNMG 332 Inserts (Coated)

| Application | Material | Kit Contents  | Right Hand Kit Code No. | Price \$      | Left Hand Kit Code No. | Price \$      |
|-------------|----------|---|-------------------------|---------------|------------------------|---------------|
| Medium      | Steel    | 1pc MVJNR 16-3D (145893)/MVJNL 16-3D (145738) 10pcs VNMG 332 M PT25C (149265) | 149455                  | <b>436.47</b> | 149457                 | <b>436.47</b> |

## MWLNLR/L Turning Kits



**Consists of:**  
 1 - MWLNLR/L Toolholder  
 10 - WNMG 432 Inserts (Coated)

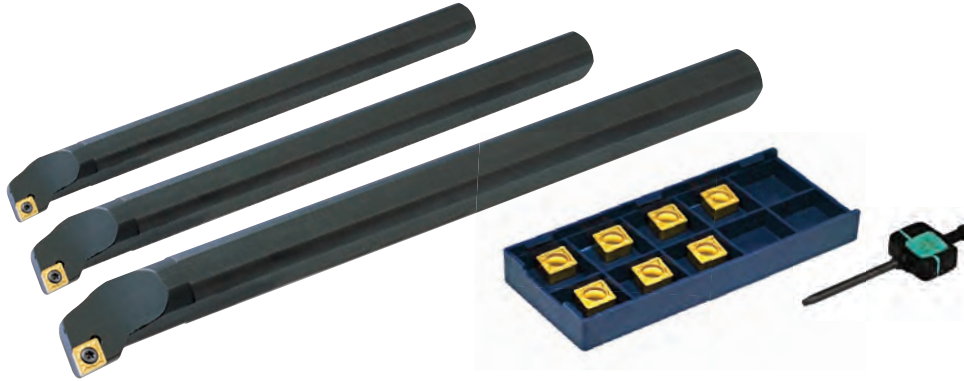
| Application   | Material        | Kit Contents  | Right Hand Kit Code No. | Price \$      | Left Hand Kit Code No. | Price \$      |
|---------------|-----------------|---|-------------------------|---------------|------------------------|---------------|
| Medium Finish | Steel           | 1pc MWLNLR 16-4D (145808) 10pcs WNMG 432 M PT25C (149248)                                   | 149459                  | <b>329.23</b> | -                      | -             |
| Medium        | Steel           | 1pc MWLNLR 16-4D 1" Shank (145808)/MWLNLR 16-4D (145809) 10pcs WNMG 432 MM PT25C (149249)   | 149461                  | <b>328.73</b> | 149463                 | <b>392.27</b> |
| Medium        | Steel           | 1pc MWLNLR 12-4D 3/4" Shank (145875)/MWLNLR 12-4D (145876) 10pcs WNMG 432 MM PT25C (149249) | 149465                  | <b>372.30</b> | 149467                 | <b>372.30</b> |
| Medium        | Stainless Steel | 1pc MWLNLR 16-4D (145808) 10pcs WNMG 432 MM MT20C (146769)                                  | 149827                  | <b>329.23</b> | -                      | -             |
| Medium        | Cast Iron       | 1pc MWLNLR 16-4D (145808) 10pcs WNMA 432 KT05C (147429)                                     | 149828                  | <b>394.55</b> | -                      | -             |
| Roughing      | Cast Iron       | 1pc MWLNLR 16-4D (145808) 10pcs WNMA 432 KT10C (147672)                                     | 149829                  | <b>295.13</b> | -                      | -             |

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Images are representational only and may not reflect actual product.

# Indexable Cutting Tools

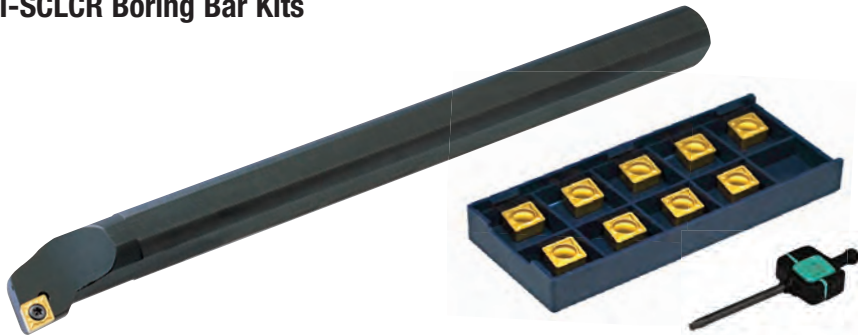
## SI-SCLCR/L Master Boring Bar Kits



**Consists of:**  
 1 - 5/8" Ø B/Bar, SI-SCLCR 10-3 (145925)  
 1 - 3/4" Ø B/Bar, SI-SCLCR 12-3 (145926)  
 1 - 1" Ø B/Bar, SI-SCLCR 16-3 (145927)  
 10 - CCMT 32.51 inserts  
 1 - wrench (146940)

| Application | Material | Kit Contents                            | Right Hand Kit Code No.             | Price \$ | Left Hand Kit Code No. | Price \$      |
|-------------|----------|---|-------------------------------------|----------|------------------------|---------------|
| Medium      | Steel    | 1pc SI SCLCR 5/8", 3/4", 1" Boring Bars | 10pcs CCMT 32.51 F2P PT25C (149220) | 149471   | 612.04                 | -             |
| Medium      | Steel    | 1pc SI SCLCL 5/8", 3/4", 1" Boring Bars | 10pcs CCMT 32.51 F2P PT25C (149220) | -        | -                      | 149473 663.80 |
| Medium      | Aluminum | 1pc SI SCLCR 5/8", 3/4", 1" Boring Bars | 10pcs CCGT 32.51 AP KT10U (146011)  | 149847   | 685.37                 | -             |

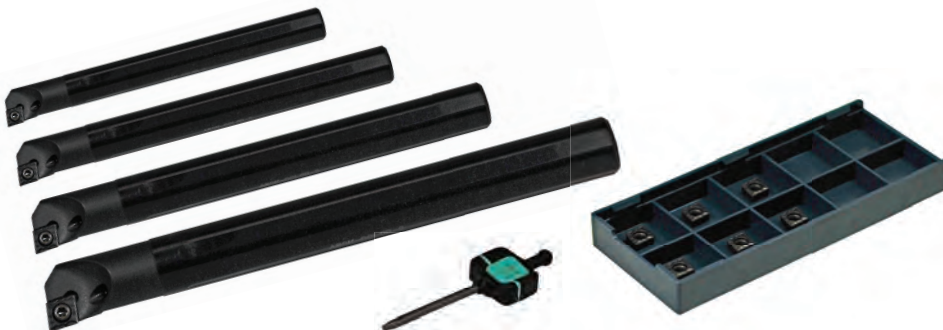
## SI-SCLCR Boring Bar Kits



**Consists of:**  
 1 - SI-SCLCR Boring Bar  
 10 - CCMT 32.51 Inserts (Coated)

| Application | Material | Kit Contents                    | Right Hand Kit Code No.             | Price \$      |
|-------------|----------|---------------------------------|-------------------------------------|---------------|
| Medium      | Steel    | 1pc SI SCLCR 10-3(5/8")(145925) | 10pcs CCMT 32.51 F2P PT25C (149220) | 149475 266.77 |
| Medium      | Steel    | 1pc SI SCLCR 12-3(3/4")(145926) | 10pcs CCMT 32.51 F2P PT25C (149220) | 149477 293.80 |
| Medium      | Steel    | 1pc SI SCLCR 16-3(1")(145927)   | 10pcs CCMT 32.51 F2P PT25C (149220) | 149479 328.20 |

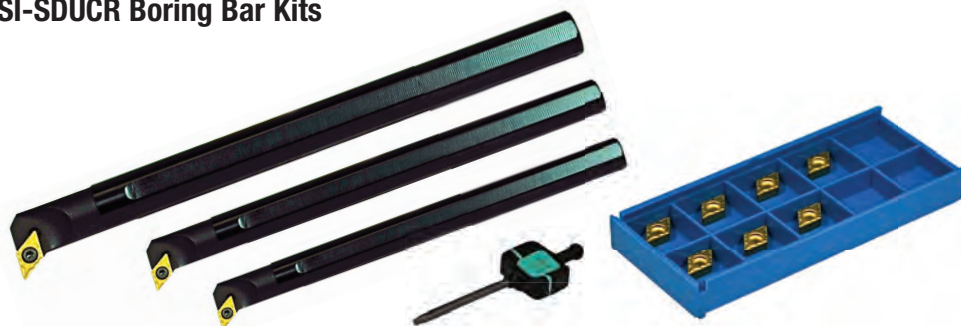
## A-SCLCR Coolant Through Boring Bar Kits



**Consists of:**  
 1 - 5/16" Ø B/Bar, A-SCLCR 5-2 (146589)  
 1 - 3/8" Ø B/Bar, A-SCLCR 6-2 (146590)  
 1 - 1/2" Ø B/Bar, A-SCLCR 8-2 (146591)  
 1 - 5/8" Ø B/Bar, A-SCLCR 10-2 (147348)  
 1 - wrench (146939)  
 10 - CC\_T21.51 Inserts

| Application | Material | Kit Contents                       | Right Hand Kit Code No.               | Price \$      |
|-------------|----------|------------------------------------|---------------------------------------|---------------|
| Finishing   | Steel    | 1pc A-SCLCR 5/16", 3/8", 1/2", 5/8 | 10pcs CCMT 21.50.5 F2P PT25C (149252) | 149481 735.85 |
| Medium      | Steel    | 1pc A-SCLCR 5/16", 3/8", 1/2", 5/8 | 10pcs CCMT 21.51 F2P PT25C (149227)   | 149483 735.75 |
| Medium      | Aluminum | 1pc A-SCLCR 5/16", 3/8", 1/2", 5/8 | 10pcs CCGT 21.51 AP KT10U (146024)    | 149850 640.18 |

## SI-SDUCR Boring Bar Kits



**Consists of:**

- 1 - 3/8"  $\emptyset$  B/Bar, SI-SDUCR 6-2 (145939)
- 1 - 1/2"  $\emptyset$  B/Bar, SI-SDUCR 8-2 (145940)
- 1 - 5/8"  $\emptyset$  B/Bar, SI-SDUCR 10-2 (145941)
- 10 DC\_\_T21.51 Inserts

| Application | Material | Kit Contents  | Right Hand Kit Code No. | Price \$ |
|-------------|----------|---|-------------------------|----------|
| Medium      | Steel    | 1pc SI-SDUCR 3/8", 1/2", 5/8" Boring Bars 10pcs DCMT 21.51 F2P PT25C (149260) | 149485                  | 483.53   |
| Medium      | Aluminum | 1pc SI-SDUCR 3/8", 1/2", 5/8" Boring Bars 10pcs DCGT 21.51 AP KT10U (146989)  | 149852                  | 505.16   |

## External Threading Kits



**Consists of:**

- 1 - ETH3 Toolholder
- 2 - ECTR 300 Inserts (Coated)

| Kit Contents   | Insert              | Kit Code No. | Price \$ |
|--|---------------------|--------------|----------|
| 3/4" Toolholder (146708) c/w 2pcs 3/8" Partial Profile inserts Coated (146597) | ECTR 300 8-28 PM30P | 149839       | 225.60   |
| 1" Toolholder (146290) c/w 2pcs 3/8" Partial Profile inserts Coated (146597)   | ECTR 300 8-28 PM30P | 149840       | 239.63   |

## Internal Threading Kits



**Consists of:**

- 1 - ITH3 Toolholder
- 2 - ICTR 300 Inserts (Coated)

| Kit Contents   | Insert              | Kit Code No. | Price \$ |
|--|---------------------|--------------|----------|
| 3/4" Toolholder (146255) c/w 2pcs - 3/8" Partial Profile inserts Coated (146610)   | ICTR 300 8-28 PM30P | 149842       | 289.13   |
| 1" Toolholder (146254) c/w 2pcs - 3/8" Partial Profile inserts Coated (146610)     | ICTR 300 8-28 PM30P | 149843       | 324.26   |
| 1-1/4" Toolholder (146256) c/w 2pcs - 3/8" Partial Profile inserts Coated (146610) | ICTR 300 8-28 PM30P | 149879       | 396.80   |



## PRO Part Off Kits



- Consists of:**  
 1 - PP-B Part Off Blade  
 10 - SP 300 Inserts (Coated)  
 1 - SW15S Wrench

| Kit Contents   | Insert      | Kit Code No. | Price \$ |
|--|-------------|--------------|----------|
| PP-B 326S 1" Blade (146232) c/w 10-1/8" inserts (146452)       | SP300 PT30C | 149835       | 434.96   |
| PP-B 332S 1-1/4" Blade (146898) c/w 10-1/8" inserts (146452)   | SP300 PT30C | 149836       | 425.53   |
| PP-B 432S 1-1/4" Blade (146899) c/w 10-0.161" inserts (146454) | SP400 PT30C | 147441       | 432.43   |

## PRO Part Off Kits



- Consists of:**  
 1 - PP-B Part Off Blade  
 1 - P.O.B. Part Off Block  
 10 - SP 300 Inserts (Coated)  
 1 - SW15S Wrench

| Kit Contents  | Insert      | Kit Code No. | Price \$ |
|---|-------------|--------------|----------|
| PP-B 326S 1" Blade (146232) c/w 10-1/8" inserts (146452) & P.O.B. 19-5 Part Off Block (146510)        | SP300 PT30C | 149837       | 671.40   |
| PP-B 326S 1-1/4" Blade (146898) c/w 10-1/8" inserts (146452) & P.O.B. 25; 4-6 Part Off Block (145895) | SP300 PT30C | 149838       | 631.37   |

## MTG — Multi Turn Groove Kits



- Consists of:**  
 1 - MGEHR Toolholder  
 5 - MGMN Inserts (Coated)

| Kit Contents  | Insert          | Kit Code No. | Price \$ |
|---|-----------------|--------------|----------|
| MGEHR 16-3 1" Shank (148066) c/w 5-3mm inserts (149225) | MGMN 300M PT25C | 149640       | 343.72   |
| MGEHR 16-4 1" Shank (148074) c/w 5-4mm inserts (149237) | MGMN 400M PT25C | 149642       | 353.12   |

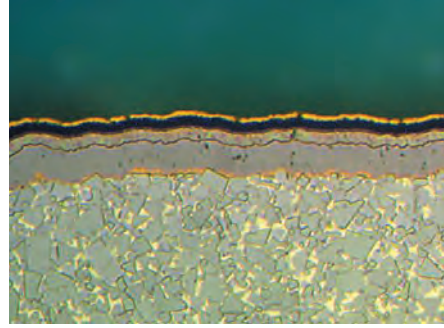
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## Special Features

- 1) Having superior wear resistance and toughness at the same time due to special crystalline structure of film
- 2) High bonding strength between film and substrate by adopting new-coating technology.



- TiN** Reduces Friction-Force
- Al<sub>2</sub>O<sub>3</sub>** Wear Resistance, Prevents Edge Build-Up
- TiC** Wear Resistance
- TiCN** Enhancing Wear-resistance and toughness by adopting New-Coating Tech.

Cross-sectional view of CVD coating film

## Guide of Grade Selection

### ■ Turning

| Workpiece            | Cutting Condition    | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO            | Application Range |
|----------------------|----------------------|------------------------|---------------------|----------------|-------------------|
| Steel                | Continuous Cutting   | PT10C                  | 925(725 ~ 1150)     | P01            |                   |
|                      |                      | PT25C                  | 918(590 ~ 1,246)    | P10            |                   |
|                      | Intermittent Cutting | PT20C                  | 600(500 ~ 650)      | P20            |                   |
|                      |                      | PT30C                  | 500(400 ~ 650)S     | P30            |                   |
|                      | Cast Iron            | Continuous Cutting     | KT05C               | 825(500 ~ 975) |                   |
| KT10C                |                      |                        | 725(500 ~ 875)      | K01            |                   |
| Intermittent Cutting |                      | KT10C                  | 600(500 ~ 825)      | K10            |                   |
|                      |                      |                        |                     | K20            |                   |
| Stainless Steel      | Continuous Cutting   | MT20C                  | 550(400 ~ 725)      | K30            |                   |
|                      |                      |                        |                     | K01            |                   |
|                      | Intermittent Cutting | PT30C                  | 325(250 ~ 400)      | M01            |                   |
|                      |                      |                        |                     | M10            |                   |

### ■ Milling

| Workpiece | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO | Application Range |
|-----------|------------------------|---------------------|-----|-------------------|
| Steel     | PM25C                  | 825(500 ~ 975)      | P20 |                   |
|           |                        |                     | M20 |                   |
|           | PM30C                  | 650(500 ~ 825)      | P30 |                   |
| M30       |                        |                     |     |                   |
| Cast Iron | KM20C                  | 650(500 ~ 825)      | P40 |                   |
|           |                        |                     | M40 |                   |
|           |                        |                     | K10 |                   |
|           |                        |                     | K20 |                   |
|           |                        |                     | K30 |                   |

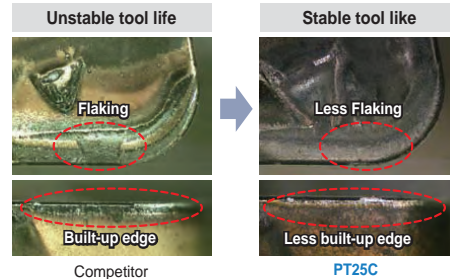
## Introducing The New & Improved PT25C

### Features of PT25C [New coating layer with oxidation resistance and adhesion]

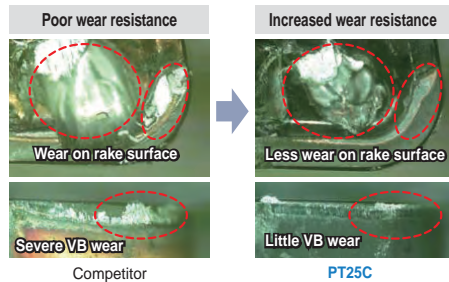
- Universal grade especially for machining forged automobile components and bearing steel both in continuous and interrupted cutting
- Available for all kinds of steels - carbon steel, alloy steel, rolled steel, tool steel, mild steel, bearing steel and other special kinds of steel
- New coating technology increases welding resistance and chipping resistance, which leads to longer tool life

Stable tool life  
 > Higher production stability

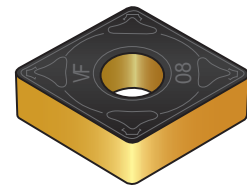
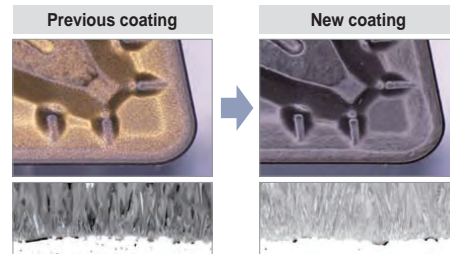
Longer tool life & Higher removal rate  
 > High cutting conditions and shorter cutting time available



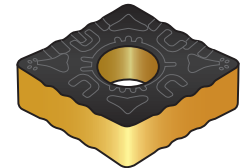
Ideal combination of a grade and chip breakers  
 > Prolongs tool life  
 > Wide applications ranging from roughing to finishing



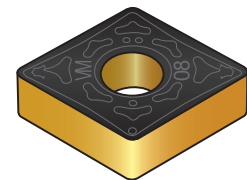
Disperse cutting force > Reduce chipping >  
 Increase tool life > Improved productivity



[ For Finishing ]



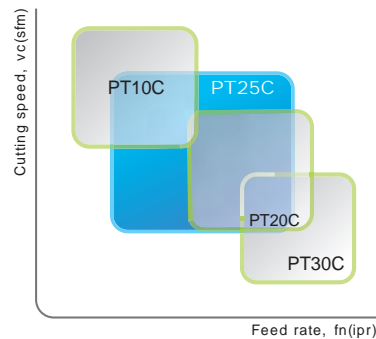
[ For medium-finishing ]



[ For medium machining ]

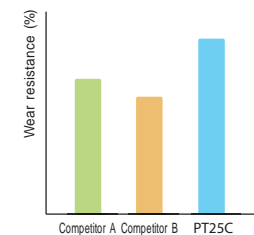
**Increased wear resistance, welding resistance, and chipping resistance**

### Application and Features

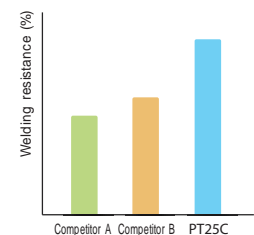


- General grade for all kinds of steel (carbon steel, alloy steel, rolled steel, tool steel, mild steel, bearing steel, etc.) in both continuous and interrupted machining
- Longer tool life in high speed machining due to improved wear resistance and plastic deformation resistance
- Improved coating layer with superior adhesion improves chipping resistance and stability of machining
- Fine finished coating surface provides welding resistance, superior lubrication, and lower cutting load

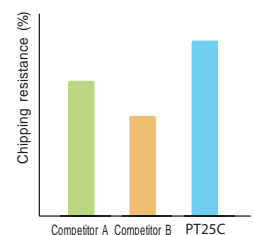
#### Wear resistance



#### Welding resistance



#### Chipping resistance



### Recommended Cutting

| Workpiece | Recommended grade   | vc(sfm) | ISO             | Application range |
|-----------|---------------------|---------|-----------------|-------------------|
| P Steel   | Continuous cutting  | PT10C   | 984(656~ 1,312) | P01               |
|           |                     | PT25C   | 918(590~ 1,246) | P10               |
|           |                     | PT20C   | 820(492~ 1,148) | P15               |
|           | Interrupted cutting | PT30C   | 656(492~ 820)   | P20               |
|           |                     | PTM50C  | 623(328~ 754)   | P20               |
|           |                     |         |                 | P30               |
|           |                     |         |                 | P35               |
|           |                     |         | P40             |                   |



CVD Coating Grades



| Grade | ISO                    | Special Features  | Use     |
|-------|------------------------|---|---------|
| PT10C | P05 - P15              | <ul style="list-style-type: none"> <li>For high speed machining of steel</li> <li>Optimal for high speed machining of steel due to the combination of high hardness substrate and CVD Al<sub>2</sub>O<sub>3</sub> film</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>  | Turning |
| PT15C | P10 - P20              | <ul style="list-style-type: none"> <li>For medium to high speed machining of steel</li> <li>Excellent combination of toughness and wear resistance</li> <li>Stable consistent cutting performance</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>   | Turning |
| PT25C | P15 - P30              | <ul style="list-style-type: none"> <li>For medium cutting of steel</li> <li>Excellent combination of tough substrate and coating having superior chipping resistance providing stable and consistent cutting performance</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>  | Turning |
| PT30C | P25 - P35<br>M15 - M25 | <ul style="list-style-type: none"> <li>For medium to roughing and intermittent cutting of steel and stainless steel</li> <li>Toughest substrate provides wide available application range</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>   | Turning |
| PT40C | P25 - P40<br>M15 - M25 | <ul style="list-style-type: none"> <li>For medium to roughing and intermittent cutting of steel and stainless steel</li> <li>Toughest substrate provides wide available application range</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>   | Turning |
| KT05C | K05 - K15              | <ul style="list-style-type: none"> <li>For high speed cutting of cast iron</li> <li>High hardness substrate and thick CVD Al<sub>2</sub>O<sub>3</sub> coating provide excellent wear resistance</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>   | Turning |
| KT10C | K10 - K25              | <ul style="list-style-type: none"> <li>For general, high efficient cutting of cast iron</li> <li>Special substrate suitable for fast feed and deep depth of cut and thick CVD Al<sub>2</sub>O<sub>3</sub> coating provide stable and consistent cutting performance</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul> | Turning |
| MT20C | M10 - M20              | <ul style="list-style-type: none"> <li>For high speed cutting of stainless steel</li> <li>Special substrate having excellent thermal properties and CVD coating having superior chipping resistance provide longer tool life</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>  | Turning |
| PM10C | P05 - P15              | <ul style="list-style-type: none"> <li>For high speed machining of steel</li> <li>Optimal for high speed machining of steel due to the combination of high hardness substrate and CVD Al<sub>2</sub>O<sub>3</sub> film</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>  | Milling |
| PM25C | P20 - P30<br>M20 - M30 | <ul style="list-style-type: none"> <li>For high speed milling of steel and stainless steel</li> <li>Optimal substrate and coating having optimal wear resistance and toughness provide consistent tool life</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>   | Milling |
| PM30C | P30 - P40<br>M30 - M40 | <ul style="list-style-type: none"> <li>For intermittent and rough milling of steel and stainless steel</li> <li>Tough substrate provide stable cutting even at severe intermittent cutting</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub> + TiN</li> </ul>  | Milling |
| KM20C | K15 - K25              | <ul style="list-style-type: none"> <li>For general milling of cast iron</li> <li>Tough substrate and fine grain size Al<sub>2</sub>O<sub>3</sub> coating provide wide available cutting range for both dry and wet cutting</li> <li>MT-TiCN + Al<sub>2</sub>O<sub>3</sub></li> </ul>  | Milling |

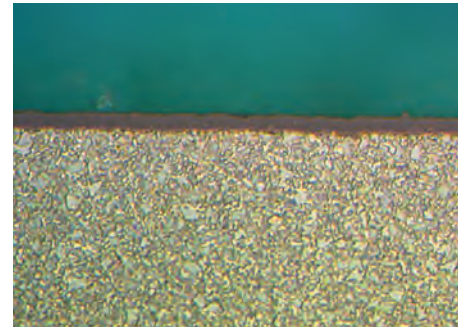
## Special Features



- 1) PVD coating technique has inherent advantage such as superior chipping resistance of coated film itself and maintains the toughness of carbide substrate. Thus it is possible to increase the tool life approximately 2~4 times longer than carbide cutting tools.
- 2) PVD coating can make sharp cutting edge without blunting of sharp substrate.
- 3) Ti-base coating film can provide excellent surface finish and high accuracy machining due to the low affinity of Ti film and workpiece.

## SOWA PVD Trio

- PM30P** Steel milling grade equipped with tough substrate and Nano-TiAlN coating film.
- MT30P** Exclusive grade for turning of stainless steel consisting of tough substrate and TiAlN coating film.
- MM30P** Exclusive grade for milling of stainless steel consisting ultra fine grain size substrate and TiAlN coating film.



Cross-sectional view of PVD coating film

## Guide of Grade Selection

### ■ Turning

| Workpiece       | Cutting Condition | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO | Application Range |
|-----------------|-------------------|------------------------|---------------------|-----|-------------------|
| Steel           | TiAlN             |                        | 600(400 ~ 750)      | P10 |                   |
|                 |                   |                        |                     | P20 |                   |
|                 | TiCN              |                        | 425(305 ~ 525)      | P30 |                   |
|                 |                   |                        |                     | P40 |                   |
| Cast Iron       | TiAlN             |                        | 650(500 ~ 825)      | K01 |                   |
|                 |                   |                        |                     | K10 |                   |
|                 | TiAlN             |                        | 500(325 ~ 650)      | K20 |                   |
| Stainless Steel | TiAlN             | MT30P                  | 420(160 ~ 260)      | M20 | MT30P             |
|                 |                   |                        |                     | M30 |                   |
|                 |                   |                        |                     | M40 |                   |

### ■ Milling

| Workpiece       | Cutting Condition | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO | Application Range   |
|-----------------|-------------------|------------------------|---------------------|-----|---|
| Steel           | TiAlN             | PM10P                  | 650(500 ~ 825)      | P10 | PM10P                      PM30P                      PM40P |
|                 |                   |                        |                     | P20 |   |
|                 |                   | PM30P<br>PM40P         | 400(325 ~ 500)      | P30 |   |
|                 |                   |                        |                     | P40 |   |
| Cast Iron       | TiAlN             |                        | 650(500 ~ 825)      | K01 |   |
|                 |                   |                        |                     | K10 |   |
|                 | TiAlN             |                        | 500(325 ~ 650)      | K20 |   |
| Stainless Steel | TiAlN             | MM30P                  | 420(160 ~ 260)      | M20 | MM30P   |
|                 |                   |                        |                     | M30 |   |
|                 |                   |                        |                     | M40 |   |



PVD Coating Grades



| Grade | ISO       | Special Features  | Use                  |
|-------|-----------|---|----------------------|
| PM10P | P05 - P15 | <ul style="list-style-type: none"> <li>For milling of steel</li> <li>Tough exclusive substrate with Nano-TiAlN coating provides excellent wear resistance and toughness at the same time</li> <li>Nano-TiAlN coating</li> </ul>   | Milling              |
| PM30P | P10 - P25 | <ul style="list-style-type: none"> <li>For milling of steel</li> <li>Tough exclusive substrate with Nano-TiAlN coating provides excellent wear resistance and toughness at the same time</li> <li>Nano-TiAlN coating</li> </ul>   | Milling              |
| PM35P | P25 - P40 | <ul style="list-style-type: none"> <li>For milling of steel</li> <li>Tough exclusive substrate with Nano-TiAlN coating provides excellent wear resistance and toughness at the same time</li> <li>Nano-TiAlN coating</li> </ul>   | Milling              |
| PM40P | P25 - P40 | <ul style="list-style-type: none"> <li>For milling of steel</li> <li>Tough exclusive substrate with Nano-TiAlN coating provides excellent wear resistance and toughness at the same time</li> <li>Nano-TiAlN coating</li> </ul>   | Milling              |
| MT30P | M20 - M35 | <ul style="list-style-type: none"> <li>For medium to roughing, intermittent turning of stainless steel</li> <li>Toughest sub-micron substrate with PVD TiAlN coating prevents edge build-up, thus providing extended and consistent tool life</li> <li>TiAlN coating</li> </ul>   | Turning<br>Threading |
| MM30P | M35 - M45 | <ul style="list-style-type: none"> <li>For medium to rough milling of Stainless Steel</li> <li>Toughest sub-micron substrate provides excellent cutting performance at fast feed machining</li> <li>TiAlN coating</li> </ul>  | Milling              |
| KT15P | K10 - K20 | <ul style="list-style-type: none"> <li>Optimal grade for milling of cast iron at medium to low speed cutting</li> <li>Available for machining aluminum as well</li> <li>TiAlN coating</li> </ul>  | Milling              |
| SM20P | S20       | <ul style="list-style-type: none"> <li>For milling high temp alloys (inconel, titanium, stellite, haynes hastelloy)</li> <li>Special substrate with increased toughness for better shock resistance</li> <li>Special coating for increased oxidation resistance and anti-adhesion</li> <li>TiAl(ME)N coating</li> </ul> | Milling              |
| ST10P | S10       | <ul style="list-style-type: none"> <li>For turning high temp alloys (inconel, titanium, stellite, haynes hastelloy)</li> <li>Unique substrate combining high wear resistance and toughness</li> <li>Special PVD coating provides good wear resistance and anti-adhesion</li> <li>TiAl(ME)N coating</li> </ul>           | Turning              |

*Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.*

*Images are representational only and may not reflect actual product.*

## Cermet Grades





### Comparing with Coated Carbide

1. Suitable for light cutting (finishing)
2. Better wear resistance and surface finish can be acquired at the same cutting condition


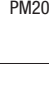



## Guide of Grade Selection

### ■ Turning

| Workpiece | Cutting Condition       | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO | Application Range   |
|-----------|-------------------------|------------------------|---------------------|-----|---|
| Steel     | Finishing               |                        |                     | P01 |   |
|           | Light to Medium Cutting | PT10S                  | 650(500 ~ 825)      | P10 |  |
|           |                         | PT20S                  | 650(425 ~ 825)      | P20 |  |

### ■ Milling

| Workpiece | Cutting Condition       | 1 <sup>st</sup> Choice | Cutting Speed (sfm) | ISO | Application Range   |
|-----------|-------------------------|------------------------|---------------------|-----|---|
| Steel     | Finishing               | PM20S                  | 750(500 ~ 975)      | P01 |  |
|           |                         |                        |                     | P10 |  |
|           | Light to Medium Cutting | PM30S                  | 650(500 ~ 825)      | P20 |  |

## Cermet Grades

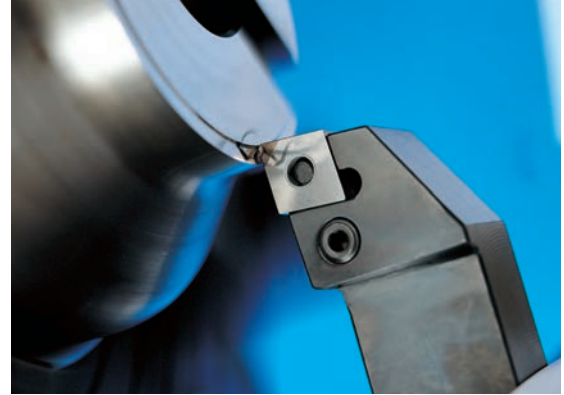


| SOWA Grade | ISO       | Special Features   | Use                |
|------------|-----------|--|--------------------|
| PT10S      | P05 - P15 | For turning of steel.<br>* Hard cermet having superior wear resistance   | Milling<br>Turning |
| PM20S      | P10 - P20 | For milling and turning of steel.<br>* General grade has optimal wear resistance and toughness at the same time.                               | Milling<br>Turning |
| PT20S      | P05 - P15 | Comprehensive grade can cover from roughing to finishing of steel.<br>* Special cermet developed with Functionally-Graded-Material technology. | Turning            |
| PM30S      | P20 - P30 | Exclusive for steel milling  | Milling            |



**Special Features**

CBN is a cutting tool material made under ultra high pressure and temperature sintering mixture of cubic boron nitride and special ceramic binder material. CBN tool is suitable for high speed precise machining of hardened steels and cast irons. Machining with CBN can replace conventional grinding process effectively.



**SOWA CBN Grades**

| Cutting Condition   | Special Features  | Workpiece  |
|---|---|--|
| <p>Graph for KB320: Cutting speed (V) ranges from 250 to 650 (sfm) and 0.0004 to 0.012 (ipr). Feed (f) ranges from 0.0004 to 0.012 (ipr). The graph shows a peak performance region for hardened steel.</p>                               | <p><b>KB320</b></p> <ul style="list-style-type: none"> <li>• Suitable for general cutting, intermittent and continuous cutting</li> <li>• Superior toughness</li> <li>• Comprehensive grade having optimal wear resistance and toughness</li> </ul> | <p><b>Hardened Steel</b><br/>HRC : 40 ~ 65</p>                       |
| <p>Graph for KB330: Cutting speed (V) ranges from 25 to 650 (sfm) and 0.0004 to 0.012 (ipr). Feed (f) ranges from 0.0004 to 0.012 (ipr). The graph shows a peak performance region for hardened steel.</p>                                | <p><b>KB330</b></p> <ul style="list-style-type: none"> <li>• Suitable for intermittent cutting</li> </ul>   | <p><b>Hardened Steel</b><br/>HRC : 40 ~ 65</p>                       |
| <p>Graph for KB350: Cutting speed (V) ranges from 325 to 2625 (sfm) and 0.004 to 0.020 (ipr). Feed (f) ranges from 0.004 to 0.020 (ipr). The graph shows performance for bainite and cast iron.</p>                                       | <p><b>KB350</b></p> <ul style="list-style-type: none"> <li>• Suitable for high speed finishing of cast iron</li> <li>• Comprehensive grade for machining of cast iron</li> </ul>  | <p><b>Cast Iron</b><br/>HRB : 180 ~ 250</p>                          |
| <p>Graph for KB360: Cutting speed (V) ranges from 175 to 4925 (sfm) and 0.0012 to 0.02 (ipr). Feed (f) ranges from 0.0012 to 0.02 (ipr). The graph shows performance for heat resisting alloy, sintered alloy, and chilled cast iron.</p> | <p><b>KB360</b></p> <ul style="list-style-type: none"> <li>• Suitable for high speed cutting of cast iron and milling of high hardness roll, sintered alloy as well</li> </ul>  | <p><b>FC, Sintered Alloy, Heat Resisting Alloy, Carbide Roll</b></p> |
| <p>Graph for KB420: Cutting speed (V) ranges from 325 to 650 (sfm) and 0.0004 to 0.012 (ipr). Feed (f) ranges from 0.0004 to 0.012 (ipr). The graph shows a peak performance region for hardened steel.</p>                               | <p><b>KB420</b></p> <ul style="list-style-type: none"> <li>• Unsurpassed tool life at high speed cut</li> <li>• High productivity</li> </ul>  | <p><b>Hardened Steel</b><br/>HRC : 40 ~ 65</p>                       |





## Cutting Conditions

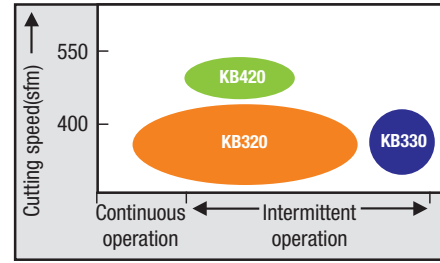
### Hardened Steel

#### ● Grade

| Grade | Application Range                      | Hardness | TRS (kgm <sup>2</sup> ) |
|-------|--|----------|-------------------------|
| KB320 | Comprehensive grade for hardened steel | >45HRC   | 100 ~ 110               |
| KB330 | Severe intermittent cutting            | >45HRC   | 110 ~ 120               |
| KB420 | For difficult intermittent operations  | >45HRC   | 110 ~ 120               |

TRS = Transverse ruptural strength

#### ● Application



### Cast Iron

#### ● Grade

| Grade | Application Range            | Hardness      | TRS (kgm <sup>2</sup> ) |
|-------|------------------------------|---------------|-------------------------|
| KB350 | Cast Iron, Ductile Cast Iron | 180 ~ 230 HRB | 100 ~ 110               |
| KB360 | Machining of Cast Iron       | 180 ~ 230 HRB | 95 ~ 110                |

TRS = Transverse ruptural strength

#### ● Application range

| Workpiece                  | Hardness (HRB) | Part Name         | Cutting Speed (sfm) |     |      |      |      |
|----------------------------|----------------|-------------------|---------------------|-----|------|------|------|
|                            |                |                   | 325                 | 650 | 1325 | 1975 | 2625 |
| GC250 (Ferrite & Pearlite) | 180            | Oil Pump Housing  |                     |     |      |      |      |
|                            |                | Brake Disc        |                     |     |      |      |      |
| GC300 Pearlite             | 250            | Engine Block      |                     |     |      |      |      |
| Alloy Iron Pearlite        | 250            | Scroll Compressor |                     |     |      |      |      |
|                            |                | Brake Drum Liner  |                     |     |      |      |      |
| GCD400 Ferrite & Pearlite  | 150            | Differential Case |                     |     |      |      |      |
| GCD700 Bainite             | 300            | Brake Body        |                     |     |      |      |      |
|                            |                | Knuckle           |                     |     |      |      |      |

### Sintered Alloy

#### ● Grade

| Grade | Application Range                                       | Hardness      | TRS (kgm <sup>2</sup> ) |
|-------|---|---------------|-------------------------|
| KB360 | Machining of sintered alloy, roll, heat resistant alloy | 180 ~ 230 HRB | 95 ~ 110                |

TRS = Transverse ruptural strength

#### ● Application range

|                       | Valve seat of gasoline engine | Valve seat of gasoline engine |
|-----------------------|-------------------------------|-------------------------------|
| Flange Cutting        |                               |                               |
| Traverse Cutting      |                               |                               |
| Hardness of Workpiece |                               |                               |

### Heat Resistant Alloy

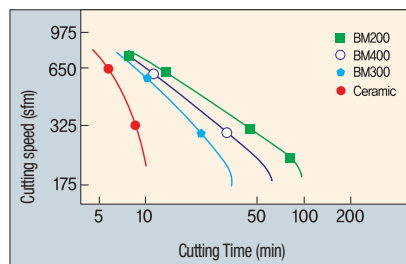
#### ● Grade

| Grade | Application Range                                       | Hardness      | TRS (kgm <sup>2</sup> ) |
|-------|---|---------------|-------------------------|
| KB360 | Machining of sintered alloy, roll, heat resistant alloy | 180 ~ 230 HRB | 95 ~ 110                |

TRS = Transverse ruptural strength

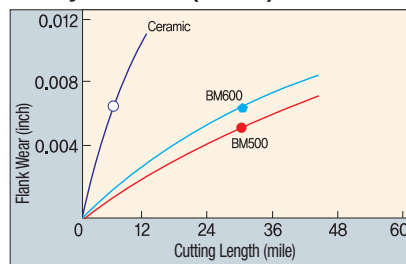
### Cutting Test Examples

#### ● Heat Treated Steels



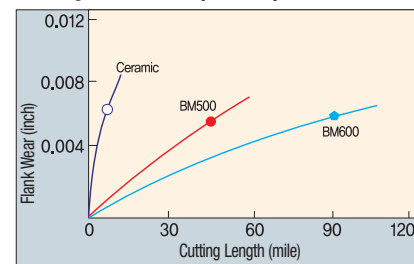
Workpiece: SUJ2(62-64 HRC) Cutting condition: V=250, 325, 650, 825sfm  
Insert: SNGN 432 f=0.004ipr d=0.008inch  
Cutting condition: BM200, BM300, BM400

#### ● Gray Cast Iron (No45B)



Workpiece: Gray cast irons (No35B) Cutting condition: V=1650sfm  
f=0.012ipr d=0.005inch, Wet cut

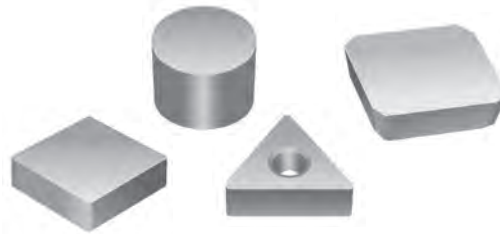
#### ● Gray Cast Iron (No35B)



Workpiece: Gray cast irons (No35B) Cutting condition: V=2300sfm  
f=0.01ipr d=0.01inch, Wet cut



## SOWA Ceramic Grades



| SOWA Grade | ISO                    | Special Features  | Use     |
|------------|------------------------|---|---------|
| GP100      | P01 - P10<br>K01 - K10 | Universal grade for machining cast iron and hardened steel. Tougher alternative to GP300. High thermal shock resistance. Al <sub>2</sub> O <sub>3</sub> +TiC grade with micrograin structure. | Turning |
| GP300      | P01 - P15<br>K01 - K15 | GP300 was developed for extremely hardened steel and high hardness alloy steel. It is a Al <sub>2</sub> O <sub>3</sub> +TiCN grade with micrograin structure.                                 | Turning |
| S300       | P01 - P15<br>K01 - K15 | Designed for high cutting speed of cast iron with heavy interruption.   | Milling |
| S400       | P01 - P20<br>K01 - K20 | The toughness and hardness of the edge were highly improved against wear for high speed cutting with heavy interruption. Especially in the automobile industry.                               | Milling |

## Recommended Cutting Condition

### ■ Turning






| Grade | Workpiece   | Cutting Style   | Speed (sfm)                | Feed (in/rev)                 | Depth (D.O.C.) (in)            |
|-------|---|-----------------|----------------------------|-------------------------------|--------------------------------|
| GP100 | Gray Cast Iron <ul style="list-style-type: none"> <li>• Gray Cast Iron (FC)</li> <li>• Malleable (FCMB)</li> <li>• Ductile Cast Iron (FCD)</li> </ul> | Rough<br>Finish | 450 ~ 2,400<br>600 ~ 3,600 | 0.008 ~ 0.02<br>0.012 ~ 0.02  | 0.118 ~ 0.236<br>0.004 ~ 0.020 |
|       |   |                 | Rough<br>Finish            | 90 ~ 300<br>150 ~ 600         | 0.004 ~ 0.008<br>0.002 ~ 0.006 |
| GP300 | Steel <ul style="list-style-type: none"> <li>• Carbon Steel</li> <li>• Alloy Steel</li> <li>• Bearing Steel</li> </ul>                                | Rough<br>Finish | 450 ~ 1,200<br>600 ~ 2,400 | 0.008 ~ 0.02<br>0.002 ~ 0.008 | 0.079 ~ 0.197<br>0.004 ~ 0.020 |
|       |   |                 | Rough<br>Finish            | 60 ~ 300<br>120 ~ 600         | 0.004 ~ 0.008<br>0.002 ~ 0.02  |

### ■ Milling






| Grade | Workpiece  | Cutting Style   | Speed (sfm)                | Feed (in/rev)                  | Depth (D.O.C.) (in)            |
|-------|--|-----------------|----------------------------|--------------------------------|--------------------------------|
| S300  | <ul style="list-style-type: none"> <li>• Gray Cast Iron</li> </ul>                           | Rough<br>Finish | 300 ~ 3,600<br>450 ~ 4,500 | 0.012 ~ 0.020<br>0.012 ~ 0.028 | 0.118 ~ 0.236<br>0.004 ~ 0.020 |
| S400  | <ul style="list-style-type: none"> <li>• Ductile Cast Iron</li> <li>• Alloy Steel</li> </ul> | Rough           | 270 ~ 1,500                | 0.004 ~ 0.012                  | <0.197                         |
|       |  | Medium          | 300 ~ 2,100                | 0.004 ~ 0.016                  | <0.118                         |
|       |  | Finish          | 600 ~ 4,500                | 0.004 ~ 0.020                  | <0.118                         |

## Guide of Grade Selection

### ■ Turning

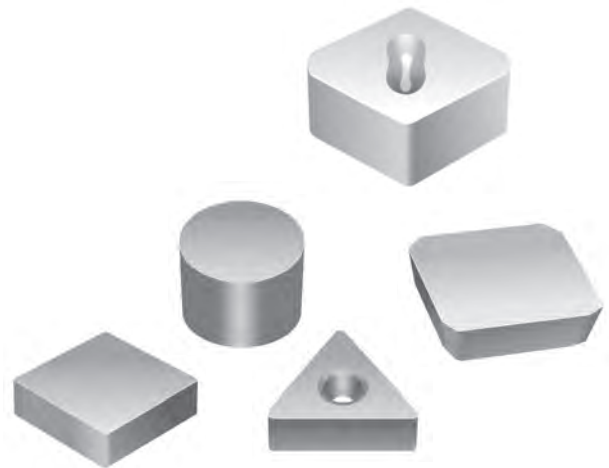
| ISO | Application Range   | ISO | Application Range   |
|-----|---|-----|---|
| P01 |   | K01 |   |
| P10 |  | K10 |    |
| P20 |  | K20 |   |

### ■ Milling

| ISO | Application Range   | ISO | Application Range   |
|-----|---|-----|---|
| P01 |   | K01 |   |
| P10 |  | K10 |    |
| P20 |  | K20 |   |

## Choice of Ceramic

|                    | Workpiece            | Grade | GP 100<br>GP 300 | GP 100<br>GP 300 |
|--------------------|----------------------|-------|------------------|------------------|
| Cast Iron          | Gray Cast Iron       |       | ●                | ●                |
|                    | Chilled Cast Iron    |       | ●                | ●                |
|                    | Ductile Cast Iron    |       | ○                | ○                |
| Steel              | Mild Steel           |       |                  |                  |
|                    | Carbon Steel         |       |                  |                  |
|                    | Alloy Steel          |       | ●                |                  |
|                    | Forged Steel         |       | ●                |                  |
|                    | Heat Treated Steel   |       | ●                |                  |
|                    | High Speed Steel     |       | ●                |                  |
|                    | High Manganese Steel |       | ○                | ○                |
|                    | Stainless Steel      |       |                  |                  |
|                    | Heat Resistant Steel |       | ○                | ○                |
| Super Alloys Steel |                      | ○     | ○                |                  |





## Special Features

SOWA uncoated carbide grades have exceptional wear resistance and toughness at the same time through special alloy design with WC, Co, and additives like TaC, TiC etc.

1. Excellent resistance to thermal crack allows cutting with coolant.
2. Specially designed alloys have fine micro structure and low affinity with workpiece.
3. They have excellent toughness in general.



### ● Special Features

| ISO | Composition   | Characteristics  | Workpiece   |
|-----|---------------|--|---|
| P   | WC-TiC-TaC-Co | Excellent thermal shock resistance and resistance against plastic deformation      | Carbon Steel, Alloy Steel                         |
| M   | WC-TiC-TaC-Co | Comprehensive grades have excellent thermal shock resistance and superior strength | Alloy Steel, Stainless Steel                      |
| K   | WC-Co         | Hard and strong grades   | Cast Iron, Non-ferrous metal, Plastic, Acryl, etc |



| ISO | Grade  | Hardness (HRA) | TRS (kg/mm <sup>2</sup> ) | Young's Modulus (x103kg/mm <sup>2</sup> ) | Thermal Conductivity (cal/cm·Sec·°C) | Thermal Expansion Coefficient (x10 <sup>-6</sup> /°C) |
|-----|--------|----------------|---------------------------|---|--------------------------------------|---|
| P   | PT20U  | 91.8           | 180                       | 5.6                                       | 0.10                                 | 5.2   |
|     | PM20U  | 91.5           | 200                       | 5.3                                       | -                                    | 5.2   |
|     | PTM30U | 91.3           | 210                       | 5.3                                       | -                                    | 5.2   |
|     |        |                |                           |   |                                      |   |
| M   |        |                |                           |   |                                      |   |
| K   | KT10U  | 92.8           | 190                       | 6.6                                       | 0.26                                 | 4.7   |
|     |        |                |                           |   |                                      |   |
|     |        |                |                           |   |                                      |   |
|     |        |                |                           |   |                                      |   |

## Special Features

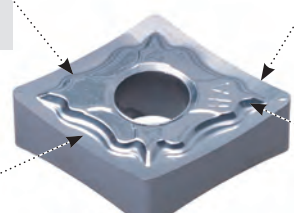
### ■ For Turning

| Workpiece      | 1 <sup>st</sup> Choice | Recommended Cutting Speed (sfm) | ISO | Application Range   |
|----------------|------------------------|---------------------------------|-----|---|
| Steel          |                        |                                 | P10 |   |
|                | PT20U                  | 425(225 ~ 600)                  | P20 |  |
|                | PM20U, PTM30U          | 425(225 ~ 600)                  | P30 |  |
| Cast Iron      |                        |                                 | K01 |   |
|                | KTM10U                 | 500(325 ~ 650)                  | K10 |  |
|                |                        |                                 | K20 |  |
| Aluminum Alloy | KT10U                  | 1650(975 ~ 2625)                | K20 |  |
| Copper, Bronze | KT10U                  | 650(500 ~ 975)                  | K30 |   |

### ■ For Milling

| Workpiece      | 1 <sup>st</sup> Choice | Recommended Cutting Speed (sfm) | ISO | Application Range  |
|----------------|------------------------|---------------------------------|-----|--|
| Steel          | PM20U                  | 425(225 ~ 600)                  | P20 |   |
|                | PTM30U                 | 425(225 ~ 600)                  | P30 |  |
| Cast Iron      | KTM10U                 | 500(325 ~ 650)                  | K01 |  |
|                |                        |                                 | K10 |   |
| Aluminum Alloy | KTM10U                 | 1650(975 ~ 2625)                | K20 |   |
| Copper, Bronze | KTM10U                 | 650(500 ~ 975)                  | K30 |  |

## Aluminum Machining — Chipbreaker A

**1. Wide Chip Pocket & High Rake Angle**

- Smooth chip evacuation
- Prevents edge build-up
- Reduces cutting force

**2. Reinforce Cutting Edge Strength**

- Increases main cutting edge toughness
- Induces smooth chip flow at shallow depth of cut
- Prevent chipping

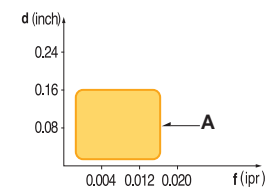
**3. 2 Step Chip Breaker**

- Induces smooth chip curl.
- Reduces cutting force at high speed, high feed machining

**4. Curved Cutting Edge**

- Sharp cutting edge provides effective shallow cutting
- Excellent surface finish of workpiece and smooth cut

### ■ Recommended Cutting Condition



### ■ Cutting Condition

| Workpiece                   | Hardness    | Recommended Grade | Recommended Cutting Condition |             |                     |
|-----------------------------|-------------|-------------------|-------------------------------|-------------|---------------------|
|                             |             |                   | Speed (sfm)                   | Feed (ipr)  | Depth of Cut (inch) |
| Aluminum and Aluminum Alloy | 20°~125 HRB | KT10U<br>KTM10U   | 650 ~ 2650                    | 0.004-0.016 | 0.020-0.040         |

# Chipbreaker Recommendation As Per Workpiece



**1. Workpiece Material : 1010, 1015, 12L14, 5015, 1112, etc.  
Soft Steel  
Hardness : Under 180HRB (18HRC)**

## ■ Chipbreaker, Grade, Cutting Condition Recommendation

| Workpiece   | Chipbreaker & Grade Selection |                             |                                  |                                 | Insert Shape |          |          |          |              |          |
|---|-------------------------------|-----------------------------|----------------------------------|---------------------------------|--------------|----------|----------|----------|--------------|----------|
|   | Chipbreaker & Feed            |                             | Grade & Cutting Speed            |                                 | 80°          | 80°      | 55°      | 60°      | 35°          | 90°      |
| Depth of Cut (inch)   | Chipbreaker                   | Feed (ipr)                  | Grade                            | Cutting Speed (sfm)             | [NEG]        | [NEG]    | [NEG]    | [NEG]    | [NEG]        | [NEG]    |
|   |                               |                             |                                  |                                 | CN□G         | WN□G     | DN□G     | TN□G     | VN□G         | SN□G     |
| 0.008 ~<br>0.020<br>~ 0.039<br>Ultra Finishing                    | <b>F1</b><br>                 | 0.002 ~<br>0.004<br>~ 0.008 | PT10S<br>PT20S                   | 925<br>850                      |              |          |          |          |              |          |
| 0.020 ~<br>0.039<br>~ 0.079<br>Finishing                          | <b>F2</b><br>                 | 0.003 ~<br>0.006<br>~ 0.012 | PT10C<br>PT25C<br>PT20S          | 1025<br>957<br>875<br>875       | CNMG<br>     | WNMG<br> | DNMG<br> |          | VNMG<br>     |          |
| 0.03 ~<br>0.08<br>~ 0.14<br>Medium-Finishing                      | <b>A</b><br>                  | 0.004 ~<br>0.010<br>~ 0.016 | PT25C<br>PT30C                   | 1000<br>750                     | CNMG<br>     | WNMG<br> | DNMG<br> | TNMG<br> |              | SNMG<br> |
| 0.031 ~<br>0.059<br>~ 0.138<br>Medium-Finishing                   | <b>F3</b><br>                 | 0.004 ~<br>0.008<br>~ 0.014 | PT10C<br>PT30C<br>PT20S          | 975<br>950<br>825<br>825        |              |          | DNMG<br> |          |              |          |
| 0.059 ~<br>0.098<br>~ 0.197<br>Medium Cutting,<br>Medium-Roughing | <b>M</b><br>                  | 0.006 ~<br>0.01<br>~ 0.02   | PT10C<br>PT25C<br>PT30C<br>PT20S | 875<br>825<br>750<br>700<br>725 | CNMG<br>     | WNMG<br> | DNMG<br> | TNMG<br> | VNMG<br>     | SNMG<br> |
| 0.100 ~<br>0.160<br>~ 0.280<br>Roughing                           | <b>R2</b><br>                 | 0.01 ~<br>0.018<br>~ 0.026  | PT10C<br>PT25C<br>PT30C          | 500<br>475<br>425<br>325        | CNMG<br>     | WNMG<br> |          | TNMG<br> |              | SNMG<br> |
| 0.197 ~<br>0.280<br>~ 0.440<br>Heavy Duty                         | <b>R3</b><br>                 | 0.02 ~<br>0.04<br>~ 0.044   | PT25C<br>PT30C                   | 500<br>425<br>325               | CNMG<br>     |          |          |          |              | SNMG<br> |
| Depth of Cut (inch)   | Chipbreaker                   | Feed (ipr)                  | Grade                            | Cutting Speed (sfm)             | [POS]        | [POS]    | [POS]    | [POS]    | [POS]        | [POS]    |
|   |                               |                             |                                  |                                 | CC□T         | WC□T     | DC□T     | TC□T     | VC□T<br>VB□T | SC□T     |
|   |                               |                             |                                  |                                 | CCGT         |          |          |          |              |          |
| 0.004 ~<br>0.020<br>~ 0.059<br>Finishing                          | <b>F1P</b><br>                | 0.002 ~<br>0.006<br>~ 0.01  | PT10C<br>PT25C                   | 925<br>850<br>825<br>825        | CCGT<br>     |          |          |          |              |          |
| 0.020 ~<br>0.059<br>~ 0.138<br>Medium Cutting,<br>Medium-Roughing | <b>F2P</b><br>                | 0.003 ~<br>0.008<br>~ 0.016 | PT10C<br>PT25C<br>PT20S          | 850<br>800<br>750<br>750        | CCMT<br>     |          | DCMT<br> | TCMT<br> |              | SCMT<br> |
| 0.039 ~<br>0.079<br>~ 0.118<br>Medium Cutting                     | <b>F3P</b><br>                | 0.004 ~<br>0.01<br>~ 0.014  | PT10C<br>PT25C                   | 825<br>750<br>725               | CCMT<br>     |          | DCMT<br> | TCMT<br> |              | SCMT<br> |

■ : 1<sup>st</sup> Recommended cutting condition

Indexable Cutting Tools

**2. Workpiece Material : 1045,1050,4130, 4140 etc.**  
**General Steel**  
**Hardness : 180~260 HRB (up to 26HRC)**



**Chipbreaker, Grade, Cutting Condition Recommendation**

| Workpiece   | Chipbreaker & Grade Selection |                                    |                                  |  | Insert Shape       |                    |                    |                    |                    |                    |
|---|-------------------------------|------------------------------------|----------------------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   | Chipbreaker & Feed            |                                    | Grade & Cutting Speed            |  | 80°                | 80°                | 55°                | 60°                | 35°                | 90°                |
| Depth of Cut (inch)   | Chipbreaker                   | Feed (ipr)                         | Grade                            | Cutting Speed (sfm)                    | [NEG]              | [NEG]              | [NEG]              | [NEG]              | [NEG]              | [NEG]              |
|   |                               |                                    |                                  |  | CN□G               | WN□G               | DN□G               | TN□G               | VN□G               | SN□G               |
| 0.020 ~<br><b>0.039</b><br>~ 0.079<br>Finishing                           | <b>F2</b><br>                 | 0.003 ~<br><b>0.006</b><br>~ 0.012 | PT10C<br>PT25C<br>PT20S          | <b>725</b><br>650<br>625<br>600        | CNMG<br><br>P. E10 | WNMG<br><br>P. E31 | DNMG<br><br>P. E14 |                    | VNMG<br><br>P. E29 |                    |
| 1.031 ~<br><b>0.059</b><br>~ 0.138<br>Medium-Finishing                    | <b>F3</b><br>                 | 0.004 ~<br><b>0.008</b><br>~ 0.014 | PT10C<br>PT25C<br>PT30C<br>PT20S | 700<br>950<br><b>600</b><br>525<br>500 |                    |                    | DNMG<br><br>P. E15 |                    |                    |                    |
| 0.059 ~<br><b>0.098</b><br>~ 0.197<br>General Medium                      | <b>M</b><br>                  | 0.004 ~<br><b>0.010</b><br>~ 0.016 | PT10C<br>PT25C<br>PT30C<br>PT20S | 650<br>600<br><b>550</b><br>500<br>525 | CNMG<br><br>P. E10 | WNMG<br><br>P. E32 | DNMG<br><br>P. E15 | TNMG<br><br>P. E25 | VNMG<br><br>P. E29 | SNMG<br><br>P. E20 |
| 0.098 ~<br><b>0.138</b><br>~ 0.280<br>Roughing                            | <b>R2</b><br>                 | 0.01 ~<br><b>0.018</b><br>~ 0.026  | PT10C<br>PT25C<br><b>PT30C</b>   | 550<br>525<br>500<br><b>425</b>        | CNMG<br><br>P. E11 | WNMG<br><br>P. E33 |                    | TNMG<br><br>P. E26 |                    | SNMG<br><br>P. E21 |
| 0.160 ~<br><b>0.280</b><br>~ 0.520<br>Heavy Duty                          | <b>R3</b><br>                 | 0.016 ~<br><b>0.028</b><br>~ 0.044 | PT10C<br>PT25C<br><b>PT30C</b>   | 425<br>400<br>375<br><b>300</b>        | CNMM<br><br>P. E12 |                    |                    |                    |                    | SNMM<br><br>P. E21 |
| Depth of Cut (inch)   | Chipbreaker                   | Feed (ipr)                         | Grade                            | Cutting Speed (sfm)                    | [POS]              | [POS]              | [POS]              | [POS]              | [POS]              | [POS]              |
|   |                               |                                    |                                  |  | CC□T               | WC□T               | DC□T               | TC□T               | VC□T<br>VB□T       | SC□T               |
| 0.004 ~<br><b>0.020</b><br>~ 0.059<br>Finishing                           | <b>F1P</b><br>                | 0.002 ~<br><b>0.006</b><br>~ 0.01  | PT10C<br>PT25C                   | <b>725</b><br>650<br>600<br>650        | CCGT<br><br>P. E8  |                    |                    |                    |                    |                    |
| 0.020 ~<br><b>0.059</b><br>~ 0.138<br>Medium-Finishing,<br>General Medium | <b>F2P</b><br>                | 0.003 ~<br><b>0.008</b><br>~ 0.016 | PT10C<br>PT25C<br>PT30C<br>PT20S | 700<br>625<br><b>600</b><br>500<br>550 | CCMT<br><br>P. E9  |                    | DCMT<br><br>P. E13 | TCMT<br><br>P. E23 |                    | SCMT<br><br>P. E19 |
| 0.039 ~<br><b>0.079</b><br>~ 0.118<br>Medium-Roughing                     | <b>F3P</b><br>                | 0.004 ~<br><b>0.01</b><br>~ 0.014  | PT10C<br>PT25C<br>PT30C          | 650<br>600<br><b>550</b><br>500        | CCMT<br><br>P. E9  |                    | DCMT<br><br>P. E13 | TCMT<br><br>P. E24 |                    | SCMT<br><br>P. E19 |






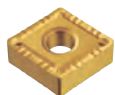




























**■** : 1<sup>st</sup> Recommended cutting condition

# Chipbreaker Recommendation As Per Workpiece



**3. Workpiece Material : 3310, 8640, 4340.  
Hardened Steels  
Hardness : 260~350 HRB (26-35 HRC)**

## Chipbreaker, Grade, Cutting Condition Recommendation

| Workpiece   | Chipbreaker & Grade Selection   |                                    |                                       |                                 | Insert Shape  |   |   |   |   |   |
|---|---|------------------------------------|---------------------------------------|---------------------------------|---|---|---|---|---|---|
|   | Chipbreaker & Feed  |                                    | Grade & Cutting Speed                 |                                 | 80°   | 80°   | 55°   | 60°   | 35°   | 90°   |
| Depth of Cut (inch)   | Chipbreaker   | Feed (ipr)                         | Grade                                 | Cutting Speed (sfm)             | [NEG]   | [NEG]   | [NEG]   | [NEG]   | [NEG]   | [NEG]   |
|   |   |                                    |                                       |                                 | CN□G  | WN□G  | DN□G  | TN□G  | VN□G  | SN□G  |
| 0.020 ~<br><b>0.039</b><br>~ 0.079<br>Finishing                           | <b>F2</b><br>    | 0.003 ~<br><b>0.006</b><br>~ 0.012 | <b>PT10C</b><br>PT25C<br>PT20S        | <b>425</b><br>400<br>375<br>375 | CNMG<br><br>P. E10   | WNMG<br><br>P. E31  | DNMG<br><br>P. E14   |   | VNMG<br><br>P. E29 |   |
| 0.031 ~<br><b>0.059</b><br>~ 0.138<br>Medium-Finishing                    | <b>F3</b><br>    | 0.004 ~<br><b>0.008</b><br>~ 0.014 | <b>PT25C</b><br>PT30C<br>PT20S        | 500<br><b>425</b><br>375<br>325 |   |   | DNMG<br><br>P. E15   |   |   |   |
| 0.079 ~<br><b>0.118</b><br>~ 0.197<br>General Medium                      | <b>M</b><br>     | 0.006 ~<br><b>0.01</b><br>~ 0.02   | <b>PT10C</b><br><b>PT25C</b><br>PT20S | 425<br>400<br><b>325</b><br>300 | CNMG<br><br>P. E10   | WNMG<br><br>P. E32  | DNMG<br><br>P. E15   | TNMG<br><br>P. E25   | VNMG<br><br>P. E29 | SNMG<br><br>P. E20   |
| 0.1 ~<br><b>0.14</b><br>~ 0.24<br>Roughing                                | <b>R2</b><br>   | 0.01 ~<br><b>0.014</b><br>~ 0.024  | <b>PT10C</b><br><b>PT25C</b><br>PT30C | 325<br>300<br><b>300</b><br>275 | CNMG<br><br>P. E11  | WNMG<br><br>P. E33 |   | TNMG<br><br>P. E26  |   | SNMG<br><br>P. E21  |
| 0.197 ~<br><b>0.24</b><br>~ 0.4<br>Heavy Duty                             | <b>R3</b><br>  | 0.02 ~<br><b>0.024</b><br>~ 0.04   | <b>PT10C</b><br>PT25C<br><b>PT30C</b> | 300<br>275<br>275<br><b>225</b> | CNMM<br><br>P. E12 |   |   |   |   | SNMM<br><br>P. E21 |
| Depth of Cut (inch)   | Chipbreaker   | Feed (ipr)                         | Grade                                 | Cutting Speed (sfm)             | [POS]   | [POS]   | [POS]   | [POS]   | [POS]   | [POS]   |
|   |   |                                    |                                       |                                 | CC□T  | WC□T  | DC□T  | TC□T  | VC□T<br>VB□T  | SC□T  |
| 0.004 ~<br><b>0.020</b><br>~ 0.059<br>Finishing                           | <b>F1P</b><br> | 0.002 ~<br><b>0.006</b><br>~ 0.01  | <b>PT10C</b><br>PT25C                 | <b>425</b><br>400<br>375<br>400 | CCGT<br><br>P. E8  |   |   |   |   |   |
| 0.008 ~<br><b>0.039</b><br>~ 0.118<br>Medium-Finishing,<br>General Medium | <b>F2P</b><br> | 0.003 ~<br><b>0.008</b><br>~ 0.016 | <b>PT10C</b><br><b>PT25C</b><br>PT20S | 400<br>375<br><b>375</b><br>325 | CCMT<br><br>P. E9  |   | DCMT<br><br>P. E13 | TCMT<br><br>P. E23 |   | SCMT<br><br>P. E19 |
| 0.020 ~<br><b>0.059</b><br>~ 0.098<br>Medium-Roughing                     | <b>F3P</b><br> | 0.004 ~<br><b>0.01</b><br>~ 0.014  | <b>PT10C</b><br><b>PT25C</b><br>PT30C | 375<br>325<br><b>325</b><br>300 | CCMT<br><br>P. E9  |   | DCMT<br><br>P. E13 | TCMT<br><br>P. E24 |   | SCMT<br><br>P. E19 |

**■** : 1<sup>st</sup> Recommended cutting condition







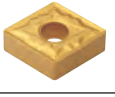































# Indexable Cutting Tools Chipbreaker Recommendation As Per Workpiece

4. Workpiece Material : 430, 444, 416, 432, etc.  
 Stainless Steels  
 Hardness : 180~260 HRB (up to 26HRC)



## ■ Chipbreaker, Grade, Cutting Condition Recommendation

| Workpiece   | Chipbreaker & Grade Selection   |                              |                       |                     | Insert Shape   |  |   |   |  |   |
|---|---|------------------------------|-----------------------|---------------------|--|--|---|---|--|---|
|   | Chipbreaker & Feed  |                              | Grade & Cutting Speed |                     | 80°  | 80°  | 55°   | 60°   | 35°  | 90°   |
| Depth of Cut (inch)   | Chipbreaker   | Feed (ipr)                   | Grade                 | Cutting Speed (sfm) | [NEG]<br>CN□G  | [NEG]<br>WN□G  | [NEG]<br>DN□G   | [NEG]<br>TN□G   | [NEG]<br>VN□G  | [NEG]<br>SN□G   |
| 0.02 ~<br>0.060<br>~ 0.100<br>Medium-Finishing                  | <b>A</b><br>     | 0.0012 ~<br>0.006<br>~ 0.012 | MT20C<br>MT30P        | 625<br>575          | CNMG<br><br>P. E10  | WNMG<br><br>P. E31  | DNMG<br><br>P. E14   | TNMG<br><br>P. E24   |  | SNMG<br><br>P. E20   |
| 0.04 ~<br>0.1<br>~ 0.16<br>Medium-Cutting                       | <b>SM</b><br>    | 0.004 ~<br>0.01<br>~ 0.016   | MT20C<br>MT30P        | 600<br>525          | CNMG<br><br>P. E12  | WNMG<br><br>P. E33  | DNMG<br><br>P. E16   | TNMG<br><br>P. E27   |  | SNMG<br><br>P. E21   |
| 0.031 ~<br>0.079<br>~ 0.157<br>Medium-Finishing                 | <b>MM</b><br>    | 0.003 ~<br>0.01<br>~ 0.016   | MT20C<br>MT30P        | 450<br>560          | CNMG<br><br>P. E11  | WNMG<br><br>P. E32  | DNMG<br><br>P. E16   | TNMG<br><br>P. E26   |  |   |
| 0.039 ~<br>0.079<br>~ 0.157<br>General Medium                   | <b>M</b><br>    | 0.004 ~<br>0.010<br>~ 0.016  | MT20C<br>MT30P        | 525<br>400          | CNMG<br><br>P. E10 | WNMG<br><br>P. E32 | DNMG<br><br>P. E15  | TNMG<br><br>P. E25  | VNMG<br><br>P. E29 | SNMG<br><br>P. E20  |
| Depth of Cut (inch)   | Chipbreaker   | Feed (ipr)                   | Grade                 | Cutting Speed (sfm) | [POS]<br>CC□T  | [POS]<br>WC□T  | [POS]<br>DC□T   | [POS]<br>TC□T   | [POS]<br>VC□T<br>VB□T  | [POS]<br>SC□T   |
| 0.005 ~<br>0.02<br>~ 0.06<br>Finishing                          | <b>F1P</b><br> | 0.002 ~<br>0.006<br>~ 0.01   | MT20C<br>MT30P        | 600<br>525          | CCGT<br><br>P. E8 |  |   |   |  |   |
| 0.02 ~<br>0.04<br>~ 0.12<br>Medium-Finishing,<br>General Medium | <b>F2P</b><br> | 0.004 ~<br>0.008<br>~ 0.012  | MT20C<br>MT30P        | 525<br>400          | CCMT<br><br>P. E9 |  | DCMT<br><br>P. E13 | TCMT<br><br>P. E23 |  | SCMT<br><br>P. E19 |
| 0.04 ~<br>0.06<br>~ 0.012<br>Medium-Roughing                    | <b>F3P</b><br> | 0.006 ~<br>0.01<br>~ 0.014   | MT20C<br>MT30P        | 500<br>525          | CCMT<br><br>P. E9 |  | DCMT<br><br>P. E13 | TCMT<br><br>P. E24 |  | SCMT<br><br>P. E19 |

■ : 1<sup>st</sup> Recommended cutting condition

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.




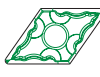











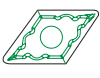

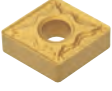


















Images are representational only and may not reflect actual product.

# Chipbreaker Recommendation As Per Workpiece



**5. Workpiece Material : 304, 316, 202, etc.**  
**Austenitic Stainless Steel**  
**Hardness : 260~350 HRB (26-35 HRC)**

## ■ Chipbreaker, Grade, Cutting Condition Recommendation

| Workpiece  | Chipbreaker & Grade Selection   |                                     |                              |                          | Insert Shape   |   |   |   |  |   |
|--|---|-------------------------------------|------------------------------|--------------------------|--|---|---|---|--|---|
|  | Chipbreaker & Feed  |                                     | Grade & Cutting Speed        |                          | 80°  | 80°   | 55°   | 60°   | 35°  | 90°   |
| Depth of Cut (inch)  | Chipbreaker   | Feed (ipr)                          | Grade                        | Cutting Speed (sfm)      | [NEG]<br>CN□G  | [NEG]<br>WN□G   | [NEG]<br>DN□G   | [NEG]<br>TN□G   | [NEG]<br>VN□G  | [NEG]<br>SN□G   |
| 0.02 ~<br><b>0.060</b><br>~ 0.100<br>Medium-Finishing                  | <b>A</b><br>     | 0.0012 ~<br><b>0.006</b><br>~ 0.012 | <b>MT20C</b><br><b>MT30P</b> | <b>530</b><br><b>450</b> | CNMG<br><br>P. E10  | WNMG<br><br>P. E31  | DNMG<br><br>P. E14   | TNMG<br><br>P. E24   |  | SNMG<br><br>P. E20   |
| 0.04 ~<br><b>0.1</b><br>~ 0.16<br>Medium-Cutting                       | <b>SM</b><br>    | 0.004 ~<br><b>0.01</b><br>~ 0.016   | <b>MT20C</b><br><b>MT30P</b> | <b>500</b><br><b>425</b> | CNMG<br><br>P. E12  | WNMG<br><br>P. E33  | DNMG<br><br>P. E16   | TNMG<br><br>P. E27   |  | SNMG<br><br>P. E21   |
| 0.031 ~<br><b>0.08</b><br>~ 0.16<br>Medium-Finishing                   | <b>MM</b><br>    | 0.004 ~<br><b>0.008</b><br>~ 0.016  | <b>MT20C</b><br><b>MT30P</b> | <b>450</b><br><b>560</b> | CNMG<br><br>P. E11  | WNMG<br><br>P. E32  | DNMG<br><br>P. E16   | TNMG<br><br>P. E26   |  |   |
| 0.04 ~<br><b>0.08</b><br>~ 0.16<br>General Medium                      | <b>M</b><br>    | 0.004 ~<br><b>0.008</b><br>~ 0.016  | <b>MT20C</b><br><b>MT30P</b> | <b>425</b><br><b>400</b> | CNMG<br><br>P. E10 | WNMG<br><br>P. E32 | DNMG<br><br>P. E15  | TNMG<br><br>P. E25  | VNMG<br><br>P. E29 | SNMG<br><br>P. E20  |
| Depth of Cut (inch)  | Chipbreaker   | Feed (ipr)                          | Grade                        | Cutting Speed (sfm)      | [POS]<br>CC□T  | [POS]<br>WC□T   | [POS]<br>DC□T   | [POS]<br>TC□T   | [POS]<br>VC□T<br>VB□T  | [POS]<br>SC□T   |
| 0.005 ~<br><b>0.02</b><br>~ 0.06<br>Finishing                          | <b>F1P</b><br> | 0.002 ~<br><b>0.004</b><br>~ 0.008  | <b>MT20C</b><br><b>MT30P</b> | <b>500</b><br><b>425</b> | CCGT<br><br>P. E8 |   |   |   |  |   |
| 0.02 ~<br><b>0.04</b><br>~ 0.12<br>Medium-Finishing,<br>General Medium | <b>F2P</b><br> | 0.003 ~<br><b>0.006</b><br>~ 0.012  | <b>MT20C</b><br><b>MT30P</b> | <b>450</b><br><b>400</b> | CCMT<br><br>P. E9 |   | DCMT<br><br>P. E13 | TCMT<br><br>P. E23 |  | SCMT<br><br>P. E19 |
| 0.04 ~<br><b>0.06</b><br>~ 0.12<br>Medium-Roughing                     | <b>F3P</b><br> | 0.004 ~<br><b>0.008</b><br>~ 0.012  | <b>MT20C</b><br><b>MT30P</b> | <b>425</b><br><b>350</b> | CCMT<br><br>P. E9 |   | DCMT<br><br>P. E13 | TCMT<br><br>P. E24 |  | SCMT<br><br>P. E19 |

■ : 1<sup>st</sup> Recommended cutting condition

# Indexable Cutting Tools Chipbreaker Recommendation As Per Workpiece

**6. Workpiece Material : G1800, G2500, G3000, G3500, M3210, M4504 etc.**  
**Gray Cast Iron, Ductile Cast Iron**  
**Hardness : 135~185 HRB (up to 18HRC)**  
**Tensile Strength : Under 450N/B±**



## ■ Chipbreaker, Grade, Cutting Condition Recommendation

| Workpiece   | Chipbreaker & Grade Selection |                                     |                                |                                       | Insert Shape       |                    |                    |                    |                       |                    |
|---|-------------------------------|-------------------------------------|--------------------------------|---------------------------------------|--------------------|--------------------|--------------------|--------------------|-----------------------|--------------------|
|   | Chipbreaker & Feed            |                                     | Grade & Cutting Speed          |                                       | 80°                | 80°                | 55°                | 60°                | 35°                   | 90°                |
| Depth of Cut (inch)                                 | Chipbreaker                   | Feed (ipr)                          | Grade                          | Cutting Speed (sfm)                   | CNMG<br>CNGG       | WNMG<br>WNGG       | DNMG<br>DNGG       | TNMG<br>TNGG       | VNMG<br>VWNGG         | SNMG<br>SNGG       |
| 0.005 ~<br><b>0.015</b><br>~ 0.04<br>Finishing      |                               | 0.002 ~<br><b>0.004</b><br>~ 0.02   | <b>KB350</b><br>KT05C          | 650 ~<br><b>1650</b><br>~ 2300<br>975 |                    |                    |                    |                    |                       | SNMA<br><br>P. E19 |
| 0.02 ~<br><b>0.08</b><br>~ 0.14<br>Medium-Finishing | <b>G</b><br>                  | 0.004 ~<br><b>0.008</b><br>~ 0.012  | <b>KT05C</b>                   | 425 ~<br><b>825</b><br>~ 1150         |                    |                    | DNMG<br><br>P. E15 | TNMG<br><br>P. E25 |                       | SNMG<br><br>P. E20 |
| 0.04 ~<br><b>0.1</b><br>~ 0.16<br>General Medium    | <b>M</b><br>                  | 0.006 ~<br><b>0.012</b><br>~ 0.02   | <b>KT05C</b><br>KT10C          | 500 ~<br><b>825</b><br>~ 1150         | CNMG<br><br>P. E10 | WNMG<br><br>P. E32 | DNMG<br><br>P. E15 | TNMG<br><br>P. E25 | VNMG<br><br>P. E24    | SNMG<br><br>P. E20 |
| 0.004 ~<br><b>0.12</b><br>~ 0.18<br>Medium-Roughing | <b>R1</b><br>                 | 0.008 ~<br><b>0.014</b><br>~ 0.02   | <b>KT05C</b><br>KT10C          | <b>825</b><br>725                     | CNMG<br><br>P. E11 | WNMG<br><br>P. E32 |                    | TNMG<br><br>P. E26 |                       | SNMG<br><br>P. E21 |
| 0.01 ~<br><b>0.14</b><br>~ 0.24<br>Roughing         | <b>R2</b><br>                 | 0.01 ~<br><b>0.014</b><br>~ 0.024   | PT10C<br><b>PT22C</b><br>PT30C | 325<br>300<br><b>300</b><br>275       | CNMG<br><br>P. E11 | WNMG<br><br>P. E33 |                    | TNMG<br><br>P. E26 |                       | SNMG<br><br>P. E21 |
| 0.16 ~<br><b>0.26</b><br>~ 0.4<br>Heavy Duty        | <b>R3</b><br>                 | 0.012 ~<br><b>0.0028</b><br>~ 1.043 | <b>KT10C</b>                   | <b>500</b>                            | CNMM<br><br>P. E12 |                    |                    |                    |                       | SNMM<br><br>P. E21 |
| Depth of Cut (inch)                                 | Chipbreaker                   | Feed (ipr)                          | Grade                          | Cutting Speed (sfm)                   | [POS]<br>CCMT      | [POS]<br>WCMT      | [POS]<br>DCMT      | [POS]<br>TCMT      | [POS]<br>VCMT<br>VBMT | [POS]<br>SCMT      |
| 0.02 ~<br><b>0.06</b><br>~ 0.12<br>Medium-Finishing | <b>F2P</b><br>                | 0.003 ~<br><b>0.008</b><br>~ 0.016  | <b>KT05C</b><br>KT10C          | <b>825</b><br>725                     | CCMT<br><br>P. E8  |                    | DCMT<br><br>P. E14 | TCMT<br><br>P. E25 |                       | SCMT<br><br>P. E20 |
| 0.04 ~<br><b>0.08</b><br>~ 0.14<br>Medium Cutting   | <b>F3P</b><br>                | 0.004 ~<br><b>0.01</b><br>~ 0.016   | <b>KT05C</b><br>KT10C          | <b>825</b><br>725                     | CCMT<br><br>P. E9  |                    | DCMT<br><br>P. E14 | TCMT<br><br>P. E26 |                       | SCMT<br><br>P. E20 |

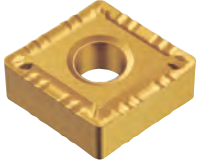
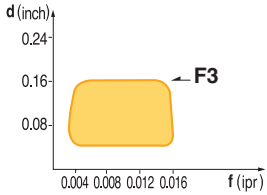

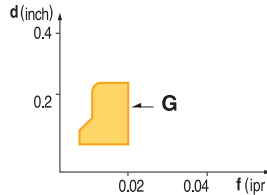

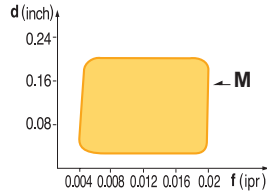

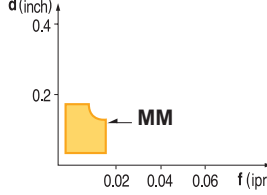

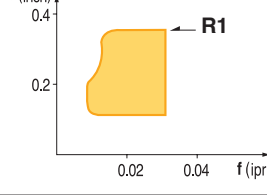

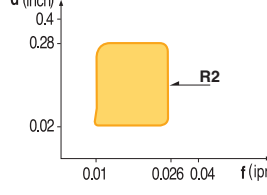

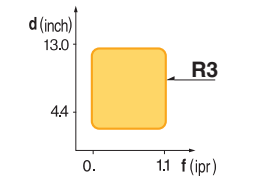
: 1<sup>st</sup> Recommended cutting condition



## Turning Chipbreakers

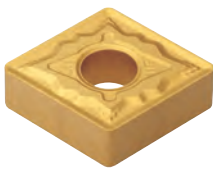
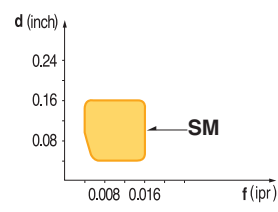
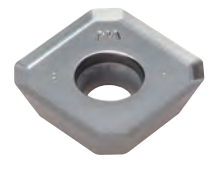
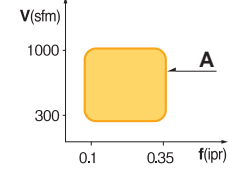
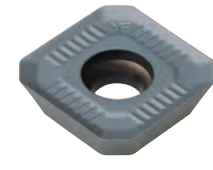
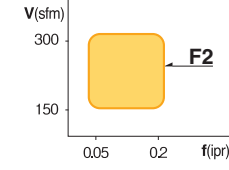
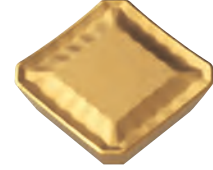
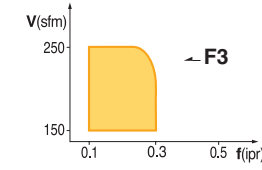
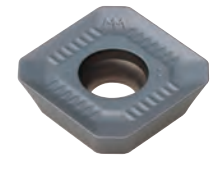
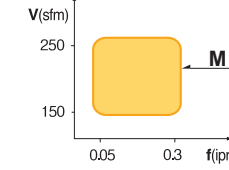
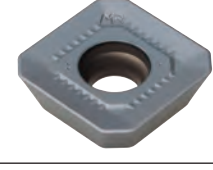
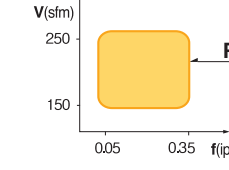
| TURNING CHIPBREAKERS |                  | Shape | Application Range | Special Feature  |
|----------------------|------------------|-------|-------------------|--|
| TURNING CHIPBREAKERS | <b>A</b> (Neg)   |       |                   | <ul style="list-style-type: none"> <li><b>For Light-Alloy, Stainless-Steel Machining</b> <ul style="list-style-type: none"> <li>Sharp cutting edge generates low cutting force.</li> <li>Specially designed tough main cutting edge.</li> <li>Suitable for cutting of low carbon steel, stainless steel, aluminum.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.03 \sim 0.16</math>inch</li> <li><math>f = 0.004 \sim 0.016</math>ipr</li> </ul> </li> </ul>  |
|                      | <b>AP</b> (Pos)  |       |                   | <ul style="list-style-type: none"> <li><b>For Aluminum Cutting</b> <ul style="list-style-type: none"> <li>Exclusive chip breaker for aluminum and aluminum alloy.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.04 \sim 0.2</math>inch</li> <li><math>f = 0.001 \sim 0.02</math>ipr</li> </ul> </li> </ul>   |
|                      | <b>F1P</b> (Pos) |       |                   | <ul style="list-style-type: none"> <li><b>For Finishing</b> <ul style="list-style-type: none"> <li>Excellent chip control at shallow depth of cut and low feed rate.</li> <li>Excellent surface finish of workpiece due to reduced cutting force.</li> <li>Suitable for fine boring.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.004 \sim 0.06</math>inch</li> <li><math>f = 0.002 \sim 0.01</math>ipr</li> </ul> </li> </ul>  |
|                      | <b>F2P</b> (Pos) |       |                   | <ul style="list-style-type: none"> <li><b>For Medium cutting</b> <ul style="list-style-type: none"> <li>Excellent chip control at wide range of cutting conditions.</li> <li>Suitable for stainless steel cutting.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.02 \sim 0.14</math>inch</li> <li><math>f = 0.002 \sim 0.016</math>ipr</li> </ul> </li> </ul>  |
|                      | <b>F3P</b> (Pos) |       |                   | <ul style="list-style-type: none"> <li><b>For Medium Cutting</b> <ul style="list-style-type: none"> <li>Suitable for intermittent cutting and cast iron machining.</li> <li>Good surface finish due to low cutting force.</li> <li>Suitable for both boring and outer diameter turning.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.04 \sim 0.12</math>inch</li> <li><math>f = 0.004 \sim 0.012</math>ipr</li> </ul> </li> </ul>   |
|                      | <b>F1</b> (Neg)  |       |                   | <ul style="list-style-type: none"> <li><b>For Ultra-Fine Finishing, Finishing</b> <ul style="list-style-type: none"> <li>Suitable for applications requiring fine surface finish</li> <li>Generates low cutting force due to sharp cutting edge design.</li> <li>Specially designed chip breaker ensures stable chip control at ultra fine-finishing condition.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.004 \sim 0.006</math>inch</li> <li><math>f = 0.0012 \sim 0.01</math>ipr</li> </ul> </li> </ul> |
|                      | <b>F2</b> (Neg)  |       |                   | <ul style="list-style-type: none"> <li><b>For Finishing</b> <ul style="list-style-type: none"> <li>Excellent chip control at varied depth of cut cutting.</li> <li>Strong cutting edge toughness due to special design.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li><math>d = 0.012 \sim 0.1</math>inch</li> <li><math>f = 0.002 \sim 0.14</math>ipr</li> </ul> </li> </ul>  |

Neg = Negative  
Pos = Positive

| Shape                |  | Application Range   | Special Feature   |
|----------------------|--|---|---|
| TURNING CHIPBREAKERS | <b>F3 (Neg)</b><br>   |    | <ul style="list-style-type: none"> <li><b>For Medium to Finish Cutting</b> <ul style="list-style-type: none"> <li>Excellent for copying of special shape.</li> <li>Smooth chip control at shallow cut as well as deep depth of cut.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.03 ~ 0.16inch</li> <li>f = 0.003 ~ 0.016ipr</li> </ul> </li> </ul>  |
|                      | <b>G (Neg)</b><br>    |    | <ul style="list-style-type: none"> <li><b>For General Cutting</b> <ul style="list-style-type: none"> <li>Suitable for general cutting condition cutting.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.08 ~ 0.24inch</li> <li>f = 0.01 ~ 0.02ipr</li> </ul> </li> </ul>   |
|                      | <b>M (Neg)</b><br>    |    | <ul style="list-style-type: none"> <li><b>For Medium Cutting</b> <ul style="list-style-type: none"> <li>Wide available chip control range from medium-finishing to medium-roughing.</li> <li>Suitable chip breaker for CNC machining.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.01 ~ 0.2inch</li> <li>f = 0.004 ~ 0.02ipr</li> </ul> </li> </ul>  |
|                      | <b>MM (Neg)</b><br> |   | <ul style="list-style-type: none"> <li><b>For Medium to Roughing of Stainless-Steel</b> <ul style="list-style-type: none"> <li>Exclusive chip breaker for stainless steel.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.04 ~ 0.2inch</li> <li>f = 0.004 ~ 0.02ipr</li> </ul> </li> </ul>   |
|                      | <b>R1 (Neg)</b><br> |  | <ul style="list-style-type: none"> <li><b>For Medium to Roughing</b> <ul style="list-style-type: none"> <li>Suitable for deep depth of cut and fast feed cutting of steel and cast iron.</li> <li>Suitable for intermittent cutting.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.12 ~ 0.32inch</li> <li>f = 0.012 ~ 0.032ipr</li> </ul> </li> </ul>   |
|                      | <b>R2 (Neg)</b><br> |  | <ul style="list-style-type: none"> <li><b>For Roughing</b> <ul style="list-style-type: none"> <li>Excellent chip control at deep depth of cut and fast feed rate.</li> <li>Strong cutting edge makes excellent cutting performance at intermittent cutting.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.1 ~ 0.28inch</li> <li>f = 0.01 ~ 0.028ipr</li> </ul> </li> </ul>  |
|                      | <b>R3 (Neg)</b><br> |  | <ul style="list-style-type: none"> <li><b>For Heavy Duty Cutting</b> <ul style="list-style-type: none"> <li>Specially designed toughest cutting edge provides superior cutting performance at deep depth of cut and fast feed rate.</li> <li>Unique design of dot on cutting edge makes smooth chip flow and reduce cutting force.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.16 ~ 0.5inch</li> <li>f = 0.018 ~ 0.04ipr</li> </ul> </li> </ul> |

Neg = Negative



| Shape                |  | Application Range   | Special Feature   |
|----------------------|--|---|---|
| MILLING CHIPBREAKERS | <b>SM (Neg)</b><br>   |    | <ul style="list-style-type: none"> <li><b>For Medium Cutting of Stainless-Steel</b> <ul style="list-style-type: none"> <li>Exclusive design for stainless steel cutting provides longer tool life</li> <li>Wear resistance has been reinforced through high rake angle of chip breaker land.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.04 ~ 0.16inch</li> <li>f = 0.004 ~ 0.016ipr</li> </ul> </li> </ul> |
|                      | <b>A (Pos)</b><br>    |    | <ul style="list-style-type: none"> <li><b>For Aluminum Milling</b> <ul style="list-style-type: none"> <li>Suitable design for aluminum machining, has sharp cutting edge, mirror face of insert top which prevent build up edge, provides excellent cutting performance.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.02 ~ 0.2inch</li> <li>f = 0.004 ~ 0.014ipr</li> </ul> </li> </ul>                      |
|                      | <b>F2 (Pos)</b><br>   |    | <ul style="list-style-type: none"> <li><b>For Finishing of Milling</b> <ul style="list-style-type: none"> <li>Special design for light cutting of gummy materials like stainless steel and hard to machine material provides fine surface finish and longer tool life.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.02 ~ 0.2inch</li> <li>f = 0.002 ~ 0.008ipr</li> </ul> </li> </ul>                        |
|                      | <b>F3 (Pos)</b><br> |   | <ul style="list-style-type: none"> <li><b>For General Milling</b> <ul style="list-style-type: none"> <li>Possible to increase productivity through increase feed and depth.</li> <li>Excellent heat resistance due to the special chip breaker design of top face of insert.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.004 ~ 0.2inch</li> <li>f = 0.004 ~ 0.012ipr</li> </ul> </li> </ul>                 |
|                      | <b>M (Pos)</b><br>  |  | <ul style="list-style-type: none"> <li><b>For Medium Cutting of Milling</b> <ul style="list-style-type: none"> <li>Chip breaker, designed general cutting conditions, provides wide range of available applications.</li> <li>Ground type and sintered type are available.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.04 ~ 0.2inch</li> <li>f = 0.002 ~ 0.012ipr</li> </ul> </li> </ul>                    |
|                      | <b>R8 (Pos)</b><br> |  | <ul style="list-style-type: none"> <li><b>For Roughing of Milling</b> <ul style="list-style-type: none"> <li>Strongest cutting edge strength provides stable tool life even in case of severe cutting with heavy intermittent and heavy roughing.</li> </ul> </li> <li><b>Recommended Cutting Conditions</b> <ul style="list-style-type: none"> <li>d = 0.06 ~ 0.2inch</li> <li>f = 0.002 ~ 0.014ipr</li> </ul> </li> </ul>   |

Neg = Negative  
Pos = Positive



| APPLICATION                   |                               |                   | SOWA             | KORLOY                   | SUMITO-MO              | SANDVIK                    | KENNA-METAL            | KYOCERA                          | mitsubishi         | ISCAR                    | TOSHIBA            | SECO              | WALTER                     | DIJECT         |    |
|-------------------------------|-------------------------------|-------------------|------------------|--------------------------|------------------------|----------------------------|------------------------|----------------------------------|--------------------|--------------------------|--------------------|-------------------|----------------------------|----------------|----|
| NEGATIVE                      | STEELS                        | EXTREME FINISHING | F1               | HU                       | FA                     | QF                         | FF                     | GP<br>DP<br>CF                   | FH                 | SF                       | TF                 | FF1<br>F1, F2     |                            | F1<br>FA       |    |
|                               |                               | FINISHING         | F2               | HF                       | SU, SK<br>SP<br>LU     | PF                         | FN<br>FP<br>FW         | CQ<br>HQ                         | SH                 | NF                       | TS, AS<br>11<br>17 | MF2               | NF<br>NF3<br>NF5           | FT<br>UA       |    |
|                               |                               | MEDIUM FINISHING  | F3               | HC                       | SX<br>UU               | SM                         |                        | CQ<br>HQ                         | SH                 | NF<br>RF<br>LF           | MJ                 | MF1               | NS4<br>NS8                 | GP<br>UR<br>PF |    |
|                               |                               | MEDIUM ROUGHING   | M                | HM                       | GU<br>UX<br>UG         | PM<br>QM                   | MN<br>MP<br>MW         | GS<br>HS<br>CS                   | MA<br>MH           | TF<br>PP                 | TM                 | M3<br>MR3         | NM, NM4<br>NM5, NM6<br>NM7 | UB<br>GG       |    |
|                               |                               | ROUGHING          | R2               | HR                       | MU<br>MX               | PR                         | RN<br>CT               | GT<br>HT<br>★                    | GH                 | NR                       | TH                 | MR4<br>M5<br>MR7  | NR5<br>NR7                 | UD             |    |
|                               |                               | HEAVY             | R3               | HH                       | HG<br>MP<br>HP         | HR                         | RH<br>SP<br>HP         | HX                               | HZ, HV<br>HH<br>HX | TNM                      | TU<br>57<br>65     | RR9<br>R4         |                            | UC             |    |
|                               |                               | WIPER             | W                | HW                       | LUW<br>GUW             | WF<br>WM<br>WR             | MW<br>FW               | WQ                               | MW<br>SW           | WF<br>WG                 | ASW                | M3<br>M5          | NF, PF<br>NM, PM           |                |    |
|                               | GENERAL                       | G                 | B25              | UZ                       | 23                     | MG                         | ★                      | MT, MV                           | GN                 |                          |                    |                   |                            | GN             |    |
|                               | STAINLESS STEEL<br>MILD STEEL | A<br>SM<br>MM     | HA<br>HS         | SU, EX<br>MU, FL<br>(GU) | MF<br>MM, QM<br>MR     | FF, FW<br>FP, MP<br>MW, RN | GU, HU<br>XP, XQ<br>XS | FS, FJ<br>SH, MJ<br>MS, GJ<br>GH | PP<br>TF           | TF<br>SS<br>SA<br>TU, MS | MF1<br>MF3<br>M5   | NS4<br>NM4<br>NR7 | SF                         |                |    |
|                               | CAST IRON                     | R2                | GR               | UZ<br>UX<br>★            | KF<br>KM, QM<br>KR, QR | FF, FW<br>MP, MW<br>RN     | GC<br>★<br>ZS          | ★<br>★                           | GN                 | ★<br>★<br>★              | 33, CM<br>★        | MF3<br>M5         | NS4, NS8<br>★<br>NM4       |                |    |
|                               | ALUMINUM                      | A                 | HA               |                          |                        | F<br>GP<br>MS              | AH                     |                                  | PP                 |                          |                    |                   |                            |                |    |
|                               | POSITIVE                      | CAST IRON         | FINISHING        | F1P                      | HFP                    | FP<br>FK                   | PF<br>KF               | MT-UF<br>MT-LF<br>GT-LF          | GP<br>DP<br>HQ     | FV<br>SQ                 | °/<br>SM           | 01<br>PF          | F1                         | PF4<br>PF5     | FT |
|                               |                               |                   | MEDIUM FINISHING | F2P                      | HMP                    | SJ, SU<br>SK               | (PM)<br>(KM)           | MF                               | XQ<br>HQ           | R/L<br>R/L-F             | 14, SM<br>17, 19   | PS<br>23<br>PM    | F1<br>F2                   | PS4<br>PS5     |    |
| MEDIUM ROUGHING               |                               |                   | F3P              | C25                      | SF<br>MU               | (PR)<br>(KR)               | MT-MF<br>GM            | ★<br>G                           | MV<br>MQ<br>★      | 19                       | 24<br>★            | F2                | PM2, PM5<br>(PR5)          |                |    |
| ALUMINUM & ALLOY              |                               | AP                | AK               | AG                       | AL                     | HP                         | A3                     |                                  | AS                 | PP                       | AI                 |                   | ALU<br>ACB                 |                |    |
| STAINLESS STEEL<br>MILD STEEL |                               | F2P               | HMP              | MU                       | MF, MM<br>MR           | LF                         | (XQ)                   | FV<br>★                          | 14, SM<br>17, 19   | SS                       |                    | PS4<br>PM5        |                            |                |    |

★ No Name    ★ Simple Type





# Measuring & Inspecting





# Measuring & Inspecting

## MICROMETERS

|                                |      |
|--------------------------------|------|
| Micrometers & Stands . . . . . | F3-8 |
|--------------------------------|------|

## CALIPERS

|                    |       |
|--------------------|-------|
| Calipers . . . . . | F9-11 |
|--------------------|-------|

## INDICATORS & ACCESSORIES

|  |        |
|--|--------|
| Indicators . . . . .                     | F12-14 |
| Magnetic Bases & Gauge Holders . . . . . | F15-18 |

## GAUGES, ETC.

|   |        |
|---|--------|
| Depth Gauges . . . . .                            | F18    |
| Bore Gauges . . . . .                             | F19    |
| Height Gauges . . . . .                           | F19-20 |
| Surface Plates & Stands . . . . .                 | F20    |
| Gauges, Scales & Rules . . . . .                  | F21-24 |
| Combination Sets . . . . .                        | F24-25 |
| Edge & Centre Finders . . . . .                   | F25-26 |
| Protractors, Spring Calipers & Dividers . . . . . | F26-27 |
| Scribers & Engineer's Tool Sets . . . . .         | F27    |
| Squares & Angle Blocks & Angle Plates . . . . .   | F28    |
| Gauge Blocks & Pin Gauges & Sets . . . . .        | F29    |
| Planer Gauge . . . . .                            | F30    |
| Plug Thread & Ring Gauges . . . . .               | F30    |
| Hardness & Surface Testers . . . . .              | F31    |
| Profile Projector . . . . .                       | F31    |
| Mitutoyo Knee Mill Packages . . . . .             | F31    |
| Parallels . . . . .                               | F32-33 |
| Straight Edges . . . . .                          | F33    |
| Set-up Blocks . . . . .                           | F34    |
| Books . . . . .                                   | F34    |
| Tool Kits & Combos . . . . .                      | F35    |

# ASIMETO®

## Exactly what you need.

Everything we do is as exacting as the tools we make. Asimeto is the creator and manufacturer of high-precision measuring instruments - designed and registered exclusively in Germany. Asimeto tools are very competitively priced and are sold through the Asimeto distribution network. Our ultimate commitment to quality allows us to ensure strict production standards and reliable technical service for our global customers.

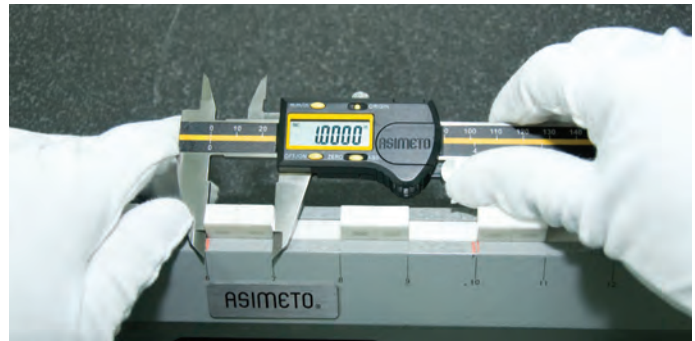
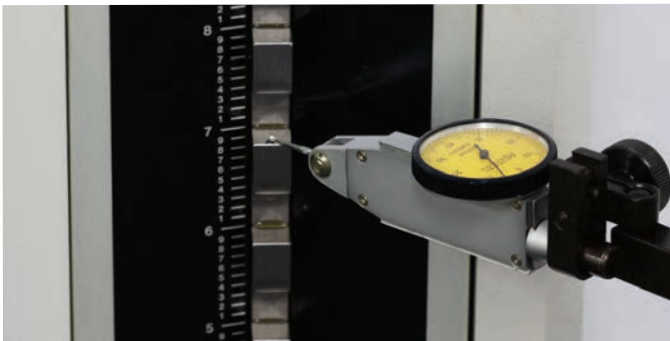
The quality and measuring accuracy of all Asimeto precision tools is guaranteed by the Asimeto Calibration Laboratory. All tools are inspected for conformance to the Asimeto design specifications and are then processed through the Asimeto calibration laboratory. Only the latest state of the art calibration equipment has been selected, from the leading global manufacturers, to ensure that the calibration costs are contained by increasing throughput, without compromising measurement accuracy or repeatability.

## CALIBRATION

Every Asimeto tool is supplied with its own calibration certificate. All tools are calibrated by our **ISO 17025** accredited lab at no extra charge to the customer.

## 12 + 12 CARE PROGRAM

To supplement the industry standard 12 month warranty an additional 12 month warranty is available by registering your individual purchase online at [www.asimeto.com](http://www.asimeto.com) within 30 days from the date of purchase.



## Digital Outside Micrometers with SPC Output

ASIMETO

- Accuracy: Per B89.1.13-2001 specification
- Carbide measuring faces
- Automatic on/off to maximize battery life
- Inch/Metric conversion
- Absolute or incremental measuring modes



| Range       | Inch Resolution | Accuracy | Range   | Metric Resolution | Accuracy | Thimble Type | Code No. | Price \$ |
|-------------|-----------------|----------|---------|-------------------|----------|--------------|----------|----------|
| 0-1         | 0.00005"        | 0.0001"  | 0-25    | 0.001mm           | 0.002mm  | Ratchet      | 7105015  | 296.26   |
| 1-2         | 0.00005"        | 0.0002"  | 25-50   | 0.001mm           | 0.002mm  | Ratchet      | 7105025  | 356.54   |
| 2-3         | 0.00005"        | 0.0002"  | 50-75   | 0.001mm           | 0.003mm  | Ratchet      | 7105035  | 397.58   |
| 3-4         | 0.00005"        | 0.0002"  | 75-100  | 0.001mm           | 0.003mm  | Ratchet      | 7105045  | 432.20   |
| 4-5         | 0.00005"        | 0.0002"  | 100-125 | 0.001mm           | 0.003mm  | Ratchet      | 7105055  | 497.61   |
| 5-6         | 0.00005"        | 0.0002"  | 125-150 | 0.001mm           | 0.003mm  | Ratchet      | 7105065  | 534.80   |
| 8-9         | 0.00005"        | 0.0002"  | 200-225 | 0.001mm           | 0.004mm  | Ratchet      | -        | -        |
| <b>Sets</b> |                 |          |         |                   |          |              |          |          |
| 0-3         | 0.00005"        |          | 0-75    | 0.001mm           |          | Ratchet      | 7105639  | 929.81   |

## Economic Digital Outside Micrometers

ASIMETO

- Carbide tipped measuring faces
- Painted frame
- Friction thimble
- Inch/Metric conversion
- Absolute or incremental measuring modes



| Range        | Resolution       | Accuracy          | Code No. | Price \$ |
|--------------|------------------|-------------------|----------|----------|
| 0-1"/0-25mm  | 0.00005"/0.001mm | ±0.00016"/0.004mm | 7116011  | 164.16   |
| 1-2"/25-50mm | 0.00005"/0.001mm | ±0.00016"/0.004mm | 7116021  | 197.51   |
| 2-3"/50-75mm | 0.00005"/0.001mm | ±0.0002"/0.005mm  | 7116031  | 242.39   |

## QuantuMike

Mitutoyo

### Speed

- Get the job done four times faster! Mitutoyo's patented high precision lead screw feeds the spindle by 2mm per revolution of the thimble instead of the standard 0.5mm.



### Reliability

- Expect excellent repeatability results thanks to the patented ratchet thimble mechanism. It transmits microvibrations along the spindle to the contact face to provide a constant measuring force and encourage good workpiece contact.

### Ergonomic

- The ratchet works from the thimble as well as the speeder, so it's always easy to use - even when taking one-handed measurements

### Features:

- 0.00005" / 0.001mm resolution
- +/- 0.00005" / 1um accuracy

| Mitutoyo Model No. | Range (in./mm)      | SPC | Sowa Code No. | Price \$ |
|--------------------|---------------------|-----|---------------|----------|
| 293-180-30         | 0-1" / 0-25.4 mm    | YES | 849302        | 373.00   |
| 293-181-30         | 1-2" / 25.4-50.8 mm | YES | 846306        | 425.00   |
| 293-185-30         | 0-1" / 0-25.4 mm    | NO  | 846307        | 322.00   |
| 293-186-30         | 1-2" / 25.4-50.8 mm | NO  | 849178        | 367.00   |

## MDC LITE Digimatic Micrometers

Mitutoyo

- Extra large LCD readout
- Carbide face
- Inch/Metric conversion



| Mitutoyo Model No. | Range (in./mm)  | Grad (in./mm)      | Thimble          | Sowa Code No. | Price \$ |
|--------------------|-----------------|--------------------|------------------|---------------|----------|
| 293-831            | 0-1" / 0-25.4mm | 0.00005" / 0.001mm | Ratchet Stop     | 842888        | 198.00   |
| 293-832            | 0-1" / 0-25.4mm | 0.00005" / 0.001mm | Friction Thimble | 845774        | 209.00   |

## Digimatic Micrometers

Mitutoyo

- Graduation: 0.00005"/0.001mm
- Ratchet stop or ratchet thimble
- Extra large LCD readout
- Carbide face
- Measurement hold button
- Inch/Metric conversion



| Mitutoyo Model No. | Range (in./mm)      | SPC | Sowa Code No. | Price \$ |
|--------------------|---------------------|-----|---------------|----------|
| 293-330-30         | 0-1" / 0-25.4 mm    | YES | 840181        | 341.00   |
| 293-331-30         | 1-2" / 25.4-50.8 mm | YES | 840182        | 399.00   |
| 293-340-30         | 0-1" / 0-25.4 mm    | NO  | 840184        | 268.00   |
| 293-344-30*        | 0-1" / 0-25.4 mm    | NO  | 848665        | 268.00   |

\* Ratchet thimble

## Micrometer Stands

ASIMETO

These stands are designed to allow bench top use with hand micrometers.



| Notes                  | Code No. | Price \$ |
|------------------------|----------|----------|
| Painted Cast Iron Base | 7109021  | 56.88    |

## Micrometer Stand

Mitutoyo

These stands are designed to allow bench top use with hand micrometers with range up to 4" or other gauges. Adjustable angle type.



| Mitutoyo Model No. | Sowa Code No. | Price \$ |
|--------------------|---------------|----------|
| 156-101-10         | 840086        | 127.00   |

## Outside Micrometers — Inch

ASIMETO

- Locking clamp
- Carbide faces
- Satin chrome finish



Ratchet Thimble

| Range  | Graduation | Accuracy  | Thimble Type | Code No. | Price \$ |
|--------|------------|-----------|--------------|----------|----------|
| 0-1"   | 0.001"     | ±0.0001"  | Ratchet      | 7101011  | 109.85   |
| 1-2"   | 0.001"     | ±0.0002"  | Ratchet      | 7101021  | 121.39   |
| 0-1"   | 0.0001"    | ±0.0001"  | Ratchet      | 7101013  | 58.87    |
| 1-2"   | 0.0001"    | ±0.0002"  | Ratchet      | 7101023  | 65.80    |
| 2-3"   | 0.0001"    | ±0.0002"  | Ratchet      | 7101033  | 73.10    |
| 3-4"   | 0.0001"    | ±0.00015" | Ratchet      | 7101043  | 82.34    |
| 4-5"   | 0.0001"    | ±0.00015" | Ratchet      | 7101053  | 104.02   |
| 5-6"   | 0.0001"    | ±0.00015" | Ratchet      | 7101063  | 117.87   |
| 6-7"   | 0.0001"    | ±0.0002"  | Ratchet      | 7101073  | 138.51   |
| 7-8"   | 0.0001"    | ±0.0002"  | Ratchet      | 7101083  | 150.05   |
| 8-9"   | 0.0001"    | ±0.0002"  | Ratchet      | 7101093  | 166.73   |
| 9-10"  | 0.0001"    | ±0.00025" | Ratchet      | 7101103  | 175.70   |
| 10-11" | 0.0001"    | ±0.00025" | Ratchet      | 7101113  | 202.64   |
| 11-12" | 0.0001"    | ±0.00025" | Ratchet      | 7101123  | 216.74   |

## Outside Micrometers Sets — Inch

ASIMETO

- Locking clamp
- Carbide faces
- Satin chrome finish



| Range        | Grad.   | Notes                                     | Code No. | Price \$ |
|--------------|---------|---|----------|----------|
| 0-3" (3pc)   | 0.0001" | 0-1"+1-2" Friction 2-3" Ratchet           | 7101637  | 176.99   |
| 0-6" (6pc)   | 0.0001" | 0-1"+1-2" Friction 2-3" to 5-6" Ratchet   | 7101667  | 450.16   |
| 6-12" (6pc)  | 0.0001" | All Ratchet Stop                          | 7101827  | 902.88   |
| 0-12" (12pc) | 0.0001" | 0-1"+1-2" Friction 2-3" to 11-12" Ratchet | 7101727  | 1,313.28 |

## Outside Micrometers — Metric

ASIMETO

- Locking clamp
- Carbide faces
- Satin chrome finish



Ratchet Thimble

| Range  | Graduation | Accuracy | Thimble Type | Code No. | Price \$ |
|--------|------------|----------|--------------|----------|----------|
| 0-25mm | 0.001mm    | ±0.004mm | Ratchet      | 7101012  | 90.79    |

## Outside Micrometers

STM

- Deluxe heat insulated forged steel frame up to 4"
- Chrome clad
- Complete with standards (2" and up)
- Carbide faces
- Ratchet stop for exact and repetitive reading
- Fitted case



| Range (in.) | Graduation (in.) | Code No. | Price \$ |
|-------------|------------------|----------|----------|
| 0-1"        | 0.0001"          | 200570   | 47.49    |
| 1-2"        | 0.0001"          | 200572   | 53.00    |

## Outside Micrometer Sets

STM

- Ratchet and lock nut
- Complete with standards (2" and up)
- Carbide faces
- Fitted wood case



| Range (in.) | Graduation (in.) | Code No. | Price \$ |
|-------------|------------------|----------|----------|
| 0-6"        | 0.0001"          | 200580   | 464.05   |

## Outside Micrometers

Mitutoyo

- Carbide faces
- Positive locking clamp
- Ratchet stop for exact repetitive readings
- Baked enamel finished frame
- Clear graduations on satin chrome finish



| Mitutoyo Model No. | Range (in./mm)            | Grad (in./mm) | Sowa Code No. | Price \$ |
|--------------------|---------------------------|---------------|---------------|----------|
| 101-114            | 1 - 2" (satin finish)     | 0.0001"       | 840017        | 207.48   |
| 103-177            | 0 - 1"                    | 0.001"        | 840029        | 127.00   |
| 103-128            | 1 - 2" (friction thimble) | 0.001"        | 840022        | 124.70   |
| 103-178            | 1 - 2"                    | 0.001"        | 840030        | 146.00   |
| 103-179            | 2 - 3"                    | 0.001"        | 840031        | 181.00   |
| 103-180            | 3 - 4"                    | 0.001"        | 840032        | 204.00   |
| 103-181            | 4 - 5"                    | 0.001"        | 840033        | 218.00   |
| 103-182            | 5 - 6"                    | 0.001"        | 840034        | 240.00   |
| 103-183            | 6 - 7"                    | 0.001"        | 840845        | 277.00   |
| 103-260            | 0 - 1"                    | 0.0001"       | 840044        | 158.00   |
| 103-135            | 0 - 1" (friction thimble) | 0.0001"       | 840023        | 161.00   |
| 103-262            | 1 - 2"                    | 0.0001"       | 840045        | 185.00   |
| 103-217            | 2 - 3"                    | 0.0001"       | 840037        | 210.00   |
| 103-218            | 3 - 4"                    | 0.0001"       | 840038        | 231.00   |
| 103-219            | 4 - 5"                    | 0.0001"       | 840039        | 253.00   |
| 103-220            | 5 - 6"                    | 0.0001"       | 840040        | 272.00   |
| 103-221            | 6 - 7"                    | 0.0001"       | 840041        | 304.00   |
| 103-137            | 0 - 25mm                  | 0.01mm        | 840025        | 149.00   |
| 103-138            | 25 - 50mm                 | 0.01mm        | 840026        | 171.00   |
| 103-139-10         | 50 - 75mm                 | 0.01mm        | 840027        | 198.00   |

## Outside Micrometer Sets

Mitutoyo

- Carbide faces
- Positive locking clamp
- Ratchet stop for exact repetitive readings
- Baked enamel finished frame
- Clear graduations on satin chrome finish



| Mitutoyo Model No. | Range (in./mm) | Grad. Type (in./mm)        | Sowa Code No. | Price \$ |
|--------------------|----------------|----------------------------|---------------|----------|
| 103-929            | 0 - 3"         | 0.001" / Ratchet           | 840055        | 487.00   |
| 103-904-10         | 0 - 6"         | 0.001" / Ratchet           | 840046        | 1,242.00 |
| 103-906            | 6 - 12"        | 0.001" / Ratchet           | 840047        | 2,334.00 |
| 103-908-01         | 0 - 12"        | 0.0001" / Ratchet          | 840049        | 2,866.00 |
| 103-922            | 0 - 3"         | 0.0001" / Friction/Ratchet | 840053        | 549.00   |
| 103-907-40         | 0 - 6"         | 0.0001" / Friction/Ratchet | 848080        | 1,137.00 |
| 103-909            | 6 - 12"        | 0.0001" / Friction/Ratchet | 840050        | 2,489.00 |
| 103-905-10         | 0 - 12"        | 0.001" / Ratchet           | 840628        | 3,689.00 |
| 103-927-10         | 0 - 75 mm      | 0.01 mm / Ratchet          | 840054        | 555.00   |
| 103-913-31         | 0 - 150 mm     | 0.01mm / Ratchet           | 840051        | 1,263.00 |

## T444 Outside Micrometers

**Starrett**

- No-glare satin chrome finish which resists rust
- Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- Balanced frame and thimble design to ensure easy handling and better readability
- Provides quick and easy adjustment
- Graduation: 0.0001"

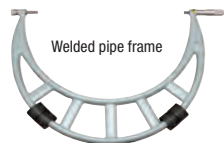


| Range | Starrett No. | Sowa Code No. | Price \$ |
|-------|--------------|---------------|----------|
| 0-1"  | T444.1XRL-1  | 633913        | 197.00   |
| 1-2"  | T444.1XRL-2  | 633901        | 233.00   |
| 2-3"  | T444.1XRL-3  | 633902        | 254.00   |
| 3-4"  | T444.1XRL-4  | 633961        | 301.00   |
| 4-5"  | T444.1XRL-5  | 633962        | 324.00   |
| 5-6"  | T444.1XRL-6  | 633963        | 360.00   |

## Interchangeable Anvil Micrometers

**ASIMETO**

- Ratchet stop
- Locking clamp
- Carbide faces
- Satin chrome finish
- Sizes over 12" have a welded pipe frame



| Range  | Grad.  | Accuracy  | Notes                       | Code No. | Price \$ |
|--------|--------|-----------|-----------------------------|----------|----------|
| 0-6"   | 0.001" | ± 0.0002" | with 6 Anvils & 5 Standards | 7111061  | 603.89   |
| 6-12"  | 0.001" | ± 0.0003" | with 6 Anvils & 6 Standards | 7111121  | 407.45   |
| 12-16" | 0.001" | ± 0.0004" | with 4 Anvils & 2 Standards | 7111161  | 752.05   |
| 16-20" | 0.001" | ± 0.0005" | with 4 Anvils & 2 Standards | 7111201  | 836.60   |
| 20-24" | 0.001" | ± 0.0006" | with 4 Anvils & 2 Standards | 7111241  | 1,289.53 |
| 24-28" | 0.001" | ± 0.0006" | with 4 Anvils & 2 Standards | 7111281  | 1,551.36 |
| 28-32" | 0.001" | ± 0.0007" | with 4 Anvils & 2 Standards | 7111321  | 1,877.70 |
| 32-36" | 0.001" | ± 0.0008" | with 4 Anvils & 2 Standards | 7111361  | 1,531.15 |
| 36-40" | 0.001" | ± 0.0008" | with 4 Anvils & 2 Standards | 7111401  | 2,384.00 |

Note: The individual anvils are matched as a set with the frame. The accuracy cannot be guaranteed if used with a different frame.

## Interchangeable Anvil Micrometers

**Mitutoyo**

- Graduation: 0.001"
- 6 anvils
- Quick change anvils
- Anvils are microlapped
- 0.250" dia. spindle is microlapped & carbide tipped
- Ratchet stop



| Mitutoyo Model No. | Range (in.) | Grad. (in.) | Sowa Code No. | Price \$ |
|--------------------|-------------|-------------|---------------|----------|
| 104-137            | 0 - 6"      | 0.001"      | 840058        | 549.00   |
| 104-138            | 6 - 12"     | 0.001"      | 840059        | 943.00   |
| 104-201            | 12 - 18"    | 0.001"      | 840062        | 1,167.00 |

## Digital Disc Micrometers — Non-Rotating Spindle

**ASIMETO**

- Resolution: 0.00005"/0.001mm
- Non rotating spindle
- Ratchet stop
- Inch/Metric conversion
- Absolute or incremental measuring modes
- Automatic On/Off
- Sizes over 1" come with standard



| Range           | Accuracy | Notes                             | Code No. | Price \$ |
|-----------------|----------|-----------------------------------|----------|----------|
| 0-1" / 0-25mm   | ±0.0001" | Disc Diameter 0.79"               | 7145011  | 618.22   |
| 1-2" / 25-50mm  | ±0.0002" | Disc Diameter 0.79" with Standard | 7145021  | 676.74   |
| 2-3" / 50-75mm  | ±0.0002" | Disc Diameter 0.79" with Standard | 7145031  | 752.88   |
| 3-4" / 75-100mm | ±0.0002" | Disc Diameter 0.79" with Standard | 7145041  | 834.79   |

## Digimatic Disc Micrometer

**Mitutoyo**

- With SPC Output
- Resolution 0.00005"/0.001mm



| Mitutoyo Model No. | Range (in.) | Grad (in./mm) | Sowa Code No. | Price \$ |
|--------------------|-------------|---------------|---------------|----------|
| 323-350            | 0 - 1"      | 0.001"/0.01mm | 840656        | 707.00   |

## 220 Series Mul-T-Anvil Micrometer

**Starrett**

- Graduation: 0.001"
- Balanced frame and thimble design
- Ring-type knurled lock nut
- Interchangeable anvils rigidly held in vise type frame, and are quickly interchanged by a single lock screw adjustment
- Two hardened anvils furnished – round 0.120" diameter (3mm) and flat 0.125" (3mm) and 0.060" (1.5mm) thick – sizes approximate
- Accommodates special anvils up to 5/16" (8mm) thick
- Can be used as height gauge by removing vise jaw
- Satin chrome finish
- Rigid one-piece frame of drop forged steel
- Extremely hard and stable one-piece spindle
- Micro-lapped measuring faces



| Range | Starrett No. | Sowa Code No. | Price \$ |
|-------|--------------|---------------|----------|
| 0-1"  | 220XFL-1     | 629813        | 512.00   |

## Digital Blade Micrometers

**ASIMETO**

- For measuring the groove diameter of shafts, keyways, and other hard to reach portions
- Ratchet stop
- Non-rotating spindle
- Carbide measuring faces
- Inch/Metric conversion
- Absolute or incremental measuring modes



| Range           | Resolution         | Accuracy | Blade Dimensions Depth x Length | Code No. | Price \$ |
|-----------------|--------------------|----------|---------------------------------|----------|----------|
| 0-1" / 0-25mm   | 0.00005" / 0.001mm | ±0.0001" | 0.030" x 0.250"                 | 7117011  | 747.70   |
| 1-2" / 25-50mm  | 0.00005" / 0.001mm | ±0.0002" | 0.030" x 0.250"                 | 7117021  | 793.87   |
| 2-3" / 50-75mm  | 0.00005" / 0.001mm | ±0.0002" | 0.030" x 0.250"                 | 7117031  | 739.68   |
| 3-4" / 75-100mm | 0.00005" / 0.001mm | ±0.0002" | 0.030" x 0.250"                 | 7117041  | 794.26   |

## Digital Screw Thread Micrometers

**ASIMETO**

- For measuring various screw threads
- Automatic on/off to maximize battery life
- Inch/Metric conversion
- Absolute or incremental measuring modes
- Ratchet stop
- Interchangeable tips are optional
- Non-rotating spindle



| Range (in.) | Inch Resolution | Accuracy | Range (mm) | Metric Resolution | Accuracy | Code No. | Price \$ |
|-------------|-----------------|----------|------------|-------------------|----------|----------|----------|
| 0-1"        | 0.00005"        | ±0.0001" | 0-25       | 0.001mm           | ±0.004mm | 7136011  | 520.70   |
| 1-2"        | 0.00005"        | ±0.0002" | 25-50      | 0.001mm           | ±0.004mm | 7136021  | 530.95   |

## Screw Thread Micrometers

ASIMETO

- For measuring various screw threads
- Friction thimble
- Interchangeable tips are optional

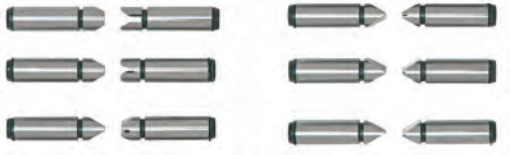


| Range | Grad.  | Accuracy | Notes         | Code No. | Price \$ |
|-------|--------|----------|---------------|----------|----------|
| 0-1"  | 0.001" | ±0.0001" |               | 7132011  | 207.77   |
| 1-2"  | 0.001" | ±0.0002" | with Standard | 7132021  | 234.70   |
| 2-3"  | 0.001" | ±0.0002" | with Standard | 7132031  | 269.33   |
| 3-4"  | 0.001" | ±0.0002" | with Standard | 7132041  | 297.54   |

## Anvils

ASIMETO

- For screw 60° ISO



| T.P.I.       | Pitch (in./mm)         | Notes      | Code No. | Price \$ |
|--------------|------------------------|------------|----------|----------|
| 64-48 (M1)   | 0.016-0.019"/0.4-0.5mm | 1 pair     | 7130610  | 35.44    |
| 44-28 (M2)   | 0.024-0.035"/0.6-0.9mm | 1 pair     | 7130620  | 35.44    |
| 24-14 (M3)   | 0.04-0.068"/1.0-1.75mm | 1 pair     | 7130630  | 35.44    |
| 13-9 (M4)    | 0.079-0.118"/2.0-3.0mm | 1 pair     | 7130640  | 35.44    |
| 8-5 (M5)     | 0.138-0.196"/3.5-5.0mm | 1 pair     | 7130650  | 35.44    |
| 4.5-3.5 (M6) | 0.217-0.275"/5.5-7.0mm | 1 pair     | 7130660  | 35.44    |
| 64-3.5       | 0.016-0.275"/0.4-7.0mm | 6 Pair Set | 7130600  | 238.55   |

## Micrometer Standards

ASIMETO

- Used for zero point setting of outside micrometers
- Heat insulating handle to prevent heat expansion due to body temperature
- Flat measuring face

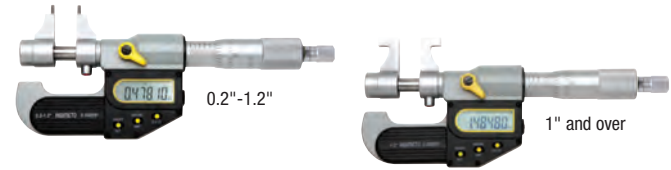


| Size | Accuracy  | Diameter | Code No. | Price \$ |
|------|-----------|----------|----------|----------|
| 1"   | ±0.00005" | 0.276"   | 7110011  | 9.33     |
| 2"   | ±0.0001"  | 0.276"   | 7110021  | 10.72    |
| 3"   | ±0.0001"  | 0.276"   | 7110031  | 12.96    |
| 4"   | ±0.0001"  | 0.315"   | 7110041  | 16.67    |
| 5"   | ±0.00015" | 0.315"   | 7110051  | 20.14    |
| 6"   | ±0.00015" | 0.315"   | 7110061  | 22.32    |
| 7"   | ±0.00015" | 0.315"   | 7110071  | 25.64    |
| 8"   | ±0.00015" | 0.315"   | 7110081  | 29.24    |
| 9"   | ±0.00020" | 0.315"   | 7110091  | 32.38    |
| 10"  | ±0.00020" | 0.315"   | 7110101  | 36.90    |
| 11"  | ±0.00020" | 0.315"   | 7110111  | 40.16    |
| 12"  | ±0.00025" | 0.630"   | 7110121  | 90.98    |
| 13"  | ±0.00025" | 0.630"   | 7110131  | 90.98    |
| 14"  | ±0.00025" | 0.630"   | 7110141  | 108.92   |
| 15"  | ±0.00025" | 0.630"   | 7110151  | 90.98    |
| 16"  | ±0.00025" | 0.630"   | 7110161  | 108.92   |
| 17"  | ±0.00025" | 0.630"   | 7110171  | 96.43    |
| 18"  | ±0.00025" | 0.630"   | 7110181  | 110.81   |
| 19"  | ±0.00030" | 0.630"   | 7110191  | 96.43    |
| 20"  | ±0.00030" | 0.630"   | 7110201  | 115.48   |
| 21"  | ±0.00030" | 0.630"   | 7110211  | 110.86   |
| 23"  | ±0.00030" | 0.630"   | 7110221  | 121.76   |

## Digital Inside Micrometers

ASIMETO

- Resolution: 0.00005"/0.001mm
- Carbide faces
- Ratchet Stop
- 0.2"-1.2"/5-30mm & 1.0"-2.0"/25-50mm ranges are supplied with setting rings

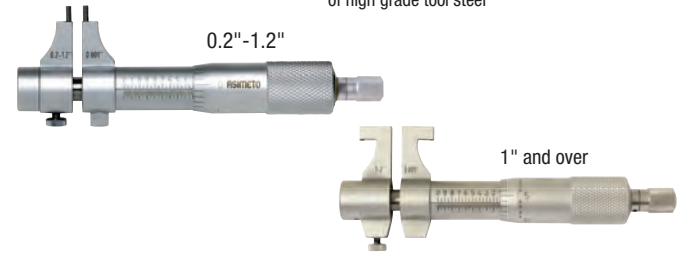


| Range                | Resolution       | Accuracy | Code No. | Price \$ |
|----------------------|------------------|----------|----------|----------|
| <b>Inch Thimble</b>  |                  |          |          |          |
| 0.2"-1.2" / 5-30mm   | 0.00005"/0.001mm | ±0.0001" | 7207011  | 633.56   |
| 1.0"-2.0" / 25-50mm  | 0.00005"/0.001mm | ±0.0002" | 7207021  | 565.58   |
| 2.0"-3.0" / 50-75mm  | 0.00005"/0.001mm | ±0.0002" | 7207031  | 568.25   |
| 3.0"-4.0" / 75-100mm | 0.00005"/0.001mm | ±0.0002" | 7207041  | 592.17   |

## Inside Micrometers

ASIMETO

- Carbide measuring faces
- Graduation: Inch: 0.001"
- Ratchet stop
- Caliper type jaws are made of high grade tool steel



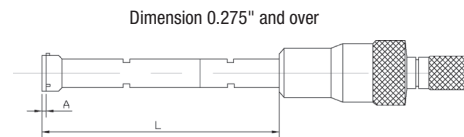
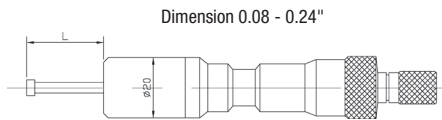
| Range      | Grad.  | Accuracy | Notes          | Code No. | Price \$ |
|------------|--------|----------|----------------|----------|----------|
| 0.2"-1.18" | 0.001" | ±0.0001" | c/w ring gauge | 7203011  | 161.60   |
| 1-2"       | 0.001" | ±0.0002" | c/w ring gauge | 7203021  | 173.14   |
| 2-3"       | 0.001" | ±0.0002" |                | 7203031  | 198.79   |
| 3-4"       | 0.001" | ±0.0002" |                | 7203041  | 223.16   |

## Digital Two & Three Point Internal Micrometers

- Resolution: 0.00005"/0.001mm
- Carbide tipped contact points
- Ratchet Stop
- Protection level IP65
- Setting rings supplied
- Measuring contact points are designed to allow measurements near to the bottom of blind holes
- Models up to 6mm or 0.24" have two measuring points and models over 7mm or 0.275" have three measuring points

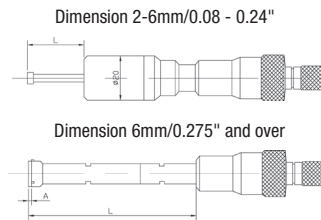


| Range       | Thimble Graduation | Accuracy  | Setting Rings | L     | A     | Extension Rods | Code No. | Price \$ |
|-------------|--------------------|-----------|---------------|-------|-------|----------------|----------|----------|
| 0.5 - 0.65" | 0.0002"            | ±0.00016" | 0.65"         | 80mm  | 0.5mm | 150mm          | 7208241  | 1,191.44 |
| 0.65 - 0.8" | 0.0002"            | ±0.00016" | 0.65"         | 80mm  | 0.5mm | 150mm          | 7208251  | 1,191.44 |
| 0.8 - 1.0"  | 0.0002"            | ±0.00016" | 1"            | 90mm  | 0.5mm | 150mm          | 7208261  | 1,240.18 |
| 1 - 1.2"    | 0.0002"            | ±0.00016" | 1"            | 90mm  | 0.5mm | 150mm          | 7208271  | 1,240.18 |
| 1.2 - 1.6"  | 0.0002"            | ±0.00016" | 1.6"          | 97mm  | 0.5mm | 150mm          | 7208281  | 1,370.99 |
| 1.6 - 2.0"  | 0.0002"            | ±0.0002"  | 1.6"          | 97mm  | 0.5mm | 150mm          | 7208291  | 1,370.99 |
| 2.0 - 2.5"  | 0.0002"            | ±0.0002"  | 2.5"          | 114mm | 0.5mm | 150mm          | 7208301  | 1,482.57 |
| 2.5 - 3.0"  | 0.0002"            | ±0.0002"  | 2.5"          | 114mm | 0.5mm | 150mm          | 7208311  | 1,565.93 |
| 3.0 - 3.5"  | 0.0002"            | ±0.0002"  | 3.5"          | 114mm | 0.5mm | 150mm          | 7208321  | 1,628.78 |
| 3.5 - 4.0"  | 0.0002"            | ±0.0002"  | 3.5"          | 114mm | 0.5mm | 150mm          | 7208331  | 1,694.18 |



## Two & Three Point Internal Micrometers

- Carbide tipped contact points
- Ratchet stop
- Setting rings supplied (sizes up to 4")
- Measuring contact points are designed to allow measurements near to the bottom of blind holes
- Models up to 6mm or 0.24" have two measuring points and models over 7mm or 0.275" have three measuring points



| Range       | Graduation | Accuracy  | Setting Rings | L     | A     | Extension Rods | Code No. | Price \$ |
|-------------|------------|-----------|---------------|-------|-------|----------------|----------|----------|
| 0.5 - 0.65" | 0.0002"    | ±0.00016" | 0.65"         | 80mm  | 0.5mm | 150mm          | 7209241  | 546.35   |
| 0.65 - 0.8" | 0.0002"    | ±0.00016" | 0.65"         | 80mm  | 0.5mm | 150mm          | 7209251  | 546.35   |
| 0.8 - 1.0"  | 0.0002"    | ±0.00016" | 1"            | 90mm  | 0.5mm | 150mm          | 7209261  | 768.22   |
| 1 - 1.2"    | 0.0002"    | ±0.00016" | 1"            | 90mm  | 0.5mm | 150mm          | 7209271  | 768.22   |
| 1.2 - 1.6"  | 0.0002"    | ±0.00016" | 1.6"          | 97mm  | 0.5mm | 150mm          | 7209281  | 827.21   |
| 1.6 - 2.0"  | 0.0002"    | ±0.0002"  | 1.6"          | 97mm  | 0.5mm | 150mm          | 7209291  | 960.59   |
| 2.0 - 2.5"  | 0.0002"    | ±0.0002"  | 2.5"          | 114mm | 0.5mm | 150mm          | 7209301  | 1,010.61 |
| 2.5 - 3.0"  | 0.0002"    | ±0.0002"  | 2.5"          | 114mm | 0.5mm | 150mm          | 7209311  | 1,083.71 |
| 3.0 - 3.5"  | 0.0002"    | ±0.0002"  | 3.5"          | 114mm | 0.5mm | 150mm          | 7209321  | 1,132.45 |
| 3.5 - 4.0"  | 0.0002"    | ±0.0002"  | 3.5"          | 114mm | 0.5mm | 150mm          | 7209331  | 1,178.62 |

## Wireless Data Transfer

| Used For  | Function | Frequency | Code No. | Price \$ |
|---|----------|-----------|----------|----------|
| ABS Digital Calipers<br>Digital Micrometers<br>Heavy Duty Digital Calipers                            | Output   | 2.4G      | 7901001  | 169.26   |
| IP65 Digital Indicators   | Output   | 2.4G      | 7901002  | 169.26   |
| ABS Digital Calipers<br>Digital Micrometers<br>Heavy Duty Digital Calipers<br>IP65 Digital Indicators | Input    | 2.4G      | 7901003  | 98.80    |

## Inside Micrometers — Interchangeable Rod Type

- Graduation: Inch: 0.001"
- Rods marked with its measuring range
- Satin chrome finish throughout
- All contact points hardened for extra long tool life



| Range | Head Travel | Grad.  | Spacing Collar | Rod Dia. | Notes                 | Code No. | Price \$ |
|-------|-------------|--------|----------------|----------|-----------------------|----------|----------|
| 1-2"  | 0.25"       | 0.001" | 0.250"         | 0.248"   | 1" Mic head & 2 Rods  | 7242021  | 335.70   |
| 2-12" | 0.50"       | 0.001" | 0.500"         | 0.248"   | 2" Mic head & 10 Rods | 7242121  | 402.71   |
| 8-40" | 1.00"       | 0.001" | 1", 2"         | 0.355"   | 8" Mic head & 8 Rods  | 7242401  | 1,156.82 |

Note: individual rods are matched with micrometer and should not be interchanged with other sets.



## 823 Series Tubular Inside Micrometers

**Starrett**

- Graduation: 0.001"
- Extension rods made of steel tubing, light in weight, extremely rigid
- Rods are approximately 3/8" (9.5mm) diameter
- Rods are insulated, with the exception of 1/2" (13mm) and 1" (25mm) sizes
- Each rod marked with length
- Hardened and ground anvils on rods are adjustable for length
- Head anvil is hardened and ground
- Interchangeable anvils on both 1/2" (13mm) and 1" (25mm) heads
- Quick reading figures – every thousandth numbered on inch reading tools
- Lock nut furnished on 1" (25mm) heads



| Range     | Description          | Starrett No. | Sowa Code No. | Price \$ |
|-----------|----------------------|--------------|---------------|----------|
| 1 1/2-8"  | With 5 Rods & Handle | 823AZ        | 629521        | 569.00   |
| 1 1/2-12" | With 8 Rods & Handle | 823BZ        | 629023        | 684.00   |
| 4-24"     | With 7 Rods          | 823CZ        | 629024        | 885.00   |
| 4-32"     | With 8 Rods          | 823DZ        | 630264        | 981.00   |

## 124 Series Inside Micrometers

**Starrett**

- Graduation: 0.001"
- Rod diameters are approximately 1/4" (6mm)
- Rods are insulated
- Each rod marked with length
- Hardened and ground anvils on rods, adjustable for length
- Head anvil is hardened and ground
- Quick-reading figures – every thousandth numbered on inch reading tools
- Furnished with case

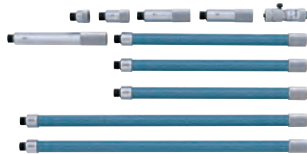


| Range | No. of Rods | Starrett No. | Sowa Code No. | Price \$ |
|-------|-------------|--------------|---------------|----------|
| 2-8"  | 6           | 124AZ        | 629581        | 478.00   |
| 2-12" | 10          | 124BZ        | 629021        | 571.00   |

## Tubular Inside Micrometers

**Mitutoyo**

- Ideal for fast, accurate inside measurement of cylinders, rings and parallel surfaces
- Adjustable zero-setting helps provide accuracy
- Scale on thimble and sleeve is laser etched for easier reading in all conditions
- Carbide measuring surfaces provide better accuracy and wear resistance



| Mitutoyo Model No. | Range (in.) | Grad (in.) | Sowa Code No. | Price \$ |
|--------------------|-------------|------------|---------------|----------|
| 137-212            | 2-12        | 0.001"     | 844684        | 517.00   |
| 137-214            | 2-40        | 0.001"     | 840984        | 831.00   |

## Inside Micrometers — Rod Type

**Mitutoyo**

- Interchangeable measuring rods and spacers achieve the full specified measuring range
- Each interchangeable rod is marked with its measuring range
- An extension handle to help you measure deep bores is included in sets up to 300mm range



| Mitutoyo Model No. | Range (in.) | Grad (in.) | Sowa Code No. | Price \$ |
|--------------------|-------------|------------|---------------|----------|
| 141-208            | 2 - 8"      | 0.001"     | 840071        | 244.00   |
| 141-233            | 2 - 12"     | 0.001"     | 840072        | 316.00   |
| 141-121            | 8 - 20"     | 0.001"     | 841523        | 530.00   |

## Digital Depth Micrometers

**ASIMETO**

- Resolution: 0.00005"
- 0.157 Dia. interchangeable rod lengths can be adjusted after wear on the measuring tip
- Ratchet stop
- Satin Chrome finish throughout
- Protection level IP65
- Absolute and incremental measuring modes
- Auto On/Off
- Inch/Metric conversion



| Range | Thimble Grad. | Accuracy | Base Length | Notes                | Code No. | Price \$ |
|-------|---------------|----------|-------------|----------------------|----------|----------|
| 0-4"  | 0.0001"       | ±0.0002" | 2.5"        | With Int. Rods: 4pcs | 7205041  | 702.05   |
| 0-6"  | 0.0001"       | ±0.0002" | 2.5"        | With Int. Rods: 6pcs | 7205061  | 773.35   |
| 0-4"  | 0.0001"       | ±0.0002" | 4.0"        | With Int. Rods: 4pcs | 7205043  | 720.44   |
| 0-6"  | 0.0001"       | ±0.0002" | 4.0"        | With Int. Rods: 6pcs | 7205063  | 726.43   |

## Depth Micrometers

**ASIMETO**

- 0.157 Dia. interchangeable rod lengths can be adjusted after wear on the measuring tip
- Ratchet stop
- Satin Chrome finish throughout



| Range | Grad.  | Accuracy | Base Length | Notes                | Code No. | Price \$ |
|-------|--------|----------|-------------|----------------------|----------|----------|
| 0-4"  | 0.001" | +0.0002" | 2.5"        | With Int. Rods: 4pcs | 7201041  | 215.22   |
| 0-6"  | 0.001" | +0.0002" | 2.5"        | With Int. Rods: 6pcs | 7201061  | 227.18   |
| 0-4"  | 0.001" | +0.0002" | 4.0"        | With Int. Rods: 4pcs | 7201043  | 256.50   |
| 0-6"  | 0.001" | +0.0002" | 4.0"        | With Int. Rods: 6pcs | 7201063  | 311.65   |

## Depth Micrometers

**Mitutoyo**

- ø4mm interchangeable rods, with lapped measuring surfaces, enable you to make wide-range measurement
- The ratchet stop provides constant measuring force
- Measuring rod lock



| Mitutoyo Model No. | Range (in.) | Grad (in.) | Base (in.) | No. of Rods | Sowa Code No. | Price \$ |
|--------------------|-------------|------------|------------|-------------|---------------|----------|
| 129-127            | 0 - 4"      | 0.001"     | 2-1/2"     | 4           | 840066        | 262.00   |
| 129-132            | 0 - 6"      | 0.001"     | 4"         | 6           | 840069        | 341.00   |
| 129-150            | 0 - 12"     | 0.001"     | 4"         | 12          | 841092        | 560.00   |

## 445 Series Depth Micrometers

**Starrett**

- Ratchet Stop, Lock Nut, Carbide Faces, in fitted case
- Graduation: 0.001" • Base: 3" • Rod Diameter: 5/32"
- Combination ratchet and speeder for uniform pressure and quicker adjustment
- Ring-type lock nut
- Satin chrome finish
- Measuring rods are adjustable



| Range | No. of Rods | Starrett No. | Sowa Code No. | Price \$ |
|-------|-------------|--------------|---------------|----------|
| 0-3"  | 3           | 445AZ-3RL    | 630665        | 477.00   |
| 0-6"  | 6           | 445AZ-6RL    | 629027        | 564.00   |

## IP67 Coolant Proof Digital Calipers

ASIMETO

- Absolute function, there is no need to set the zero
- Hold function for easy reading
- Absolute or incremental measuring modes
- Inch/Metric conversion
- Metal Housing, the design will allow the caliper to be used in normal workshop conditions and is resistant to coolant, water, dust or oil
- Auto power on/off
- Power: 3V lithium battery



| Range           | Resolution       | Accuracy | Code No. | Price \$      |
|-----------------|------------------|----------|----------|---------------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"  | 7305062  | <b>280.87</b> |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015" | 7305082  | <b>430.92</b> |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015" | 7305122  | <b>514.28</b> |

## IP67 Big Screen Coolant Proof Digital Calipers

ASIMETO

- Absolute function, there is no need to set the zero
- Hold function for easy reading
- Absolute or incremental measuring modes
- Inch/Metric conversion
- Big Screen design allows for very easy reading while also remaining resistant to coolant, water, dust or oil
- Auto power on/off
- Power: 3V lithium battery



| Range           | Resolution       | Accuracy | Code No. | Price \$      |
|-----------------|------------------|----------|----------|---------------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"  | 7305065  | <b>260.41</b> |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015" | 7305085  | <b>399.10</b> |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015" | 7305125  | <b>480.63</b> |

## IP67 Coolant Proof Digital Calipers — Sylvac

ASIMETO

- Conforms to IP67 rating
- Inch/Metric conversion
- Auto power on/off
- Sylvac system



SWISS MADE

| Range          | Resolution       | Accuracy       | Code No. | Price \$      |
|----------------|------------------|----------------|----------|---------------|
| 0-6" / 0-150mm | 0.0005" / 0.01mm | ±0.001"/0.02mm | 7301060  | <b>152.39</b> |

## Coolant Proof Digimatic Calipers

Mitutoyo

### IP67 Series

- IP67 Dust/Water Protection
- Resolution: 0.0005"/0.01mm
- Accuracy: +/- 0.001"
- Single Battery Operation
- 3 Year Battery Life



| Mitutoyo Model No. | Measuring Range     | Sowa Code No. | Price \$      |
|--------------------|---------------------|---------------|---------------|
| 500-752-20         | 0 - 6" / 0 - 150mm  | 843223        | <b>295.00</b> |
| 500-753-20         | 0 - 8" / 0 - 200mm  | 843555        | <b>397.00</b> |
| 500-754-20         | 0 - 12" / 0 - 300mm | 845003        | <b>601.00</b> |

## Digital Calipers

ASIMETO

- Large LCD readout
- Inch/Metric conversion
- With thumb wheel



| Range           | Resolution       | Accuracy | Code No. | Price \$      |
|-----------------|------------------|----------|----------|---------------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"  | 7307065  | <b>89.40</b>  |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015" | 7307085  | <b>132.10</b> |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015" | 7307125  | <b>198.79</b> |

## 798 Series Coolant Proof Digimatic Calipers

Starrett

- Large, easy to read LCD display
- IP67 level of protection against coolant, water, dirt and dust
- Hardened stainless steel measuring surface for long life
- Resolution is 0.0005" (0.01mm)
- Output data to Starrett SPC Plus hardware and software and to PCs



| Range         | Starrett No. | Sowa Code No. | Price \$      |
|---------------|--------------|---------------|---------------|
| 0-6" / 150mm  | 798B-6/150   | 632747        | <b>460.00</b> |
| 0-8" / 200mm  | 798B-8/200   | 632800        | <b>549.00</b> |
| 0-12" / 300mm | 798B-12/300  | 633046        | <b>875.00</b> |

## Digital Calipers

STM

- Inside, outside, step and depth measurements
- Inch/Metric conversion
- Auto on, auto shutoff
- 0.0005"/0.01mm resolution
- Zero button



| Range (in./mm) | Resolution (in./mm) | Code No. | Price \$      |
|----------------|---------------------|----------|---------------|
| 0-6" / 150mm   | 0.0005" x 0.01mm    | 200645   | <b>73.93</b>  |
| 0-8" / 200mm   | 0.0005" x 0.01mm    | 200646   | <b>109.43</b> |
| 0-12" / 300mm  | 0.0005" x 0.01mm    | 200647   | <b>163.91</b> |
| 0-24" / 600mm  | 0.0005" x 0.01mm    | 200648** | <b>792.47</b> |

\*\*no depth gauge

## Large Display Digital Calipers

STM

- Large face for easy reading
- Inside, outside, step and depth measurements
- Inch/Metric conversion
- Auto on, auto shutoff
- 0.0005"/0.01mm resolution
- Zero button



| Range (in./mm) | Resolution (in./mm) | Code No. | Price \$      |
|----------------|---------------------|----------|---------------|
| 0-6" / 150mm   | 0.0005" / 0.01mm    | 200540   | <b>73.93</b>  |
| 0-8" / 200mm   | 0.0005" / 0.01mm    | 200541   | <b>109.43</b> |

## 799 Series Electronic Calipers

Starrett

- Inch/millimeter conversion reads 0.0005" or 0.01mm
- Last measuring position retained when shut off
- Resolution is 0.0005" (0.01mm)



### 6", 8" & 12" Calipers Only

- Large easy-to-read LCD, 0.32" high characters
- Integrated depth rod

### Extended Range 24" & 40" Calipers

- Preset and hold feature
- Minimum and maximum limits set
- I.D. jaw dimension is 0.800"/20.32mm
- LCD characters are 0.50" high



| Range          | Starrett No.  | Sowa Code No. | Price \$        |
|----------------|---------------|---------------|-----------------|
| 0-6" / 150mm   | EC799A-6/150  | 634002        | <b>259.00</b>   |
| 0-8" / 200mm   | EC799A-8/200  | 632081        | <b>373.00</b>   |
| 0-12" / 300mm  | EC799A-12/300 | 632465        | <b>603.00</b>   |
| 0-24" / 600mm  | 799AZ-24/600  | 632466        | <b>1,497.00</b> |
| 0-40" / 1000mm | 799AZ-40/1000 | 632467        | <b>2,892.00</b> |

## Absolute Digital Calipers

ASIMETO

- Inch/Metric conversion
- The ZERO/ABS changes the measurement mode from absolute to incremental



| Range           | Resolution       | Accuracy | Code No. | Price \$ |
|-----------------|------------------|----------|----------|----------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"  | 7307563  | 118.45   |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015" | 7307583  | 133.90   |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015" | 7307623  | 195.70   |

## ABSOLUTE Digimatic Calipers

Mitutoyo

- Both AN/LED Display and Imprinted/INC Scale
- Smaller models offer a convenient thumb wheel
- Stainless steel construction
- Linear scale embedded in epoxy
- Inside, Outside, Depth and Step measurements
- Repeatability: 0.005"
- Display: LCD 5-Digit
- Response speed: 1m (40")/Sec
- Absolute Encoder Technology always remembers its position



| Mitutoyo Model No. | Measuring Range                 | Sowa Code No. | Price \$ |
|--------------------|---------------------------------|---------------|----------|
| 500-196-30         | 0 - 6" / 0 - 150mm              | 848467 *      | 221.00   |
| 500-197-30         | 0 - 8" / 0 - 200 mm / 0.0005    | 840586 *      | 319.00   |
| 500-193            | 0 - 12" / 0 - 300 mm / 0.0005   | 840448 *      | 636.00   |
| 500-505-10         | 0 - 18" / 0 - 450 mm / 0.0005   | 840190        | 1,161.00 |
| 500-506-10         | 0 - 24" / 0 - 600 mm / 0.0005   | 840191        | 1,276.00 |
| 500-507-10         | 0 - 40" / 0 - 1,000 mm / 0.0005 | 840449        | 2,455.00 |
| 500-171-30         | 0 - 6" w/ spc output            | 840188        | 259.00   |
| 500-172-30         | 0-8" w/ spc output              | 840189        | 342.00   |

\* without SPC

## Dial Calipers — Stainless Steel

ASIMETO

- Hardened Stainless Steel
- Preloaded dual pinions eliminate backlash and provides better repeatability



| Range | Graduation | Range per Rev | Accuracy | Code No. | Price \$ |
|-------|------------|---------------|----------|----------|----------|
| 0-6"  | 0.001"     | 0.100"        | ±0.001"  | 7303061  | 93.37    |
| 0-8"  | 0.001"     | 0.100"        | ±0.0015" | 7303081  | 124.02   |
| 0-12" | 0.001"     | 0.100"        | ±0.0015" | 7303121  | 207.77   |

## Dial Calipers — Diecast Aluminum

ASIMETO

- Sturdy Aluminum diecast housing can be used in the harshest of manufacturing environments, including situations with hot steel chips without damage
- The dual pinion mechanism offers ultra smooth feel
- Preloaded pinion offers better repeatability



| Range | Grad.  | Range per Rev | Accuracy | Code No. | Price \$ |
|-------|--------|---------------|----------|----------|----------|
| 0-6"  | 0.001" | 0.100"        | ±0.001"  | 7304065  | 146.73   |
| 0-12" | 0.001" | 0.100"        | ±0.0015" | 7304125  | 333.38   |

## Dial Calipers

Mitutoyo

- Extra rigid (3-4mm thick) main beam
- Extra large dial face
- Hardened stainless steel
- 4-way measurements
- Easy-read point re-adjustment with adjuster supplies



| Mitutoyo Model No. | Range (in.) | Per Rev (in.) | Sowa Code No. | Price \$ |
|--------------------|-------------|---------------|---------------|----------|
| 505-742            | 0 - 6"      | 0.100"        | 850043        | 189.00   |
| 505-743            | 0 - 8"      | 0.100"        | 850028        | 250.48   |
| 505-746            | 0 - 12"     | 0.100"        | 840199        | 390.23   |
| 505-720            | 0 - 12"     | 0.200"        | 840194        | 370.00   |

## Dial Calipers

STM

- Covered rack
- Accurate to 0.001 per 6"
- Made of Stainless Steel
- Clamp for repetitive setting
- Deluxe case
- 0.100" Revolution



| Range | Graduation | Code No. | Price \$ |
|-------|------------|----------|----------|
| 0-6"  | 0.001"     | 200582   | 73.20    |
| 0-8"  | 0.001"     | 200584   | 97.06    |
| 0-12" | 0.001"     | 200586   | 170.15   |

## 120 Series Dial Calipers

Starrett®

- Sharp, clear dial graduations of 0.001" or 0.02mm – 0.100" or 2mm in one revolution
- Sharp, black graduations on satin finished bar, every 0.100" or 1mm
- Knife-edge contacts for inside and outside measurements
- Thumb-operated fine adjustment roll
- Positive split-gear anti-backlash control
- Rack teeth point down to shed foreign matter more easily



| Range | Graduation | Starrett No. | Sowa Code No. | Price \$ |
|-------|------------|--------------|---------------|----------|
| 0-6"  | 0.001"     | 120A-6       | 629034        | 360.00   |
| 0-9"  | 0.001"     | 120A-9       | 629036        | 590.00   |
| 0-12" | 0.001"     | 120-12       | 630877        | 673.00   |

## Vernier Calipers

ASIMETO

- Can measure OD, ID, depth and steps
- Available in Plain, Thumb Clamp and Fine adjustment
- Stainless Steel
- Measuring surfaces allow for the measurement of external diameters, internal diameters, depths, and steps
- Upper and lower scales on the slider are angles to reduce parallax error



| Range                |       | Graduation |        | Accuracy | Code No. | Price \$ |
|----------------------|-------|------------|--------|----------|----------|----------|
| Lower                | Upper | Lower      | Upper  |          |          |          |
| <b>Plain Vernier</b> |       |            |        |          |          |          |
| 0-150mm              | 0-6"  | 0.02mm     | 0.001" | ±0.03mm  | 7341064  | 64.77    |
| <b>Thumb Clamp</b>   |       |            |        |          |          |          |
| 0-150mm              | 0-6"  | 0.02mm     | 0.001" | ±0.03mm  | 7351064  | 78.65    |

## Vernier Calipers With Fine Adjustment

STM

### Precision Stainless Steel Vernier Calipers

- Satin chrome finish
- Extra long vernier to insure accuracy
- Made of fully hardened stainless steel throughout
- Jaws designed for outside, inside, and thread measurement
- All measurements can be read directly from vernier scale 1/1000" x 1/20 mm
- Raised sliding surfaces prevent defacement and wear of graduations: clear black engravings



| Range (in x mm) | Graduation (in x mm) | Code No. | Price \$ |
|-----------------|----------------------|----------|----------|
| 0-6" x 150mm    | 1/1000" x 1/20mm     | 200600   | 50.45    |

## Precision Vernier Calipers

Mitutoyo

- Graduations photo engraved
- Hardened stainless steel throughout
- Satin chrome finish
- All measuring surfaces are ground and capped



| Mitutoyo Model No. | Range (in./mm) | Vernier Reading |             | Sowa Code No. | Price \$ |
|--------------------|----------------|-----------------|-------------|---------------|----------|
|                    |                | Upper Scale     | Lower Scale |               |          |
| <b>Plain Type</b>  |                |                 |             |               |          |
| 530-312            | 0-6"/0-150mm   | 0.001"          | 0.02mm      | 840225        | 129.00   |
| 530-118            | 0-8"/0-200mm   | 0.001"          | 0.02mm      | 840224        | 161.00   |
| 530-115            | 0-12"/0-300mm  | 1/128           | 0.05mm      | 840222        | 335.00   |
| <b>Thumb Clamp</b> |                |                 |             |               |          |
| 531-128            | 0-6"/0-150mm   | 0.001"          | 0.02mm      | 841207        | 139.00   |
| 531-129            | 0-8"/0-200mm   | 0.001"          | 0.02mm      | 841858        | 189.00   |

## 125 Series Vernier Calipers

Starrett

- High quality basic vernier caliper
- Graduation: 0.001"/0.02mm



| Range       | Starrett No.  | Sowa Code No. | Price \$ |
|-------------|---------------|---------------|----------|
| 0-6"/150mm  | 125MEA-6/150  | 631977        | 210.00   |
| 0-8"/200mm  | 125MEA-8/200  | 631978        | 247.00   |
| 0-12"/300mm | 125MEA-12/300 | 631979        | 439.00   |

## ABS Heavy Duty Digital Calipers

ASIMETO

- Resolution: 0.0005" / 0.01mm
- Designed with fine adjustment to allow precise movement of the slider
- Internal measurement jaws are rounded to provide accurate measurement of internal diameters
- Minimum internal diameter measurement capability of 20mm
- Inch/Metric conversion
- Zero setting at any position
- Without upper jaws

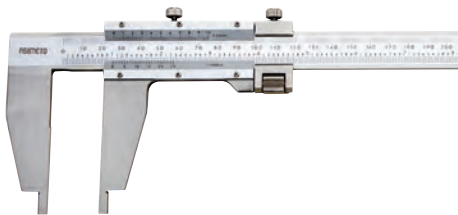


| Range          | Jaw Length | Accuracy | Code No. | Price \$ |
|----------------|------------|----------|----------|----------|
| 0-12"/0-300mm  | 90mm       | ±0.04mm  | 7315126  | 356.65   |
| 0-24"/0-600mm  | 100mm      | ±0.05mm  | 7315246  | 623.30   |
| 0-40"/0-1000mm | 150mm      | ±0.10mm  | 7315406  | 2,023.79 |

## Heavy Duty Vernier Calipers

ASIMETO

- Graduation:  
Lower Scale: 0.001"  
Upper Scale: 0.02mm
- Nib style jaws and fine adjustment



| Range |          | Graduation |        | Accuracy | Jaw Depth | Code No. | Price \$ |
|-------|----------|------------|--------|----------|-----------|----------|----------|
| Lower | Upper    | Lower      | Upper  |          |           |          |          |
| 0-12" | 0-300mm  | 0.001"     | 0.02mm | ±0.0015" | 75mm      | 7311121  | 272.57   |
| 0-18" | 0-450mm  | 0.001"     | 0.02mm | ±0.002"  | 100mm     | 7311181  | 469.92   |
| 0-24" | 0-600mm  | 0.001"     | 0.02mm | ±0.002"  | 100mm     | 7311241  | 536.70   |
| 0-40" | 0-1000mm | 0.001"     | 0.02mm | ±0.003"  | 150mm     | 7311401  | 1,174.73 |
| 0-60" | 0-1500mm | 0.001"     | 0.02mm | ±0.004"  | 200mm     | 7311601  | 3,238.48 |
| 0-80" | 0-2000mm | 0.001"     | 0.02mm | ±0.005"  | 200mm     | 7311801  | 4,532.06 |

## Digital Caliper With Adjustable Measuring Jaw

ASIMETO

- Resolution: 0.0005"/0.01mm
- Stationary jaw on the beam is designed with vertical movement for the purpose of measuring various steps of different heights
- Inch/Metric conversion
- Zero setting at any position



| Range       | Adjustable Jaw Length | Accuracy        | Code No. | Price \$ |
|-------------|-----------------------|-----------------|----------|----------|
| 0-6"/150mm  | 110mm                 | ±0.0015"/0.04mm | 7317060  | 354.73   |
| 0-12"/300mm | 130mm                 | ±0.0020"/0.05mm | 7317120  | 627.89   |

## Digimatic Scale

Mitutoyo

- No rack, no pinion, no glass scale. Digimatic Scale is safely embedded in the hardened stainless steel blade
- All units come with two mounting brackets, each located at either end of the scale
- Battery life approximately 2 years



| Mitutoyo Model No. | Range (in./mm) | Resolution (in./mm) | Output | Sowa Code No. | Price \$ |
|--------------------|----------------|---------------------|--------|---------------|----------|
| 572-211-20         | 6"/150mm       | 0.0005"/0.01mm      | YES    | 847859        | 320.35   |

## Digital Indicators

- Tolerance measurement feature
- Inch/Metric conversion
- The maximum, minimum, or runout value can be displayed during measurement
- Absolute and incremental measuring modes
- SR44 battery
- Flat Back (attached) and Lug Back supplied
- 3/8" stem diameter for inch models and 8mm stem diameter for metric models

ASIMETO



| Range           | Resolution      | Accuracy          | Code No. | Price \$ |
|-----------------|-----------------|-------------------|----------|----------|
| 0-0.5"/0-12.5mm | 0.0005"/0.001mm | ±0.0003"/±0.007mm | 7405955  | 152.62   |
| 0-0.5"/0-12.5mm | 0.0005"/0.01mm  | ±0.0008"/±0.02mm  | 7405951  | 194.90   |
| 0-1"/0-25mm     | 0.0005"/0.01mm  | ±0.0012"/±0.03mm  | 7405011  | 212.90   |
| 0-2"/0-50mm     | 0.0005"/0.01mm  | ±0.0012"/±0.02mm  | 7405021  | 527.11   |

## IP65 Absolute Digital Indicators

- Absolute or incremental measuring modes
- Tolerance measurement feature allows for the upper and lower tolerance for maximum and minimum
- Inch/Metric conversion
- Flat back (attached) and lug back supplied
- 3/8" stem diameter
- 360 deg. screen rotation
- Cable data output: 7900070
- Wireless data transfer: 7901002

ASIMETO



7407013

7407023

| Range           | Resolution     | Accuracy         | Code No. | Price \$ |
|-----------------|----------------|------------------|----------|----------|
| 0-0.5"/0-12.5mm | 0.0005"/0.01mm | ±0.0008"/±0.02mm | 7407013  | 242.39   |
| 0-1"/0-25mm     | 0.0005"/0.01mm | ±0.0012"/±0.02mm | 7407023  | 202.84   |
| 0-2"/0-50mm     | 0.0005"/0.01mm | ±0.0012"/±0.02mm | 7407033  | 697.68   |

## Digimatic Indicators ID-N/B

Mitutoyo

- Proven ABSOLUTE sensor
- Rated to IP66 water- and dust-proofing standard and oil resistance improved
- Slim body design is advantageous for multi-point measurements
- Improvement in workability with the LCD readout-rotation function
- Back plunger design (ID-B).
- Built-in tolerance judgment function
- Switchable resolution
- Waterproof data output connector
- Built-in hold/preset function



Slim type ID-N

Back plunger type ID-B



| Mitutoyo Model No. | Range (in./mm) | Resolution (in./mm) | Sowa Code No. | Price \$ |
|--------------------|----------------|---------------------|---------------|----------|
| 543-571 ID-N       | 0.500"/12.7 mm | 0.0008"/0.02 mm     | 846425        | 511.00   |
| 543-576 ID-N       | 0.500"/12.7 mm | 0.00012"/0.003 mm   | 846426        | 709.00   |
| 543-581 ID-B       | 0.220"/5.6 mm  | 0.0005"/0.01 mm     | 846424        | 564.00   |
| 543-586 ID-B       | 0.220"/5.6mm   | 0.00005"/0.001 mm   | 846185        | 763.00   |

## ID-S Digimatic Indicators

Mitutoyo

- 2-3/8 dial face
- ABS sensor
- Absolute linear encoder track or pin
- 3/8 stem diameter



### With ABSOLUTE ENCODER

| Mitutoyo Model No. | Type      | Range (in./mm)  | Resolution (in./mm) | Sowa Code No. | Price \$ |
|--------------------|-----------|-----------------|---------------------|---------------|----------|
| 543-392B           | Flat Back | 0-0.5"/0-12.7mm | 0.00005"/0.001mm    | 840616        | 578.35   |
| 543-262            | Lug Back* | 0-0.5"/0-12.7mm | 0.00005"/0.001mm    | 842932        | 646.08   |
| 543-263            | Lug Back* | 0-0.5"/0-12.7mm | 0.0001"/0.001mm     | 842477        | 646.08   |
| 543-472B           | Flat Back | 0-1.00"/0-25mm  | 0.00005"/0.001mm    | 846486        | 856.78   |
| 543-683            | Lug Back  | 0-.05"/0-12.7mm | 0.0005"/0.01mm      | 841419        | 240.80   |

\*Peak Hold Feature

## 3600 Series Electronic Indicator

Starrett

- Large, easy-to-read LCD
- Range: 0.500" or 12.7mm
- Resolution: 0.0005" or 0.01mm
- Lug-on-centre back + additional flat back



| Range         | Resolution     | Starrett No. | Sowa Code No. | Price \$ |
|---------------|----------------|--------------|---------------|----------|
| 0.500"/12.7mm | 0.0005"/0.01mm | 3600-5       | 632014        | 249.00   |

## AGD1 Dial Indicators

ASIMETO

- Graduation: Inch: 0.001" Metric: 0.01mm
- Dial face dia. 1.65"
- Jeweled bearings
- Lug Back



| Range     | Dial Reading | Range per Rev | Stem Dia. | Code No. | Price \$ |
|-----------|--------------|---------------|-----------|----------|----------|
| 0 - 0.25" | 0-100        | 0.1"          | 3/8       | 7401061  | 67.85    |

## AGD2 Dial Indicators

ASIMETO

- Dial face dia. 2.20"
- Lug Back
- Easy to read dial face



7402265

7402267

| Range                   | Grad.   | Dial Reading | Range per Rev. | Stem Dia. | Code No. | Price \$ |
|-------------------------|---------|--------------|----------------|-----------|----------|----------|
| <b>Inch</b>             |         |              |                |           |          |          |
| 0-0.05"                 | 0.0001" | 0-50-0       | 0.01"          | 3/8       | 7402013  | 140.46   |
| 0-0.05"                 | 0.0001" | 10-0         | 0.01"          | 3/8       | 7402011  | 140.46   |
| 0-0.05"                 | 0.0001" | 0-5-0        | 0.01"          | 3/8       | 7402015  | 176.61   |
| 0-0.25"                 | 0.0005" | 0-25-0       | 0.05"          | 3/8       | 7402065  | 63.49    |
| 0-0.5"                  | 0.0005" | 0-50         | 0.05"          | 3/8       | 7402125  | 63.49    |
| 0-1"                    | 0.0005" | 0-50         | 0.05"          | 3/8       | 7402265  | 65.29    |
| 0-0.25"                 | 0.001"  | 0-100        | 0.1"           | 3/8       | 7402061  | 56.05    |
| 0-0.25"                 | 0.001"  | 0-50-0       | 0.1"           | 3/8       | 7402063  | 84.99    |
| 0-0.5"                  | 0.001"  | 0-100        | 0.1"           | 3/8       | 7402121  | 58.36    |
| 0-0.5"                  | 0.001"  | 0-50-0       | 0.1"           | 3/8       | 7402123  | 67.53    |
| 0-1"                    | 0.001"  | 0-100        | 0.1"           | 3/8       | 7402261  | 54.38    |
| 0-1"                    | 0.001"  | 0-50-0       | 0.1"           | 3/8       | 7402263  | 67.78    |
| 0-2"                    | 0.001"  | 0-100        | 0.1"           | 3/8       | 7402511  | 129.53   |
| <b>Metric</b>           |         |              |                |           |          |          |
| 0-10mm                  | 0.01mm  | 0-100        | 1mm            | 3/8       | 7402101  | 106.79   |
| 0-25mm                  | 0.01mm  | 0-50-0       | 1mm            | 3/8       | 7402253  | 188.30   |
| <b>IP54 Water Proof</b> |         |              |                |           |          |          |
| 0-0.4"                  | 0.001"  | 0-100        | 0.1"           | 3/8       | 7402267  | 126.63   |
| 0-0.4"                  | 0.0005" | 0-50         | 0.05"          | 3/8       | 7402269  | 126.63   |

## Dial Indicators

- Reverse counter
- Stainless steel components
- Rotating bezel with clamp
- Lugback (1/4" hole)
- Interchangeable point
- Conforms to AGD 2 standards



| Travel Range | Dial Reading | Grad.   | Dial Colour | Code No. | Price \$ |
|--------------|--------------|---------|-------------|----------|----------|
| 1/2"         | 0-100"       | 0.001"  | White       | 200718   | 46.27    |
| 1"           | 0-100"       | 0.001"  | White       | 200720   | 40.17    |
| 1"           | 0-50"        | 0.0005" | White       | 200755   | 53.00    |
| 2"           | 0-100"       | 0.001"  | White       | 200725   | 102.09   |

| Magnetic Back   |              |
|-----------------|--------------|
| For AGD2 series | 200722 22.39 |

## Dial Indicators

- Jewelled bearings
- Reversible contact point is adjustable within 220°
- Fully adjustable bevel/dial face, 1.27" easy to read



Series #1- 1-5/8" dia. dial face  
Series #2- 2-1/4" dia. dial face

| Mitutoyo Model No. | Range (in./mm) | Grad (in./mm) | Reading | Sowa Code No. | Price \$ |
|--------------------|----------------|---------------|---------|---------------|----------|
| 1044S              | 5mm            | 0.01mm        | 0-100   | 841286        | 136.53   |
| 1410S              | 0.250"         | 0.001"        | 0-100   | 841696        | 155.00   |
| 1411S              | 0.250"         | 0.001"        | 0-50-0  | 848586        | 139.75   |
| 2046S              | 10mm           | 0.01mm        | 0-100   | 840249        | 132.00   |
| 2047S-01           | 10mm           | 0.01mm        | 0-50-0  | 842938        | 122.55   |
| 2414S              | 0.500"         | 0.001"        | 0-100   | 840417        | 155.00   |
| 2416S-10           | 1.00"          | 0.001"        | 0-100   | 840255        | 176.00   |
| 2424S-19           | 2.00"          | 0.001"        | 0-100   | 847987        | 287.03   |
| 2804S-10           | 0.050"         | 0.0001"       | 0-10    | 840258        | 234.00   |
| 2923S-10           | 0.050"         | 0.0001"       | 0-5-0   | 840260        | 229.00   |
| 2923SB-10          | 0.050"         | 0.0001"       | 0-5-0   | 843450        | 208.55   |
| 2971               | 0.5mm          | 0.01mm        | 25-0-25 | 843498        | 131.00   |

"S" = flat crystal & flat back    "-10" = jewelled bearings    "-01" = metric ind. with ANSI specs

## Test Indicators

- Jeweled bearings
- Inch units come with 3/8 & 8mm dovetail stems
- Easy to read yellow face
- 32mm and 40mm face diameters available



Vertical

### Full Set

Carbide tipped point  
DIA.  $\phi$ 2mm

Steel point  
DIA.  $\phi$ 1mm

Stem Dia.  
Metric 4mm  
Inch 0.157"

Holding Bar  
Metric 9x9x100mm  
Inch 0.25"x0.5"x4"

Swivel Clamp  
Metric for  $\phi$ 4mm, &  $\phi$ 8mm Dia.  
Inch for 3/8", & 0.157" Dia.

### Base Set

Stem Dia.  
Metric  $\phi$ 8mm  
Inch  $\phi$ 3/8"

Knurled  
Clamping Ring

Wrench

Horizontal

|           | Grad.   | Range  | Dial Reading | Accuracy      | Type                          | Code No. | Price \$ |
|-----------|---------|--------|--------------|---------------|-------------------------------|----------|----------|
| Inch      | 0.0001" | 0.008" | 0-4-0        | $\pm$ 0.0001" | Horizontal                    | 7501783  | 154.28   |
|           | 0.0001" | 0.008" | 0-4-0        | $\pm$ 0.0001" | Vertical                      | 7501785  | 175.70   |
|           | 0.0005" | 0.03"  | 0-15-0       | $\pm$ 0.0005" | Horizontal                    | 7501733  | 148.77   |
|           | 0.0005" | 0.03"  | 0-15-0       | $\pm$ 0.0005" | Vertical                      | 7501735  | 133.07   |
|           | 0.0005" | 0.03"  | 0-15-0       | $\pm$ 0.0005" | Horizontal/Long Point (1.25") | 7501736  | 205.27   |
| Inch Sets | 0.0001" | 0.008" | 0-4-0        | $\pm$ 0.0001" | Horizontal                    | 7501787  | 185.96   |
|           | 0.0005" | 0.03"  | 0-15-0       | $\pm$ 0.0005" | Horizontal                    | 7501738  | 227.32   |

## 196 Series Dial Indicators

- Inch reading
- Graduation: 0.001"
- Dial reading: 0-100
- Shank Diameter 1/4"
- Accurate, reliable, and simple to operate
- Rugged with few moving parts
- Smooth in operation



| Range  | Supplied With                                   | Starrett No. | Sowa Code No. | Price \$ |
|--------|---|--------------|---------------|----------|
| 0.200" | 3 Contact Pts & Adapter, 4 attachments* in Case | 196A1Z       | 628864        | 441.00   |
| 0.200" | 3 Contact Pts & Adapter Only                    | 196B1        | 629144        | 254.00   |

\*Attachments include clamp, tool post holder, snug and hole attachment

## 25 Series Dial Indicators

- Lug-on-centre back
- Graduation: 0.001"
- Range: 0.250"
- Shockless hardened steel gear train and jewel bearings
- Contact point is interchangeable
- Easy-to-read dial style



| Range per Rev. | Dial Reading | Starrett No. | Sowa Code No. | Price \$ |
|----------------|--------------|--------------|---------------|----------|
| 0.100"         | 0-50-0       | 25-141J      | 629457        | 281.00   |

## Holding Bars

- Scalloped design
- Black oxide coating for corrosion resistance



| Shank Dia. | Length | Code No. | Price \$ |
|------------|--------|----------|----------|
| 1/4 x 1/2  | 4"     | 7500213  | 35.16    |
| 9mm x 9mm  | 50mm   | 7500210  | 38.47    |
| 9mm x 9mm  | 100mm  | 7500212  | 39.50    |



## Test Indicators and Sets

- Available in bezel or dial
- Contact point adjustable through 230°
- Fully jeweled movement
- Extremely light contact pressure
- Clear, easy to read, white face
- Dovetails on top and back for all-around positioning
- Sets include 5/32" and 3/8" mounting shanks and 3/8" bar



| Dial Dia. (in.) | Grad. (in.) | Range (in.) | Reading (in.) | Point Length (in.) | Code No. | Price \$ |
|-----------------|-------------|-------------|---------------|--------------------|----------|----------|
| 1.250"          | 0.0005"     | 0.030"      | 0-15-0        | 0.700"             | 200730   | 92.36    |

## Quick Set / True Test Indicators

Basic Model Includes:

- Horizontal type, series 513
- 0.078" carbide contact point
- 3/8 dovetail and nut

Complete Model Includes:

- All basic accessories
- 0.039 and 0.118 contact points
- Swivel clamp for 5/32 and 3/8 dovetail
- 5/32 dovetail arm

Mitutoyo



| Mitutoyo Model No.       | Range (in./mm)      | Grad (in./mm)  | Sowa Code No. | Price \$ |
|--------------------------|---------------------|----------------|---------------|----------|
| <b>Basic Model</b>       |                     |                |               |          |
| 513-402                  | 0.030"              | 0.0005"        | 840211        | 173.00   |
| 513-403                  | 0.008"              | 0.0001"        | 840212        | 201.00   |
| <b>Complete Model</b>    |                     |                |               |          |
| 513-402T                 | 0.030"              | 0.0005"        | 840215        | 194.00   |
| 513-403T                 | 0.008"              | 0.0001"        | 840216        | 281.00   |
| 513-405T                 | 0.2mm               | 0.002mm        | 840476        | 271.00   |
| 513-406T                 | 0.030"/0.7mm (dual) | 0.0005"/0.01mm | 840217        | 239.00   |
| 513-412-10T (long point) | 0.030"              | 0.0005"        | 849370        | 304.00   |

## Pocket Test Indicators

- Jewelled bearings
- Reversible contact point is adjustable within 220°
- Fully adjustable bevel/dial face, 1.27" easy to read

Mitutoyo



| Mitutoyo Model No. | Range (in./mm) | Grad (in./mm) | Reading | Sowa Code No. | Price \$ |
|--------------------|----------------|---------------|---------|---------------|----------|
| 513-518T (set)     | 0.040"         | 0.001"        | 0-20-0  | 840208        | 207.00   |
| 513-518 (ind)      | 0.040"         | 0.001"        | 0-20-0  | 840473        | 191.00   |
| 513-515 (ind)      | 1.00mm         | 0.01mm        | 0-50-0  | 842594        | 207.48   |

## Extended Range Dial Test Indicators

- Jeweled bearing design and resistant to magnetic fields
- Stem diameter: Inch: 3/8", Metric: 8mm
- Carbide contact point swivels 210°

ASIMETO



| Range  | Graduation | Dial Reading | Accuracy | Type                    | Code No. | Price \$ |
|--------|------------|--------------|----------|-------------------------|----------|----------|
| 0.060" | 0.001"     | 0-15-0       | ±0.0012" | Horizontal w/ 30mm dial | 7503061  | 254.94   |
| 0.060" | 0.0005"    | 0-15-0       | ±0.0012" | Horizontal w/ 30mm dial | 7503561  | 254.94   |
| 0.060" | 0.0005"    | 0-15-0       | ±0.0012" | Horizontal w/ 38mm dial | 7504561  | 254.94   |
| 0.060" | 0.001"     | 0-15-0       | ±0.0012" | Vertical w/ 30mm dial   | 7503063  | 259.51   |
| 0.060" | 0.0005"    | 0-15-0       | ±0.0012" | Vertical w/ 30mm dial   | 7503563  | 195.63   |
| 0.060" | 0.0005"    | 0-15-0       | ±0.0012" | Vertical w/ 38mm dial   | 7504563  | 228.41   |

## Centering Indicators

- Operating speed not to exceed 800rpm
- Range: Internal: 5/32" - 12"  
External: Up to 12"
- Includes: 6pc feeler set, centre locating feeler



ASIMETO

| Dial Range | Graduation | Accuracy | Stem Dia. | Code No. | Price \$ |
|------------|------------|----------|-----------|----------|----------|
| 0-0.15"    | 0.0005"    | ±0.0002" | 0.375"    | 7469008  | 326.58   |

### Parts

| Description            | Length   | Capacity  | Code No. | Price \$ |
|------------------------|----------|-----------|----------|----------|
| ID Feeler              | 2"/50mm  | 4"/100mm  | 7469012  | 6.59     |
| ID Feeler              | 4"/100mm | 8"/200mm  | 7469013  | 6.31     |
| ID Feeler              | 6"/150mm | 12"/300mm | 7469014  | 6.59     |
| OD Feeler              | 2"/50mm  | 4"/100mm  | 7469015  | 6.59     |
| OD Feeler              | 4"/100mm | 8"/200mm  | 7469016  | 6.59     |
| OD Feeler              | 6"/150mm | 12"/300mm | 7469017  | 6.31     |
| Centre Locating Feeler |          |           | 7469018  | 20.00    |
| Feeling Rod            |          |           | 7469019  | 7.08     |

## 711 Series Dial Test Indicators

- Graduation: 0.001" Dial Reading 0-15-0
- Steel contact points length: 5/32" (4mm)
- Steel contact points ball diameters: 0.035" (0.9mm), 0.062" (1.6mm), 0.120" (3mm)
- Ideal for precise measurements in machining, layout, and inspection work
- Smooth, jeweled lever action
- Positive reversing switch
- Hard chrome-plated ratchet contact point
- Swiveling tubular body
- Easy reading dials, half-shaded yellow for clarity

Starrett



| Range  | Contact Length (in./mm) | Steel Contact Points Ball Dia. (in./mm)         | Starrett No. | Sowa Code No. | Price \$ |
|--------|-------------------------|---|--------------|---------------|----------|
| 0.030" | 5/32"/4mm               | 3pc: 0.035"/0.9mm<br>0.062"/1.6mm<br>0.120"/3mm | 711GCSZ      | 629140        | 468.00   |

## 708 Series Dial Test Indicators

- With Attachments: Attachments include dovetail body clamp, tool post holder, swivel post snug with dovetail indicator clamp, and snug and rod unit
- Large 1 3/8" (35mm) dial diameter
- Carbide contact points 13/16 x 0.078" dia
- Precision gear driven design with accurate, smooth, jeweled movement
- Furnished in case

Starrett



| Range  | Grad.   | Dial Reading | Starrett No. | Sowa Code No. | Price \$ |
|--------|---------|--------------|--------------|---------------|----------|
| 0.010" | 0.0001" | 0-5-0        | 708ACZ       | 629138        | 677.00   |
| 0.030" | 0.0005" | 0-15-0       | 709ACZ       | 629139        | 547.00   |

## Extended Range Dial Test Indicator Sets #1

ASIMETO

- Double the range of most indicators
- Jeweled movement

### Standard Accessories:

- Calibration certificate, instruction manual, warranty card, indicator, wrench
- Height gauge bar with swivel clamp w/ 5/32", 7/32", 1/4" holes
- Axial support with 3/8" stem and dovetail
- Reduction sleeve 3/8" to 5/32"
- Two dovetail stems, 3/8" and 5/32"
- Three contact points: 0.4" (hardened steel), 0.08", 0.12" (Tungsten Carbide) x 5/8" long



| Range  | Graduation | Accuracy | Dial Dia. | Indicator            | Code No. | Price \$ |
|--------|------------|----------|-----------|----------------------|----------|----------|
| 0.060" | 0.0005"    | ±0.0012" | 38mm      | Horizontal (7504561) | 7504811  | 304.23   |
| 0.060" | 0.0005"    | ±0.0012" | 30mm      | Horizontal (7503561) | 7504813  | 296.03   |
| 0.060" | 0.001"     | ±0.0012" | 30mm      | Horizontal (7503061) | 7504815  | 283.73   |

## Extended Range Dial Test Indicator Sets #2

ASIMETO

- Double the range of most indicators
- Jeweled movement

### Standard Accessories:

- Calibration certificate, instruction manual, warranty card, indicator, wrench
- Xtra-Mag magnetic base with 2 universal ball sockets
- Micro-fine adjustment screw
- 3-9/16" extension arm
- Two dovetail stems, 3/8" and 5/32"
- Three contact points: 0.4" (hardened steel), 0.08", 0.12" (Tungsten Carbide) x 5/8" long



| Range  | Graduation | Accuracy | Dial Dia. | Indicator            | Code No. | Price \$ |
|--------|------------|----------|-----------|----------------------|----------|----------|
| 0.060" | 0.0005"    | ±0.0012" | 38mm      | Horizontal (7504561) | 7504821  | 298.21   |

## Dovetail Stem Sets

ASIMETO

- Includes stem and knurled clamping ring
- Used in conjunction with a magnetic base clamp to mount a test indicator with a dovetail



| Size  | Code No. | Price \$ |
|-------|----------|----------|
| 3/8"  | 7500311  | 9.74     |
| 5/32" | 7500313  | 9.74     |

## Swivel Clamp

ASIMETO

- Used to mount an indicator via either a dovetail stem or directly by a dovetail
- Clamps directly onto the main post of a magnetic base



| Description                          | Code No. | Price \$ |
|--------------------------------------|----------|----------|
| For 3/8" & 5/32" Dia. Dovetail Stems | 7500251  | 48.18    |
| For 8mm & 6mm Dia. Dovetail Stems    | 7500252  | 47.47    |

## Centering Holders

ASIMETO

- Allows large diameter cylinder or holes to be centered



| Description     | Code No. | Price \$ |
|-----------------|----------|----------|
| 8mm Dia. Stem   | 7500350  | 50.74    |
| 0.25" Dia. Stem | 7500351  | 32.58    |

## Half Round Combination Holder

STM

- Two-point adjustment
- 1/4" shank
- For dovetail and 5/32" stem indicators



| Description                   | Code No. | Price \$ |
|-------------------------------|----------|----------|
| Half Round Combination Holder | 200816   | 27.17    |

## Test Indicator Points

ASIMETO

- Carbide, Steel, or Ruby ball



| Ball Dia.           | Tip Length | Ind. Range/Resolution | Code No. | Price \$ |
|---------------------|------------|-----------------------|----------|----------|
| <b>Carbide Ball</b> |            |                       |          |          |
| 2mm                 | 16.2mm     | 0.03"/0.0005"         | 7500622  | 11.88    |
| 3mm                 | 16.7mm     | 0.03"/0.0005"         | 7500632  | 15.17    |
| 3mm                 | 16.7mm     | 0.008"/0.0001"        | 7500732  | 15.17    |
| 2mm                 | 21.8mm     | 0.06"/0.0005"         | 7500822  | 8.57     |
| 3mm                 | 22.3mm     | 0.06"/0.0005"         | 7500832  | 12.80    |
| 2mm                 | 16.2mm     | 0.2mm/0.002mm         | 7500722  | 10.97    |
| <b>Steel Ball</b>   |            |                       |          |          |
| 1mm                 | 15.9mm     | 0.03"/0.0005"         | 7500611  | 11.60    |
| 2mm                 | 16.2mm     | 0.03"/0.0005"         | 7500621  | 5.80     |
| 3mm                 | 16.7mm     | 0.03"/0.0005"         | 7500631  | 5.80     |
| 3mm                 | 16.7mm     | 0.008"/0.0001"        | 7500731  | 5.80     |
| 1mm                 | 21.3mm     | 0.06"/0.0005"         | 7500811  | 5.54     |
| 2mm                 | 21.8mm     | 0.06"/0.0005"         | 7500821  | 5.80     |
| 3mm                 | 22.3mm     | 0.06"/0.0005"         | 7500831  | 5.80     |
| <b>Ruby Ball</b>    |            |                       |          |          |
| 2mm                 | 16.2mm     | 0.03"/0.0005"         | 7500623  | 17.02    |
| 2mm                 | 21.8mm     | 0.06"/0.0005"         | 7500823  | 12.80    |



## Straight Metric Indicator Stem Bushing

- Accepts 8mm stem, converts to 3/8" diameter stem
- Straight bushing, no head
- 0.500" length
- Brass, Nickel Plated

ASIMETO



| Description                            | Code No. | Price \$ |
|--|----------|----------|
| Straight Metric Indicator Stem Bushing | 7500320  | 3.41     |

## Select-A-Point Kit

The most useful accessory kit for all dial indicators - a complete set of 22 different points, increasing the versatility of your indicators.

- Fits all AGD 1, 2, 3, 4 drop style indicators, 4-48 threads



| Description        | Code No. | Price \$ |
|--------------------|----------|----------|
| Select-A-Point Kit | 200820   | 18.54    |

## Articulating Arm Magnetic Bases

- Accepts test indicators with dovetail clamping mechanism
- Dial gauges can be held by the 3/8" or 8mm diameter stem or by the lug backing plate
- Arm has 3 articulating joints that can be locked with the single hand knob
- The rotary knob switches natural magnet on or off
- The precision surfaces and the bottom V are securely fastened to the ferrous workpiece or machine table when the rotary knob is in the on position
- Slot: 6.5mm
- Working Angle 150°
- 7602011 does not have fine adjustment

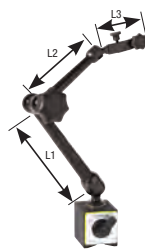
ASIMETO



| Magnetic Power | Magnetic Base (L x W x H) | Height | Code No. | Price \$ |
|----------------|---------------------------|--------|----------|----------|
| 30 kg          | 36 x 30 x 35mm            | 195mm  | 7602011  | 79.68    |
| 80 kg          | 60 x 50 x 55mm            | 350mm  | 7602021  | 226.04   |
| 80 kg          | 60 x 50 x 55mm            | 440mm  | 7602031  | 99.87    |
| 130 kg         | 117 x 50 x 55mm           | 690mm  | 7602051  | 291.13   |

## Dimensional Data

| L1    | L2    | L3   |
|-------|-------|------|
| 65mm  | 55mm  | 60mm |
| 120mm | 105mm | 60mm |
| 160mm | 140mm | 75mm |
| 345mm | 230mm | 60mm |



## Hydraulic Magnetic Base

- Accepts test indicators with dovetail clamping mechanism
- Dial gauges can be held by the 3/8" or 8mm diameter stem or by the lug backing plate
- The rotary knob switches natural magnet on or off
- The precision surfaces and the bottom V are securely fastened to the ferrous workpiece or machine table when the rotary knob is in the on position
- Working Angle 150°

ASIMETO



| Magnetic Power | Magnetic Base (L x W x H) | Height | Code No. | Price \$ |
|----------------|---------------------------|--------|----------|----------|
| 80 kg          | 60 x 50 x 55mm            | 385mm  | 7603010  | 225.85   |

## Permanent Magnetic Base

- With permanent magnetic base, without On/Off switch
- Dovetail groove included

ASIMETO



| Magnetic Power | Main Body  | Main Stem Length | Dia. of Hole | Slot | Code No. | Price \$ |
|----------------|------------|------------------|--------------|------|----------|----------|
| 17 kg          | Ø30 x 25mm | 85mm             | Ø6mm         | 6mm  | 7601120  | 78.75    |

## Standard Magnetic Bases

- For Indicators with 3/8 stems and or Lug backs with 1/4 hole diameter
- On/Off switch
- 132 lbf Magnetic pull

ASIMETO



| Model                                    | Pull Action | Code No. | Price \$ |
|--|-------------|----------|----------|
| With 6" Rod and Universal clamp          | 132 lbf     | 7601011  | 37.08    |
| With 6" Adjustable Rod / Fine Adjustment | 132 lbf     | 7601021  | 34.00    |

## Standard Magnetic Bases

Base only with M8 threaded hole for uses limited only by your imagination.

ASIMETO



| Magnetic Power | Magnetic Base (L x W x H)     | Female Thread | Code No. | Price \$ |
|----------------|-------------------------------|---------------|----------|----------|
| 60 kg          | 60 x 50 x 55mm                | M8            | 7600011  | 54.24    |
| 80 kg          | 60 x 50 x 55mm (metal switch) | M8            | 7600012  | 29.22    |

## STM Magnetic Bases



| Standard Model BA-1 Code No. | Price \$ | Fine Adj. Model BA-1F Code No. | Price \$ |
|------------------------------|----------|--------------------------------|----------|
| 225705                       | 38.81    | 225700                         | 35.85    |

## Universal Magnetic Indicator Holder



- Two universal ball sockets permit adjustment to any angle or position
- Fine adjustment
- Dovetail clamp for test indicators
- 1/4" hole for 1/4" stem indicators



| Description                         | Code No. | Price \$ |
|-------------------------------------|----------|----------|
| Universal magnetic indicator holder | 200825   | 23.91    |

## Single Action Dial Gauge Holder



Articulated arm style magnetic base positions and locks easily; includes ON/OFF switch and central locking knob. One knob mechanically tightens both arms. Dial gauge holder includes fine adjustment and full 360° swivel.



| Description       | Code No. | Price \$ |
|-------------------|----------|----------|
| Dial gauge holder | 200875   | 150.19   |

## Magnetic Stands

- On/Off switch
- 6" Rod and Universal Clamp



| Mitutoyo Model No. | Pull Action | Type                | Sowa Code No. | Price \$ |
|--------------------|-------------|---------------------|---------------|----------|
| 70105-10           | 132 lb      | standard            | 846997        | 138.00   |
| 7033B              | 132 lb      | universal mag stand | 847852        | 394.52   |

## Holders With Fine Adjustment On Top



**New Fine Adjustment on top with universal clamp.**

- Holds 6mm, 3/8", dovetail and lug back
- Unique central locking mechanism with spring loaded bearing
- Dial gauge holder is 3 dimensional
- Powerful on/off magnetic base
- Instant fixation in any position
- Fast and easy to set up gauges into required position
- Black finished arms



| Arm Length and Diameter |                       |                    |          |          |
|-------------------------|-----------------------|--------------------|----------|----------|
| Model                   | Bottom Arm Length(mm) | Top Arm Length(mm) | Code No. | Price \$ |
| NF61003                 | 56                    | 51                 | 165498   | 206.03   |
| DG61003                 | 110                   | 101                | 165500   | 260.40   |
| MG61003                 | 133                   | 113                | 165502   | 327.00   |
| MA61003                 | 326                   | 242                | 165425   | 532.69   |

## Holders With Fine Adjustment On Base



**Unique single direction fine adjustment at base.**

- Powerful on/off magnetic base
- Holds 3/8" and dovetail
- Unique central locking mechanism with spring loaded bearing
- Five axis holder
- Instant fixation in any position
- Easy to set up into required position
- Black finished arms



| Arm Length and Diameter |                       |                    |          |          |
|-------------------------|-----------------------|--------------------|----------|----------|
| Model                   | Bottom Arm Length(mm) | Top Arm Length(mm) | Code No. | Price \$ |
| NF10433                 | 56                    | 51                 | 165504   | 223.97   |
| DG10533                 | 110                   | 101                | 165506   | 278.57   |
| MG10533                 | 133                   | 113                | 165508   | 328.67   |

## Holder With Double Fine Adjustment — MG6161



- New double fine adjustment
  - Bottom: unique single direction
  - Top: universal swivel clamp
- Holds 6mm, 8mm, 3/8", dovetail, and lug back
- Five axis holder
- Unique central locking mechanism with Noga designed spring loaded bearing
- Powerful magnetic base 80kgf



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| MG6161    | 165501   | 366.22   |

## PH Holders With Fine Adjustment At Base



- Single direction fine adjustment at base
- Powerful on/off magnetic base
- Universal Swivel Clamp for all dial & test indicators
- Holds 6mm, 3/8", dovetail and lug back
- Strong arm lock by using the unique 3-point system
- Easy to set up gauges into required system
- Black finished arms



| Arm Length and Diameter |                        |                       |          |          |
|-------------------------|------------------------|-----------------------|----------|----------|
| Model                   | Post Dia. x Length(mm) | Arm Dia. x Length(mm) | Code No. | Price \$ |
| PH3100                  | 10 x 120               | 8 x 110               | 165471   | 84.96    |
| PH2040                  | 14 x 203               | 12 x 185              | 165365   | 104.03   |

## Noga Economy Magnetic Base — PH6400



- Solid arm locked by using Noga unique 3-point clamping system
- Universal swivel clamp for 3/8", 8mm, 6mm, dovetail and back lug
- Improved fine adjustment on the magnet base
- Powerful 176 lbf on/off magnetic base
- Post - 14mmX200mm Arm - 12mmX190mm



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| PH6400 | 165472   | 157.72   |

## Noga Standard Holder — DG1033



- 11" Reach
- Noga central locking mechanism with Noga designed spring loaded bearing
- Powerful On/Off magnetic base 80kgf
- Dial gauge holder is 3 dimensional



| Arm Length and Diameter |                       |                    |          |          |
|-------------------------|-----------------------|--------------------|----------|----------|
| Model                   | Bottom Arm Length(mm) | Top Arm Length(mm) | Code No. | Price \$ |
| DG1033                  | 110                   | 101                | 165350   | 278.57   |

## Noga Heavy Duty Holder — MG1033



- Has fine adjustment
- Noga central locking mechanism with spring loaded bearing
- Powerful magnetic base 80 kgf



| Arm Length and Diameter |                       |                    |          |          |
|-------------------------|-----------------------|--------------------|----------|----------|
| Model                   | Bottom Arm Length(mm) | Top Arm Length(mm) | Code No. | Price \$ |
| MG1033                  | 133                   | 113                | 165355   | 135.99   |

## Five Axis Holder — NF1024



- Unique, 5 axis, 3 dimensional holder
- Patented 360 degree fine adjustment at the base
- Central locking mechanism
- On/Off magnetic base 17 kgf



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NF1024 | 165360   | 258.83   |

## Noga Centerflex — NF1018



- Centerflex, holds indicators with dovetails and 3/8" diameter stems
- Test Indicator holder arm with 5/16" diameter and 1-9/16" long stem
- Most useful for centering holes on milling machines



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NF1018 | 165420   | 151.44   |

## F/A Top Attachment — FA1500



- Holds indicators with 3/8", 6mm, 8mm stems and dovetails
- M6 thread
- Fine adjustment



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| FA1500 | 165421   | 72.75    |

## Universal Surface Gauges



Fully hardened and ground base serves as an accurate reference surface. Machined Vee groove in the base allows the gauge to be used conveniently on curved surfaces.



| Base Dim. (in.) | Spindle Length (in.)      | Scriber Length (in.) | Model No. | Code No. | Price \$ |
|-----------------|---------------------------|----------------------|-----------|----------|----------|
| 2-3/16 x 1-5/8  | 7" with extra 4" spindle  | 3                    | SG/4-7    | 231246   | 78.48    |
| 3-1/8 x 2-1/2   | 12" with extra 9" spindle | 7                    | SG/9-12   | 231248   | 113.65   |

## Digital Interchangeable Rod Type Depth Gauges



- The total measuring range is accomplished with threaded depth rods in 1"
- The base surface is precisely finished and hardened for accurate repeatable measurements
- Inch/Metric conversion
- Stroke 12.7mm
- Includes 10 rods



| Range      | Resolution     | Accuracy       | Base Length | Code No. | Price \$ |
|------------|----------------|----------------|-------------|----------|----------|
| 0-4"/100mm | 0.0005"/0.01mm | ±0.001"/0.02mm | 63x17mm     | 7475040  | 447.29   |

## Absolute Digital Depth Calipers



- Extra large LCD readout
- Inch/Metric conversion
- Precision ground measuring surfaces



| Range           | Resolution       | Accuracy | Code No. | Price \$ |
|-----------------|------------------|----------|----------|----------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"  | 7327067  | 138.51   |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015" | 7327087  | 173.14   |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015" | 7327127  | 402.71   |

## Absolute Digital Depth Calipers With Single Hook



- Stationary measuring surface on the beam protrudes at right angles (hook) to allow for measurement of depths, internal groove positions, and other intricate measurements
- All measuring surfaces are hardened



| Range           | Resolution       | Accuracy        | Code No. | Price \$ |
|-----------------|------------------|-----------------|----------|----------|
| 0-6" / 0-150mm  | 0.0005" / 0.01mm | ±0.001"/0.02mm  | 7322067  | 196.22   |
| 0-8" / 0-200mm  | 0.0005" / 0.01mm | ±0.0015"/0.03mm | 7322087  | 219.18   |
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015"/0.04mm | 7322127  | 444.21   |

## Dial Interchangeable Rod Type Depth Gauges



- The total measuring range is accomplished with threaded depth rods in 1"
- The base surface is precisely finished and hardened for accurate repeatable measurements
- Stroke 1"
- Includes 4 rods



| Range | Graduation | Accuracy | Base Length | Code No. | Price \$ |
|-------|------------|----------|-------------|----------|----------|
| 0-4"  | 0.001"     | ±0.002"  | 2.5"x0.63"  | 7473041  | 292.46   |
| 0-4"  | 0.001"     | ±0.002"  | 4"x0.63"    | 7473043  | 333.42   |

## Digital Tire Depth Gauge



- The origin point is retained throughout the life of the battery
- Inch/Metric conversion
- Spherical end anvil



| Range         | Resolution     | Accuracy        | Base Length | Code No. | Price \$ |
|---------------|----------------|-----------------|-------------|----------|----------|
| 0-1.2"/0-30mm | 0.0005"/0.01mm | ±0.0015"/0.03mm | 60mm        | 7321010  | 147.49   |

## Dial / Digital Bore Gauges

Mitutoyo

- Interchangeable anvils
- Carbide ball contact point for durability
- Optional extension rods can be attached
- A digimatic indicator can be attached in place of the dial gauge



| Mitutoyo Model No. | Capacity (in.)  | Grad (in.)       | Sowa Code No. | Price \$ |
|--------------------|-----------------|------------------|---------------|----------|
| 511-741            | 0.7 - 1.4       | 0.0005           | 840460        | 484.83   |
| 511-742            | 1.4 - 2.5       | 0.0005           | 846411        | 504.00   |
| 511-743            | 2.0 - 6.0       | 0.0005           | 840202        | 564.00   |
| 511-751            | 0.7 - 1.4       | 0.0001           | 840203        | 524.00   |
| 511-752            | 1.4 - 2.5       | 0.0001           | 847567        | 576.00   |
| 511-753            | 2.0 - 6.0       | 0.0001           | 847344        | 565.00   |
| Digital            | Range           | Resolution       |               |          |
| 511-521            | 1.8-4"/45-100mm | 0.00005"/0.001mm | 843940        | 1,759.00 |

## Digital Bore Gauges

ASIMETO

- Resolution: 0.00005"
- Dynamic carbide contact point
- 0.24-0.4" range is with fixed anvils
- 0.4-0.7" range is with plate guide and fixed anvils
- 0.7-1.4" range is with canister and fixed anvils
- Over 1.4" range is with wheel guide and inserting anvils



| Range     | No. Anvils | No. Spacers | No. Sub-anvils | Probe Depth | Code No. | Price \$ |
|-----------|------------|-------------|----------------|-------------|----------|----------|
| 0.24-0.4" | 9          | -           | -              | 2"          | 7485111  | 641.25   |
| 0.4-0.7"  | 9          | 1           | -              | 4"          | 7485121  | 614.32   |
| 0.7-1.4"  | 10         | 2           | -              | 4"          | 7485211  | 584.82   |
| 1.4-2.4"  | 6          | 3           | -              | 6"          | 7485221  | 574.56   |
| 2-6"      | 11         | 3           | 1              | 6"          | 7485311  | 679.73   |
| 6-10"     | 6          | 5           | 1              | 16"         | 7485321  | 654.08   |
| 10-16"    | 6          | 5           | 2              | 16"         | 7485331  | 705.38   |

## Dial Bore Gauges

ASIMETO

- Graduation: 0.0001" / 0.01mm
- Fixed measuring points made of steel
- Movable probe pin with carbide ball



| Range       | No. Anvils | No. Spacers | No. Sub-Anvils | Probe Depth | Code No. | Price \$ |
|-------------|------------|-------------|----------------|-------------|----------|----------|
| <b>Inch</b> |            |             |                |             |          |          |
| 0.24"-0.4"  | 9 pcs      | -           | -              | 2"          | 7483111  | 349.77   |
| 0.4"-0.7"   | 9 pcs      | 1           | -              | 4"          | 7483121  | 315.73   |
| 0.7"-1.5"   | 10 pcs     | 2           | -              | 6"          | 7483211  | 289.75   |
| 1.4"-2.4"   | 6 pcs      | 4           | -              | 6"          | 7483221  | 262.17   |
| 2.0"-6.0"   | 11 pcs     | 4           | 1              | 6"          | 7483311  | 276.25   |
| 6.0"-10.0"  | 6 pcs      | 6           | 1              | 10"         | 7483321  | 344.37   |
| 10.0"-16.0" | 6 pcs      | 6           | 2              | 16"         | 7483331  | 485.13   |

Note: For 0.0005" Graduation Purchase Code # 7402065 Dial Indicator

## ABSOLUTE Digimatic Snap Bore Gauges

Mitutoyo

- TiN coated contact points
- Large LCD digits for error-free reading
- 330° rotatable display unit for easy reading at any angle
- GO/NO-GO judgment function
- ABSOLUTE linear encoder eliminates over-speed errors
- With SPC output
- Can measure deep holes by attaching optional extension rod
- Supplied in fitted wooden case



| Mitutoyo Model No. | Range (in./mm)                 | Setting Rings Included   | Sowa Code No. | Price \$ |
|--------------------|--------------------------------|--------------------------|---------------|----------|
| 568-965            | 0.275" - 0.5" / 6.985 - 12.7mm | 0.35" dia. / 0.425" dia. | 847863        | 7,058.00 |
| 568-966            | 0.5" - 1" / 12.7 - 25.4mm      | 0.65" dia. / 0.8" dia.   | 847864        | 7,368.00 |
| 568-967            | 1" - 2" / 25.4 - 50.8mm        | 1.2" dia. / 1.6" dia.    | 847865        | 7,692.00 |
| 568-968            | 2" - 3" / 50.8 - 76.2mm        | 2.5" dia. / 3.5" dia.    | 847866        | 5,508.00 |
| 568-969            | 3" - 4" / 76.2 - 101.6mm       | 2.5" dia. / 3.5" dia.    | 847867        | 6,113.00 |

## Single Beam Digital Height Gauges With Hand Wheel

ASIMETO

- Large LCD display
- Hand wheel design for fine adjustment
- Inch/Metric conversion
- Carbide tipped scriber
- Zero setting on any position



| Range           | Resolution       | Accuracy        | Code No. | Price \$ |
|-----------------|------------------|-----------------|----------|----------|
| 0-12" / 0-300mm | 0.0005" / 0.01mm | ±0.0015"/0.04mm | 7626120  | 896.47   |
| 0-18" / 0-450mm | 0.0005" / 0.01mm | ±0.0015"/0.04mm | 7626180  | 1,093.97 |
| 0-24" / 0-600mm | 0.0005" / 0.01mm | ±0.0020"/0.05mm | 7626240  | 1,329.95 |

## Digital Height Gauges

ASIMETO

- Fine adjustment
- Easy to read large LCD display
- Inch/Metric conversion
- Origin memory eliminates the need to zero the reading each time the height gauge is turned on
- The base is designed with a thermal heat isolation hand grip



| Range         | Resolution     | Accuracy | Code No. | Price \$ |
|---------------|----------------|----------|----------|----------|
| 0-12"/0-300mm | 0.0005"/0.01mm | ±0.0015" | 7625120  | 725.90   |
| 0-24"/0-600mm | 0.0005"/0.01mm | ±0.0020" | 7625240  | 1,320.98 |

## Double Beam Digital Height Gauges w/ Hand Wheel

- Large LCD display
- Hand wheel design for fine adjustment
- Inch/Metric conversion
- Carbide tipped scriber
- Zero setting on any position



| Range           | Resolution      | Accuracy        | Code No. | Price \$        |
|-----------------|-----------------|-----------------|----------|-----------------|
| 0-12" / 0-300mm | 0.001" / 0.01mm | ±0.0015"/0.04mm | 7627120  | <b>732.02</b>   |
| 0-18" / 0-450mm | 0.001" / 0.01mm | ±0.0015"/0.04mm | 7627180  | <b>1,416.35</b> |
| 0-24" / 0-600mm | 0.001" / 0.01mm | ±0.0020"/0.05mm | 7627240  | <b>1,050.75</b> |

## Digimatic Height Gauges

- New design ergonomic base
- New lever clamp secures main unit against beam
- Large LCD display
- Absolute Encoder Technology always remembers its position
- SPC output capability



| Mitutoyo Model No. | Range (in./mm) | SPC | Resolution (in./mm) | Sowa Code No. | Price \$        |
|--------------------|----------------|-----|---------------------|---------------|-----------------|
| 570-312            | 12/300         | YES | 0.0005"/0.01mm      | 841069        | <b>1,033.00</b> |
| 570-314            | 24/600         | YES | 0.0005"/0.01mm      | 844528        | <b>1,610.00</b> |

## Twin Column Digimatic Height Gauges

- Inch/metric conversion
- Resolution 0.0005"/0.01mm
- Carbide tipped scriber
- Double-column structure ensures high measuring accuracy
- Large LCD Display



| Mitutoyo Model No. | Range (in./mm) | SPC | Accuracy | Sowa Code No. | Price \$        |
|--------------------|----------------|-----|----------|---------------|-----------------|
| 192-630-10         | 12/300         | NO  | ±0.001   | 842050        | <b>1,867.00</b> |
| 192-631-10         | 18/450         | NO  | ±0.002   | 842174        | <b>2,978.00</b> |
| 192-632-10         | 24/600         | NO  | ±0.002   | 842172        | <b>3,254.00</b> |
| 192-671-10         | 18/450         | YES | ±0.0015  | 842213        | <b>3,136.00</b> |
| 192-672-10         | 24/600         | YES | ±0.0015  | 841282        | <b>4,122.00</b> |

## Double Beam Digit Counter Height Gauges

- Graduation: 0.001"
- Dial and digit counter reading
- Hand wheel for easier travel
- Carbide tipped scriber
- The digit counter provides bi-directional positioning and the capability of setting zero at any position



| Range | Dial Grad. | Counter Grad.       | Accuracy | Code No. | Price \$        |
|-------|------------|---------------------|----------|----------|-----------------|
| 0-12" | 0.001"     | 0.1" (Dual Reading) | ±0.0015" | 7623121  | <b>594.94</b>   |
| 0-18" | 0.001"     | 0.1" (Dual Reading) | ±0.002"  | 7623181  | <b>751.24</b>   |
| 0-24" | 0.001"     | 0.1" (Dual Reading) | ±0.002"  | 7623241  | <b>1,123.54</b> |

## Vernier Height Gauges

- Fine adjustment for easy setting
- Satin chrome finish
- Carbide tipped scriber



| Range         | Grad.         | Accuracy | Code No. | Price \$      |
|---------------|---------------|----------|----------|---------------|
| 0-12"/0-300mm | 1/128"/0.05mm | ±0.0015" | 7621120  | <b>385.04</b> |
| 0-24"/0-600mm | 1/128"/0.05mm | ±0.002"  | 7621240  | <b>804.27</b> |

## Black Granite Surface Plates 0-Ledge



### Imported Precision Toolroom Black Granite Surface Plates

These plates are made of the highest quality – True Black – Fine Grained – Non-porous – Jewel Hardness – Granite available to give years of long lasting service.



**Specifications:**  
Compressive Strength 7329 lbs. / in<sup>2</sup>  
Water Absorptivity 0.13%

| Size (in.)                         | Thickness (in.) | Shipping Weight (lb) | (±)       | Code No. | Price \$        |
|------------------------------------|-----------------|----------------------|-----------|----------|-----------------|
| <b>Grade B-Tool Room- No Ledge</b> |                 |                      |           |          |                 |
| 9 x 12"                            | 3"              | 40                   | ±0.0001   | 255100   | <b>112.26</b>   |
| 12 x 18"                           | 3"              | 110                  | ±0.0001   | 255105   | <b>174.48</b>   |
| 18 x 24"                           | 4"              | 189                  | ±0.00015  | 255110   | <b>463.20</b>   |
| 24 x 36"                           | 4"              | 475                  | ±0.0002   | 255115   | <b>850.56</b>   |
| 36 x 48"                           | 6"              | 1427                 | ±0.0004   | 255120   | <b>2,307.19</b> |
| <b>Grade A-Inspection</b>          |                 |                      |           |          |                 |
| 12 x 18"                           | 3"              | 110                  | ±0.000050 | 255130   | <b>267.22</b>   |
| 18 x 24"                           | 3"              | 145                  | ±0.000075 | 255135   | <b>431.89</b>   |
| 24 x 36"                           | 4"              | 475                  | ±0.0001   | 255140   | <b>937.80</b>   |

## Steel Surface Plate Stands



- Fabricated from 2" x 2" 1/4" thick angle iron, welded together for extra strength—easily support more than twice the weight of the surface plate
- No assembly required; ready to use
- Gray enamel finish
- For exact height, add stand height listed in chart to surface plate thickness
- Made in Canada



| Plate Size (in.) | Weight (lb) | Stand Height (in.) | Code No. | Price \$        |
|------------------|-------------|--------------------|----------|-----------------|
| 12 x 18"         | 80"         | 33"                | 255200   | <b>1,191.31</b> |
| 18 x 24"         | 95"         | 33"                | 255205   | <b>2,453.98</b> |
| 24 x 36"         | 125"        | 32"                | 255210   | <b>2,263.32</b> |
| 36 x 48"         | 175"        | 30"                | 255215   | <b>3,092.40</b> |
| 48 x 72"         | 300"        | 28"                | 255220   | <b>2,467.82</b> |

## Radius Gauges

- Satin Finish Stainless Steel
- No. L300 Series



| Model No. | Specifications                      | Code No. | Price \$      |
|-----------|-------------------------------------|----------|---------------|
| L 300 CX  | 1/64–17/64 x 64ths 9/32–1/2 x 32nds | 225005   | <b>236.90</b> |
| L 300 MX  | 0.5mm–13mm x 0.5mm                  | 225010   | <b>425.86</b> |

## Radius Gauges

- Size is marked on each gauge leaf
- Gauge profiles have both convex and concave radii



ASIMETO

| Range       | Qty      | Composition                      | Notes    | Code No. | Price \$ |
|-------------|----------|----------------------------------|----------|----------|----------|
| 1/32-17/64" | 16 pairs | 1/32-17/64 x 64ths               | 90° arc  | 7605401  | 33.65    |
| 1/32-1/4"   | 15 pairs | 1/32-1/4 x 64ths                 | 180° arc | 7605411  | 36.42    |
| 1/64-1/2"   | 25 pairs | 1/64-17/64 x 64ths, 9/32-1/2x3rd | -        | 7605441  | 92.73    |

## No. 272 Fillet or Radius Gauges



STM

| Model No. | Specifications     | Code No. | Price \$ |
|-----------|--------------------|----------|----------|
| 272A      | 1/32-17/64 x 64ths | 225230   | 50.45    |

## Radius Gauges

- Each radius gauge has five measuring locations
- The gauges have a satin finish



Mitutoyo



186-901

186-107

| Mitutoyo Model No. | No. of Leaves | Description                              | Sowa Code No. | Price \$ |
|--------------------|---------------|--|---------------|----------|
| 186-901            | 25            | 1/64 - 17/64 x 64ths<br>9/32-1/2 x 32nds | 840159        | 193.00   |
| 186-101            | 15            | 1/32-1/4 x 64ths                         | 840155        | 55.00    |
| 186-107            | 30            | 15.5mm - 25mm                            | 840372        | 114.00   |

## Feeler Gauge

- 26 tapered leaf thickness gauges
- 3" long



STM

| Range (in.)      | Code No. | Price \$ |
|------------------|----------|----------|
| 0.0015 to 0.025" | 606050   | 53.35    |

## Small Hole Gauge Set

- Extra long for gauging deep and shallow holes, slots and similar work



Mitutoyo

| Mitutoyo Model No. | Description   | Sowa Code No. | Price \$ |
|--------------------|---------------|---------------|----------|
| 154-901            | 0.125"-0.500" | 840077        | 150.50   |

## S829 Series Small Hole Gauge Set

- Hardened-ball measuring surface with two-point contact
- Radius on each gauge is less than the minimum diameter to be measured, which provides the two-point contact necessary for maximum accuracy
- Smooth, sensitive adjustment for better feel, giving more accurate measurements
- The adjustment of the gauges beyond their range is restricted by a safety stop that prevents breakage



Starrett

| Description                          | Starrett No. | Sowa Code No. | Price \$ |
|--------------------------------------|--------------|---------------|----------|
| Set of 4 in case, Nos. 829A, B, C, D | S829EZ       | 629059        | 298.00   |

## S579 Series Telescoping Gauge Sets



Starrett

- Gauges have two telescoping contacts
- Handles are rigidly attached to contact plungers and are automatically self-centering
- Constant spring tension gives uniform contact pressure
- Both plungers are easily locked at any desired setting
- Supplied with protective case

| Description                           | Starrett No. | Sowa Code No. | Price \$ |
|---------------------------------------|--------------|---------------|----------|
| Set of 4, 5/16" - 2 1/8" (8mm - 54mm) | S579GZ       | 629060        | 276.00   |
| Set of 6, 5/16" - 6" (8mm - 150mm)    | S579HZ       | 629061        | 470.00   |

## Telescoping Gauges

ASIMETO

- Plunger is spring loaded and expands within the bore, allowing measurement of the internal diameter



| Range                | Depth | Model            | Code No. | Price \$ |
|----------------------|-------|------------------|----------|----------|
| 0.315"-0.500"        | 4.2"  | A                | 7487011  | 12.95    |
| 0.500"-0.748"        | 4.4"  | B                | 7487021  | 14.21    |
| 0.748"-1.26"         | 4.4"  | C                | 7487031  | 16.83    |
| 1.26"-2.126"         | 5.85" | D                | 7487041  | 17.79    |
| 2.126"-3.54"         | 5.85" | E                | 7487051  | 19.55    |
| 3.54"-5.90"          | 5.85" | F                | 7487061  | 17.09    |
| 0.315-5.90" Set of 6 |       | A, B, C, D, E, F | 7487869  | 68.74    |

|               |     |  |         |       |
|---------------|-----|--|---------|-------|
| 0.315"-0.500" | 12" |  | 7487013 | 19.37 |
| 0.500"-0.748" | 12" |  | 7487023 | 19.37 |
| 0.748"-1.26"  | 12" |  | 7487033 | 19.37 |
| 1.26"-2.126"  | 12" |  | 7487043 | 22.32 |
| 2.126"-3.54"  | 12" |  | 7487053 | 22.32 |
| 3.54"-5.90"   | 12" |  | 7487063 | 22.32 |

## Telescoping Gauge Set

STM

- Plunger is spring loaded and expands within the bore, allowing measurement of the internal diameter



| Sizes Consisting of:  | Code No. | Price \$ |
|---|----------|----------|
| 5/16-1/2, 1/2-3/4, 3/4-1-1/4, 1-1/4-2-1/8, 2-1/8-3-1/2, 3-1/2-6 | 200710   | 49.68    |

## Telescoping Gauges

Mitutoyo

- Plunger is spring loaded and expands within the bore, allowing measurement of the internal diameter
- Knurled clamp
- Supplied in a fitted pouch



| Mitutoyo Model No. | Description      | Sowa Code No. | Price \$ |
|--------------------|------------------|---------------|----------|
| 155-121            | 5/16 - 1/2"      | 840078        | 40.00    |
| 155-122            | 1/2 - 3/4"       | 840079        | 44.00    |
| 155-123            | 3/4 - 1-1/4"     | 840080        | 47.00    |
| 155-124            | 1-1/4 - 2-1/8"   | 840081        | 49.00    |
| 155-125            | 2-1/8 - 3-1/2"   | 840348        | 57.00    |
| 155-126            | 3-1/2 - 6"       | 840349        | 65.00    |
| 155-903            | 5/16 - 6 SET     | 840082        | 291.00   |
| 155-907            | 5/16 - 2-1/8 SET | 840085        | 172.00   |

## Centre Gauges

STM

- Satin-chrome finish
- American National Standard



| Model | Description          | Code No. | Price \$ |
|-------|----------------------|----------|----------|
| 5031  | U.S. Standard, 60°   | 225410   | 25.17    |
| 5032  | Metric Standard, 60° | 225415   | 25.17    |

## Centre Gauge

Mitutoyo

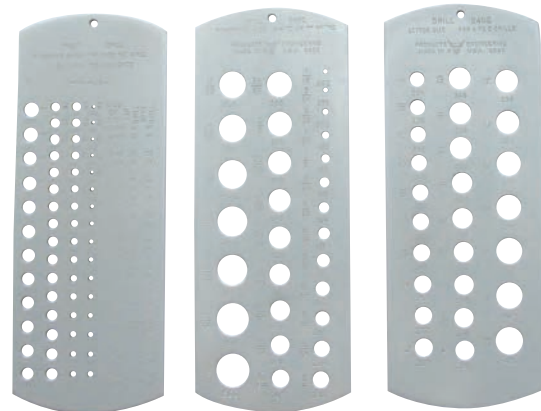
- Hardened with lapped edges and notches
- Meets requirements of the American National and US 60° standards



| Mitutoyo Model No. | Description  | Sowa Code No. | Price \$ |
|--------------------|--------------|---------------|----------|
| 950-201            | Centre Gauge | 840235        | 22.00    |

## Drill Gauges

- Made of high quality steel
- Satin chrome finish
- Offer a quick and accurate way of checking drill and rod sizes



5051

5052

5053

## 1-60 Drill/Machine Screw Tap Gauge

STM

- Tells at a glance the correct size tap drill for machine screw tap in "NF" National Fine or "NC" National Coarse thread series
- Shows the correct body size drill to use, 60 sizes shown with number and decimal equivalent of drill at each hole

| Model No. | Description                        | Code No. | Price \$ |
|-----------|------------------------------------|----------|----------|
| 5051      | 1-60 Drill/Machine Screw Tap Gauge | 606314   | 72.89    |

## 1/16 - 1/2 Drill Gauge

STM

- Gauge has 29 measuring holes for determining twist drill sizes from 1/16" to 1/2" in 1/64" increments
- Shows drill sizes in inches and decimal equivalents

| Model No. | Description          | Code No. | Price \$ |
|-----------|----------------------|----------|----------|
| 5052      | 1/16-1/2 Drill Gauge | 606316   | 70.82    |

## A-Z Drill Gauge

STM

- Used to select or check drill sizes from "A" to "Z"
- Each gauge hole is marked by letter and its decimal equivalent from 0.234 inch diameter through 0.413 inch diameter

| Model No. | Description     | Code No. | Price \$ |
|-----------|-----------------|----------|----------|
| 5053      | A-Z Drill Gauge | 606318   | 70.82    |

## Thread Pitch Gauges

- Each individual gauge is stamped with the thread pitch size



ASIMETO

### Metric Screw Pitch Gauges (60°)

| Range      | No. of Leaves | Composition of Leaves   | Code No. | Price \$ |
|------------|---------------|---|----------|----------|
| 0.25-2.5mm | 28            | 0.25 - 0.90mm by 0.05mm, 1 - 2mm x 0.1mm step, Plus 1.25, 1.75, 2.5mm   | 7605500  | 20.54    |
| 0.35-6mm   | 22            | 0.35, 0.4, 0.45, 0.5, 0.6, 0.7, 0.75, 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6mm, and 60° angle gauge | 7605510  | 24.77    |
| 0.4-7mm    | 21            | 0.4, 0.5, 0.7, 0.75, 0.8, 0.9, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm                          | 7605520  | 16.81    |
| 0.4-7mm    | 18            | 0.4, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm   | 7605530  | 16.90    |

### Unified Screw Pitch Gauges (60°)

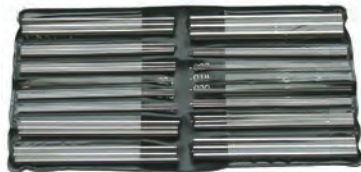
| Range    | No. of Leaves | Composition of Leaves  | Code No. | Price \$ |
|----------|---------------|--|----------|----------|
| 4-42 TPI | 30            | 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI | 7605502  | 20.40    |
| 4-84 TPI | 51            | 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30 - 84 by 2, TPI              | 7605512  | 36.51    |

### Metric and Unified Screw Pitch Gauges (60°)

| Range               | No. of Leaves | Composition of Leaves | Code No. | Price \$ |
|---------------------|---------------|-----------------------|----------|----------|
| 0.4-7mm<br>4-42 TPI | 51            | 7605520 and 7605502   | 7605508  | 35.68    |

## Thread Measuring Wire Set

- 48 wires - 16 different sizes
- Measures all threads from 3 - 48 threads per inch
- Measures all metric threads from 0.5mm to 6mm
- Also measures ACME threads
- Laminated chart included



ASIMETO

| Description     | Code No. | Price \$ |
|-----------------|----------|----------|
| Thread Wire Set | 7697300  | 33.27    |

## Screw Pitch Gauges

- With locking devices

### Inch range of pitches:

- 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82 and 84

### Metric range of pitches:

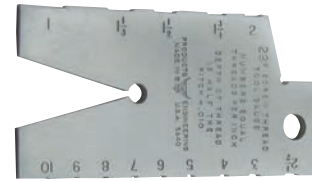
- 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 1, 1.10, 1.20, 1.25, 1.30, 1.40, 1.50, 1.60, 1.70, 1.75, 1.80, 1.90, 2, 2.50, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm



STM

| Model No. | No. of Leaves | Ranges of Pitch                      | Code No. | Price \$ |
|-----------|---------------|--------------------------------------|----------|----------|
| 5651      | 51            | 4 to 84                              | 225315   | 104.53   |
| 156m      | 28            | 0.25 to 2.50 mm                      | 225320   | 55.67    |
| 5628      | 28            | 4 to 80                              | 225325   | 58.86    |
| 5617      | 18            | 0.5 to 7.00mm<br>and 60° angle gauge | 225330   | 50.76    |
| 5629      | 28            | 4 to 56 0.5-6.0mm                    | 225335   | 58.86    |

## Acme Gauge



STM

| Description    | Code No. | Price \$ |
|----------------|----------|----------|
| 1-10 TPI (29°) | 225450   | 67.21    |

## U.S. Standard Wire Gauge

- Individual gauge sizes embossed on gauge
- Satin-chrome finish
- Made of high quality steel

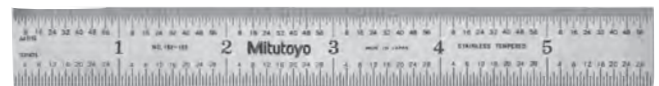


Mitutoyo

| Mitutoyo Model No. | Description | Sowa Code No. | Price \$ |
|--------------------|-------------|---------------|----------|
| 950-203            | No. 0-36    | 840236        | 56.00    |

## Wide Rigid Rules (3/64 Thick)

- Constructed with tempered stainless steel to ensure accuracy and provide better durability for a longer instrument life span
- Clear graduations are easy to read on the satin-chrome finish
- Rigid steel rulers are designed to not flex



Mitutoyo

| Mitutoyo Model No. | Size        | Graduations              | Width | Sowa Code No. | Price \$ |
|--------------------|-------------|--------------------------|-------|---------------|----------|
| 182-101            | 6" 4R       | 1/8, 1/16, 1/32, 1/64"   | 3/4"  | 840112        | 20.00    |
| 182-102            | 6" 16R      | 1/32, 1/64, 1/50, 1/100" | 3/4"  | 840113        | 20.00    |
| 182-104            | 6" 3R       | 1/32, 1/64, 1/10, 1/50"  | 3/4"  | 840114        | 21.00    |
| 182-105            | 6" / 150mm  | 1/32, 1/64, 1mm, 1/2mm   | 3/4"  | 840115        | 20.00    |
| 182-106            | 6" / 150mm  | 1/50, 1/100, 1mm, 1/2mm  | 3/4"  | 840778        | 30.00    |
| 182-111            | 150mm       | 1mm, 0.5mm, 1mm, 0.5mm   | 19mm  | 840118        | 20.00    |
| 182-125            | 12" / 300mm | 1/32, 1/64, 1mm, 1/2mm   | 1"    | 840120        | 44.00    |
| 182-126            | 12" / 300mm | 1/30, 1/100, 1mm, 1/2mm  | 1"    | 840121        | 56.00    |

## Rigid and Flexible Scales



STM

| Size (in.) | Type  | Graduation                 | Code No. | Price \$ |
|------------|-------|----------------------------|----------|----------|
| 6          | Flex  | 4R 1/8, 1/16, 1/32, 1/64"  | 606001   | 25.64    |
| 6          | Flex  | 3R 1/32, 1/64, 1/10, 1/50" | 606012   | 25.64    |
| 6          | Flex  | - 1/32, 1/64, 0.5mm, 1mm   | 606015   | 25.64    |
| 6          | Rigid | 4R 1/8, 1/16, 1/32, 1/64"  | 606017   | 27.18    |
| 12         | Flex  | 4R 1/8, 1/16, 1/32, 1/64"  | 606002   | 49.56    |
| 12         | Flex  | 3R 1/32, 1/64, 1/10, 1/50" | 606013   | 49.56    |
| 12         | Flex  | - 1/32, 1/64, 0.5mm, 1mm   | 606016   | 49.56    |
| 12         | Rigid | - 1/32, 1/64, 0.5mm, 1mm   | 606033   | 54.47    |
| 12         | Rigid | 4R 1/8, 1/16, 1/32, 1/64"  | 606018   | 54.51    |
| 24         | Flex  | 3R 1/32, 1/64, 1/10, 1/50" | 606014   | 108.28   |



## Flex Rules (1/64 Thick)

Mitutoyo

- Constructed with tempered stainless steel to ensure accuracy and provide better durability for a longer instrument life span
- Clear graduations are easy to read on the satin-chrome finish



| Mitutoyo Model No. | Size        | Graduations              | Width | Sowa Code No. | Price \$ |
|--------------------|-------------|--------------------------|-------|---------------|----------|
| 182-201            | 6" 4R       | 1/8, 1/16, 1/32, 1/64"   | 1/2"  | 840127        | 20.00    |
| 182-202            | 6" 16R      | 1/32, 1/64, 1/50, 1/100" | 1/2"  | 840128        | 20.00    |
| 182-203            | 6" 5R       | 1/32, 1/64, 1/10, 1/100" | 1/2"  | 840129        | 20.00    |
| 182-204            | 6" 3R       | 1/32, 1/64, 1/10, 1/50"  | 1/2"  | 840130        | 20.00    |
| 182-205            | 6" / 150mm  | 1/32, 1/64, 1mm, 1/2mm   | 1/2"  | 840131        | 20.00    |
| 182-206            | 6" / 150mm  | 1/50, 1/100, 1mm, 1/2mm  | 1/2"  | 840132        | 20.00    |
| 182-207            | 6" / 150mm  | 1/10, 1/100, 1mm, 0.5mm  | 1/2"  | 840133        | 20.00    |
| 182-208            | 6" / 150mm  | 1/10, 1/50, 1mm, 0.5mm   | 1/2"  | 840134        | 29.00    |
| 182-211            | 150mm       | 1mm, 0.5mm, 1mm, 0.5mm   | 12mm  | 840135        | 31.00    |
| 182-222            | 12" 16R     | 1/32, 1/64, 1/50, 1/100" | 1/2"  | 840137        | 39.00    |
| 182-225            | 12" / 300mm | 1/32, 1/64, 1mm, 1/2mm   | 1/2"  | 840140        | 38.00    |
| 182-226            | 12" / 300mm | 1/50, 1/100, 1mm, 1/2mm  | 1/2"  | 840141        | 55.00    |
| 182-231            | 300mm       | 1mm, 0.5mm, 1mm, 0.5mm   | 12mm  | 840142        | 39.00    |

## Pocket Rules (1/64 Thick)

Mitutoyo

- Constructed with tempered stainless steel to ensure accuracy and provide better durability for a longer instrument life span
- Clear graduations are easy to read on the satin-chrome finish



| Mitutoyo Model No. | Size       | Graduations | Width | Sowa Code No. | Price \$ |
|--------------------|------------|-------------|-------|---------------|----------|
| 950-300            | 6" / 150mm | 1mm, 1/64"  | 1/2"  | 840244        | 14.00    |

## Drill Point Gauge

Mitutoyo

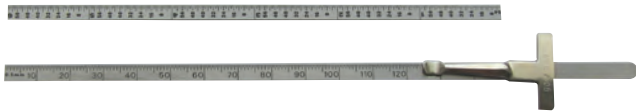
- For measuring properly ground 59° drill tips
- Rule and slide made of steel
- Satin chrome finish
- Slide graduated in 32nds
- End clip is adjustable and removable
- Versatile - Can be used as Rule, Hook Rule, Try Square, Depth Gauge or Caliper, and for Layout



| Mitutoyo Model No. | Size | Rule Graduation        | Code No. | Price \$ |
|--------------------|------|------------------------|----------|----------|
| 950-275            | 6"   | 1/8, 1/16, 1/32, 1/64" | 845589   | 51.00    |

## Narrow Rules & Depth Gauge Rules

STM



| Model No. | Description         | Graduations                       | Code No. | Price \$ |
|-----------|---------------------|-----------------------------------|----------|----------|
| 7305-006  | 6" with clip        | 32nds one face, 64ths other face  | 606156   | 22.78    |
| 7305-012  | 12" with clip       | 32nds one face, 64ths other face  | 606158   | 40.85    |
| 7305-006  | 6" without clip     | 32nds one face, 64ths other face  | 606160   | 16.63    |
| 7305-012  | 12" without clip    | 32nds one face, 64ths other face  | 606162   | 40.37    |
| 7305-M06  | 6" with clip        | 32nds one face, 0.5 mm other face | 606164   | 22.82    |
| 7305-M12  | 12" with clip       | 32nds one face, 0.5 mm other face | 606166   | 40.85    |
| 7305-M06  | 6" without clip     | 32nds one face, 0.5 mm other face | 606168   | 16.65    |
| 7305-M12  | 12" without clip    | 32nds one face, 0.5 mm other face | 606170   | 30.23    |
| 7305-M15  | 150 mm with clip    | mm one face, 0.5 mm other face    | 606172   | 22.82    |
| 7305-M30  | 300 mm with clip    | mm one face, 0.5 mm other face    | 606174   | 30.38    |
| 7305-M15  | 150 mm without clip | mm one face, 0.5 mm other face    | 606176   | 16.63    |
| 7305-M30  | 300 mm without clip | mm one face, 0.5 mm other face    | 606178   | 40.37    |

## Specialty Rules — Round End

STM



| Model No. | Description  | Graduations  | Code No. | Price \$ |
|-----------|--|--------------|----------|----------|
| 7202-SS6  | 6" flex, not plated, round end rule with clip<br>Decimal equivalent chart on back    | 32nds, 64ths | 606180   | 10.10    |
| 7203-SS6  | 6" flex, not plated, round end rule with clip<br>Metric equivalent chart on back     | mm, 64ths    | 606182   | 10.10    |
| 7202-C06  | 6" flex, chrome plated, round end rule with clip<br>Decimal equivalent chart on back | 32nds, 64ths | 606184   | 17.63    |
| 7203-C06  | 6" flex, chrome plated, round end rule with clip<br>Metric equivalent chart on back  | mm, 64ths    | 606186   | 25.17    |

## 12" Combination Square Set

ASIMETO

- Graduation: Protractor: 1°  
Blade: 64ths, 32nds, 1mm, 0.5mm (E/M)  
8ths, 16ths, 32nds, 64ths (4R)
- Blade is hardened and tempered
- Heads are hardened cast finish in baked enamel
- 45° Centre Gauge

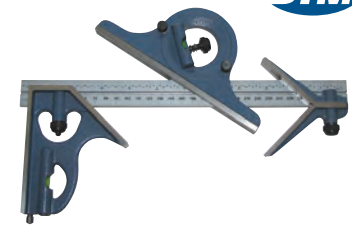


| Description                        | Blade Length | Code No. | Price \$ |
|------------------------------------|--------------|----------|----------|
| 4pc Set (With E/M rule)            | 12"/300mm    | 7490208  | 201.07   |
| 4pc Set (With 4R rule)             | 12"/300mm    | 7490218  | 223.99   |
| <b>Parts</b>                       |              |          |          |
| 12" 4R Stainless Steel Rule        |              | 7490210  | 31.09    |
| 12"/300mm E/M Stainless Steel Rule |              | 7910051  | 31.09    |
| 45° Centre Gauge                   |              | 7490250  | 41.34    |
| Dial Scale Protractor Head         |              | 7490260  | 61.29    |
| Square Head                        |              | 7490270  | 48.37    |
| Lock Nut                           |              | 7490220  | 8.65     |

## Combination Set

STM

- Used for layout, set-up, checking heights, depths and setting angles
- Square head, centre head and reversible protractor head
- Hardened cast iron heads



## Blade for Combination Set



| Graduation                       | Length of Rule | Code No. | Price \$ |
|----------------------------------|----------------|----------|----------|
| 1/32, 1/64, 0.5 mm, 1 mm         | 12"            | 220850   | 516.30   |
| <b>Rules for Combination Set</b> |                |          |          |
| 1/32, 1/64, 0.5 mm, 1 mm         | 12"            | 606044   | 100.78   |
| 1/8, 1/16, 1/32, 1/64            | 24"            | 606046   | 196.37   |
| <b>Locking Assembly</b>          |                | 220851   | 12.69    |

## 6" Pocket Rule

ASIMETO

- Stainless steel, hardened and tempered
- Includes removable pocket clip



| Size | Code No. | Price \$ |
|------|----------|----------|
| 6"   | 7606009  | 3.84     |

## Combination Square Sets

- Three measuring heads are attached to the stainless steel rule (blade), allowing versatile measurements on various types of workpieces
- Measuring heads are hardened



Mitutoyo

| Mitutoyo Model No. | Type        | Features             | Sowa Code No. | Price \$ |
|--------------------|-------------|----------------------|---------------|----------|
| 180-907B           | 12" / 300mm | 32", 64", 1mm, 1/2mm | 848591        | 391.30   |

## Blades For Combination Square Sets

Mitutoyo

| Mitutoyo Model No. | Length (in./mm) | Graduations              | Sowa Code No. | Price \$ |
|--------------------|-----------------|--------------------------|---------------|----------|
| 180-502B           | 12"             | 32, 64, 50, 100ths (16R) | 840095        | 80.63    |
| 180-603B           | 24"/600mm       | 32, 64ths/1, 0.5mm       | 840100        | 162.33   |

## Heads For Combination Square Sets

Mitutoyo

| Mitutoyo Model No. | Type                       | Features                 | Sowa Code No. | Price \$ |
|--------------------|----------------------------|--------------------------|---------------|----------|
| 180-102B           | Square head for 12-24"     | Hardened Cast Iron       | 840090        | 89.23    |
| 180-202B           | Centre head for 12-24"     | Hardened Cast Iron       | 840366        | 83.85    |
| 180-301B           | Protractor head for 12-24" | Cast Iron - Not Hardened | 840091        | 144.05   |

## Centre Finder

- Satin chrome finish
- Accurately and quickly locates centre on round workpieces
- Place tool in drill chuck or collet and line up pointer with line scribed on shaft



STM

| Model No. | Size (in.)    | Code No. | Price \$ |
|-----------|---------------|----------|----------|
| 4200-100  | Centre finder | 606340   | 45.22    |

## Depth & Angle Gauge

The ability to measure depths and angles is combined in this versatile tool. The head is made from selected steel and has an attractive black finish. It is graduated both left and right to 15°, 30° and 45° and the rule can be set to any of these angles. A 6" (150mm) steel rule is fitted to the head and can be locked in final position for depth or angular measurements by a knurled nut.



STM

| Rule Length | Code No. | Price \$ |
|-------------|----------|----------|
| 6"          | 231274   | 25.71    |

## Bore Gauges (Taper Gauges)

Manufactured from stainless steel, these have permanently engraved graduations. Accurate taper throughout the length of the gauge. Available with imperial or metric graduations.



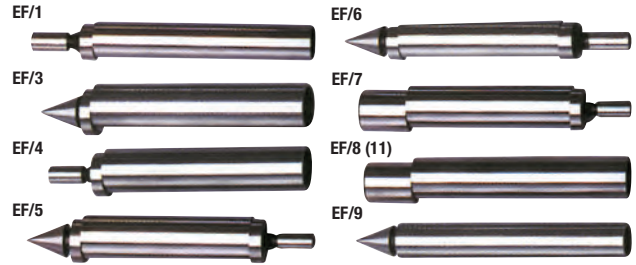
STM

| Range      | Model No. | Code No. | Price \$ |
|------------|-----------|----------|----------|
| 1/32"-5/8" | DG/1-15   | 231276   | 32.17    |
| 1-16mm     | BG/1-15   | 231277   | 32.19    |

## Edge & Centre Finders

STM

Edge and Centre Finders are time saving positioning tools for use on jig boring, milling machines etc. These are used for accurate locating work edges, shoulders, grooves, centre points and scribed lines.

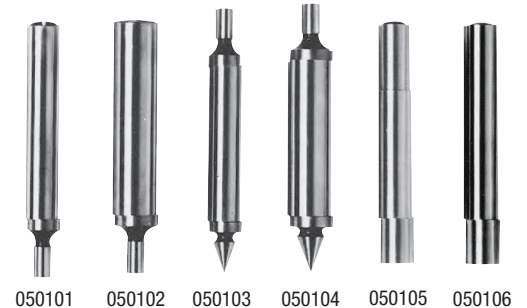


| Model                                       | Tip Dia. | Shank Dia. | Code No. | Price \$ |
|---|----------|------------|----------|----------|
| <b>Centre Finder</b>                        |          |            |          |          |
| EF/3  |          | 1/2"       | 231302   | 24.72    |
| EF/9  |          | 3/8"       | 231304   | 23.86    |
| <b>Combination Edge &amp; Centre Finder</b> |          |            |          |          |
| EF/6  | 0.200"   | 3/8"       | 231306   | 26.49    |
| EF/5  | 0.200"   | 1/2"       | 231308   | 28.15    |
| <b>Edge Finder</b>                          |          |            |          |          |
| EF/1  | 0.200"   | 3/8"       | 231310   | 20.78    |
| EF/4  | 0.200"   | 1/2"       | 231312   | 24.72    |
| EF/11                                       | 10mm     | 3/8"       | 231314   | 24.72    |
| EF/8  | 1/2"     | 1/2"       | 231316   | 23.86    |
| <b>Double Edge Finder</b>                   |          |            |          |          |
| EF/7  | 0.200"   | 1/2"       | 231318   | 26.49    |

## Edge & Centre Finders

Mitutoyo

- Hardened and ground on all surfaces



| Mitutoyo Model No. | Shank Dia. (in./mm) | Tip Dia. | Description        | Sowa Code No. | Price \$ |
|--------------------|---------------------|----------|--------------------|---------------|----------|
| 050101             | 3/8" / 0.375"       | 0.20"    | Edge type          | 840009        | 32.00    |
| 050102             | 1/2" / 0.500"       | 0.20"    | Edge type          | 840010        | 31.00    |
| 050103             | 3/8" / 0.375"       | 0.20"    | Edge & Centre type | 840011        | 37.00    |
| 050104             | 1/2" / 0.500"       | 0.20"    | Edge & Centre type | 840012        | 30.00    |
| 050105             | 0.375" / 10mm       | 10mm     | Edge type          | 840837        | 25.00    |
| 050106             | 10mm                | 10mm     | Edge type          | 840269        | 25.00    |

## 827 Series Edge Finders

Starrett

- 0.200" Contact Diameter
- Locate work surfaces easily, quickly and accurately
- Body and contacts made of tool steel, hardened, ground and lapped to close tolerances for diameter and concentricity
- Furnished in protective case



| Description                              | Body Dia. | Starrett No. | Sowa Code No. | Price \$ |
|--|-----------|--------------|---------------|----------|
| Single End                               | 0.375"    | 827A         | 629087        | 48.00    |
| Double End<br>0.200" and pointed contact | 0.500"    | 827B         | 629086        | 59.00    |

## Wiggler or Centre Finder

Comes with four interchangeable attachments. They can be snapped onto the chuck without removing the collet. Spring tension on the ball of the point.



| Description                               | Code No. | Price \$     |
|---|----------|--------------|
| Centre Finder complete with 4 attachments | WCF/WZ-6 | 231300       |
|   |          | <b>59.82</b> |

## S828 Series Wiggler or Centre Finder

- Attachments are interchangeable
- Attachments are snapped in the chuck, clamped by a ball swivel-joint which permits adjustment to an angular position or true concentricity



| Description   | Starrett No. | Sowa Code No. | Price \$      |
|---|--------------|---------------|---------------|
| Complete with case and 4 attachments, Nos. 828B Ball Contact 0.250"/6.3mm<br>C- Disc Contact 0.100"/2.5mm,<br>D- Offset Indicator Holder, PT09186 Pointed Shank | S828HZ       | 629091        | <b>114.00</b> |

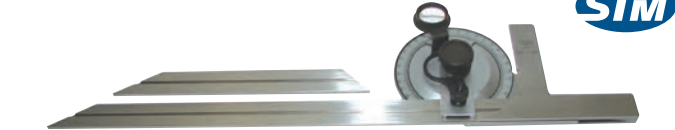
## Digital Protractors — Level Type

- This protractor provides an immediate digital reading of any angle in a full circle with 0°-90°-0°-90°-0° readings
- ABS/ZERO button allows two measuring modes, Standard and Alternate Reference
- Four 90° quadrants for display purposes
- HOLD button for freezing a reading in an unreadable position
- V-grooves on top and bottom for use on curved surfaces
- 7490162 comes with a magnetic bottom for easy fixing



| Range | Resolution | Accuracy | Code No. | Price \$      |
|-------|------------|----------|----------|---------------|
| 360°  | 0.1°       | ±0.1°    | 7490160  | <b>258.45</b> |
| 360°  | 0.1°       | ±0.1°    | 7490162  | <b>218.48</b> |

## STM Universal Bevel Protractor

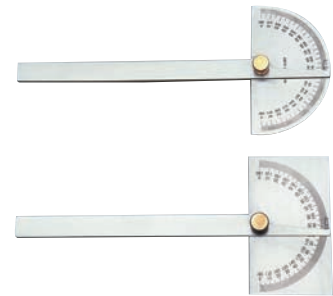


- Base available for setting up jobs on surface plates, milling machines, etc.
- Dial face and vernier are finished in satin chrome to insure easy reading
- Vernier reading in 5 minutes of the arc
- Blades is fastened by a knurled thumb lock which can be set at any desired point
- An angle attachment for acute angle measuring is also available
- Blade slides full length
- Fine adjustment knob for measuring or setting of minute angles
- Protractor dial is graduated over 360° (in 0° to 90° sectors) and rotates around the full circle
- Hardened stainless steel, rust and wear resistant for long life
- With magnifier glass for easy and faster reading
- Protractor accepts both 6" and 12" blade
- Positive rigid locking clamps
- Includes fitted case

| Description                         | Blade Size | Code No. | Price \$      |
|-------------------------------------|------------|----------|---------------|
| Protractor head with magnifier lens | 6 and 12   | 205610   | <b>185.77</b> |
| Magnifier                           | —          | 205645   | <b>36.24</b>  |

## Degree Protractors

This stainless steel protractor comes with either a semi-circular or a rectangular head. The head has permanently deep etched graduations, 0 to 180° in opposite directions thus permitting reading an angle directly and also its supplement. The 6" (150 mm) blade has a graduation line on one end that permits accurate setting and reading of angles.



| Type        | Code No. | Price \$     |
|-------------|----------|--------------|
| Round       | 231266   | <b>30.10</b> |
| Rectangular | 231268   | <b>32.58</b> |

## Depth Gauge with Protractor

A versatile tool, the Depth Gauge with Protractor allows for measurement of both angles and depths.

- Stainless steel
- Graduations: 0-180° in opposite directions
- 6" (150 mm) steel rule



| Type        | Code No. | Price \$     |
|-------------|----------|--------------|
| Round       | 231270   | <b>33.48</b> |
| Rectangular | 231272   | <b>36.45</b> |

## Protractors

- Measures angles from 0-180°
- Used for drawing radial lines, transferring angles and setting bevvels
- Head measures 3-5/16" x 2"
- Features 6" arm and knurled thumb lock nut
- Blade secured firmly by lock nut at any angle
- Made of tempered steel with satin chrome finish



| Model No. | Style       | Description            | Code No. | Price \$     |
|-----------|-------------|------------------------|----------|--------------|
| 5170      | Rectangle   | Supplied with 6" arm   | 606150   | <b>81.46</b> |
| 5180      | Semi-Circle | Supplied with 6" arm   | 606152   | <b>81.46</b> |
| 5190      | Rectangle   | With 6" graduated rule | 606154   | <b>94.59</b> |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## Spring Calipers & Dividers

- Styles include solid nut or quick nut
- Spring joint for precision settings
- Legs pivot on a roller
- Legs tensioned by bow spring



| Model No.               | USA Solid Nut Code No. | Price \$     | STM Solid Nut Code No. | Price \$     | Model No. | STM Quick Nut Code No. | Price \$     |
|-------------------------|------------------------|--------------|------------------------|--------------|-----------|------------------------|--------------|
| <b>Inside Calipers</b>  |                        |              |                        |              |           |                        |              |
| ID/3                    |                        |              | 231148                 | <b>13.60</b> | ID/Q-3    | 231160                 | <b>17.21</b> |
| ID/4                    |                        |              | 231150                 | <b>13.60</b> | ID/Q-4    | 231162                 | <b>17.21</b> |
| ID/6                    | 606105                 | <b>23.94</b> | 231152                 | <b>18.92</b> | ID/Q-6    | 231164                 | <b>22.41</b> |
| ID/8                    |                        |              | 231154                 | <b>23.86</b> | ID/Q-8    | 231166                 | <b>6.99</b>  |
| ID/10                   |                        |              | 231156                 | <b>31.45</b> | ID/Q-10   | 231168                 | <b>34.25</b> |
| ID/12                   |                        |              | 231158                 | <b>37.29</b> | ID/Q-12   | 231170                 | <b>9.99</b>  |
| <b>Outside Calipers</b> |                        |              |                        |              |           |                        |              |
| OD/3                    |                        |              | 231172                 | <b>13.60</b> | OD/Q-3    | 231184                 | <b>17.21</b> |
| OD/4                    |                        |              | 231174                 | <b>13.60</b> | OD/Q-4    | 231186                 | <b>17.21</b> |
| OD/6                    | 606110                 | <b>23.94</b> | 231176                 | <b>18.92</b> | OD/Q-6    | 231188                 | <b>22.41</b> |
| OD/8                    |                        |              | 231178                 | <b>23.86</b> | OD/Q-8    | 231190                 | <b>27.16</b> |
| OD/10                   |                        |              | 231180                 | <b>31.45</b> | OD/Q-10   | 231192                 | <b>34.25</b> |
| OD/12                   |                        |              | 231182                 | <b>37.29</b> | OD/Q-12   | 231194                 | <b>9.99</b>  |
| <b>Spring Dividers</b>  |                        |              |                        |              |           |                        |              |
| DD/3                    |                        |              | 231196                 | <b>13.65</b> | DD/Q-3    | 231208                 | <b>17.20</b> |
| DD/4                    |                        |              | 231198                 | <b>13.65</b> | DD/Q-4    | 231210                 | <b>17.20</b> |
| DD/6                    | 606100                 | <b>24.30</b> | 231200                 | <b>18.98</b> | DD/Q-6    | 231212                 | <b>22.45</b> |
| DD/8                    |                        |              | 231202                 | <b>23.90</b> | DD/Q-8    | 231214                 | <b>27.14</b> |
| DD/10                   |                        |              | 231204                 | <b>31.39</b> | DD/Q-10   | 231216                 | <b>34.18</b> |
| DD/12                   |                        |              | 231206                 | <b>37.25</b> | DD/Q-12   | 231218                 | <b>40.14</b> |

## Jenny Calipers — Hermaphrodite Calipers

Manufactured from selected steel, the legs are exceptionally rugged and well finished. The leg that holds the adjustable point is offset. The locating lug is incorporated in the straight leg.



| Size (in.) | Model No. | Code No. | Price \$     |
|------------|-----------|----------|--------------|
| 6"         | JC/6      | 231244   | <b>16.02</b> |

## Spring Caliper

- Contact ends fully rounded to give accurate dimensions



| Mitutoyo Model No. | Description | Sowa Code No. | Price \$     |
|--------------------|-------------|---------------|--------------|
| 950-222            | 6"          | 840240        | <b>48.38</b> |

## STM Pen Scriber



| Description                       | Code No. | Price \$    |
|-----------------------------------|----------|-------------|
| STM Pen Scriber c/w carbide point | 201060   | <b>9.35</b> |
| Replacement carbide point         | 201065   | <b>3.05</b> |

## Scribers

### MS/3-ST

3 interchangeable threaded points, short straight, short bent and long bent

### MS/4

Single ended light duty

### MS/MG/6

Tungsten carbide tip for marking on hard materials. Permanent magnet on the other end for picking up small metal parts

### MS/P/3

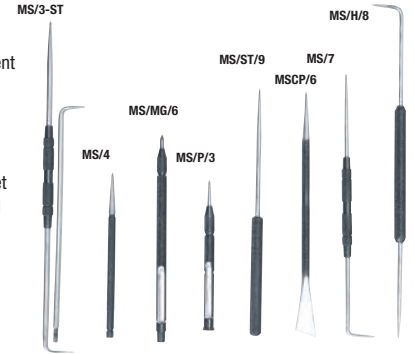
Scriber point is held by a knurled chuck and can be reversed when not in use

### MS/ST/9

Double ended – combining a needle point with a chisel end

MS/7 - Double ended with one straight point and one point bent at 90°

MS/H/8 - Double ended heavy duty with one straight point, the other bent at 90°



| Overall Length | Model No. | Code No. | Price \$     |
|----------------|-----------|----------|--------------|
| 9 & 12"        | MS/3-ST   | 231250   | <b>9.17</b>  |
| 4-1/2"         | MS/4      | 231252   | <b>3.69</b>  |
| 6"             | MS/MG/6   | 231254   | <b>15.60</b> |
| 3-1/2"         | MS/P/3    | 231256   | <b>8.66</b>  |
| 7"             | MS/ST/9   | 231258   | <b>5.82</b>  |
| 6-3/4"         | MSCP/6    | 231260   | <b>6.84</b>  |
| 7-1/2"         | MS/7      | 231262   | <b>5.82</b>  |
| 9-3/16"        | MS/H/8    | 231264   | <b>6.81</b>  |

## Engineer's Tool Sets



### ETS/1

Contains: Inside Caliper 4", Outside Caliper 4", Screw Cutting Gauge, Steel Rule 6", Pocket Scriber 3-1/2", and Centre Punch 5/32"

### ETS/2

Contains: Engineer's Precision Square 4", Jenny Caliper 6", Steel Rule 6", Double Ended Scriber 7-1/2", Centre Punch 5/32", Adjustable Tap and Reamer Wrench, and Spring Divider 4"



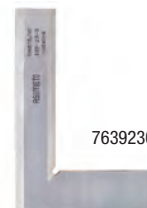
ETS/1

ETS/2

| Model No. | Code No. | Price \$      |
|-----------|----------|---------------|
| ETS/1     | 231278   | <b>85.17</b>  |
| ETS/2     | 231280   | <b>119.89</b> |

## Steel Squares

- Made of precision ground hardened stainless steel



| Inch Size           | Metric Size | Squareness | Style | Code No. | Price \$      |
|---------------------|-------------|------------|-------|----------|---------------|
| <b>General Type</b> |             |            |       |          |               |
| 2" x 1.6"           | 50 x 40mm   | 00         | Bevel | 7639210  | <b>46.73</b>  |
| 3" x 2"             | 75 x 50mm   | 00         | Bevel | 7639220  | <b>76.87</b>  |
| 4" x 2.75"          | 100 x 70mm  | 00         | Bevel | 7639230  | <b>84.24</b>  |
| 6" x 4"             | 150 x 100mm | 00         | Bevel | 7639240  | <b>146.81</b> |
| 8" x 5"             | 200 x 130mm | 00         | Bevel | 7639250  | <b>188.21</b> |

## Diemaker's Square Set

ASIMETO

- Use for precise miniature layouts
- Hardened and ground with very fine finish, extremely accurate
- Set includes: 3 hardened beveled edge squares; 3/4", 1-1/4", 2-3/8" plus 1- 1/2" triangular straight edge with handle complete in a fitted case
- Straight edge sides are machined in the middle for clearance of burs and dirt

| Specifications of Squares: | Beam     | Blade    |
|----------------------------|----------|----------|
|                            | 1-15/16" | 2-15/16" |
|                            | 1-1/8"   | 1-9/16"  |
|                            | 3/4"     | 1"       |



| Description           | Code No. | Price \$ |
|-----------------------|----------|----------|
| Diemaker's Square Set | 7606670  | 262.68   |

## Centre Square

The knife edge is made from Spring Steel and is hardened and ground for extended life.



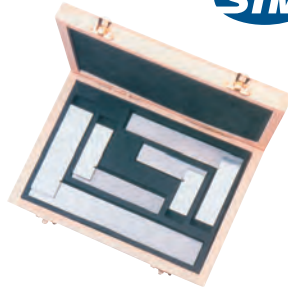
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| Work Dia. | Model No. | Code No. | Price \$ |
|-----------|-----------|----------|----------|
| 1-1/2"    | CS/1      | 231320   | 33.47    |
| 3"        | CS/2      | 231322   | 63.73    |

## Engineer's Precision Squares

Hardened spring steel blades are permanently fixed to the stock by means of tapered self-locking rivets which ensure complete rigidity. Both the blade and stock are precisely ground to ensure straightness and parallelism.

- Internal and external squareness as per BS939 Grade B



STM

| Blade Length (in.) | Model No.    | Squareness | Code No. | Price \$ |
|--------------------|--------------|------------|----------|----------|
| 2"                 | SS/A/2       | 0.00063"   | 231000   | 32.21    |
| 3"                 | SS/A/3       | 0.00063"   | 231010   | 32.21    |
| 4"                 | SS/A/4       | 0.00063"   | 231015   | 44.72    |
| 6"                 | SS/A/6       | 0.00063"   | 231020   | 57.04    |
| 9"                 | SS/A/9       | 0.00094"   | 231030   | 142.52   |
| 12"                | SS/A/12      | 0.00094"   | 231040   | 214.03   |
| Set 1              | SS/A/2-3-4-6 |            | 231045   | 189.97   |
| Set 2              | SS/A/2-4-6   |            | 231050   | 157.90   |

Set 1 contains one each of 2", 3", 4" and 6" Squares  
Set 2 contains one each of 2", 4" and 6" Squares

## Magnetic Cylinder Square

- Designed to easily check squareness on component parts
- Base is perpendicular to shaft within 0.0001" over the length of the square. Magnetic base eliminates clamping distortion and speeds set-up
- Manufactured from steel selected and normalized to insure stability and uniformity



Suburban

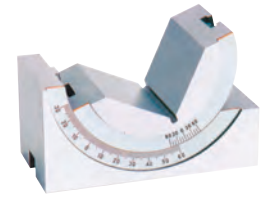
| Model No. | Length | Base Dia. | Shaft Dia. | Shaft Length | Weight lbs | Code No. | Price \$ |
|-----------|--------|-----------|------------|--------------|------------|----------|----------|
| MCS-4     | 4-1/2" | 1-7/16"   | 1/2"       | 3-1/2"       | 3          | 251926   | 880.15   |
| MCS-6     | 6-1/2" | 3-3/8"    | 1"         | 5-1/2"       | 7          | 251928   | 1,036.75 |

## Adjustable Angle Block 0-60°

STM

Made from fully hardened (50-55) HRC and ground tool steel. The block is fully adjustable from 0°-60° and can be set at any desired position by locking of the hex screw located in the base.

- Sold Individually



| Block Length (in.) | Block Height (in.) | Block Width (in.) | Model No. | Code No. | Price \$ |
|--------------------|--------------------|-------------------|-----------|----------|----------|
| 3-3/4"             | 2"                 | 1-3/4"            | PAB/01    | 231096   | 319.61   |
| 3-3/4"             | 2"                 | 1-3/16"           | PAB/02    | 231098   | 259.61   |
| 3"                 | 1-11/32"           | 1"                | PAB/03    | 231100   | 209.80   |

## Precision Square Levels



STM

| Model    | Dimensions (mm)  | Weight (kg) | Code No. | Price \$ |
|----------|------------------|-------------|----------|----------|
| VSL-200A | 200 x 200 x 39.5 | 4.10        | 230370   | 609.36   |
| VSL-300A | 250 x 250 x 44.6 | 8.83        | 230380   | 895.92   |

## Horizontal Leveling Instrument

STM

- 0.02mm/100mm tolerance



| Model    | Dimensions (mm) | Weight (kg) | Code No. | Price \$ |
|----------|-----------------|-------------|----------|----------|
| VLI-200A | 200x50x45       | 2.1         | 230390   | 539.52   |

## Precision Angle Plates

STM

### YCT-AP Angle Plate

- Material: SK2
- Hardness: 50-54 HRC
- Squareness: within 0.005 mm
- Tolerance of angle: 10"
- Angular measures from 0-60°



| Model No. | H  | W  | L   | h  | Net Wt. | Code No. | Price \$ |
|-----------|----|----|-----|----|---------|----------|----------|
| AP-1      | 47 | 46 | 102 | 28 | 1.5 kg  | 230745   | 123.06   |
| AP-3      | 32 | 25 | 75  | 22 | 0.5 kg  | 230755   | 113.82   |

## STM Universal Angle Block Sets

STM

- Set complete in fitted case
- Hardened steel, precision ground
- Size 3" long by 1/4" thick
- Accuracy ± .0001" per inch



DK33-006



DK32-027

| Model No. | Description   | Code No. | Price \$ |
|-----------|---|----------|----------|
| DK 32-027 | 1pc. each 1°, 2°, 3°, 4°, 5°, 10°, 15°, 30°           | 230865   | 316.92   |
| DK 33-006 | 1pc. each 1°, 2°, 3°, 4°, 5°, 10°, 15°, 20°, 25°, 30° | 230867   | 103.60   |

## Rectangular Gauge Block Sets — Inch

ASIMETO

- Individual serial numbers on each block, regardless of grade
- A complete certificate of calibration traceable to the N.I.S.T. showing the deviation of each block
- All sets are supplied in deluxe fitted wooden case
- Mirror polished surfaces provide superior wringing characteristics



| Blocks per Set | Blocks In Set                              | Grade | Former Grade | Code No. | Price \$        |
|----------------|--|-------|--------------|----------|-----------------|
| 81             | 1 Block: 0.050"                            | 0     | (2)          | 7650010  | <b>1,354.32</b> |
|                | 10 Blocks: 0.1000"-0.1009" x 0.0001" steps |       |              |          |                 |
|                | 49 Blocks: 0.101"-0.149" x 0.001" steps    |       |              |          |                 |
|                | 17 Blocks: 0.150"-0.950" x 0.050" steps    |       |              |          |                 |
|                | 4 Blocks: 1.000"-4.000" x 1.000" steps     |       |              |          |                 |
| 36             | 1 Block: 0.050"                            | 0     | (2)          | 7650020  | <b>779.76</b>   |
|                | 10 Blocks: 0.1000"-0.1009" x 0.0001" steps |       |              |          |                 |
|                | 9 Blocks: 0.101"-0.109" x 0.001" steps     |       |              |          |                 |
|                | 9 Blocks: 0.110"-0.190" x 0.010" steps     |       |              |          |                 |
|                | 4 Blocks: 0.200"-0.500" x 0.100" steps     |       |              |          |                 |
|                | 3 Blocks: 1,2,4"                           | AS-1  | (3)          | 7650011  | <b>964.44</b>   |
|                |  | AS-2  | (B)          | 7650012  | <b>678.44</b>   |
|                |  | AS-1  | (3)          | 7650021  | <b>578.41</b>   |
|                |  | AS-2  | (B)          | 7650022  | <b>436.05</b>   |

## Individual Rectangular Gauge Blocks

ASIMETO

- Grade 0
- Individual serial numbers on each block
- Mirror polished surfaces provide superior wringing characteristics



| Size (in.) | Code No. | Price \$     |
|------------|----------|--------------|
| 0.050"     | 7651010  | <b>25.39</b> |
| 0.100"     | 7651150  | <b>25.39</b> |
| 0.200"     | 7651800  | <b>25.98</b> |
| 0.250"     | 7651820  | <b>45.52</b> |
| 0.500"     | 7651870  | <b>50.61</b> |
| 1.000"     | 7651970  | <b>50.60</b> |

## Rectangular Gauge Block Set — Metric

ASIMETO

- Individual serial numbers on each block, regardless of grade
- A complete certificate of calibration traceable to the N.I.S.T. showing the deviation of each block
- All sets are supplied in deluxe fitted wooden case
- Mirror polished surfaces provide superior wringing characteristics



| Blocks per Set | Blocks In Set                          | Grade | Former Grade | Code No. | Price \$        |
|----------------|--|-------|--------------|----------|-----------------|
| 88             | 1 Block: 1.0005mm                      | AS-1  | (3)          | 7650181  | <b>1,163.61</b> |
|                | 9 Blocks: 1.001-1.009mm x 0.01mm steps |       |              |          |                 |
|                | 49 Blocks: 1.01-1.49mm x 0.01mm steps  |       |              |          |                 |
|                | 19 Blocks: 0.5-9.5 x 0.5mm steps       |       |              |          |                 |
|                | 10 Blocks: 10-100mm x 10mm steps       |       |              |          |                 |

## Standard Rectangular Gauge Block Set

STM

### Workshop Grade B

- All blocks are manufactured to the same high standards as our premium sets
- Each set is supplied with a certificate guaranteeing that each block is manufactured to meet or exceed federal spec GGG-G-15C, and is within tolerance ( $\pm 0.000050$ )
- This certificate does not show the individual deviation of each block
- Each set is provided in a fitted wooden case



| No. Blocks   | Blocks Included  | Code No. | Price \$      |
|--------------|--|----------|---------------|
| 81 piece set | 9-0.1001-0.1009 in 0.0001 steps,<br>49-0.101-0.149 in 0.001 steps<br>19-0.050-0.950 in 0.050 steps<br>4-1.000-4.000 in 1.000 steps | 200715   | <b>502.19</b> |

## Pin Gauge Sets

ASIMETO

- Furnished in molded plastic case



### Plus Tolerance +0.0002"/-0

| Qty | Range                       | Finish | Code No. | Price \$      |
|-----|-----------------------------|--------|----------|---------------|
| 50  | 0.011"-0.060" x 0.001" step | Bright | 7697010  | <b>103.25</b> |
| 190 | 0.061"-0.250" x 0.001" step | Bright | 7697020  | <b>266.11</b> |
| 250 | 0.251"-0.500" x 0.001" step | Bright | 7697030  | <b>481.45</b> |
| 125 | 0.501"-0.625" x 0.001" step | Bright | 7697040  | <b>481.45</b> |
| 125 | 0.626"-0.750" x 0.001" step | Bright | 7697050  | <b>576.29</b> |

### Minus Tolerance +0/-0.0002"

| Qty | Range                       | Finish | Code No. | Price \$      |
|-----|-----------------------------|--------|----------|---------------|
| 50  | 0.011"-0.060" x 0.001" step | Bright | 7697012  | <b>111.52</b> |
| 190 | 0.061"-0.250" x 0.001" step | Bright | 7697022  | <b>249.34</b> |
| 250 | 0.251"-0.500" x 0.001" step | Bright | 7697032  | <b>450.98</b> |
| 125 | 0.501"-0.625" x 0.001" step | Bright | 7697042  | <b>481.45</b> |

## Ergonomic Pin Gauge Handles

ASIMETO

- Comfortable, ergonomically designed handle for pin gauges
- Can be used with GO pin (green) on one end, NO GO (red) on opposite end



| Range           | Code No. | Price \$     |
|-----------------|----------|--------------|
| 0.011" - 0.060" | 7697410  | <b>39.53</b> |
| 0.061" - 0.250" | 7697411  | <b>40.46</b> |
| 0.251" - 0.500" | 7697412  | <b>48.15</b> |
| 0.501" - 0.625" | 7697413  | <b>45.35</b> |
| 0.626" - 0.750" | 7697414  | <b>49.37</b> |

## Precision Steel Pin Gauge Sets

STM

- Hardness: heat treated to a hardness of 60-62 Rockwell C Drill Rod
- All members 2" long, centerless lapped
- Size Electro etched in each piece
- Finish: Each gauge inspected and has 10 micron finish or better
- Deluxe box with insert
- Tolerance: Minus -0.0002"/+0.0000"



| Gauge Set No. | Range           | No. of Gauges | Minus Code No. | Price \$      |
|---------------|-----------------|---------------|----------------|---------------|
| P-1           | 0.061" - 0.250" | 190           | 255040         | <b>164.58</b> |
| P-2           | 0.251" - 0.500" | 250           | 255045         | <b>326.00</b> |

## Precision Inspection Gauge Ball Sets

ASIMETO

- Meets all grade 25 AFBMA standards
- Chrome alloy steel, hardened to 63HRC
- Surface finish to 1.5 micro-inches
- Within 0.0001"/0.0025mm of actual size
- Spherical accuracy within 0.000025"/0.0006mm



| Quantity | Description                   | Code No. | Price \$      |
|----------|-------------------------------|----------|---------------|
| 26 Pair  | 1/8" - 1"                     | 7679901  | <b>174.48</b> |
| 25 Pair  | 1mm to 25mm by 1mm increments | 7679900  | <b>174.48</b> |

## Suburban Planer Gauges



- 7/16" to 10" range
- Parallelism of gauging surfaces to base within 0.0002" in any position
- All surfaces square and parallel for use in any plane
- 1-1/8" wide body
- Beveled ways eliminate side play
- Most accurate planer gauge made
- Base dimensions: 6-3/16" L x 1-1/8" W x 3-1/2" H
- Fitted wooden case and 3" extension included



| Model  | Weight (lb) | Code No. | Price \$ |
|--------|-------------|----------|----------|
| PG-613 | 6 lb        | 251320   | 891.75   |

## Metric Ring Gauges

- Made of the finest steel alloy



| Size         | 6G GO Code No. | Price \$ | 6G NO GO Code No. | Price \$ |
|--------------|----------------|----------|-------------------|----------|
| M3.0 x 0.5   | 222144         | 398.97   | 222164            | 328.16   |
| M4.0 x 0.7   | 222146         | 371.62   | 222166            | 371.62   |
| M5.0 x 0.80  | 222148         | 371.62   | 222168            | 371.62   |
| M6.0 x 1.0   | 222150         | 341.18   | 222170            | 341.18   |
| M8.0 x 1.25  | 222152         | 341.18   | 222172            | 280.19   |
| M8.0 x 1.0   | 222154         | 280.19   | 222174            | 341.18   |
| M10.0 x 1.5  | 222156         | 371.62   | 222176            | 371.62   |
| M10.0 x 1.25 | 222158         | 371.62   | 222178            | 371.62   |
| M12.0 x 1.75 | 222160         | 395.44   | -                 | -        |
| M12.0 x 1.25 | 222162         | 381.87   | 222180            | 381.87   |

## Standard Ring Gauges

- Made of the finest steel alloy
- Please specify class of fit



| Size    | GO 2A Code No. | Price \$ | GO 3A Code No. | Price \$ | NO GO 2A Code No. | Price \$ | NO GO 3A Code No. | Price \$ | Holder Code No. | Price \$ |
|---------|----------------|----------|----------------|----------|-------------------|----------|-------------------|----------|-----------------|----------|
| 2-56    | 222220         | 388.49   | 222276         | 320.23   | 222332            | 320.23   | 222388            | 320.23   | -               | -        |
| 4-40    | 222222         | 357.93   | 222278         | 296.19   | 222334            | 357.93   | 222390            | 296.19   | -               | -        |
| 5-40    | 222224         | 258.92   | 222280         | 258.92   | 222336            | 313.83   | 222392            | 258.92   | -               | -        |
| 6-32    | 222226         | 313.83   | 222282         | 258.92   | 222338            | 313.83   | 222394            | 258.92   | -               | -        |
| 8-32    | 222228         | 300.15   | 222284         | 248.22   | 222340            | 300.15   | 222396            | 248.22   | -               | -        |
| 10-24   | 222230         | 300.15   | 222286         | 248.22   | 222342            | 300.15   | 222398            | 248.22   | -               | -        |
| 10-32   | 222232         | 300.15   | 222288         | 248.22   | 222344            | 300.15   | 222400            | 248.22   | 222450          | 61.64    |
| 1/4-20  | 222234         | 250.87   | 222290         | 250.87   | 222346            | 303.47   | 222402            | 250.87   | -               | -        |
| 1/4-28  | 222236         | 303.47   | 222292         | 250.87   | 222348            | 303.47   | 222404            | 250.87   | -               | -        |
| 5/16-18 | 222238         | 293.22   | 222294         | 242.93   | 222350            | 293.22   | 222406            | 242.93   | -               | -        |
| 5/16-24 | 222240         | 293.22   | 222296         | 242.93   | 222352            | 293.22   | 222408            | 242.93   | 222452          | 68.48    |
| 3/8-16  | 222242         | 327.28   | 222298         | 269.50   | 222354            | 327.28   | 222410            | 269.50   | -               | -        |
| 3/8-24  | 222244         | 327.28   | 222300         | 269.50   | 222356            | 327.28   | 222412            | 269.50   | -               | -        |
| 7/16-14 | 222246         | 258.92   | 222302         | 258.92   | 222358            | 258.92   | 222414            | 258.92   | -               | -        |
| 7/16-20 | 222248         | 342.83   | 222304         | 258.92   | 222360            | 313.83   | 222416            | 258.92   | -               | -        |
| 1/2-13  | 222250         | 327.28   | 222306         | 269.50   | 222362            | 327.28   | 222418            | 269.50   | -               | -        |
| 1/2-20  | 222252         | 327.28   | 222308         | 327.28   | 222364            | 327.28   | 222420            | 327.28   | 222454          | 68.48    |
| 9/16-12 | 222254         | 381.87   | 222310         | 314.82   | 222366            | 314.82   | 222422            | 314.82   | -               | -        |
| 9/16-18 | 222256         | 381.87   | 222312         | 314.82   | 222368            | 314.82   | 222424            | 314.82   | -               | -        |
| 5/8-11  | 222258         | 381.87   | 222314         | 314.82   | 222370            | 381.87   | 222426            | 381.87   | -               | -        |
| 5/8-18  | 222260         | 381.87   | 222316         | 381.87   | 222372            | 381.87   | 222428            | 381.87   | -               | -        |
| 3/4-10  | 222262         | 470.42   | 222318         | 386.84   | 222374            | 470.42   | 222430            | 386.84   | -               | -        |
| 3/4-16  | 222264         | 386.84   | 222320         | 470.42   | 222376            | 470.42   | 222432            | 470.42   | 222456          | 78.84    |
| 7/8-9   | 222266         | 504.49   | 222322         | 416.27   | 222378            | 504.49   | 222434            | 416.27   | -               | -        |
| 7/8-14  | 222268         | 504.49   | 222324         | 504.49   | 222380            | 416.27   | 222436            | 504.49   | -               | -        |
| 1"-8    | 222270         | 620.17   | 222326         | 512.20   | 222382            | 620.17   | 222438            | 512.20   | -               | -        |
| 1"-12   | 222272         | 620.17   | 222328         | 512.20   | 222384            | 512.20   | 222440            | 512.20   | -               | -        |
| 1"-14   | 222274         | 620.17   | 222330         | 512.20   | 222386            | 620.17   | 222442            | 512.20   | 222458          | 106.08   |

## Metric Plug Thread Gauges



- Made of the finest steel alloy



| Size         | 6H GO Plug Code No. | Price \$ | 6H NO GO Plug Code No. | Price \$ | Handle Code No. | Price \$ | Double End w/ Handle | Price \$ |
|--------------|---------------------|----------|------------------------|----------|-----------------|----------|----------------------|----------|
| M2.0 x 0.4   | 222460              | 133.65   | 222500                 | 157.24   | 222540          | 30.99    | 222182               | 347.57   |
| M2.5 x 0.45  | 222462              | 146.77   | 222502                 | 146.77   | 222540          | 30.99    | 222184               | 327.28   |
| M3.0 x 0.5   | 222464              | 221.61   | 222504                 | 146.77   | 222540          | 30.99    | 222186               | 277.45   |
| M3.5 x 0.6   | 222468              | 106.85   | 222506                 | 126.26   | 222540          | 30.99    | 222188               | 286.60   |
| M4.0 x 0.7   | 222470              | 126.26   | 222508                 | 126.26   | 222540          | 30.99    | 222190               | 234.21   |
| M5.0 x 0.8   | 222472              | 106.85   | 222510                 | 126.26   | 222540          | 30.99    | 222192               | 286.60   |
| M6.0 x 1.0   | 222474              | 80.17    | 222512                 | 95.83    | 222542          | 30.99    | 222194               | 184.26   |
| M8.0 x 1.25  | 222476              | 157.58   | 222514                 | 95.83    | 222542          | 30.99    | 222196               | 221.87   |
| M8.0 x 1.0   | 222478              | 95.83    | 222516                 | 80.17    | 222542          | 30.99    | 222198               | 221.87   |
| M10.0 x 1.5  | 222480              | 99.25    | 222518                 | 99.25    | 222544          | 30.99    | 222200               | 228.59   |
| M10.0 x 1.25 | 222482              | 99.25    | 222520                 | 99.25    | 222544          | 30.99    | 222202               | 228.59   |
| M12 x 1.75   | 222484              | 116.22   | 222522                 | 116.22   | 222544          | 30.99    | 222204               | 262.78   |
| M12 x 1.25   | 222486              | 122.95   | 222524                 | 104.21   | 222544          | 30.99    | 222206               | 262.78   |
| M14.0 x 2.0  | 222488              | 109.50   | 222526                 | 109.50   | 222546          | 30.99    | 222208               | 289.91   |
| M14 x 1.5    | 222490              | 129.90   | 222528                 | 109.50   | 222546          | 30.99    | 222210               | 242.93   |
| M16 x 2.0    | 222492              | 129.90   | 222530                 | 109.50   | 222546          | 30.99    | 222212               | 289.91   |
| M16 x 1.5    | 222494              | 129.90   | 222532                 | 109.50   | 222546          | 30.99    | 222214               | 242.93   |
| M20.0 x 2.5  | 222496              | 181.06   | 222534                 | 181.06   | 222548          | 30.99    | 222216               | 392.12   |

## Standard Plug Thread Gauges



- Made of the finest steel alloy



| Size    | GO Class 2B Code No. | Price \$ | NO GO Class 2B Code No. | Price \$ | Double End 2B Code No. | Price \$ |
|---------|----------------------|----------|-------------------------|----------|------------------------|----------|
| 2-56    | 222000               | 143.35   | 222048                  | 143.35   | 222096                 | 334.23   |
| 4-40    | 222002               | 116.22   | 222050                  | 116.22   | 222098                 | 265.97   |
| 5-40    | 222004               | 106.08   | 222052                  | 106.08   | 222100                 | 245.46   |
| 6-32    | 222006               | 95.83    | 222054                  | 95.83    | 222102                 | 225.07   |
| 8-32    | 222008               | 95.83    | 222056                  | 95.83    | 222104                 | 225.07   |
| 10-24   | 222010               | 80.17    | 222058                  | 80.17    | 222106                 | 225.07   |
| 10-32   | 222012               | 95.83    | 222060                  | 80.17    | 222108                 | 225.07   |
| 1/4-20  | 222014               | 88.88    | 222062                  | 88.88    | 222110                 | 173.57   |
| 1/4-28  | 222016               | 88.88    | 222064                  | 88.88    | 222112                 | 208.08   |
| 5/16-18 | 222018               | 88.88    | 222066                  | 88.88    | 222114                 | 208.08   |
| 5/16-24 | 222020               | 74.87    | 222068                  | 74.87    | 222116                 | 208.08   |
| 3/8-16  | 222022               | 74.87    | 222070                  | 88.88    | 222118                 | 173.57   |
| 3/8-24  | 222024               | 88.88    | 222072                  | 88.88    | 222120                 | 208.08   |
| 7/16-14 | 222026               | 92.40    | 222074                  | 92.40    | 222122                 | 215.02   |
| 7/16-20 | 222028               | 77.52    | 222076                  | 92.40    | 222124                 | 195.73   |
| 1/2-13  | 222030               | 95.83    | 222078                  | 80.17    | 222126                 | 184.26   |
| 1/2-20  | 222032               | 80.17    | 222080                  | 80.17    | 222128                 | 221.87   |
| 9/16-18 | 222034               | 109.50   | 222082                  | 109.50   | 222130                 | 242.93   |
| 5/8-11  | 222036               | 133.32   | 222084                  | 112.15   | 222132                 | 248.22   |
| 5/8-18  | 222038               | 133.32   | 222086                  | 112.15   | 222134                 | 248.22   |
| 3/4-10  | 222040               | 140.04   | 222088                  | 140.04   | 222136                 | 310.30   |
| 3/4-16  | 222042               | 140.04   | 222090                  | 140.04   | 222138                 | 310.30   |
| 7/8-9   | 222044               | 146.77   | 222092                  | 146.77   | 222140                 | 277.45   |
| 7/8-14  | 222046               | 153.50   | 222094                  | 153.50   | 222142                 | 341.18   |

## Rockwell Type Hardness Tester

- For testing the hardness of various materials to determine the Rockwell hardness to scales A, B, and C
- Unit is designed with mechanical loads for precise hardness readings
- Conform to the requirements of ASTM E18, ISO 6508-2, and GB/T 230.2 standards
- Readings provided to a minimum resolution 0.5HR

### Standard Accessories:

- Diamond cone penetrator 1pc
- V-notch anvil 1pc
- Small flat anvil 1pc
- Large flat anvil 1pc
- Rockwell standard 5pcs
- 1/16" steel ball penetrator 1pc
- Instruction manual 1pc

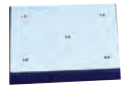
| Range                            | Test Force                            | Test Height | Throat Depth | Code No. | Price \$ |
|----------------------------------|---------------------------------------|-------------|--------------|----------|----------|
| 20-88 HRA, 20-100 HRB, 20-70 HRC | 588.4, 980.7, 1471N (60, 100, 150kgf) | 170mm       | 135mm        | 7640010  | 3,961.83 |

ASIMETO



## Hardness Test Block

- To be used with Asimeto Impact Hardness Tester



ASIMETO

| Range of Hardness                                 | Dimensions     | Weight | Code No. | Price \$ |
|---|----------------|--------|----------|----------|
| 20-30 HRC 80-88 HRA 35-55 HRC 85-95 HRB 60-70 HRC | 60 x 40 x 10mm | 0.19kg | 7640810  | 255.37   |

## Impact Hardness Tester

### Features:

- Used for determining the hardness of ferrous and non-ferrous metals
- Hardness is displayed in an "L" value that can be converted into Brinell, Rockwell, Vickers, and Shore Hardness

### Specifications:

- Range: 330-890HL
- Impact capacity: 11 Nmm
- Testing direction: Arbitrary
- Power: DC 6.0 V
- Mass of impact body: 5.5g
- Diameter of carbide ball: 3mm



ASIMETO

| Description            | Code No. | Price \$ |
|------------------------|----------|----------|
| Impact Hardness Tester | 7640171  | 2,225.91 |

## Hardness Tester Penetrators



ASIMETO

| Description                  | Specifications   | Code No. | Price \$ |
|------------------------------|--|----------|----------|
| For Rockwell Hardness Tester | 120° diamond cone penetrator Ø1.588mm (1/16") steel ball | 7640830  | 612.50   |
| For Brinell Hardness Tester  | Ø2.5, 5, 10mm tungsten carbide ball penetrators          | 7640840  | 551.40   |

## Surface Roughness Standards Set

- Used for the visual comparison of surface roughness
- Set of 30 specimens, 7/8" x 3/8" electro-formed, solid nickel



ASIMETO

| Code No.: 7506010 |                |   | Price \$ 360.77 |
|-------------------|----------------|---|-----------------|
| Qty.              | Desc.          | Roughness   |                 |
| 2                 | Flat Lapping   | 0.05; 0.1µm (2; 4µm)  |                 |
| 4                 | Reaming        | 0.2; 0.4; 0.8; 1.6µm (8; 16; 32; 63µm)                        |                 |
| 6                 | Grinding       | 0.05; 0.1; 0.2; 0.4; 0.8; 1.6µm (2; 4; 8; 16; 32; 63µm)       |                 |
| 6                 | Horiz. Milling | 0.4; 0.8; 1.6; 3.2; 6.3; 12.5µm (16; 32; 63; 125; 250; 500µm) |                 |
| 6                 | Vert. Milling  | 0.4; 0.8; 1.6; 3.2; 6.3; 12.5µm (16; 32; 63; 125; 250; 500µm) |                 |
| 6                 | Turning        | 0.4; 0.8; 1.6; 3.2; 6.3; 12.5µm (16; 32; 63; 125; 250; 500µm) |                 |

## Profile Projector — PH-A14

Mitutoyo

### High Performance

- Mitutoyo's lens technology and workmanship unite to provide a bright, crisp image for error free inspection
- The PH-14's generous XY workstage travel (8x4) provides users with ample range to cover application needs
- The workstage provides high accuracy and can handle a workload of up to 100lbs

### Affordability

- Our customer's will benefit in acquisition savings from Mitutoyo's Global manufacturing strength and efficiency. We have brought together proven quality components and combined them to produce for our customers our new PH-14 optical comparator

### Flexibility

- Mitutoyo has designed the PH-14 for your toughest in-process, shop floor, or quality room inspection needs
- A wide variety of lens, magnifications and other accessories are available to fit your every measuring need

CALL OUR ORDER DESK FOR PACKAGE PRICING!



FIVE YEAR MFG. WARRANTY

Save Time. Save Money. Save Now!

### Absolute AT715 Linear Scales

- Absolute electro-magnetic induction system achieves IP67 rating to resist the harshest contamination found in machine tool environments
- Patented ABSOLUTE technology system detects and outputs an absolute position - no reference point setup needed at every power-on
- Scale position detection is not affected by electric noise such as power spike, brown out or power-off
- Water and splash-proof signal cable connector for easy installation and maintenance



### KA Display Counter

- High cost performance 2 axis counter with many standard functions
- Can be used as "standard counter" or "lathe counter" by modifying parameters
- Selectable resolution



IP67

Choose from these popular sizes, or call us for many other custom size options to fit your application needs.

## 12" x 30" Knee Mill Package

Mitutoyo

### Package Contains:

- 174183A 2 Axis KA Counter
- 539805 12" AT715 Scale
- 539814 30" AT715 Scale
- Y axis bracket
- X axis screw kit
- Tray with arm

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| D950-989  | 847858   | 1,530.00 |

## 16" x 36" Knee Mill Package

Mitutoyo

### Package Contains:

- 174183A 2 Axis KA Counter
- 539807 16" AT715 Scale
- 539816 36" AT715 Scale
- Y axis bracket
- X axis screw kit
- Tray with arm

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| D950-992  | 847363   | 1,555.00 |



## Precision Parallel Sets

- Hardened and ground high grade alloy steel
- Hardness 52-58 HRC
- 6" length
- Absolute heights are nominal
- Supplied in durable plastic case
- Width Accuracy:  $\pm 0.0008"$  Length Accuracy:  $\pm 0.0006"$



| Description   | Range                 | Parallelism   | Paired Accuracy | Code No. | Price \$      |
|---------------|-----------------------|---------------|-----------------|----------|---------------|
| 8 Pair 1/2"   | 7/8" to 1-3/4" x 1/8" | $\pm 0.0003"$ | $\pm 0.0003"$   | 7607080  | <b>285.71</b> |
| 9 Pair 1/4"   | 3/4" to 1-3/4" x 1/8" | $\pm 0.0002"$ | $\pm 0.0002"$   | 7607090  | <b>270.43</b> |
| 10 Pair 1/8"  | 1/2" to 1-5/8" x 1/8" | $\pm 0.0002"$ | $\pm 0.0002"$   | 7607100  | <b>171.40</b> |
| 10 Pair 1/32" | 1/2" to 1-5/8" x 1/8" | $\pm 0.0002"$ | $\pm 0.0002"$   | 7607101  | <b>128.21</b> |

## Precision Parallel Sets

- Matched pairs
- Made of high grade steel alloy
- Hardened and ground
- Tolerance  $\pm 0.0003"$



| Model No. | Dimensions per Pair  | Code No. | Price \$      |
|-----------|--|----------|---------------|
| DK 32-045 | 3/16 x 1 x 6, 3/16 x 1-1/4 x 6, 3/16 x 1-1/2 x 6, 3/16 x 1-3/4 x 6   | 230850   | <b>110.75</b> |
| DK 32-012 | 3/16 x 1 x 6, 3/16 x 1-1/4 x 6, 1/2 x 1-1/2 x 6, 1/2 x 1-3/4 x 6   | 230853   | <b>104.74</b> |
| DK 32-050 | 1/2 x 1 x 6, 1/2 x 1-1/4 x 6, 1/2 x 1-1/2 x 6, 1/2 x 1-3/4 x 6   | 230855   | <b>123.75</b> |
| DK 32-064 | 1/4 x 3/4 x 6, 1/4 x 7/8 x 6, 1/4 x 1 x 6, 1/4 x 1-1/8 x 6, 1/4 x 1-3/8 x 6, 1/4 x 1-1/2 x 6, 1/4 x 1-5/8 x 6, 1/4 x 1-3/4 x 6 | 230857   | <b>202.97</b> |
| DK 32-073 | 1/2 x 7/8 x 6, 1/2 x 1 x 6, 1/2 x 1-1/8 x 6, 1/2 x 1-1/4 x 6, 1/2 x 1-3/8 x 6, 1/2 x 1-5/8 x 6, 1/2 x 1-3/4 x 6                | 230860   | <b>183.11</b> |

## Steel Parallel Set

### All 10 Pairs Including Fitted Case

- Thin style, 1/8" thick
- Matched pairs
- Made of high grade steel alloy
- Hardened and ground
- Tolerance  $\pm 0.0003"$



| Width | Height | Length |
|-------|--------|--------|
| 1/8"  | 1/2"   | 6      |
| 1/8"  | 5/8"   | 6      |
| 1/8"  | 3/4"   | 6      |
| 1/8"  | 7/8"   | 6      |
| 1/8"  | 1"     | 6      |
| 1/8"  | 1-1/8" | 6      |
| 1/8"  | 1-1/4" | 6      |
| 1/8"  | 1-3/8" | 6      |
| 1/8"  | 1-1/2" | 6      |
| 1/8"  | 1-5/8" | 6      |



Code No.: 230863

Price \$: 116.39

## Ultra Precision Wavy Parallel Set

- Made of high quality spring steel, hardened, stress relieved, and precision ground
- Parallel within  $\pm 0.0002"$ , paired  $\pm 0.0002"$
- Includes 9 pairs 4-1/4" long with the following heights: 1/2, 5/8, 3/4, 7/8, 1, 1-1/8, 1-1/4, 1-3/8, 1-1/2
- Shims can be compressed, useful for the holding of thin parts



| Description                       | Code No. | Price \$      |
|-----------------------------------|----------|---------------|
| Ultra Precision Wavy Parallel Set | 7607660  | <b>161.69</b> |

## Precision Thin Steel Parallels

- Thin style, 1/8" thick
- Sold in matched pairs
- Made of high grade alloy steel
- Hardened and ground
- 2 holes in each parallel
- Accuracy:  $\pm 0.0002"$  parallelism in height  $\pm 0.001"$  to size in height



| W x H x L        | Hole Size | Code No. | Price \$     |
|------------------|-----------|----------|--------------|
| 1/8 x 1/2 x 6"   | 13/64"    | 230200   | <b>16.36</b> |
| 1/8 x 5/8 x 6"   | 1/4"      | 230205   | <b>17.78</b> |
| 1/8 x 3/4 x 6"   | 5/16"     | 230210   | <b>17.78</b> |
| 1/8 x 7/8 x 6"   | 5/16"     | 230215   | <b>17.78</b> |
| 1/8 x 1 x 6"     | 5/16"     | 230220   | <b>17.53</b> |
| 1/8 x 1-1/8 x 6" | 3/8"      | 230225   | <b>15.68</b> |
| 1/8 x 1-1/4 x 6" | 3/8"      | 230230   | <b>17.78</b> |
| 1/8 x 1-3/8 x 6" | 7/16"     | 230235   | <b>17.78</b> |
| 1/8 x 1-1/2 x 6" | 1/2"      | 230240   | <b>17.78</b> |
| 1/8 x 1-5/8 x 6" | 1/2"      | 230245   | <b>17.78</b> |

## 2-Way Steel Parallels — Matched Pairs



- Made of tool steel, hardened to 58-62 HRC and ground in matched pairs on two side
- Provides an economical alternative to 4-way ground parallels, when only two parallel sides required
- Size tolerance of the ground height is  $\pm 0.001"$  while being held to a total of 0.0001" between the pieces of a matched pair
- Total parallelism over the 6" length is 0.0001"



| Model No. | Length | Width | Height  | Weight (lb) | Code No. | Price \$      |
|-----------|--------|-------|---------|-------------|----------|---------------|
| TWP-001   | 6"     | 1/4   | 3/8     | 1           | 251786   | <b>152.25</b> |
| TWP-002   | 6"     | 1/4   | 7/16    | 1           | 251788   | <b>152.25</b> |
| TWP-003   | 6"     | 1/4   | 1/2     | 1           | 251789   | <b>152.25</b> |
| TWP-004   | 6"     | 1/4   | 9/16    | 1           | 251790   | <b>152.25</b> |
| TWP-005   | 6"     | 1/4   | 5/8     | 1           | 251792   | <b>152.25</b> |
| TWP-006   | 6"     | 1/4   | 11/16   | 1           | 251793   | <b>152.25</b> |
| TWP-007   | 6"     | 1/4   | 3/4     | 1           | 251794   | <b>152.25</b> |
| TWP-008   | 6"     | 1/4   | 13/16   | 1           | 251795   | <b>152.25</b> |
| TWP-009   | 6"     | 1/4   | 7/8     | 1           | 251796   | <b>152.25</b> |
| TWP-010   | 6"     | 1/4   | 15/16   | 2           | 251797   | <b>152.25</b> |
| TWP-011   | 6"     | 1/4   | 1"      | 2           | 251798   | <b>152.25</b> |
| TWP-012   | 6"     | 1/4   | 1-1/16  | 2           | 251799   | <b>152.25</b> |
| TWP-013   | 6"     | 1/4   | 1-1/8   | 2           | 251800   | <b>152.25</b> |
| TWP-014   | 6"     | 1/4   | 1-3/16  | 2           | 251801   | <b>152.25</b> |
| TWP-015   | 6"     | 1/4   | 1-1/4   | 2           | 251802   | <b>152.25</b> |
| TWP-016   | 6"     | 1/4   | 1-5/16  | 2           | 251803   | <b>152.25</b> |
| TWP-017   | 6"     | 1/4   | 1-3/8   | 2           | 251804   | <b>152.25</b> |
| TWP-018   | 6"     | 1/4   | 1-7/16  | 2           | 251805   | <b>152.25</b> |
| TWP-019   | 6"     | 1/4   | 1-1/2   | 2           | 251806   | <b>152.25</b> |
| TWP-020   | 6"     | 1/4   | 1-9/16  | 2           | 251807   | <b>152.25</b> |
| TWP-021   | 6"     | 1/4   | 1-5/8   | 2           | 251808   | <b>152.25</b> |
| TWP-022   | 6"     | 1/4   | 1-11/16 | 2           | 251809   | <b>152.25</b> |
| TWP-023   | 6"     | 1/4   | 1-3/4   | 2           | 251810   | <b>152.25</b> |
| TWP-024   | 6"     | 1/4   | 1-13/16 | 2           | 251811   | <b>152.25</b> |
| TWP-025   | 6"     | 1/4   | 1-7/8   | 2           | 251812   | <b>152.25</b> |
| TWP-026   | 6"     | 1/4   | 1-15/16 | 2           | 251813   | <b>152.25</b> |
| TWP-027   | 6"     | 1/4   | 2"      | 2           | 251814   | <b>152.25</b> |

## 2-Way Steel Parallels — Sets of Matched Pairs



- Includes matched pairs 6" long x 1/4" wide in 1/16" height increments
- Furnished in a wooden holder, marked with sizes

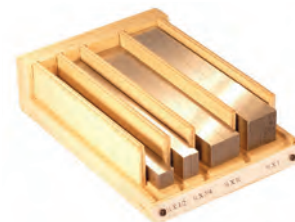


| Model No.  | Pairs/Set | Size Range           | Weight (lb) | Code No. | Price \$        |
|------------|-----------|----------------------|-------------|----------|-----------------|
| TWP9-SET-A | 9         | 3/8 through 7/8      | 9           | 251815   | <b>1,393.45</b> |
| TWP9-SET-B | 9         | 15/16 through 1-7/16 | 13          | 251816   | <b>1,393.45</b> |
| TWP9-SET-C | 9         | 1-1/2 through 2"     | 18          | 251817   | <b>1,393.45</b> |
| TWP22-SET  | 22        | 1/2 through 1-13/16  | 30          | 251818   | <b>3,374.15</b> |

## 4-Way Steel Parallels — Sets of Matched Pairs



- Each set includes four pairs of parallels in the sizes shown
- Furnished in a wooden holder marked with sizes
- Parallel specifications same as for matched pairs of the same size



| Model No. | Pairs/Set | Size Range                               | Weight (lb) | Code No. | Price \$        |
|-----------|-----------|--|-------------|----------|-----------------|
| P4W-SET-A | 4         | 6x1/4x1/2, 6x1/4x3/4, 6x1/2x3/4, 6x1/2x1 | 6           | 251847   | <b>1,895.15</b> |
| P4W-SET-B | 4         | 8x1/2x1, 8x3/4x1, 12x3/4x1, 12x1x2       | 30          | 251848   | <b>4,135.40</b> |

## 4-Way Steel Parallels – Individual



- Hardened steel parallels are ground to such close tolerances on four sides that there is no need to buy matched pairs for many common uses
- Can be used individually or matched with any other individual 4-way parallel at any time
- Different sizes can be used together - for example a 6"x1/2"x1" can be used with a 8"x3/4"x1" on the 1" dimension
- Held to size  $\pm 0.00025"$  on four sides
- Adjacent sides within 0.0005" per square inch
- Opposite sides parallel within 0.0001" per 6 inches



| Model No.  | Length | Width | Height | Weight (lb) | Code No. | Price \$ |
|------------|--------|-------|--------|-------------|----------|----------|
| P-06025038 | 6"     | 1/4   | 3/8    | 1           | 251849   | 153.70   |
| P-06025050 | 6"     | 1/4   | 1/2    | 1           | 251850   | 155.15   |
| P-06025063 | 6"     | 1/4   | 5/8    | 1           | 251851   | 155.15   |
| P-06025075 | 6"     | 1/4   | 3/4    | 1           | 251852   | 165.30   |
| P-06025100 | 6"     | 1/4   | 1"     | 1           | 251853   | 172.55   |
| P-06038050 | 6"     | 3/8   | 1/2    | 1           | 251854   | 165.30   |
| P-06038063 | 6"     | 3/8   | 5/8    | 1           | 251855   | 172.55   |
| P-06038075 | 6"     | 3/8   | 3/4    | 1           | 251856   | 172.55   |
| P-06050063 | 6"     | 1/2   | 5/8    | 1           | 251857   | 198.65   |
| P-06050075 | 6"     | 1/2   | 3/4    | 1           | 251858   | 210.25   |
| P-06050100 | 6"     | 1/2   | 1"     | 2           | 251859   | 214.60   |
| P-08050100 | 8"     | 1/2   | 1"     | 2           | 251860   | 326.25   |
| P-08075100 | 8"     | 3/4   | 1"     | 3           | 251861   | 350.90   |
| P-08075125 | 8"     | 3/4   | 1-1/4  | 3           | 251862   | 372.65   |
| P-12075100 | 12"    | 3/4   | 1"     | 4           | 251863   | 417.60   |
| P-12100150 | 12"    | 1"    | 1-1/2  | 6           | 251864   | 490.10   |
| P-12100200 | 12"    | 1"    | 2"     | 8           | 251865   | 545.20   |
| P-12150200 | 12"    | 1-1/2 | 2"     | 11          | 251866   | 748.20   |
| P-12150300 | 12"    | 1-1/2 | 3"     | 16          | 251867   | 874.35   |

## 4-Way Steel Parallels – Matched Pairs



- Made of tool steel, hardened to 58-62 HRC and ground in matched pairs on four sides. For use where extra precision is required
- Pairs are matched in size on the width and height to a tolerance of  $\pm 0.0002"$  on 6", 8" & 12" lengths and 0.0003" for longer lengths
- Total parallelism, straightness over the full length and size tolerance between pieces of a matched pair is 0.0001" on 6" & 8" lengths, 0.0002" on 12" lengths & 0.0003" on longer lengths
- Adjacent ground sides are square with each other within 0.0004", except the 6"x1/4"x3/4", 6"x1/4"x3/8" and 6"x1/4"x1/2" sizes, which are square within 0.0005"



| Model No.    | Length | Width | Height | Weight (lb) | Code No. | Price \$ |
|--------------|--------|-------|--------|-------------|----------|----------|
| P-06025038-M | 6"     | 1/4   | 3/8    | 1           | 251822   | 379.90   |
| P-06025050-M | 6"     | 1/4   | 1/2    | 1           | 251823   | 385.70   |
| P-06025063-M | 6"     | 1/4   | 5/8    | 1           | 251824   | 385.70   |
| P-06025075-M | 6"     | 1/4   | 3/4    | 1           | 251825   | 404.55   |
| P-06038050-M | 6"     | 3/8   | 1/2    | 1           | 251826   | 404.55   |
| P-06038075-M | 6"     | 3/8   | 3/4    | 2           | 251827   | 410.35   |
| P-06050063-M | 6"     | 1/2   | 5/8    | 2           | 251828   | 490.10   |
| P-06050075-M | 6"     | 1/2   | 3/4    | 2           | 251829   | 513.30   |
| P-06050100-M | 6"     | 1/2   | 1"     | 2           | 251830   | 523.45   |
| P-06063100-M | 6"     | 5/8   | 1"     | 3           | 251831   | 545.20   |
| P-06075100-M | 6"     | 3/4   | 1"     | 3           | 251832   | 566.95   |
| P-06075150-M | 6"     | 3/4   | 1-1/2  | 5           | 251833   | 598.85   |
| P-08050100-M | 8"     | 1/2   | 1"     | 3           | 251834   | 809.10   |
| P-08063150-M | 8"     | 5/8   | 1-1/2  | 5           | 251835   | 809.10   |
| P-08075100-M | 8"     | 3/4   | 1"     | 4           | 251836   | 861.30   |
| P-08075125-M | 8"     | 3/4   | 1-1/4  | 5           | 251837   | 909.15   |
| P-08075163-M | 8"     | 3/4   | 1-5/8  | 6           | 251838   | 993.25   |
| P-12075100-M | 12"    | 3/4   | 1"     | 6           | 251839   | 1,041.10 |
| P-12100150-M | 12"    | 1"    | 1-1/2  | 11          | 251840   | 1,223.80 |
| P-12100200-M | 12"    | 1"    | 2"     | 14          | 251841   | 1,347.05 |
| P-12150200-M | 12"    | 1-1/2 | 2"     | 21          | 251842   | 1,864.70 |
| P-12150300-M | 12"    | 1-1/2 | 3"     | 32          | 251843   | 2,182.25 |
| P-18100200-M | 18"    | 1"    | 2"     | 22          | 251844   | 2,221.40 |
| P-24100200-M | 24"    | 1"    | 2"     | 29          | 251845   | 2,995.70 |
| P-36100200-M | 36"    | 1"    | 2"     | 53          | 251846   | 5,446.20 |

## Tool Steel Straight Edges



- Extremely accurate reference line
- Can be used for checking surfaces for straightness
- Precision ground and finely finished
- Perfect for drawing or scribing straight lines
- Graduated & non-graduated models available
- Straight within 0.0005" per foot



| Model No.                           | Length | Width   | Thickness | Weight (lb) | Code No. | Price \$ |
|-------------------------------------|--------|---------|-----------|-------------|----------|----------|
| <b>Graduated - Beveled Edge</b>     |        |         |           |             |          |          |
| SE-24-TSBG                          | 24"    | 1-13/32 | 11/64     | 3           | 251718   | 462.55   |
| SE-36-TSBG                          | 36"    | 2-13/32 | 7/32      | 12          | 251720   | 826.50   |
| SE-48-TSBG                          | 48"    | 2-13/32 | 7/32      | 17          | 251722   | 1,937.20 |
| <b>Non-Graduated - Square Edge</b>  |        |         |           |             |          |          |
| SE-12-TS                            | 12"    | 1-13/32 | 11/64     | 2           | 251724   | 101.50   |
| SE-24-TS                            | 24"    | 1-13/32 | 11/64     | 3           | 251726   | 162.40   |
| SE-36-TS                            | 36"    | 2-13/32 | 7/32      | 12          | 251728   | 345.10   |
| SE-48-TS                            | 48"    | 2-13/32 | 7/32      | 17          | 251730   | 614.80   |
| SE-72-TS                            | 72"    | 3-5/32  | 9/32      | 36          | 251732   | 870.00   |
| <b>Non-Graduated - Beveled Edge</b> |        |         |           |             |          |          |
| SE-12-TSB                           | 12"    | 1-13/32 | 11/64     | 2           | 251734   | 126.15   |
| SE-24-TSB                           | 24"    | 1-13/32 | 11/64     | 3           | 251736   | 292.90   |
| SE-36-TSB                           | 36"    | 2-13/32 | 7/32      | 12          | 251738   | 410.35   |
| SE-48-TSB                           | 48"    | 2-13/32 | 7/32      | 17          | 251740   | 677.15   |
| SE-72-TSB                           | 72"    | 3-5/32  | 9/32      | 36          | 251742   | 1,028.05 |
| SE-96-TSB                           | 96"    | 3-1/4   | 5/16      | 51          | 251744   | 1,584.85 |

## Cast Iron Straight Edges



- Made of stress-relieved, cast iron for maximum stability
- Cored and ribbed for increased rigidity and reduced weight
- Top and bottom faces are precision ground parallel and straight to within 0.0001" per 12"
- Use for setting up and leveling machinery and equipment and for checking the flatness of surfaces or scribing
- Also can be used for positioning above and parallel to a surface



| Model No.                          | Length | Width | Thickness | Weight (lb) | Code No. | Price \$  |
|------------------------------------|--------|-------|-----------|-------------|----------|-----------|
| <b>Non-Graduated - Square Edge</b> |        |       |           |             |          |           |
| SE-24-CI                           | 24"    | 1"    | 2"        | 10          | 251776   | 1,276.00  |
| SE-36-CI                           | 36"    | 1-1/2 | 3"        | 27          | 251778   | 1,854.55  |
| SE-48-CI                           | 48"    | 1-1/2 | 3"        | 36          | 251780   | 2,373.65  |
| SE-6024-CI                         | 60"    | 2"    | 4"        | 95          | 251782   | 3,828.00  |
| SE-72-CI                           | 72"    | 2"    | 4"        | 110         | 251784   | 4,168.75  |
| SE-96-CI                           | 96"    | 3"    | 8"        | 400         | 251785   | 13,442.95 |

## Stainless Steel Straight Edges



- Extremely accurate reference line
- Can be used for checking surfaces for straightness
- Precision ground and finely finished
- Perfect for drawing or scribing straight lines
- Graduated & non-graduated models available
- Stainless steel models have hang-up hole
- Straight within 0.0005" per foot



| Model No.                           | Length | Width | Thickness | Weight (lb) | Code No. | Price \$ |
|-------------------------------------|--------|-------|-----------|-------------|----------|----------|
| <b>Non-Graduated - Beveled Edge</b> |        |       |           |             |          |          |
| SE-12-SSBHD                         | 12"    | 1-1/2 | 3/16      | 2           | 251748   | 425.43   |
| SE-24-SSBHD                         | 24"    | 2"    | 3/16      | 4           | 251750   | 507.50   |
| SE-36-SSBHD                         | 36"    | 2"    | 1/4       | 12          | 251752   | 759.80   |
| SE-48-SSBHD                         | 48"    | 2-1/2 | 1/4       | 18          | 251754   | 1,106.35 |
| SE-60-SSBHD                         | 60"    | 3"    | 1/4       | 28          | 251756   | 1,508.00 |
| SE-72-SSBHD                         | 72"    | 3"    | 1/4       | 34          | 251758   | 1,809.60 |
| SE-96-SSBHD                         | 96"    | 3-1/4 | 5/16      | 76          | 251760   | 2,756.45 |
| <b>Non-Graduated - Square Edge</b>  |        |       |           |             |          |          |
| SE-12-SSHD                          | 12"    | 1-1/2 | 3/16      | 2           | 251762   | 417.60   |
| SE-24-SSHD                          | 24"    | 2"    | 3/16      | 4           | 251764   | 458.20   |
| SE-36-SSHD                          | 36"    | 2"    | 1/4       | 13          | 251766   | 682.95   |
| SE-48-SSHD                          | 48"    | 2-1/2 | 1/4       | 19          | 251768   | 993.25   |
| SE-60-SSHD                          | 60"    | 3"    | 1/4       | 29          | 251770   | 1,364.45 |
| SE-72-SSHD                          | 72"    | 3"    | 1/4       | 35          | 251772   | 1,629.80 |
| SE-96-SSHD                          | 96"    | 3-1/4 | 5/16      | 78          | 251774   | 2,463.55 |

## Precision 1-2-3 Blocks



- These blocks are very useful in mounting work for precision grinding, layout work, etc.
- Blocks are hardened to 58-60 HRC and ground to surface finish 6-10 micro inches
- Tolerances are guaranteed to 0.0001" for squareness per inch
- 0.0002" for parallelism
- Blocks are matched and measure 1" x 2" x 3"



| Description | Code No. | Price \$ |
|-------------|----------|----------|
| 2 Piece set | 230876   | 57.70    |

## 1-2-3 or 2-4-6 Blocks



- Heat treated and case hardened to 55-60 HRC
- Precision ground and case hardened
- Squareness of all sides is within 0.0001"
- Parallel Accuracy 0.0003"
- Surface finish 6-16 micro inches
- 23 holes-5 are tapped in 3/8-16
- Supplied in pairs



| Size  | Description    | Code No. | Price \$ |
|-------|----------------|----------|----------|
| 1-2-3 | 23 Holes       | 230870   | 31.24    |
| 2-4-6 | 23 Holes       | 230872   | 239.48   |
| 1-2-3 | No Hole (Pair) | 230874   | 39.57    |

## Precision Tri Blocks

- Hardened steel, ground on all six sides
- Available as single blocks or in matched pairs, per chart below
- B-123-H1-M has one 1/2" through hole in 2" x 3" face
- 11-hole models have 5/16-18 tapped holes
- 23-hole models have 3/8-16 tapped holes
- All models, except PB123, come with fitted, wooden box
- B-123-H11-M, B-123-H23M, B-234-H23-M & B-246-H23-M have drilled, counter-bored and tapped holes to allow screw mounting and conversion into angle plates and other precision set-ups



| Model No.   | Single or Pair | Holes | Square        | Flat & Parallel | Size                           | Weight lbs | Code No. | Price \$ |
|-------------|----------------|-------|---------------|-----------------|--------------------------------|------------|----------|----------|
| B-123-H11-M | Pair           | 11    | 0.0001"/1"    | 0.0002"         | 1" x 2" x 3" +0.0002"          | 3          | 251958   | 333.50   |
| B-123-H1-M  | Pair           | 1     | 0.0001"/1"    | 0.0002"         | 1" x 2" x 3" +0.0001"/+0.0003" | 3          | 251960   | 262.45   |
| B-123-H23-M | Pair           | 23    | 0.0001"/1"    | 0.0002"         | 1" x 2" x 3" +0.0001"/+0.0003" | 3          | 251962   | 406.00   |
| B-123-NH-M  | Pair           | None  | 0.0001"/1"    | 0.0002"         | 1" x 2" x 3" +0.0001"/+0.0003" | 3          | 251964   | 226.20   |
| B-234-H23-M | Pair           | 23    | 0.0001"/1"    | 0.0003"         | 2" x 3" x 4" +0.0001"/+0.0004" | 12         | 251966   | 909.15   |
| B-246-H23-M | Pair           | 23    | 0.0001"/1"    | 0.0003"         | 2" x 4" x 6" +0.0001"/+0.0004" | 24         | 251968   | 1,402.15 |
| PB-123      | Single         | None  | 0.0002" Total | 0.0002"         | 1" x 2" x 3" +0.0001"          | 2          | 251970   | 178.35   |

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Celebrating nearly 100 years as "The Bible of the Mechanical Industries", the latest edition brings together volumes of knowledge, information and data gathered, revised and improved upon from experts throughout the mechanical industries. Extraordinarily comprehensive yet easy to use since it premiered, Machinery's Handbook provides mechanical and manufacturing engineers, designers, draftsmen, toolmakers, and machinists with a broad range of material, from the very basic to the more advanced. It has always, and continues to provide industry fundamentals and standards while it moves into the 21st century with material reflecting technological advances and offering vast editorial improvements, making this latest edition the best tool...ever!



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| Description              | Code No. | Price \$ |
|--------------------------|----------|----------|
| Machinery Handbook       | 180105   | 229.16   |
| Large Print Version      | 180115   | 272.84   |
| Machinery Handbook Guide | 180110   | 34.00    |

## Fastener Black Book



- Inch
- ISO & DIN Specifications
- Fastener Platings & Finishes
- Pre-Loads & Tightening Torques
- Thread Terminology & Classifications
- Standard Grades, Tolerances & Markings
- Thread Forms, Heads, Points, Materials and Coatings



Includes a Free Thread Gauge!

| Description                | Code No. | Price \$ |
|----------------------------|----------|----------|
| Fastener Black Book Metric | 180156   | 57.15    |

## 5pc Precision Tool Kit

ASIMETO

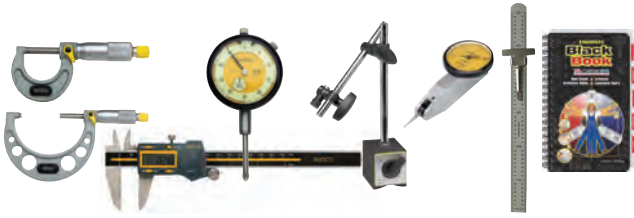
- 6" x 0.0005" Sylvac Digital Caliper (7301060)
- 03" x 0.0005" Dial Test Indicator (7501733)
- 1" x 0.001" AGD2 Dial Indicator (7402261)
- 0-1" x 0.0001" Outside Micrometer (7101013)
- Articulating Arm Magnetic Base (7602021)



| Description            | Code No. | Price \$ |
|------------------------|----------|----------|
| 5pc Precision Tool Kit | 7960161  | 865.74   |

## Asimeto Precision Tools Kit #1

ASIMETO



| Description                                      | Code No. | Price \$ |
|--|----------|----------|
| <b>Includes 1 each of the following:</b>         |          |          |
| • 7101013 (0-1" micrometer 0.0001")              |          |          |
| • 7101023 (1-2" micrometer 0.0001")              |          |          |
| • 7307065 (6" digital caliper)                   |          |          |
| • 7402261 (0-1" dial indicator 0.001")           | 500122   | 504.93   |
| • 7601011 (magnetic base)                        |          |          |
| • 7501733 (0.0005" x 0.030" dial test indicator) |          |          |
| • 606180 (6" pocket rule)                        |          |          |
| • 180151 (Engineers Black Book)(Imperial)        |          |          |

## Asimeto Precision Tools Kit #2

ASIMETO



| Description                                      | Code No. | Price \$ |
|--|----------|----------|
| <b>Includes 1 each of the following:</b>         |          |          |
| • 7101637 (0-3" 0.0001" outside micrometer set)  |          |          |
| • 7307065 (6" digital caliper)                   |          |          |
| • 7402261 (0-1" dial indicator 0.001")           | 500128   | 558.08   |
| • 7601011 (magnetic base)                        |          |          |
| • 7501733 (0.0005" x 0.030" dial test indicator) |          |          |
| • 896919 (6" pocket rule with Sowa logo)         |          |          |
| • 180151 (Engineers Black Book)(Imperial)        |          |          |

## Asimeto Indicator/Mag Base Kit #1

ASIMETO



| Description                                      | Code No. | Price \$ |
|--|----------|----------|
| <b>Includes 1 each of the following:</b>         |          |          |
| • 7602021 (Type II triple jointed magnetic base) | 500216   | 285.04   |
| • 7401061 (0-.25" 0.001" AGD1 dial indicator)    |          |          |

## Asimeto Indicator/Mag Base Kit #2

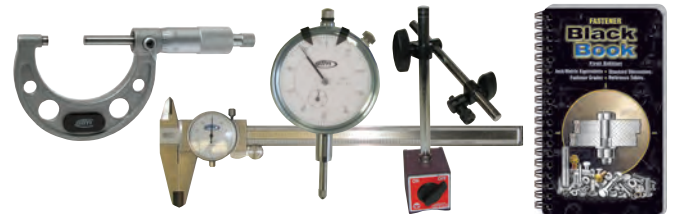
ASIMETO



| Description                                       | Code No. | Price \$ |
|---|----------|----------|
| <b>Includes 1 each of the following:</b>          |          |          |
| • 7602031 (Type III triple jointed magnetic base) | 500730   | 149.52   |
| • 7402261 (0-1" 0.001" AGD2 dial indicator)       |          |          |

## Toolmakers Kit

STM



| Description                                | Code No. | Price \$ |
|--|----------|----------|
| <b>Includes 1 each of the following:</b>   |          |          |
| • 200582 (6" 0.001" dial caliper)          |          |          |
| • 200570 (0-1" 0.0001" outside micrometer) |          |          |
| • 200720 (1" travel 0.001" dial indicator) | 500193   | 249.33   |
| • 225001 (BA-1 magnetic base)              |          |          |
| • 180156 (Fastener Black Book)             |          |          |

## Water Resistant Dial Indicator & Mag Base Combo

STM



| Description  | Code No. | Price \$ |
|--|----------|----------|
| <b>Includes 1 each of the following:</b>                 |          |          |
| • 225700 (STM fine adjustment magnetic base)             | 500006   | 361.98   |
| • 200075 (0-0.4" 0.0005" water resistant dial indicator) |          |          |

## 8" STM Dial Caliper & Engineers Black Book Combo

STM



| Description                               | Code No. | Price \$ |
|---|----------|----------|
| <b>Includes 1 each of the following:</b>  |          |          |
| • 200584 (8" 0.001" STM dial caliper)     | 500135   | 151.92   |
| • 180151 (Engineers Black Book)(imperial) |          |          |

# Tool Holding



## END MILL HOLDERS

|                                 |       |
|---------------------------------|-------|
| End Mill Holder Index . . . . . | G3    |
| End Mill Holders . . . . .      | G4-10 |
| Retention Knobs . . . . .       | G11   |

## SHELL MILL HOLDERS

|                              |        |
|------------------------------|--------|
| Shell Mill Holders . . . . . | G13-15 |
| Milling Arbors . . . . .     | G15-16 |

## COLLET CHUCKS & SHRINK FIT TOOLING

|                                   |        |
|-----------------------------------|--------|
| Collet Chucks & Collets . . . . . | G18-43 |
| Shrink Fit Tooling . . . . .      | G43-46 |

## ANGLE HEADS

|                             |        |
|-----------------------------|--------|
| GS Driven Tooling . . . . . | G48    |
| Right Angle Heads . . . . . | G48-61 |

## TAPPING CHUCKS & COLLETS

|   |        |
|---|--------|
| Tapping Chuck & Collets Index . . . . . | G62    |
| Tapping Chucks . . . . .                | G63-65 |
| Tap Collets, Reducers & Sets . . . . .  | G65    |
| Synchrize Tapping System . . . . .      | G66-67 |
| Tapping Heads . . . . .                 | G68    |
| Air Tapping Units . . . . .             | G68    |

## DRILL CHUCKS & TAP ADAPTERS

|   |                |
|---|----------------|
| Drill Chuck & Taper Adapter Index . . . . . | G69            |
| Drill Chucks . . . . .                      | G70-74         |
| Taper Adapters & Arbors . . . . .           | G72-73, G78-81 |
| Lathe Mandrels . . . . .                    | G81            |
| Annular Cutter Holders . . . . .            | G81            |
| Taper Dimensions . . . . .                  | G82-83         |

## BORING HEADS

|                                       |        |
|---------------------------------------|--------|
| Narex Boring & Facing Heads . . . . . | G84-89 |
| Precision Boring Heads . . . . .      | G89    |

## MISC

|   |     |
|---|-----|
| Height Presetters . . . . .               | G90 |
| Touch Point Sensors . . . . .             | G90 |
| NC/CNC Trolley . . . . .                  | G90 |
| Draw Bar for Bridgeport Machine . . . . . | G90 |
| Tool Locks . . . . .                      | G91 |
| Spindle Taper Wipers . . . . .            | G91 |

**SOWA NOW HAS TWO HOLDER OPTIONS:**



**Which one works best for your application?**

**NEW**

**STM PREMIUM**

The perfect economic tooling solution for general purpose machining applications.

**VS**

**GS TOOLING**

Superior tooling performance when speed and accuracy matter most.

|  |                         |  |
|--|-------------------------|--|
| 42CrMo   | <b>Material Grade</b>   | 16NiCr4 (Premium European Alloy Steel)   |
| AT3 or better (0.00024-0.00036in/ft)   | <b>Taper Accuracy</b>   | AT2 or better (0.00012-0.00024in/ft)   |
| 0.0002"  | <b>Runout Accuracy</b>  | 0.0001"  |
| CAT40 End Mill Holders: Balanced to G2.5 / 8,000rpm<br>CAT50 End Mill Holders: Balanced to G2.5 / 6,000rpm | <b>Balance</b>          | CAT40 End Mill Holders: Balanced to G6.3 / 30,000rpm<br>CAT50 End Mill Holders: Balanced to G6.3 / 25,000rpm |
| CAT40 Collet Chucks: Balanced to G2.5 / 20,000rpm<br>CAT50 Collet Chucks: Balanced to G2.5 / 15,000rpm     | <b>Coolant Features</b> | CAT40 Collet Chucks: Balanced to G2.5 / 30,000rpm<br>CAT50 Collet Chucks: Balanced to G2.5 / 25,000rpm       |
| AD/B DIN coolant through flange  | <b>Thread Tolerance</b> | AD/B DIN coolant through flange  |
| H6 = basic plus 0.0025-0.0030" (standard class of fit)   | <b>SKU Offering</b>     | H4 = basic plus 0.0015-0.0020" (premium class of fit)  |
| Limited to the most popular items  |                         | Wide selection   |



# End Mill Holders

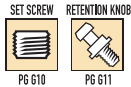
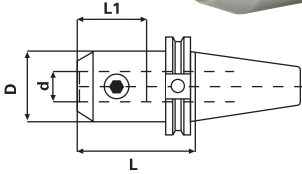
|  |     |
|--|-----|
| CAT40 End Mill Holders . . . . .                         | G4  |
| CAT40 Dual Contact End Mill Holders . . . . .            | G5  |
| CAT40 Direct Coolant End Mill Holders . . . . .          | G5  |
| CAT50 End Mill Holders . . . . .                         | G6  |
| CAT50 Dual Contact End Mill Holders . . . . .            | G6  |
| CAT50 Direct Coolant End Mill Holders . . . . .          | G7  |
| BT30 End Mill Holders . . . . .                          | G7  |
| BT30 Direct Coolant End Mill Holders . . . . .           | G7  |
| BT40 End Mill Holders . . . . .                          | G8  |
| BT40 Direct Coolant End Mill Holders . . . . .           | G8  |
| BT50 End Mill Holders . . . . .                          | G8  |
| HSK63A End Mill Holders . . . . .                        | G9  |
| HSK100A End Mill Holders . . . . .                       | G9  |
| NMTB40 End Mill Holders . . . . .                        | G9  |
| NMTB50 End Mill Holders . . . . .                        | G9  |
| R8 End Mill Holders . . . . .                            | G10 |
| Straight Shank End Mill Holders . . . . .                | G10 |
| Blank Bars . . . . .                                     | G10 |
| Replacement Set Screws . . . . .                         | G10 |
| HSK Coolant Tubes & Coolant Tube Wrenches . . . . .      | G10 |
| Replacement O-Rings For Direct Coolant Holders . . . . . | G10 |
| Retention Knobs . . . . .                                | G11 |



## CAT40 End Mill Holders



- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT40  | 1/8           | 1.35*            | 0.59 | 0.75 | 8-32      | 531069   | 166.61   |
| CT40  | 1/8           | 2.50             | 0.59 | 0.75 | 8-32      | 531070   | 142.88   |
| CT40  | 1/8           | 4.00             | 0.59 | 0.75 | 8-32      | 531071   | 218.37   |
| CT40  | 3/16          | 1.38*            | 0.79 | 0.75 | 10-32     | 531072   | 166.61   |
| CT40  | 3/16          | 2.50             | 0.79 | 0.75 | 10-32     | 531073   | 142.88   |
| CT40  | 3/16          | 4.00             | 0.79 | 0.75 | 10-32     | 531074   | 218.37   |
| CT40  | 1/4           | 1.38*            | 1.18 | 0.79 | 1/4-28    | 531000   | 147.17   |
| CT40  | 1/4           | 2.50             | 1.18 | 0.79 | 1/4-28    | 531002   | 142.88   |
| CT40  | 1/4           | 4.00             | 1.18 | 0.79 | 1/4-28    | 531004   | 147.17   |
| CT40  | 1/4           | 9.00             | 1.18 | 0.79 | 1/4-28    | 531005   | 312.39   |
| CT40  | 5/16          | 1.38*            | 1.18 | 0.87 | 5/16-24   | 531006   | 147.17   |
| CT40  | 5/16          | 2.50             | 1.18 | 0.87 | 5/16-24   | 531008   | 142.88   |
| CT40  | 5/16          | 4.00             | 1.18 | 0.87 | 5/16-24   | 531010   | 147.17   |
| CT40  | 5/16          | 9.00             | 1.18 | 0.87 | 5/16-24   | 531011   | 312.39   |
| CT40  | 3/8           | 1.38*            | 1.57 | 1.00 | 3/8-24    | 531012   | 147.17   |
| CT40  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 531014   | 142.88   |
| CT40  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 531016   | 142.88   |
| CT40  | 3/8           | 5.00             | 1.57 | 1.00 | 3/8-24    | 531018   | 267.95   |
| CT40  | 3/8           | 9.00             | 1.57 | 1.00 | 3/8-24    | 531031   | 312.39   |
| CT40  | 7/16          | 2.50             | 1.50 | 1.38 | 7/16-20   | 531020   | 147.17   |
| CT40  | 7/16          | 4.00             | 1.50 | 1.38 | 7/16-20   | 531022   | 147.17   |
| CT40  | 7/16          | 9.00             | 1.50 | 1.38 | 7/16-20   | 531033   | 312.39   |
| CT40  | 1/2           | 1.75*            | 2.56 | 1.38 | 7/16-20   | 531024   | 142.88   |
| CT40  | 1/2           | 2.50             | 2.56 | 1.38 | 7/16-20   | 531026   | 147.17   |
| CT40  | 1/2           | 4.00             | 2.56 | 1.38 | 7/16-20   | 531028   | 186.02   |
| CT40  | 1/2           | 5.00             | 3.07 | 1.38 | 7/16-20   | 531030   | 229.08   |
| CT40  | 1/2           | 9.00             | 2.56 | 1.38 | 7/16-20   | 531035   | 312.39   |
| CT40  | 5/8           | 1.75*            | 1.97 | 1.65 | 9/16-18   | 531032   | 142.88   |
| CT40  | 5/8           | 3.00             | 2.76 | 1.65 | 9/16-18   | 531034   | 142.88   |
| CT40  | 5/8           | 4.00             | 2.76 | 1.65 | 9/16-18   | 531036   | 166.61   |
| CT40  | 5/8           | 5.50             | 2.76 | 1.65 | 9/16-18   | 531038   | 212.43   |
| CT40  | 5/8           | 9.00             | 3.50 | 1.65 | 9/16-18   | 531037   | 312.39   |
| CT40  | 3/4           | 1.75*            | 2.01 | 1.89 | 5/8-18    | 531040   | 147.17   |
| CT40  | 3/4           | 3.00             | 2.56 | 1.75 | 5/8-18    | 531042   | 147.17   |
| CT40  | 3/4           | 4.00             | 2.56 | 1.75 | 5/8-18    | 531044   | 166.61   |
| CT40  | 3/4           | 5.50             | 2.56 | 1.75 | 5/8-18    | 531046   | 199.93   |
| CT40  | 3/4           | 9.00             | 3.86 | 1.75 | 5/8-18    | 531039   | 312.39   |
| CT40  | 7/8           | 1.75*            | 2.17 | 1.94 | 5/8-18    | 531048   | 166.61   |
| CT40  | 7/8           | 3.50             | 3.15 | 2.00 | 5/8-18    | 531050   | 166.61   |
| CT40  | 7/8           | 6.00             | 4.22 | 2.00 | 5/8-18    | 531052   | 231.86   |
| CT40  | 7/8           | 9.00             | 4.22 | 2.00 | 5/8-18    | 531041   | 354.04   |
| CT40  | 1             | 2.00*            | 2.32 | 2.25 | 3/4-16    | 531054   | 161.76   |
| CT40  | 1             | 4.00             | 3.54 | 2.36 | 3/4-16    | 531056   | 161.76   |
| CT40  | 1             | 6.00             | 3.54 | 2.36 | 3/4-16    | 531058   | 231.86   |
| CT40  | 1             | 9.00             | 4.50 | 2.36 | 3/4-16    | 531043   | 409.58   |
| CT40  | 1-1/4         | 2.00*            | 2.44 | 2.25 | 3/4-16    | 531060‡  | 176.58   |
| CT40  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 531062   | 181.88   |
| CT40  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 531064   | 258.24   |
| CT40  | 1-1/2         | 4.50             | 2.95 | 2.99 | 3/4-16    | 531066   | 208.26   |
| CT40  | 1-1/2         | 6.00             | 3.20 | 2.99 | 3/4-16    | 531068   | 270.75   |

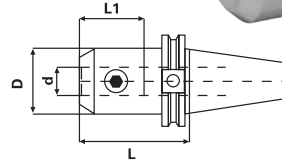
\* Stubby Length

‡ Not DIN Coolant

## STM CAT40 End Mill Holders



- DIN coolant option - standard
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0002" OD to ID
- RFID chip hole



**BALANCE CERTIFICATE**  
**G2.5 at 8,000rpm**  
**INCLUDED**

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT40  | 1/8           | 2.50             | 0.63 | 0.75 | 8-32      | 525070   | 87.68    |
| CT40  | 1/8           | 4.00             | 0.63 | 0.75 | 8-32      | 525071   | 87.68    |
| CT40  | 3/16          | 2.50             | 0.86 | 0.75 | 10-32     | 525073   | 87.68    |
| CT40  | 3/16          | 4.00             | 0.86 | 0.75 | 10-32     | 525074   | 87.68    |
| CT40  | 1/4           | 2.50             | 1.10 | 0.79 | 1/4-28    | 525002   | 87.68    |
| CT40  | 1/4           | 4.00             | 1.10 | 0.79 | 1/4-28    | 525004   | 87.68    |
| CT40  | 5/16          | 2.50             | 1.26 | 0.87 | 5/16-24   | 525008   | 87.68    |
| CT40  | 3/8           | 2.50             | 1.26 | 1.00 | 3/8-24    | 525014   | 87.68    |
| CT40  | 3/8           | 4.00             | 1.26 | 1.00 | 3/8-24    | 525016   | 87.68    |
| CT40  | 1/2           | 1.75*            | 1.50 | 1.38 | 7/16-20   | 525024   | 87.68    |
| CT40  | 1/2           | 2.50             | 1.50 | 1.38 | 7/16-20   | 525026   | 87.68    |
| CT40  | 1/2           | 4.00             | 1.50 | 1.38 | 7/16-20   | 525028   | 87.68    |
| CT40  | 5/8           | 1.75*            | 1.61 | 1.65 | 9/16-18   | 525032   | 87.68    |
| CT40  | 5/8           | 3.00             | 1.61 | 1.65 | 9/16-18   | 525034   | 87.68    |
| CT40  | 3/4           | 1.75*            | 1.77 | 1.89 | 5/8-18    | 525040   | 87.68    |
| CT40  | 3/4           | 3.00             | 1.77 | 1.75 | 5/8-18    | 525042   | 87.68    |
| CT40  | 1             | 2.00*            | 2.36 | 2.25 | 3/4-16    | 525054   | 87.68    |
| CT40  | 1             | 4.00             | 2.36 | 2.36 | 3/4-16    | 525056   | 87.68    |
| CT40  | 1-1/4         | 2.00*            | 2.28 | 2.25 | 3/4-16    | 525060‡  | 87.68    |

\* Stubby Length

‡ Not DIN Coolant

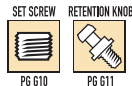
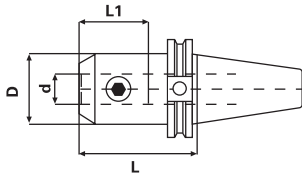
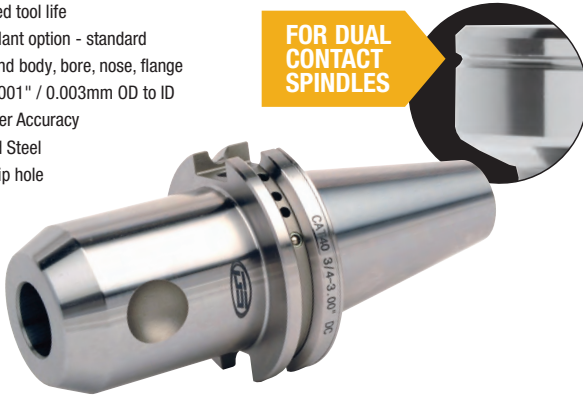


## CAT40 DUAL CONTACT End Mill Holders



- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

FOR DUAL CONTACT SPINDLES



PREMIUM BALANCE  
G6.3 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT40  | 1/2           | 2.50             | 2.56 | 1.38 | 7/16-20   | 521026   | 195.50   |
| CT40  | 1/2           | 4.00             | 2.56 | 1.38 | 7/16-20   | 521028   | 195.50   |
| CT40  | 1/2           | 5.00             | 2.56 | 1.38 | 7/16-20   | 521030   | 244.38   |
| CT40  | 5/8           | 3.00             | 3.50 | 1.65 | 9/16-18   | 521034   | 213.39   |
| CT40  | 5/8           | 4.00             | 3.50 | 1.65 | 9/16-18   | 521036   | 240.79   |
| CT40  | 5/8           | 5.50             | 3.50 | 1.65 | 9/16-18   | 521038   | 262.26   |
| CT40  | 3/4           | 3.00             | 3.86 | 1.75 | 5/8-18    | 521042   | 219.34   |
| CT40  | 3/4           | 4.00             | 3.86 | 1.75 | 5/8-18    | 521044   | 219.34   |
| CT40  | 3/4           | 5.50             | 3.86 | 1.75 | 5/8-18    | 521046   | 348.08   |
| CT40  | 1             | 2.00             | 2.36 | 2.36 | 3/4-16    | 521054   | 241.99   |
| CT40  | 1             | 4.00             | 4.21 | 2.36 | 3/4-16    | 521056   | 241.99   |
| CT40  | 1             | 6.00             | 4.21 | 2.36 | 3/4-16    | 521058   | 417.22   |
| CT40  | 1-1/4         | 2.00*            | 2.36 | 2.25 | 3/4-16    | 521060‡  | 246.76   |
| CT40  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 521062   | 246.76   |
| CT40  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 521064   | 417.22   |
| CT40  | 1-1/2         | 4.50             | 2.95 | 2.99 | 3/4-16    | 521066   | 268.21   |

\* Stubby Length

‡ Not DIN Coolant

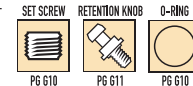
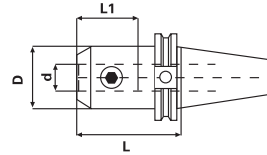
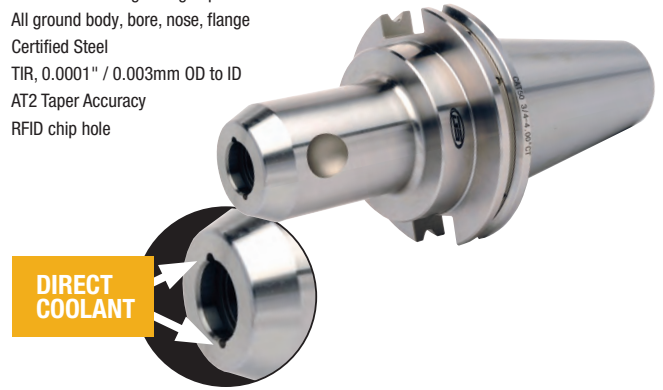
## CAT40 DIRECT COOLANT End Mill Holders



### NOW 3 COOLANT OPTIONS ALL IN ONE!

- Coolant through the spindle and body
- DIN coolant through flange option
- All ground body, bore, nose, flange
- Certified Steel
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- RFID chip hole

DIRECT COOLANT



PREMIUM BALANCE  
G6.3 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT40  | 1/4           | 1.38*            | 1.18 | 0.79 | 1/4-28    | 522014   | 201.95   |
| CT40  | 1/4           | 2.50             | 1.18 | 0.79 | 1/4-28    | 522016   | 201.95   |
| CT40  | 1/4           | 4.00             | 1.18 | 0.79 | 1/4-28    | 522018   | 274.65   |
| CT40  | 5/16          | 1.38*            | 1.18 | 0.87 | 5/16-24   | 522022   | 201.95   |
| CT40  | 5/16          | 2.50             | 1.18 | 0.87 | 5/16-24   | 522024   | 201.95   |
| CT40  | 5/16          | 4.00             | 1.18 | 0.87 | 5/16-24   | 522026   | 274.65   |
| CT40  | 3/8           | 1.38*            | 1.57 | 1.00 | 3/8-24    | 522030   | 201.95   |
| CT40  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 522032   | 201.95   |
| CT40  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 522034   | 274.65   |
| CT40  | 3/8           | 5.00             | 1.57 | 1.00 | 3/8-24    | 522036   | 316.39   |
| CT40  | 1/2           | 1.75*            | 2.56 | 1.38 | 7/16-20   | 522046   | 201.95   |
| CT40  | 1/2           | 2.50             | 2.56 | 1.38 | 7/16-20   | 522048   | 201.95   |
| CT40  | 1/2           | 4.00             | 2.56 | 1.38 | 7/16-20   | 522050   | 274.65   |
| CT40  | 1/2           | 5.00             | 2.56 | 1.38 | 7/16-20   | 522052   | 346.01   |
| CT40  | 5/8           | 1.75*            | 2.72 | 1.65 | 9/16-18   | 522056   | 201.95   |
| CT40  | 5/8           | 3.00             | 2.56 | 1.65 | 9/16-18   | 522058   | 201.95   |
| CT40  | 5/8           | 4.00             | 2.56 | 1.65 | 9/16-18   | 522060   | 201.95   |
| CT40  | 3/4           | 1.75*            | 2.56 | 1.89 | 5/8-18    | 522066   | 201.95   |
| CT40  | 3/4           | 3.00             | 2.56 | 1.75 | 5/8-18    | 522068   | 201.95   |
| CT40  | 3/4           | 4.00             | 2.56 | 1.75 | 5/8-18    | 522070   | 274.65   |
| CT40  | 3/4           | 5.50             | 2.56 | 1.75 | 5/8-18    | 522072   | 346.01   |
| CT40  | 1             | 2.00*            | 2.36 | 2.25 | 3/4-16    | 522080   | 201.95   |
| CT40  | 1             | 4.00             | 3.54 | 2.36 | 3/4-16    | 522082   | 201.95   |
| CT40  | 1-1/4         | 2.00*            | 2.44 | 2.25 | 3/4-16    | 522088   | 201.95   |
| CT40  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 522090   | 235.61   |
| CT40  | 1-1/2         | 4.50             | 2.95 | 2.99 | 3/4-16    | 522094   | 242.35   |

\* Stubby Length

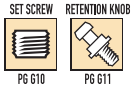
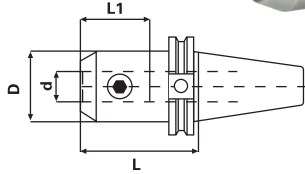
Spindle Taper Wipers  
Clean spindle holes easily  
and quickly!

See Page G91

## CAT50 End Mill Holders



- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**

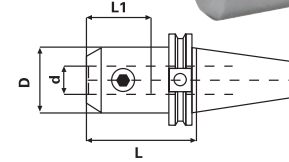
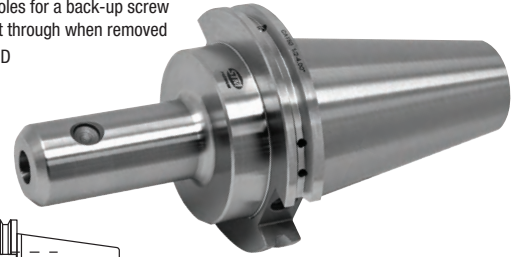
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT50  | 1/4           | 1.38*            | 0.71 | 0.79 | 1/4-28    | 531082   | 194.37   |
| CT50  | 1/4           | 2.50             | 1.18 | 0.79 | 1/4-28    | 531084   | 194.37   |
| CT50  | 1/4           | 4.00             | 1.18 | 0.79 | 1/4-28    | 531086   | 224.92   |
| CT50  | 1/4           | 6.00             | 1.18 | 0.79 | 1/4-28    | 531088   | 254.07   |
| CT50  | 1/4           | 8.00             | 1.18 | 0.79 | 1/4-28    | 531090   | 338.77   |
| CT50  | 5/16          | 2.50             | 1.18 | 0.87 | 5/16-24   | 531092   | 194.37   |
| CT50  | 5/16          | 4.00             | 1.18 | 0.87 | 5/16-24   | 531094   | 224.92   |
| CT50  | 5/16          | 6.00             | 1.18 | 0.87 | 5/16-24   | 531096   | 254.07   |
| CT50  | 3/8           | 1.38*            | 1.57 | 1.00 | 3/8-24    | 531098   | 194.37   |
| CT50  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 531100   | 194.37   |
| CT50  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 531102   | 224.92   |
| CT50  | 3/8           | 6.00             | 1.57 | 1.00 | 3/8-24    | 531104   | 254.07   |
| CT50  | 3/8           | 8.00             | 1.57 | 1.00 | 3/8-24    | 531106   | 297.12   |
| CT50  | 3/8           | 14.00            | 1.57 | 1.00 | 3/8-24    | 531107   | 909.40   |
| CT50  | 7/16          | 2.50             | 1.50 | 1.38 | 7/16-20   | 531108   | 194.37   |
| CT50  | 7/16          | 4.00             | 1.50 | 1.38 | 7/16-20   | 531110   | 224.92   |
| CT50  | 7/16          | 6.00             | 1.50 | 1.38 | 7/16-20   | 531112   | 258.24   |
| CT50  | 7/16          | 14.00            | 1.48 | 1.38 | 7/16-20   | 531113   | 909.40   |
| CT50  | 1/2           | 1.75*            | 1.50 | 1.38 | 7/16-20   | 531116   | 194.37   |
| CT50  | 1/2           | 2.63             | 1.77 | 1.38 | 7/16-20   | 531118   | 194.37   |
| CT50  | 1/2           | 4.00             | 1.77 | 1.38 | 7/16-20   | 531120   | 218.37   |
| CT50  | 1/2           | 6.00             | 1.77 | 1.38 | 7/16-20   | 531122   | 258.24   |
| CT50  | 1/2           | 8.00             | 1.77 | 1.38 | 7/16-20   | 531124   | 297.12   |
| CT50  | 1/2           | 14.00            | 1.77 | 1.38 | 7/16-20   | 531125   | 909.40   |
| CT50  | 9/16          | 6.00             | 1.77 | 1.65 | 9/16-18   | 531133   | 258.24   |
| CT50  | 5/8           | 1.75*            | 1.73 | 1.65 | 9/16-18   | 531126   | 224.92   |
| CT50  | 5/8           | 3.00             | 1.77 | 1.65 | 9/16-18   | 531128   | 224.92   |
| CT50  | 5/8           | 4.00             | 1.77 | 1.65 | 9/16-18   | 531130   | 224.92   |
| CT50  | 5/8           | 6.00             | 1.77 | 1.65 | 9/16-18   | 531132   | 258.24   |
| CT50  | 5/8           | 8.00             | 1.77 | 1.65 | 9/16-18   | 531134   | 297.12   |
| CT50  | 5/8           | 14.00            | 1.57 | 1.65 | 9/16-18   | 531131   | 909.40   |
| CT50  | 3/4           | 1.75*            | 2.76 | 1.89 | 5/8-18    | 531136   | 224.92   |
| CT50  | 3/4           | 3.00             | 2.76 | 1.89 | 5/8-18    | 531138   | 224.92   |
| CT50  | 3/4           | 4.00             | 2.76 | 1.89 | 5/8-18    | 531140   | 224.92   |
| CT50  | 3/4           | 6.00             | 2.76 | 1.89 | 5/8-18    | 531142   | 258.24   |
| CT50  | 3/4           | 8.00             | 2.76 | 1.89 | 5/8-18    | 531144   | 297.12   |
| CT50  | 3/4           | 14.00            | 3.86 | 1.89 | 5/8-18    | 531145   | 909.40   |
| CT50  | 7/8           | 1.75*            | 3.15 | 2.00 | 5/8-18    | 531146   | 224.92   |
| CT50  | 7/8           | 3.75             | 3.15 | 2.00 | 5/8-18    | 531148   | 224.92   |
| CT50  | 1             | 2.00*            | 2.32 | 2.36 | 3/4-16    | 531152   | 224.92   |
| CT50  | 1             | 4.00             | 3.54 | 2.36 | 3/4-16    | 531154   | 218.37   |
| CT50  | 1             | 6.00             | 3.54 | 2.36 | 3/4-16    | 531156   | 231.86   |
| CT50  | 1             | 8.00             | 3.54 | 2.36 | 3/4-16    | 531158   | 269.36   |
| CT50  | 1-1/4         | 2.00*            | 2.56 | 2.75 | 3/4-16    | 531160   | 224.92   |
| CT50  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 531162   | 230.47   |
| CT50  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 531164   | 267.95   |
| CT50  | 1-1/4         | 8.00             | 3.54 | 2.48 | 3/4-16    | 531166   | 308.23   |
| CT50  | 1-1/2         | 2.25*            | 2.83 | 2.75 | 3/4-16    | 531168   | 230.47   |
| CT50  | 1-1/2         | 4.50             | 3.15 | 2.99 | 3/4-16    | 531170   | 230.47   |
| CT50  | 1-1/2         | 7.00             | 3.15 | 2.99 | 3/4-16    | 531172   | 416.52   |
| CT50  | 1-1/2         | 9.00             | 3.15 | 2.99 | 3/4-16    | 531174   | 715.03   |
| CT50  | 2             | 3.63*            | 3.66 | 3.74 | 1-14      | 531176   | 319.33   |
| CT50  | 2             | 5.37             | 4.13 | 3.74 | 1-14      | 531178   | 381.81   |
| CT50  | 2             | 8.00             | 4.13 | 3.74 | 1-14      | 531180   | 708.08   |
| CT50  | 2             | 10.00            | 4.13 | 3.74 | 1-14      | 531182   | 715.03   |
| CT50  | 2-1/2         | 6.00             | 3.94 | 4.25 | 1-14      | 531184   | 430.41   |

\* Stubby Length

## STM CAT50 End Mill Holders



- DIN coolant option - standard
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0002" OD to ID
- RFID chip hole



**BALANCE CERTIFICATE**  
**G6.5 at 6,000rpm**  
**INCLUDED**

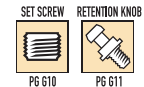
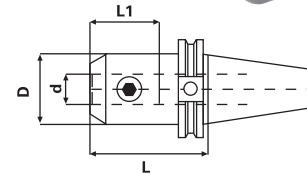
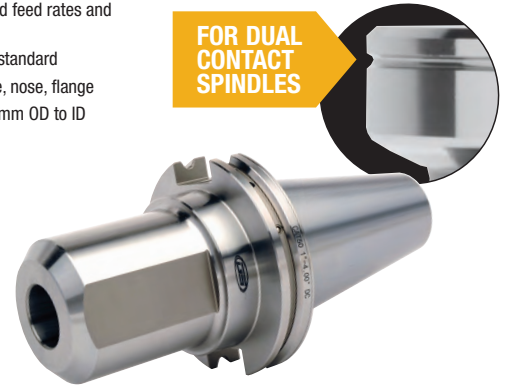
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT50  | 1/2           | 4.00             | 1.50 | 1.38 | 7/16-20   | 525120   | 110.37   |
| CT50  | 3/4           | 4.00             | 1.77 | 1.89 | 5/8-18    | 525140   | 110.37   |
| CT50  | 1             | 4.00             | 2.36 | 2.36 | 3/4-16    | 525154   | 133.06   |
| CT50  | 1-1/4         | 4.00             | 2.55 | 2.48 | 3/4-16    | 525162   | 133.06   |

## CAT50 DUAL CONTACT End Mill Holders



- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

**FOR DUAL CONTACT SPINDLES**



**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**

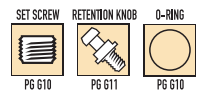
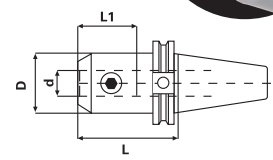
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT50  | 1/2           | 4.00             | 1.77 | 1.38 | 7/16-20   | 521120   | 345.70   |
| CT50  | 1/2           | 6.00             | 1.77 | 1.38 | 7/16-20   | 521122   | 342.11   |
| CT50  | 5/8           | 4.00             | 1.77 | 1.65 | 9/16-18   | 521130   | 333.78   |
| CT50  | 5/8           | 6.00             | 1.77 | 1.65 | 9/16-18   | 521132   | 417.22   |
| CT50  | 3/4           | 3.00             | 3.86 | 1.89 | 5/8-18    | 521138   | 321.85   |
| CT50  | 3/4           | 4.00             | 3.86 | 1.89 | 5/8-18    | 521140   | 339.74   |
| CT50  | 3/4           | 6.00             | 3.86 | 1.89 | 5/8-18    | 521142   | 345.70   |
| CT50  | 1             | 4.00             | 4.21 | 2.36 | 3/4-16    | 521154   | 345.70   |
| CT50  | 1             | 6.00             | 4.21 | 2.36 | 3/4-16    | 521156   | 352.85   |
| CT50  | 1             | 8.00             | 4.21 | 2.36 | 3/4-16    | 521158   | 405.31   |
| CT50  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 521162   | 369.54   |
| CT50  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 521164   | 374.31   |
| CT50  | 1-1/4         | 8.00             | 3.54 | 2.48 | 3/4-16    | 521166   | 423.19   |
| CT50  | 1-1/2         | 4.50             | 3.15 | 2.99 | 3/4-16    | 521170   | 369.54   |
| CT50  | 1-1/2         | 7.00             | 3.15 | 2.99 | 3/4-16    | 521172   | 610.34   |
| CT50  | 2             | 5.37             | 4.13 | 3.74 | 1-14      | 521178   | 399.34   |

## CAT50 DIRECT COOLANT End Mill Holders



### NOW 3 COOLANT OPTIONS ALL IN ONE!

- Coolant through the spindle
- DIN coolant through flange option
- Coolant through the body
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**

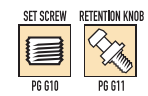
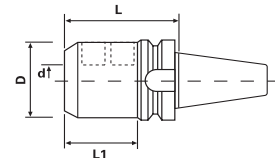
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| CT50  | 1/4           | 2.50             | 1.18 | 0.79 | 1/4-28    | 522102   | 246.38   |
| CT50  | 1/4           | 4.00             | 1.18 | 0.79 | 1/4-28    | 522104   | 292.15   |
| CT50  | 5/16          | 4.00             | 1.26 | 0.87 | 5/16-24   | 522112   | 292.15   |
| CT50  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 522118   | 246.38   |
| CT50  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 522120   | 292.15   |
| CT50  | 3/8           | 6.00             | 1.57 | 1.00 | 3/8-24    | 522122   | 321.77   |
| CT50  | 3/8           | 8.00             | 1.26 | 1.00 | 3/8-24    | 522124   | 360.82   |
| CT50  | 7/16          | 4.00             | 1.50 | 1.38 | 7/16-20   | 522130   | 292.15   |
| CT50  | 1/2           | 1.75*            | 1.50 | 1.38 | 7/16-20   | 522134   | 246.38   |
| CT50  | 1/2           | 2.63             | 1.77 | 1.38 | 7/16-20   | 522136   | 246.38   |
| CT50  | 1/2           | 4.00             | 1.77 | 1.38 | 7/16-20   | 522138   | 302.92   |
| CT50  | 1/2           | 6.00             | 1.77 | 1.38 | 7/16-20   | 522140   | 315.04   |
| CT50  | 1/2           | 8.00             | 1.48 | 1.38 | 7/16-20   | 522142   | 360.82   |
| CT50  | 5/8           | 1.75*            | 1.77 | 1.65 | 9/16-18   | 522148   | 246.38   |
| CT50  | 5/8           | 3.00             | 1.77 | 1.65 | 9/16-18   | 522150   | 276.00   |
| CT50  | 5/8           | 4.00             | 1.77 | 1.65 | 9/16-18   | 522152   | 315.04   |
| CT50  | 5/8           | 6.00             | 1.61 | 1.65 | 9/16-18   | 522154   | 315.04   |
| CT50  | 3/4           | 1.75*            | 2.76 | 1.89 | 5/8-18    | 522158   | 276.00   |
| CT50  | 3/4           | 3.00             | 2.76 | 1.89 | 5/8-18    | 522160   | 276.00   |
| CT50  | 3/4           | 4.00             | 2.76 | 1.89 | 5/8-18    | 522162   | 315.04   |
| CT50  | 3/4           | 6.00             | 2.76 | 1.89 | 5/8-18    | 522164   | 315.04   |
| CT50  | 3/4           | 8.00             | 2.76 | 1.89 | 5/8-18    | 522166   | 360.82   |
| CT50  | 1             | 2.00*            | 2.32 | 2.36 | 3/4-16    | 522176   | 276.00   |
| CT50  | 1             | 4.00             | 3.54 | 2.36 | 3/4-16    | 522178   | 315.04   |
| CT50  | 1             | 6.00             | 3.54 | 2.36 | 3/4-16    | 522180   | 315.04   |
| CT50  | 1             | 8.00             | 3.54 | 2.36 | 3/4-16    | 522182   | 325.81   |
| CT50  | 1             | 12.00            | 2.36 | 2.36 | 3/4-16    | 522183   | 818.24   |
| CT50  | 1-1/4         | 2.00*            | 2.56 | 2.75 | 3/4-16    | 522186   | 276.00   |
| CT50  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 522188   | 321.77   |
| CT50  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 522190   | 325.81   |
| CT50  | 1-1/2         | 2.25*            | 2.83 | 2.75 | 3/4-16    | 522196   | 276.00   |
| CT50  | 1-1/2         | 4.50             | 3.15 | 2.99 | 3/4-16    | 522198   | 337.93   |
| CT50  | 2             | 3.63*            | 3.66 | 3.74 | 1-14      | 522204   | 321.77   |
| CT50  | 2             | 5.37             | 4.13 | 3.74 | 1-14      | 522206   | 337.93   |
| CT50  | 2             | 8.00             | 4.13 | 3.74 | 1-14      | 522208   | 787.60   |
| CT50  | 2             | 10.00            | 4.13 | 3.74 | 1-14      | 522210   | 875.12   |

\* Stubby Length

## BT30 End Mill Holders



- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

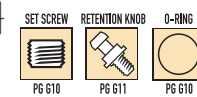
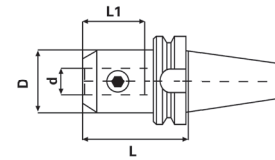
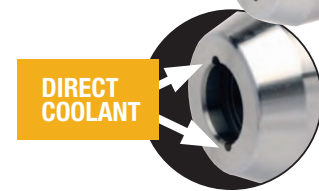
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| BT30  | 1/8           | 2.36             | 0.59 | 0.75 | 8-32      | 532001   | 143.01   |
| BT30  | 3/16          | 2.36             | 0.79 | 0.75 | 10-32     | 532003   | 143.01   |
| BT30  | 1/4           | 2.36             | 1.18 | 0.79 | 1/4-28    | 532000   | 143.01   |
| BT30  | 5/16          | 2.36             | 1.18 | 0.87 | 5/16-24   | 532002   | 143.01   |
| BT30  | 3/8           | 2.36             | 1.18 | 1.00 | 3/8-24    | 532004   | 143.01   |
| BT30  | 7/16          | 2.36             | 1.50 | 1.38 | 7/16-20   | 532006   | 143.01   |
| BT30  | 1/2           | 2.36             | 2.95 | 1.38 | 7/16-20   | 532008   | 143.01   |
| BT30  | 5/8           | 2.50             | 1.61 | 1.65 | 9/16-18   | 532010   | 143.01   |
| BT30  | 3/4           | 3.00             | 1.77 | 1.88 | 5/8-18    | 532012   | 143.01   |
| BT30  | 7/8           | 3.54             | 2.09 | 2.00 | 5/8-18    | 532014   | 159.66   |
| BT30  | 1             | 3.54             | 2.32 | 2.36 | 3/4-16    | 532016   | 159.66   |

## BT30 DIRECT COOLANT End Mill Holders



### NOW 2 COOLANT OPTIONS ALL IN ONE!

- Coolant through the spindle
- Coolant through the body
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

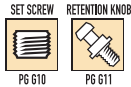
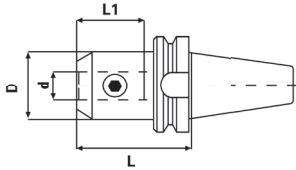
| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| BT30  | 1/4           | 2.36             | 1.10 | 0.79 | 1/4-28    | 522218   | 157.79   |
| BT30  | 5/16          | 2.36             | 1.26 | 0.87 | 5/16-24   | 522220   | 157.79   |
| BT30  | 3/8           | 2.36             | 1.26 | 1.00 | 3/8-24    | 522222   | 157.79   |
| BT30  | 1/2           | 2.36             | 1.50 | 1.38 | 7/16-20   | 522224   | 157.79   |
| BT30  | 3/4           | 3.00             | 1.77 | 1.88 | 5/8-18    | 522228   | 157.79   |

Tool Holding

## BT40 End Mill Holders



- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| BT40  | 1/8           | 1.38*            | 0.59 | 1.75 | 8-32      | 531019   | 147.17   |
| BT40  | 1/8           | 2.50             | 0.59 | 0.75 | 8-32      | 531021   | 177.72   |
| BT40  | 1/8           | 4.00             | 0.59 | 0.75 | 8-32      | 531023   | 224.92   |
| BT40  | 3/16          | 1.38*            | 0.79 | 0.75 | 10-32     | 531025   | 147.17   |
| BT40  | 3/16          | 2.50             | 0.79 | 0.75 | 10-32     | 531027   | 177.72   |
| BT40  | 3/16          | 4.00             | 0.79 | 0.75 | 10-32     | 531029   | 224.92   |
| BT40  | 1/4           | 1.38*            | 1.18 | 0.79 | 1/4-28    | 532018   | 177.72   |
| BT40  | 1/4           | 2.50             | 1.18 | 0.79 | 1/4-28    | 532020   | 177.72   |
| BT40  | 1/4           | 4.00             | 1.18 | 0.79 | 1/4-28    | 532022   | 224.92   |
| BT40  | 5/16          | 1.38*            | 1.18 | 0.87 | 5/16-24   | 532024   | 177.72   |
| BT40  | 5/16          | 2.50             | 1.18 | 0.87 | 5/16-24   | 532026   | 177.72   |
| BT40  | 5/16          | 4.00             | 1.18 | 0.87 | 5/16-24   | 532028   | 224.92   |
| BT40  | 3/8           | 1.38*            | 1.57 | 1.00 | 3/8-24    | 532030   | 177.72   |
| BT40  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 532032   | 177.72   |
| BT40  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 532034   | 224.92   |
| BT40  | 7/16          | 2.50             | 1.50 | 1.38 | 7/16-20   | 532036   | 177.72   |
| BT40  | 1/2           | 1.75*            | 1.50 | 1.38 | 7/16-20   | 532038   | 177.72   |
| BT40  | 1/2           | 2.50             | 2.56 | 1.38 | 7/16-20   | 532040   | 177.72   |
| BT40  | 1/2           | 4.00             | 2.56 | 1.38 | 7/16-20   | 532042   | 224.92   |
| BT40  | 5/8           | 1.75*            | 1.97 | 1.65 | 9/16-18   | 532044   | 177.72   |
| BT40  | 5/8           | 2.50             | 2.76 | 1.65 | 9/16-18   | 532046   | 177.72   |
| BT40  | 5/8           | 4.00             | 3.50 | 1.65 | 9/16-18   | 532048   | 224.92   |
| BT40  | 3/4           | 1.75*            | 2.01 | 1.89 | 5/8-18    | 532050   | 177.72   |
| BT40  | 3/4           | 2.50             | 2.56 | 1.89 | 5/8-18    | 532052   | 177.72   |
| BT40  | 3/4           | 4.00             | 2.56 | 1.89 | 5/8-18    | 532054   | 224.92   |
| BT40  | 7/8           | 3.38             | 4.06 | 2.00 | 5/8-18    | 532056   | 230.47   |
| BT40  | 7/8           | 6.00             | 2.08 | 2.00 | 5/8-18    | 532058   | 238.81   |
| BT40  | 1             | 2.00*            | 2.32 | 2.25 | 3/4-16    | 532060   | 230.47   |
| BT40  | 1             | 3.56             | 3.54 | 2.36 | 3/4-16    | 532062   | 230.47   |
| BT40  | 1             | 6.00             | 3.54 | 2.36 | 3/4-16    | 532064   | 238.81   |
| BT40  | 1-1/4         | 2.00*            | 2.36 | 2.25 | 3/4-16    | 532066‡  | 238.81   |
| BT40  | 1-1/4         | 3.56             | 3.54 | 2.48 | 3/4-16    | 532068   | 238.81   |
| BT40  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 532070   | 291.56   |
| BT40  | 1-1/2         | 4.50             | 3.15 | 2.99 | 3/4-16    | 532072   | 238.81   |
| BT40  | 1-1/2         | 6.00             | 3.15 | 2.99 | 3/4-16    | 532074   | 291.56   |

\* Stubby Length

‡ Not DIN Coolant

## BT40 DIRECT COOLANT End Mill Holders

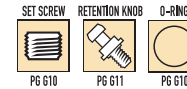
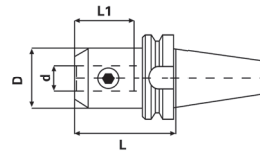


### NOW 3 COOLANT OPTIONS ALL IN ONE!

- Coolant through the spindle
- DIN coolant through flange option
- Coolant through the body
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



**DIRECT COOLANT**



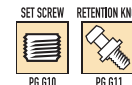
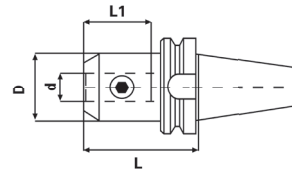
**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| BT40  | 1/4           | 4.00             | 1.10 | 0.79 | 1/4-28    | 522246   | 254.26   |
| BT40  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 522256   | 252.16   |
| BT40  | 3/8           | 4.00             | 1.57 | 1.00 | 3/8-24    | 522258   | 254.26   |
| BT40  | 1/2           | 2.50             | 2.56 | 1.38 | 7/16-20   | 522264   | 254.26   |
| BT40  | 1/2           | 4.00             | 2.56 | 1.38 | 7/16-20   | 522266   | 254.26   |
| BT40  | 3/4           | 2.50             | 2.56 | 1.89 | 5/8-18    | 522276   | 254.26   |
| BT40  | 3/4           | 4.00             | 2.56 | 1.89 | 5/8-18    | 522278   | 254.26   |
| BT40  | 1             | 2.00*            | 2.32 | 2.25 | 3/4-16    | 522282   | 252.16   |

## BT50 End Mill Holders



- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



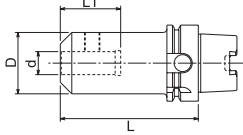
**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| BT50  | 3/8           | 2.50             | 1.57 | 1.00 | 3/8-24    | 532075   | 408.19   |
| BT50  | 3/8           | 5.31             | 1.57 | 1.00 | 3/8-24    | 532076   | 590.07   |
| BT50  | 1/2           | 2.75             | 1.77 | 1.38 | 7/16-20   | 532077   | 408.19   |
| BT50  | 1/2           | 5.31             | 1.77 | 1.38 | 7/16-20   | 532078   | 590.07   |
| BT50  | 5/8           | 3.00             | 1.77 | 1.65 | 9/16-18   | 532079   | 408.19   |
| BT50  | 5/8           | 5.31             | 1.77 | 1.65 | 9/16-18   | 532081   | 590.07   |
| BT50  | 3/4           | 3.00             | 2.76 | 1.75 | 5/8-18    | 532083   | 408.19   |
| BT50  | 3/4           | 6.00             | 3.82 | 1.75 | 5/8-18    | 532085   | 590.07   |
| BT50  | 1             | 4.00             | 4.21 | 2.36 | 3/4-16    | 532087   | 408.19   |
| BT50  | 1             | 6.00             | 3.54 | 2.36 | 3/4-16    | 532089   | 617.85   |
| BT50  | 1-1/4         | 4.00             | 3.54 | 2.48 | 3/4-16    | 532091   | 408.19   |
| BT50  | 1-1/4         | 6.00             | 3.54 | 2.48 | 3/4-16    | 532093   | 631.72   |
| BT50  | 1-1/2         | 4.13             | 3.15 | 2.99 | 3/4-16    | 532095   | 645.60   |
| BT50  | 1-1/2         | 7.00             | 3.15 | 2.99 | 3/4-16    | 532097   | 728.91   |
| BT50  | 2             | 4.72             | 4.13 | 3.86 | 1-14      | 532099   | 645.60   |

## HSK63A End Mill Holders



- High rigidity and torque transmission
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



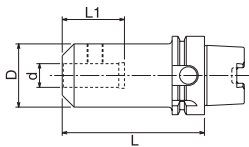
PREMIUM BALANCE  
G6.3 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper  | Hole Dia. (d) | Gauge Length (L) | L1    | D     | Set Screw        | Code No. | Price \$ |
|--------|---------------|------------------|-------|-------|------------------|----------|----------|
| HSK63A | 3/16          | 3.00             | 0.866 | 0.748 | 10-32X1/4        | 536002   | 512.32   |
| HSK63A | 3/16          | 5.00             | 0.866 | 0.748 | 10-32X1/4        | 536004   | 512.32   |
| HSK63A | 1/4           | 3.00             | 1.102 | 0.787 | 1/4-28X1/4       | 536006   | 512.32   |
| HSK63A | 1/4           | 5.00             | 1.102 | 0.787 | 1/4-28X1/4       | 536008   | 512.32   |
| HSK63A | 5/16          | 3.00             | 1.417 | 0.874 | 5/16-24X1/4      | 536010   | 512.32   |
| HSK63A | 5/16          | 5.00             | 1.417 | 0.874 | 5/16-24X1/4      | 536012   | 512.32   |
| HSK63A | 3/8           | 3.50             | 1.574 | 1.00  | 3/8-24X5/16      | 536014   | 512.32   |
| HSK63A | 3/8           | 5.00             | 1.574 | 1.00  | 3/8-24X5/16      | 536016   | 512.32   |
| HSK63A | 7/16          | 5.00             | 1.771 | 1.378 | 7/16-20X3/8      | 536020   | 512.32   |
| HSK63A | 1/2           | 4.00             | 1.771 | 1.378 | 7/16-20X3/8      | 536022   | 512.32   |
| HSK63A | 1/2           | 5.00             | 1.771 | 1.378 | 7/16-20X3/8      | 536024   | 512.32   |
| HSK63A | 5/8           | 4.00             | 1.889 | 1.654 | 9/16-18X1/2      | 536026   | 512.32   |
| HSK63A | 3/4           | 4.50             | 1.968 | 1.889 | 5/8-18X1/2       | 536030   | 512.32   |
| HSK63A | 3/4           | 6.00             | 1.968 | 1.889 | 5/8-18X1/2       | 536032   | 512.32   |
| HSK63A | 1             | 4.50             | 2.755 | 2.363 | 3/4-16X11/16 (2) | 536034   | 512.32   |
| HSK63A | 1-1/4         | 4.50             | 2.952 | 2.88  | 3/4-16X11/16 (2) | 536038   | 512.32   |

## HSK100A End Mill Holders



- High rigidity and torque transmission
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



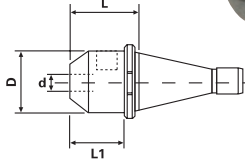
PREMIUM BALANCE  
G6.3 at 25,000rpm  
CERTIFICATE INCLUDED

| Taper   | Hole Dia. (d) | Gauge Length (L) | L1    | D     | Set Screw        | Code No. | Price \$ |
|---------|---------------|------------------|-------|-------|------------------|----------|----------|
| HSK100A | 3/16          | 4.00             | 0.867 | 0.748 | 10-32X1/4        | 536042   | 624.78   |
| HSK100A | 3/16          | 6.00             | 0.867 | 0.748 | 10-32X1/4        | 536044   | 683.10   |
| HSK100A | 1/4           | 4.00             | 1.102 | 0.787 | 1/4-28X1/4       | 536046   | 624.78   |
| HSK100A | 1/4           | 6.00             | 1.102 | 0.787 | 1/4-28X1/4       | 536048   | 683.10   |
| HSK100A | 5/16          | 4.00             | 1.220 | 0.866 | 5/16-24X1/4      | 536050   | 624.78   |
| HSK100A | 5/16          | 6.00             | 1.220 | 0.866 | 5/16-24X1/4      | 536052   | 683.10   |
| HSK100A | 3/8           | 4.00             | 1.260 | 1.00  | 3/8-24X5/16      | 536054   | 624.78   |
| HSK100A | 3/8           | 6.00             | 1.260 | 1.00  | 3/8-24X5/16      | 536056   | 683.10   |
| HSK100A | 1/2           | 4.00             | 1.575 | 1.378 | 7/16-20X3/8      | 536062   | 624.78   |
| HSK100A | 1/2           | 6.00             | 1.575 | 1.378 | 7/16-20X3/8      | 536064   | 683.10   |
| HSK100A | 5/8           | 4.00             | 1.693 | 1.654 | 9/16-18X1/2      | 536066   | 624.78   |
| HSK100A | 3/4           | 4.00             | 2.56  | 1.890 | 5/8-18X1/2       | 536070   | 624.78   |
| HSK100A | 3/4           | 6.00             | 1.969 | 1.890 | 5/8-18X1/2       | 536072   | 683.10   |
| HSK100A | 1             | 4.00             | 2.559 | 2.362 | 3/4-16X11/16 (2) | 536074   | 624.78   |
| HSK100A | 1             | 6.00             | 2.559 | 2.362 | 3/4-16X11/16 (2) | 536076   | 683.10   |
| HSK100A | 1-1/4         | 4.00             | 2.559 | 2.480 | 3/4-16X11/16 (2) | 536078   | 624.78   |
| HSK100A | 1-1/4         | 6.00             | 2.559 | 2.480 | 3/4-16X11/16 (2) | 536080   | 683.10   |

## NMTB40 End Mill Holders



- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel

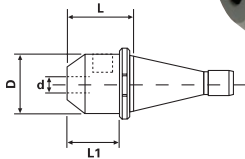


| Taper  | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|--------|---------------|------------------|------|------|-----------|----------|----------|
| NMTB40 | 1/4           | 2.31             | 1.97 | 0.79 | 1/4-28    | 534000   | 165.33   |
| NMTB40 | 5/16          | 2.31             | 1.18 | 0.87 | 5/16-24   | 534002   | 165.33   |
| NMTB40 | 3/8           | 2.31             | 1.57 | 1.00 | 3/8-24    | 534004   | 165.33   |
| NMTB40 | 1/2           | 2.31             | 2.56 | 1.38 | 7/16-20   | 534008   | 165.33   |
| NMTB40 | 5/8           | 2.31             | 2.76 | 1.65 | 9/16-18   | 534010   | 165.33   |
| NMTB40 | 3/4           | 2.31             | 2.76 | 1.89 | 5/8-18    | 534012   | 165.33   |
| NMTB40 | 7/8           | 2.94             | 3.15 | 2.01 | 5/8-18    | 534014   | 165.33   |
| NMTB40 | 1             | 3.37             | 3.54 | 2.36 | 3/4-16    | 534016   | 165.33   |
| NMTB40 | 1-1/4         | 3.69             | 3.54 | 2.48 | 3/4-16    | 534018   | 165.33   |
| NMTB40 | 1-1/2         | 3.95             | 2.95 | 2.99 | 3/4-16    | 534019   | 170.14   |

## NMTB50 End Mill Holders



- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel

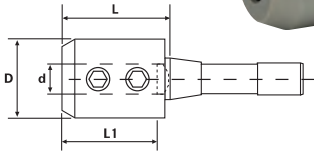


| Taper  | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|--------|---------------|------------------|------|------|-----------|----------|----------|
| NMTB50 | 1/4           | 2.75             | 1.57 | 0.79 | 1/4-28    | 534020   | 227.43   |
| NMTB50 | 3/8           | 2.75             | 1.57 | 1.00 | 3/8-24    | 534022   | 227.43   |
| NMTB50 | 1/2           | 2.75             | 1.50 | 1.38 | 7/16-20   | 534026   | 227.43   |
| NMTB50 | 1/2           | 4.50             | 1.50 | 1.38 | 7/16-20   | 534028   | 238.67   |
| NMTB50 | 5/8           | 2.75             | 1.77 | 1.65 | 9/16-18   | 534030   | 227.43   |
| NMTB50 | 3/4           | 2.88             | 1.77 | 1.89 | 5/8-18    | 534034   | 227.43   |
| NMTB50 | 3/4           | 4.50             | 2.76 | 1.89 | 5/8-18    | 534036   | 238.67   |
| NMTB50 | 7/8           | 2.88             | 2.17 | 2.01 | 5/8-18    | 534038   | 236.11   |
| NMTB50 | 1             | 3.50             | 2.36 | 2.36 | 3/4-16    | 534042   | 243.01   |
| NMTB50 | 1-1/4         | 3.50             | 2.56 | 2.48 | 3/4-16    | 534046   | 272.70   |
| NMTB50 | 2             | 4.69             | 4.13 | 3.74 | 1-14      | 534054   | 325.51   |

## R8 End Mill Holders



- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel

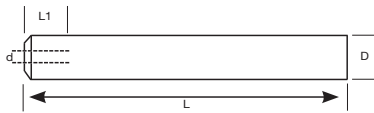


| Taper | Hole Dia. (d) | Gauge Length (L) | L1   | D    | Set Screw | Code No. | Price \$ |
|-------|---------------|------------------|------|------|-----------|----------|----------|
| R8    | 1/4           | 1.33             | 1.18 | 0.79 | 1/4-28    | 534056   | 93.27    |
| R8    | 5/16          | 1.75             | 1.26 | 0.87 | 5/16-24   | 534058   | 93.27    |
| R8    | 3/8           | 1.33             | 1.26 | 1.00 | 3/8-24    | 534060   | 93.27    |
| R8    | 1/2           | 1.33             | 2.56 | 1.38 | 7/16-20   | 534064   | 93.27    |
| R8    | 5/8           | 1.50             | 1.61 | 1.65 | 9/16-18   | 534066   | 93.27    |
| R8    | 3/4           | 2.37             | 1.77 | 1.89 | 5/8-18    | 534068   | 106.89   |
| R8    | 1             | 3.25             | 2.76 | 2.36 | 3/4-16    | 534072   | 118.94   |
| R8    | 1-1/4         | 3.25             | 3.15 | 2.48 | 3/4-16    | 534074   | 124.71   |

## Straight Shank End Mill Holders



- Can be used to extend the reach of the cutting tool as well as machining within tight clearances
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel



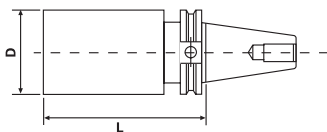
| Hole Dia. (d) | Gauge Length (L) | L1   | D     | Set Screw | Code No. | Price \$ |
|---------------|------------------|------|-------|-----------|----------|----------|
| 1/4           | 6.00             | 1.18 | 0.750 | 1/4-28    | 534078   | 119.59   |
| 5/16          | 6.00             | 1.18 | 0.750 | 5/16-24   | 534080   | 113.31   |
| 3/8           | 6.00             | 1.57 | 1.00  | 3/8-24    | 534082   | 120.86   |
| 1/2           | 6.00             | 1.77 | 1.00  | 1/4-28    | 534084   | 120.86   |

## Blank Bars



Blank bars are suitable for all applications, including deep boring. While the tapers are ground and hardened, the projections are not.

- Traverse ground shank to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- Material to be machined - SNMC 415H

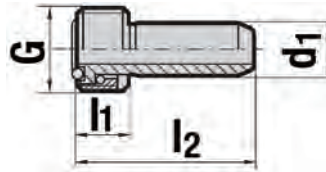


| Taper             | L  | D    | Code No. | Price \$ |
|-------------------|----|------|----------|----------|
| <b>CAT Taper</b>  |    |      |          |          |
| CAT 40            | 13 | 2.50 | 531592   | 430.48   |
| CAT 50            | 13 | 3.88 | 531594   | 484.41   |
| <b>NMTB Taper</b> |    |      |          |          |
| NMTB50            | 13 | 3.88 | 534602   | 444.77   |

## HSK Coolant Tubes



- Designed specifically to be used with HSK holders
- Leak-proof screwed connection



| Used with Taper | d1 | G       | l1   | l2   | Code No. | Price \$ |
|-----------------|----|---------|------|------|----------|----------|
| HSK63A          | 12 | M18x1   | 36.5 | 11.5 | 536600   | 42.29    |
| HSK100A         | 16 | M24x1.5 | 44.0 | 15.5 | 536602   | 46.42    |

## Coolant Tube Wrenches



- Designed to lock and unlock the HSK coolant supply units



| Description         | Used with Taper | Code No. | Price \$ |
|---------------------|-----------------|----------|----------|
| Coolant Tube Wrench | HSK63A          | 536604   | 64.81    |
| Coolant Tube Wrench | HSK100A         | 536606   | 69.06    |

## Replacement O-Rings For DIRECT COOLANT Holders



- Can be used in all tapers of Direct Coolant Holders



| Holder Size | Code No. | Price \$ |
|-------------|----------|----------|
| 1/4         | 522390   | 2.50     |
| 5/16        | 522391   | 2.50     |
| 3/8         | 522392   | 2.50     |
| 1/2         | 522393   | 2.50     |
| 5/8         | 522394   | 2.50     |
| 3/4         | 522395   | 2.50     |
| 1           | 522396   | 2.50     |
| 1-1/4       | 522397   | 2.50     |

## Replacement Set Screws



| Size           | Size of Holder  | Code No. | Price \$ |
|----------------|-----------------|----------|----------|
| 8-32 x 5/16    | 1/8             | 534109   | 0.80     |
| 10-32 x 5/16   | 3/16            | 534111   | 0.80     |
| 1/4-28 x 1/4   | 1/4             | 534110   | 3.70     |
| 5/16-24 x 1/4  | 5/16            | 534112   | 3.70     |
| 3/8-24 x 5/16  | 3/8, 7/16       | 534114   | 5.62     |
| 7/16-20 x 3/8  | 1/2             | 534116   | 6.75     |
| 9/16-18 x 1/2  | 5/8             | 534118   | 5.30     |
| 5/8-18 x 1/2   | 3/4, 7/8        | 534120   | 9.15     |
| 3/4-16 x 9.5mm | 1, 1-1/4, 1-1/2 | 534119   | 8.73     |
| 3/4-16 x 11/16 | 1, 1-1/4, 1-1/2 | 534122   | 9.96     |
| 1-14 x 7/8     | 2               | 534124   | 32.74    |

## Retention Knobs

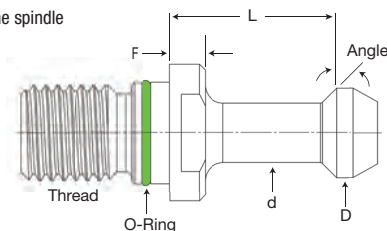
- Ground Pilot
- O-Ring on Pilot to prevent coolant penetration into the spindle

### Can't find your retention knob?

We invite your inquiries.

Please have ready the following information when calling:

- Taper of Machine
- Make and Model No. of the Machine
- Draw Bar Thread Diameter and Pitch
- Taper Angle required underneath head of stud



| Taper | Model     | Coolant Through | D     | d     | L     | F     | Angle | Thread   | Code No. | Price \$ |
|-------|-----------|-----------------|-------|-------|-------|-------|-------|----------|----------|----------|
| BT30  | GS585X45  | N               | 0.433 | 0.276 | 0.709 | 0.197 | 45    | M12x1.75 | 366000   | 32.06    |
| BT30  | GS585X60  | N               | 0.433 | 0.276 | 0.709 | 0.197 | 60    | M12x1.75 | 366002   | 33.97    |
| BT40  | PS444X15  | N               | 0.748 | 0.551 | 0.905 | 0.275 | 15    | M16x2    | 366003   | 42.34    |
| BT40  | GSC444X15 | Y               | 0.748 | 0.551 | 0.905 | 0.275 | 15    | M16x2    | 366004   | 45.30    |
| BT40  | GS444X45  | N               | 0.590 | 0.390 | 1.102 | 0.236 | 45    | M16x2    | 366006   | 32.06    |
| BT40  | GS444X60  | N               | 0.590 | 0.390 | 1.102 | 0.236 | 60    | M16x2    | 366008   | 33.97    |
| BT40  | PS444X90  | N               | 0.590 | 0.390 | 1.102 | 0.236 | 90    | M16x2    | 366010   | 33.02    |
| BT40  | GSC444X45 | Y               | 0.590 | 0.390 | 1.102 | 0.236 | 45    | M16x2    | 366012   | 34.73    |
| BT40  | GSC444X60 | Y               | 0.590 | 0.390 | 1.102 | 0.236 | 60    | M16x2    | 366014   | 36.80    |
| BT40  | PSC444X90 | Y               | 0.590 | 0.390 | 1.102 | 0.236 | 90    | M16x2    | 366016   | 38.99    |
| BT40  | PS477     | N               | 0.740 | 0.490 | 0.552 | 0.236 | 45    | M16x2    | 366018   | 37.14    |
| BT40  | PSC478    | Y               | 0.740 | 0.490 | 0.440 | 0.120 | 45    | M16x2    | 366020   | 35.77    |
| BT40  | PSC479    | Y               | 0.740 | 0.490 | 0.552 | 0.120 | 45    | M16x2    | 366022   | 42.34    |
| BT40  | GSC477    | Y               | 0.740 | 0.490 | 0.552 | 0.236 | 45    | M16x2    | 366024   | 42.34    |
| BT40  | PSC480X15 | Y               | 0.748 | 0.551 | 0.900 | 0.157 | 15    | M16x2    | 366026   | 44.63    |
| BT40  | PS534X45  | N               | 0.590 | 0.390 | 0.990 | 0.236 | 45    | M16x2    | 366028   | 40.20    |
| BT40  | PS554     | N               | 0.594 | 0.406 | 1.250 | 0.187 | 45    | M16x2    | 366030   | 40.20    |
| BT40  | PSC554    | Y               | 0.594 | 0.406 | 1.250 | 0.187 | 45    | M16x2    | 366032   | 49.07    |
| CT40  | GSC470X15 | Y               | 0.748 | 0.551 | 0.787 | 0.157 | 15    | 5/8x11   | 366034   | 26.72    |
| CT40  | GS474     | N               | 0.740 | 0.490 | 0.440 | 0.118 | 45    | 5/8x11   | 366036   | 26.72    |
| CT40  | GSC474    | Y               | 0.740 | 0.490 | 0.440 | 0.118 | 45    | 5/8x11   | 366038   | 26.72    |
| CT40  | GSC475    | Y               | 0.740 | 0.490 | 0.440 | 0.120 | 45    | 5/8x11   | 366040   | 26.72    |
| CT40  | GS475     | N               | 0.740 | 0.490 | 0.440 | 0.120 | 45    | 5/8x11   | 366042   | 26.72    |
| CT40  | PS498     | N               | 0.590 | 0.390 | 0.777 | 0.200 | 90    | 5/8x11   | 366044   | 35.77    |
| CT40  | PS531X45  | N               | 0.590 | 0.390 | 1.000 | 0.236 | 45    | 5/8x11   | 366046   | 30.58    |
| CT40  | GS532X15  | N               | 0.748 | 0.551 | 0.792 | 0.275 | 15    | 5/8x11   | 366048   | 28.31    |
| CT40  | GS532X45  | N               | 0.590 | 0.390 | 0.990 | 0.236 | 45    | 5/8x11   | 366050   | 26.72    |
| CT40  | GS532X60  | N               | 0.590 | 0.390 | 0.990 | 0.236 | 60    | 5/8x11   | 366052   | 28.31    |
| CT40  | GS532X90  | N               | 0.590 | 0.390 | 0.990 | 0.236 | 90    | 5/8x11   | 366054   | 28.31    |
| CT40  | GSC532X15 | Y               | 0.748 | 0.551 | 0.792 | 0.275 | 15    | 5/8x11   | 366056   | 26.72    |
| CT40  | GSC532X45 | Y               | 0.590 | 0.390 | 0.990 | 0.236 | 45    | 5/8x11   | 366058   | 26.72    |
| CT40  | GSC532X60 | Y               | 0.590 | 0.390 | 0.990 | 0.236 | 60    | 5/8x11   | 366060   | 28.31    |
| CT40  | GSC532X90 | Y               | 0.590 | 0.390 | 0.990 | 0.236 | 90    | 5/8x11   | 366062   | 28.31    |
| CT40  | PS552     | N               | 0.594 | 0.406 | 1.139 | 0.187 | 45    | 5/8x11   | 366064   | 37.90    |
| CT40  | PSC552    | Y               | 0.594 | 0.406 | 1.139 | 0.187 | 45    | 5/8x11   | 366066   | 46.93    |
| CT40  | GS572X45  | N               | 0.590 | 0.390 | 0.990 | 0.120 | 45    | 5/8x11   | 366068   | 26.72    |
| CT40  | PS572X60  | N               | 0.590 | 0.390 | 0.990 | 0.120 | 60    | 5/8x11   | 366070   | 39.89    |
| CT40  | PS572X90  | N               | 0.590 | 0.390 | 0.990 | 0.120 | 90    | 5/8x11   | 366072   | 30.58    |
| CT40  | PSC572X45 | Y               | 0.590 | 0.390 | 0.990 | 0.120 | 45    | 5/8x11   | 366074   | 37.31    |
| CT40  | PSC572X60 | Y               | 0.590 | 0.390 | 0.990 | 0.120 | 60    | 5/8x11   | 366076   | 45.40    |
| CT40  | PSC572X90 | Y               | 0.590 | 0.390 | 0.990 | 0.120 | 90    | 5/8x11   | 366078   | 30.58    |
| CT45  | PSC375    | Y               | 0.940 | 0.605 | 0.580 | 0.160 | 45    | 3/4x10   | 366080   | 35.77    |
| BT50  | PSC278    | Y               | 1.140 | 0.820 | 0.700 | 0.200 | 45    | M24x3    | 366082   | 46.93    |
| BT50  | GS446X45  | N               | 0.906 | 0.669 | 1.378 | 0.394 | 45    | M24x3    | 366084   | 66.53    |
| BT50  | PS446X60  | N               | 0.906 | 0.669 | 1.378 | 0.394 | 60    | M24x3    | 366086   | 64.66    |
| BT50  | PS446X90  | N               | 0.906 | 0.669 | 1.378 | 0.394 | 90    | M24x3    | 366088   | 49.53    |
| BT50  | GSC446X45 | Y               | 0.906 | 0.669 | 1.378 | 0.394 | 45    | M24x3    | 366090   | 69.36    |
| CT50  | GS275     | N               | 1.140 | 0.820 | 0.700 | 0.200 | 45    | 1x8      | 366092   | 35.38    |
| CT50  | PSC274    | Y               | 1.140 | 0.820 | 0.700 | 0.200 | 45    | 1x8      | 366094   | 49.07    |
| CT50  | GSC275    | Y               | 1.140 | 0.820 | 0.700 | 0.200 | 45    | 1x8      | 366096   | 33.39    |
| CT50  | GS536X45  | N               | 0.906 | 0.669 | 1.386 | 0.394 | 45    | 1x8      | 366098   | 34.06    |
| CT50  | GS536X60  | N               | 0.906 | 0.669 | 1.386 | 0.394 | 60    | 1x8      | 366100   | 33.39    |
| CT50  | GS536X90  | N               | 0.906 | 0.669 | 1.386 | 0.394 | 90    | 1x8      | 366102   | 35.38    |
| CT50  | GSC536X45 | Y               | 0.906 | 0.669 | 1.386 | 0.394 | 45    | 1x8      | 366104   | 33.39    |
| CT50  | GSC536X60 | Y               | 0.906 | 0.669 | 1.386 | 0.394 | 60    | 1x8      | 366106   | 33.39    |
| CT50  | GSC536X90 | Y               | 0.906 | 0.669 | 1.386 | 0.394 | 90    | 1x8      | 366108   | 33.39    |



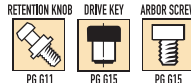
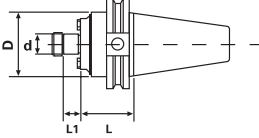
## Shell Mill Holders & Milling Arbors

|   |     |
|---|-----|
| CAT40 Shell Mill Holders . . . . .                  | G13 |
| CAT40 Dual Contact Shell Mill Holders . . . . .     | G13 |
| CAT50 Shell Mill Holders . . . . .                  | G13 |
| CAT50 Dual Contact Shell Mill Holders . . . . .     | G13 |
| CAT50 Face Mill Holders . . . . .                   | G14 |
| BT Taper Shell Mill Holders . . . . .               | G14 |
| HSK63 Shell Mill Holders . . . . .                  | G14 |
| HSK100 Shell Mill Holders . . . . .                 | G14 |
| NMTB Taper Shell Mill & Face Mill Holders . . . . . | G14 |
| R8 Shell Mill Holders . . . . .                     | G14 |
| Replacement Drive Keys & Arbor Screws . . . . .     | G15 |
| Shell End Mill Arbors For MT Spindles . . . . .     | G15 |
| STM Face Mill Holders . . . . .                     | G15 |
| CAT & BT Taper Stub Arbors . . . . .                | G15 |
| Slitting Saw Arbor . . . . .                        | G15 |
| Milling Machine Arbors . . . . .                    | G16 |
| Arbor Spacers & Bushings With Keyways . . . . .     | G16 |
| Arbor Nuts . . . . .                                | G16 |

## CAT40 Shell Mill Holders



- DIN coolant option - standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

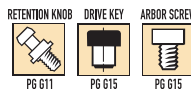
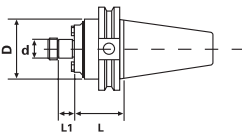
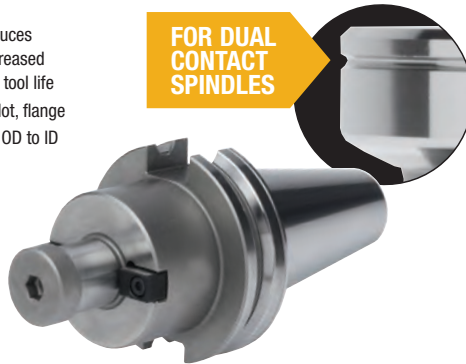


| Taper | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------|-------|------|------|------|----------|--------------|----------|----------|
| CT40  | 1/2   | 1.75 | 1.38 | 0.57 | 1/4      | 1/4-28       | 531190   | 220.76   |
| CT40  | 3/4   | 1.75 | 1.75 | 0.67 | 5/16     | 3/8-24       | 531192   | 199.93   |
| CT40  | 3/4   | 4.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 531194   | 267.95   |
| CT40  | 3/4   | 6.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 531195   | 301.29   |
| CT40  | 1     | 1.75 | 2.38 | 0.67 | 3/8      | 1/2-20       | 531196   | 199.93   |
| CT40  | 1     | 4.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 531198   | 267.95   |
| CT40  | 1     | 6.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 531199   | 301.29   |
| CT40  | 1-1/4 | 2.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 531200   | 212.43   |
| CT40  | 1-1/4 | 4.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 531202   | 301.29   |
| CT40  | 1-1/4 | 6.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 531203   | 309.62   |
| CT40  | 1-1/2 | 2.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531204   | 234.64   |
| CT40  | 1-1/2 | 4.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531206   | 336.00   |

## CAT40 DUAL CONTACT Shell Mill Holders



- DIN coolant through the flange option - Standard
- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

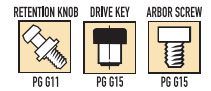
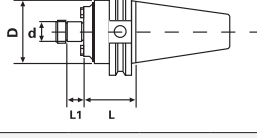


| Taper | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------|-------|------|------|------|----------|--------------|----------|----------|
| CT40  | 3/4   | 1.75 | 1.75 | 0.67 | 5/16     | 3/8-24       | 521192   | 239.60   |
| CT40  | 3/4   | 4.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 521194   | 348.08   |
| CT40  | 3/4   | 6.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 521195   | 388.61   |
| CT40  | 1     | 1.75 | 2.38 | 0.67 | 3/8      | 1/2-20       | 521196   | 244.38   |
| CT40  | 1     | 4.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 521198   | 348.08   |
| CT40  | 1     | 6.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 521199   | 394.57   |
| CT40  | 1-1/4 | 2.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 521200   | 262.26   |
| CT40  | 1-1/4 | 4.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 521202   | 405.31   |
| CT40  | 1-1/2 | 2.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521204   | 286.09   |
| CT40  | 1-1/2 | 4.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521206   | 429.14   |

## CAT50 Shell Mill Holders



- DIN coolant option - Standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

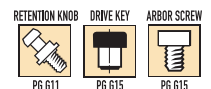
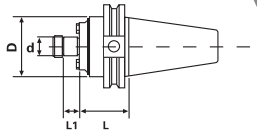


| Taper | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------|-------|------|------|------|----------|--------------|----------|----------|
| CT50  | 3/4   | 1.75 | 2.00 | 0.67 | 5/16     | 3/8-24       | 531208   | 238.81   |
| CT50  | 3/4   | 4.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 531210   | 309.62   |
| CT50  | 3/4   | 6.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 531212   | 397.08   |
| CT50  | 3/4   | 8.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 531214   | 492.88   |
| CT50  | 1     | 1.75 | 2.75 | 0.69 | 3/8      | 1/2-20       | 531216   | 248.53   |
| CT50  | 1     | 4.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 531218   | 336.00   |
| CT50  | 1     | 6.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 531220   | 431.79   |
| CT50  | 1     | 8.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 531222   | 492.88   |
| CT50  | 1-1/4 | 1.75 | 2.88 | 0.69 | 1/2      | 5/8-18       | 531224   | 283.24   |
| CT50  | 1-1/4 | 4.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 531226   | 336.00   |
| CT50  | 1-1/4 | 6.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 531228   | 431.79   |
| CT50  | 1-1/4 | 8.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 531230   | 526.21   |
| CT50  | 1-1/2 | 2.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531232   | 283.24   |
| CT50  | 1-1/2 | 4.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531234   | 336.00   |
| CT50  | 1-1/2 | 6.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531236   | 431.79   |
| CT50  | 1-1/2 | 8.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 531238   | 562.30   |
| CT50  | 2     | 2.00 | 4.38 | 0.93 | 3/4      | 1-14         | 531240   | 355.43   |
| CT50  | 2     | 4.00 | 4.38 | 0.93 | 3/4      | 1-14         | 531242   | 634.50   |
| CT50  | 2     | 6.00 | 4.38 | 0.93 | 3/4      | 1-14         | 531244   | 763.62   |

## CAT50 DUAL CONTACT Shell Mill Holders



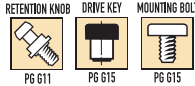
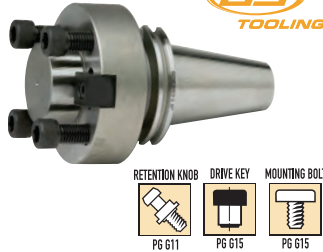
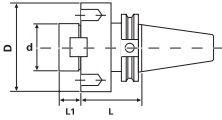
- DIN Coolant through the flange option - Standard
- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



| Taper | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------|-------|------|------|------|----------|--------------|----------|----------|
| CT50  | 3/4   | 1.75 | 2.00 | 0.67 | 5/16     | 3/8-24       | 521208   | 317.09   |
| CT50  | 3/4   | 4.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 521210   | 400.54   |
| CT50  | 3/4   | 6.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 521212   | 500.66   |
| CT50  | 3/4   | 8.00 | 2.00 | 0.67 | 5/16     | 3/8-24       | 521214   | 600.66   |
| CT50  | 1     | 1.75 | 2.75 | 0.69 | 3/8      | 1/2-20       | 521216   | 290.86   |
| CT50  | 1     | 4.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 521218   | 429.14   |
| CT50  | 1     | 6.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 521220   | 536.42   |
| CT50  | 1     | 8.00 | 2.75 | 0.69 | 3/8      | 1/2-20       | 521222   | 665.17   |
| CT50  | 1-1/4 | 1.75 | 2.88 | 0.69 | 1/2      | 5/8-18       | 521224   | 290.86   |
| CT50  | 1-1/4 | 4.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 521226   | 429.14   |
| CT50  | 1-1/4 | 6.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 521228   | 536.42   |
| CT50  | 1-1/4 | 8.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 521230   | 665.17   |
| CT50  | 1-1/2 | 2.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521232   | 317.09   |
| CT50  | 1-1/2 | 4.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521234   | 429.14   |
| CT50  | 1-1/2 | 6.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521236   | 536.42   |
| CT50  | 1-1/2 | 8.00 | 3.80 | 0.93 | 5/8      | 3/4-16       | 521238   | 665.17   |
| CT50  | 2     | 2.00 | 4.38 | 0.93 | 3/4      | 1-14         | 521240   | 544.77   |
| CT50  | 2     | 4.00 | 4.38 | 0.93 | 3/4      | 1-14         | 521242   | 766.51   |

## CAT50 Face Mill Holders

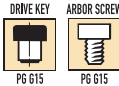
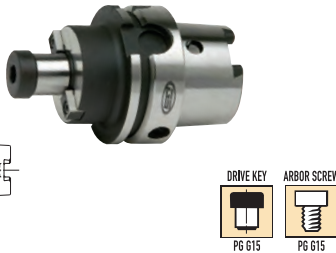
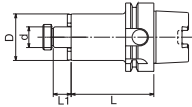
- All ground body
- 4 bolts, 5/8-11
- 4" bolt circle
- AT2 Taper Accuracy
- RFID chip hole



| Taper | d     | L    | D    | L1   | Key Size | Code No. | Price \$ |
|-------|-------|------|------|------|----------|----------|----------|
| CT50  | 2     | 2.95 | 5.06 | 0.86 | 3/4      | 531246   | 406.24   |
| CT50  | 2-1/2 | 2.95 | 5.00 | 1.18 | 1        | 531248   | 418.27   |

## HSK63A Shell Mill Holders

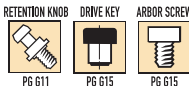
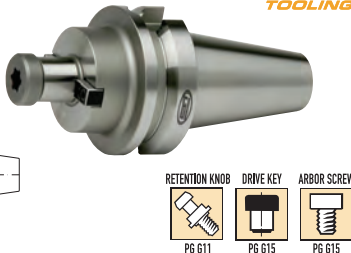
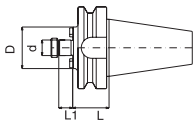
- High rigidity and torque transmission
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



| Taper  | d     | L    | D     | L1    | Key Size | Arbor Thread | Code No. | Price \$ |
|--------|-------|------|-------|-------|----------|--------------|----------|----------|
| HSK63A | 3/4   | 3.00 | 1.693 | 0.669 | 5/16     | 3/8-24       | 536082   | 590.07   |
| HSK63A | 3/4   | 5.00 | 1.693 | 0.669 | 5/16     | 3/8-24       | 536084   | 590.07   |
| HSK63A | 1     | 3.00 | 2.165 | 0.669 | 3/8      | 1/2-20       | 536086   | 590.07   |
| HSK63A | 1     | 5.00 | 2.165 | 0.669 | 3/8      | 1/2-20       | 536088   | 590.07   |
| HSK63A | 1-1/4 | 3.00 | 2.756 | 0.669 | 1/2      | 5/8-18       | 536090   | 590.07   |
| HSK63A | 1-1/4 | 5.00 | 2.756 | 0.669 | 1/2      | 5/8-18       | 536092   | 590.07   |

## BT Taper Shell Mill Holders

- DIN coolant option - standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole

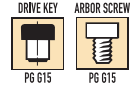
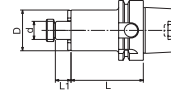


| Taper       | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------------|-------|------|------|------|----------|--------------|----------|----------|
| <b>BT30</b> |       |      |      |      |          |              |          |          |
| BT30        | 1/2   | 1.19 | 1.38 | 0.57 | 1/4      | 1/4-28       | 532080†  | 216.59   |
| BT30        | 3/4   | 1.19 | 2.00 | 0.67 | 5/16     | 3/8-24       | 532082†  | 195.76   |
| BT30        | 1     | 1.77 | 2.38 | 0.69 | 3/8      | 1/2-20       | 532084†  | 170.77   |
| <b>BT40</b> |       |      |      |      |          |              |          |          |
| BT40        | 1/2   | 1.75 | 1.38 | 0.57 | 1/4      | 1/4-28       | 532086   | 242.97   |
| BT40        | 3/4   | 1.75 | 1.75 | 0.67 | 5/16     | 3/8-24       | 532088   | 230.47   |
| BT40        | 3/4   | 4.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 532111   | 276.29   |
| BT40        | 3/4   | 6.00 | 1.75 | 0.67 | 5/16     | 3/8-24       | 532114   | 381.81   |
| BT40        | 1     | 1.75 | 2.38 | 0.67 | 3/8      | 1/2-20       | 532090   | 230.47   |
| BT40        | 1     | 4.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 532115   | 258.24   |
| BT40        | 1     | 6.00 | 2.38 | 0.67 | 3/8      | 1/2-20       | 532117   | 333.22   |
| BT40        | 1-1/4 | 2.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 532092   | 284.62   |
| BT40        | 1-1/4 | 4.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 532119   | 363.75   |
| BT40        | 1-1/4 | 6.00 | 2.88 | 0.67 | 1/2      | 5/8-18       | 532121   | 374.87   |
| BT40        | 1-1/2 | 2.00 | 3.80 | 0.92 | 5/8      | 3/4-16       | 532094   | 363.75   |
| <b>BT50</b> |       |      |      |      |          |              |          |          |
| BT50        | 1     | 1.75 | 2.75 | 0.69 | 3/8      | 1/2-20       | 532101   | 462.34   |
| BT50        | 1-1/4 | 1.75 | 2.88 | 0.69 | 1/2      | 5/8-18       | 532103   | 462.34   |
| BT50        | 1-1/2 | 1.75 | 3.80 | 0.92 | 5/8      | 3/4-16       | 532105   | 388.75   |
| BT50        | 2     | 1.75 | 4.38 | 0.92 | 3/4      | 1-14         | 532107   | 556.76   |

† Not DIN Coolant

## HSK100A Shell Mill Holders

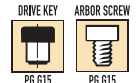
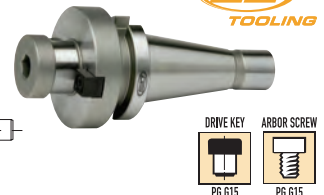
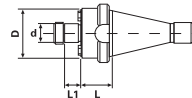
- High rigidity and torque transmission
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



| Taper   | d     | L    | D     | L1    | Key Size | Arbor Thread | Code No. | Price \$ |
|---------|-------|------|-------|-------|----------|--------------|----------|----------|
| HSK100A | 3/4   | 4.00 | 1.693 | 0.669 | 5/16     | 3/8-24       | 536094   | 687.27   |
| HSK100A | 3/4   | 6.00 | 1.693 | 0.669 | 5/16     | 3/8-24       | 536096   | 737.24   |
| HSK100A | 1     | 4.00 | 2.165 | 0.669 | 3/8      | 1/2-20       | 536098   | 687.27   |
| HSK100A | 1     | 6.00 | 2.165 | 0.669 | 3/8      | 1/2-20       | 536100   | 737.24   |
| HSK100A | 1-1/2 | 4.00 | 3.504 | 0.902 | 5/8      | 3/4-16       | 536106   | 713.65   |
| HSK100A | 1-1/2 | 6.00 | 3.504 | 0.902 | 5/8      | 3/4-16       | 536108   | 798.33   |

## NMTB Taper Shell Mill Holders

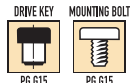
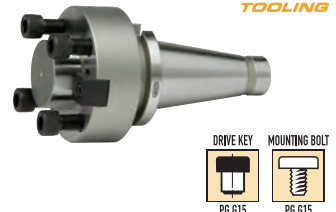
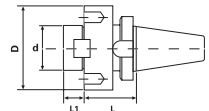
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel



| Taper         | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|---------------|-------|------|------|------|----------|--------------|----------|----------|
| <b>NMTB40</b> |       |      |      |      |          |              |          |          |
| NMTB40        | 1/2   | 0.87 | 1.38 | 0.57 | 1/4      | 1/4-28       | 534130   | 203.84   |
| NMTB40        | 3/4   | 0.87 | 1.94 | 0.67 | 5/16     | 3/8-24       | 534132   | 203.84   |
| NMTB40        | 1     | 1.31 | 2.38 | 0.67 | 3/8      | 1/2-20       | 534134   | 203.84   |
| NMTB40        | 1-1/4 | 1.50 | 2.88 | 0.67 | 1/2      | 5/8-18       | 534136   | 203.84   |
| NMTB40        | 1-1/2 | 1.63 | 3.50 | 0.93 | 5/8      | 3/4-16       | 534138   | 203.84   |
| <b>NMTB50</b> |       |      |      |      |          |              |          |          |
| NMTB50        | 3/4   | 1.25 | 2.00 | 0.67 | 5/16     | 3/8-24       | 534140   | 256.66   |
| NMTB50        | 1     | 1.88 | 2.38 | 0.67 | 3/8      | 1/2-20       | 534142   | 264.35   |
| NMTB50        | 1-1/4 | 1.88 | 2.88 | 0.67 | 1/2      | 5/8-18       | 534144   | 269.33   |
| NMTB50        | 1-1/2 | 1.88 | 3.50 | 0.93 | 5/8      | 3/4-16       | 534146   | 295.99   |
| NMTB50        | 2     | 1.88 | 4.38 | 0.93 | 3/4      | 1-14         | 534148   | 298.71   |

## NMTB50 Taper Face Mill Holders

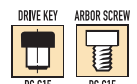
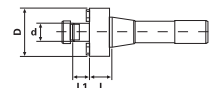
- All ground body
- 4 bolts, 5/8-11
- 4" bolt circle



| Taper  | d     | L    | D    | L1   | Key Size | Code No. | Price \$ |
|--------|-------|------|------|------|----------|----------|----------|
| NMTB50 | 2-1/2 | 3.00 | 5.00 | 1.18 | 1        | 534152   | 298.71   |

## R8 Shell Mill Holders

- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel



| Taper | d     | L    | D    | L1   | Key Size | Arbor Thread | Code No. | Price \$ |
|-------|-------|------|------|------|----------|--------------|----------|----------|
| R8    | 1/2   | 1.00 | 1.38 | 0.57 | 1/4      | 1/4-28       | 534154   | 122.31   |
| R8    | 3/4   | 1.00 | 2.00 | 0.69 | 5/16     | 3/8-24       | 534156   | 122.31   |
| R8    | 1     | 1.00 | 2.38 | 0.69 | 3/8      | 1/2-20       | 534158   | 127.92   |
| R8    | 1-1/4 | 1.00 | 2.88 | 0.69 | 1/2      | 5/8-18       | 534160   | 131.29   |
| R8    | 1-1/2 | 1.75 | 3.50 | 0.94 | 5/8      | 3/4-16       | 534162   | 146.71   |

## Replacement Drive Keys



| Spigot Dia. | Description        | Code No. | Price \$ |
|-------------|--------------------|----------|----------|
| 1/2         | Two 1/4 Drive keys | 534164   | 21.01    |
| 3/4         | Two 5/16           | 534166   | 24.72    |
| 1           | Two 3/8            | 534168   | 30.36    |
| 1-1/4       | Two 1/2            | 534170   | 33.53    |
| 1-1/2       | Two 5/8            | 534172   | 36.35    |
| 2           | Two 3/4            | 534174   | 44.69    |
| 2-1/2       | Two 1              | 534176   | 38.36    |

## Replacement Arbor Screws



| Thread Size | Size of Holder          | Code No. | Price \$ |
|-------------|-------------------------|----------|----------|
| 5/8-11      | Face Mill Mounting Bolt | 534178   | 19.67    |
| 1/4-28      | 1/2                     | 534180   | 19.67    |
| 3/8-24      | 3/4                     | 534182   | 20.54    |
| 1/2-20      | 1                       | 534184   | 23.69    |
| 5/8-18      | 1-1/4                   | 534186   | 26.85    |
| 3/4-16      | 1-1/2                   | 534188   | 41.57    |
| 1-14        | 2                       | 534190   | 58.91    |

## Shell End Mill Arbors For Morse Taper Spindles

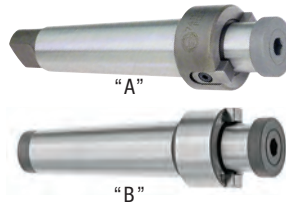


Style "B" with Draw Bar End

Style "A" with Tang End

Machined from one piece forgings, hardened and precisely ground; hardness 52-56 HRC. Maximum misalignment of taper in shank, in which the tool is fixed: 0.0006". The drive keys are pressed in.

- Draw bar threads for #4 MT: 1/2"-13
- Draw bar threads for #5 MT: 5/8"-11

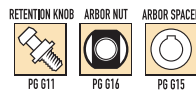
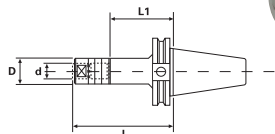


| Draw Bar Arbor No. | M.T. | For Bore Dia. | Dia. for Range of Shell End Mill | Style "B" Draw Bar End Code No. | Price \$ | Style "A" Tang End Code No. | Price \$ |
|--------------------|------|---------------|----------------------------------|---------------------------------|----------|-----------------------------|----------|
| MT4-1/2            | 4    | 1/2           | 1-1/4 to 1-1/2                   | 410405                          | 277.67   | 410305                      | 355.63   |
| MT4-3/4            | 4    | 3/4           | 1-3/4 to 2                       | 410410                          | 292.15   | 410310                      | 424.70   |
| MT4-1              | 4    | 1             | 2-1/4 to 2-3/4                   | -                               | -        | 410315                      | 453.66   |
| MT4-1-1/4          | 4    | 1-1/4         | 3 to 3-1/2                       | -                               | -        | 410320                      | 514.80   |
| MT4-1-1/2          | 4    | 1-1/2         | 4 to 5                           | -                               | -        | 410325                      | 540.53   |
| MT5-1-1/4          | 5    | 1-1/4         | 3 to 3-1/2                       | 410435                          | 402.32   | 410335                      | 518.48   |
| MT5-1-1/2          | 5    | 1-1/2         | 4 to 5                           | -                               | -        | 410340                      | 575.92   |

## CAT Taper Stub Arbors



- Each arbor equipped with 1/8, 1/4, 3/8, 1/2 spacers



| Taper        | d     | L    | D    | L1   | Code No. | Price \$ |
|--------------|-------|------|------|------|----------|----------|
| <b>CAT40</b> |       |      |      |      |          |          |
| CT40         | 1     | 6.17 | 1.50 | 4.00 | 531580   | 229.04   |
| CT40         | 1-1/4 | 6.29 | 1.75 | 4.00 | 531582   | 234.02   |
| CT40         | 1-1/2 | 6.60 | 2.12 | 4.00 | 531584   | 250.47   |
| <b>CAT50</b> |       |      |      |      |          |          |
| CT50         | 1     | 6.17 | 1.50 | 4.00 | 531586   | 341.24   |
| CT50         | 1-1/4 | 6.28 | 1.75 | 4.00 | 531588   | 361.85   |
| CT50         | 1-1/2 | 6.60 | 2.12 | 4.00 | 531590   | 372.71   |

## Face Mill Holders



Made of selected steel, hardened and precision ground

- These holders have 4 mounting holes and bolts with 5/8-11 threads on a 4" bolt circle



| Taper | Fore Bore Dia. | Length of Arbor | Screw Size | Code No. | Price \$ |
|-------|----------------|-----------------|------------|----------|----------|
| ISA40 | 2              | 6.20            | 5/8-11     | 410190   | 1,225.86 |
| ISA40 | 2-1/2          | 6.20            | 5/8-11     | 410192   | 1,216.21 |
| ISA50 | 2              | 7.56            | 5/8-11     | 410194   | 1,331.28 |
| ISA50 | 2-1/2          | 7.56            | 5/8-11     | 410196   | 1,370.65 |
| MT 5  | 2              | 9.57            | 5/8-11     | 410202   | 1,961.60 |
| MT 5  | 2-1/2          | 9.57            | 5/8-11     | 410204   | 2,023.79 |
| MT 6  | 2              | 13.58           | 5/8-11     | 410206   | 2,158.74 |
| MT 6  | 2-1/2          | 13.58           | 5/8-11     | 410208   | 2,532.15 |

## Replacement Stub Arbor Spacers



| Description                   | Code No. | Price \$ |
|-------------------------------|----------|----------|
| 1/8" Spacer for 3/4" Holder   | 534568   | 15.01    |
| 1/4" Spacer for 3/4" Holder   | 534570   | 15.01    |
| 3/8" Spacer for 3/4" Holder   | 534572   | 15.01    |
| 1/2" Spacer for 3/4" Holder   | 534574   | 15.01    |
| 1/8" Spacer for 1" Holder     | 534576   | 15.34    |
| 3/8" Spacer for 1" Holder     | 534580   | 15.34    |
| 1/8" Spacer for 1-1/4" Holder | 534584   | 16.06    |
| 3/8" Spacer for 1-1/4" Holder | 534588   | 16.68    |
| 1/8" Spacer for 1-1/2" Holder | 534592   | 17.36    |
| 3/8" Spacer for 1-1/2" Holder | 534596   | 16.71    |
| 1/2" Spacer for 1-1/2" Holder | 534598   | 16.71    |

## Slitting Saw Arbor



| Diameter of Arbor (in.) | Length (in.) | Fits Following Hole Size (in.) | Code No. | Price \$ |
|-------------------------|--------------|--------------------------------|----------|----------|
| 1/2                     | 2-9/16       | 1/2, 5/8, 3/4, 7/8, 1          | 400150   | 115.53   |

## R8 Stub Milling Machine Arbor



To fit Bridgeport and other popular machines. Furnished complete with assorted spacers.



| Arbor No. | Arbor Dia. (in.) | Length of Shoulder to Nut (in.) | Thread of Nut | Code No. | Price \$ |
|-----------|------------------|---------------------------------|---------------|----------|----------|
| R8S1      | 1                | 2                               | 1 - 14        | 400350   | 588.81   |

## Milling Machine Arbors



### For 30-40-50 National Standard Taper Spindles

Milling Machine Arbors are made of top quality one piece forgings. Carefully heat treated and surfaces ground with extremely narrow tolerances assure a rigid setup and accurate machining operations. All threads are ground. Arbors are equipped with assorted width solid spacers and necessary running bushings with standard keyways and threaded arbor nut.

Drawbar Threads for #30 Taper - 1/2" - 13

Drawbar Threads for #40 Taper - 5/8" - 11

Drawbar Threads for #50 Taper - 1" - 8

\* Style A



Style B



| Arbor No.      | Taper | Arbor Dia. (in.) | Length of Shoulder to Nut (in.) | Dimensions of Running Bushing Dia. x L (in.) | Bushing Furnished | Code No. | Price \$ |
|----------------|-------|------------------|---------------------------------|--|-------------------|----------|----------|
| 31-B2          | 30    | 1                | 2                               | None   | None              | 400205   | 876.56   |
| 41-A8          | 40    | 1                | 8                               | None   | None              | 400030*  | 1,235.51 |
| 40-7/8-B14-3   | 40    | 7/8              | 14                              | 1-7/8 x 3-1/8                                | 1                 | 400210   | 1,169.29 |
| 40-7/8-B16-3   | 40    | 7/8              | 16                              | 1-7/8 x 3-1/8                                | 1                 | 400215   | 1,568.62 |
| 41-B3          | 40    | 1                | 3                               | None   | None              | 400220   | 871.93   |
| 41-B14-3       | 40    | 1                | 14                              | 1-7/8 x 3-1/8                                | 1                 | 400225   | 1,933.54 |
| 41-B20-3       | 40    | 1                | 20                              | 1-7/8 x 3-1/8                                | 1                 | 400230   | 2,181.45 |
| 41-1/4-B3      | 40    | 1-1/4            | 3                               | None   | None              | 400235   | 938.93   |
| 41-1/4-B14-3   | 40    | 1-1/4            | 14                              | 1-7/8 x 3-1/8                                | 1                 | 400240   | 1,917.61 |
| 41-1/4-B20-3   | 40    | 1-1/4            | 20                              | 1-7/8 x 3-1/8                                | 1                 | 400245   | 2,348.75 |
| 41-1/2-B20-4   | 40    | 1-1/2            | 20                              | 2-1/8 x 3-3/4                                | 1                 | 400250   | 2,722.47 |
| 51-B3-1/2      | 50    | 1                | 3-1/2                           | None   | None              | 400255   | 1,039.25 |
| 51-B15-4       | 50    | 1                | 15                              | 2-1/8 x 3-3/4                                | 1                 | 400260   | 1,851.33 |
| 51-B18-4       | 50    | 1                | 18                              | 2-1/8 x 3-3/4                                | 2                 | 400265   | 2,269.67 |
| 51-B24-4       | 50    | 1                | 24                              | 2-1/8 x 3-3/4                                | 2                 | 400270   | 2,757.38 |
| 51-1/4-B3-1/2  | 50    | 1-1/4            | 3-1/2                           | None   | None              | 400275   | 1,264.46 |
| 51-1/4-B15-4   | 50    | 1-1/4            | 15                              | 2-1/8 x 3-3/4                                | 1                 | 400280   | 2,380.93 |
| 51-1/4-B18-4   | 50    | 1-1/4            | 18                              | 2-1/8 x 3-3/4                                | 2                 | 400285   | 2,528.94 |
| 51-1/4-B24-4   | 50    | 1-1/4            | 24                              | 2-1/8 x 3-3/4                                | 2                 | 400290   | 2,934.34 |
| 51-1/4-B30-4   | 50    | 1-1/4            | 30                              | 2-1/8 x 3-3/4                                | 2                 | 400295   | 3,560.93 |
| 51-1/2-B3-1/2  | 50    | 1-1/2            | 3-1/2                           | None   | None              | 400300   | 1,099.73 |
| 51-1/2-B18-4   | 50    | 1-1/2            | 18                              | 2-1/8 x 3-3/4                                | 2                 | 400305   | 2,731.64 |
| 51-1/2-B24-5   | 50    | 1-1/2            | 24                              | 2-3/4 x 4-1/4                                | 2                 | 400310   | 3,252.87 |
| 51-1/2-B30-5   | 50    | 1-1/2            | 30                              | 2-3/4 x 4-1/4                                | 2                 | 400315   | 3,963.92 |
| 51-1/2-B36-5   | 50    | 1-1/2            | 36                              | 2-3/4 x 4-1/4                                | 2                 | 400320   | 2,367.70 |
| 52-B24-5       | 50    | 2                | 24                              | 2-3/4 x 4-1/4                                | 2                 | 400325   | 3,947.84 |
| 52-B30-5       | 50    | 2                | 30                              | 2-3/4 x 4-1/4                                | 2                 | 400330   | 4,019.97 |
| 52-B36-5       | 50    | 2                | 36                              | 2-3/4 x 4-1/4                                | 2                 | 400335   | 4,266.37 |
| 52-1/2 - B36-6 | 50    | 2-1/2            | 36                              | 3-3/8 x 4-1/4                                | 2                 | 400340   | 6,336.90 |

\* Style A

## Arbor Running Bushings With Keyways



Standard keyways on bushing allow fixed mounting on arbor and prevent rotation.



| Bushing No. | Bushing O.D. | Hole Dia. | Bushing Length | Code No. | Price \$ |
|-------------|--------------|-----------|----------------|----------|----------|
| 2 - 7/8     | 1-5/8        | 7/8       | 2-5/8          | 400900   | 121.26   |
| 2 - 1       | 1-5/8        | 1         | 2-5/8          | 400905   | 144.96   |
| 2 - 1-1/4   | 1-7/8        | 1-1/4     | 2-5/8          | 400910   | 153.60   |
| 3 - 1       | 1-7/8        | 1         | 3-1/8          | 400920   | 181.93   |
| 3 - 1-1/4   | 1-7/8        | 1-1/4     | 3-1/8          | 400925   | 192.58   |
| 4 - 7/8     | 2-1/8        | 7/8       | 3-3/4          | 400930   | 203.54   |
| 4 - 1       | 2-1/8        | 1         | 3-3/4          | 400935   | 206.44   |
| 4 - 1-1/4   | 2-1/8        | 1-1/4     | 3-3/4          | 400940   | 181.34   |
| 4 - 1-1/2   | 2-1/8        | 1-1/2     | 3-3/4          | 400945   | 184.56   |
| 5 - 1       | 2-3/4        | 1         | 4-1/4          | 400955   | 226.35   |
| 5 - 1-1/4   | 2-3/4        | 1-1/4     | 4-1/4          | 400960   | 253.60   |
| 5 - 1-1/2   | 2-3/4        | 1-1/2     | 4-1/4          | 400965   | 271.73   |
| 5 - 2       | 2-3/4        | 2         | 4-1/4          | 400970   | 231.11   |

## Arbor Nuts

Arbor nuts are hardened and have a ground thread and shoulder.



| Thread Size  | For Arbor Diameter | Code No. | Price \$ |
|--------------|--------------------|----------|----------|
| 7/8 - 14RH   | 7/8                | 405105   | 104.11   |
| 1 - 14RH     | 1                  | 405110   | 137.19   |
| 1-1/4 - 12RH | 1-1/4              | 405115   | 156.60   |
| 1-1/2 - 12RH | 1-1/2              | 405120   | 273.48   |
| 2 - 12RH     | 2                  | 405125   | 357.95   |
| 2-1/2 - 12RH | 2-1/2              | 405130   | 520.04   |

## Arbor Solid Spacers With Keyways

Spacers are hardened and have parallel and perpendicular surfaces precisely ground to ensure precise operation of cutters on milling machine arbors.



| Width of Spacer | 7/8" Hole 1-3/8" O.D. Code No. | Price \$ | 1" Hole 1-1/2" O.D. Code No. | Price \$ | 1-1/4" Hole 1-3/4" O.D. Code No. | Price \$ | 1-1/2" Hole 2-1/8" O.D. Code No. | Price \$ | 2" Hole 2-3/4" O.D. Code No. | Price \$ |
|-----------------|--------------------------------|----------|------------------------------|----------|----------------------------------|----------|----------------------------------|----------|------------------------------|----------|
| 1/16            | 400405                         | 33.33    | 400490                       | 38.96    | 400575                           | 41.82    | 400660                           | 51.47    | 400745                       | 21.30    |
| 3/32            | 400410                         | 32.72    | 400495                       | 35.07    | -                                | -        | 400665                           | 50.08    | 400750                       | 21.30    |
| 1/8             | 400415                         | 40.43    | 400500                       | 45.05    | 400585                           | 41.83    | 400670                           | 54.70    | 400755                       | 70.79    |
| 3/16            | 400420                         | 10.20    | 400505                       | 45.05    | 400590                           | 42.35    | 400675                           | 50.16    | 400760                       | 63.64    |
| 1/4             | 400425                         | 41.53    | 400510                       | 51.48    | 400595                           | 51.48    | 400680                           | 61.14    | 400765                       | 67.73    |
| 5/16            | -                              | -        | 400515                       | 47.33    | 400600                           | 44.08    | 400685                           | 53.63    | 400770                       | 82.24    |
| 3/8             | 400435                         | 41.38    | 400520                       | 54.70    | 400605                           | 54.70    | 400690                           | 67.57    | 400775                       | 74.81    |
| 7/16            | 400440                         | 47.87    | -                            | -        | 400610                           | 53.37    | 400695                           | 67.22    | -                            | -        |
| 1/2             | 400445                         | 49.96    | 400530                       | 51.96    | 400615                           | 61.13    | 400700                           | 70.79    | 400785                       | 99.75    |
| 5/8             | 400450                         | 46.78    | 400535                       | 61.13    | 400620                           | 54.37    | -                                | -        | 400790                       | 67.89    |
| 3/4             | 400455                         | 54.89    | 400540                       | 70.79    | 400625                           | 73.99    | 400710                           | 83.66    | 400795                       | 115.82   |
| 7/8             | 400460                         | 66.34    | 400545                       | 69.75    | 400630                           | 63.13    | -                                | -        | 400800                       | 80.76    |
| 1               | 400465                         | 64.13    | 400550                       | 74.00    | 400635                           | 74.41    | 400720                           | 88.92    | 400805                       | 123.14   |
| 1-1/4           | 400470                         | 74.01    | 400555                       | 73.72    | 400640                           | 88.39    | 400725                           | 86.26    | 400810                       | 148.12   |
| 1-1/2           | 400475                         | 78.54    | -                            | -        | 400645                           | 83.59    | 400730                           | 46.62    | 400815                       | 104.88   |
| 2               | 400480                         | 80.11    | 400565                       | 102.95   | 400650                           | 107.52   | 400735                           | 141.75   | 400820                       | 176.49   |
| 3               | 400485                         | 46.62    | 400570                       | 118.73   | 400655                           | 115.61   | 400740                           | 168.72   | 400825                       | 215.52   |



# Collet Chucks

|  |        |
|--|--------|
| ER Collet Chucks - CAT, BT, HSK, NMTB & R8 Taper . . . . . | G18-21 |
| Dual Contact ER Collet Chucks . . . . .                    | G18-19 |
| ER Collet Chuck Extensions . . . . .                       | G21    |
| ER Collets . . . . .                                       | G22-32 |
| ER Collet Chuck Sets . . . . .                             | G23    |
| ER Collet Sets . . . . .                                   | G31-32 |
| ER Chuck Nuts, Wrenches, Backup Screws. . . . .            | G32    |
| SA Collet Chucks . . . . .                                 | G33    |
| SA Collets . . . . .                                       | G33-34 |
| TG Collet Chucks . . . . .                                 | G34-35 |
| TG 75, 100, 150 Collets & Sets. . . . .                    | G35-37 |
| TG Chuck Nuts, Wrenches, Backup Screws. . . . .            | G38    |
| Milling Chucks . . . . .                                   | G38-39 |
| Dual Contact Milling Chucks . . . . .                      | G39    |
| Milling Collets . . . . .                                  | G39    |
| DA Collet Chucks & Parts . . . . .                         | G39-40 |
| DA Collets . . . . .                                       | G40-41 |
| Type 25 & 32 Collet Sets . . . . .                         | G42    |
| Type 25 & Type 32 Collets . . . . .                        | G42    |
| 5C Collets & Set . . . . .                                 | G43    |
| Emergency Type Collet . . . . .                            | G43    |
| R8 Collets & Set . . . . .                                 | G43    |

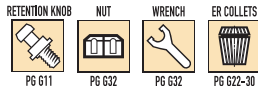
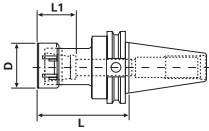
# Shrink Fit Tooling

|   |     |
|---|-----|
| Introduction to GS Shrink Fit Tooling . . . . . | G43 |
| CAT40 Shrink Fit Holders . . . . .              | G44 |
| CAT50 Shrink Fit Holders . . . . .              | G44 |
| BT30 Shrink Fit Holders . . . . .               | G45 |
| BT40 Shrink Fit Holders . . . . .               | G45 |
| HSK63 Shrink Fit Holders . . . . .              | G46 |
| HSK100 Shrink Fit Holders . . . . .             | G46 |



## CAT50 ER Collet Chucks

- DIN coolant option - standard
- All ground body
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0003" at 4xDia.
- Wrench not included
- AT2 Taper Accuracy
- RFID Chip Hole



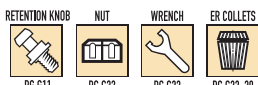
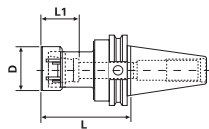
**PREMIUM BALANCE**  
**G2.5 at 25,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Collet Series | Collet Range | L     | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|-------|------|------|------------------------|----------|----------|
| CT50  | ER16**        | 0.019-0.406  | 4.12  | 0.87 | 1.26 | 56.9                   | 531432   | 300.60   |
| CT50  | ER16**        | 0.019-0.406  | 6.00  | 0.87 | 1.26 | 56.9                   | 531434   | 326.21   |
| CT50  | ER16**        | 0.019-0.406  | 8.00  | 0.87 | 1.26 | 56.9                   | 531436   | 430.00   |
| CT50  | ER16**        | 0.019-0.406  | 12.00 | 0.87 | 1.26 | 56.9                   | 531437   | 788.56   |
| CT50  | ER20**        | 0.039-0.511  | 2.50  | 1.06 | 1.38 | 81.3                   | 531438   | 308.69   |
| CT50  | ER20**        | 0.039-0.511  | 4.00  | 1.06 | 1.38 | 81.3                   | 531440   | 308.69   |
| CT50  | ER20**        | 0.039-0.511  | 6.00  | 1.06 | 1.38 | 81.3                   | 531442   | 308.69   |
| CT50  | ER20**        | 0.039-0.511  | 8.00  | 1.06 | 1.38 | 81.3                   | 531444   | 430.00   |
| CT50  | ER20**        | 0.039-0.511  | 12.00 | 1.06 | 1.38 | 81.3                   | 531445   | 788.56   |
| CT50  | ER25          | 0.039-0.629  | 2.50  | 1.18 | 1.65 | 128.8                  | 531446   | 292.51   |
| CT50  | ER25          | 0.039-0.629  | 4.00  | 1.18 | 1.65 | 128.8                  | 531448   | 292.51   |
| CT50  | ER25          | 0.039-0.629  | 6.00  | 1.18 | 1.65 | 128.8                  | 531450   | 324.86   |
| CT50  | ER25          | 0.039-0.629  | 8.00  | 1.18 | 1.65 | 128.8                  | 531452   | 430.00   |
| CT50  | ER32          | 0.078-0.787  | 0.750 |      |      |                        | 531403*  | 283.07   |
| CT50  | ER32          | 0.078-0.787  | 4.00  | 1.34 | 1.97 | 169.5                  | 531454   | 292.51   |
| CT50  | ER32          | 0.078-0.787  | 6.00  | 1.34 | 1.97 | 169.5                  | 531456   | 342.39   |
| CT50  | ER32          | 0.078-0.787  | 8.00  | 1.34 | 1.97 | 169.5                  | 531458   | 385.51   |
| CT50  | ER32          | 0.078-0.787  | 12.00 | 1.34 | 1.97 | 169.5                  | 531459   | 788.56   |
| CT50  | ER40          | 0.118-1.023  | 4.00  | 1.50 | 2.48 | 219.6                  | 531460   | 308.69   |
| CT50  | ER40          | 0.118-1.023  | 6.00  | 1.50 | 2.48 | 219.6                  | 531462   | 359.91   |
| CT50  | ER40          | 0.118-1.023  | 8.00  | 1.50 | 2.48 | 219.6                  | 531464   | 443.48   |

\* ER Shorty collet chuck, Not DIN coolant \*\* Hex Nut

## CAT50 DUAL CONTACT ER Collet Chucks

- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- DIN coolant option - standard
- All ground body
- TIR, 0.0003" at 4xDia.
- AT2 Taper Accuracy
- RFID Chip Hole



**PREMIUM BALANCE**  
**G2.5 at 25,000rpm**  
**CERTIFICATE INCLUDED**

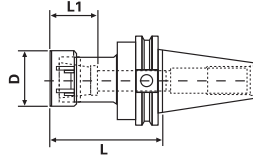
| Taper | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|------------------------|----------|----------|
| CT50  | ER16**        | 0.019-0.406  | 4.12 | 0.87 | 1.26 | 56.9                   | 521432   | 445.84   |
| CT50  | ER16**        | 0.019-0.406  | 6.00 | 0.87 | 1.26 | 56.9                   | 521434   | 466.10   |
| CT50  | ER16**        | 0.019-0.406  | 8.00 | 0.87 | 1.26 | 56.9                   | 521436   | 537.62   |
| CT50  | ER32          | 0.078-0.787  | 4.00 | 1.34 | 1.97 | 169.5                  | 521454   | 437.48   |
| CT50  | ER32          | 0.078-0.787  | 6.00 | 1.34 | 1.97 | 169.5                  | 521456   | 530.47   |
| CT50  | ER32          | 0.078-0.787  | 8.00 | 1.34 | 1.97 | 169.5                  | 521458   | 511.40   |

\*\* Hex Nut

## STM CAT50 ER Collet Chucks



- DIN coolant option - standard
- Factory balanced to save spindle life, tool life and increased productivity
- TIR, 0.0002" at 4xDia.
- Wrench not included
- AT2 Taper Accuracy
- RFID Chip Hole



**BALANCE CERTIFICATE**  
**G2.5 at 15,000rpm**  
**INCLUDED**

| Taper | Collet Series | Collet Range | L     | L1    | D     | Code No. | Price \$ |
|-------|---------------|--------------|-------|-------|-------|----------|----------|
| CT50  | ER16*         | 0.019-0.413" | 4.12" | 0.87" | 1.26" | 525432   | 115.53   |
| CT50  | ER16*         | 0.019-0.413" | 6.00" | 0.87" | 1.26" | 525434   | 139.25   |
| CT50  | ER20*         | 0.019-0.551" | 4.00" | 1.06" | 1.38" | 525440   | 115.53   |
| CT50  | ER20*         | 0.019-0.551" | 6.00" | 1.06" | 1.38" | 525442   | 139.25   |
| CT50  | ER32          | 0.078-0.787" | 4.00" | 1.34" | 1.97" | 525454   | 115.53   |
| CT50  | ER32          | 0.078-0.787" | 6.00" | 1.34" | 1.97" | 525456   | 139.25   |

\* Hex Nut



From simple to deluxe, we have a Tool Setting Stand to suit your needs.

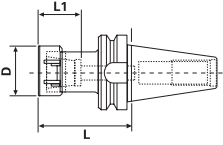
See Page G91



## BT Taper ER Collet Chucks



- DIN coolant option - standard
- All ground body
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- Wrench not included
- AT2 Taper Accuracy
- RFID Chip Hole



**PREMIUM BALANCE**  
G2.5 at 30,000rpm  
CERTIFICATE INCLUDED

**PREMIUM BALANCE**  
G2.5 at 25,000rpm  
CERTIFICATE INCLUDED

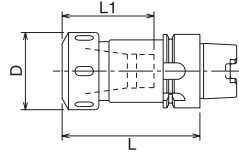
| Taper       | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------------|---------------|--------------|------|------|------|------------------------|----------|----------|
| <b>BT30</b> |               |              |      |      |      |                        |          |          |
| BT30        | ER11**        | 0.019-0.275  | 2.00 | 0.65 | 0.75 | 29.8                   | 532150*  | 220.76   |
| BT30        | ER11**        | 0.019-0.275  | 4.00 | 0.65 | 0.75 | 29.8                   | 532152*  | 223.53   |
| BT30        | ER16**        | 0.019-0.406  | 2.36 | 0.87 | 1.26 | 56.9                   | 532154*  | 220.76   |
| BT30        | ER16**        | 0.019-0.406  | 4.00 | 0.87 | 1.26 | 56.9                   | 532156*  | 223.53   |
| BT30        | ER16**        | 0.019-0.406  | 5.00 | 0.87 | 1.26 | 56.9                   | 532158*  | 230.47   |
| BT30        | ER16**        | 0.019-0.406  | 6.00 | 0.87 | 1.26 | 56.9                   | 532160*  | 256.86   |
| BT30        | ER20**        | 0.039-0.511  | 2.50 | 1.06 | 1.38 | 81.3                   | 532162*  | 220.76   |
| BT30        | ER20**        | 0.039-0.511  | 4.00 | 1.06 | 1.38 | 81.3                   | 532164*  | 256.86   |
| BT30        | ER25          | 0.039-0.629  | 2.00 | 1.18 | 1.65 | 128.8                  | 532166*  | 267.95   |
| BT30        | ER25          | 0.039-0.629  | 4.00 | 1.18 | 1.65 | 128.8                  | 532168*  | 267.95   |
| BT30        | ER32          | 0.078-0.787  | 3.00 | 1.34 | 1.97 | 169.5                  | 532170*  | 226.31   |
| BT30        | ER32          | 0.078-0.787  | 5.00 | 1.34 | 1.97 | 169.5                  | 532172*  | 274.91   |
| <b>BT40</b> |               |              |      |      |      |                        |          |          |
| BT40        | ER11**        | 0.019-0.275  | 4.00 | 0.65 | 0.75 | 29.8                   | 532176   | 248.53   |
| BT40        | ER11**        | 0.019-0.275  | 6.00 | 0.65 | 0.75 | 29.8                   | 532178   | 280.46   |
| BT40        | ER16**        | 0.019-0.406  | 3.50 | 0.87 | 1.26 | 56.9                   | 532180   | 248.53   |
| BT40        | ER16**        | 0.019-0.406  | 5.00 | 0.87 | 1.26 | 56.9                   | 532182   | 273.52   |
| BT40        | ER20**        | 0.039-0.511  | 2.50 | 1.06 | 1.38 | 81.3                   | 532184   | 248.53   |
| BT40        | ER20**        | 0.039-0.511  | 4.00 | 1.06 | 1.38 | 81.3                   | 532186   | 248.53   |
| BT40        | ER20**        | 0.039-0.511  | 6.00 | 1.06 | 1.38 | 81.3                   | 532188   | 284.62   |
| BT40        | ER25          | 0.039-0.629  | 2.25 | 1.18 | 1.65 | 128.8                  | 532190   | 256.86   |
| BT40        | ER25          | 0.039-0.629  | 4.00 | 1.18 | 1.65 | 128.8                  | 532192   | 208.26   |
| BT40        | ER25          | 0.039-0.629  | 6.00 | 1.18 | 1.65 | 128.8                  | 532194   | 290.17   |
| BT40        | ER32          | 0.078-0.787  | 1.06 |      |      |                        | 532191*  | 224.92   |
| BT40        | ER32          | 0.078-0.787  | 3.13 | 1.34 | 1.97 | 169.5                  | 532196   | 248.53   |
| BT40        | ER32          | 0.078-0.787  | 5.00 | 1.34 | 1.97 | 169.5                  | 532198   | 284.62   |
| BT40        | ER40          | 0.118-1.023  | 3.13 | 1.50 | 2.50 | 219.6                  | 532200   | 284.62   |
| BT40        | ER40          | 0.118-1.023  | 5.00 | 1.50 | 2.50 | 219.6                  | 532202   | 317.95   |
| <b>BT50</b> |               |              |      |      |      |                        |          |          |
| BT50        | ER16**        | 0.019-0.406  | 2.50 | 0.87 | 1.26 | 56.9                   | 532203   | 326.21   |
| BT50        | ER25          | 0.039-0.629  | 4.00 | 1.18 | 1.65 | 128.8                  | 532206   | 326.21   |

\* Not DIN Coolant  
\*\* Hex Nut  
‡ ER Shorty Collet Chuck

## HSK63A ER Collet Chucks



- All ground body
- High rigidity and torque transmission
- Wrench not included
- AT2 Taper Accuracy
- RFID chip hole



**PREMIUM BALANCE**  
G2.5 at 30,000rpm  
CERTIFICATE INCLUDED

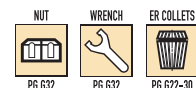
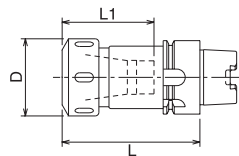
| Taper  | Collet Series | Collet Range | L    | L1    | D     | Tightening Torque (Nm) | Code No. | Price \$ |
|--------|---------------|--------------|------|-------|-------|------------------------|----------|----------|
| HSK63A | ER16**        | 0.019-0.393  | 3.00 | 0.866 | 1.260 | 56.9                   | 536114   | 484.55   |
| HSK63A | ER16**        | 0.019-0.393  | 5.00 | 0.866 | 1.260 | 56.9                   | 536116   | 484.55   |
| HSK63A | ER20**        | 0.039-0.511  | 3.00 | 1.062 | 1.378 | 81.3                   | 536118   | 484.55   |
| HSK63A | ER20**        | 0.039-0.511  | 5.00 | 1.062 | 1.378 | 81.3                   | 536120   | 484.55   |
| HSK63A | ER25          | 0.039-0.629  | 3.00 | 1.181 | 1.654 | 128.8                  | 536122   | 484.55   |
| HSK63A | ER25          | 0.039-0.629  | 5.00 | 1.181 | 1.654 | 128.8                  | 536124   | 484.55   |
| HSK63A | ER32          | 0.078-0.787  | 4.00 | 1.260 | 1.969 | 169.5                  | 536126   | 484.55   |
| HSK63A | ER32          | 0.078-0.787  | 6.00 | 1.260 | 1.969 | 169.5                  | 536128   | 565.08   |
| HSK63A | ER40          | 0.118-1.023  | 4.00 | 1.496 | 2.480 | 219.6                  | 536130   | 520.65   |

\*\* Hex Nut

## HSK100A ER Collet Chucks



- All ground body
- High rigidity and torque transmission
- Wrench not included
- AT2 Taper Accuracy
- RFID chip hole

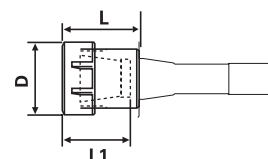


**PREMIUM BALANCE**  
G2.5 at 25,000rpm  
CERTIFICATE INCLUDED

| Taper   | Collet Series | Collet Range | L    | L1    | D     | Tightening Torque (Nm) | Code No. | Price \$ |
|---------|---------------|--------------|------|-------|-------|------------------------|----------|----------|
| HSK100A | ER16**        | 0.019-0.393  | 4.00 | 0.866 | 1.260 | 56.9                   | 536134   | 555.37   |
| HSK100A | ER16**        | 0.019-0.393  | 6.00 | 0.866 | 1.260 | 56.9                   | 536136   | 701.14   |
| HSK100A | ER20**        | 0.039-0.511  | 4.00 | 1.062 | 1.378 | 81.3                   | 536138   | 555.37   |
| HSK100A | ER20**        | 0.039-0.511  | 6.00 | 1.062 | 1.378 | 81.3                   | 536140   | 701.14   |
| HSK100A | ER25          | 0.039-0.629  | 6.00 | 1.181 | 1.654 | 128.8                  | 536144   | 701.14   |
| HSK100A | ER32          | 0.078-0.787  | 4.00 | 1.260 | 1.969 | 169.5                  | 536146   | 713.65   |
| HSK100A | ER32          | 0.078-0.787  | 6.00 | 1.260 | 1.969 | 169.5                  | 536148   | 765.01   |
| HSK100A | ER40          | 0.118-1.023  | 6.00 | 1.496 | 2.480 | 219.6                  | 536152   | 874.69   |

\*\* Hex Nut

## R8 Taper ER Collet Chucks



| Taper | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|------------------------|----------|----------|
| R8    | ER16          | 0.019-0.406  | 1.25 | 2.83 | 1.25 | 56.9                   | 534360   | 153.92   |
| R8    | ER20          | 0.039-0.511  | 2.00 | 1.50 | 1.38 | 81.3                   | 534362   | 153.92   |
| R8    | ER25          | 0.039-0.629  | 2.50 | 1.64 | 1.66 | 128.8                  | 534364   | 159.72   |

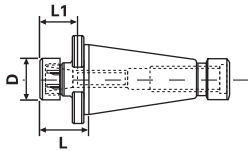
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## NMTB Taper ER Collet Chucks



- Wrench not included

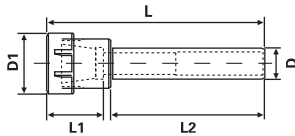


| Taper         | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|---------------|---------------|--------------|------|------|------|------------------------|----------|----------|
| <b>NMTB40</b> |               |              |      |      |      |                        |          |          |
| NMTB40        | ER16          | 0.019-0.406  | 1.77 | 0.87 | 1.26 | 56.9                   | 534352   | 201.12   |
| NMTB40        | ER25          | 0.039-0.629  | 2.00 | 1.18 | 1.65 | 128.8                  | 534354   | 210.10   |
| NMTB40        | ER32          | 0.078-0.787  | 2.00 | -    | -    | -                      | 534260   | 192.13   |
| <b>NMTB50</b> |               |              |      |      |      |                        |          |          |
| NMTB50        | ER16          | 0.019-0.406  | 2.00 | 0.87 | 1.26 | 56.6                   | 534356   | 242.05   |

## ER Collet Chuck Extensions



- Wrench not included



| Collet Series | Collet Range | Shank Dia. (D) | D1    | L    | L1    | L2   | Tightening Torque (Nm) | Code No. | Price \$ |
|---------------|--------------|----------------|-------|------|-------|------|------------------------|----------|----------|
| ER11          | 0.019-0.275  | 1/2            | 0.740 | 6.11 | 0.091 | 5.00 | 29.8                   | 534368   | 175.23   |
| ER11          | 0.019-0.275  | 5/8            | 0.740 | 6.11 | 0.091 | 5.00 | 29.8                   | 534370   | 212.43   |
| ER11          | 0.019-0.275  | 3/4            | 0.740 | 5.65 | 0.091 | 5.00 | 29.8                   | 534372   | 210.58   |
| ER16          | 0.019-0.406  | 5/8            | 1.26  | 6.48 | 1.28  | 5.00 | 56.9                   | 534374   | 195.76   |
| ER16          | 0.019-0.406  | 3/4            | 1.26  | 6.48 | 1.28  | 5.00 | 56.9                   | 534376   | 212.43   |
| ER16          | 0.019-0.406  | 1              | 1.26  | 5.89 | 1.28  | 5.00 | 56.9                   | 534378   | 225.53   |
| ER20          | 0.039-0.511  | 3/4            | 1.38  | 6.67 | 1.48  | 5.00 | 81.3                   | 534380   | 166.61   |
| ER20          | 0.039-0.511  | 1              | 1.38  | 6.40 | 1.48  | 5.00 | 81.3                   | 534382   | 224.92   |
| ER20          | 0.039-0.511  | 1-1/4          | 1.38  | 6.40 | 1.48  | 5.00 | 81.3                   | 534384   | 225.53   |
| ER25          | 0.039-0.629  | 3/4            | 1.65  | 6.85 | 1.65  | 5.00 | 128.8                  | 534386   | 226.16   |
| ER25          | 0.039-0.629  | 1              | 1.65  | 6.85 | 1.65  | 5.00 | 128.8                  | 534388   | 212.43   |
| ER25          | 0.039-0.629  | 1-1/4          | 1.65  | 6.00 | 1.65  | 5.00 | 128.8                  | 534390   | 226.16   |
| ER32          | 0.078-0.787  | 1              | 1.97  | 7.09 | 1.85  | 5.00 | 169.5                  | 534392   | 362.36   |
| ER32          | 0.078-0.787  | 1-1/4          | 1.97  | 6.30 | 2.13  | 4.00 | 169.5                  | 337805   | 273.45   |
| ER32          | 0.078-0.787  | 1-1/4          | 1.97  | 7.09 | 1.85  | 5.00 | 169.5                  | 534394   | 270.75   |

## R8 Taper ER Collet Chucks



- Wrench not included



| Collet Series | Gauge Length | Nose Dia. | Draw Bar       | Code No. | Price \$ |
|---------------|--------------|-----------|----------------|----------|----------|
| ER32          | 40mm         | 50mm      | 7/16-20 UNF-3  | 337815   | 273.45   |
| ER40          | 70mm         | 63mm      | 7/16-20 UNF-3B | 337820   | 334.16   |

## NMTB Taper ER Collet Chucks



- Wrench not included

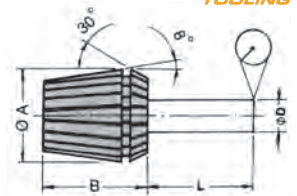


| Taper  | Collet Series | Gauge Length | Nose Dia. | Draw Bar | Code No. | Price \$ |
|--------|---------------|--------------|-----------|----------|----------|----------|
| NMTB30 | ER32          | 55           | 50        | 1/2-13   | 337825   | 273.45   |
| NMTB30 | ER40          | 85           | 63        | 1/2-13   | 337830   | 334.16   |
| NMTB40 | ER40          | 55           | 63        | 5/8-11   | 337835   | 340.22   |
| NMTB50 | ER40          | 58           | 63        | 1-8      | 337840   | 455.70   |

## ER Spring Collet Dimensional Data



ER collet system is made of special elastic steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

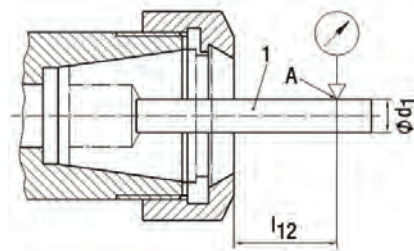


| Type | A (mm) | B (mm) | L (mm) | øD (mm) | DIN 6343 Precision | GS Precision |
|------|--------|--------|--------|---------|--------------------|--------------|
| ER11 | 11.5   | 18     | -      | 0.5-7   | 0.02               | 0.010        |
| ER16 | 17     | 27     | 6      | 0.5-10  | 0.02               | 0.010        |
| ER20 | 21     | 31     | 10     | 1-14    | 0.02               | 0.010        |
| ER25 | 26     | 35     | 16     | 1-17    | 0.02               | 0.010        |
| ER32 | 33     | 40     | 25     | 2-20    | 0.02               | 0.010        |
| ER40 | 41     | 46     | 40     | 3-26    | 0.03               | 0.010        |
| ER50 | 52     | 60     | 50     | 10-32   | 0.03               | 0.010        |

## Mounting Instructions for ER Collets

- Place collet inside nut and rotate the nut to engage with the extractor spiral in collet groove
  - Only then mount nut and collet together into the collet holder or machine spindle
- Note: Never use a 11-12mm collet to clamp a 12mm diameter, but rather use a 12-13mm collet

## 5 Micron AA ER Collet Tolerance Values



## Collet Run-Out Tolerance Values

| d1<br>H7<br>Nominal Diameter |                  | 112 | Run-Out Tolerance A |         |
|------------------------------|------------------|-----|---------------------|---------|
| Above                        | Up To (included) |     | Class 1             | Class 2 |
| 1 (included)                 | 1.6              | 6   | 0.005               | 0.015   |
| 1,6                          | 3                | 10  |                     |         |
| 3                            | 6                | 16  |                     |         |
| 6                            | 10               | 25  | 0.005               | 0.020   |
| 10                           | 18               | 40  |                     |         |
| 18                           | 26               | 50  |                     |         |

Introducing...



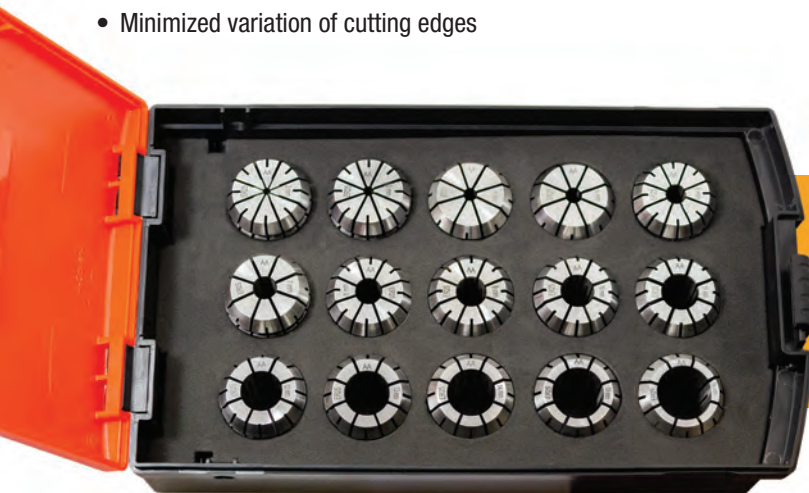
## EXTREME PRECISION 5 MICRON COLLETS

Nothing else compares.

DIN 6343 Precision Collets have a runout of 20-30 microns (0.02 - 0.03mm)  
 GS High Precision Collets have a runout of 10-20 microns (0.01 - 0.02mm)  
 The new **GS Extreme Precision AA Collets** have a runout of only 5 microns (0.005mm)

### Features & Benefits:

- 16 slots allows sufficient collapse while increasing the area of contact with less tendency to distort
- All edges are deburred and rounded to promote good interface with the taper of the chuck without the tendency to damage it. This results in more consistent repeatability
- Collets are polished to eliminate blemishes that promote corrosion. Better corrosion resistance will result in longer product life of both the collet and the holder between the collet and the cutting tool shank
- Minimized variation of cutting edges
- Maximized Concentricity
- Evenly distributed cutting edges for high performance machining
- Highly polished OD surfaces reduce the amount of force absorbed by friction between the collet and the collet chuck seat, increasing the grip force on the cutting tool. The inside bore of the collet is intentionally left unpolished to increase the friction
- Improve system performance and lower cost per piece when used with quality GS chucks
- Consistent cutting profiles ensure the job stays within desired tolerances



The result of an improved AA collet in a quality GS chuck is increased gripping force, improved rigidity, decreased runout, and a renewed confidence in your collet chuck system.

### 5 Micron AA ER Collet Sets



| Series        | No. Pcs.        | Range           | Code No. | Price \$        |
|---------------|-----------------|-----------------|----------|-----------------|
| <b>Metric</b> |                 |                 |          |                 |
| ER11          | Metric 13pc Set | 1-7mm x 0.5mm   | 336986   | <b>626.96</b>   |
| ER16          | Metric 10pc Set | 1-10mm x 1.0mm  | 336987   | <b>503.24</b>   |
| ER20          | Metric 12pc Set | 2-13mm x 1.0mm  | 336988   | <b>641.63</b>   |
| ER25          | Metric 15pc Set | 2-16mm x 1.0mm  | 336989   | <b>817.76</b>   |
| ER32          | Metric 18pc Set | 3-20mm x 1.0mm  | 336990   | <b>981.32</b>   |
| ER40          | Metric 23pc Set | 4-26mm x 1.0mm  | 336991   | <b>1,374.47</b> |
| <b>Inch</b>   |                 |                 |          |                 |
| ER11          | Inch 7pc Set    | 1/16-1/4 x 1/32 | 336992   | <b>337.59</b>   |
| ER16          | Inch 11pc Set   | 1/16-3/8 x 1/32 | 336993   | <b>553.56</b>   |
| ER20          | Inch 15pc Set   | 1/16-1/2 x 1/32 | 336994   | <b>802.04</b>   |
| ER25          | Inch 18pc Set   | 3/32-5/8 x 1/32 | 336995   | <b>981.32</b>   |
| ER32          | Inch 21pc Set   | 1/8-3/4 x 1/32  | 336996   | <b>1,144.87</b> |
| ER40          | Inch 15pc Set   | 1/8-1" x 1/16   | 336997   | <b>896.39</b>   |



## ER Collet Chuck Sets



Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

- Wrench included



| Shank       | Collet Set                              | Code No. | Price \$        |
|-------------|---|----------|-----------------|
| <b>ER16</b> |   |          |                 |
| 3/4 x 4     | 10 collets in set (range 0.019 - 0.393) | 337700   | <b>510.59</b>   |
| 3/4 x 6     | 10 collets in set (range 0.019 - 0.393) | 337705   | <b>551.44</b>   |
| R8          | 10 collets in set (range 0.019 - 0.393) | 337710   | <b>567.98</b>   |
| <b>ER20</b> |   |          |                 |
| 3/4 x 4     | 12 collets in set (range 0.039 - 0.511) | 337715   | <b>633.13</b>   |
| 3/4 x 6     | 12 collets in set (range 0.039 - 0.511) | 337720   | <b>673.98</b>   |
| <b>ER32</b> |   |          |                 |
| 1-1/4 x 4   | 11 collets in set (range 0.080 - 0.787) | 337730   | <b>701.21</b>   |
| ISO-30      | 11 collets in set (range 0.080 - 0.787) | 337735   | <b>701.21</b>   |
| R8          | 11 collets in set (range 0.080 - 0.787) | 337740   | <b>932.61</b>   |
| <b>ER40</b> |   |          |                 |
| R8          | 15 collets in set (range 0.120 - 1.020) | 337745   | <b>792.37</b>   |
| ISO-30      | 15 collets in set (range 0.120 - 1.020) | 337750   | <b>959.91</b>   |
| ISO-40      | 15 collets in set (range 0.120 - 1.020) | 337755   | <b>1,102.50</b> |
| ISO-50      | 23 collets in set (range 0.120 - 1.020) | 337760   | <b>1,416.04</b> |

## ER11 Collets



Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

- Size range: 0.5mm - 7mm (0.019" - 0.275")
- ER11 collets collapse approximately 1/64" with full accuracy

AA Collets have a runout of only 5 microns (0.005mm)



REGULAR

| Size (mm)       | Size (in.)      | Code No. | Price \$      | AA Code No. | Price \$      |
|-----------------|-----------------|----------|---------------|-------------|---------------|
| <b>Metric</b>   |                 |          |               |             |               |
| 0.5-1           | 0.019-0.039     | 337650*  | <b>37.73</b>  | 336700*     | <b>54.51</b>  |
| 1-1.5           | 0.039-0.059     | 337652*  | <b>37.73</b>  | 336702*     | <b>54.51</b>  |
| 1.5-2           | 0.059-0.078     | 337654*  | <b>37.73</b>  | 336705*     | <b>54.51</b>  |
| 2-2.5           | 0.078-0.098     | 337656*  | <b>37.73</b>  | 336707*     | <b>54.51</b>  |
| 2.5-3           | 0.098-0.118     | 337658*  | <b>31.26</b>  | 336709*     | <b>48.22</b>  |
| 3-3.5           | 0.118-0.137     | 337660*  | <b>31.26</b>  | 336711*     | <b>48.22</b>  |
| 3.5-4           | 0.137-0.157     | 337662*  | <b>31.26</b>  | 336714*     | <b>48.22</b>  |
| 4-4.5           | 0.157-0.177     | 337664*  | <b>31.26</b>  | 336716*     | <b>48.22</b>  |
| 4.5-5           | 0.177-0.196     | 337666*  | <b>31.26</b>  | 336718*     | <b>48.22</b>  |
| 5-5.5           | 0.196-0.216     | 337668*  | <b>31.26</b>  | 336720*     | <b>48.22</b>  |
| 5.5-6           | 0.216-0.236     | 337670*  | <b>31.26</b>  | 336723*     | <b>48.22</b>  |
| 6-6.5           | 0.236-0.255     | 337672*  | <b>31.26</b>  | 336725*     | <b>48.22</b>  |
| 6.5-7           | 0.255-0.275     | 337674*  | <b>31.26</b>  | 336727*     | <b>48.22</b>  |
| <b>13pc Set</b> | <b>1-7mm</b>    | 337379   | <b>409.61</b> | 336986      | <b>626.96</b> |
| <b>Inch</b>     |                 |          |               |             |               |
|                 | 3/64            | 337609   | <b>38.81</b>  | 336701      | <b>54.51</b>  |
|                 | 1/16            | 337610*  | <b>38.81</b>  | 336703*     | <b>54.51</b>  |
|                 | 5/64            | 337611   | <b>38.81</b>  | 336704      | <b>54.51</b>  |
|                 | 3/32            | 337613*  | <b>37.73</b>  | 336706*     | <b>54.51</b>  |
|                 | 7/64            | 337614   | <b>38.81</b>  | 336708      | <b>54.51</b>  |
|                 | 1/8             | 337615*  | <b>31.26</b>  | 336710*     | <b>48.22</b>  |
|                 | 9/64            | 337617   | <b>31.26</b>  | 336712      | <b>48.22</b>  |
|                 | 5/32            | 337618*  | <b>31.26</b>  | 336713*     | <b>48.22</b>  |
|                 | 11/64           | 337619   | <b>31.26</b>  | 336715      | <b>48.22</b>  |
|                 | 3/16            | 337651*  | <b>31.26</b>  | 336717*     | <b>48.22</b>  |
|                 | 13/64           | 337653   | <b>31.26</b>  | 336719      | <b>48.22</b>  |
|                 | 7/32            | 337655*  | <b>31.26</b>  | 336721*     | <b>48.22</b>  |
|                 | 15/64           | 337657   | <b>31.26</b>  | 336722      | <b>48.22</b>  |
|                 | 1/4             | 337659*  | <b>31.26</b>  | 336724*     | <b>48.22</b>  |
|                 | 17/64           | 337661   | <b>31.26</b>  | 336726      | <b>48.22</b>  |
|                 | 9/32            | 337627   | <b>37.73</b>  | 336728      | <b>54.51</b>  |
| <b>7pc Set</b>  | <b>1/16-1/4</b> | 337401   | <b>223.13</b> | 336992      | <b>337.59</b> |

\* Part of Set

## ER8 Collets



Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

- Size range: 0.5mm - 5mm (0.019" - 0.196")
- ER8 collets collapse approximately 0.3mm with full accuracy



| Size (mm)     | Size (in.)  | Code No. | Price \$     |
|---------------|-------------|----------|--------------|
| <b>Metric</b> |             |          |              |
| 0.5-1.0       | 0.019-0.039 | 337635   | <b>39.97</b> |
| 1.0-1.5       | 0.039-0.059 | 337637   | <b>39.97</b> |
| 2.0-2.5       | 0.078-0.098 | 337641   | <b>39.97</b> |
| 2.5-3.0       | 0.098-0.118 | 337643   | <b>39.97</b> |
| 3.0-3.5       | 0.118-0.137 | 337645   | <b>39.97</b> |
| 3.5-4.0       | 0.137-0.157 | 337647   | <b>39.97</b> |
| 4.0-4.5       | 0.157-0.177 | 337648   | <b>39.97</b> |
| 4.5-5.0       | 0.177-0.196 | 337649   | <b>39.97</b> |
| <b>Inch</b>   |             |          |              |
|               | 1/16        | 337629   | <b>39.97</b> |
|               | 1/8         | 337631   | <b>39.97</b> |
|               | 3/16        | 337625   | <b>39.97</b> |

## ER11 Sealed Collets



- Sealed for coolant through applications
- Pressure resistance tested to 500 psi
- Size range: 3/6 - 17/64", 4.0 - 7.0mm



| Size (in/mm)   | Code No. | Price \$      |
|----------------|----------|---------------|
| <b>Metric</b>  |          |               |
| 4.5            | 337636   | <b>78.24</b>  |
| 5.5            | 337640   | <b>78.24</b>  |
| 6.0            | 337642   | <b>78.24</b>  |
| 6.5            | 337644   | <b>78.24</b>  |
| 7.0            | 337646   | <b>78.24</b>  |
| <b>Inch</b>    |          |               |
| 3/16           | 337622   | <b>78.24</b>  |
| 13/64          | 337624   | <b>78.24</b>  |
| 7/32           | 337626   | <b>78.24</b>  |
| 15/64          | 337628   | <b>78.24</b>  |
| 1/4            | 337630   | <b>78.24</b>  |
| 17/64          | 337632   | <b>78.24</b>  |
| <b>6pc Set</b> | 337929   | <b>469.44</b> |

## ER11 Tap Collets



- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity

| Tap           | Shank Dia. | Size of Square | Code No. | Price \$     |
|---------------|------------|----------------|----------|--------------|
| <b>Metric</b> |            |                |          |              |
| M1.4 - M1.8   | 2.5mm      | 2.1mm          | 337911   | <b>63.19</b> |
| M2 - M2.6     | 2.8mm      | 2.1mm          | 337913   | <b>63.19</b> |
| M2 - M2.6     | 3.0mm      | 2.5mm          | 337915   | <b>63.19</b> |
| <b>Inch</b>   |            |                |          |              |
| #0-#6         | 0.141"     | 0.110"         | 337966   | <b>63.19</b> |
| #8            | 0.168"     | 0.131"         | 337967   | <b>63.19</b> |
| #10           | 0.194"     | 0.152"         | 337968   | <b>63.19</b> |
| #12           | 0.220"     | 0.165"         | 337969   | <b>63.19</b> |

- See page G31, G32 for Sets
- See page G21 for Dimensional Data

## ER16 Collets



Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

- Size range: 0.5mm-10mm (0.019" - 0.393")
- ER16 collets collapse approximately 1/32" with full accuracy



REGULAR

AA Collets have a runout of only 5 microns (0.005mm)

| Size (mm)       | Size (in.)      | Code No. | Price \$      | AA Code No. | Price \$      |
|-----------------|-----------------|----------|---------------|-------------|---------------|
| <b>Metric</b>   |                 |          |               |             |               |
| 0.5-1           | 0.019-0.039     | 337302*  | 44.19         | 336729*     | 60.81         |
| 1-1.5           | 0.039-0.059     |          |               | 336730      | 60.81         |
| 1-2             | 0.039-0.078     | 337304*  | 44.19         |             |               |
| 1.5-2           | 0.059-0.078     |          |               | 336732*     | 60.81         |
| 2-2.5           | 0.078-0.098     |          |               | 336734      | 60.81         |
| 2-3             | 0.078-0.118     | 337306*  | 33.42         |             |               |
| 2.5-3           | 0.098-0.118     |          |               | 336735*     | 50.33         |
| 3-3.5           | 0.118-0.137     |          |               | 336737      | 50.33         |
| 3-4             | 0.118-0.157     | 337308*  | 33.42         |             |               |
| 3.5-4           | 0.137-0.157     |          |               | 336740*     | 50.33         |
| 4-4.5           | 0.157-0.177     |          |               | 336741      | 50.33         |
| 4-5             | 0.157-0.196     | 337310*  | 33.42         |             |               |
| 4.5-5           | 0.177-0.196     |          |               | 336743*     | 50.33         |
| 5-5.5           | 0.196-0.217     |          |               | 336744      | 50.33         |
| 5-6             | 0.196-0.236     | 337312*  | 33.42         |             |               |
| 5.5-6           | 0.217-0.236     |          |               | 336746*     | 50.33         |
| 6-6.5           | 0.236-0.256     |          |               | 336748      | 50.33         |
| 6-7             | 0.236-0.275     | 337314*  | 33.42         |             |               |
| 6.5-7           | 0.256-0.275     |          |               | 336749*     | 50.33         |
| 7-7.5           | 0.275-0.295     |          |               | 336751      | 50.33         |
| 7-8             | 0.275-0.314     | 337316*  | 33.42         |             |               |
| 7.5-8           | 0.295-0.314     |          |               | 336753*     | 50.33         |
| 8-8.5           | 0.314-0.335     |          |               | 336754      | 50.33         |
| 8-9             | 0.314-0.354     | 337318*  | 33.42         |             |               |
| 8.5-9           | 0.335-0.354     |          |               | 336756*     | 50.33         |
| 9-9.5           | 0.354-0.374     |          |               | 336757      | 50.33         |
| 9-10            | 0.354-0.393     | 337320*  | 33.42         |             |               |
| 9.5-10          | 0.374-0.393     |          |               | 336759*     | 50.33         |
| <b>10pc Set</b> | <b>1-10mm</b>   | 337380   | <b>305.05</b> | 336987      | <b>503.24</b> |
| <b>Inch</b>     |                 |          |               |             |               |
|                 | 1/16            | 337531*  | 44.19         | 336731*     | 60.81         |
|                 | 3/32            | 337532*  | 33.42         | 336733*     | 60.81         |
|                 | 1/8             | 337533*  | 33.42         | 336736*     | 50.33         |
|                 | 9/64            | 337529   | 33.41         | 336738      | 50.33         |
|                 | 5/32            | 337534*  | 33.42         | 336739*     | 50.33         |
|                 | 3/16            | 337535*  | 33.42         | 336742*     | 50.33         |
|                 | 7/32            | 337536*  | 33.42         | 336745*     | 50.33         |
|                 | 1/4             | 337537*  | 33.42         | 336747*     | 50.33         |
|                 | 9/32            | 337538*  | 33.42         | 336750*     | 50.33         |
|                 | 5/16            | 337540*  | 33.42         | 336752*     | 50.33         |
|                 | 11/32           | 337541*  | 33.42         | 336755*     | 50.33         |
|                 | 3/8             | 337542*  | 33.42         | 336758*     | 50.33         |
|                 | 13/32           | 337543   | 33.42         | 336760      | 50.33         |
| <b>11pc Set</b> | <b>1/16-3/8</b> | 337403   | <b>367.57</b> | 336993      | <b>553.56</b> |

\* Part of Set

## ER16 Sealed Collets



- Sealed for coolant through applications
- Pressure resistance tested to 2000 psi

| Metric Size     | Metric Code No. | Price \$      | Inch Size       | Inch Code No. | Price \$      |
|-----------------|-----------------|---------------|-----------------|---------------|---------------|
| 3.0             | 338290          | 62.59         | 1/8             | 337841*       | 63.79         |
| 3.5             | 338291          | 63.79         | 5/32            | 337842*       | 63.79         |
| 4.0             | 338292*         | 63.79         | 3/16            | 337843*       | 63.79         |
| 4.5             | 338294*         | 63.79         | 13/64           | 337826        | 63.79         |
| 5.0             | 338296*         | 63.79         | 7/32            | 337844*       | 63.79         |
| 5.5             | 338298*         | 63.79         | 15/64           | 337827        | 63.79         |
| 6.0             | 338300*         | 63.79         | 1/4             | 337845*       | 63.79         |
| 6.5             | 338302*         | 63.79         | 17/64           | 337828        | 63.79         |
| 7.0             | 338304*         | 63.79         | 9/32            | 337846*       | 63.79         |
| 7.5             | 338305*         | 63.79         | 19/64           | 337829        | 63.79         |
| 8.0             | 338306*         | 63.79         | 5/16            | 337847*       | 63.79         |
| 8.5             | 338307*         | 63.79         | 21/64           | 337831        | 63.79         |
| 9.0             | 338308*         | 63.79         | 11/32           | 337848*       | 63.79         |
| 9.5             | 338309*         | 63.79         | 23/64           | 337832        | 63.79         |
| 10.0            | 338310*         | 63.79         | 3/8             | 337849*       | 63.79         |
|                 |                 |               | 25/64           | 337833        | 63.79         |
|                 |                 |               | 13/32           | 337834*       | 63.79         |
| <b>13pc Set</b> | 337932          | <b>829.27</b> | <b>10pc Set</b> | 337931        | <b>731.47</b> |

\* Part of Set

## ER16 Tap Collets



- Alloy steel
- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity
- See page G63-64 for rigid tapping holders



| Tap            | Shank Dia. | Size of Square | Code No.  | Price \$      |
|----------------|------------|----------------|-----------|---------------|
| <b>Metric</b>  |            |                |           |               |
| M1.4-M1.8      | 2.5mm      | 2.1mm          | 338095    | 65.63         |
| M2             | 2.8mm      | 2.1mm          | 338111    | 65.63         |
| M2-M2.6        | 3.0mm      | 2.5mm          | 338096    | 65.63         |
| M3             | 2.25mm     | 1.8mm          | 338097    | 65.63         |
| M3             | 3.5mm      | 2.7mm          | 338113    | 65.63         |
| M3             | 4mm        | 3.0mm          | 338099    | 65.63         |
| M3.5           | 2.5mm      | 2.0mm          | 338098    | 65.63         |
| M4-M5          | 5mm        | 4.0mm          | 338101    | 65.63         |
| M4-M6          | 4.5mm      | 3.4mm          | 338115    | 65.63         |
| M4-M6          | 5.5mm      | 4.3mm          | 338116    | 65.63         |
| M5-M5.5        | 4.5mm      | 4.5mm          | 338103    | 65.63         |
| M5-M5.5        | 5.5mm      | 4.5mm          | 338105    | 65.63         |
| M5-M8          | 6mm        | 4.9mm          | 338117    | 65.63         |
| M6             | 6mm        | 4.5mm          | 338118    | 65.63         |
| M8             | 6.2mm      | 5.0mm          | 338119    | 65.63         |
| M8             | 8mm        | 6.2mm          | 338121    | 65.63         |
| M8-M11         | 8mm        | 6.0mm          | 338107    | 65.63         |
| M10            | 7mm        | 5.5mm          | 338123    | 65.63         |
| M10            | 10mm       | 8.0mm          | 338125    | 65.63         |
| M12            | 8.5mm      | 6.5mm          | 338127    | 65.63         |
| M12            | 9mm        | 7.0mm          | 338129    | 65.63         |
| <b>Inch</b>    |            |                |           |               |
| 0-6            | 0.141      | 0.110          | ‡ 337850* | 65.63         |
| 8              | 0.168      | 0.131          | ‡ 337851* | 65.63         |
| 10             | 0.194      | 0.152          | ‡ 337852* | 65.63         |
| 12             | 0.220      | 0.165          | ‡ 337853* | 65.63         |
| 1/4            | 0.255      | 0.191          | ‡ 337854* | 65.63         |
| 5/16           | 0.318      | 0.238          | ‡ 337855  | 65.63         |
| 3/8            | 0.381      | 0.286          | ‡ 337824  | 65.63         |
| 7/16           | 0.323      | 0.242          | ‡ 337839  | 65.63         |
| 1/2            | 0.367      | 0.275          | ‡ 337838  | 65.63         |
| <b>5pc Set</b> |            |                | 337986    | <b>328.10</b> |
| <b>9pc Set</b> |            |                | 337343    | <b>590.59</b> |

\* Part of 5pc Set ‡ Part of 9pc Set

## ER20 Collets



Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.



REGULAR

- Size range: 1mm - 13mm (0.039" - 0.511")
- ER20 collets collapse approximately 1/32" with full accuracy

AA Collets have a runout of only 5 microns (0.005mm)

| Size (mm)       | Size (in.)      | Code No. | Price \$ | AA Code No. | Price \$ |
|-----------------|-----------------|----------|----------|-------------|----------|
| <b>Metric</b>   |                 |          |          |             |          |
| 1-1.5           | 0.039-0.059     | 337446   | 44.19    |             |          |
| 1.5-2           | 0.059-0.078     |          |          | 336763*     | 60.81    |
| 1-2             | 0.039-0.078     | 337473*  | 44.19    |             |          |
| 2-2.5           | 0.078-0.098     | 337447   | 44.19    | 336765      | 60.81    |
| 2-3             | 0.078-0.118     | 337474*  | 36.65    |             |          |
| 2.5-3           | 0.098-0.118     |          |          | 336766*     | 53.47    |
| 2.5-3.5         | 0.098-0.137     | 337471   | 36.65    |             |          |
| 3-3.5           | 0.118-0.137     |          |          | 336768      | 53.47    |
| 3-4             | 0.118-0.157     | 337475*  | 36.65    |             |          |
| 3.5-4           | 0.137-0.157     |          |          | 336770*     | 53.47    |
| 4-4.5           | 0.157-0.177     | 337448   | 36.65    | 336771      | 53.47    |
| 4-5             | 0.157-0.196     | 337476*  | 36.65    |             |          |
| 4.5-5           | 0.177-0.196     |          |          | 336773*     | 53.47    |
| 5-5.5           | 0.196-0.217     | 337449   | 36.65    | 336774      | 53.47    |
| 5-6             | 0.196-0.236     | 337477*  | 36.65    |             |          |
| 5.5-6           | 0.217-0.236     |          |          | 336776*     | 53.47    |
| 6-6.5           | 0.236-0.256     | 337451   | 36.65    | 336778      | 53.47    |
| 6-7             | 0.236-0.275     | 337478*  | 36.65    |             |          |
| 6.5-7           | 0.256-0.275     |          |          | 336779*     | 53.47    |
| 7-7.5           | 0.275-0.295     | 337453   | 36.65    | 336781      | 53.47    |
| 7-8             | 0.275-0.314     | 337479*  | 36.65    |             |          |
| 7.5-8           | 0.295-0.314     |          |          | 336783*     | 53.47    |
| 8-8.5           | 0.314-0.335     | 337455   | 36.65    | 336784      | 53.47    |
| 8-9             | 0.314-0.354     | 337480*  | 36.65    |             |          |
| 8.5-9           | 0.335-0.354     |          |          | 336786*     | 53.47    |
| 9-9.5           | 0.354-0.374     | 337457   | 36.65    | 336787      | 53.47    |
| 9-10            | 0.354-0.393     | 337481*  | 36.65    |             |          |
| 9.5-10          | 0.374-0.393     |          |          | 336789*     | 53.47    |
| 10-10.5         | 0.393-0.413     | 337459   | 36.65    | 336791      | 53.47    |
| 10-11           | 0.393-0.433     | 337482*  | 36.65    |             |          |
| 10.5-11         | 0.413-0.433     |          |          | 336792*     | 53.47    |
| 11-11.5         | 0.433-0.452     | 337469   | 36.65    | 336794      | 53.47    |
| 11-12           | 0.433-0.472     | 337483*  | 36.65    |             |          |
| 11.5-12         | 0.452-0.472     |          |          | 336796*     | 53.47    |
| 12-12.5         | 0.472-0.492     | 337463   | 36.65    | 336797      | 53.47    |
| 12-13           | 0.472-0.511     | 337484*  | 36.65    |             |          |
| 12.5-13         | 0.492-0.511     |          |          | 336799*     | 53.47    |
| 13-13.5         | 0.511-0.531     |          |          | 336800      | 53.47    |
| 13.5-14         | 0.531-0.551     |          |          | 336801      | 53.47    |
| <b>12pc Set</b> | <b>2-13mm</b>   | 337382   | 417.15   | 336988      | 641.63   |
| <b>Inch</b>     |                 |          |          |             |          |
|                 | 1/16            | 337621*  | 44.19    | 336762*     | 60.81    |
|                 | 3/32            | 337623*  | 44.19    | 336764*     | 60.81    |
|                 | 1/8             | 337663*  | 36.65    | 336767*     | 53.47    |
|                 | 5/32            | 337665*  | 36.65    | 336769*     | 53.47    |
|                 | 3/16            | 337667*  | 36.65    | 336772*     | 53.47    |
|                 | 7/32            | 337669*  | 36.65    | 336775*     | 53.47    |
|                 | 1/4             | 337671*  | 36.65    | 336777*     | 53.47    |
|                 | 9/32            | 337673*  | 36.65    | 336780*     | 53.47    |
|                 | 5/16            | 337675*  | 36.65    | 336782*     | 53.47    |
|                 | 11/32           | 337676*  | 36.65    | 336785*     | 53.47    |
|                 | 3/8             | 337677*  | 36.65    | 336788*     | 53.47    |
|                 | 13/32           | 337678*  | 36.65    | 336790*     | 53.47    |
|                 | 7/16            | 337679*  | 36.65    | 336793*     | 53.47    |
|                 | 15/32           | 337681*  | 36.65    | 336795*     | 53.47    |
|                 | 1/2             | 337682*  | 36.65    | 336798*     | 53.47    |
| <b>15pc Set</b> | <b>1/16-1/2</b> | 337404   | 549.74   | 336994      | 802.04   |

\* Part of set

- See page G31, G32 for Sets
- See page G21 for Dimensional Data

## ER20 Sealed Collets



- Sealed for coolant through applications
- Pressure resistance tested to 2000 psi

|               | Size (in/mm)    | Code No. | Price \$ |
|---------------|-----------------|----------|----------|
| <b>Metric</b> |                 |          |          |
|               | 4.0             | 338325** | 68.61    |
|               | 4.5             | 338299** | 63.79    |
|               | 5.0             | 338330   | 68.61    |
|               | 5.5             | 338334   | 68.61    |
|               | 6.0             | 338336   | 68.61    |
|               | 6.5             | 338337   | 68.61    |
|               | 7.0             | 338338   | 68.61    |
|               | 7.5             | 338339   | 68.61    |
|               | 8.0             | 338340   | 68.61    |
|               | 8.5             | 338341   | 68.61    |
|               | 9.0             | 338342   | 68.61    |
|               | 9.5             | 338343   | 68.61    |
|               | 10.0            | 338344   | 68.61    |
|               | 10.5            | 338345   | 68.61    |
|               | 11.0            | 338346   | 68.61    |
|               | 11.5            | 338347   | 68.61    |
|               | 12.0            | 338348   | 68.61    |
|               | 12.5            | 338349   | 68.61    |
|               | 13.0            | 338350   | 68.61    |
|               | <b>17pc Set</b> | 337935   | 1,284.49 |
| <b>Inch</b>   |                 |          |          |
|               | 1/8             | 337856** | 68.61    |
|               | 5/32            | 337857   | 68.61    |
|               | 3/16            | 337858   | 68.61    |
|               | 7/32            | 337859   | 68.61    |
|               | 1/4             | 337860   | 68.61    |
|               | 9/32            | 337861   | 68.61    |
|               | 5/16            | 337862   | 68.61    |
|               | 11/32           | 337863   | 68.61    |
|               | 3/8             | 337864   | 68.61    |
|               | 13/32           | 337865   | 68.61    |
|               | 7/16            | 337866   | 68.61    |
|               | 15/32           | 337867   | 68.61    |
|               | 1/2             | 337868   | 68.61    |
|               | <b>12pc Set</b> | 337933   | 836.13   |

\*\* Not Part of Set

## ER20 Tap Collets



- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity

| Tap            | Shank Dia. | Size of Square | Code No. | Price \$ |
|----------------|------------|----------------|----------|----------|
| <b>Metric</b>  |            |                |          |          |
| M4 -M6         | 4.5mm      | 3.4mm          | 338131   | 65.63    |
| M4-M6          | 5.5mm      | 4.3mm          | 338133   | 65.63    |
| M5-M8          | 6mm        | 4.9mm          | 338135   | 65.63    |
| M8             | 8mm        | 6.2mm          | 338137   | 65.63    |
| M10            | 7mm        | 5.5mm          | 338139   | 65.63    |
| M10            | 10mm       | 8.0mm          | 338141   | 65.63    |
| M12            | 9mm        | 7.0mm          | 338143   | 65.63    |
| M14            | 11mm       | 9.0mm          | 338145   | 65.63    |
| M16            | 12mm       | 9.0mm          | 338147   | 65.63    |
| <b>Inch</b>    |            |                |          |          |
| 0-6            | 0.141      | 0.110          | 337869*  | 65.63    |
| 8              | 0.168      | 0.131          | 337870*  | 65.63    |
| 10             | 0.194      | 0.152          | 337871*  | 65.63    |
| 12             | 0.220      | 0.165          | 337872*  | 65.63    |
| 1/4            | 0.255      | 0.191          | 337873*  | 65.63    |
| 5/16           | 0.318      | 0.238          | 337874*  | 65.63    |
| 3/8            | 0.381      | 0.286          | 337875*  | 65.63    |
| 7/16           | 0.323      | 0.242          | 337876*  | 65.63    |
| 1/2            | 0.367      | 0.275          | 337877*  | 65.63    |
| <b>9pc Set</b> |            |                | 337345   | 590.59   |

\* Part of Set

## ER25 Collets

Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

AA Collets have a runout of only 5 microns (0.005mm)



REGULAR

| Size (mm)       | Size (in.)     | Code No. | Price \$ | AA Code No. | Price \$ |
|-----------------|----------------|----------|----------|-------------|----------|
| <b>Metric</b>   |                |          |          |             |          |
| 1-2             | 0.039-0.078    | 337330*  | 45.27    |             |          |
| 1.5-2           | 0.059-0.078    |          |          | 336802*     | 61.86    |
| 2-2.5           | 0.078-0.098    | 337274   | 45.27    | 336804      | 61.86    |
| 2-3             | 0.078-0.118    | 337332*  | 37.73    |             |          |
| 2.5-3           | 0.098-0.118    |          |          | 336805*     | 54.51    |
| 2.5-3.5         | 0.098-0.137    | 337333   | 37.73    |             |          |
| 3-3.5           | 0.118-0.137    |          |          | 336807      | 54.51    |
| 3-4             | 0.118-0.157    | 337334*  | 37.73    |             |          |
| 3.5-4           | 0.137-0.157    |          |          | 336809*     | 54.51    |
| 4-4.5           | 0.157-0.177    | 337486   | 37.73    | 336810      | 54.51    |
| 4-5             | 0.157-0.196    | 337336*  | 37.73    |             |          |
| 4.5-5           | 0.177-0.196    |          |          | 336812*     | 54.51    |
| 5-5.5           | 0.196-0.217    | 337487   | 37.73    | 336813      | 54.51    |
| 5-6             | 0.196-0.236    | 337338*  | 37.73    |             |          |
| 5.5-6           | 0.217-0.236    |          |          | 336815*     | 54.51    |
| 6-6.5           | 0.236-0.256    | 337488   | 37.73    | 336816      | 54.51    |
| 6-7             | 0.236-0.275    | 337340*  | 37.73    |             |          |
| 6.5-7           | 0.256-0.275    |          |          | 336818*     | 54.51    |
| 7-7.5           | 0.275-0.295    | 337489   | 37.73    | 336820      | 54.51    |
| 7-8             | 0.275-0.314    | 337342*  | 37.73    |             |          |
| 7.5-8           | 0.295-0.314    |          |          | 336822*     | 54.51    |
| 8-8.5           | 0.314-0.335    | 337490   | 37.73    | 336823      | 54.51    |
| 8-9             | 0.314-0.354    | 337344*  | 37.73    |             |          |
| 8.5-9           | 0.335-0.354    |          |          | 336825*     | 54.51    |
| 9-9.5           | 0.354-0.374    | 337491   | 37.73    | 336826      | 54.51    |
| 9-10            | 0.354-0.393    | 337346*  | 37.73    |             |          |
| 9.5-10          | 0.374-0.393    |          |          | 336828*     | 54.51    |
| 10-10.5         | 0.393-0.413    | 337492   | 37.73    | 336830      | 54.51    |
| 10-11           | 0.393-0.433    | 337348*  | 37.73    |             |          |
| 10.5-11         | 0.413-0.433    |          |          | 336831*     | 54.51    |
| 11-11.5         | 0.433-0.452    | 337349   | 37.73    | 336833      | 54.51    |
| 11-12           | 0.433-0.472    | 337350*  | 37.73    |             |          |
| 11.5-12         | 0.452-0.472    |          |          | 336835*     | 54.51    |
| 12-12.5         | 0.472-0.492    | 337493   | 37.73    | 336836      | 54.51    |
| 12-13           | 0.472-0.511    | 337352*  | 37.73    |             |          |
| 12.5-13         | 0.492-0.511    |          |          | 336838*     | 54.51    |
| 13-13.5         | 0.511-0.531    | 337494   | 37.73    | 336840      | 54.51    |
| 13-14           | 0.511-0.551    | 337354*  | 37.73    |             |          |
| 13.5-14         | 0.531-0.551    |          |          | 336841*     | 54.51    |
| 14-14.5         | 0.551-0.571    | 337495   | 37.73    |             |          |
| 14-15           | 0.551-0.590    | 337356*  | 37.73    |             |          |
| 14.5-15         | 0.571-0.590    |          |          | 336844*     | 54.51    |
| 15-15.5         | 0.590-0.610    | 337497   | 37.73    | 336846      | 54.51    |
| 15-16           | 0.590-0.629    | 337358*  | 37.73    |             |          |
| 15.5-16         | 0.610-0.629    |          |          | 336848*     | 54.51    |
| 16-16.5         | 0.629-0.650    | 337499   | 67.91    |             |          |
| 16.5-17         | 0.650-0.669    | 337301   | 67.91    |             |          |
| <b>15pc Set</b> | <b>2-16mm</b>  | 337383   | 532.49   | 336989      | 817.76   |
| <b>Inch</b>     |                |          |          |             |          |
|                 | 3/32           | 337602** | 45.27    | 336803**    | 61.86    |
|                 | 1/8            | 337683   | 37.73    | 336806      | 54.51    |
|                 | 5/32           | 337684   | 37.73    | 336808      | 54.51    |
|                 | 3/16           | 337685   | 37.73    | 336811      | 54.51    |
|                 | 7/32           | 337686   | 37.73    | 336814      | 54.51    |
|                 | 1/4            | 337687   | 37.73    | 336817      | 54.51    |
|                 | 9/32           | 337688   | 37.73    | 336819      | 54.51    |
|                 | 5/16           | 337689   | 37.73    | 336821      | 54.51    |
|                 | 11/32          | 337691   | 37.73    | 336824      | 54.51    |
|                 | 3/8            | 337692   | 37.73    | 336827      | 54.51    |
|                 | 13/32          | 337693   | 37.73    | 336829      | 54.51    |
|                 | 7/16           | 337694   | 37.73    | 336832      | 54.51    |
|                 | 15/32          | 337696   | 37.73    | 336834      | 54.51    |
|                 | 1/2            | 337697   | 37.73    | 336837      | 54.51    |
|                 | 17/32          | 337698   | 37.73    | 336839      | 54.51    |
|                 | 9/16           | 337699   | 37.73    | 336842      | 54.51    |
|                 | 19/32          | 337701   | 37.73    | 336845      | 54.51    |
|                 | 5/8            | 337702   | 37.73    | 336847      | 54.51    |
| <b>17pc Set</b> | <b>1/8-5/8</b> | 337405   | 603.63   | 336995      | 981.32   |

\*\* Not Part of Set

\* Part of Set

## ER25 Sealed Collets

- Steel sealed for coolant through applications
- Pressure resistance tested to 2000 psi



| Metric Size     | Metric Code No. | Price \$ | Inch Size       | Inch Code No. | Price \$ |
|-----------------|-----------------|----------|-----------------|---------------|----------|
| 3.0             | 338297          | 75.83    | 1/8             | 337878        | 75.83    |
| 3.5             | 338326          | 75.83    | 5/32            | 337879        | 75.83    |
| 4.0             | 338327          | 75.83    | 3/16            | 337880        | 75.83    |
| 4.5             | 338373          | 75.83    | 7/32            | 337881        | 75.83    |
| 5.0             | 338329          | 75.83    | 1/4             | 337882*       | 75.83    |
| 5.5             | 338331          | 75.83    | 17/64           | 338352        | 75.83    |
| 6.0             | 338360*         | 75.83    | 9/32            | 337883*       | 75.83    |
| 6.5             | 338362*         | 75.83    | 19/64           | 338354        | 75.83    |
| 7.0             | 338364*         | 75.83    | 5/16            | 337884*       | 75.83    |
| 7.5             | 338366*         | 75.83    | 21/64           | 338356        | 75.83    |
| 8.0             | 338368*         | 75.83    | 11/32           | 337885*       | 75.83    |
| 8.5             | 338370*         | 75.83    | 23/64           | 338358        | 75.83    |
| 9.0             | 338372*         | 75.83    | 3/8             | 337886*       | 75.83    |
| 9.5             | 338374*         | 75.83    | 25/64           | 337916        | 75.83    |
| 10.0            | 338376*         | 75.83    | 13/32           | 337887*       | 75.83    |
| 10.5            | 338378*         | 75.83    | 27/64           | 337917        | 75.83    |
| 11.0            | 338380*         | 75.83    | 7/16            | 337888*       | 75.83    |
| 11.5            | 338382*         | 75.83    | 29/64           | 337918        | 75.83    |
| 12.0            | 338384*         | 75.83    | 15/32           | 337889*       | 75.83    |
| 12.5            | 338386*         | 75.83    | 31/64           | 337919        | 75.83    |
| 13.0            | 338388*         | 75.83    | 1/2             | 337890*       | 75.83    |
| 13.5            | 338390*         | 75.83    | 33/64           | 337920        | 75.83    |
| 14.0            | 338392*         | 75.83    | 17/32           | 337891*       | 75.83    |
| 14.5            | 338394*         | 75.83    | 35/64           | 337921        | 75.83    |
| 15.0            | 338396*         | 80.64    | 9/16            | 337892*       | 75.83    |
| 15.5            | 338398*         | 75.83    | 37/64           | 337922        | 75.83    |
| 16.0            | 338400*         | 75.83    | 19/32           | 337893*       | 75.83    |
|                 |                 |          | 39/64           | 337923        | 75.83    |
|                 |                 |          | 5/8             | 337894*       | 75.83    |
| <b>21pc Set</b> | 337939          | 1,521.41 | <b>13pc Set</b> | 337938        | 1,054.60 |

\* Part of Set

## ER25 Tap Collets

- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity



| Tap                        | Shank Dia. | Size of Square | Code No. | Price \$ |
|----------------------------|------------|----------------|----------|----------|
| <b>Metric</b>              |            |                |          |          |
| M4-M6                      | 4.5mm      | 3.4mm          | 338149   | 65.63    |
| M4-M6                      | 5.5mm      | 4.3mm          | 338151   | 65.63    |
| M4-M8                      | 6mm        | 4.9mm          | 338153   | 65.63    |
| M10                        | 7mm        | 5.5mm          | 338155   | 65.63    |
| M8                         | 8mm        | 6.2mm          | 338157   | 65.63    |
| M10                        | 10mm       | 8.0mm          | 338159   | 74.13    |
| M12                        | 9mm        | 7.0mm          | 338161   | 74.13    |
| M14                        | 11mm       | 9.0mm          | 338162   | 74.13    |
| M16                        | 12mm       | 9.0mm          | 338163   | 74.13    |
| M16                        | 12.5mm     | 10.0mm         | 338164   | 74.13    |
| M18                        | 14mm       | 11.0mm         | 338165   | 74.13    |
| M20                        | 15mm       | 12.0mm         | 338166   | 74.13    |
| M20                        | 16mm       | 12.0mm         | 338167   | 74.13    |
| <b>Inch</b>                |            |                |          |          |
| 0-6                        | 0.141      | 0.110          | 337895*  | 74.13    |
| 8                          | 0.168      | 0.131          | 337896*  | 74.13    |
| 10                         | 0.194      | 0.152          | 337897*  | 74.13    |
| 12                         | 0.220      | 0.165          | 337898*  | 74.13    |
| 1/4                        | 0.255      | 0.191          | 337899*  | 74.13    |
| 5/16                       | 0.318      | 0.238          | 337900*  | 74.13    |
| 3/8                        | 0.381      | 0.286          | 337901*  | 74.13    |
| 7/16                       | 0.323      | 0.242          | 337902*  | 74.13    |
| 1/2                        | 0.367      | 0.275          | 337903*  | 74.13    |
| 9/16                       | 0.429      | 0.322          | 337904*  | 74.13    |
| 5/8                        | 0.480      | 0.360          | 337905*  | 74.13    |
| 11/16                      | 0.542      | 0.406          | 337983   | 74.13    |
| <b>11pc Set</b>            |            |                | 337347   | 815.43   |
| <b>NPT</b>                 |            |                |          |          |
| 1/16, 1/8-SS (small shank) | 0.3125     | 0.234          | 337909   | 74.13    |
| 1/8-LS (large shank)       | 0.4375     | 0.328          | 337910   | 74.13    |

\* Part of Set

## ER32 Collets

Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

AA Collets have a runout of only 5 microns (0.005mm)



REGULAR

| Size (mm)     | Size (in.)  | Code No. | Price \$ | AA Code No. | Price \$ |
|---------------|-------------|----------|----------|-------------|----------|
| <b>Metric</b> |             |          |          |             |          |
| 2-2.5         | 0.078-0.098 | 337415   | 37.73    | 336852      | 54.51    |
| 2-3           | 0.078-0.118 | 337361*  | 37.73    |             |          |
| 2.5-3         | 0.098-0.118 |          |          | 336853*     | 54.51    |
| 2.5-3.5       | 0.098-0.137 | 337359   | 37.73    |             |          |
| 3-3.5         | 0.118-0.137 |          |          | 336855      | 54.51    |
| 3-4           | 0.118-0.157 | 337362*  | 37.73    |             |          |
| 3.5-4         | 0.137-0.157 |          |          | 336857*     | 54.51    |
| 4-4.5         | 0.157-0.177 | 337217   | 37.73    | 336858      | 54.51    |
| 4-5           | 0.157-0.196 | 337363*  | 37.73    |             |          |
| 4.5-5         | 0.177-0.196 |          |          | 336860*     | 54.51    |
| 5-5.5         | 0.196-0.217 | 337218   | 37.73    | 336861      | 54.51    |
| 5-6           | 0.196-0.236 | 337364*  | 37.73    |             |          |
| 5.5-6         | 0.217-0.236 |          |          | 336863*     | 54.51    |
| 6-6.5         | 0.236-0.256 | 337219   | 37.73    | 336864      | 54.51    |
| 6-7           | 0.236-0.275 | 337365*  | 37.73    |             |          |
| 6.5-7         | 0.256-0.275 |          |          | 336866*     | 54.51    |
| 7-7.5         | 0.275-0.295 | 337289   | 37.73    | 336868      | 54.51    |
| 7-8           | 0.275-0.314 | 337366*  | 37.73    |             |          |
| 7.5-8         | 0.295-0.314 |          |          | 336870*     | 54.51    |
| 8-8.5         | 0.314-0.335 | 337221   | 37.73    | 336871      | 54.51    |
| 8-9           | 0.314-0.354 | 337367*  | 37.73    |             |          |
| 8.5-9         | 0.335-0.354 |          |          | 336873*     | 54.51    |
| 9-9.5         | 0.354-0.374 | 337222   | 37.73    | 336874      | 54.51    |
| 9-10          | 0.354-0.393 | 337368*  | 37.73    |             |          |
| 9.5-10        | 0.374-0.393 |          |          | 336876*     | 54.51    |
| 10-10.5       | 0.393-0.413 | 337223   | 37.73    | 336878      | 54.51    |
| 10-11         | 0.393-0.433 | 337369*  | 37.73    |             |          |
| 10.5-11       | 0.413-0.433 |          |          | 336879*     | 54.51    |
| 10.5-11.5     | 0.413-0.452 | 337357   | 37.73    |             |          |
| 11-11.5       | 0.433-0.452 |          |          | 336881      | 54.51    |
| 11-12         | 0.433-0.472 | 337370*  | 37.73    |             |          |
| 11.5-12       | 0.452-0.472 |          |          | 336883*     | 54.51    |
| 12-12.5       | 0.472-0.492 | 337227   | 37.73    | 336884      | 54.51    |
| 12-13         | 0.472-0.511 | 337371*  | 37.73    |             |          |
| 12.5-13       | 0.492-0.511 |          |          | 336886*     | 54.51    |
| 13-13.5       | 0.511-0.531 | 337229   | 37.73    | 336888      | 54.51    |
| 13-14         | 0.511-0.551 | 337372*  | 37.73    |             |          |
| 13.5-14       | 0.531-0.551 |          |          | 336889*     | 54.51    |
| 14-14.5       | 0.551-0.571 | 337249   | 37.73    | 336891      | 54.51    |
| 14-15         | 0.551-0.590 | 337373*  | 37.73    |             |          |
| 14.5-15       | 0.571-0.590 |          |          | 336892*     | 54.51    |

| Size (mm)       | Size (in.)     | Code No. | Price \$      | AA Code No. | Price \$        |
|-----------------|----------------|----------|---------------|-------------|-----------------|
| 15-15.5         | 0.590-0.610    | 337255   | 37.73         | 336894      | 54.51           |
| 15-16           | 0.590-0.629    | 337374*  | 37.73         |             |                 |
| 15.5-16         | 0.610-0.629    |          |               | 336896*     | 54.51           |
| 16-16.5         | 0.629-0.650    | 337256   | 37.73         | 336897      | 54.51           |
| 16-17           | 0.629-0.669    | 337375*  | 37.73         |             |                 |
| 16.5-17         | 0.650-0.669    |          |               | 336899*     | 54.51           |
| 17-17.5         | 0.669-0.689    | 337272   | 37.73         | 336901      | 54.51           |
| 17-18           | 0.669-0.708    | 337376*  | 37.73         |             |                 |
| 17.5-18         | 0.689-0.708    |          |               | 336902*     | 54.51           |
| 18-18.5         | 0.708-0.728    | 337215   | 37.73         | 336904      | 54.51           |
| 18-19           | 0.708-0.748    | 337377*  | 37.73         |             |                 |
| 18.5-19         | 0.728-0.748    |          |               | 336905*     | 54.51           |
| 18.5-19.5       | 0.728-0.767    | 337355   | 37.73         |             |                 |
| 19-19.5         | 0.748-0.767    |          |               | 336907      | 54.51           |
| 19-20           | 0.748-0.787    | 337378*  | 37.73         |             |                 |
| 19.5-20         | 0.767-0.787    |          |               | 336909*     | 54.51           |
| <b>18pc Set</b> | <b>3-20mm</b>  | 337384   | <b>631.66</b> | 336990      | <b>981.32</b>   |
| <b>Inch</b>     |                |          |               |             |                 |
|                 | 3/32           |          |               | 336851      | 67.10           |
|                 | 1/8            | 337703*  | 37.73         | 336854*     | 54.51           |
|                 | 5/32           | 337704*  | 37.73         | 336856*     | 54.51           |
|                 | 3/16           | 337706*  | 37.73         | 336859*     | 54.51           |
|                 | 7/32           | 337707*  | 37.73         | 336862*     | 54.51           |
|                 | 1/4            | 337708*  | 37.73         | 336865*     | 54.51           |
|                 | 9/32           | 337709*  | 37.73         | 336867*     | 54.51           |
|                 | 5/16           | 337711*  | 37.73         | 336869*     | 54.51           |
|                 | 11/32          | 337712*  | 37.73         | 336872*     | 54.51           |
|                 | 3/8            | 337713*  | 37.73         | 336875*     | 54.51           |
|                 | 13/32          | 337714*  | 37.73         | 336877*     | 54.51           |
|                 | 7/16           | 337716*  | 37.73         | 336880*     | 54.51           |
|                 | 15/32          | 337717*  | 37.73         | 336882*     | 54.51           |
|                 | 1/2            | 337718*  | 37.73         | 336885*     | 54.51           |
|                 | 17/32          | 337719*  | 37.73         | 336887*     | 54.51           |
|                 | 9/16           | 337721*  | 37.73         | 336890*     | 54.51           |
|                 | 19/32          | 337722*  | 37.73         | 336893*     | 54.51           |
|                 | 5/8            | 337723*  | 37.73         | 336895*     | 54.51           |
|                 | 21/32          | 337724*  | 37.73         | 336898*     | 54.51           |
|                 | 11/16          | 337725*  | 37.73         | 336900*     | 54.51           |
|                 | 23/32          | 337726*  | 37.73         | 336903*     | 54.51           |
|                 | 3/4            | 337727*  | 37.73         | 336906*     | 54.51           |
|                 | 25/32          | 337605   | 37.73         | 336908      | 54.51           |
| <b>21pc Set</b> | <b>1/8-3/4</b> | 337407   | <b>737.30</b> | 336996      | <b>1,144.87</b> |

- See page G31, G32 for Sets
- See page G21 for Dimensional Data

\* Part of Set

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Images are representational only and may not reflect actual product.



## ER32 Sealed Collets

- Sealed for coolant through applications
- Pressure resistance tested to 2000 psi



| Metric Size     | Code No. | Price \$        | Inch Size       | Code No. | Price \$        |
|-----------------|----------|-----------------|-----------------|----------|-----------------|
| 3.0             | 338335   | 80.64           | 1/8             | 338200   | 80.64           |
| 3.5             | 338351   | 80.64           | 5/32            | 338201   | 80.64           |
| 4.0             | 338353   | 80.64           | 3/16            | 338202   | 80.64           |
| 4.5             | 338333   | 80.64           | 7/32            | 338203   | 80.64           |
| 5.0             | 338355   | 80.64           | 1/4             | 338204*  | 80.64           |
| 5.5             | 338363   | 80.64           | 17/64           | 338301   | 80.64           |
| 6.0             | 338320   | 80.64           | 9/32            | 338205*  | 80.64           |
| 6.5             | 338365   | 80.64           | 19/64           | 338303   | 80.64           |
| 7.0             | 338357   | 80.64           | 5/16            | 338206*  | 80.64           |
| 7.5             | 338367   | 80.64           | 21/64           | 338311   | 80.64           |
| 8.0             | 338324   | 80.64           | 11/32           | 338207*  | 80.64           |
| 8.5             | 338369   | 80.64           | 23/64           | 338312   | 80.64           |
| 9.0             | 338359   | 80.64           | 3/8             | 338208*  | 80.64           |
| 9.5             | 338361   | 80.64           | 25/64           | 338313   | 80.64           |
| 10.0            | 338328   | 80.64           | 13/32           | 338209*  | 80.64           |
| 10.5            | 338404*  | 80.64           | 27/64           | 338314   | 80.64           |
| 11.0            | 338406*  | 80.64           | 7/16            | 338210*  | 80.64           |
| 11.5            | 338371*  | 80.64           | 29/64           | 338315   | 80.64           |
| 12.0            | 338332*  | 80.64           | 15/32           | 338211*  | 80.64           |
| 12.5            | 338408*  | 80.64           | 31/64           | 338316   | 80.64           |
| 13.0            | 338410*  | 80.64           | 1/2             | 338212*  | 80.64           |
| 13.5            | 338412*  | 80.64           | 33/64           | 338317   | 80.64           |
| 14.0            | 338414*  | 80.64           | 17/32           | 338213*  | 80.64           |
| 14.5            | 338416*  | 80.64           | 35/64           | 338318   | 80.64           |
| 15.0            | 338418*  | 80.64           | 9/16            | 338214*  | 80.64           |
| 15.5            | 338420*  | 80.64           | 37/64           | 338319   | 80.64           |
| 16.0            | 338422*  | 80.64           | 19/32           | 338215*  | 80.64           |
| 16.5            | 338424*  | 80.64           | 39/64           | 338321   | 80.64           |
| 17.0            | 338426*  | 80.64           | 5/8             | 338216*  | 80.64           |
| 17.5            | 338428*  | 80.64           | 41/64           | 337924   | 80.64           |
| 18.0            | 338430*  | 80.64           | 21/32           | 338217*  | 80.64           |
| 18.5            | 338432*  | 80.64           | 43/64           | 337925   | 80.64           |
| 19.0            | 338434*  | 80.64           | 11/16           | 338218*  | 80.64           |
| 19.5            | 338436*  | 80.64           | 45/64           | 337926   | 80.64           |
| 20.0            | 338438*  | 80.64           | 23/32           | 338219*  | 80.64           |
|                 |          |                 | 47/64           | 337927   | 80.64           |
|                 |          |                 | 3/4             | 338220*  | 80.64           |
|                 |          |                 | 49/64           | 337928   | 80.64           |
|                 |          |                 | 25/32           | 338322   | 80.64           |
| <b>20pc Set</b> | 337942   | <b>1,612.80</b> | <b>17pc Set</b> | 337940   | <b>1,466.67</b> |

\* Part of set

- See page G31, G32 for Sets
- See page G21 for Dimensional Data

## ER32 Tap Collets

- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity



| Tap                        | Shank Dia. | Size of Square | Code No. | Price \$        |
|----------------------------|------------|----------------|----------|-----------------|
| <b>Metric</b>              |            |                |          |                 |
| M3                         | 2.5mm      | 1.8mm          | 338168   | 77.77           |
| M3.5                       | 2.5mm      | 2.0mm          | 338169   | 77.77           |
| M4                         | 2.8mm      | 2.1mm          | 338170   | 77.77           |
| M3-M5                      | 3.5mm      | 2.7mm          | 338171   | 77.77           |
| M3-M5                      | 4mm        | 3.0mm          | 338172   | 77.77           |
| M4-M5                      | 5mm        | 4.0mm          | 338197   | 77.77           |
| M4-M6                      | 4.5mm      | 3.4mm          | 338173*  | 77.77           |
| M4-M6                      | 5.5mm      | 4.3mm          | 338174   | 77.77           |
| M5-M5.5                    | 4.5mm      | 4.5mm          | 338198   | 77.77           |
| M5-M5.5                    | 5.5mm      | 4.5mm          | 338175   | 77.77           |
| M4-M8                      | 6mm        | 4.9mm          | 338176   | 77.77           |
| M5-M8                      | 6mm        | 4.5mm          | 338177*  | 77.77           |
| M7-M8                      | 6.2mm      | 5.0mm          | 338178   | 77.77           |
| M8                         | 8mm        | 6.2mm          | 338179   | 77.77           |
| M9-M10                     | 7mm        | 5.5mm          | 338180*  | 77.77           |
| M8-M11                     | 8mm        | 6.0mm          | 338181*  | 77.77           |
| M10                        | 10mm       | 8.0mm          | 338182*  | 77.77           |
| M12                        | 8.5mm      | 6.5mm          | 338199   | 77.77           |
| M12                        | 9mm        | 7.0mm          | 338183*  | 77.77           |
| M14                        | 11mm       | 9.0mm          | 338184*  | 77.77           |
| M14                        | 10.5mm     | 8.0mm          | 338185   | 77.77           |
| M16                        | 12mm       | 9.0mm          | 338186*  | 77.77           |
| M16                        | 12.5mm     | 10.0mm         | 338187   | 77.77           |
| M18                        | 14mm       | 11.0mm         | 338188*  | 77.77           |
| M20                        | 15mm       | 12.0mm         | 338189   | 77.77           |
| M20                        | 16mm       | 12.0mm         | 338190*  | 77.77           |
| M22                        | 17mm       | 13.0mm         | 338191   | 77.77           |
| M22-M24                    | 18mm       | 14.5mm         | 338192   | 77.77           |
| M24-M25                    | 19mm       | 15.0mm         | 338193   | 77.77           |
| M26-M27                    | 20mm       | 15.0mm         | 338194*  | 77.77           |
| M27-M30                    | 20mm       | 16.0mm         | 338195   | 77.77           |
| M30                        | 22mm       | 18.0mm         | 338196   | 77.77           |
| <b>11pc Set</b>            |            |                | 337992   | <b>855.51</b>   |
| <b>Inch</b>                |            |                |          |                 |
| 0-6                        | 0.141      | 0.110          | 338221*  | 77.77           |
| 8                          | 0.168      | 0.131          | 338222*  | 77.77           |
| 10                         | 0.194      | 0.152          | 338223*  | 77.77           |
| 12                         | 0.220      | 0.165          | 338224*  | 77.77           |
| 1/4                        | 0.255      | 0.191          | 338225*  | 77.77           |
| 5/16                       | 0.318      | 0.238          | 338226*  | 77.77           |
| 3/8                        | 0.381      | 0.286          | 338227*  | 77.77           |
| 7/16                       | 0.323      | 0.242          | 338228*  | 77.77           |
| 1/2                        | 0.367      | 0.275          | 338229*  | 77.77           |
| 9/16                       | 0.429      | 0.322          | 338230*  | 77.77           |
| 5/8                        | 0.480      | 0.360          | 338231*  | 77.77           |
| 11/16                      | 0.542      | 0.406          | 338232*  | 77.77           |
| 3/4                        | 0.590      | 0.442          | 338233*  | 77.77           |
| 13/16                      | 0.652      | 0.489          | 338234*  | 77.77           |
| <b>NPT</b>                 |            |                |          |                 |
| 1/16, 1/8-SS (small shank) | 0.3125     | 0.234          | 338235*  | 77.77           |
| 1/8-LS (large shank)       | 0.4375     | 0.328          | 338236   | 77.77           |
| 1/4                        | 0.5625     | 0.421          | 338237*  | 77.77           |
| <b>16pc Set</b>            |            |                | 337351   | <b>1,244.38</b> |

\* Part of Set

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## ER40 Collets

Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

AA Collets have a runout of only 5 microns (0.005mm)



REGULAR

| Size (mm)     | Size (in.)  | Code No. | Price \$ | AA Code No. | Price \$ |
|---------------|-------------|----------|----------|-------------|----------|
| <b>Metric</b> |             |          |          |             |          |
| 3.0           | 0.1181      |          |          | 336985      | 59.75    |
| 3-3.5         | 0.118-0.137 | 337545   | 43.12    | 336911      | 59.75    |
| 3-4           | 0.118-0.157 | 337501*  | 43.12    |             |          |
| 3.5-4         | 0.137-0.157 |          |          | 336913*     | 59.75    |
| 4-4.5         | 0.157-0.177 | 337546   | 43.12    | 336914      | 59.75    |
| 4-5           | 0.157-0.196 | 337502*  | 43.12    |             |          |
| 4.5-5         | 0.177-0.196 |          |          | 336916*     | 59.75    |
| 5-5.5         | 0.196-0.216 | 337547   | 43.12    | 336917      | 59.75    |
| 5-6           | 0.196-0.236 | 337503*  | 43.12    |             |          |
| 5.5-6         | 0.216-0.236 |          |          | 336919*     | 59.75    |
| 6-6.5         | 0.236-0.256 | 337548   | 43.12    | 336920      | 59.75    |
| 6-7           | 0.236-0.275 | 337505*  | 43.12    |             |          |
| 6.5-7         | 0.256-0.275 |          |          | 336922*     | 59.75    |
| 7-7.5         | 0.275-0.295 | 337549   | 43.12    | 336924      | 59.75    |
| 7-8           | 0.275-0.314 | 337506*  | 43.12    |             |          |
| 7.5-8         | 0.295-0.314 |          |          | 336926*     | 59.75    |
| 8-8.5         | 0.314-0.335 | 337554   | 43.12    | 336927      | 59.75    |
| 8-9           | 0.314-0.354 | 337507*  | 43.12    |             |          |
| 8.5-9         | 0.335-0.354 |          |          | 336929*     | 59.75    |
| 9-9.5         | 0.354-0.374 | 337557   | 43.12    | 336930      | 59.75    |
| 9-10          | 0.354-0.393 | 337509*  | 43.12    |             |          |
| 9.5-10        | 0.374-0.393 |          |          | 336932*     | 59.75    |
| 10-10.5       | 0.393-0.413 | 337558   | 43.12    | 336934      | 59.75    |
| 10-11         | 0.393-0.433 | 337510*  | 43.12    |             |          |
| 10.5-11       | 0.413-0.433 |          |          | 336935*     | 59.75    |
| 10.5-11.5     | 0.413-0.452 | 337498   | 43.12    |             |          |
| 11-11.5       | 0.433-0.452 |          |          | 336937      | 59.75    |
| 11-12         | 0.433-0.472 | 337511*  | 43.12    |             |          |
| 11.5-12       | 0.452-0.472 |          |          | 336939*     | 59.75    |
| 12-12.5       | 0.472-0.492 | 337559   | 43.12    | 336940      | 59.75    |
| 12-13         | 0.472-0.511 | 337513*  | 43.12    |             |          |
| 12.5-13       | 0.492-0.511 |          |          | 336942*     | 59.75    |
| 13-13.5       | 0.511-0.531 | 336562   | 75.06    | 336944      | 59.75    |
| 13-14         | 0.511-0.551 | 337514*  | 43.12    |             |          |
| 13.5-14       | 0.531-0.551 |          |          | 336945*     | 59.75    |
| 14-14.5       | 0.551-0.571 | 337563   | 43.12    | 336947      | 59.75    |
| 14-15         | 0.551-0.590 | 337515*  | 43.12    |             |          |
| 14.5-15       | 0.571-0.590 |          |          | 336948*     | 59.75    |
| 15-15.5       | 0.590-0.610 | 337564   | 43.12    | 336950      | 59.75    |
| 15-16         | 0.590-0.629 | 337517*  | 43.12    |             |          |
| 15.5-16       | 0.610-0.629 |          |          | 336952*     | 59.75    |
| 16-16.5       | 0.629-0.650 | 337567   | 43.12    | 336953      | 59.75    |
| 16-17         | 0.629-0.669 | 337518*  | 43.12    |             |          |
| 16.5-17       | 0.650-0.669 |          |          | 336955*     | 59.75    |
| 17-17.5       | 0.669-0.689 | 337568   | 43.12    | 336957      | 59.75    |
| 17-18         | 0.669-0.708 | 337519*  | 43.12    |             |          |
| 17.5-18       | 0.689-0.708 |          |          | 336958*     | 59.75    |
| 18-18.5       | 0.708-0.728 | 337569   | 43.12    | 336960      | 59.75    |
| 18-19         | 0.708-0.748 | 337521*  | 43.12    |             |          |
| 18.5-19       | 0.728-0.748 |          |          | 336961*     | 59.75    |
| 18.5-19.5     | 0.728-0.767 | 337496   | 43.12    |             |          |
| 19-19.5       | 0.748-0.767 |          |          | 336963      | 59.75    |

| Size (mm)       | Size (in.)      | Code No. | Price \$        | AA Code No. | Price \$        |
|-----------------|-----------------|----------|-----------------|-------------|-----------------|
| 19-20           | 0.748-0.787     | 337522*  | 43.12           |             |                 |
| 19.5-20         | 0.767-0.787     |          |                 | 336965*     | 59.75           |
| 20-20.5         | 0.787-0.807     | 337572   | 43.12           | 336966      | 59.75           |
| 20-21           | 0.787-0.826     | 337523*  | 43.12           |             |                 |
| 20.5-21         | 0.807-0.826     |          |                 | 336968*     | 59.75           |
| 21-21.5         | 0.826-0.846     | 337573   | 43.12           | 336970      | 59.75           |
| 21-22           | 0.826-0.866     | 337524*  | 43.12           |             |                 |
| 21.5-22         | 0.846-0.866     |          |                 | 336971*     | 59.75           |
| 22-22.5         | 0.866-0.886     | 337574   | 10.99           | 336973      | 59.75           |
| 22-23           | 0.866-0.905     | 337525*  | 43.12           |             |                 |
| 22.5-23         | 0.886-0.905     |          |                 | 336974*     | 59.75           |
| 23-23.5         | 0.905-0.925     | 337577   | 43.12           | 336976      | 59.75           |
| 23-24           | 0.905-0.944     | 337526*  | 43.12           |             |                 |
| 23.5-24         | 0.925-0.944     |          |                 | 336978*     | 59.75           |
| 24-24.5         | 0.944-0.965     | 337578   | 43.12           | 336979      | 59.75           |
| 24-25           | 0.944-0.984     | 337527*  | 43.12           |             |                 |
| 24.5-25         | 0.965-0.984     |          |                 | 336981*     | 59.75           |
| 25-25.5         | 0.984-1.004     | 337579   | 43.12           | 336983      | 59.75           |
| 25-26           | 0.984-1.023     | 337528*  | 43.12           |             |                 |
| 25.5-26         | 1.004-1.023     |          |                 | 336984*     | 59.75           |
| <b>23pc Set</b> | <b>3.5-26mm</b> | 337386   | <b>894.67</b>   | 336991      | <b>1,374.47</b> |
| <b>Inch</b>     |                 |          |                 |             |                 |
|                 | 1/8             | 337728*  | 43.12           | 336910*     | 59.75           |
|                 | 5/32            | 337729*  | 43.12           | 336912      | 59.75           |
|                 | 3/16            | 337731*  | 43.12           | 336915*     | 59.75           |
|                 | 7/32            | 337732*  | 43.12           | 336918      | 59.75           |
|                 | 1/4             | 337733*  | 43.12           | 336921*     | 59.75           |
|                 | 9/32            | 337734*  | 43.12           | 336923      | 59.75           |
|                 | 5/16            | 337736*  | 43.12           | 336925*     | 59.75           |
|                 | 11/32           | 337737*  | 43.12           | 336928      | 59.75           |
|                 | 3/8             | 337738*  | 43.12           | 336931*     | 59.75           |
|                 | 13/32           | 337739*  | 43.12           | 336933      | 59.75           |
|                 | 7/16            | 337741*  | 43.12           | 336936*     | 59.75           |
|                 | 15/32           | 337742*  | 43.12           | 336938      | 59.75           |
|                 | 1/2             | 337743*  | 43.12           | 336941*     | 59.75           |
|                 | 17/32           | 337744*  | 43.12           | 336943      | 59.75           |
|                 | 9/16            | 337746*  | 43.12           | 336946*     | 59.75           |
|                 | 19/32           | 337747*  | 43.12           | 336949      | 59.75           |
|                 | 5/8             | 337748*  | 43.12           | 336951*     | 59.75           |
|                 | 21/32           | 337749*  | 43.12           | 336954      | 59.75           |
|                 | 11/16           | 337751*  | 43.12           | 336956*     | 59.75           |
|                 | 23/32           | 337752*  | 43.12           | 336959      | 59.75           |
|                 | 3/4             | 337753*  | 43.12           | 336962*     | 59.75           |
|                 | 25/32           | 337754*  | 43.12           | 336964      | 59.75           |
|                 | 13/16           | 337756*  | 43.12           | 336967*     | 59.75           |
|                 | 27/32           | 337757*  | 43.12           | 336969      | 59.75           |
|                 | 7/8             | 337758*  | 43.12           | 336972*     | 59.75           |
|                 | 29/32           | 337759*  | 43.12           | 336975      | 59.75           |
|                 | 15/16           | 337761*  | 43.12           | 336977*     | 59.75           |
|                 | 31/32           | 337762*  | 43.12           | 336980      | 59.75           |
|                 | 1               | 337763*  | 43.12           | 336982*     | 59.75           |
| <b>15pc Set</b> | <b>1/8-1</b>    |          |                 | 336997      | <b>896.39</b>   |
| <b>29pc Set</b> | <b>1/8-1</b>    | 337409   | <b>1,128.58</b> |             |                 |

\* Part of Set

## ER40 Sealed Collets

- Sealed for coolant through applications
- Pressure resistance tested to 2000 psi



| Metric Size | Code No. | Price \$ | Inch Size | Code No. | Price \$ |
|-------------|----------|----------|-----------|----------|----------|
| 6.0         | 338441   | 86.66    | 1/8       | 338238   | 86.66    |
| 6.5         | 338435   | 86.66    | 5/32      | 338239   | 86.66    |
| 7.0         | 338443   | 86.66    | 3/16      | 338240   | 86.66    |
| 7.5         | 338437   | 86.66    | 7/32      | 338241   | 86.66    |
| 8.0         | 338445   | 86.66    | 1/4       | 338242   | 86.66    |
| 8.5         | 338439   | 86.66    | 9/32      | 338243   | 86.66    |
| 9.0         | 338447   | 86.66    | 5/16      | 338244   | 86.66    |
| 9.5         | 338449   | 86.66    | 11/32     | 338245   | 86.66    |
| 10.0        | 338440*  | 86.66    | 3/8       | 338246   | 86.66    |
| 10.5        | 338442*  | 86.66    | 13/32     | 338247   | 86.66    |
| 11.0        | 338444*  | 86.66    | 7/16      | 338248   | 86.66    |
| 11.5        | 338446*  | 86.66    | 15/32     | 338249   | 86.66    |
| 12.0        | 338448*  | 86.66    | 1/2       | 338250   | 86.66    |
| 12.5        | 338450*  | 86.66    | 17/32     | 338251   | 86.66    |
| 13.0        | 338452*  | 86.66    | 9/16      | 338252   | 86.66    |
| 13.5        | 338454*  | 86.66    | 19/32     | 338253   | 86.66    |
| 14.0        | 338456*  | 86.66    | 5/8       | 338254   | 86.66    |
| 14.5        | 338458*  | 86.66    | 21/32     | 338255   | 86.66    |
| 15.0        | 338460*  | 86.66    | 11/16     | 338256   | 86.66    |
| 15.5        | 338462*  | 86.66    | 23/32     | 338257   | 86.66    |
| 16.0        | 338464*  | 86.66    | 3/4       | 338258   | 86.66    |
| 16.5        | 338468*  | 86.66    | 25/32     | 338259   | 86.66    |
| 17.0        | 338470*  | 86.66    | 13/16     | 338260   | 86.66    |
| 17.5        | 338472*  | 86.66    | 27/32     | 338261   | 86.66    |
| 18.0        | 338474*  | 86.66    | 7/8       | 338262   | 86.66    |
| 18.5        | 338476*  | 86.66    | 29/32     | 338263   | 86.66    |
| 19.0        | 338478*  | 86.66    | 15/16     | 338264   | 86.66    |
| 19.5        | 338480*  | 86.66    | 31/32     | 338265   | 86.66    |
| 20.0        | 338482*  | 86.66    | 1         | 338266   | 86.66    |
| 20.5        | 338484*  | 86.66    |           |          |          |
| 21.0        | 338486*  | 86.66    |           |          |          |
| 21.5        | 338488*  | 86.66    |           |          |          |
| 22.0        | 338490*  | 86.66    |           |          |          |
| 22.5        | 338492*  | 86.66    |           |          |          |
| 23.0        | 338494*  | 86.66    |           |          |          |
| 23.5        | 338496*  | 86.66    |           |          |          |
| 24.0        | 338498*  | 86.66    |           |          |          |
| 24.5        | 338500*  | 86.66    |           |          |          |
| 25.0        | 338502*  | 86.66    |           |          |          |
| 25.5        | 338504*  | 86.66    |           |          |          |
| 26.0        | 338506*  | 86.66    |           |          |          |

\* Part of set

## ER50 Collets

Our ER collet system is made of special alloy steel material under excellent heat treatment and precise grinding process, so it has precise accuracy, powerful clamping ability, and is durable. This collet can clamp for a specific standard size and its next size. It can be widely used for boring, milling, drilling and tapping as well as for grinding operation, and is available for all sizes.

- ER50 collets collapse approximately 5/64" with full accuracy



| Size (mm)       | Size (in.)         | Code No. | Price \$      |
|-----------------|--------------------|----------|---------------|
| 10-12           | 0.394-0.472        | 337450*  | 74.38         |
| 12-14           | 0.472-0.551        | 337452*  | 74.38         |
| 14-16           | 0.551-0.630        | 337454*  | 74.38         |
| 16-18           | 0.630-0.709        | 337456*  | 74.38         |
| 18-20           | 0.709-0.789        | 337458*  | 74.38         |
| 20-22           | 0.789-0.866        | 337460*  | 74.38         |
| 22-24           | 0.866-0.945        | 337461*  | 74.38         |
| 24-26           | 0.945-1.024        | 337462*  | 74.38         |
| 26-28           | 1.024-1.102        | 337464*  | 74.38         |
| 28-30           | 1.102-1.181        | 337466*  | 74.38         |
| 30-32           | 1.181-1.260        | 337468*  | 74.38         |
| <b>11pc Set</b> | <b>0.394-1.260</b> | 337387   | <b>892.52</b> |

## ER40 Tap Collets

- For synchronous, rigid tapping operations using ER collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity



| Metric      | Tap Inch                   | Shank Dia. | Size of Square | Code No. | Price \$        |
|-------------|----------------------------|------------|----------------|----------|-----------------|
|             | M4                         | 2.8mm      | 2.1mm          | 338387   | 91.14           |
|             | M3-M5                      | 3.5mm      | 2.7mm          | 338389   | 91.14           |
|             | M3-M5                      | 4mm        | 3.0mm          | 338391   | 91.14           |
|             | M4-M6                      | 4.5mm      | 3.4mm          | 338393   | 91.14           |
|             | M4-M6                      | 5.5mm      | 4.3mm          | 338383   | 91.14           |
|             | M4-M5                      | 5mm        | 4.0mm          | 338395   | 91.14           |
|             | M5-M5.5                    | 4.5mm      | 4.5mm          | 338397   | 91.14           |
|             | M4-M8                      | 6mm        | 4.9mm          | 338385   | 91.14           |
|             | M5-M8                      | 6mm        | 4.5mm          | 338399   | 91.14           |
|             | M7-M8                      | 6.2mm      | 5.0mm          | 338401   | 91.14           |
|             | M8-M11                     | 8mm        | 6.0mm          | 338405   | 91.14           |
|             | M8                         | 8mm        | 6.2mm          | 338409   | 91.14           |
|             | M10                        | 7mm        | 5.5mm          | 338403   | 91.14           |
|             | M10                        | 10mm       | 8.0mm          | 338413   | 91.14           |
|             | M12                        | 8.5mm      | 6.5mm          | 338407   | 91.14           |
|             | M12                        | 9mm        | 7.0mm          | 338411   | 91.14           |
|             | M14                        | 10.5mm     | 8.0mm          | 338415   | 91.14           |
|             | M14                        | 11mm       | 9.0mm          | 338417   | 91.14           |
|             | M16                        | 12mm       | 9.0mm          | 338419   | 91.14           |
|             | M16                        | 12.5mm     | 10.0mm         | 338421   | 91.14           |
|             | M18                        | 14mm       | 11.0mm         | 338423   | 91.14           |
|             | M20                        | 15mm       | 12.0mm         | 338425   | 91.14           |
|             | M20                        | 16mm       | 12.0mm         | 338427   | 91.14           |
|             | M22                        | 17mm       | 13.0mm         | 338429   | 91.14           |
|             | M22-M24                    | 18mm       | 14.5mm         | 338431   | 91.14           |
|             | M27-M30                    | 20mm       | 16.0mm         | 338433   | 91.14           |
| <b>Inch</b> |                            |            |                |          |                 |
|             | 0-6                        | 0.141      | 0.110          | 338267*  | 91.14           |
|             | 8                          | 0.168      | 0.131          | 338268*  | 91.14           |
|             | 10                         | 0.194      | 0.152          | 338269*  | 91.14           |
|             | 12                         | 0.220      | 0.165          | 338270*  | 91.14           |
|             | 1/4                        | 0.255      | 0.191          | 338271*  | 91.14           |
|             | 5/16                       | 0.318      | 0.238          | 338272*  | 91.14           |
|             | 3/8                        | 0.381      | 0.286          | 338273*  | 91.14           |
|             | 7/16                       | 0.323      | 0.242          | 338274*  | 91.14           |
|             | 1/2                        | 0.367      | 0.275          | 338275*  | 91.14           |
|             | 9/16                       | 0.429      | 0.322          | 338276*  | 91.14           |
|             | 5/8                        | 0.480      | 0.360          | 338277*  | 91.14           |
|             | 11/16                      | 0.542      | 0.406          | 338278*  | 91.14           |
|             | 3/4                        | 0.590      | 0.442          | 338279*  | 91.14           |
|             | 13/16                      | 0.652      | 0.489          | 338280*  | 91.14           |
|             | 7/8                        | 0.697      | 0.523          | 338281*  | 91.14           |
|             | 15/16                      | 0.760      | 0.570          | 338282*  | 91.14           |
|             | 1                          | 0.800      | 0.600          | 338283*  | 91.14           |
| <b>NPT</b>  |                            |            |                |          |                 |
|             | 1/16, 1/8-SS (small shank) | 0.3125     | 0.234          | 338284*  | 91.14           |
|             | 1/8-LS (large shank)       | 0.4375     | 0.328          | 338285   | 91.14           |
|             | 1/4                        | 0.5625     | 0.421          | 338286*  | 91.14           |
|             | 3/8                        | 0.7000     | 0.531          | 338287*  | 91.14           |
|             | 1/2                        | 0.6875     | 0.515          | 338288*  | 91.14           |
|             | <b>21pc Set</b>            |            |                | 337353   | <b>1,913.96</b> |

\* Part of set

- See page G31, G32 for Sets
- See page G21 for Dimensional Data

## ER Collet Sets



\* Case may not be as shown



| ER11 / 13 Pieces |             | ER16 / 10 Pieces |             | ER20 / 12 Pieces |             | ER25 / 15 Pieces |             |
|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|
| Code No.         | Price \$    | Code No.         | Price \$    | Code No.         | Price \$    | Code No.         | Price \$    |
| 337379           | 409.61      | 337380           | 305.05      | 337382           | 417.15      | 337383           | 532.49      |
| Code No.         | Size        | Code No.         | Size        | Code No.         | Size        | Code No.         | Size        |
| 337650           | 0.019-0.039 | 337302           | 0.019-0.039 | 337473           | 0.059-0.078 | 337330           | 0.059-0.078 |
| 337652           | 0.039-0.059 | 337304           | 0.059-0.078 | 337474           | 0.098-0.118 | 337332           | 0.098-0.118 |
| 337654           | 0.059-0.078 | 337306           | 0.098-0.118 | 337475           | 0.137-0.157 | 337334           | 0.137-0.157 |
| 337656           | 0.078-0.098 | 337308           | 0.137-0.157 | 337476           | 0.177-0.196 | 337336           | 0.177-0.196 |
| 337658           | 0.098-0.118 | 337310           | 0.177-0.196 | 337477           | 0.217-0.236 | 337338           | 0.217-0.236 |
| 337660           | 0.118-0.137 | 337312           | 0.217-0.236 | 337478           | 0.256-0.275 | 337340           | 0.256-0.275 |
| 337662           | 0.137-0.157 | 337314           | 0.256-0.275 | 337479           | 0.295-0.314 | 337342           | 0.295-0.314 |
| 337664           | 0.157-0.177 | 337316           | 0.295-0.314 | 337480           | 0.335-0.354 | 337344           | 0.335-0.354 |
| 337666           | 0.177-0.196 | 337318           | 0.335-0.354 | 337481           | 0.374-0.393 | 337346           | 0.374-0.393 |
| 337668           | 0.196-0.216 | 337320           | 0.374-0.393 | 337482           | 0.413-0.433 | 337348           | 0.413-0.433 |
| 337670           | 0.216-0.236 |                  |             | 337483           | 0.452-0.472 | 337350           | 0.452-0.472 |
| 337672           | 0.236-0.255 |                  |             | 337484           | 0.492-0.511 | 337352           | 0.492-0.511 |
| 337674           | 0.255-0.275 |                  |             |                  |             | 337354           | 0.531-0.551 |
|                  |             |                  |             |                  |             | 337356           | 0.571-0.590 |
|                  |             |                  |             |                  |             | 337358           | 0.610-0.629 |

| ER32 / 18 Pieces |             | ER40 / 23 Pieces |             | ER50 / 11 Pieces |             |
|------------------|-------------|------------------|-------------|------------------|-------------|
| Code No.         | Price \$    | Code No.         | Price \$    | Code No.         | Price \$    |
| 337384           | 631.66      | 337386           | 894.67      | 337387           | 892.52      |
| Code No.         | Size        | Code No.         | Size        | Code No.         | Size        |
| 337361           | 0.098-0.118 | 337501           | 0.137-0.157 | 337450           | 0.394-0.472 |
| 337362           | 0.137-0.157 | 337502           | 0.177-0.196 | 337452           | 0.472-0.551 |
| 337363           | 0.177-0.196 | 337503           | 0.216-0.236 | 337454           | 0.551-0.630 |
| 337364           | 0.217-0.236 | 337505           | 0.256-0.275 | 337456           | 0.630-0.709 |
| 337365           | 0.256-0.275 | 337506           | 0.295-0.314 | 337458           | 0.709-0.789 |
| 337366           | 0.295-0.314 | 337507           | 0.335-0.354 | 337460           | 0.789-0.866 |
| 337367           | 0.335-0.354 | 337509           | 0.374-0.393 | 337461           | 0.866-0.945 |
| 337368           | 0.374-0.393 | 337510           | 0.413-0.433 | 337462           | 0.945-1.024 |
| 337369           | 0.413-0.433 | 337511           | 0.452-0.472 | 337464           | 1.024-1.102 |
| 337370           | 0.452-0.472 | 337513           | 0.492-0.511 | 337466           | 1.102-1.181 |
| 337371           | 0.492-0.511 | 337514           | 0.531-0.551 | 337468           | 1.181-1.260 |
| 337372           | 0.531-0.551 | 337515           | 0.571-0.590 |                  |             |
| 337373           | 0.571-0.590 | 337517           | 0.610-0.629 |                  |             |
| 337374           | 0.610-0.629 | 337518           | 0.650-0.669 |                  |             |
| 337375           | 0.650-0.669 | 337519           | 0.689-0.708 |                  |             |
| 337376           | 0.689-0.708 | 337521           | 0.728-0.748 |                  |             |
| 337377           | 0.728-0.748 | 337522           | 0.767-0.787 |                  |             |
| 337378           | 0.767-0.787 | 337523           | 0.807-0.826 |                  |             |
|                  |             | 337524           | 0.846-0.866 |                  |             |
|                  |             | 337525           | 0.886-0.905 |                  |             |
|                  |             | 337526           | 0.925-0.944 |                  |             |
|                  |             | 337527           | 0.965-0.984 |                  |             |
|                  |             | 337528           | 1.004-1.023 |                  |             |

## ER Collet Sets



- Shipped as set, no plastic container



| Collet | Description          | Range            | Code No. | Price \$ |
|--------|----------------------|------------------|----------|----------|
| ER16   | Inch 11pc Collet Set | 1/16-3/8 x 32nds | 337440   | 383.56   |
| ER25   | Inch 17pc Collet Set | 1/8-5/8 x 32nds  | 337442   | 669.25   |
| ER32   | Inch 21pc Collet Set | 1/8-3/4 x 32nds  | 337444   | 826.72   |

## ER Sealed Collet Sets



| Collet | Description                   | Range               | Code No. | Price \$ |
|--------|-------------------------------|---------------------|----------|----------|
| ER11   | Inch 6pc Sealed Collet Set    | 3/16-17/64 x 64ths  | 337929   | 469.44   |
| ER16   | Inch 10pc Sealed Collet Set   | 1/8-13/32 x 32nds   | 337931   | 731.47   |
| ER16   | Metric 13pc Sealed Collet Set | 4.0-10.0mm x 0.5mm  | 337932   | 829.27   |
| ER20   | Inch 12pc Sealed Collet Set   | 5/32-1/2 x 32nds    | 337933   | 836.13   |
| ER20   | Metric 17pc Sealed Collet Set | 5.0-13.0mm x 0.5mm  | 337935   | 1,284.49 |
| ER25   | Inch 13pc Sealed Collet Set   | 1/4-5/8 x 32nds     | 337938   | 1,054.60 |
| ER25   | Metric 21pc Sealed Collet Set | 6.0-16.0mm x 0.5mm  | 337939   | 1,521.41 |
| ER32   | Inch 17pc Sealed Collet Set   | 1/4-3/4 x 32nds     | 337940   | 1,466.67 |
| ER32   | Metric 20pc Sealed Collet Set | 10.5-20.0mm x 0.5mm | 337942   | 1,612.80 |
| ER40   | Metric 33pc Sealed Collet Set | 10.0-26.0mm x 0.5mm | 337944   | 3,059.71 |

## ER Tap Collet Sets



- For synchronous, rigid tapping operations using ER collet chucks
- Collet bore is exact tool diameter with square drive for accuracy and rigidity
- See page G63-67 for rigid tapping holders



| Collet        | Description         | Range       | Code No. | Price \$ |
|---------------|---------------------|-------------|----------|----------|
| <b>Metric</b> |                     |             |          |          |
| ER32          | 11pc Tap Collet Set | M4 - M26    | 337992   | 855.51   |
| <b>Inch</b>   |                     |             |          |          |
| ER16          | 5pc Tap Collet Set  | #6 - 1/4"   | 337986   | 328.10   |
| ER16          | 9pc Tap Collet Set  | #6 - 1/2"   | 337343   | 590.59   |
| ER20          | 9pc Tap Collet Set  | #6 - 1/2"   | 337345   | 590.59   |
| ER25          | 11pc Tap Collet Set | #6 - 5/8"   | 337347   | 815.43   |
| ER32          | 16pc Tap Collet Set | #6 - 13/16" | 337351   | 1,244.38 |
| ER40          | 21pc Tap Collet Set | #6 - 1"     | 337353   | 1,913.96 |

## ER Inch Collet Sets



| ER11 / 7 Pieces |          | ER16 / 11 Pieces |          | ER20 / 15 Piece |          | ER25 / 17 Pieces |          | ER32 / 21 Pieces |          | ER40 / 13 Pieces |          | ER40 / 29 Pieces |          |
|-----------------|----------|------------------|----------|-----------------|----------|------------------|----------|------------------|----------|------------------|----------|------------------|----------|
| Code No.        | Price \$ | Code No.         | Price \$ | Code No.        | Price \$ | Code No.         | Price \$ | Code No.         | Price \$ | Code No.         | Price \$ | Code No.         | Price \$ |
| Code No.        | Size     | Code No.         | Size     | Code No.        | Size     | Code No.         | Size     | Code No.         | Size     | Code No.         | Size     | Code No.         | Size     |
| 337401          | 223.13   | 337403           | 367.57   | 337404          | 549.74   | 337405           | 603.63   | 337407           | 737.30   | 337417           | 677.60   | 337409           | 1,128.58 |
| 337610          | 1/16     | 337531           | 1/16     | 337621          | 1/16     | 337683           | 1/8      | 337703           | 1/8      | 337728           | 1/8      | 337728           | 1/8      |
| 337613          | 3/32     | 337532           | 3/32     | 337623          | 3/32     | 337684           | 5/32     | 337704           | 5/32     | 337731           | 3/16     | 337729           | 5/32     |
| 337615          | 1/8      | 337533           | 1/8      | 337663          | 1/8      | 337685           | 3/16     | 337706           | 3/16     | 337733           | 1/4      | 337731           | 3/16     |
| 337618          | 5/32     | 337534           | 5/32     | 337665          | 5/32     | 337686           | 7/32     | 337707           | 7/32     | 337736           | 5/16     | 337732           | 7/32     |
| 337651          | 3/16     | 337535           | 3/16     | 337667          | 3/16     | 337687           | 1/4      | 337708           | 1/4      | 337738           | 3/8      | 337733           | 1/4      |
| 337655          | 7/32     | 337536           | 7/32     | 337669          | 7/32     | 337688           | 9/32     | 337709           | 9/32     | 337741           | 7/16     | 337734           | 9/32     |
| 337659          | 1/4      | 337537           | 1/4      | 337671          | 1/4      | 337689           | 5/16     | 337711           | 5/16     | 337743           | 1/2      | 337736           | 5/16     |
|                 |          | 337538           | 9/32     | 337673          | 9/32     | 337691           | 11/32    | 337712           | 11/32    | 337746           | 9/16     | 337737           | 11/32    |
|                 |          | 337540           | 5/16     | 337675          | 5/16     | 337692           | 3/8      | 337713           | 3/8      | 337748           | 5/8      | 337738           | 3/8      |
|                 |          | 337541           | 11/32    | 337676          | 11/32    | 337693           | 13/32    | 337714           | 13/32    | 337751           | 11/16    | 337739           | 13/32    |
|                 |          | 337542           | 3/8      | 337677          | 3/8      | 337694           | 7/16     | 337716           | 7/16     | 337753           | 3/4      | 337741           | 7/16     |
|                 |          |                  |          | 337678          | 13/32    | 337696           | 15/32    | 337717           | 15/32    | 337758           | 7/8      | 337742           | 15/32    |
|                 |          |                  |          | 337679          | 7/16     | 337697           | 1/2      | 337718           | 1/2      | 337763           | 1        | 337743           | 1/2      |
|                 |          |                  |          | 337681          | 15/32    | 337698           | 17/32    | 337719           | 17/32    |                  |          | 337744           | 17/32    |
|                 |          |                  |          | 337682          | 1/2      | 337699           | 9/16     | 337721           | 9/16     |                  |          | 337746           | 9/16     |
|                 |          |                  |          |                 |          | 337701           | 19/32    | 337722           | 19/32    |                  |          | 337747           | 19/32    |
|                 |          |                  |          |                 |          | 337702           | 5/8      | 337723           | 5/8      |                  |          | 337748           | 5/8      |
|                 |          |                  |          |                 |          |                  |          | 337724           | 21/32    |                  |          | 337749           | 21/32    |
|                 |          |                  |          |                 |          |                  |          | 337725           | 11/16    |                  |          | 337751           | 11/16    |
|                 |          |                  |          |                 |          |                  |          | 337726           | 23/32    |                  |          | 337752           | 23/32    |
|                 |          |                  |          |                 |          |                  |          | 337727           | 3/4      |                  |          | 337753           | 3/4      |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337754           | 25/32    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337756           | 13/16    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337757           | 27/32    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337758           | 7/8      |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337759           | 29/32    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337761           | 15/16    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337762           | 31/32    |
|                 |          |                  |          |                 |          |                  |          |                  |          |                  |          | 337763           | 1        |

## Replacement ER Chuck Nuts



Collet Nut for ER32 Shorty Collet Chuck

| Description        | Steam Oxide |          | Balanced & Bright |          |
|--------------------|-------------|----------|-------------------|----------|
|                    | Code No.    | Price \$ | Code No.          | Price \$ |
| ER11 Nut (Hex)     | 337680      | 62.63    | 534790            | 38.12    |
| ER16 Nut (Hex)     | 337389      | 62.63    | 534792            | 38.12    |
| ER20 Nut (Hex)     | 337391      | 62.63    | 534794            | 43.57    |
| ER25 Nut (Notched) | 337390      | 68.08    | 534796            | 47.66    |
| ER32 Nut (Notched) | 337392      | 66.02    | 534798            | 53.10    |
| ER40 Nut (Notched) | 337393      | 72.16    | 534800            | 57.19    |
| ER50 Nut (Notched) | 337385      | 158.99   |                   |          |

### ER32 Shorty Collet Nut

|  |        |        |
|--|--------|--------|
| Fits ER32 Shorty Chucks (M40 x 1.5 Thread) | 337411 | 118.02 |
|--|--------|--------|

## ER Chuck Nut Wrenches



Wrench for ER32 Shorty Collet Chuck

| Description                     | Code No. | Price \$ |
|---------------------------------|----------|----------|
| Fits ER11 Chucks (Hex)          | 337388   | 25.60    |
| Fits ER16 Chucks (Hex)          | 337395   | 25.60    |
| Fits ER20 Chucks (Hex)          | 337397   | 37.73    |
| Fits ER25 Chucks (Notched)      | 337396   | 37.73    |
| Fits ER32 Chucks (Notched)      | 337398   | 37.73    |
| Fits ER40 Chucks (Notched)      | 337399   | 44.46    |
| <b>ER32 Shorty Chuck Wrench</b> |          |          |
| Fits ER32 Shorty Chucks         | 337381   | 122.64   |

## Replacement Backup Screws

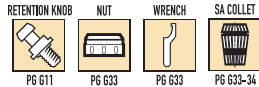


| Description        | Code No. | Price \$ |
|--------------------|----------|----------|
| ER11 Backup Screws | 534814   | 9.44     |
| ER16 Backup Screws | 534816   | 10.78    |
| ER20 Backup Screws | 534818   | 10.78    |
| ER25 Backup Screws | 534820   | 13.48    |
| ER32 Backup Screws | 534822   | 12.00    |
| ER40 Backup Screws | 534824   | 16.17    |

## CAT Taper SA High Precision Collet Chucks



- DIN coolant through the flange at no extra charge
- Run out accuracy is > 5µm at 4xD of the cutting tool shank
- 8° tapered collet seats deeper in the body of the holder providing increased rigidity. This results in concentricity and stronger gripping power
- Wrench not included
- AT2 Taper Accuracy
- RFID chip hole



| Taper        | Collet Series | Collet Range | Gauge Length | Code No. | Price \$ |
|--------------|---------------|--------------|--------------|----------|----------|
| <b>CAT40</b> |               |              |              |          |          |
| CT40         | SA10          | 0.069-0.394  | 3.54         | 531756   | 95.72    |
| CT40         | SA10          | 0.069-0.394  | 4.72         | 531758   | 100.75   |
| CT40         | SA16          | 0.108-0.630  | 3.54         | 531762   | 100.75   |
| CT40         | SA16          | 0.108-0.630  | 5.91         | 531766   | 128.22   |
| CT40         | SA25          | 0.630-1.00   | 3.54         | 531768   | 109.46   |
| <b>CAT50</b> |               |              |              |          |          |
| CT50         | SA10          | 0.069-0.394  | 4.13         | 531776   | 132.31   |
| CT50         | SA16          | 0.108-0.630  | 4.13         | 531782   | 132.97   |
| CT50         | SA25          | 0.630-1.00   | 4.13         | 531788   | 147.56   |

## Replacement SA Collet Nuts



| Description        | Code No. | Price \$ |
|--------------------|----------|----------|
| SA10 Nut (Hex)     | 536588   | 88.39    |
| SA16 Nut (Notched) | 536590   | 95.03    |
| SA25 Nut (Notched) | 536592   | 28.73    |

## SA Collet Chuck Wrenches



| Description | Code No. | Price \$ |
|-------------|----------|----------|
| Fits SA10   | 536580   | 37.40    |
| Fits SA16   | 536582   | 37.40    |
| Fits SA25   | 536584   | 10.91    |

## SA Collet Extractors



| Description | Code No. | Price \$ |
|-------------|----------|----------|
| SA10        | 536572   | 4.61     |
| SA16        | 536574   | 5.81     |
| SA25        | 536576   | 7.99     |

## SA10 Collets



| Size          | Collapse Range (mm) | Collapse Range (in.) | Code No. | Price \$ |
|---------------|---------------------|----------------------|----------|----------|
| <b>Metric</b> |                     |                      |          |          |
| 2.0mm         | 1.75-2.0            | 0.068-0.078          | 338564   | 24.99    |
| 2.25mm        | 2.0-2.25            | 0.078-0.088          | 338566   | 98.37    |
| 2.5mm         | 2.25-2.5            | 0.088-0.098          | 338568   | 24.99    |
| 3.0mm         | 2.75-3.0            | 0.108-0.118          | 338572   | 24.99    |
| 3.5mm         | 3.0-3.5             | 0.118-0.137          | 338574   | 98.37    |
| 4.0mm         | 3.5-4.0             | 0.137-0.157          | 338576   | 24.99    |
| 4.5mm         | 4.0-4.5             | 0.157-0.177          | 338578   | 24.99    |
| 5.0mm         | 4.5-5.0             | 0.177-0.196          | 338580   | 24.99    |
| 5.5mm         | 5.0-5.5             | 0.196-0.216          | 338582   | 24.99    |
| 6.0mm         | 5.5-6.0             | 0.216-0.236          | 338583   | 98.37    |
| 6.5mm         | 6.0-6.5             | 0.236-0.255          | 338584   | 24.99    |
| 7.0mm         | 6.5-7.0             | 0.255-0.275          | 338586   | 24.99    |
| 7.5mm         | 7.0-7.5             | 0.275-0.295          | 338588   | 24.99    |
| 8.0mm         | 7.5-8.0             | 0.295-0.314          | 338590   | 24.99    |
| 8.5mm         | 8.0-8.5             | 0.314-0.334          | 338592   | 24.99    |
| 9.0mm         | 8.5-9.0             | 0.334-0.354          | 338594   | 24.99    |
| 9.5mm         | 9.0-9.5             | 0.354-0.374          | 338596   | 24.99    |
| 10.0mm        | 9.5-10.0            | 0.374-0.393          | 338598   | 24.99    |
| <b>Inch</b>   |                     |                      |          |          |
| 1/8           | -                   | -                    | 338602   | 24.99    |
| 3/16          | -                   | -                    | 338604   | 24.99    |
| 1/4           | -                   | -                    | 338606   | 24.99    |
| 5/16          | -                   | -                    | 338608   | 24.99    |
| 3/8           | -                   | -                    | 338610   | 24.99    |

## SA25 Collets



| Size          | Collapse Range (mm) | Collapse Range (in.) | Code No. | Price \$ |
|---------------|---------------------|----------------------|----------|----------|
| <b>Metric</b> |                     |                      |          |          |
| 16.5mm        | 16.0-16.5           | 0.629-0.649          | 338694   | 120.09   |
| 17.0mm        | 16.5-17.0           | 0.649-0.669          | 338696   | 120.09   |
| 17.5mm        | 17.0-17.5           | 0.669-0.688          | 338698   | 120.09   |
| 18.0mm        | 17.5-18.0           | 0.688-0.708          | 338700   | 29.99    |
| 18.5mm        | 18.0-18.5           | 0.708-0.728          | 338702   | 120.09   |
| 19.0mm        | 18.5-19.0           | 0.728-0.748          | 338704   | 120.09   |
| 20.0mm        | 19.5-20.0           | 0.767-0.787          | 338708   | 29.99    |
| 20.5mm        | 20.0-20.5           | 0.787-0.807          | 338710   | 120.09   |
| 21.0mm        | 20.5-21.0           | 0.807-0.826          | 338712   | 120.09   |
| 21.5mm        | 21.0-21.5           | 0.826-0.846          | 338714   | 120.09   |
| 22.0mm        | 21.5-22.0           | 0.846-0.866          | 338716   | 29.99    |
| 23.0mm        | 22.5-23.0           | 0.885-0.905          | 338720   | 120.09   |
| 24.0mm        | 23.5-24.0           | 0.925-0.944          | 338724   | 29.99    |
| 24.5mm        | 24.0-24.5           | 0.944-0.964          | 338726   | 120.09   |
| 25.0mm        | 24.5-25.0           | 0.964-0.984          | 338728   | 29.99    |
| 25.4mm        | 25.0-25.4           | 0.984-1.000          | 338730   | 29.99    |
| <b>Inch</b>   |                     |                      |          |          |
| 1/4           | -                   | -                    | 338736   | 29.99    |
| 5/16          | -                   | -                    | 338738   | 29.99    |
| 3/8           | -                   | -                    | 338740   | 29.99    |
| 7/16          | -                   | -                    | 338742   | 29.99    |
| 1/2           | -                   | -                    | 338744   | 29.99    |
| 5/8           | -                   | -                    | 338746   | 29.99    |
| 3/4           | -                   | -                    | 338748   | 29.99    |

## SA16 Collets



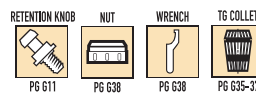
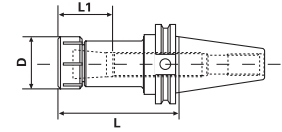
| Size          | Collapse Range (mm) | Collapse Range (in.) | Code No. | Price \$ |
|---------------|---------------------|----------------------|----------|----------|
| <b>Metric</b> |                     |                      |          |          |
| 2.0mm         |                     |                      | 338614   | 98.37    |
| 2.5mm         |                     |                      | 338616   | 98.37    |
| 3.0mm         | 2.75-3.0            | 0.108-0.118          | 338618   | 24.99    |
| 3.5mm         | 3.0-3.5             | 0.118-0.137          | 338620   | 98.37    |
| 4.0mm         | 3.5-4.0             | 0.137-0.157          | 338622   | 98.37    |
| 4.5mm         | 4.0-4.5             | 0.157-0.177          | 338624   | 98.37    |
| 5.0mm         | 4.5-5.0             | 0.177-0.196          | 338626   | 24.99    |
| 5.5mm         | 5.0-5.5             | 0.196-0.216          | 338628   | 24.99    |
| 6.0mm         | 5.5-6.0             | 0.216-0.236          | 338630   | 24.99    |
| 6.5mm         | 6.0-6.5             | 0.236-0.255          | 338632   | 24.99    |
| 7.0mm         | 6.5-7.0             | 0.255-0.275          | 338634   | 24.99    |
| 7.5mm         | 7.0-7.5             | 0.275-0.295          | 338636   | 24.99    |
| 8.0mm         | 7.5-8.0             | 0.295-0.314          | 338638   | 24.99    |
| 8.5mm         | 8.0-8.5             | 0.314-0.334          | 338640   | 24.99    |
| 9.0mm         | 8.5-9.0             | 0.334-0.354          | 338642   | 98.37    |
| 9.5mm         | 9.0-9.5             | 0.354-0.374          | 338644   | 24.99    |
| 10.0mm        | 9.5-10.0            | 0.374-0.393          | 338646   | 24.99    |
| 10.5mm        | 10.0-10.5           | 0.393-0.413          | 338648   | 24.99    |
| 11.0mm        | 10.5-11.0           | 0.413-0.433          | 338650   | 24.99    |
| 11.5mm        | 11.0-11.5           | 0.433-0.452          | 338652   | 24.99    |
| 12.0mm        | 11.5-12.0           | 0.452-0.472          | 338654   | 24.99    |
| 12.5mm        | 12.0-12.5           | 0.472-0.492          | 338656   | 98.37    |
| 13.0mm        | 12.5-13.0           | 0.492-0.511          | 338658   | 24.99    |
| 13.5mm        | 13.0-13.5           | 0.511-0.531          | 338660   | 24.99    |
| 14.0mm        | 13.5-14.0           | 0.531-0.551          | 338662   | 24.99    |
| 14.5mm        | 14.0-14.5           | 0.551-0.570          | 338664   | 98.37    |
| 15.0mm        | 14.5-15.0           | 0.570-0.590          | 338666   | 24.99    |
| 15.5mm        | 15.0-15.5           | 0.590-0.610          | 338668   | 24.99    |
| 16.0mm        | 15.5-16.0           | 0.610-0.629          | 338670   | 24.99    |

| Size        | Collapse Range (mm) | Collapse Range (in.) | Code No. | Price \$ |
|-------------|---------------------|----------------------|----------|----------|
| <b>Inch</b> |                     |                      |          |          |
| 1/8         | -                   | -                    | 338674   | 24.99    |
| 3/16        | -                   | -                    | 338676   | 98.37    |
| 1/4         | -                   | -                    | 338678   | 24.99    |
| 5/16        | -                   | -                    | 338680   | 24.99    |
| 3/8         | -                   | -                    | 338682   | 24.99    |
| 7/16        | -                   | -                    | 338684   | 24.99    |
| 1/2         | -                   | -                    | 338686   | 24.99    |
| 9/16        | -                   | -                    | 338688   | 24.99    |
| 5/8         | -                   | -                    | 338690   | 24.99    |

## CAT Taper TG Collet Chucks



- DIN coolant through the flange
- Shank traverse ground to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- Wrench not included
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0006"
- AT2 Taper Accuracy
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**  
**CAT50**

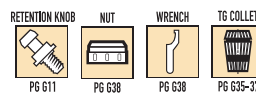
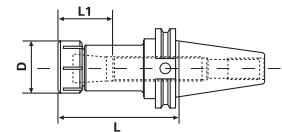
**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**  
**CAT40**

| Taper        | Collet Series | Collet Range | L     | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|--------------|---------------|--------------|-------|------|------|------------------------|----------|----------|
| <b>CAT40</b> |               |              |       |      |      |                        |          |          |
| CT40         | TG75          | 3/64-3/4     | 3.00  | 1.61 | 1.89 | 81.3                   | 531284   | 363.75   |
| CT40         | TG75          | 3/64-3/4     | 5.00  | 1.61 | 1.89 | 81.3                   | 531286   | 186.05   |
| CT40         | TG100         | 3/64-1       | 3.00  | 2.13 | 2.50 | 81.3                   | 531288   | 267.95   |
| CT40         | TG100         | 3/64-1       | 3.50  | 2.13 | 2.50 | 81.3                   | 531290   | 267.95   |
| CT40         | TG100         | 3/64-1       | 5.50  | 2.13 | 2.50 | 81.3                   | 531292   | 267.95   |
| CT40         | TG150         | 1/2-1-1/2    | 6.00  | 2.88 | 3.50 | 94.9                   | 531294   | 267.95   |
| <b>CAT50</b> |               |              |       |      |      |                        |          |          |
| CT50         | TG75          | 3/64-3/4     | 3.50  | 1.61 | 1.89 | 81.3                   | 531296   | 256.86   |
| CT50         | TG100         | 3/64-1       | 3.50  | 2.13 | 2.50 | 81.3                   | 531300   | 256.86   |
| CT50         | TG100         | 3/64-1       | 5.50  | 2.13 | 2.50 | 81.3                   | 531302   | 349.87   |
| CT50         | TG100         | 3/64-1       | 7.50  | 2.13 | 2.50 | 81.3                   | 531304   | 484.55   |
| CT50         | TG100         | 3/64-1       | 10.00 | 2.13 | 3.50 | 81.3                   | 531306   | 548.42   |
| CT50         | TG150         | 1/2-1-1/2    | 3.50  | 2.88 | 3.50 | 94.9                   | 531308   | 381.81   |
| CT50         | TG150         | 1/2-1-1/2    | 6.00  | 2.88 | 3.50 | 94.9                   | 531310   | 423.45   |

## BT Taper TG Collet Chucks



- DIN coolant through the flange
- Shank traverse ground to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- Wrench not included
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0006"
- AT2 Taper Accuracy
- RFID chip hole



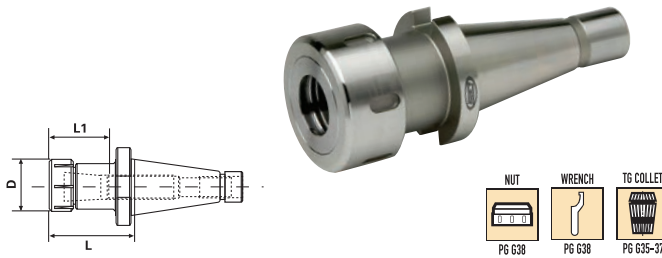
**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**  
**BT50**

**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**  
**BT30/40**

| Taper       | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------------|---------------|--------------|------|------|------|------------------------|----------|----------|
| <b>BT30</b> |               |              |      |      |      |                        |          |          |
| BT30        | TG75          | 3/64-3/4     | 2.50 | 1.61 | 1.89 | 81.3                   | 532128‡  | 363.75   |
| BT30        | TG100         | 3/64-1       | 3.94 | 2.24 | 2.50 | 81.3                   | 532130‡  | 195.76   |
| <b>BT40</b> |               |              |      |      |      |                        |          |          |
| BT40        | TG75          | 3/64-3/4     | 3.00 | 1.61 | 1.89 | 81.3                   | 532132   | 363.75   |
| BT40        | TG100         | 3/64-1       | 3.50 | 2.13 | 2.50 | 81.3                   | 532134   | 195.76   |
| BT40        | TG100         | 3/64-1       | 5.50 | 2.13 | 2.50 | 81.3                   | 532136   | 215.20   |
| <b>BT50</b> |               |              |      |      |      |                        |          |          |
| BT50        | TG100         | 3/64-1       | 4.00 | 2.13 | 2.50 | 81.3                   | 532139   | 317.95   |
| BT50        | TG100         | 3/64-1       | 6.00 | 2.13 | 2.50 | 81.3                   | 532140   | 409.58   |

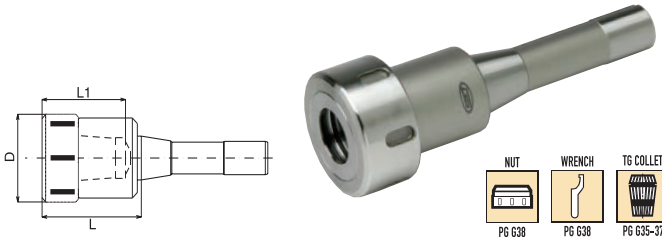
‡ Not DIN Coolant

## NMTB Taper TG Collet Chucks



| Taper  | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|--------|---------------|--------------|------|------|------|------------------------|----------|----------|
| NMTB40 | TG100         | 3/64-1       | 3.00 | 2.12 | 2.50 | 81.3                   | 534304   | 161.15   |
| NMTB50 | TG75          | 3/64-3/4     | 3.00 | 1.61 | 1.89 | 81.3                   | 534308   | 195.02   |
| NMTB50 | TG100         | 3/64-1       | 3.50 | 2.12 | 2.50 | 81.3                   | 534310   | 257.62   |

## R8 Taper TG Collet Chuck



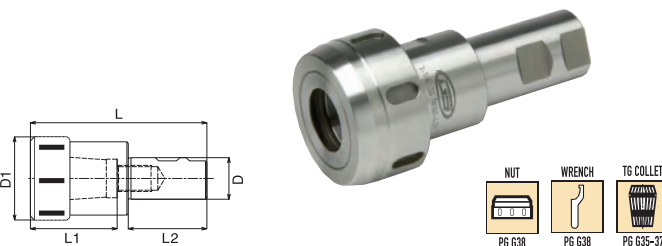
| Taper | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|------------------------|----------|----------|
| R8    | TG100         | 3/64-1       | 3.25 | 2.17 | 2.50 | 81.3                   | 534314   | 174.96   |

## Morse Taper TG Collet Chucks



| Taper | Collet Series | Collet Range | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|------------------------|----------|----------|
| MT3   | TG100         | 3/64-1       | 3.25 | 2.73 | 2.50 | 81.3                   | 534322   | 277.19   |
| MT4   | TG100         | 3/64-1       | 3.25 | 2.73 | 2.50 | 81.3                   | 534324   | 291.64   |

## Straight Shank TG Collet Chucks



| Shank Dia. | Collet Series | Collet Range | L    | L1   | L2   | D1   | Tightening Torque (Nm) | Code No. | Price \$ |
|------------|---------------|--------------|------|------|------|------|------------------------|----------|----------|
| 1-1/2      | TG100         | 3/64-1       | 9.00 | 2.73 | 6.00 | 2.50 | 81.3                   | 534320   | 207.53   |

## TG75 Standard & Sealed Collets



- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341
- 80 ft/lbs maximum tightening torque

### Sealed Collets

- Sealed for coolant-through applications
- Pressure resistance tested to 1000 psi
- Sealed with rubber



| Size (in.) | Regular Code No. | Price \$ | Sealed Code No. | Price \$ |
|------------|------------------|----------|-----------------|----------|
| 3/64       | 334790           | 38.48    | -               | -        |
| 1/16       | 334791           | 38.48    | -               | -        |
| 5/64       | 334792           | 38.48    | -               | -        |
| 3/32       | 334800           | 38.48    | -               | -        |
| 7/64       | 334801           | 38.48    | -               | -        |
| 1/8        | 334802           | 37.35    | 334843          | 74.62    |
| 9/64       | 334803           | 38.48    | 334844          | 74.62    |
| 5/32       | 334804           | 38.48    | 334845          | 74.62    |
| 11/64      | 334805           | 37.35    | 334846          | 74.62    |
| 3/16       | 334806           | 38.48    | 334847          | 74.62    |
| 13/64      | 334807           | 37.35    | 334848          | 74.62    |
| 7/32       | 334808           | 38.48    | 334849          | 74.62    |
| 15/64      | 334809           | 37.35    | 334850          | 74.62    |
| 1/4        | 334810           | 37.35    | 334851          | 74.62    |
| 17/64      | 334811           | 37.35    | 334852          | 74.62    |
| 9/32       | 334812           | 38.48    | 334853          | 74.62    |
| 19/64      | 334813           | 37.35    | 334854          | 74.62    |
| 5/16       | 334814           | 38.48    | 334855          | 74.62    |
| 21/64      | 334815           | 37.35    | 334856          | 74.62    |
| 11/32      | 334816           | 37.35    | 334857          | 74.62    |
| 23/64      | 334817           | 38.48    | 334858          | 74.62    |
| 3/8        | 334818           | 38.48    | 334859          | 74.62    |
| 25/64      | 334819           | 38.48    | 334860          | 74.62    |
| 13/32      | 334820           | 37.35    | 334861          | 74.62    |
| 27/64      | 334821           | 38.48    | 334862          | 74.62    |
| 7/16       | 334822           | 38.48    | 334863          | 74.62    |
| 29/64      | 334823           | 38.48    | 334864          | 74.62    |
| 15/32      | 334824           | 37.35    | 334865          | 74.62    |
| 31/64      | 334825           | 38.48    | 334866          | 74.62    |
| 1/2        | 334826           | 37.35    | 334867          | 74.62    |
| 33/64      | 334827           | 38.48    | 334868          | 74.62    |
| 17/32      | 334828           | 37.35    | 334869          | 74.62    |
| 35/64      | 334829           | 38.48    | 334870          | 74.62    |
| 9/16       | 334830           | 38.48    | 334871          | 74.62    |
| 37/64      | 334831           | 38.48    | 334872          | 74.62    |
| 19/32      | 334832           | 37.35    | 334873          | 74.62    |
| 39/64      | 334833           | 38.48    | 334874          | 74.62    |
| 5/8        | 334834           | 38.48    | 334875          | 74.62    |
| 41/64      | 334835           | 38.48    | 334876          | 74.62    |
| 21/32      | 334836           | 37.35    | 334877          | 74.62    |
| 43/64      | 334837           | 38.48    | 334878          | 74.62    |
| 11/16      | 334838           | 37.35    | 334879          | 74.62    |
| 45/64      | 334839           | 38.48    | 334880          | 74.62    |
| 23/32      | 334840           | 38.48    | 334881          | 74.62    |
| 47/64      | 334841           | 38.48    | 334882          | 74.62    |
| 3/4        | 334842           | 38.48    | 334883          | 74.62    |

• See page G38 for Dimensional Data



## TG75 Tap Collets

- For synchronous, rigid tapping operations using TG collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity



| Tap Inch          | Shank Dia. (in.) | Size of Square (in.) | Code No. | Price \$ |
|-------------------|------------------|----------------------|----------|----------|
| 0-6               | 0.141            | 0.110                | 334884   | 66.83    |
| 8                 | 0.168            | 0.131                | 334885   | 66.83    |
| 10                | 0.194            | 0.152                | 334886   | 66.83    |
| 12                | 0.220            | 0.165                | 334887   | 66.83    |
| 1/4               | 0.255            | 0.191                | 334888   | 66.83    |
| 5/16              | 0.318            | 0.238                | 334889   | 66.83    |
| 3/8               | 0.381            | 0.286                | 334890   | 66.83    |
| 7/16              | 0.323            | 0.242                | 334891   | 66.83    |
| 1/2               | 0.367            | 0.275                | 334892   | 66.83    |
| 9/16              | 0.429            | 0.322                | 334893   | 66.83    |
| 5/8               | 0.480            | 0.360                | 334894   | 66.83    |
| 11/16             | 0.542            | 0.406                | 334895   | 66.83    |
| 3/4               | 0.590            | 0.442                | 334896   | 66.83    |
| <b>NPT</b>        |                  |                      |          |          |
| 1/16, 1/8 NPT-ss* | 0.3125           | 0.234                | 334897   | 66.83    |
| 1/8 NPT-LS*       | 0.4375           | 0.328                | 334898   | 66.83    |
| 1/4 NPT           | 0.5625           | 0.421                | 334899   | 66.83    |

\*ss = small shank  
\*LS = large shank

## Standard TG75 Collet Sets

- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341
- 80 ft/lbs maximum tightening torque



| No. of Pieces | Range (in.) | Increment (in.) | Code No. | Price \$ |
|---------------|-------------|-----------------|----------|----------|
| 43            | 3/32-3/4    | 1/64            | 334900   | 1,636.60 |
| 41            | 1/8-3/4     | 1/64            | 334901   | 1,560.77 |
| 33            | 1/4-3/4     | 1/64            | 334902   | 1,256.31 |
| 25            | 3/8-3/4     | 1/64            | 334903   | 951.86   |
| 22            | 3/32-3/4    | 1/32            | 334904   | 835.28   |
| 13            | 3/8-3/4     | 1/32            | 334905   | 495.74   |
| 11            | 1/8-3/4     | 1/16            | 334906   | 418.77   |

• See page G38 for Dimensional Data

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## TG100 Standard & Sealed Collets

- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341
- 90 ft/lbs maximum tightening torque

### Sealed Collets

- Sealed for coolant-through applications
- Pressure resistance tested between 650 - 750 psi
- Sealed with rubber



REGULAR

SEALED

| Size (in.) | Regular Code No. | Price \$ | Sealed Code No. | Price \$ |
|------------|------------------|----------|-----------------|----------|
| 3/64       | 334418           | 38.48    | -               | -        |
| 5/64       | 334423           | 38.48    | -               | -        |
| 3/32       | 334425N          | 38.48    | -               | -        |
| 7/64       | 334426           | 38.48    | -               | -        |
| 1/8        | 334427N          | 38.48    | -               | -        |
| 9/64       | 334428           | 38.48    | -               | -        |
| 5/32       | 334429N          | 38.48    | 334907          | 80.64    |
| 11/64      | 334430           | 38.48    | 334908          | 80.64    |
| 3/16       | 334431N          | 38.48    | 334909          | 80.64    |
| 13/64      | 334432           | 38.48    | 334910          | 80.64    |
| 7/32       | 334433N          | 38.48    | 334911          | 80.64    |
| 15/64      | 334434           | 38.48    | 334912          | 80.64    |
| 1/4        | 334435N          | 38.48    | 334913          | 80.64    |
| 17/64      | 334436           | 38.48    | 334914          | 80.64    |
| 9/32       | 334437N          | 38.48    | 334915          | 80.64    |
| 19/64      | 334438           | 38.48    | 334916          | 80.64    |
| 5/16       | 334439N          | 38.48    | 334917          | 80.64    |
| 21/64      | 334440           | 38.48    | 334918          | 80.64    |
| 11/32      | 334441N          | 38.48    | 334919          | 80.64    |
| 23/64      | 334442           | 38.48    | 334920          | 80.64    |
| 3/8        | 334443N          | 38.48    | 334921          | 80.64    |
| 25/64      | 334444           | 38.48    | 334922          | 80.64    |
| 13/32      | 334445N          | 38.48    | 334923          | 80.64    |
| 27/64      | 334446           | 38.48    | 334924          | 80.64    |
| 7/16       | 334447N          | 38.48    | 334925          | 80.64    |
| 29/64      | 334448           | 38.48    | 334926          | 80.64    |
| 15/32      | 334449N          | 38.48    | 334927          | 80.64    |
| 31/64      | 334450           | 38.48    | 334928          | 80.64    |
| 1/2        | 334451N          | 38.48    | 334929          | 80.64    |
| 33/64      | 334452           | 38.48    | 334930          | 80.64    |
| 17/32      | 334453N          | 38.48    | 334931          | 80.64    |
| 35/64      | 334454           | 38.48    | 334932          | 80.64    |
| 9/16       | 334455N          | 38.48    | 334933          | 80.64    |
| 37/64      | 334456           | 38.48    | 334934          | 80.64    |
| 19/32      | 334457N          | 38.48    | 334935          | 80.64    |
| 39/64      | 334458           | 38.48    | 334936          | 80.64    |
| 5/8        | 334459N          | 38.48    | 334937          | 80.64    |
| 41/64      | 334460           | 38.48    | 334938          | 80.64    |
| 21/32      | 334461N          | 38.48    | 334939          | 80.64    |
| 43/64      | 334462           | 38.48    | 334940          | 80.64    |
| 11/16      | 334463N          | 38.48    | 334941          | 80.64    |
| 45/64      | 334464           | 38.48    | 334942          | 80.64    |
| 23/32      | 334465N          | 38.48    | 334943          | 80.64    |
| 47/64      | 334466           | 38.48    | 334944          | 80.64    |
| 3/4        | 334467N          | 38.48    | 334945          | 80.64    |
| 49/64      | 334468           | 38.48    | 334946          | 80.64    |
| 25/32      | 334469N          | 38.48    | 334947          | 80.64    |
| 51/64      | 334470           | 38.48    | 334948          | 80.64    |
| 13/16      | 334471N          | 38.48    | 334949          | 80.64    |
| 53/64      | 334472           | 38.48    | 334950          | 80.64    |
| 27/32      | 334473N          | 38.48    | 334951          | 80.64    |
| 55/64      | 334474           | 38.48    | 334952          | 80.64    |
| 7/8        | 334475N          | 38.48    | 334953          | 80.64    |
| 57/64      | 334476           | 38.48    | 334954          | 80.64    |
| 29/32      | 334477N          | 38.48    | 334955          | 80.64    |
| 59/64      | 334478           | 38.48    | 334956          | 80.64    |
| 15/16      | 334479N          | 38.48    | 334957          | 80.64    |
| 61/64      | 334480           | 38.48    | 334958          | 80.64    |
| 31/32      | 334481N          | 38.48    | 334959          | 80.64    |
| 63/64      | 334482           | 38.48    | 334960          | 80.64    |
| 1          | 334483N          | 38.48    | 334961          | 80.64    |

## TG100 Tap Collets

- For synchronous, rigid tapping operations using TG collet chuck
- Collet bore is exact tool diameter with square drive for accuracy and rigidity



| Tap Inch          | Shank Dia. | Size of Square | Code No. | Price \$     |
|-------------------|------------|----------------|----------|--------------|
| 0-6               | 0.141      | 0.110          | 334963   | <b>70.49</b> |
| 8                 | 0.168      | 0.131          | 334964   | <b>70.49</b> |
| 10                | 0.194      | 0.152          | 334965   | <b>70.49</b> |
| 12                | 0.220      | 0.165          | 334966   | <b>70.49</b> |
| 1/4               | 0.255      | 0.191          | 334967   | <b>70.49</b> |
| 5/16              | 0.318      | 0.238          | 334968   | <b>70.49</b> |
| 3/8               | 0.381      | 0.286          | 334969   | <b>70.49</b> |
| 7/16              | 0.323      | 0.242          | 334970   | <b>70.49</b> |
| 1/2               | 0.367      | 0.275          | 334971   | <b>70.49</b> |
| 9/16              | 0.429      | 0.322          | 334972   | <b>70.49</b> |
| 5/8               | 0.480      | 0.360          | 334973   | <b>70.49</b> |
| 11/16             | 0.542      | 0.406          | 334974   | <b>70.49</b> |
| 3/4               | 0.590      | 0.442          | 334975   | <b>70.49</b> |
| 13/16             | 0.652      | 0.489          | 334976   | <b>70.49</b> |
| 7/8               | 0.697      | 0.523          | 334977   | <b>70.49</b> |
| 15/16             | 0.760      | 0.570          | 334978   | <b>70.49</b> |
| 1                 | 0.800      | 0.600          | 334979   | <b>70.49</b> |
| <b>NPT</b>        |            |                |          |              |
| 1/16, 1/8 NPT-ss* | 0.3125     | 0.234          | 334980   | <b>70.49</b> |
| 1/8 NPT-LS*       | 0.4375     | 0.328          | 334981   | <b>70.49</b> |
| 1/4 NPT           | 0.5625     | 0.421          | 334982   | <b>70.49</b> |
| 3/8 NPT           | 0.7000     | 0.531          | 334983   | <b>70.49</b> |
| 1/2 NPT           | 0.6875     | 0.515          | 334984   | <b>70.49</b> |

\*ss = small shank  
\*LS = large shank

## Standard TG100 Collet Sets

- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341
- 90 ft/lbs maximum tightening torque



| No. of Pieces | Range (in.) | Increment (in.) | Code No. | Price \$        |
|---------------|-------------|-----------------|----------|-----------------|
| 59            | 3/32-1      | 1/64            | 334575   | <b>2,270.42</b> |
| 41            | 3/8-1       | 1/64            | 334570   | <b>1,577.75</b> |
| 30            | 3/32-1      | 1/32            | 334565   | <b>1,154.45</b> |
| 21            | 3/8-1       | 1/32            | 334560   | <b>808.11</b>   |
| 15            | 1/8-1       | 1/16            | 334561   | <b>577.23</b>   |

• See page G38 for Dimensional Data

## TG150 Standard Collets

- Unique 8" taper design affords highest gripping power
- True double angle, for extreme concentricity
- 16 jaws giving powerful gripping and parallel clamping
- A unique self releasing system is built into the collet and clamping nut to eliminate cutting tools sticking in collets
- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341



| Size (in.) | Code No. | Price \$     | Size (in.) | Code No. | Price \$     |
|------------|----------|--------------|------------|----------|--------------|
| 1/2        | 334485N  | <b>54.33</b> | 1-1/64     | 334518   | <b>54.33</b> |
| 33/64      | 334486   | <b>54.33</b> | 1-1/32     | 334519N  | <b>54.33</b> |
| 17/32      | 334487N  | <b>54.33</b> | 1-3/64     | 334520   | <b>54.33</b> |
| 35/64      | 334488   | <b>54.33</b> | 1-1/16     | 334521N  | <b>54.33</b> |
| 9/16       | 334489N  | <b>54.33</b> | 1-5/64     | 334522   | <b>54.33</b> |
| 37/64      | 334490   | <b>54.33</b> | 1-3/32     | 334523N  | <b>54.33</b> |
| 19/32      | 334491N  | <b>54.33</b> | 1-7/64     | 334524   | <b>54.33</b> |
| 39/64      | 334492   | <b>54.33</b> | 1-1/8      | 334525N  | <b>54.33</b> |
| 5/8        | 334493N  | <b>54.33</b> | 1-9/64     | 334526   | <b>54.33</b> |
| 41/64      | 334494   | <b>54.33</b> | 1-5/32     | 334527N  | <b>54.33</b> |
| 21/32      | 334495N  | <b>54.33</b> | 1-11/64    | 334528   | <b>54.33</b> |
| 43/64      | 334496   | <b>54.33</b> | 1-3/16     | 334529N  | <b>54.33</b> |
| 11/16      | 334497N  | <b>54.33</b> | 1-13/64    | 334530   | <b>54.33</b> |
| 45/64      | 334498   | <b>54.33</b> | 1-7/32     | 334531N  | <b>54.33</b> |
| 23/32      | 334499N  | <b>54.33</b> | 1-15/64    | 334532   | <b>54.33</b> |
| 47/64      | 334500   | <b>54.33</b> | 1-1/4      | 334533N  | <b>54.33</b> |
| 3/4        | 334501N  | <b>54.33</b> | 1-17/64    | 334534   | <b>54.33</b> |
| 49/64      | 334502   | <b>54.33</b> | 1-9/32     | 334535N  | <b>54.33</b> |
| 25/32      | 334503N  | <b>54.33</b> | 1-19/64    | 334536   | <b>54.33</b> |
| 51/64      | 334504   | <b>54.33</b> | 1-5/16     | 334537N  | <b>54.33</b> |
| 13/16      | 334505N  | <b>54.33</b> | 1-21/64    | 334538   | <b>54.33</b> |
| 53/64      | 334506   | <b>54.33</b> | 1-11/32    | 334539N  | <b>54.33</b> |
| 27/32      | 334507N  | <b>54.33</b> | 1-23/64    | 334540   | <b>54.33</b> |
| 55/64      | 334508   | <b>54.33</b> | 1-3/8      | 334541N  | <b>54.33</b> |
| 7/8        | 334509N  | <b>54.33</b> | 1-25/64    | 334542   | <b>54.33</b> |
| 57/64      | 334510   | <b>54.33</b> | 1-13/32    | 334543N  | <b>54.33</b> |
| 29/32      | 334511N  | <b>54.33</b> | 1-27/64    | 334544   | <b>54.33</b> |
| 59/64      | 334512   | <b>54.33</b> | 1-7/16     | 334545N  | <b>54.33</b> |
| 15/16      | 334513N  | <b>54.33</b> | 1-29/64    | 334546   | <b>54.33</b> |
| 61/64      | 334514   | <b>54.33</b> | 1-15/32    | 334547N  | <b>54.33</b> |
| 31/32      | 334515N  | <b>54.33</b> | 1-31/64    | 334548   | <b>54.33</b> |
| 63/64      | 334516   | <b>54.33</b> | 1-1/2      | 334549N  | <b>54.33</b> |
| 1          | 334517N  | <b>54.33</b> |            |          |              |

## Standard TG150 Collet Sets

- Unique 8" taper design affords highest gripping power
- True double angle, for extreme concentricity
- 16 jaws giving powerful gripping and parallel clamping
- A unique self releasing system is built into the collet and clamping nut to eliminate cutting tools sticking in collets
- 1/64" collapse per collet
- 0.0005" in TIR precision per DIN 6341



| No. of Pieces | Range (in.) | Increment (in.) | Code No. | Price \$        |
|---------------|-------------|-----------------|----------|-----------------|
| 17            | 1/2-1-1/2   | 1/16            | 334580   | <b>923.61</b>   |
| 33            | 1/2-1-1/2   | 1/32            | 334585   | <b>1,792.79</b> |

• See page G38 or Dimensional Data

## Replacement TG Chuck Nuts



| Description      | Tightening Torque (Nm) | Code No. | Price \$      |
|------------------|------------------------|----------|---------------|
| *TG75 Nut        | 81.3                   | 534760   | <b>109.68</b> |
| *TG100 Nut       | 81.3                   | 534762   | <b>72.19</b>  |
| *TG150 Nut       | 94.9                   | 534764   | <b>113.06</b> |
| TG75 Nut, Solid  | 81.3                   | 534830   | <b>109.68</b> |
| TG100 Nut, Solid | 81.3                   | 534832   | <b>72.19</b>  |

\* Photo Shown / This style is supplied with chuck

## TG Chuck Wrenches



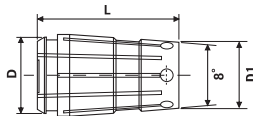
| Description      | Code No. | Price \$     |
|------------------|----------|--------------|
| Fits TG75 Chuck  | 534772   | <b>66.65</b> |
| Fits TG100 Chuck | 534774   | <b>40.26</b> |
| Fits TG150 Chuck | 534776   | <b>71.11</b> |

## Replacement TG Backup Screws



| Description   | Code No. | Price \$     |
|---------------|----------|--------------|
| TG75          | 534778   | <b>12.18</b> |
| TG100         | 534782   | <b>11.72</b> |
| TG150         | 534786   | <b>13.85</b> |
| TG150 Coolant | 534788   | <b>15.84</b> |

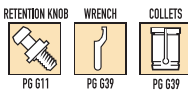
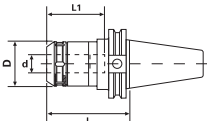
## TG Collet Dimensional Data



| Style | D     | D1    | L     | Collet Range |
|-------|-------|-------|-------|--------------|
| TG25  | 0.425 | 0.325 | 0.709 | 3/64-1/4     |
| TG50  | 0.760 | 0.594 | 1.437 | 1/8-1/2      |
| TG75  | 1.063 | 0.871 | 1.844 | 3/64-3/4     |
| TG100 | 1.278 | 1.121 | 2.386 | 3/64-1       |
| TG150 | 1.875 | 1.678 | 3.000 | 1/2-1-1/2    |

## CAT40 Milling Chucks

- DIN coolant through the flange at no extra charge
- Rough milling or 'hogging' operations
- Improved tool life over regular end mill holders
- '360°' gripping contact
- Extreme rigidity over taper collets
- TIR, 0.0002"
- AT2 Taper Accuracy
- RFID chip hole



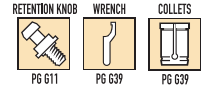
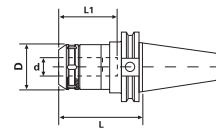
| Taper | Collet Series | Collet Range | d     | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$      |
|-------|---------------|--------------|-------|------|------|------|------------------------|----------|---------------|
| CT40  | GS 3/4        | 0.125-0.750  | 0.750 | 3.54 | 3.15 | 2.05 | 50-70                  | 531253   | <b>717.12</b> |
| CT40  | GS 3/4        | 0.125-0.750  | 0.750 | 4.14 | 3.15 | 2.05 | 50-70                  | 531250   | <b>717.12</b> |
| CT40  | GS 1          | 0.125-1.00   | 1.00  | 3.54 | 3.15 | 2.41 | 50-70                  | 531255‡  | <b>717.12</b> |
| CT40  | GS 1          | 0.125-1.00   | 1.00  | 4.14 | 3.15 | 2.41 | 50-70                  | 531254   | <b>717.12</b> |
| CT40  | GS 1-1/4      | 0.187-1.25   | 1.25  | 3.54 | 3.34 | 2.88 | 60-80                  | 531257‡  | <b>717.12</b> |
| CT40  | GS 1-1/4      | 0.187-1.25   | 1.25  | 4.14 | 3.34 | 2.88 | 60-80                  | 531256   | <b>717.12</b> |
| CT40  | GS 1-1/4      | 0.187-1.25   | 1.25  | 5.32 | 4.73 | 2.88 | 60-80                  | 531258   | <b>741.38</b> |

‡ Not DIN Coolant

## CAT40 DUAL CONTACT Milling Chucks

- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- DIN coolant through the flange at no extra charge
- Rough milling or 'hogging' operations
- '360°' gripping contact
- Improved tool life over regular end mill holders
- Extreme rigidity over taper collets
- TIR, 0.0002"
- RFID chip hole
- AT2 Taper Accuracy

FOR DUAL CONTACT SPINDLES

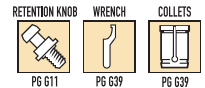
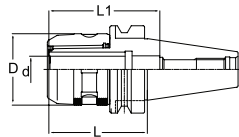


| Taper | Collet Series | Collet Range | d     | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$      |
|-------|---------------|--------------|-------|------|------|------|------------------------|----------|---------------|
| CT40  | GS 3/4        | 0.125-0.750  | 0.750 | 3.54 | 3.15 | 2.05 | 50-70                  | 521253   | <b>634.17</b> |
| CT40  | GS 1          | 0.125-1.00   | 1.00  | 3.54 | 3.15 | 2.41 | 50-70                  | 521255‡  | <b>634.17</b> |
| CT40  | GS 1-1/4      | 0.187-1.25   | 1.25  | 3.54 | 3.34 | 2.88 | 60-80                  | 521257‡  | <b>634.17</b> |

‡ Not DIN Coolant

## BT Taper Milling Chucks

- TIR 0.0004"
- AT2 Taper Accuracy
- RFID chip hole

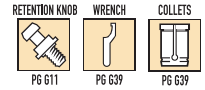
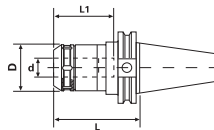


| Taper       | Collet Series | Collet Range | d     | L    | L1   | D    | Code No. | Price \$      |
|-------------|---------------|--------------|-------|------|------|------|----------|---------------|
| <b>BT30</b> |               |              |       |      |      |      |          |               |
| BT30        | GS 3/4        | 0.125-0.750  | 0.750 | 3.55 | 3.15 | 2.05 | 532096‡  | <b>717.12</b> |
| <b>BT40</b> |               |              |       |      |      |      |          |               |
| BT40        | GS 3/4        | 0.125-0.750  | 0.750 | 4.14 | 3.15 | 2.05 | 532098   | <b>717.12</b> |
| BT40        | GS 3/4        | 0.125-0.750  | 0.750 | 4.73 | 3.15 | 2.05 | 532100   | <b>717.12</b> |
| BT40        | GS 1          | 0.125-1.00   | 1.00  | 4.14 | 3.15 | 2.41 | 532102   | <b>717.12</b> |
| BT40        | GS 1-1/4      | 0.187-1.25   | 1.25  | 4.14 | 3.34 | 2.88 | 532104   | <b>717.12</b> |
| <b>BT50</b> |               |              |       |      |      |      |          |               |
| BT50        | GS 1-1/4      | 0.187-1.25   | 1.25  | 4.20 | 3.34 | 2.88 | 532113   | <b>922.01</b> |

‡ Not DIN Coolant

## CAT50 Milling Chucks

- DIN coolant through the flange at no extra charge
- Rough milling or 'hogging' operations
- Improved tool life over regular end mill holders
- '360°' gripping contact
- Extreme rigidity over taper collets
- TIR, 0.0002"
- AT2 Taper Accuracy
- RFID chip hole



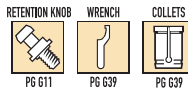
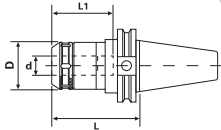
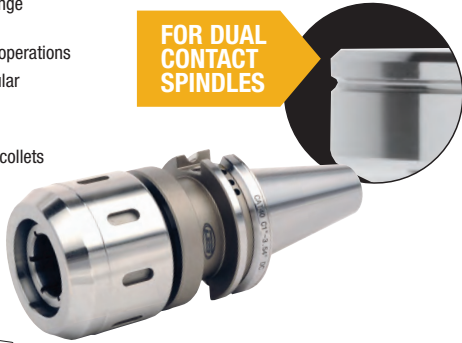
| Taper | Collet Series | Collet Range | d     | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$      |
|-------|---------------|--------------|-------|------|------|------|------------------------|----------|---------------|
| CT50  | GS 3/4        | 0.125-0.750  | 0.750 | 4.14 | 3.15 | 2.05 | 50-70                  | 531260   | <b>922.01</b> |
| CT50  | GS 3/4        | 0.125-0.750  | 0.750 | 5.32 | 3.15 | 2.05 | 50-70                  | 531262   | <b>936.84</b> |
| CT50  | GS 3/4        | 0.125-0.750  | 0.750 | 6.49 | 3.15 | 2.05 | 50-70                  | 531263   | <b>936.84</b> |
| CT50  | GS 1          | 0.125-1.00   | 1.00  | 4.14 | 3.15 | 2.41 | 50-70                  | 531264   | <b>922.01</b> |
| CT50  | GS 1-1/4      | 0.187-1.25   | 1.25  | 3.54 | 4.73 | 2.88 | 60-80                  | 531265   | <b>922.01</b> |
| CT50  | GS 1-1/4      | 0.187-1.25   | 1.25  | 4.14 | 4.73 | 2.88 | 60-80                  | 531266   | <b>922.01</b> |
| CT50  | GS 1-1/4      | 0.187-1.25   | 1.25  | 5.32 | 4.73 | 2.88 | 60-80                  | 531268   | <b>936.84</b> |
| CT50  | GS 1-1/4      | 0.187-1.25   | 1.25  | 6.49 | 4.73 | 2.88 | 60-80                  | 531269   | <b>936.84</b> |

## CAT50 DUAL CONTACT Milling Chucks



- Improves rigidity and reduces vibration allowing for increased feed rates and increased tool life
- DIN coolant through the flange at no extra charge
- Rough milling or 'hogging' operations
- Improved tool life over regular end mill holders
- '360°' gripping contact
- Extreme rigidity over taper collets
- TIR, 0.0002"
- RFID chip hole
- AT2 Taper Accuracy

FOR DUAL CONTACT SPINDLES



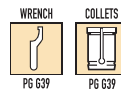
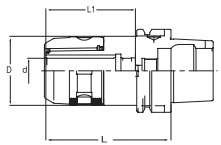
| Taper | Collet Series | Collet Range | d    | L    | L1   | D    | Tightening Torque (Nm) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|------|------------------------|----------|----------|
| CT50  | GS 1-1/4      | 0.187-1.25   | 1.25 | 4.14 | 4.73 | 2.88 | 50-70                  | 521266   | 815.37   |

## HSK Milling Chucks



### HSK Advantages:

- High rigidity and torque transmission (almost double the rigidity of V-flange holders)
- Extreme concentricity enhance tool life performance
- Coolant through capabilities
- TIR 0.0004"
- RFID chip hole
- AT2 Taper Accuracy



| Taper          | Collet Series | Collet Range | d     | L     | L1    | D     | Code No. | Price \$ |
|----------------|---------------|--------------|-------|-------|-------|-------|----------|----------|
| <b>HSK63A</b>  |               |              |       |       |       |       |          |          |
| HSK63A         | GS3/4         | 0.125-0.750  | 0.750 | 3.740 | 2.480 | 2.047 | 536154   | 708.27   |
| HSK63A         | GS1           | 0.125-1.000  | 1.000 | 5.118 | 3.150 | 2.362 | 536160   | 940.91   |
| HSK63A         | GS1-1/4       | 0.187-1.250  | 1.250 | 4.331 | 3.268 | 2.717 | 536162   | 929.85   |
| <b>HSK100A</b> |               |              |       |       |       |       |          |          |
| HSK100A        | GS3/4         | 0.125-0.750  | 0.750 | 5.315 | 3.150 | 2.047 | 536170   | 1,313.04 |
| HSK100A        | GS32          | 3mm - 32mm   | 32mm  | 5.315 | 4.055 | 2.717 | 536180   | 959.31   |
| HSK100A        | GS2           | 1.000-2.000  | 2.000 | 4.921 | 3.543 | 4.134 | 536182   | 1,770.56 |

## Milling Chuck Wrenches



| Chuck Cap. | Code No. | Price \$ |
|------------|----------|----------|
| 3/4        | 534208   | 58.90    |
| 1          | 534210   | 58.90    |
| 1-1/4      | 534212   | 58.90    |

## GS Milling Collets



| I.D.          | GS 3/4" Code No. | Price \$ | GS 1" Code No. | Price \$ | GS 11/4" Code No. | Price \$ |
|---------------|------------------|----------|----------------|----------|-------------------|----------|
| <b>Metric</b> |                  |          |                |          |                   |          |
| 6mm           | 534668           | 56.71    | 534702         | 56.71    | 534740            | 56.71    |
| 7mm           | 534670           | 56.71    | -              | -        | -                 | -        |
| 8mm           | 534672           | 56.71    | 534704         | 56.71    | 534742            | 56.71    |
| 10mm          | 534674           | 56.71    | 534706         | 56.71    | 534744            | 56.71    |
| 12mm          | 534676           | 56.71    | 534708         | 56.71    | 534746            | 56.71    |
| 14mm          | 534678           | 56.71    | 534710         | 56.71    | 534748            | 56.71    |
| 16mm          | 534680           | 56.71    | 534712         | 56.71    | 534750            | 56.71    |
| 18mm          | -                | -        | 534714         | 56.71    | -                 | -        |
| 20mm          | -                | -        | 534716         | 56.71    | 534752            | 56.71    |
| 25mm          | -                | -        | -              | -        | 534754            | 56.71    |
| <b>Inch</b>   |                  |          |                |          |                   |          |
| 1/8           | 534650           | 56.71    | 534682         | 56.71    | -                 | -        |
| 3/16          | 331469N          | 56.71    | 534684         | 56.71    | 331481N           | 56.71    |
| 1/4           | 331470N          | 56.71    | 534686         | 56.71    | 331482N           | 56.71    |
| 5/16          | 331472N          | 56.71    | 534688         | 56.71    | 331484N           | 56.71    |
| 3/8           | 331474N          | 56.71    | 534690         | 56.71    | 331486N           | 56.71    |
| 7/16          | 534660           | 56.71    | 534692         | 56.71    | 534726            | 56.71    |
| 1/2           | 331476N          | 56.71    | 534694         | 56.71    | 331488N           | 56.71    |
| 9/16          | 331477N          | 56.71    | -              | -        | 331489N           | 56.71    |
| 5/8           | 331478N          | 56.71    | 534696         | 56.71    | 331490N           | 56.71    |
| 3/4           | -                | -        | 534698         | 56.71    | 331492N           | 56.71    |
| 7/8           | -                | -        | -              | -        | 331494N           | 56.71    |
| 1             | -                | -        | -              | -        | 331496N           | 56.71    |

## Replacement DA Chuck Nuts

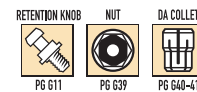
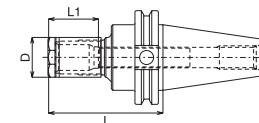


| Description                     | Code No. | Price \$ |
|---------------------------------|----------|----------|
| DA100, Complete Replacement     | 534264   | 93.34    |
| DA180 Nut, Complete Replacement | 534270   | 96.78    |
| DA200 Nut, Complete Replacement | 534276   | 92.87    |
| DA300 Nut, Complete Replacement | 534277   | 96.78    |

## CAT40 DA Collet Chucks



- DIN coolant through the flange
- All ground body
- TIR 0.0010"
- AT2 Taper Accuracy
- RFID chip hole



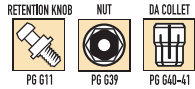
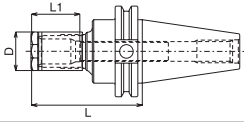
PREMIUM BALANCE  
G6.3 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper | Collet Series | Collet Range | L    | L1   | D    | Nut Tightening Torque (ft. lbs.) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|----------------------------------|----------|----------|
| CT40  | DA100         | 3/64-9/16    | 3.50 | 1.15 | 1.06 | 35                               | 531270   | 224.08   |
| CT40  | DA100         | 3/64-9/16    | 6.00 | 1.15 | 1.06 | 35                               | 531272   | 241.07   |
| CT40  | DA180         | 3/64-3/4     | 4.00 | 1.50 | 1.44 | 40                               | 531273   | 224.08   |
| CT40  | DA180         | 3/64-3/4     | 6.00 | 1.50 | 1.44 | 40                               | 531274   | 241.07   |
| CT40  | DA200         | 3/64-3/8     | 3.00 | 1.03 | 0.86 | 30                               | 531275   | 224.08   |
| CT40  | DA300         | 3/64-1/4     | 3.00 | 0.84 | 0.55 | 25                               | 531276   | 215.52   |

## CAT50 DA Collet Chucks



- DIN coolant through the flange
- All ground body
- TIR 0.0010"
- AT2 Taper Accuracy
- RFID chip hole



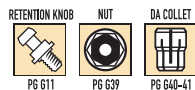
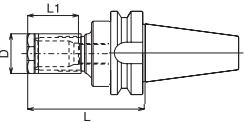
**PREMIUM BALANCE**  
**G6.3 at 25,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Collet Series | Collet Range | L    | L1   | D    | Nut Tightening Torque (ft. lbs.) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|----------------------------------|----------|----------|
| CT50  | DA180         | 3/64-3/4     | 4.00 | 1.50 | 1.44 | 40                               | 531278   | 314.78   |
| CT50  | DA180         | 3/64-3/4     | 6.00 | 1.50 | 1.44 | 40                               | 531280   | 314.78   |

## BT30 DA Collet Chucks



- All ground body
- TIR 0.0010"
- AT2 Taper Accuracy
- RFID chip hole



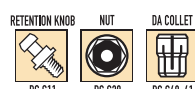
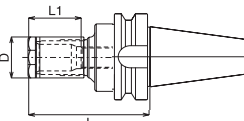
**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Collet Series | Collet Range | L    | L1   | D    | Nut Tightening Torque (ft. lbs.) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|----------------------------------|----------|----------|
| BT30  | DA100         | 3/64-9/16    | 3.00 | 1.15 | 1.06 | 35                               | 532108   | 219.58   |
| BT30  | DA180         | 3/64-3/4     | 3.00 | 1.51 | 1.44 | 40                               | 532110   | 219.58   |
| BT30  | DA200         | 3/64-3/8     | 3.00 | 1.03 | 0.86 | 30                               | 532112   | 219.58   |
| BT30  | DA300         | 3/64-1/4     | 3.00 | 1.04 | 0.55 | 25                               | 532125   | 221.99   |

## BT40 DA Collet Chucks



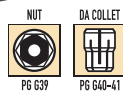
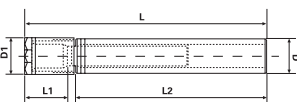
- DIN coolant through the flange
- All ground body
- TIR 0.0010"
- AT2 Taper Accuracy
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Collet Series | Collet Range | L    | L1   | D    | Nut Tightening Torque (ft. lbs.) | Code No. | Price \$ |
|-------|---------------|--------------|------|------|------|----------------------------------|----------|----------|
| BT40  | DA100         | 3/64-9/16    | 6.00 | 1.15 | 1.06 | 35                               | 532118   | 273.19   |
| BT40  | DA180         | 3/64-3/4     | 4.00 | 1.51 | 1.44 | 40                               | 532120   | 253.93   |
| BT40  | DA180         | 3/64-3/4     | 6.00 | 1.51 | 1.44 | 40                               | 532122   | 273.19   |
| BT40  | DA200         | 3/64-3/8     | 3.00 | 1.03 | 0.86 | 30                               | 532124   | 253.93   |

## DA Collet Chuck Extensions



| Collet Series | Collet Range | Shank Dia. (D) | O.A.L. L | L1   | L2   | D1   | Code No. | Price \$ |
|---------------|--------------|----------------|----------|------|------|------|----------|----------|
| DA100         | 3/64-9/16    | 1              | 5.00     | 1.66 | 3.00 | 1.06 | 534220   | 221.91   |
| DA100         | 3/64-9/16    | 1              | 7.50     | 1.66 | 5.50 | 1.06 | 534222   | 243.73   |
| DA180         | 3/64-3/4     | 1-1/4          | 5.00     | 1.83 | 3.00 | 1.44 | 534224   | 218.64   |
| DA180         | 3/64-3/4     | 1-1/4          | 7.50     | 1.83 | 5.50 | 1.44 | 534226   | 243.73   |
| DA200         | 3/64-3/8     | 3/4            | 4.50     | 1.34 | 3.00 | 0.86 | 534228   | 223.93   |
| DA200         | 3/64-3/8     | 3/4            | 7.00     | 1.34 | 5.50 | 0.86 | 534230   | 243.73   |
| DA300         | 3/64-1/4     | 1/2            | 6.80     | 1.30 | 5.50 | 0.51 | 534232   | 172.27   |

## Backup Screws For DA Collet Chucks



| Description                     | Code No. | Price \$ |
|---------------------------------|----------|----------|
| DA180 Replacement Backup Screws | 534288   | 24.93    |

## DA100 Collets



- Collapse - 1/32"
- 0.001" TIR collet accuracy
- Made from 4140 alloy steel for improved strength, hardness, wear resistance, and corrosion resistance
- For most drilling, reaming and tapping applications

| Fractional Inch | Decimal (in.) | Code No. | Price \$ |
|-----------------|---------------|----------|----------|
| 3/64            | 0.047         | 331323   | 20.37    |
| 1/16            | 0.062         | 331325   | 20.37    |
| 5/64            | 0.078         | 331327   | 20.37    |
| 3/32            | 0.094         | 331329   | 20.37    |
| 7/64            | 0.109         | 331333   | 20.37    |
| 1/8             | 0.125         | 331335   | 20.37    |
| 9/64            | 0.141         | 331337   | 20.37    |
| 5/32            | 0.156         | 331339   | 20.37    |
| 11/64           | 0.172         | 331341   | 20.37    |
| 3/16            | 0.188         | 331343   | 20.37    |
| 13/64           | 0.203         | 331345   | 20.37    |
| 7/32            | 0.219         | 331347   | 20.37    |
| 15/64           | 0.234         | 331349   | 20.37    |
| 1/4             | 0.250         | 331351   | 20.37    |
| 17/64           | 0.266         | 331353   | 20.37    |
| 9/32            | 0.281         | 331355   | 20.37    |
| 19/64           | 0.297         | 331357   | 20.37    |
| 5/16            | 0.312         | 331359   | 20.37    |
| 21/64           | 0.328         | 331503   | 20.37    |
| 11/32           | 0.344         | 331505   | 20.37    |
| 23/64           | 0.359         | 331507   | 20.37    |
| 3/8             | 0.375         | 331322   | 20.37    |
| 25/64           | 0.391         | 331509   | 20.37    |
| 13/32           | 0.406         | 331324   | 20.37    |
| 27/64           | 0.422         | 331511   | 20.37    |
| 7/16            | 0.438         | 331326   | 20.37    |
| 29/64           | 0.453         | 331513   | 20.37    |
| 15/32           | 0.469         | 331328   | 20.37    |
| 31/64           | 0.484         | 331515   | 20.37    |
| 1/2             | 0.500         | 331330   | 20.37    |
| 33/64           | 0.516         | 331517   | 20.37    |
| 17/32           | 0.531         | 331332   | 20.37    |
| 35/64           | 0.547         | 331519   | 20.37    |
| 9/16            | 0.562         | 331521   | 20.37    |

## DA100 Collet Sets



| Collet | Pieces | Range             | Code No. | Price \$ |
|--------|--------|-------------------|----------|----------|
| DA100  | 8pc    | 1/8-9/16 x 16ths  | 331356   | 162.98   |
| DA100  | 11pc   | 1/4-9/16 x 32nds  | 331358   | 224.10   |
| DA100  | 15pc   | 1/8-9/16 x 32nds  | 331362   | 305.59   |
| DA100  | 17pc   | 1/16-9/16 x 32nds | 331384   | 346.33   |
| DA100  | 21pc   | 1/4-9/16 x 64ths  | 331385   | 427.82   |
| DA100  | 29pc   | 1/8-9/16 x 64ths  | 331386   | 590.80   |
| DA100  | 33pc   | 1/16-9/16 x 64ths | 331387   | 672.29   |

## DA180 Collets



- Collapse - 1/32"
- 0.001" TIR collet accuracy
- Made from 4140 alloy steel for improved strength, hardness, wear resistance, and corrosion resistance
- For most drilling, reaming and tapping applications

| Fractional Inch | Decimal (in.) | Code No. | Price \$ |
|-----------------|---------------|----------|----------|
| 3/64            | 0.046         | 331523   | 26.03    |
| 1/16            | 0.062         | 331525   | 26.03    |
| 5/64            | 0.078         | 331527   | 26.03    |
| 3/32            | 0.094         | 331529   | 26.03    |
| 7/64            | 0.109         | 331533   | 26.03    |
| 1/8             | 0.125         | 331535   | 26.03    |
| 9/64            | 0.141         | 331537   | 26.03    |
| 5/32            | 0.156         | 331539   | 26.03    |
| 11/64           | 0.172         | 331541   | 26.03    |
| 3/16            | 0.188         | 331543   | 26.03    |
| 13/64           | 0.203         | 331545   | 26.03    |
| 7/32            | 0.219         | 331547   | 26.03    |
| 15/64           | 0.234         | 331549   | 26.03    |
| 1/4             | 0.250         | 331551   | 26.03    |
| 17/64           | 0.266         | 331553   | 26.03    |
| 9/32            | 0.281         | 331555   | 26.03    |
| 19/64           | 0.297         | 331557   | 26.03    |
| 5/16            | 0.312         | 331559   | 26.03    |
| 21/64           | 0.328         | 331561   | 26.03    |
| 11/32           | 0.344         | 331563   | 26.03    |
| 23/64           | 0.359         | 331565   | 26.03    |
| 3/8             | 0.375         | 331567   | 26.03    |
| 25/64           | 0.391         | 331569   | 26.03    |
| 13/32           | 0.406         | 331571   | 26.03    |
| 27/64           | 0.422         | 331573   | 26.03    |
| 7/16            | 0.438         | 331575   | 26.03    |
| 29/64           | 0.453         | 331577   | 26.03    |
| 15/32           | 0.469         | 331579   | 26.03    |
| 31/64           | 0.484         | 331581   | 26.03    |
| 1/2             | 0.500         | 331583   | 26.03    |
| 33/64           | 0.516         | 331585   | 26.03    |
| 17/32           | 0.531         | 331587   | 26.03    |
| 35/64           | 0.547         | 331589   | 26.03    |
| 9/16            | 0.562         | 331334   | 26.03    |
| 37/64           | 0.578         | 331595   | 26.03    |
| 19/32           | 0.594         | 331336   | 26.03    |
| 39/64           | 0.609         | 331597   | 26.03    |
| 5/8             | 0.625         | 331338   | 26.03    |
| 41/64           | 0.641         | 331601   | 26.03    |
| 21/32           | 0.656         | 331340   | 26.03    |
| 43/64           | 0.672         | 331603   | 26.03    |
| 11/16           | 0.688         | 331342   | 26.03    |
| 45/64           | 0.703         | 331605   | 26.03    |
| 23/32           | 0.719         | 331344   | 26.03    |
| 47/64           | 0.734         | 331607   | 26.03    |
| 3/4             | 0.750         | 331346   | 26.03    |

## DA180 Collet Sets



| Collet | Pieces | Range           | Code No. | Price \$ |
|--------|--------|-----------------|----------|----------|
| DA180  | 9pc    | 1/4-3/4 x 16ths | 331388   | 234.29   |
| DA180  | 17pc   | 1/4-3/4 x 32nds | 331389   | 442.54   |
| DA180  | 21pc   | 1/8-3/4 x 32nds | 331390   | 546.66   |
| DA180  | 33pc   | 1/4-3/4 x 64ths | 331391   | 859.05   |
| DA180  | 41pc   | 1/8-3/4 x 64ths | 331392   | 1,067.30 |

## DA200 Collets



- Collapse - 1/32"
- 0.001" TIR collet accuracy
- Made from 4140 alloy steel for improved strength, hardness, wear resistance, and corrosion resistance
- For most drilling, reaming and tapping applications

| Fractional Inch | Decimal (in.) | Code No. | Price \$ |
|-----------------|---------------|----------|----------|
| 3/64            | 0.047         | 331297   | 20.37    |
| 1/16            | 0.062         | 331299   | 20.37    |
| 5/64            | 0.078         | 331301   | 20.37    |
| 3/32            | 0.094         | 331303   | 20.37    |
| 7/64            | 0.109         | 331305   | 20.37    |
| 1/8             | 0.125         | 331307   | 20.37    |
| 9/64            | 0.141         | 331309   | 20.37    |
| 5/32            | 0.156         | 331311   | 20.37    |
| 11/64           | 0.172         | 331313   | 20.37    |
| 3/16            | 0.188         | 331315   | 20.37    |
| 13/64           | 0.203         | 331302   | 20.37    |
| 7/32            | 0.219         | 331304   | 20.37    |
| 15/64           | 0.234         | 331306   | 20.37    |
| 1/4             | 0.250         | 331308   | 20.37    |
| 17/64           | 0.266         | 331310   | 20.37    |
| 9/32            | 0.281         | 331312   | 20.37    |
| 19/64           | 0.297         | 331314   | 20.37    |
| 5/16            | 0.312         | 331316   | 20.37    |
| 21/64           | 0.328         | 331318   | 20.37    |
| 11/32           | 0.344         | 331320   | 20.37    |
| 23/64           | 0.359         | 331317   | 20.37    |
| 3/8             | 0.375         | 331319   | 20.37    |
| 25/64           | 0.391         | 331321   | 20.37    |

## DA200 Collet Sets



| Collet | Pieces | Range            | Code No. | Price \$ |
|--------|--------|------------------|----------|----------|
| DA200  | 9pc    | 1/8-3/8 x 32nds  | 331393   | 183.35   |
| DA200  | 11pc   | 1/16-3/8 x 32nds | 331394   | 224.10   |
| DA200  | 17pc   | 1/8-3/8 x 64ths  | 331395   | 346.33   |
| DA200  | 21pc   | 1/16-3/8 x 64ths | 331396   | 427.82   |

## DA300 Collets



- Collapse - 1/32"
- 0.001" TIR collet accuracy
- Made from 4140 alloy steel for improved strength, hardness, wear resistance, and corrosion resistance
- For most drilling, reaming and tapping applications

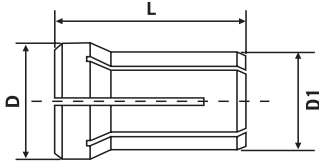
| Fractional Inch | Decimal (in.) | Code No. | Price \$ |
|-----------------|---------------|----------|----------|
| 3/64            | 0.047         | 331277   | 20.37    |
| 1/16            | 0.062         | 331283   | 20.37    |
| 5/64            | 0.078         | 331285   | 20.37    |
| 3/32            | 0.094         | 331287   | 20.37    |
| 7/64            | 0.109         | 331290   | 20.37    |
| 1/8             | 0.125         | 331292   | 20.37    |
| 9/64            | 0.141         | 331294   | 20.37    |
| 5/32            | 0.156         | 331296   | 20.37    |
| 11/64           | 0.172         | 331298   | 20.37    |
| 3/16            | 0.188         | 331300   | 20.37    |
| 13/64           | 0.203         | 331289   | 20.37    |
| 7/32            | 0.219         | 331291   | 20.37    |
| 15/64           | 0.234         | 331293   | 20.37    |
| 1/4             | 0.250         | 331295   | 20.37    |

## DA300 Collet Sets



| Collet | Pieces | Range            | Code No. | Price \$ |
|--------|--------|------------------|----------|----------|
| DA300  | 7pc    | 1/16-1/4 x 32nds | 331397   | 142.61   |
| DA300  | 9pc    | 1/8-1/4 x 64ths  | 331398   | 183.33   |
| DA300  | 13pc   | 1/16-1/4 x 64ths | 331399   | 264.84   |
| DA300  | 14pc   | 3/64-1/4 x 64ths | 331400   | 285.22   |

## DA Collet Dimensional Data



| Collet | D     | D1    | L     | Collet Range |
|--------|-------|-------|-------|--------------|
| 100DA  | 0.769 | 0.635 | 1.441 | 3/64-9/16    |
| 180DA  | 1.035 | 0.873 | 1.637 | 3/64-3/4     |
| 200DA  | 0.539 | 0.453 | 1.193 | 3/64-3/8     |
| 300DA  | 0.375 | 0.300 | 1.000 | 3/64-1/4     |

## Type 25 & Type 32 Collet Chuck Sets



### Set includes:

1 chuck, 1 wrench, 1 each collet and fitted case

### Type 25

- 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", 7/8", 1"

### Type 32

- 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1-1/8", 1-1/4"



| Chuck  | Code No. | Price \$ |
|--|----------|----------|
| <b>COLLET SETS CONSIST OF 10 COLLETS 1/8" - 1" (TYPE 25)</b>     |          |          |
| ISA-30   | 334600   | 650.86   |
| ISA-40   | 334605   | 650.86   |
| ISA-50   | 334608   | 801.57   |
| M.T.3  | 334610   | 650.86   |
| M.T.4  | 334615   | 650.86   |
| R-8  | 334620   | 650.86   |
| <b>COLLET SETS CONSIST OF 15 COLLETS 1/4" - 1-1/4" (TYPE 32)</b> |          |          |
| ISA-40   | 334625   | 1,579.14 |
| ISA-50   | 334630   | 1,636.73 |
| M.T.5  | 334635   | 1,634.22 |

## Component Parts For 1" Type 25 Sets



| Description  | Type 25     | Code No. | Price \$ |
|--------------|-------------|----------|----------|
| Wrench       | 1 (Type 25) | 334650   | 16.00    |
| Nuts         | 1 (Type 25) | 334645   | 101.42   |
| Fitted Case  | 1 (Type 25) | 334640   | 30.50    |
| Chuck ISA-30 | 1 (Type 25) | 334655   | 300.84   |
| Chuck ISA-40 | 1 (Type 25) | 334660   | 300.84   |
| Chuck ISA-50 | 1 (Type 25) | 334663   | 413.67   |
| Chuck MT 3   | 1 (Type 25) | 334665   | 300.84   |
| Chuck MT 4   | 1 (Type 25) | 334670   | 300.84   |
| Chuck R-8    | 1 (Type 25) | 334675   | 300.84   |

## Component Parts For 1-1/4" Type 32 Sets

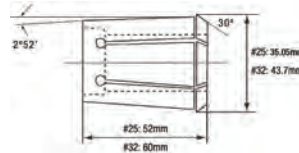


| Description  | Type 25         | Code No. | Price \$ |
|--------------|-----------------|----------|----------|
| Wrench       | 1-1/4 (Type 32) | 334690   | 43.53    |
| Nuts         | 1-1/4 (Type 32) | 334685   | 136.65   |
| Fitted Case  | 1-1/4 (Type 32) | 334680   | 30.50    |
| Chuck ISA-40 | 1-1/4 (Type 32) | 334695   | 413.67   |
| Chuck ISA-50 | 1-1/4 (Type 32) | 334700   | 488.88   |
| Chuck MT 5   | 1-1/4 (Type 32) | 334705   | 470.07   |

## Type 25 & Type 32 Collets



- Type 25 have a collapsibility of 0.2mm
- Type 32 have a collapsibility of 0.3mm



| Metric      | Size (in.) | Type 25 Code No. | Price \$ | Type 32 Code No. | Price \$ |
|-------------|------------|------------------|----------|------------------|----------|
|             | 3 mm       | 336504           | 36.86    | -                | -        |
|             | 4 mm       | 336506           | 36.86    | -                | -        |
|             | 5 mm       | 336508           | 36.86    | 336549           | 75.06    |
|             | 6 mm       | 336510           | 36.86    | 336550           | 75.06    |
|             | 7 mm       | 336512           | 36.86    | 336552           | 75.06    |
|             | 8 mm       | 336514           | 36.86    | 336554           | 75.06    |
|             | 9 mm       | 336516           | 36.86    | 336556           | 75.06    |
|             | 10 mm      | 336518           | 36.86    | 336560           | 75.06    |
|             | 11 mm      | 336520           | 36.86    | 336562           | 75.06    |
|             | 12 mm      | 336522           | 36.86    | 336564           | 75.06    |
|             | 13 mm      | 336524           | 36.86    | 336566           | 75.06    |
|             | 14 mm      | 336526           | 36.86    | 336568           | 75.06    |
|             | 15 mm      | 336528           | 36.86    | 336570           | 75.06    |
|             | 16 mm      | 336530           | 36.86    | 336572           | 75.06    |
|             | 17 mm      | 336532           | 36.86    | 336574           | 75.06    |
|             | 18 mm      | 336534           | 36.86    | 336576           | 75.06    |
|             | 19 mm      | 336536           | 36.86    | 336578           | 75.06    |
|             | 20 mm      | 336538           | 36.86    | 336580           | 75.06    |
|             | 21 mm      | 336540           | 36.86    | 336582           | 75.06    |
|             | 22 mm      | 336542           | 36.86    | 336584           | 75.06    |
|             | 23 mm      | 336544           | 36.86    | 336586           | 75.06    |
|             | 24 mm      | 336546           | 36.86    | 336588           | 75.06    |
|             | 25 mm      | 336548           | 36.86    | 336590           | 75.06    |
|             | 26 mm      | -                | -        | 336592           | 75.06    |
|             | 28 mm      | -                | -        | 336596           | 75.06    |
|             | 29 mm      | -                | -        | 336597           | 75.06    |
|             | 30 mm      | -                | -        | 336598           | 75.06    |
|             | 32 mm      | -                | -        | 336600           | 75.06    |
| <b>Inch</b> |            |                  |          |                  |          |
|             | 1/8        | 336400           | 36.86    | -                | -        |
|             | 3/16       | 336402           | 36.86    | -                | -        |
|             | 1/4        | 336404           | 36.86    | 336430           | 75.06    |
|             | 5/16       | 336406           | 36.86    | 336432           | 75.06    |
|             | 3/8        | 336408           | 36.86    | 336434           | 75.06    |
|             | 7/16       | 336409           | 36.86    | 336436           | 75.06    |
|             | 1/2        | 336410           | 36.86    | 336438           | 75.06    |
|             | 9/16       | 336411           | 36.86    | 336440           | 75.06    |
|             | 5/8        | 336412           | 36.86    | 336442           | 75.06    |
|             | 11/16      | -                | -        | 336444           | 75.06    |
|             | 3/4        | 336414           | 36.86    | 336446           | 75.06    |
|             | 13/16      | -                | -        | 336448           | 75.06    |
|             | 7/8        | 336416           | 36.86    | 336450           | 75.06    |
|             | 15/16      | -                | -        | 336452           | 75.06    |
|             | 1          | 336418           | 36.86    | 336454           | 75.06    |
|             | 1-1/8      | -                | -        | 336456           | 75.06    |
|             | 1-1/4      | -                | -        | 336458           | 75.06    |

## Collet Rack



- Holds 5C, C32, or Type 25 collets
- 220x110x6mm
- Plastic

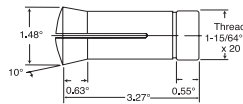


\* Collets not included

| Model | Code No. | Price \$ |
|-------|----------|----------|
| VMS-5 | 325305   | 50.95    |

## 5C Collets

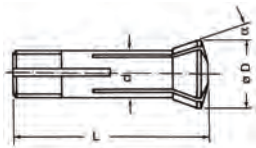
- Made of tool steel, hardened and ground to maintain original accuracy



| Size (in.)                  | GS Code No. | Price \$ | STM Code No. | Price \$      |
|-----------------------------|-------------|----------|--------------|---------------|
| 1/8                         | 325317      | 31.89    | 325315       | 16.64         |
| 3/16                        | 325322      | 31.89    | 325320       | 16.64         |
| 1/4                         | 325327      | 31.89    | 325325       | 16.64         |
| 5/16                        | 325332      | 31.89    | 325330       | 16.64         |
| 3/8                         | 325337      | 31.89    | 325335       | 16.64         |
| 7/16                        | 325342      | 31.89    | 325340       | 16.64         |
| 1/2                         | 325347      | 31.89    | 325345       | 16.64         |
| 9/16                        | 325354      | 31.89    | 325350       | 16.64         |
| 5/8                         | 325357      | 31.89    | 325355       | 16.64         |
| 11/16                       | 325362      | 31.89    | 325360       | 16.64         |
| 3/4                         | 325367      | 31.89    | 325365       | 16.64         |
| 13/16                       | 325372      | 31.89    | 325370       | 16.64         |
| 7/8                         | 325377      | 31.89    | 325375       | 16.64         |
| 15/16                       | 325382      | 31.89    | 325380       | 16.64         |
| 1                           | 325387      | 31.89    | 325385       | 16.64         |
| <b>5C Collet Set 1/8-1"</b> |             |          | 325310       | <b>239.70</b> |

## Emergency Type Collet

- Nylon
- Can be bored to custom internal diameters to hold unusual sized workpieces



| Model  | Length (mm) | D (mm) | d (mm) | Head Angle $\alpha$ | Code No. | Price \$ |
|--------|-------------|--------|--------|---------------------|----------|----------|
| VE-5CN | 87          | 37.5   | 31.75  | 10°                 | 325312   | 71.42    |

## R8 Collets & Set

Manufactured of hardened and ground tool steel, these collets can be recommended for their accuracy and fine finish.



| Size (in.)                   | GS Code No. | Price \$ | STM Code No. | Price \$      |
|------------------------------|-------------|----------|--------------|---------------|
| 1/8                          | 325167      | 31.89    | 325165       | 12.35         |
| 5/32                         | 325172      | 31.89    | 325170       | 14.76         |
| 3/16                         | 325177      | 31.89    | 325175       | 14.76         |
| 7/32                         | 325182      | 31.89    | 325180       | 14.76         |
| 1/4                          | 325187      | 31.89    | 325185       | 14.76         |
| 9/32                         | 325192      | 31.89    | 325190       | 14.76         |
| 5/16                         | 325197      | 31.89    | 325195       | 14.76         |
| 11/32                        | 325202      | 31.89    | 325200       | 14.76         |
| 3/8                          | 325207      | 31.89    | 325205       | 14.76         |
| 13/32                        | 325212      | 31.89    | 325210       | 14.76         |
| 7/16                         | 325217      | 31.89    | 325215       | 14.76         |
| 15/32                        | 325222      | 31.89    | 325220       | 14.76         |
| 1/2                          | 325227      | 31.89    | 325225       | 14.76         |
| 9/16                         | 325232      | 31.89    | 325230       | 14.76         |
| 19/32                        | 325237      | 31.89    | 325235       | 14.76         |
| 5/8                          | 325242      | 31.89    | 325240       | 14.76         |
| 21/32                        | 325247      | 31.89    | 325245       | 14.76         |
| 11/16                        | 325252      | 31.89    | 325250       | 14.76         |
| 23/32                        | 325257      | 31.89    | 325255       | 14.76         |
| 3/4                          | 325262      | 31.89    | 325260       | 14.76         |
| <b>R8 Collet Set 1/8-3/4</b> |             |          | 325300       | <b>281.09</b> |

# BALANCEABLE SHRINK FIT TOOLING

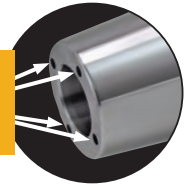


Requires a balancing machine

## Features and Benefits

- With threaded holes on holders over 6mm I.D. in order to balance.
- Improved concentricity.
- Improved balance design with no moving pieces.
- Low Centrifugal Forces due to low holder mass.
- Maximum gripping power with exceptional concentricity.
- Concentricity 0.0001"/0.003mm
- Chip load distributed evenly along cutting edge of tool which results in longer tool life.
- Constructed of H13 Tool Steel for exceptional durability and cycle life. With proper use, toolholder life should exceed that of standard end mill holders.
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force.
- Short projections are possible because no mechanical clamping devices are used. This results in greater rigidity and resistance to bending.
- Simple and fast to use. The total time elapsed to remove one cutting tool and insert another is less than 10 seconds.
- Through-spindle coolant capability.
- Coolant through holders require no special backup screws or seals. The fit between the I.D. of the tool holder and cutting tool shank forms the seal, preventing the coolant from flowing anywhere else except through the coolant ports. Coolant ports can be closed with a 3mm set screw. The use of Heat Shrink Tooling allows for greater speeds and feeds, better finishes, increased tool life, and increased productivity due to its High Speed Machining capability and simplicity of use.
- Note: No coolant ports or threaded balance holes on holders under 6mm I.D.

WITH 4 COOLANT PORTS

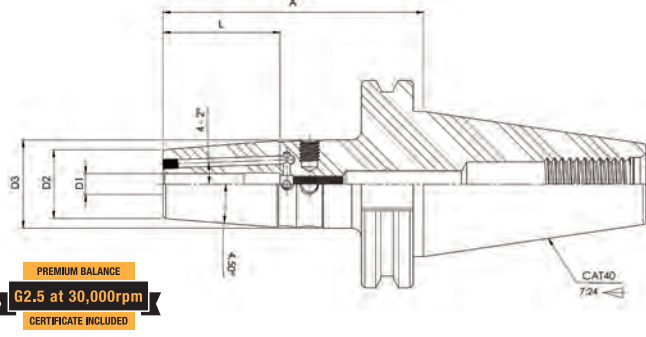




## CAT40 Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced to G2.5 at 30,000rpm
- 4 threaded Coolant ports in the nose, can be closed with a 3mm set screw
- Maximum gripping power with exceptional concentricity
- TIR ≤0.0001" / 0.003mm
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole

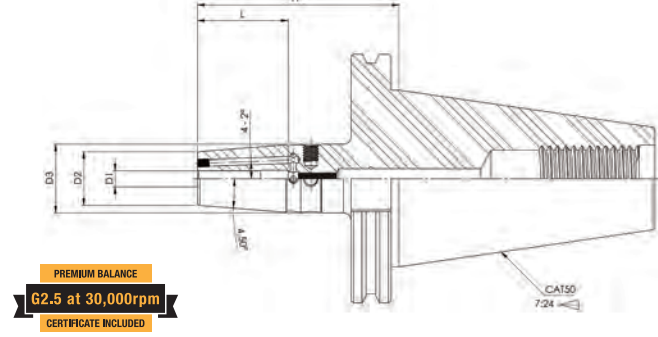


| Taper         | Hole Dia. (D1) | Gage Length (A) | D2    | D3     | L     | Code No. | Price \$ |
|---------------|----------------|-----------------|-------|--------|-------|----------|----------|
| <b>Inch</b>   |                |                 |       |        |       |          |          |
| CAT40         | 1/8"           | 3.15"           | 0.59" | 0.787" | 0.35" | 541838   | 328.94   |
| CAT40         | 3/16"          | 3.15"           | 0.59" | 0.787" | 0.47" | 541840   | 328.94   |
| CAT40         | 1/4"           | 3.15"           | 0.83" | 1.06"  | 1.42" | 541842   | 235.00   |
| CAT40         | 1/4"           | 6.30"           | 0.83" | 1.06"  | 1.42" | 541844   | 354.94   |
| CAT40         | 5/16"          | 3.15"           | 0.83" | 1.06"  | 1.42" | 541846   | 262.44   |
| CAT40         | 5/16"          | 6.30"           | 0.83" | 1.06"  | 1.42" | 541848   | 354.94   |
| CAT40         | 3/8"           | 3.15"           | 0.94" | 1.26"  | 1.65" | 541850   | 235.00   |
| CAT40         | 3/8"           | 6.30"           | 0.94" | 1.26"  | 1.65" | 541852   | 354.94   |
| CAT40         | 1/2"           | 3.15"           | 0.94" | 1.26"  | 1.65" | 541854   | 235.00   |
| CAT40         | 1/2"           | 6.30"           | 0.94" | 1.26"  | 1.65" | 541856   | 354.94   |
| CAT40         | 5/8"           | 3.15"           | 1.06" | 1.34"  | 1.97" | 541858   | 235.00   |
| CAT40         | 3/4"           | 3.15"           | 1.30" | 1.65"  | 2.05" | 541862   | 235.00   |
| CAT40         | 3/4"           | 6.30"           | 1.30" | 1.65"  | 2.05" | 541864   | 354.94   |
| CAT40         | 1"             | 3.94"           | 1.73" | 2.09"  | 2.28" | 541866   | 235.00   |
| CAT40         | 1"             | 6.30"           | 1.73" | 2.09"  | 2.28" | 541868   | 354.94   |
| CAT40         | 1-1/4"         | 3.94"           | 1.73" | 2.09"  | 2.28" | 541870   | 235.00   |
| CAT40         | 1-1/4"         | 6.30"           | 1.73" | 2.09"  | 2.28" | 541872   | 354.94   |
| <b>Metric</b> |                |                 |       |        |       |          |          |
| CAT40         | 4mm            | 80mm            | 15mm  | 20mm   | 12mm  | 541802   | 328.94   |
| CAT40         | 6mm            | 80mm            | 21mm  | 27mm   | 36mm  | 541806   | 235.00   |
| CAT40         | 6mm            | 160mm           | 21mm  | 27mm   | 36mm  | 541808   | 354.94   |
| CAT40         | 8mm            | 80mm            | 21mm  | 27mm   | 36mm  | 541810   | 235.00   |
| CAT40         | 8mm            | 160mm           | 21mm  | 27mm   | 36mm  | 541812   | 354.94   |
| CAT40         | 10mm           | 80mm            | 24mm  | 32mm   | 42mm  | 541814   | 235.00   |
| CAT40         | 10mm           | 160mm           | 24mm  | 32mm   | 42mm  | 541816   | 354.94   |
| CAT40         | 12mm           | 80mm            | 24mm  | 32mm   | 47mm  | 541818   | 235.00   |
| CAT40         | 12mm           | 160mm           | 24mm  | 32mm   | 47mm  | 541820   | 354.94   |
| CAT40         | 16mm           | 80mm            | 27mm  | 34mm   | 50mm  | 541822   | 235.00   |
| CAT40         | 16mm           | 160mm           | 27mm  | 34mm   | 50mm  | 541824   | 354.94   |
| CAT40         | 20mm           | 80mm            | 33mm  | 42mm   | 52mm  | 541826   | 235.00   |
| CAT40         | 25mm           | 100mm           | 44mm  | 53mm   | 58mm  | 541830   | 235.00   |
| CAT40         | 32mm           | 100mm           | 44mm  | 53mm   | 58mm  | 541834   | 235.00   |

## CAT50 Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced G2.5 at 30,000rpm
- 4 threaded Coolant ports in the nose, can be closed with a 3mm set screw
- Maximum gripping power with exceptional concentricity
- TIR ≤0.0001" / 0.003mm with tool shrunk in holder
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole

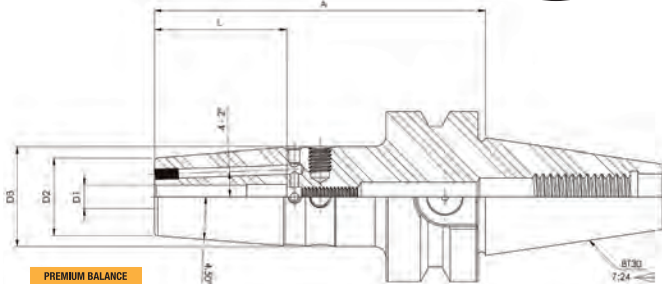


| Taper         | Hole Dia. (D1) | Gage Length (A) | D2    | D3    | L     | Code No. | Price \$ |
|---------------|----------------|-----------------|-------|-------|-------|----------|----------|
| <b>Inch</b>   |                |                 |       |       |       |          |          |
| CAT50         | 1/4"           | 3.15"           | 0.83" | 1.06" | 1.42" | 541932   | 299.00   |
| CAT50         | 1/4"           | 6.30"           | 0.83" | 1.06" | 1.42" | 541934   | 466.33   |
| CAT50         | 5/16"          | 3.15"           | 0.83" | 1.06" | 1.42" | 541936   | 399.00   |
| CAT50         | 3/8"           | 3.15"           | 0.94" | 1.26" | 1.65" | 541940   | 299.00   |
| CAT50         | 3/8"           | 6.30"           | 0.94" | 1.26" | 1.65" | 541942   | 466.33   |
| CAT50         | 1/2"           | 3.15"           | 1.06" | 1.34" | 1.65" | 541944   | 299.00   |
| CAT50         | 1/2"           | 6.30"           | 0.94" | 1.26" | 1.65" | 541946   | 466.33   |
| CAT50         | 5/8"           | 3.15"           | 1.06" | 1.34" | 1.97" | 541948   | 299.00   |
| CAT50         | 5/8"           | 6.30"           | 1.06" | 1.34" | 1.97" | 541950   | 466.33   |
| CAT50         | 3/4"           | 3.15"           | 1.30" | 1.65" | 2.05" | 541952   | 299.00   |
| CAT50         | 3/4"           | 6.30"           | 1.30" | 1.65" | 2.05" | 541954   | 466.33   |
| CAT50         | 1"             | 3.94"           | 1.73" | 2.09" | 2.28" | 541956   | 299.00   |
| CAT50         | 1"             | 6.30"           | 1.73" | 2.09" | 2.28" | 541958   | 466.33   |
| CAT50         | 1-1/4"         | 3.94"           | 1.73" | 2.09" | 2.28" | 541960   | 299.00   |
| CAT50         | 1-1/4"         | 6.30"           | 1.73" | 2.09" | 2.28" | 541962   | 466.33   |
| <b>Metric</b> |                |                 |       |       |       |          |          |
| CAT50         | 6mm            | 80mm            | 21mm  | 27mm  | 36mm  | 541900   | 299.00   |
| CAT50         | 6mm            | 160mm           | 21mm  | 27mm  | 36mm  | 541902   | 466.33   |
| CAT50         | 8mm            | 80mm            | 21mm  | 27mm  | 36mm  | 541904   | 299.00   |
| CAT50         | 8mm            | 160mm           | 21mm  | 27mm  | 36mm  | 541906   | 466.33   |
| CAT50         | 10mm           | 80mm            | 24mm  | 32mm  | 42mm  | 541908   | 299.00   |
| CAT50         | 10mm           | 160mm           | 24mm  | 32mm  | 42mm  | 541910   | 466.33   |
| CAT50         | 12mm           | 80mm            | 24mm  | 32mm  | 47mm  | 541912   | 299.00   |
| CAT50         | 12mm           | 160mm           | 24mm  | 32mm  | 47mm  | 541914   | 466.33   |
| CAT50         | 16mm           | 80mm            | 27mm  | 34mm  | 50mm  | 541916   | 299.00   |
| CAT50         | 16mm           | 160mm           | 27mm  | 34mm  | 50mm  | 541918   | 466.33   |
| CAT50         | 20mm           | 80mm            | 33mm  | 42mm  | 52mm  | 541920   | 299.00   |
| CAT50         | 25mm           | 100mm           | 44mm  | 53mm  | 58mm  | 541924   | 299.00   |
| CAT50         | 32mm           | 100mm           | 44mm  | 53mm  | 58mm  | 541928   | 299.00   |

## BT30 Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced G2.5 at 30,000rpm
- 4 Coolant ports in the nose
- For maximum gripping power with exceptional concentricity
- TIR of  $\leq 0.0001'' / 0.003\text{mm}$  with tool shrunk in holder
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole



PREMIUM BALANCE  
G2.5 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper         | Hole Dia. (D1) | Gage Length (A) | D2    | D3    | L     | Code No. | Price \$ |
|---------------|----------------|-----------------|-------|-------|-------|----------|----------|
| <b>Inch</b>   |                |                 |       |       |       |          |          |
| BT30          | 1/8"           | 3.15"           | 0.39" |       | 0.35" | 542414   | 225.00   |
| BT30          | 3/16"          | 3.15"           | 0.39" |       | 0.47" | 542416   | 225.00   |
| BT30          | 1/4"           | 3.15"           | 0.83" | 1.06" | 1.42" | 542418   | 225.00   |
| BT30          | 3/8"           | 3.15"           | 0.94" | 1.26" | 1.65" | 542422   | 225.00   |
| BT30          | 1/2"           | 3.15"           | 0.94" | 1.26" | 1.65" | 542424   | 225.00   |
| <b>Metric</b> |                |                 |       |       |       |          |          |
| BT30          | 4mm            | 80mm            | 10mm  |       | 12mm  | 542402   | 225.00   |

## Balancing Screws



| Description | Overall Length | Code No. | Price \$ |
|-------------|----------------|----------|----------|
| M6 x 1      | 6mm            | 541800   | 0.59     |

## Coolant Port Screws

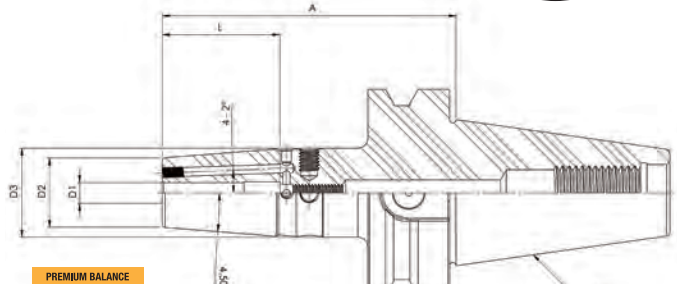


| Description      | Code No. | Price \$ |
|------------------|----------|----------|
| 4pcs per Package | 541801   | 4.93     |

## BT40 Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced G2.5 at 30,000rpm
- 4 Coolant ports in the nose
- For maximum gripping power with exceptional concentricity
- TIR of  $\leq 0.0001'' / 0.003\text{mm}$  with tool shrunk in holder
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole



PREMIUM BALANCE  
G2.5 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper         | Hole Dia. (D1) | Gage Length (A) | D2    | D3    | L     | Code No. | Price \$ |
|---------------|----------------|-----------------|-------|-------|-------|----------|----------|
| <b>Inch</b>   |                |                 |       |       |       |          |          |
| BT40          | 3/16"          | 3.54"           | 0.39" |       | 0.47" | 542466   | 322.53   |
| BT40          | 1/4"           | 3.54"           | 0.83" | 1.06" | 1.42" | 542468   | 257.69   |
| BT40          | 1/4"           | 6.30"           | 0.83" | 1.06" | 1.42" | 542470   | 359.93   |
| BT40          | 3/8"           | 3.54"           | 0.94" | 1.26" | 1.65" | 542476   | 257.69   |
| BT40          | 1/2"           | 3.54"           | 1.06" | 1.34" | 1.65" | 542480   | 257.69   |
| BT40          | 1/2"           | 6.30"           | 1.06" | 1.34" | 1.65" | 542482   | 359.93   |
| BT40          | 3/4"           | 3.54"           | 1.30" | 1.65" | 2.05" | 542488   | 257.69   |
| BT40          | 3/4"           | 6.30"           | 1.30" | 1.65" | 2.05" | 542490   | 359.93   |
| BT40          | 1"             | 3.94"           | 1.73" | 2.09" | 2.28" | 542492   | 257.69   |
| BT40          | 1-1/4"         | 3.94"           | 1.73" | 2.09" | 2.28" | 542496   | 266.83   |
| <b>Metric</b> |                |                 |       |       |       |          |          |
| BT40          | 6mm            | 90mm            | 21mm  | 27mm  | 36mm  | 542432   | 275.00   |
| BT40          | 8mm            | 90mm            | 21mm  | 27mm  | 36mm  | 542436   | 275.00   |

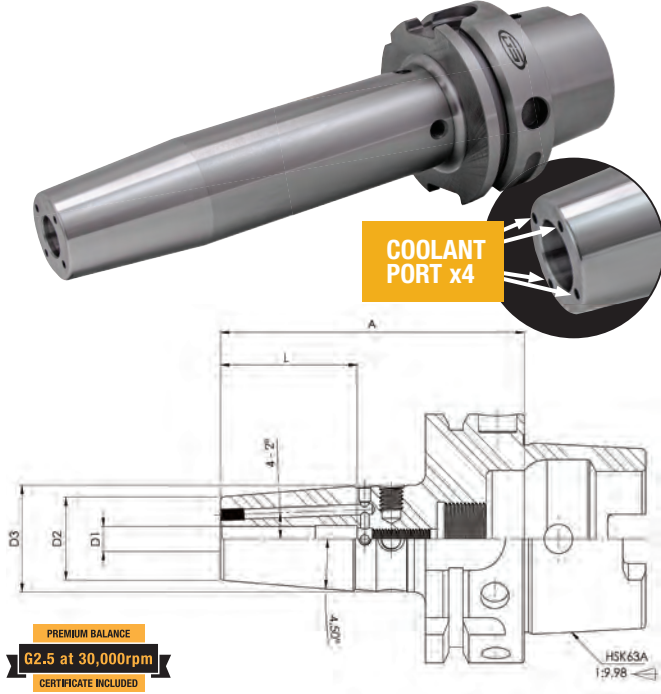
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## HSK63A Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced G2.5 at 30,000rpm
- 4 Coolant ports in the nose
- For maximum gripping power with exceptional concentricity
- TIR of  $\leq 0.0001'' / 0.003\text{mm}$  with tool shrunk in holder
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole

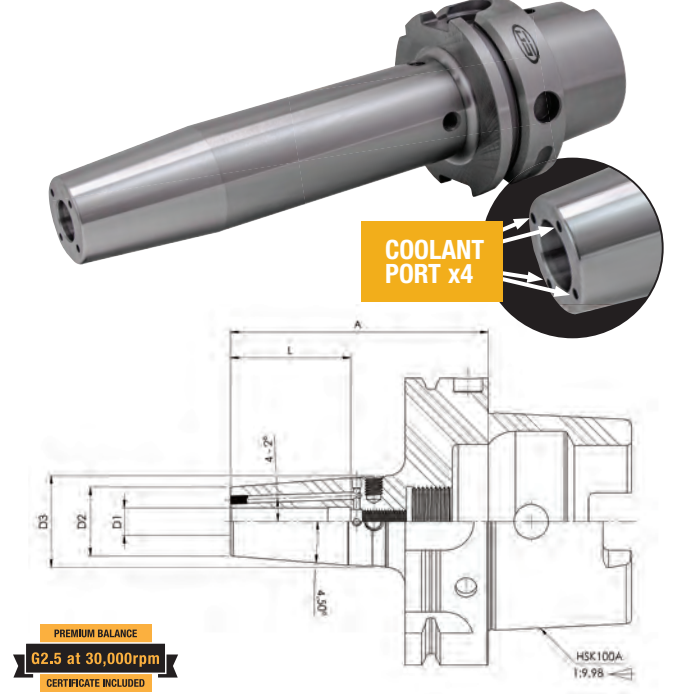


| Taper         | Hole Dia. (D1) | Gage Length (A) | D2     | D3     | L     | Code No. | Price \$ |
|---------------|----------------|-----------------|--------|--------|-------|----------|----------|
| <b>Inch</b>   |                |                 |        |        |       |          |          |
| HSK63A        | 1/8"           | 3.15"           | 0.59"  | 0.787" | 0.35" | 546338   | 325.00   |
| HSK63A        | 3/16"          | 3.15"           | 0.59"  | 0.787" | 0.47" | 546340   | 325.00   |
| HSK63A        | 1/4"           | 3.15"           | 0.826" | 1.06"  | 1.42" | 546342   | 325.00   |
| HSK63A        | 1/4"           | 6.30"           | 0.83"  | 1.06"  | 1.42" | 546344   | 465.00   |
| HSK63A        | 5/16"          | 3.15"           | 0.826" | 1.06"  | 1.42" | 546346   | 325.00   |
| HSK63A        | 3/8"           | 3.35"           | 0.94"  | 1.26"  | 1.65" | 546350   | 325.00   |
| HSK63A        | 3/8"           | 6.30"           | 0.94"  | 1.26"  | 1.65" | 546352   | 465.00   |
| HSK63A        | 1/2"           | 3.54"           | 1.06"  | 1.34"  | 1.65" | 546354   | 325.00   |
| HSK63A        | 1/2"           | 6.30"           | 1.06"  | 1.34"  | 1.65" | 546356   | 465.00   |
| HSK63A        | 5/8"           | 3.74"           | 1.06"  | 1.34"  | 1.97" | 546358   | 325.00   |
| HSK63A        | 5/8"           | 6.30"           | 1.06"  | 1.34"  | 1.97" | 546360   | 465.00   |
| HSK63A        | 3/4"           | 3.94"           | 1.30"  | 1.65"  | 2.05" | 546362   | 325.00   |
| HSK63A        | 3/4"           | 6.30"           | 1.30"  | 1.65"  | 2.05" | 546364   | 465.00   |
| HSK63A        | 1"             | 4.53"           | 1.73"  | 2.09"  | 2.28" | 546366   | 325.00   |
| HSK63A        | 1"             | 6.30"           | 1.73"  | 2.09"  | 2.28" | 546368   | 465.00   |
| HSK63A        | 1-1/4"         | 4.72"           | 1.73"  | 2.09"  | 2.28" | 546370   | 325.00   |
| HSK63A        | 1-1/4"         | 6.30"           | 1.73"  | 2.09"  | 2.28" | 546372   | 465.00   |
| <b>Metric</b> |                |                 |        |        |       |          |          |
| HSK63A        | 3mm            | 80mm            | 15mm   | 20mm   |       | 546300   | 325.00   |
| HSK63A        | 4mm            | 80mm            | 15mm   | 20mm   | 12mm  | 546302   | 325.00   |
| HSK63A        | 5mm            | 80mm            | 15mm   | 20mm   | 15mm  | 546304   | 325.00   |
| HSK63A        | 6mm            | 80mm            | 21mm   | 27mm   | 36mm  | 546306   | 325.00   |
| HSK63A        | 6mm            | 160mm           | 21mm   | 27mm   | 36mm  | 546308   | 465.00   |
| HSK63A        | 8mm            | 80mm            | 21mm   | 27mm   | 36mm  | 546310   | 325.00   |
| HSK63A        | 10mm           | 85mm            | 24mm   | 32mm   | 42mm  | 546314   | 325.00   |
| HSK63A        | 12mm           | 90mm            | 24mm   | 32mm   | 47mm  | 546318   | 325.00   |
| HSK63A        | 16mm           | 95mm            | 27mm   | 34mm   | 50mm  | 546322   | 325.00   |
| HSK63A        | 20mm           | 100mm           | 33mm   | 42mm   | 52mm  | 546326   | 325.00   |
| HSK63A        | 25mm           | 115mm           | 44mm   | 53mm   | 58mm  | 546330   | 325.00   |
| HSK63A        | 32mm           | 120mm           | 44mm   | 53mm   | 58mm  | 546334   | 325.00   |

## HSK100A Shrink Fit Holders With Coolant Ports



- Holders are balanceable with a balancing machine
- Balanced G2.5 at 30,000rpm
- 4 Coolant ports in the nose
- For maximum gripping power with exceptional concentricity
- TIR of  $\leq 0.0001'' / 0.003\text{mm}$  with tool shrunk in holder
- AT2 Taper Accuracy
- Tool is gripped 360° along the entire length of bore resulting in an evenly distributed clamping force
- Material: H13 Tool Steel
- The hot hardness (hot strength) of H13 resists thermal fatigue cracking which occurs as a result of cyclic heating and cooling cycles
- RFID chip hole



| Taper       | Hole Dia. (D1) | Gage Length (A) | D2     | D3    | L     | Code No. | Price \$ |
|-------------|----------------|-----------------|--------|-------|-------|----------|----------|
| <b>Inch</b> |                |                 |        |       |       |          |          |
| HSK100A     | 1/4"           | 3.35"           | 0.826" | 1.06" | 1.42" | 546432   | 370.00   |
| HSK100A     | 5/16"          | 3.35"           | 0.826" | 1.06" | 1.42" | 546436   | 412.06   |
| HSK100A     | 3/8"           | 3.54"           | 0.94"  | 1.26" | 1.65" | 546440   | 370.00   |
| HSK100A     | 3/8"           | 6.30"           | 0.94"  | 1.26" | 1.65" | 546442   | 522.86   |
| HSK100A     | 1/2"           | 3.74"           | 1.06"  | 1.34" | 1.65" | 546444   | 370.00   |
| HSK100A     | 1/2"           | 6.30"           | 1.06"  | 1.34" | 1.65" | 546446   | 522.86   |
| HSK100A     | 5/8"           | 3.94"           | 1.06"  | 1.34" | 1.97" | 546448   | 370.00   |
| HSK100A     | 5/8"           | 6.30"           | 1.06"  | 1.34" | 1.97" | 546450   | 536.16   |
| HSK100A     | 3/4"           | 4.13"           | 1.30"  | 1.65" | 2.05" | 546452   | 370.00   |
| HSK100A     | 3/4"           | 6.30"           | 1.30"  | 1.65" | 2.05" | 546454   | 512.88   |
| HSK100A     | 1"             | 4.53"           | 1.73"  | 2.09" | 2.28" | 546456   | 370.00   |
| HSK100A     | 1"             | 6.30"           | 1.73"  | 2.09" | 2.28" | 546458   | 512.88   |
| HSK100A     | 1-1/4"         | 4.72"           | 1.73"  | 2.09" | 2.28" | 546460   | 398.17   |
| HSK100A     | 1-1/4"         | 6.30"           | 1.73"  | 2.09" | 2.28" | 546462   | 522.86   |



# Right Angle Heads

## RIGHT ANGLE HEADS

|                                       |     |
|---------------------------------------|-----|
| Right Angle Head (VRA-Type) . . . . . | G48 |
|---------------------------------------|-----|

## GS DRIVEN TOOLS

|   |     |
|---|-----|
| For DMG MORI, DOOSAN, HAAS & MAZAK Lathes . . . . . | G48 |
|---|-----|

## GS FIXED HEADS

|   |     |
|---|-----|
| GFX07 ER11 Fixed 90° Right Angle Heads . . . . .  | G50 |
| GFX07L ER11 Fixed 90° Right Angle Heads . . . . . | G51 |
| GFX10 ER16 Fixed 90° Right Angle Heads . . . . .  | G52 |
| GFX10L ER16 Fixed 90° Right Angle Heads . . . . . | G53 |
| GFX16 ER25 Fixed 90° Right Angle Heads . . . . .  | G54 |
| GFX16L ER25 Fixed 90° Right Angle Heads . . . . . | G55 |
| GFX20 ER32 Fixed 90° Right Angle Heads . . . . .  | G56 |
| GFX20L ER32 Fixed 90° Right Angle Heads . . . . . | G57 |
| GFX S40 Fixed 90° Right Angle Heads . . . . .     | G58 |

## GS PIVOTING HEADS

|   |     |
|---|-----|
| GPV13 ER20 Pivoting Angle Heads . . . . . | G59 |
| GPV16 ER25 Pivoting Angle Heads . . . . . | G60 |
| GPV20 ER32 Pivoting Angle Heads . . . . . | G61 |

## Right Angle Head (VRA-Type)

1. Used on Vertical Milling Machine to make horizontal cutting work
2. Rigidity constructed suitable for heavy-duty cutting
3. The clamping bushing to suit milling machine



| Suitable Milling Head Quill Diameter | Weight | Model No. | Code No. | Price \$        |
|--------------------------------------|--------|-----------|----------|-----------------|
| 85.725mm - 86mm                      | 12 kgs | VRA-R8    | 326200   | <b>2,540.30</b> |
| 85.725mm - 86mm                      | 13 kgs | VRA-NT 30 | 326202   | <b>2,431.66</b> |
| 105mm                                | 20 kgs | VRA-NT 40 | 326204   | <b>3,600.12</b> |



## DRIVEN TOOLS

**2 Year Warranty**  
(against manufacturer defects)

### Main Technical Features

- Main body designed to maximize rigidity and reduce vibration
  - Specially treated corrosion resistant steel body
  - Angular contact bearings + taper roller bearings on output spindle for better rigidity and longer life
  - Gleason spiral bevel gears with completely ground involute form
  - Internal coolant option
  - Designed, manufactured and assembled in Italy
  - 2 Year warranty against manufacturer defects
- ▼ Direction of rotation is opposite to the machine spindle  
 ▼ Direction of rotation is the same as the machine spindle

### Driven Tools For DMG MORI Lathes

| Model     | Orient | Rotation | Turret | Output | Int. Coolant | Nm | RPM    | Gage Length | Code No. | Price \$        |
|-----------|--------|----------|--------|--------|--------------|----|--------|-------------|----------|-----------------|
| 99.MS.A59 | Axial  | ▼        | NL60   | ER-32  | -            | 60 | 10,000 | Max 89.9    | 381504   | <b>2,236.12</b> |
| 99.MS.A60 | Axial  | ▼        | NL60   | ER-32  | • 80bar      | 60 | 10,000 | Max 89.9    | 381505   | <b>3,308.58</b> |
| 99.MS.A72 | Radial | ▼        | NL60   | ER-32  | -            | 60 | 10,000 | 90          | 381506   | <b>4,791.74</b> |
| 99.MS.A73 | Radial | ▼        | NL60   | ER-32  | • 80bar      | 60 | 10,000 | 90          | 381507   | <b>5,362.09</b> |



### Driven Tools For DOOSAN Lathes

| Model     | Orient | Rotation | Turret | Output | Int. Coolant | Nm | RPM   | Gage Length | Code No. | Price \$        |
|-----------|--------|----------|--------|--------|--------------|----|-------|-------------|----------|-----------------|
| 99.DS.A01 | Axial  | ▼        | BMT55  | ER-25  | -            | 40 | 8,000 | 57.2        | 381512   | <b>1,939.57</b> |
| 99.DS.A02 | Axial  | ▼        | BMT55  | ER-25  | • 80bar      | 40 | 8,000 | 57.2        | 381513   | <b>2,224.75</b> |
| 99.DS.A11 | Radial | ▼        | BMT55  | ER-25  | -            | 40 | 8,000 | 70          | 381514   | <b>3,650.83</b> |
| 99.DS.A12 | Radial | ▼        | BMT55  | ER-25  | • 80bar      | 40 | 8,000 | 70          | 381515   | <b>4,312.59</b> |
| 99.DS.A41 | Axial  | ▼        | BMT65  | ER-32  | -            | 70 | 6,000 | 72.5        | 381516   | <b>2,281.82</b> |
| 99.DS.A42 | Axial  | ▼        | BMT65  | ER-32  | • 70bar      | 70 | 6,000 | 72.5        | 381517   | <b>3,501.71</b> |
| 99.DS.A51 | Radial | ▼        | BMT65  | ER-32  | -            | 70 | 6,000 | 72          | 381518   | <b>3,833.33</b> |
| 99.DS.A52 | Radial | ▼        | BMT65  | ER-32  | • 70bar      | 70 | 6,000 | 72          | 381519   | <b>4,540.68</b> |



### Driven Tools For HAAS Lathes

| Model         | Orient | Rotation | Turret | Output | Int. Coolant | Nm | RPM   | Gage Length | Code No. | Price \$        |
|---------------|--------|----------|--------|--------|--------------|----|-------|-------------|----------|-----------------|
| 99.HA.590082  | Axial  | ▼        | VDI40  | ER-32  | -            | 63 | 6,000 | 82.1        | 381500   | <b>1,688.51</b> |
| 99.HA.590082B | Axial  | ▼        | VDI40  | ER-32  | • 25bar      | 63 | 6,000 | 82.1        | 381501   | <b>2,110.70</b> |
| 99.HA.590084  | Radial | ▼        | VDI40  | ER-32  | -            | 63 | 6,000 | Max. 75     | 381502   | <b>3,171.68</b> |
| 99.HA.590084B | Radial | ▼        | VDI40  | ER-32  | • 25bar      | 63 | 6,000 | Max. 75     | 381503   | <b>4,012.14</b> |



### Driven Tools For MAZAK Lathes

| Model     | Orient       | Rotation | Turret  | Output | Int. Coolant | Nm | RPM   | Gage Length | Code No. | Price \$        |
|-----------|--------------|----------|---------|--------|--------------|----|-------|-------------|----------|-----------------|
| 99.MZ.A58 | Offset-Axial | ▼        | QTN2-40 | ER-32  | -            | 80 | 6,000 | 50          | 381508   | <b>2,966.33</b> |
| 99.MZ.A59 | Offset-Axial | ▼        | QTN2-40 | ER-32  | • 80bar      | 80 | 6,000 | 116         | 381509   | <b>4,563.54</b> |
| 99.MZ.A65 | Radial       | ▼        | QTN2-40 | ER-32  | -            | 80 | 6,000 | 130         | 381510   | <b>4,839.91</b> |
| 99.MZ.A66 | Radial       | ▼        | QTN2-40 | ER-32  | • 80bar      | 80 | 6,000 | 130         | 381511   | <b>4,183.27</b> |





ANGLE HEADS

ATC Series

### Designed for Automatic Tool Change Machines

#### Design

The compact design, along with mentioned specifications allows for the highest performances, high speeds and long tool life



Case Hardened and ground shank and shaft

Positioning pin with automatic release

Modular anti-rotation group

Standard 10Bar coolant through pin

Graduated ring

Treated steel head body with 360° position and internal air pressure, maximum rigidity and corrosion resistant. Minimum thermal expansion

#### Output

- ER Collet (Standard)
- Weldon
- Shell mill holder
- Special

Angular contact preloaded ball bearings of precision class ABE 7/9



Gleason ground spiral bevel gears for maximum performance and minimum vibration



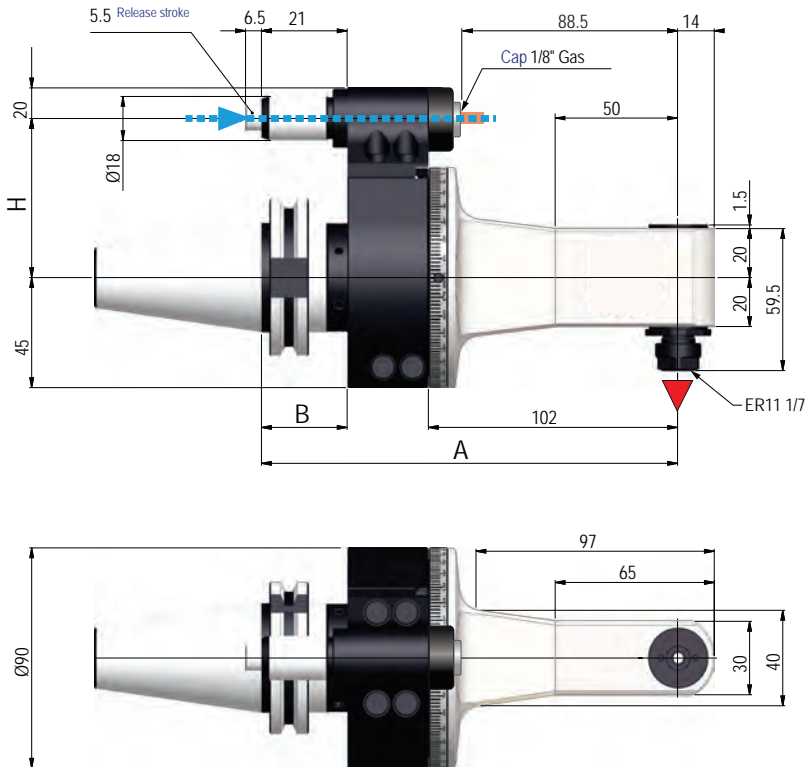
Tool Holding



## ANGLE HEADS

# ATC Series

### GFX07



### GFX07 ER11 Fixed 90° Right Angle Heads

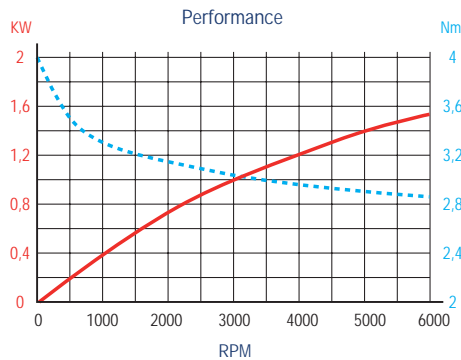
▼ Direction of rotation is opposite to the machine spindle



| Taper  | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX07 | ER11          | 170    | 35     | 65     | 7                          | M6                | 10,000  | 4            | 381002S  | 7,171.22 |
| CAT50  | GFX07 | ER11          | 170    | 35     | 80     | 7                          | M6                | 10,000  | 4            | 381004S  | 7,171.17 |
| BT40   | GFX07 | ER11          | 170    | 35     | 65     | 7                          | M6                | 10,000  | 4            | 381006S  | 6,964.76 |
| BT50   | GFX07 | ER11          | 176    | 41     | 80     | 7                          | M6                | 10,000  | 4            | 381008S  | 6,964.76 |
| HSK63  | GFX07 | ER11          | 177    | 42     | 65     | 7                          | M6                | 10,000  | 4            | 381010S  | 7,349.13 |
| HSK100 | GFX07 | ER11          | 180    | 45     | 80     | 7                          | M6                | 10,000  | 4            | 381012S  | 7,427.21 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data |     | GFX 7        |
|----------------|-----|--------------|
| Ratio          |     | 1:1          |
| RPM Max        |     | 10,000       |
| Max axial load | N   | 120          |
| Torque         | Nm  | 5            |
| Weight         | Kg. | 4            |
| Collet         | mm  | ER11 1mm-7mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

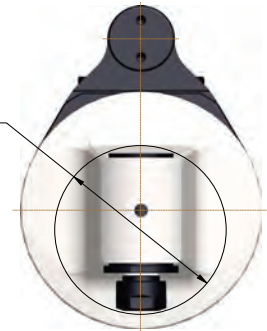
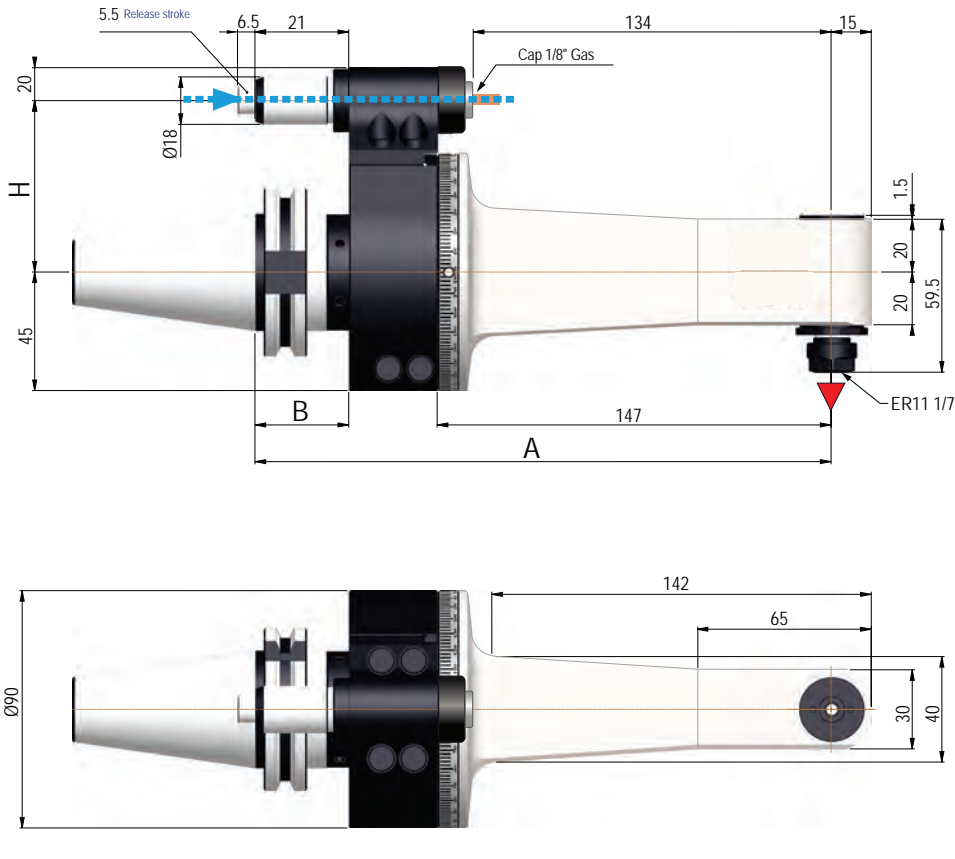




# ANGLE HEADS

# ATC Series

## GFX07L



### GFX07L ER11 Long Fixed 90° Right Angle Heads

▼ Direction of rotation is opposite to the machine spindle

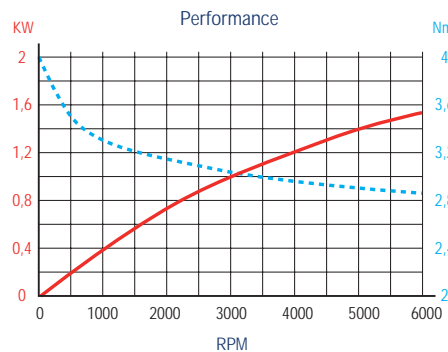


| Taper  | Model  | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|--------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX07L | ER11          | 215    | 35     | 65     | 7                          | M6                | 10,000  | 4.3          | 381302S  | 6,741.19 |
| CAT50  | GFX07L | ER11          | 215    | 35     | 80     | 7                          | M6                | 10,000  | 4.3          | 381304S  | 6,741.19 |
| BT40   | GFX07L | ER11          | 215    | 35     | 65     | 7                          | M6                | 10,000  | 4.3          | 381306S  | 6,741.19 |
| BT50   | GFX07L | ER11          | 221    | 41     | 80     | 7                          | M6                | 10,000  | 4.3          | 381308S  | 6,741.19 |
| HSK63  | GFX07L | ER11          | 222    | 42     | 65     | 7                          | M6                | 10,000  | 4.3          | 381310S  | 7,123.15 |
| HSK100 | GFX07L | ER11          | 225    | 45     | 80     | 7                          | M6                | 10,000  | 4.3          | 381312S  | 7,204.34 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data |     | GFX 7L       |
|----------------|-----|--------------|
| Ratio          |     | 1:1          |
| RPM Max        |     | 10,000       |
| Max axial load | N   | 120          |
| Torque         | Nm  | 5            |
| Weight         | Kg. | 4.3          |
| Collet         | mm  | ER11 1mm-7mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report



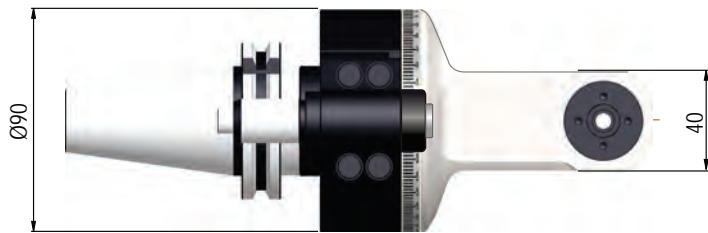
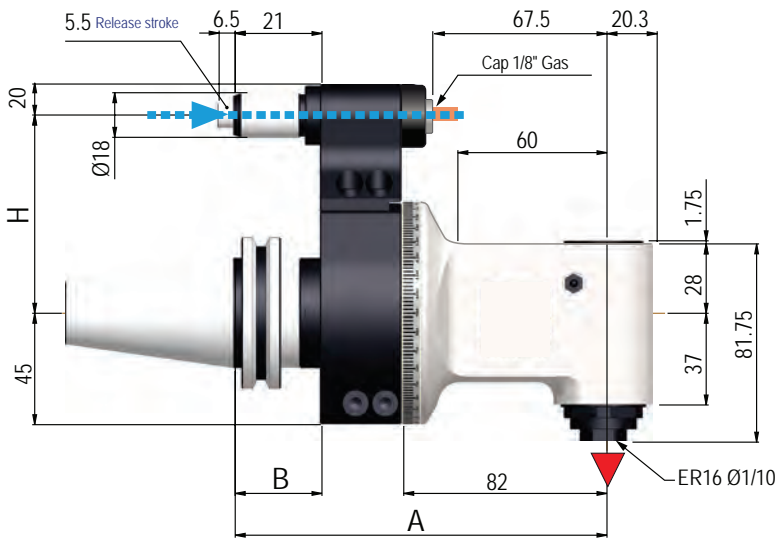




## ANGLE HEADS

# ATC Series

### GFX10



### GFX10 ER16 Fixed 90° Right Angle Heads

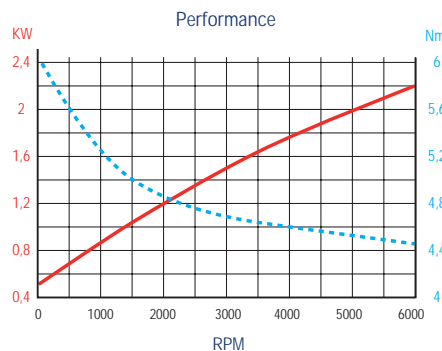
▼ Direction of rotation is opposite to the machine spindle



| Taper  | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX10 | ER16          | 150    | 35     | 65     | 10                         | M8                | 10,000  | 4.3          | 381020S  | 5,721.77 |
| CAT50  | GFX10 | ER16          | 150    | 35     | 80     | 10                         | M8                | 10,000  | 4.3          | 381022S  | 5,721.77 |
| BT40   | GFX10 | ER16          | 150    | 35     | 65     | 10                         | M8                | 10,000  | 4.3          | 381024S  | 5,721.77 |
| BT50   | GFX10 | ER16          | 156    | 41     | 80     | 10                         | M8                | 10,000  | 4.3          | 381026S  | 5,721.77 |
| HSK63  | GFX10 | ER16          | 157    | 42     | 65     | 10                         | M8                | 10,000  | 4.3          | 381028S  | 6,107.75 |
| HSK100 | GFX10 | ER16          | 160    | 45     | 80     | 10                         | M8                | 10,000  | 4.3          | 381030S  | 6,190.01 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data |     | GFX10L        |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 10,000        |
| Max axial load | N   | 250           |
| Torque         | Nm  | 10            |
| Weight         | Kg. | 4.3           |
| Collet         | mm  | ER16 1mm-10mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

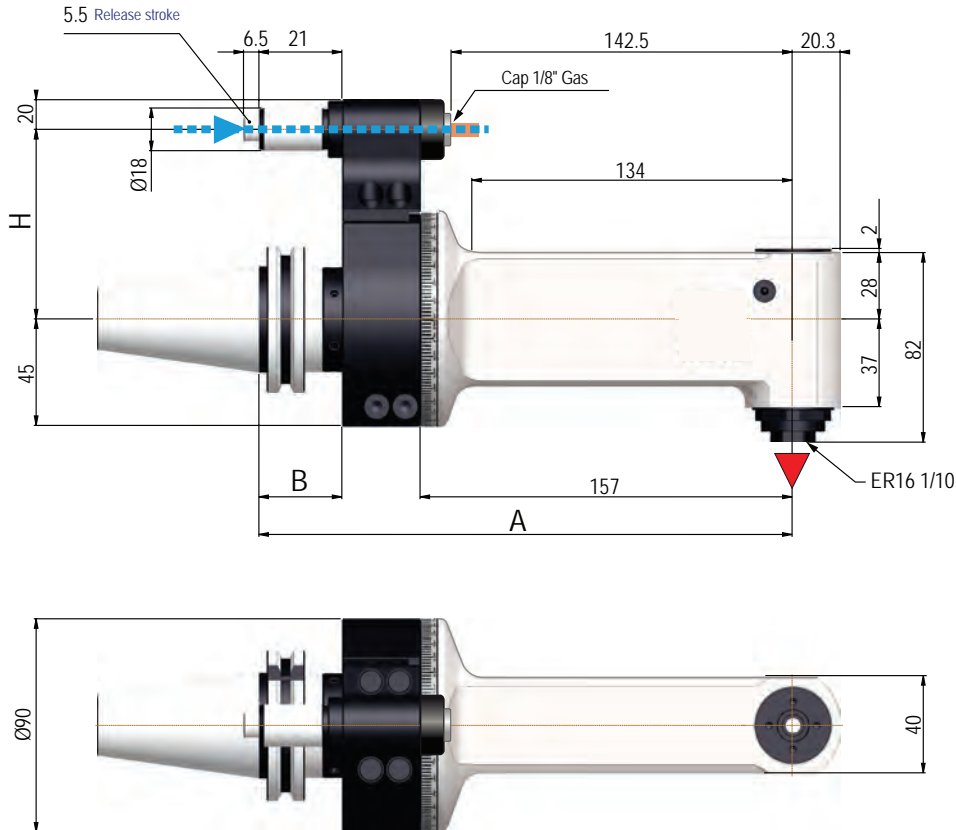




ANGLE HEADS

ATC Series

GFX10L



GFX10L ER 16 Long Fixed 90° Right Angle Heads

Direction of rotation is opposite to the machine spindle

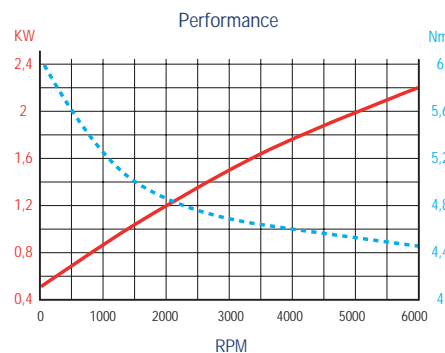


| Taper  | Model  | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|--------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX10L | ER16          | 225    | 35     | 65     | 10                         | M8                | 10,000  | 5.2          | 381320S  | 6,843.88 |
| CAT50  | GFX10L | ER16          | 225    | 35     | 80     | 10                         | M8                | 10,000  | 5.2          | 381322S  | 6,843.88 |
| BT40   | GFX10L | ER16          | 225    | 35     | 65     | 10                         | M8                | 10,000  | 5.2          | 381324S  | 6,843.88 |
| BT50   | GFX10L | ER16          | 231    | 41     | 80     | 10                         | M8                | 10,000  | 5.2          | 381326S  | 6,843.88 |
| HSK63  | GFX10L | ER16          | 232    | 42     | 65     | 10                         | M8                | 10,000  | 5.2          | 381328S  | 7,214.26 |
| HSK100 | GFX10L | ER16          | 235    | 45     | 80     | 10                         | M8                | 10,000  | 5.2          | 381330S  | 7,289.81 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data |     | GFX10L        |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 10,000        |
| Max axial load | N   | 250           |
| Torque         | Nm  | 10            |
| Weight         | Kg. | 5.2           |
| Collet         | mm  | ER16 1mm-10mm |



Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report



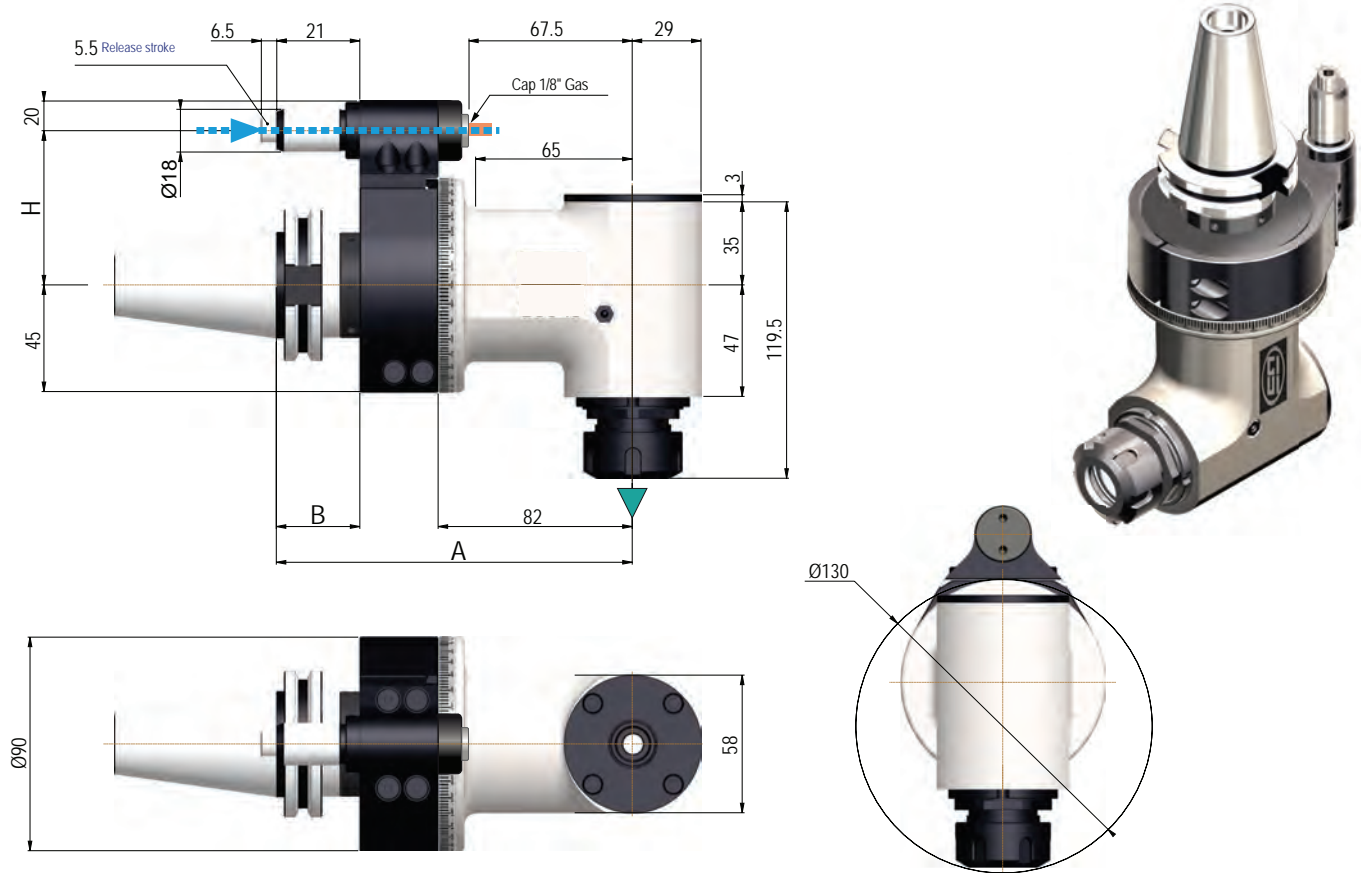
Order online at [www.SowaTool.com](http://www.SowaTool.com) or call 1-800-265-8221.



## ANGLE HEADS

# ATC Series

### GFX16



### GFX16 ER25 Fixed 90° Right Angle Heads

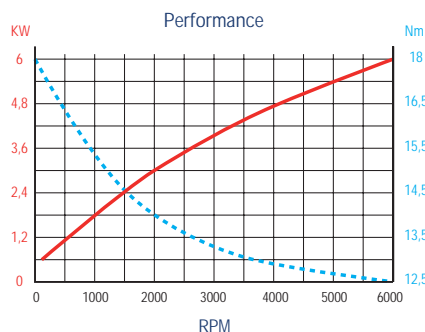
▼ Direction of rotation is the same as the machine spindle



| Taper  | Model | System Collet | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX16 | ER25          | 150    | 35     | 65     | 16                         | M12               | 8,000   | 5.4          | 381100S  | 7,178.19 |
| CAT50  | GFX16 | ER25          | 150    | 35     | 80     | 16                         | M12               | 8,000   | 5.4          | 381102S  | 7,177.97 |
| BT40   | GFX16 | ER25          | 150    | 35     | 65     | 16                         | M12               | 8,000   | 5.4          | 381104S  | 7,177.97 |
| BT50   | GFX16 | ER25          | 156    | 41     | 80     | 16                         | M12               | 8,000   | 5.4          | 381106S  | 7,177.97 |
| HSK63  | GFX16 | ER25          | 157    | 42     | 65     | 16                         | M12               | 8,000   | 5.4          | 381108S  | 7,575.80 |
| HSK100 | GFX16 | ER25          | 160    | 45     | 80     | 16                         | M12               | 8,000   | 5.4          | 381110S  | 7,662.61 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data |     | GFX16         |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 8,000         |
| Max axial load | N   | 510           |
| Torque         | Nm  | 24            |
| Weight         | Kg. | 5.4           |
| Collet         | mm  | ER25 2mm-16mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

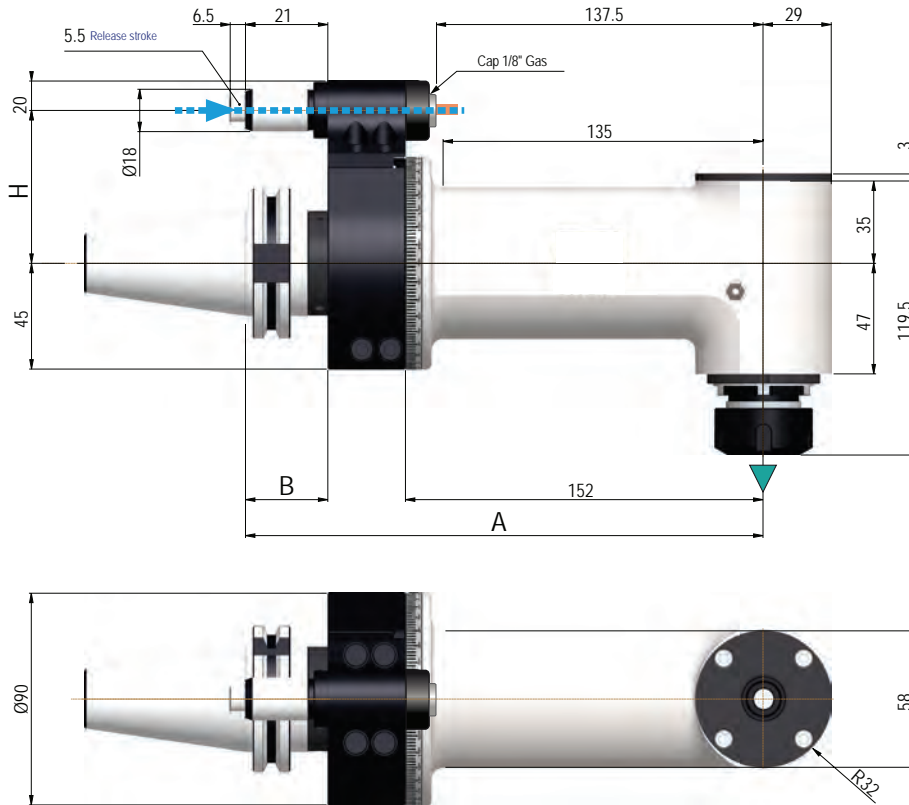




# ANGLE HEADS

# ATC Series

## GFX16L



### GFX16L ER25 Long Fixed 90° Right Angle Heads

Direction of rotation is the same as the machine spindle

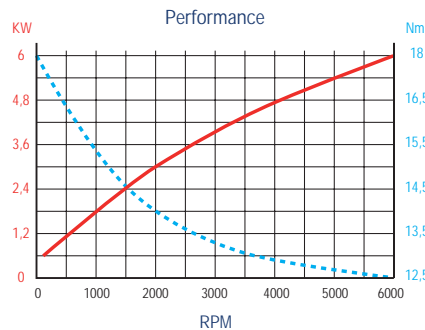


| Taper  | Model  | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|--------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GFX16L | ER25          | 220    | 35     | 65     | 16                         | M12               | 8,000   | 6.7          | 381400S  | 8,226.96 |
| CAT50  | GFX16L | ER25          | 220    | 35     | 80     | 16                         | M12               | 8,000   | 6.7          | 381402S  | 8,226.96 |
| BT40   | GFX16L | ER25          | 220    | 35     | 65     | 16                         | M12               | 8,000   | 6.7          | 381404S  | 8,226.96 |
| BT50   | GFX16L | ER25          | 226    | 41     | 80     | 16                         | M12               | 8,000   | 6.7          | 381406S  | 8,226.96 |
| HSK63  | GFX16L | ER25          | 227    | 42     | 65     | 16                         | M12               | 8,000   | 6.7          | 381408S  | 8,595.23 |
| HSK100 | GFX16L | ER25          | 230    | 45     | 80     | 16                         | M12               | 8,000   | 6.7          | 381410S  | 8,672.96 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data |     | GFX16L        |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 8,000         |
| Max axial load | N   | 510           |
| Torque         | Nm  | 24            |
| Weight         | Kg. | 6.7           |
| Collet         | mm  | ER25 2mm-16mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

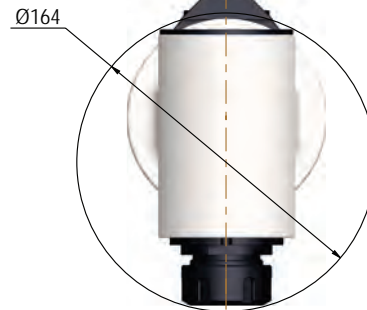
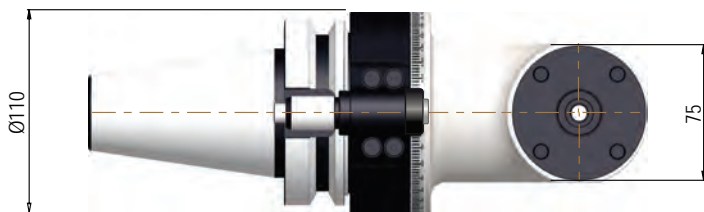
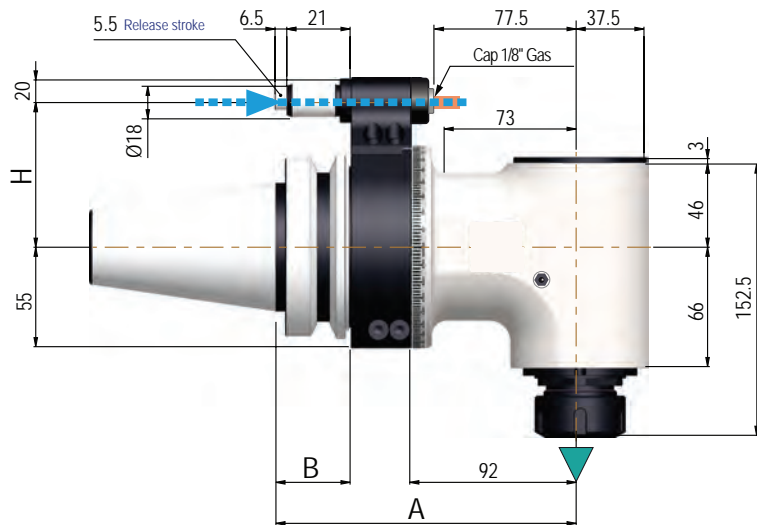




## ANGLE HEADS

# ATC Series

### GFX20



### GFX20 ER32 Fixed 90° Right Angle Head

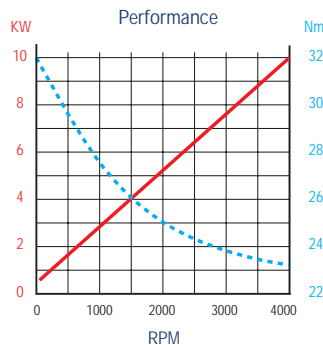
Direction of rotation is the same as the machine spindle



| Taper | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|-------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT50 | GFX20 | ER32          | 160    | 35     | 80     | 20                         | M16               | 4,000   | 11           | 381148S  | 7,376.07 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data | GFX20              |
|----------------|--------------------|
| Ratio          | 1:1                |
| RPM Max        | 4,000              |
| Max axial load | N 1250             |
| Torque         | Nm 40              |
| Weight         | Kg. 11             |
| Collet         | mm ER32 2.5mm-20mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

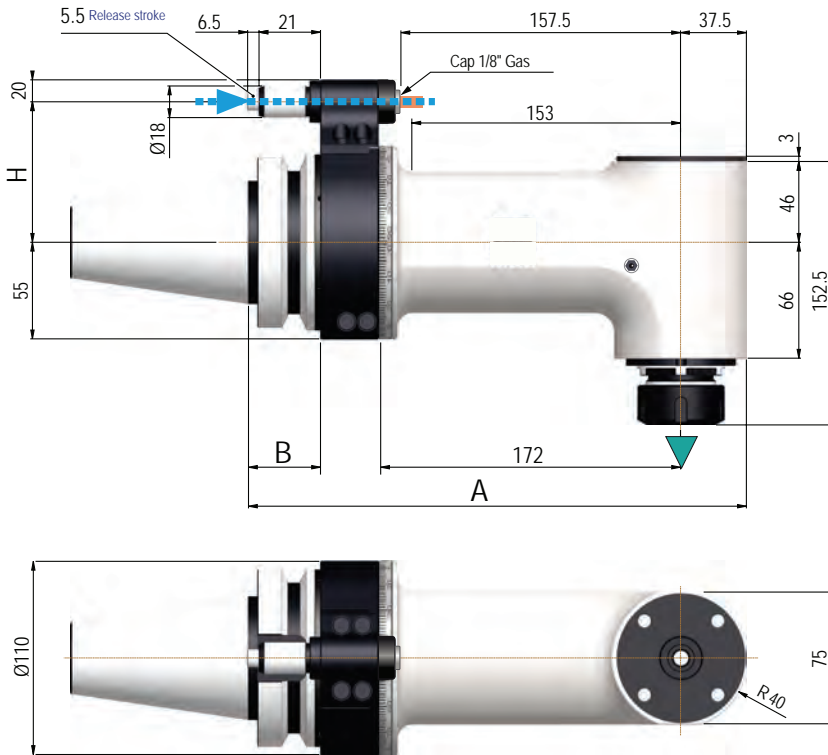




ANGLE HEADS

ATC Series

GFX20L



GFX20L ER32 Long Fixed 90° Right Angle Head

Direction of rotation is the same as the machine spindle

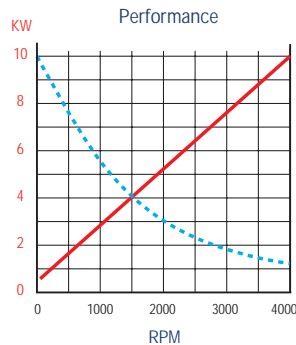


| Taper | Model  | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|-------|--------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT50 | GFX20L | ER32          | 240    | 35     | 80     | 20                         | M16               | 4,000   | 13.8         | 381448S  | 8,820.46 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data |     | GFX20L          |
|----------------|-----|-----------------|
| Ratio          |     | 1:1             |
| RPM Max        |     | 4,000           |
| Max axial load | N   | 1250            |
| Torque         | Nm  | 40              |
| Weight         | Kg. | 13.8            |
| Collet         | mm  | ER32 2.5mm-20mm |



Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

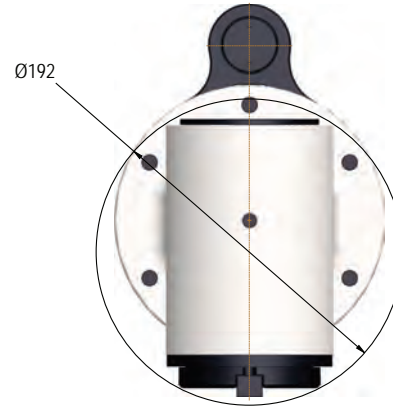
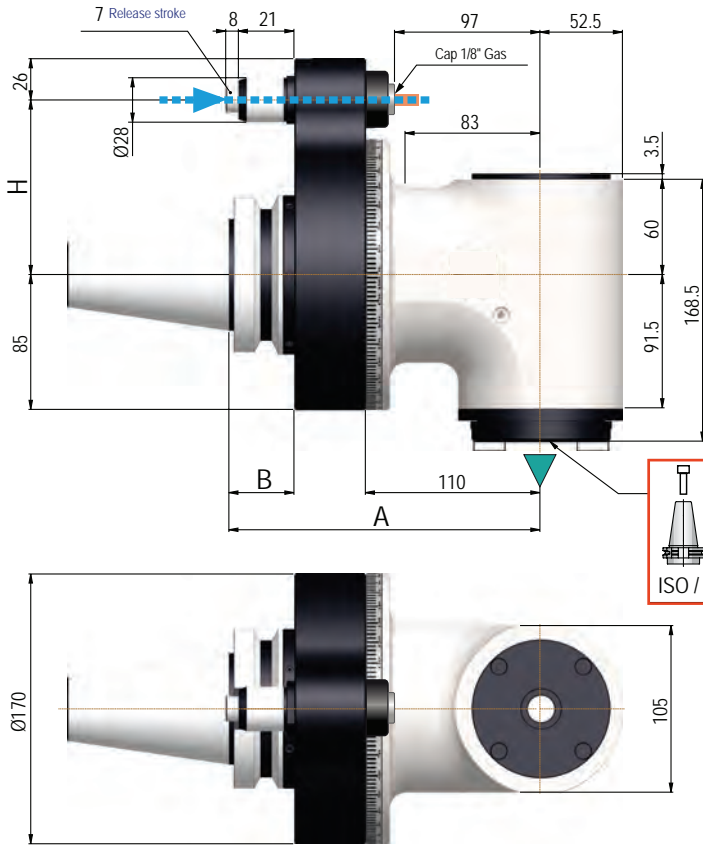




## ANGLE HEADS

# ATC Series

### GFXS40



Note: Accepts CAT40, BT40, SK40 and NMTB 40 Taper Tooling

### GFX S40 Fixed 90° Right Angle Heads

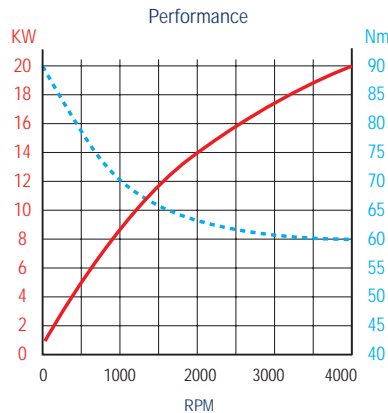
Direction of rotation is the same as the machine spindle



| Taper  | Model   | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$  |
|--------|---------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|-----------|
| CAT50  | GFX S40 | 190    | 35     | 110    | 26                         | M20               | 4,000   | 22           | 381121S  | 8,414.94  |
| BT50   | GFX S40 | 196    | 41     | 110    | 26                         | M20               | 4,000   | 22           | 381123S  | 10,939.42 |
| HSK100 | GFX S40 | 200    | 45     | 110    | 26                         | M20               | 4,000   | 22           | 381125S  | 11,610.17 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data |     | GFX S40  |
|----------------|-----|----------|
| Ratio          |     | 1:1      |
| RPM Max        |     | 4,000    |
| Max axial load | N   | 1800     |
| Torque         | Nm  | 140      |
| Weight         | Kg. | 22       |
| Drill / Tap    | mm  | 26mm/M20 |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

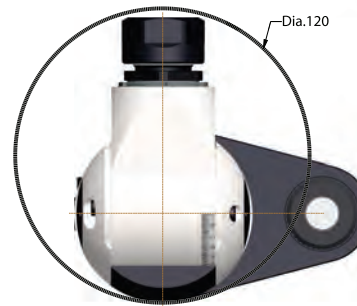
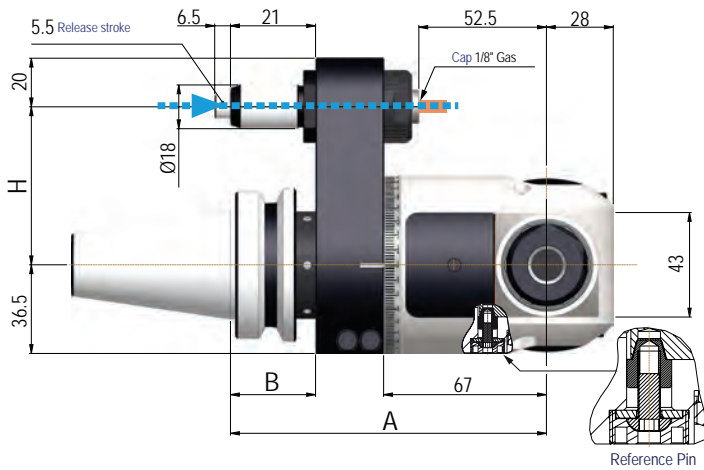
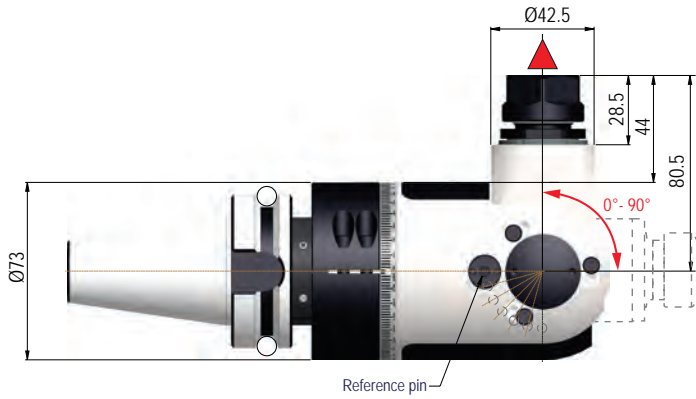




# ANGLE HEADS

# ATC Series

## GPV13



### GPV13 ER 20 Pivoting Angle Heads

▼ Direction of rotation is opposite to the machine spindle

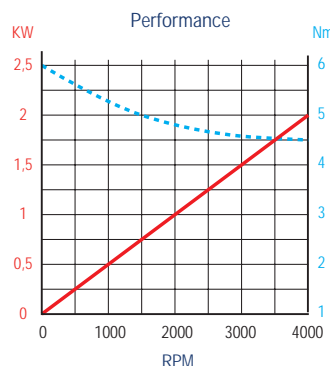


| Taper  | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GPV13 | ER20          | 130    | 35     | 65     | 13                         | M10               | 4,000   | 4.2          | 381198S  | 7,995.17 |
| CAT50  | GPV13 | ER20          | 130    | 35     | 80     | 13                         | M10               | 4,000   | 4.2          | 381200S  | 7,995.17 |
| BT40   | GPV13 | ER20          | 130    | 35     | 65     | 13                         | M10               | 4,000   | 4.2          | 381202S  | 7,995.17 |
| BT50   | GPV13 | ER20          | 136    | 41     | 80     | 13                         | M10               | 4,000   | 4.2          | 381204S  | 7,995.17 |
| HSK63  | GPV13 | ER20          | 137    | 42     | 65     | 13                         | M10               | 4,000   | 4.2          | 381206S  | 6,461.88 |
| HSK100 | GPV13 | ER20          | 140    | 45     | 80     | 13                         | M10               | 4,000   | 4.2          | 381208S  | 8,481.64 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data | GPV13            |
|----------------|------------------|
| Ratio          | 1:1              |
| RPM Max        | 4,000            |
| Max axial load | N 450            |
| Torque         | Nm 6             |
| Weight         | Kg. 4.2          |
| Collet         | mm ER20 1mm-13mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report



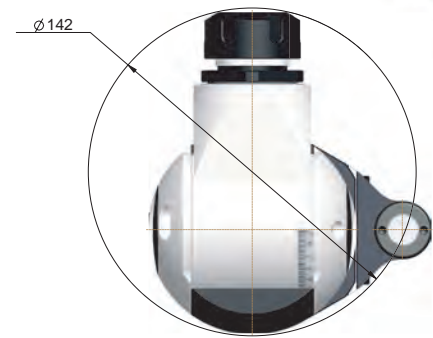
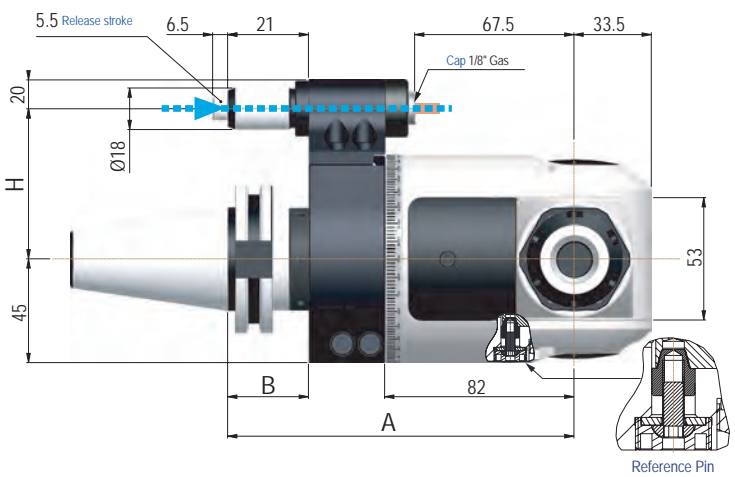
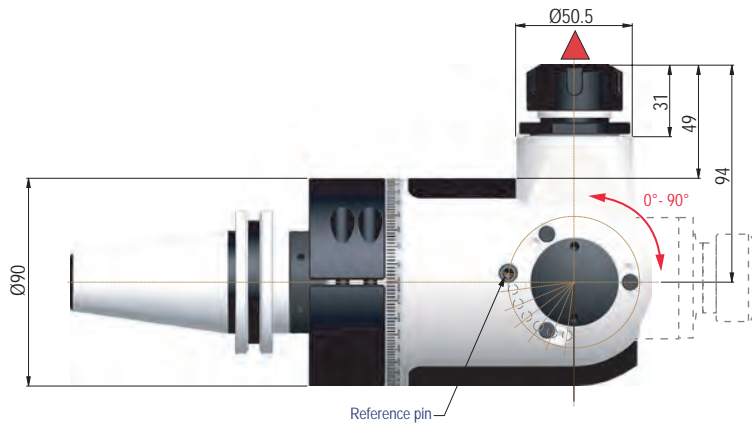




## ANGLE HEADS

# ATC Series

### GPV16



### GPV16 ER25 Pivoting Angle Heads

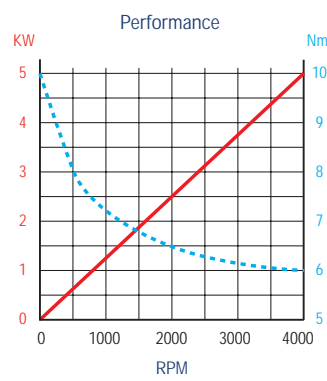
▼ Direction of rotation is opposite to the machine spindle



| Taper  | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT40  | GPV16 | ER25          | 150    | 35     | 65     | 16                         | M12               | 4,000   | 6.8          | 381270S  | 8,414.46 |
| CAT50  | GPV16 | ER25          | 150    | 35     | 80     | 16                         | M12               | 4,000   | 6.8          | 381272S  | 8,414.46 |
| BT40   | GPV16 | ER25          | 150    | 35     | 65     | 16                         | M12               | 4,000   | 6.8          | 381274S  | 8,414.46 |
| BT50   | GPV16 | ER25          | 156    | 41     | 80     | 16                         | M12               | 4,000   | 6.8          | 381276S  | 8,414.46 |
| HSK63  | GPV16 | ER25          | 157    | 42     | 65     | 16                         | M12               | 4,000   | 6.8          | 381278S  | 8,812.34 |
| HSK100 | GPV16 | ER25          | 160    | 45     | 80     | 16                         | M12               | 4,000   | 6.8          | 381280S  | 8,895.43 |

Other tapers available, please inquire.  
\* For Haas machines please contact Customer Service

| Technical Data |     | GPV16         |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 4,000         |
| Max axial load | N   | 480           |
| Torque         | Nm  | 18            |
| Weight         | Kg. | 6.8           |
| Collet         | mm  | ER25 2mm-16mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report

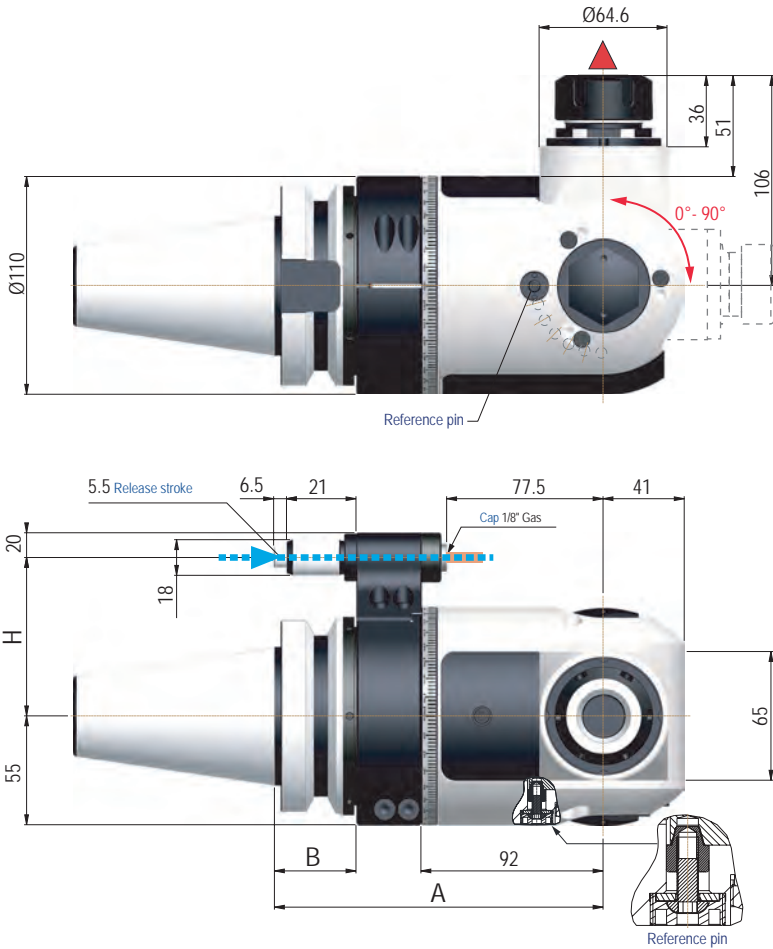




# ANGLE HEADS

# ATC Series

## GPV20



### GPV20 ER32 Pivoting Angle Heads

▼ Direction of rotation is opposite to the machine spindle

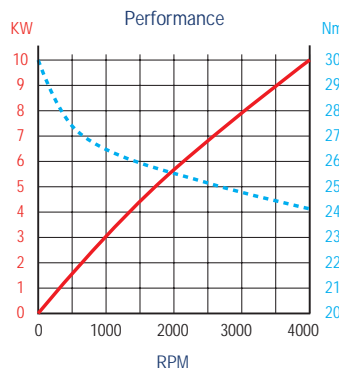


| Taper  | Model | Collet System | A (mm) | B (mm) | H (mm) | End Mill & Drill Cap. (mm) | Tap Size Capacity | Max RPM | Weight (Kg.) | Code No. | Price \$ |
|--------|-------|---------------|--------|--------|--------|----------------------------|-------------------|---------|--------------|----------|----------|
| CAT50  | GPV20 | ER32          | 160    | 35     | 80     | 20                         | M16               | 4,000   | 13           | 381150S  | 8,670.21 |
| BT50   | GPV20 | ER32          | 166    | 41     | 80     | 20                         | M16               | 4,000   | 13           | 381154S  | 8,670.21 |
| HSK100 | GPV20 | ER32          | 170    | 45     | 80     | 20                         | M16               | 4,000   | 13           | 381158S  | 9,133.29 |

Other tapers available, please inquire.

\* For Haas machines please contact Customer Service

| Technical Data |     | GPV20         |
|----------------|-----|---------------|
| Ratio          |     | 1:1           |
| RPM Max        |     | 4,000         |
| Max axial load | N   | 715           |
| Torque         | Nm  | 32            |
| Weight         | Kg. | 13            |
| Collet         | mm  | ER32 3mm-20mm |



#### Standard Features & Equipment Included:

- Internal coolant from positioning pin
- Internal air pressure
- Retaining block
- Wrenches
- Grease tube
- Instruction book and Inspection report





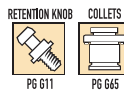
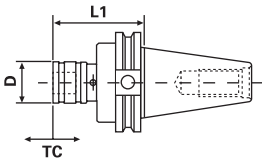
## Tapping Chucks & Collets

|  |        |
|--|--------|
| CAT Taper Tension/Compression & Rigid Tap Holders . . . . .    | G63    |
| BT Taper Tension/Compression & Rigid Tap Holders . . . . .     | G63    |
| HSK Tension/Compression & Rigid Tap Holders . . . . .          | G64    |
| NMTB Taper Tension/Compression Tap Holders . . . . .           | G64    |
| Weldon Shank Tension/Compression & Rigid Tap Holders . . . . . | G64    |
| Straight Shank Tension/Compression Tap Holders . . . . .       | G64    |
| Straight Shank T/C & Rigid Tapping Chuck . . . . .             | G64    |
| Morse Taper Tension/Compression Tap Holders . . . . .          | G65    |
| Torque Control Tap Collets & Sets . . . . .                    | G65    |
| Positive Drive Tap Collets, Reducers & Sets . . . . .          | G65    |
| Synchrolize Tapping System . . . . .                           | G66-67 |
| Air Tapping Units . . . . .                                    | G68    |
| Tapping Head . . . . .   | G68    |

## CAT Taper Tension/Compression Tap Holders



- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds
- Smooth stroke - even under full torque load, the tension-compression stroke is full and free
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole

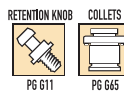
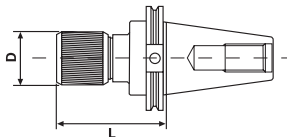


| Taper | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | T/C (in.) | Code No. | Price \$ |
|-------|----------------|----------------|--------|---------|---------|-----------|----------|----------|
| CT40  | #0-9/16        | 1/8            | #1     | 2.93    | 1.43    | 0.29/0.29 | 531543   | 506.84   |
| CT40  | #0-9/16        | 1/8            | #1     | 4.00    | 1.43    | 0.29/0.29 | 531540   | 506.84   |
| CT40  | #0-9/16        | 1/8            | #1     | 4.47    | 1.25    | 0.79/0.39 | 531542   | 506.84   |
| CT40  | 5/16-7/8       | 1/4-1/2        | #2     | 4.50    | 2.09    | 0.49/0.49 | 531544   | 572.88   |
| CT40  | 5/16-7/8       | 1/4-1/2        | #2     | 6.66    | 2.00    | 0.85/0.49 | 531546   | 550.09   |
| CT40  | 13/16-1-3/8    | 3/4-1          | #3     | 5.75    | 3.07    | 0.79/0.79 | 531549   | 1,066.24 |
| CT40  | 13/16-1-3/8    | 3/4-1          | #3     | 8.00    | 3.07    | 0.79/0.79 | 531548   | 1,025.38 |
| CT40  | 13/16-1-3/8    | 3/4-1          | #3     | 9.19    | 2.87    | 0.98/0.59 | 531550   | 1,079.45 |
| CT50  | #0-9/16        | 1/8            | #1     | 4.00    | 1.43    | 0.29/0.29 | 531552   | 675.33   |
| CT50  | #0-9/16        | 1/8            | #1     | 5.02    | 1.25    | 0.79/0.39 | 531554   | 675.33   |
| CT50  | 5/16-7/8       | 1/4-1/2        | #2     | 4.50    | 2.09    | 0.49/0.49 | 531556   | 745.42   |
| CT50  | 5/16-7/8       | 1/4-1/2        | #2     | 5.66    | 2.00    | 0.85/0.49 | 531558   | 745.42   |
| CT50  | 13/16-1-3/8    | 3/4-1          | #3     | 6.25    | 3.07    | 0.79/0.79 | 531560   | 1,128.24 |
| CT50  | 13/16-1-3/8    | 3/4-1          | #3     | 7.72    | 2.87    | 0.98/0.59 | 531562   | 974.74   |

## CAT Taper Rigid Tap Holders



- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole

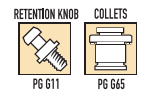
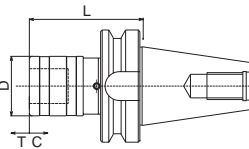


| Taper | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | Code No. | Price \$ |
|-------|----------------|----------------|--------|---------|---------|----------|----------|
| CT40  | #0-9/16        | 1/8            | #1     | 2.95    | 1.25    | 531564   | 350.47   |
| CT40  | 5/16-7/8       | 1/4-1/2        | #2     | 3.74    | 2.00    | 531566   | 393.61   |
| CT40  | 13/16-1-3/8    | 3/4-1          | #3     | 4.72    | 2.87    | 531568   | 436.74   |
| CT50  | #0-9/16        | 1/8            | #1     | 3.02    | 1.25    | 531570   | 479.87   |
| CT50  | 5/16-7/8       | 1/4-1/2        | #2     | 3.91    | 2.00    | 531572   | 514.92   |
| CT50  | 13/16-1-3/8    | 3/4-1          | #3     | 5.11    | 2.87    | 531574   | 610.63   |

## BT Taper Tension/Compression Tap Holders



- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds
- Smooth stroke - even under full torque load, the tension-compression stroke is full and free
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole

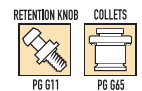
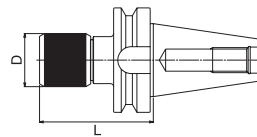


| Taper | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | T/C (in.) | Code No. | Price \$ |
|-------|----------------|----------------|--------|---------|---------|-----------|----------|----------|
| BT30  | #0-9/16        | 1/8            | #1     | 2.40    | 1.43    | 0.29/0.29 | 532261   | 552.67   |
| BT30  | #0-9/16        | 1/8            | #1     | 4.25    | 1.43    | 0.29/0.29 | 532260   | 552.67   |
| BT30  | #0-9/16        | 1/8            | #1     | 4.92    | 1.25    | 0.79/0.39 | 532262   | 552.67   |
| BT40  | #0-9/16        | 1/8            | #1     | 2.62    | 1.43    | 0.29/0.29 | 532267   | 496.05   |
| BT40  | #0-9/16        | 1/8            | #1     | 3.80    | 1.43    | 0.29/0.29 | 532264   | 496.05   |
| BT40  | #0-9/16        | 1/8            | #1     | 4.33    | 1.25    | 0.79/0.39 | 532266   | 496.05   |
| BT40  | 5/16-7/8       | 1/4-1/2        | #2     | 4.50    | 2.09    | 0.49/0.49 | 532268   | 572.88   |
| BT40  | 5/16-7/8       | 1/4-1/2        | #2     | 6.34    | 2.00    | 0.85/0.49 | 532270   | 605.10   |
| BT40  | 13/16-1-3/8    | 3/4-1          | #3     | 7.50    | 3.07    | 0.79/0.79 | 532272   | 1,116.11 |
| BT40  | 13/16-1-3/8    | 3/4-1          | #3     | 9.00    | 2.87    | 0.98/0.59 | 532274   | 1,187.44 |
| BT50  | 5/16-7/8       | 1/4-1/2        | #2     | 6.34    | 2.00    | 0.85/0.49 | 532277   | 843.83   |

## BT Taper Rigid Tap Holders



- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole

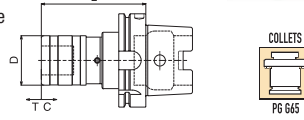


| Taper | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | Code No. | Price \$ |
|-------|----------------|----------------|--------|---------|---------|----------|----------|
| BT30  | #0-9/16        | 1/8            | #1     | 2.44    | 1.25    | 532276   | 436.74   |
| BT40  | #0-9/16        | 1/8            | #1     | 2.95    | 1.25    | 532278   | 393.61   |
| BT40  | 5/16-7/8       | 1/4-1/2        | #2     | 3.74    | 2.00    | 532280   | 384.17   |
| BT40  | 13/16-1-3/8    | 3/4-1          | #3     | 4.72    | 2.87    | 532282   | 642.98   |
| BT50  | #0-9/16        | 1/8            | #1     | 3.03    | 1.25    | 532281   | 465.05   |
| BT50  | 5/16-7/8       | 1/4-1/2        | #2     | 3.74    | 2.00    | 532283   | 610.63   |
| BT50  | 13/16-1-3/8    | 3/4-1          | #3     | 4.92    | 2.87    | 532284   | 723.86   |

## HSK Tension/Compression Tap Holders



- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds
- Smooth stroke - even under full torque load, the tension-compression stroke is full and free
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole

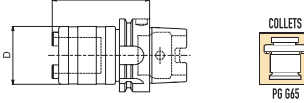


| Taper  | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | T/C (in.) | Code No. | Price \$ |
|--------|----------------|----------------|--------|---------|---------|-----------|----------|----------|
| HSK63  | #0-9/16        | 1/8            | #1     | 5.30    | 1.43    | 0.29/0.29 | 536196   | 888.31   |
| HSK63  | 5/16-7/8       | 1/4-1/2        | #2     | 6.10    | 2.09    | 0.49/0.49 | 536198   | 1,023.10 |
| HSK100 | #0-9/16        | 1/8            | #1     | 5.30    | 1.43    | 0.29/0.29 | 536202   | 1,625.64 |
| HSK100 | 5/16-7/8       | 1/4-1/2        | #2     | 6.30    | 2.09    | 0.49/0.49 | 536204   | 1,750.79 |

## HSK Rigid Tap Holders

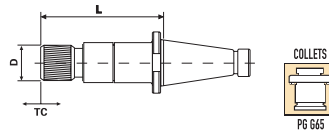


- Quick-change - push back on the holder sleeve and the adapter with tool is removable
- Press on the end of the adapter nose and the tool is removable - all in a few seconds.
- Interchangeability - our adapters and holders are interchangeable with Universal-Bilz quick change holders and adapters
- AT2 Taper Accuracy
- RFID Chip Hole



| Taper  | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | Code No. | Price \$ |
|--------|----------------|----------------|--------|---------|---------|----------|----------|
| HSK63  | #0-9/16        | 1/8            | #1     | 3.34    | 1.26    | 536184   | 735.99   |
| HSK63  | 5/16-7/8       | 1/4-1/2        | #2     | 4.00    | 1.97    | 536186   | 784.52   |
| HSK100 | #0-9/16        | 1/8            | #1     | 3.54    | 1.43    | 536190   | 1,199.69 |
| HSK100 | 5/16-7/8       | 1/4-1/2        | #2     | 3.74    | 2.09    | 536192   | 1,432.89 |

## NMTB Taper Tension/Compression Tap Holders

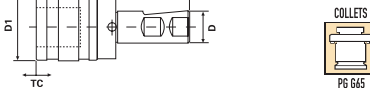
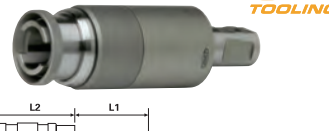


| Taper  | Tap Range Hand | Tap Range Pipe | System | L (in.) | D (in.) | T/C (in.) | Code No. | Price \$ |
|--------|----------------|----------------|--------|---------|---------|-----------|----------|----------|
| NMTB40 | #0-9/16        | 1/8            | #1     | 3.90    | 1.25    | 0.79/0.39 | 534500   | 439.92   |

## Weldon Shank Tension/Compression Tap Holders



- Precision ground surfaces
- Compact length
- Provide additional mating flexibility
- Provides axial float
- Adjustable entry force

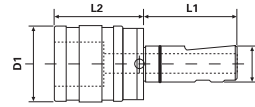


| Tap Range Hand | Tap Range Pipe | System | Shank Dia. D | D1   | L1   | L2   | T/C       | Code No. | Price \$ |
|----------------|----------------|--------|--------------|------|------|------|-----------|----------|----------|
| #0-9/16        | 1/8            | #1     | 1            | 1.25 | 2.28 | 4.13 | 0.79/0.39 | 534520   | 430.00   |
| #0-9/16        | 1/8            | #1     | 1            | 1.43 | 2.28 | 1.53 | 0.79/0.39 | 534522   | 430.00   |
| #0-9/16        | 1/8            | #1     | 1-1/2        | 1.25 | 2.69 | 4.13 | 0.79/0.39 | 534532   | 471.41   |
| 5/16-7/8       | 1/4-1/2        | #2     | 1-1/4        | 2.00 | 2.28 | 5.55 | 0.85/0.49 | 534530   | 545.42   |
| 5/16-7/8       | 1/4-1/2        | #2     | 1-1/2        | 2.00 | 2.69 | 5.55 | 0.85/0.49 | 534534   | 556.71   |

## Weldon Shank Rigid Tap Holders



- Precision ground surfaces
- Compact length
- Provides axial float
- Adjustable entry force
- Provide additional mating flexibility

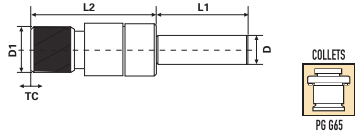


| Tap Range Hand | Tap Range Pipe | System | Shank Dia. D | D1   | L1   | L2   | Code No. | Price \$ |
|----------------|----------------|--------|--------------|------|------|------|----------|----------|
| #0-9/16        | 1/8            | #1     | 1            | 1.26 | 2.28 | 1.46 | 534540   | 249.38   |
| 5/16-7/8       | 1/4-1/2        | #2     | 1            | 1.97 | 2.28 | 2.12 | 534542   | 349.12   |
| 13/16-1-3/8    | 3/4-1          | #3     | 1-1/2        | 2.83 | 2.69 | 3.27 | 534544   | 443.48   |

## Straight Shank Tension/Compression Tap Holders



- Straight shank tooling may be used to extend tooling reach for extended length operations
- This option is less costly than extended length integral shank tooling
- They may be used with any size machining centre or lathe
- When loaded into larger holders, their reduced O.D. permits tapping applications within large holes or whenever tight clearances are encountered

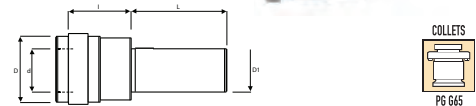


| Tap Range Hand | Tap Range Pipe | System | Shank Dia. D | D1   | L1   | L2   | Tension & Compression T C | Code No. | Price \$ |
|----------------|----------------|--------|--------------|------|------|------|---------------------------|----------|----------|
| #0-9/16        | 1/8            | #1     | 1            | 1.25 | 3.50 | 4.13 | 0.79 0.39                 | 534510   | 430.00   |
| 5/16-7/8       | 1/4-1/2        | #2     | 1            | 2.00 | 3.50 | 5.55 | 0.85 0.49                 | 534512   | 512.22   |
| #0-9/16        | 1/8            | #1     | 1-1/4        | 1.25 | 4.00 | 4.13 | 0.79 0.39                 | 534514   | 420.12   |

## Straight Shank Tension/Compression Tapping Chuck



- Precision ground surfaces
- Compact length
- Provides axial float
- Adjustable entry force
- Plastic collar to protect chuck from coolant
- Roller cage construction

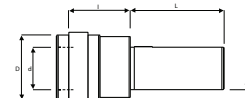


| Desc         | System | Shank D1 | d     | D    | I    | L    | Tap Capacity  | Tension & Compression T C | Code No. | Price \$ |
|--------------|--------|----------|-------|------|------|------|---------------|---------------------------|----------|----------|
| 1" shank     | #1     | 1.00     | 0.748 | 1.50 | 1.76 | 1.95 | #0 - 9/16     | 0.35 0.35                 | 339100   | 430.00   |
| 1" shank     | #2     | 1.00     | 1.220 | 2.17 | 2.52 | 2.00 | 5/16 - 7/8    | 0.59 0.59                 | 339105   | 512.22   |
| 1-1/2" shank | #2     | 1.50     | 1.220 | 2.17 | 2.52 | 3.50 | 5/16 - 7/8    | 0.59 0.59                 | 339110   | 556.71   |
| 1-1/2" shank | #3     | 1.50     | 1.890 | 3.09 | 3.85 | 3.50 | 13/16 - 1-3/8 | 0.94 0.94                 | 339115   | 798.00   |

## Straight Shank Rigid Tapping Chuck

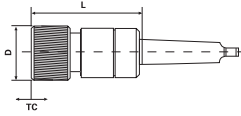


- Precision ground surfaces
- Compact length
- No float for synchronous tapping
- Coolant through spindle capability



| Desc         | System | Shank D1 | d     | D    | I    | L    | Tap Capacity  | Code No. | Price \$ |
|--------------|--------|----------|-------|------|------|------|---------------|----------|----------|
| 1" shank     | #1     | 1.00     | 0.748 | 1.30 | 1.60 | 1.95 | #0 - 9/16     | 339120   | 249.38   |
| 1" shank     | #2     | 1.00     | 1.220 | 2.00 | 2.50 | 2.00 | 5/16 - 7/8    | 339125   | 349.12   |
| 1-1/2" shank | #3     | 1.50     | 1.890 | 2.84 | 3.44 | 3.50 | 13/16 - 1-3/8 | 339130   | 443.48   |

## Morse Taper Tension/ Compression Tap Holders



| Morse Taper | Tap Range Hand | Tap Range Pipe | System | D (in.) | L (in.) | T/C (in.) | Code No. | Price \$ |
|-------------|----------------|----------------|--------|---------|---------|-----------|----------|----------|
| 3           | #0-9/16        | 1/8            | #1     | 1.25    | 4.750   | 0.79/0.39 | 534550   | 358.42   |
| 3           | 5/16-7/8       | 1/4-1/2        | #2     | 2.00    | 5.870   | 0.85/0.49 | 534552   | 366.20   |
| 4           | #0-9/16        | 1/8            | #1     | 1.25    | 4.72    | 0.79/0.39 | 534554   | 343.15   |
| 4           | 5/16-7/8       | 1/4-1/2        | #2     | 2.00    | 5.94    | 0.85/0.49 | 534556   | 350.15   |

## Torque Control Tap Collets & Sets



### Tap System #1

- Tap Collets are fully compatible with Bilz System #1. Size Range: #0 - 9/16" hand tap and 1/8" pipe tap

### Tap System #2

- Tap Collets are fully compatible with Bilz System #2. Size Range: 5/16" - 7/8" hand tap and 1/4" - 1/2" pipe tap

### Tap System #3

- Tap Collets are fully compatible with Bilz System #3. Size Range: 1/2" - 1-3/8" hand tap and 3/4" - 1" pipe tap



| Tap Size            | Tap System | D                           | Tap Shank | Square | Code No. | Price \$ |
|---------------------|------------|-----------------------------|-----------|--------|----------|----------|
| #0-#6               | 1          | 0.748                       | 0.141     | 0.110  | 337260   | 137.13   |
| #8                  | 1          | 0.748                       | 0.168     | 0.131  | 337261   | 137.13   |
| #10                 | 1          | 0.748                       | 0.194     | 0.152  | 337262   | 137.13   |
| #12                 | 1          | 0.748                       | 0.220     | 0.165  | 337263   | 137.13   |
| 1/4                 | 1          | 0.748                       | 0.255     | 0.191  | 337264   | 137.13   |
| 5/16                | 1          | 0.748                       | 0.318     | 0.238  | 337265   | 137.13   |
| 3/8                 | 1          | 0.748                       | 0.381     | 0.286  | 337266   | 137.13   |
| 7/16                | 1          | 0.748                       | 0.323     | 0.110  | 337267   | 137.13   |
| 1/2                 | 1          | 0.748                       | 0.367     | 0.110  | 337268   | 137.13   |
| 9/16                | 1          | 0.748                       | 0.429     | 0.332  | 337269   | 137.13   |
| NPT 1/8P            | 1          | 0.748                       | 0.313     | 0.234  | 337270   | 137.13   |
| 5/16                | 2          | 1.220                       | 0.318     | 0.238  | 337275   | 176.13   |
| 3/8                 | 2          | 1.220                       | 0.381     | 0.286  | 337276   | 176.13   |
| 7/16                | 2          | 1.220                       | 0.323     | 0.242  | 337277   | 176.13   |
| 1/2                 | 2          | 1.220                       | 0.367     | 0.275  | 337278   | 176.13   |
| 9/16                | 2          | 1.220                       | 0.429     | 0.322  | 337279   | 176.13   |
| 5/8                 | 2          | 1.220                       | 0.480     | 0.360  | 337280   | 176.13   |
| 11/16               | 2          | 1.220                       | 0.542     | 0.406  | 337281   | 176.13   |
| 3/4                 | 2          | 1.220                       | 0.590     | 0.442  | 337282   | 176.13   |
| 13/16               | 2          | 1.220                       | 0.652     | 0.489  | 337283   | 176.13   |
| 7/8                 | 2          | 1.220                       | 0.697     | 0.523  | 337284   | 176.13   |
| NPT 1/4P            | 2          | 1.220                       | 0.562     | 0.421  | 337285   | 176.13   |
| 3/8P                | 2          | 1.220                       | 0.700     | 0.531  | 337286   | 176.13   |
| 1/2P                | 2          | 1.220                       | 0.687     | 0.515  | 337287   | 176.13   |
| 1/2                 | 3          | 1.891                       | 0.367     | 0.275  | 337230   | 403.85   |
| 9/16                | 3          | 1.891                       | 0.429     | 0.322  | 337231   | 403.85   |
| 5/8                 | 3          | 1.891                       | 0.480     | 0.360  | 337233   | 403.85   |
| 11/16               | 3          | 1.891                       | 0.542     | 0.406  | 337234   | 403.85   |
| 3/4                 | 3          | 1.891                       | 0.590     | 0.442  | 337235   | 403.85   |
| 13/16               | 3          | 1.891                       | 0.652     | 0.489  | 337237   | 403.85   |
| 7/8                 | 3          | 1.891                       | 0.697     | 0.523  | 337238   | 403.85   |
| 15/16               | 3          | 1.891                       | 0.760     | 0.570  | 337239   | 403.85   |
| 1                   | 3          | 1.891                       | 0.800     | 0.600  | 337241   | 403.85   |
| 1-1/16 - 1-1/8      | 3          | 1.891                       | 1.021     | 0.766  | 337242   | 403.85   |
| 1-3/16 - 1-1/4      | 3          | 1.891                       | 0.381     | 0.286  | 337243   | 403.85   |
| 1-5/16 - 1-3/8      | 3          | 1.891                       | 1.108     | 0.831  | 337245   | 403.85   |
| NPT 3/4P            | 3          | 1.891                       | 0.906     | 0.679  | 337246   | 403.85   |
| 1P                  | 3          | 1.891                       | 1.125     | 0.843  | 337247   | 403.85   |
| Sets Type #1 - 11pc |            | #0-9/16, 1/8 NPT            |           |        | 337271   | 1,508.43 |
| Type #2 - 13pc      |            | 5/16-7/8, 1/4, 3/8, 1/2 NPT |           |        | 337288   | 2,289.69 |

## Positive Drive Tap Collets, Reducers & Sets



### Tap System #1

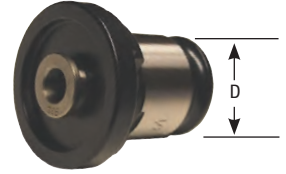
- Tap Collets are fully compatible with Bilz System #1. Size Range: #0 - 9/16" hand tap and 1/8" pipe tap

### Tap System #2

- Tap Collets are fully compatible with Bilz System #2. Size Range: 5/16" - 7/8" hand tap and 1/4" - 1/2" pipe tap

### Tap System #3

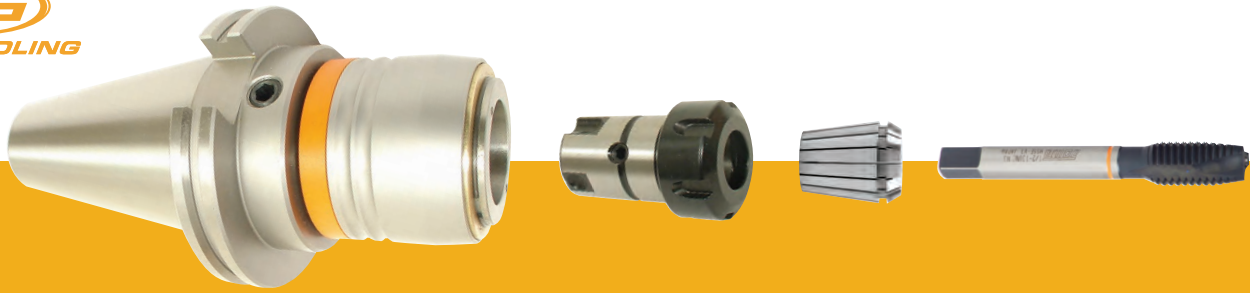
- Tap Collets are fully compatible with Bilz System #3. Size Range: 3/8" - 1-3/8" hand tap and 1/2" - 1" pipe tap



| Tap Size              | Tap System | D                           | Tap Shank | Square | Code No. | Price \$ |
|-----------------------|------------|-----------------------------|-----------|--------|----------|----------|
| #0-#6                 | 1          | 0.748                       | 0.141     | 0.110  | 337052   | 55.36    |
| #8                    | 1          | 0.748                       | 0.168     | 0.131  | 337054   | 55.36    |
| #10                   | 1          | 0.748                       | 0.194     | 0.152  | 337056   | 55.36    |
| #12                   | 1          | 0.748                       | 0.220     | 0.165  | 337058   | 55.36    |
| 1/4                   | 1          | 0.748                       | 0.255     | 0.191  | 337060   | 55.36    |
| 5/16                  | 1          | 0.748                       | 0.318     | 0.238  | 337062   | 55.36    |
| 3/8                   | 1          | 0.748                       | 0.381     | 0.286  | 337064   | 55.36    |
| 7/16                  | 1          | 0.748                       | 0.323     | 0.242  | 337066   | 55.36    |
| 1/2                   | 1          | 0.748                       | 0.367     | 0.275  | 337068   | 55.36    |
| 9/16                  | 1          | 0.748                       | 0.429     | 0.322  | 337070   | 55.36    |
| NPT 1/8P              | 1          | 0.748                       | 0.313     | 0.234  | 337072   | 55.36    |
| 5/16                  | 2          | 1.220                       | 0.318     | 0.238  | 337074   | 70.46    |
| 3/8                   | 2          | 1.220                       | 0.381     | 0.286  | 337076   | 70.46    |
| 7/16                  | 2          | 1.220                       | 0.323     | 0.242  | 337078   | 70.46    |
| 1/2                   | 2          | 1.220                       | 0.367     | 0.275  | 337080   | 70.46    |
| 9/16                  | 2          | 1.220                       | 0.429     | 0.322  | 337082   | 70.46    |
| 5/8                   | 2          | 1.220                       | 0.480     | 0.360  | 337084   | 70.46    |
| 11/16                 | 2          | 1.220                       | 0.542     | 0.406  | 337086   | 70.46    |
| 3/4                   | 2          | 1.220                       | 0.590     | 0.442  | 337088   | 70.46    |
| 13/16                 | 2          | 1.220                       | 0.652     | 0.489  | 337090   | 70.46    |
| 7/8                   | 2          | 1.220                       | 0.697     | 0.523  | 337092   | 70.46    |
| NPT 1/4P              | 2          | 1.220                       | 0.562     | 0.421  | 337094   | 70.46    |
| 3/8P                  | 2          | 1.220                       | 0.700     | 0.531  | 337096   | 70.46    |
| 1/2P                  | 2          | 1.220                       | 0.687     | 0.515  | 337098   | 70.46    |
| 3/8                   | 3          | 1.891                       | 0.381     | 0.286  | 337111   | 188.72   |
| 1/2                   | 3          | 1.891                       | 0.367     | 0.275  | 337089   | 188.72   |
| 9/16                  | 3          | 1.891                       | 0.429     | 0.322  | 337091   | 188.72   |
| 5/8                   | 3          | 1.891                       | 0.480     | 0.360  | 337093   | 188.72   |
| 11/16                 | 3          | 1.891                       | 0.542     | 0.406  | 337095   | 188.72   |
| 3/4                   | 3          | 1.891                       | 0.590     | 0.442  | 337097   | 188.72   |
| 13/16                 | 3          | 1.891                       | 0.652     | 0.489  | 337100   | 188.72   |
| 7/8                   | 3          | 1.891                       | 0.697     | 0.523  | 337102   | 188.72   |
| 15/16                 | 3          | 1.891                       | 0.760     | 0.570  | 337104   | 188.72   |
| 1                     | 3          | 1.891                       | 0.800     | 0.600  | 337106   | 188.72   |
| 1-1/8                 | 3          | 1.891                       | 0.896     | 0.672  | 337108   | 188.72   |
| 1-1/4                 | 3          | 1.891                       | 1.021     | 0.766  | 337110   | 188.72   |
| 3/8                   | 3          | 1.891                       | 0.381     | 0.286  | 337111   | 188.72   |
| 1-3/8                 | 3          | 1.891                       | 1.108     | 0.831  | 337112   | 188.72   |
| NPT 1/2P              | 3          | 1.891                       | 0.687     | 0.515  | 337113   | 188.72   |
| 3/4P                  | 3          | 1.891                       | 0.906     | 0.679  | 337114   | 188.72   |
| 1P                    | 3          | 1.891                       | 1.125     | 0.843  | 337116   | 188.72   |
| Reducers Type #2 - #1 |            |                             |           |        | 337118   | 154.10   |
| Type #3 - #2          |            |                             |           |        | 337119   | 308.13   |
| Sets Type #1 - 11pc   |            | #0-9/16, 1/8 NPT            |           |        | 337073   | 608.96   |
| Type #2 - 13pc        |            | 5/16-7/8, 1/4, 3/8, 1/2 NPT |           |        | 337099   | 915.98   |
| Type #3 - 9pc         |            | 13/16-1-3/8, 3/4, 1" NPT    |           |        | 337117   | 1,698.48 |
| Type #3 - 16pc        |            | 3/8-1-3/8, 3/8, 3/4, 1" NPT |           |        | 337121   | 3,019.52 |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.



## SYNCHROLIZE TAPPING SYSTEM FOR RIGID TAPPING

The Synchronize system has 0.008" of compensation in compression and 0.039" of compensation in tension.

- The Synchronize tapping chuck is the better solution, it gives you the possibility to work with axial compensation
- Tap capacity: M3-M12, M6-M20, M14-M33
- Triple life of tap in comparison to a traditional tapping system
- Quick change of the tap and of the adapter
- Suitable for rigid tapping with micro compensation
- Uses ER Tap Collets full and free
- Up to 9" of gauge length can be obtained when using the extension system
- No need for tap collets due to the opposing set screws in the tap adapters

### CAT Taper Synchronize Tap Chucks



- Slim nose design
- Up to 200% increase in tap life



| Taper | Tap Range Hand | System | Nose Dia. (in.) | Gauge Length (in.) | Code No. | Price \$ |
|-------|----------------|--------|-----------------|--------------------|----------|----------|
| CAT40 | #0 - 1/2       | 1      | 1.693           | 2.087              | 531610   | 717.91   |
| CAT40 | 3/8" - 3/4     | 2      | 2.323           | 2.874              | 531614   | 892.45   |
| CAT50 | #0 - 1/2       | 1      | 1.690           | 2.402              | 531612   | 767.79   |
| CAT50 | 3/8" - 3/4     | 2      | 2.323           | 2.874              | 531616   | 1,111.72 |

### BT Taper Synchronize Tap Chucks



- Slim nose design
- Up to 200% increase in tap life



| Taper | Tap Range Hand | System | Nose Dia. (in.) | Gauge Length (in.) | Code No. | Price \$ |
|-------|----------------|--------|-----------------|--------------------|----------|----------|
| BT40  | #0 - 1/2       | 1      | 1.690           | 2.402              | 532310   | 568.32   |

### HSK Synchronize Tap Chucks



- Slim nose design
- Up to 200% increase in tap life



| Taper   | Tap Range Hand | System | Nose Dia. (in.) | Gauge Length (in.) | Code No. | Price \$ |
|---------|----------------|--------|-----------------|--------------------|----------|----------|
| HSK50A  | #0 - 1/2       | 1      | 1.693           | 2.756              | 536210   | 717.91   |
| HSK50A  | 3/8" - 3/4     | 2      | 2.362           | 3.819              | 536218   | 892.45   |
| HSK63A  | #0 - 1/2       | 1      | 1.693           | 2.520              | 536212   | 717.91   |
| HSK63A  | 3/8" - 3/4     | 2      | 2.362           | 3.819              | 536214   | 892.45   |
| HSK100A | 3/8" - 3/4     | 2      | 2.362           | 3.583              | 536216   | 1,341.09 |

### Synchronize Quick Change Tap Adapters — Extended



- Opposing set screws to secure tap, NO NEED for Tap Collets
- Designed for perfect hole alignment



| System | Tap Range  | Collet Style | L    | Nose Dia. | Code No. | Price \$ |
|--------|------------|--------------|------|-----------|----------|----------|
| 1      | #0 - 1/2   | ER16         | 55mm | 28mm      | 338126   | 861.76   |
| 2      | 3/8" - 3/4 | ER25         | 86mm | 42mm      | 338128   | 921.60   |

- See page G24 for ER16 collets
- See page G26 for ER25 collets

### Synchronize Quick Change Tap Adapters



- Opposing set screws to secure tap, NO NEED for Tap Collets
- Designed for perfect hole alignment



| System | Tap Range  | Collet Style | Length | Nose Dia. | Code No. | Price \$ |
|--------|------------|--------------|--------|-----------|----------|----------|
| 1      | #0 - 1/2   | ER16         | 24mm   | 28mm      | 338120   | 323.82   |
| 2      | 3/8" - 3/4 | ER25         | 28mm   | 42mm      | 338122   | 378.67   |

- See page G24 for ER16 collets
- See page G26 for ER25 collets



## SYNCHROLIZE EXTENSION SYSTEM

Up to 9" of Gauge Length

### Synchronize Tap Adapter Bodies



| System | Length Added | Code No. | Price \$ |
|--------|--------------|----------|----------|
| 1      | 5mm          | 338132   | 423.55   |
| 2      | 7mm          | 338134   | 486.08   |

### Synchronize Terminals



| System | Tap Range  | Collet Style | Length | Code No. | Price \$ |
|--------|------------|--------------|--------|----------|----------|
| 1      | #0 - 1/2   | ER16         | 50mm   | 338138   | 438.37   |
| 2      | 3/8" - 3/4 | ER25         | 79mm   | 338140   | 448.33   |

### Synchronize Extensions



| System | Length | Code No. | Price \$ |
|--------|--------|----------|----------|
| 1      | 25mm   | 338144   | 114.68   |
| 1      | 50mm   | 338146   | 134.64   |
| 2      | 50mm   | 338148   | 174.38   |
| 2      | 100mm  | 338150   | 199.31   |

### Synchronize Assembly Supports



| System | Code No. | Price \$ |
|--------|----------|----------|
| 1      | 338156   | 209.29   |
| 2      | 338158   | 229.23   |



## Sowa High Performance Taps

For tough materials,  
stainless steels and  
aluminum.

See Chapter C





## BIG Accu-Tapper Reversing Type



Designed with Reversing Mechanism for Use on Non-reversing Spindles

- Equipped with safety clutch to prevent tap breakage in case of overload; provides smooth transition and rapid change from forward to reverse
- Axial float assures smooth tapping and guards against breakage and cross tapping
- Guaranteed depth control to  $\pm 0.1\text{mm}$  ( $\pm 0.004''$ )
- JACOBS RUBBER FLEX COLLETS are standard accessory.

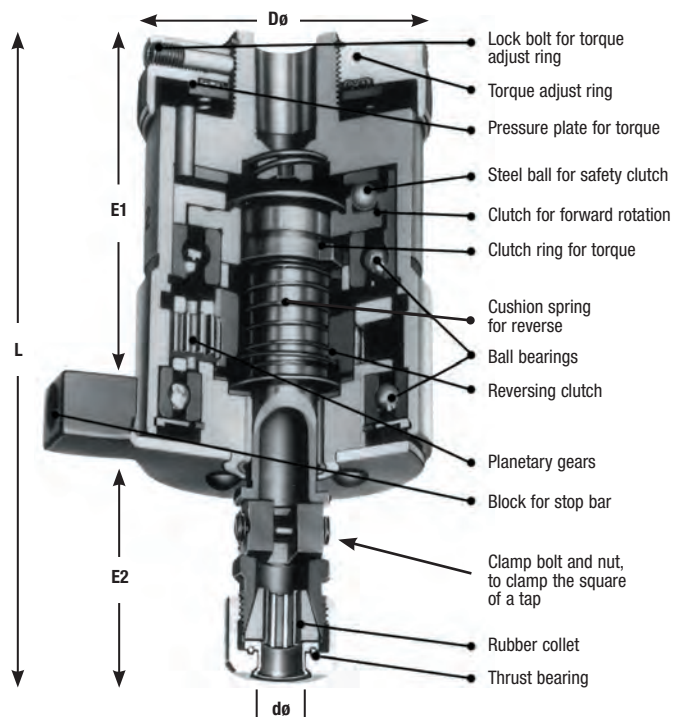


| Mount JT No. | Tapping Cap. Steel                   | Standard Collet Code No.               | Rec. Max. Speed | Gear Ratio | Clockwise Comp. (A) | Expansion (B) | Code No. | Price \$ |
|--------------|--------------------------------------|--|-----------------|------------|---------------------|---------------|----------|----------|
| M207         | #0-1/4"<br>M2-M7                     | 355940                                 | 1,500rpm        | 1:1.6      | 0.197"              | 0.14"         | 355921   | 1,362.84 |
| J-6          |                                      | (#0-10)<br>355942<br>(#10-1/4")        |                 |            |                     |               |          |          |
| M412         | #8-1/2"<br>M4-M12<br>1/8 NPT         | 355944                                 | 1,000rpm        | 1:1.75     | 0.197"              | 0.16"         | 355924   | 1,574.81 |
| J-6          |                                      | (#8-1/4")<br>355946<br>(1/4"-1/2")     |                 |            |                     |               |          |          |
| M820         | 5/16"-3/4"<br>M8-M20<br>1/8, 1/4 NPT | 355948                                 | 600rpm          | 1:1.7      | 0.236"              | 0.24"         | 355926   | 2,318.28 |
| M20          |                                      | (5/16"-5/8")<br>355950<br>(9/16"-3/4") |                 |            |                     |               |          |          |

### Clamp, Bolt & Nut

| Model | Code No. | Price \$ |
|-------|----------|----------|
| #412  | 355925   | 139.71   |
| #820  | 355927   | 155.64   |

### INTERNAL CONSTRUCTION



### ACCU-TAPPER Specifications:

| Model No. | $D\phi$ | $d\phi$ | $E1$ | $E2$ | $L$  |
|-----------|---------|---------|------|------|------|
| M207      | 2.17    | 0.91    | 3.46 | 1.65 | 5.12 |
| M412      | 2.95    | 1.10    | 3.82 | 2.32 | 6.14 |
| M820      | 3.58    | 1.57    | 4.72 | 3.31 | 8.03 |

## Mini Arm Type Air Tapping Unit — VAT-712



- Air tapping spindle
- Parallel arm
- Table mounting column
- Air combination
- 6 ANSI Tap Collets #10-1/2"
- Radial jib
- Air pressure: 6~8 kgs/cm<sup>3</sup>
- Air Cylinders included
- Requires: 5HP compressor
- Without stand plate



\* Base not included

| Tap Range | Speed RPM | Work Range | Weight (kg) | Code No. | Price \$ |
|-----------|-----------|------------|-------------|----------|----------|
| #10-1/2   | 400       | Rmax 700mm | 12          | 326700   | 7,066.66 |

## Small Arm Type Air Tapping Unit — VAT-1412



- Air tapping spindle
- Parallel arm
- Table mounting column
- Air combination
- 6 ANSI Tap Collets #10-1/2"
- Radial jib, increases arm reach by 500mm
- Air pressure: 6~8 kg/cm<sup>3</sup>
- Air Cylinders included
- Requires: 5HP compressor
- Without stand plate



\* Base not included

| Tap Range | Speed RPM | Work Range                | Weight (kg) | Code No. | Price \$ |
|-----------|-----------|---------------------------|-------------|----------|----------|
| #10 - 1/2 | 400       | Rmax 1400mm<br>Rmin 200mm | 18          | 326705   | 7,581.26 |



# Drill Chucks & Tap Adapters

|   |        |
|---|--------|
| CAT Taper Integral Keyless Drill Chucks . . . . .                 | G70    |
| BT Taper Integral Keyless Drill Chucks . . . . .                  | G70    |
| NMTB Taper Integral Keyless Drill Chucks . . . . .                | G70    |
| M.T., R8 & Straight Shank Integral Keyless Drill Chucks . . . . . | G70-71 |
| Replacement Drill Chucks & Wrenches . . . . .                     | G71    |
| Ball/Plain Bearing & Keyless Drill Chucks . . . . .               | G71    |
| Tapping Heads & Flex Collets . . . . .                            | G74-75 |
| Jacobs Drill, Tap & Die Grinder Chucks & Accessories . . . . .    | G73-76 |
| Rohm Drill Chucks & Accessories . . . . .                         | G77-78 |
| CAT, BT, NMTB & R8 Jacobs Taper Adapters . . . . .                | G79    |
| CAT, BT, NMTB & R8 Morse Taper Adapters . . . . .                 | G79    |
| CT, BT, NMTB Taper Boring Head Holders . . . . .                  | G80    |
| NMTB30 Drill Chuck Arbors . . . . .                               | G80    |
| NMTB To NMTB Taper Open End Adapters . . . . .                    | G80    |
| NMTB To R8 Taper Adapters . . . . .                               | G80    |
| Morse Taper Sleeves . . . . .                                     | G80    |
| Extension Length Sockets . . . . .                                | G80    |
| Solid Sockets . . . . .   | G81    |
| Lathe Mandrels . . . . .  | G81    |
| Annular Cutter Holders . . . . .                                  | G81    |
| Type B & C CNC Toolholder Bushings . . . . .                      | G81    |
| Taper Dimensions . . . . .  | G82-83 |



# DRILL CHUCKS

HIGH PRECISION

PREMIUM TOLERANCE

TIN COATED JAWS FOR IMPROVED LIFE

GS Keyless Drill Chucks designed to achieve the highest accuracy and rigidity possible

GS Super Heavy Duty Ball Bearing Drill Chucks are made to the highest tolerances in the market

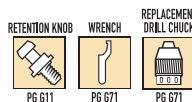
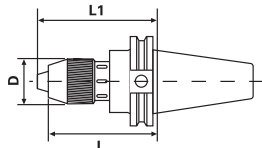


## CAT Taper Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability
- AT2 Taper Accuracy
- RFID Chip Hole



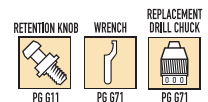
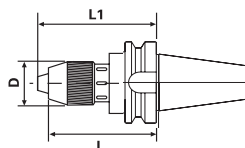
| Taper | Cap. | L     | L1    | D    | Code No. | Price \$      |
|-------|------|-------|-------|------|----------|---------------|
| CT40  | 1/4  | 2.559 | 2.795 | 1.3  | 531480   | <b>614.84</b> |
| CT40  | 1/2  | 4.527 | 4.992 | 1.97 | 531482   | <b>492.43</b> |
| CT40  | 5/8  | 4.724 | 5.236 | 2.24 | 531483   | <b>727.51</b> |
| CT50  | 1/2  | 3.54  | 3.996 | 1.97 | 531484   | <b>485.94</b> |
| CT50  | 5/8  | 3.7   | 4.134 | 2.24 | 531485   | <b>798.19</b> |

## BT Taper Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability
- AT2 Taper Accuracy
- RFID Chip Hole



| Taper | Cap. | L    | L1   | D    | Code No. | Price \$      |
|-------|------|------|------|------|----------|---------------|
| BT30  | 1/4  | 3.15 | 3.38 | 1.3  | 532210   | <b>645.30</b> |
| BT30  | 1/2  | 3.55 | 4.02 | 1.97 | 532212   | <b>534.03</b> |
| BT40  | 1/4  | 2.95 | 3.19 | 1.3  | 532214   | <b>540.00</b> |
| BT40  | 1/2  | 3.74 | 4.18 | 1.97 | 532216   | <b>483.17</b> |
| BT50  | 5/8  | 5.12 | 5.59 | 2.24 | 532219   | <b>580.16</b> |

## NMTB Taper Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability



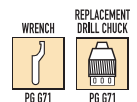
| Taper  | Cap. | Gauge Length (Open) | Gauge Length (Closed) | Chuck Dia. | Code No. | Price \$      |
|--------|------|---------------------|-----------------------|------------|----------|---------------|
| NMTB40 | 1/2  | 3.75                | 4.20                  | 1.97       | 534406   | <b>816.89</b> |
| NMTB50 | 1/2  | 3.35                | 3.74                  | 1.97       | 534408   | <b>728.91</b> |

## Morse Taper Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability



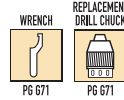
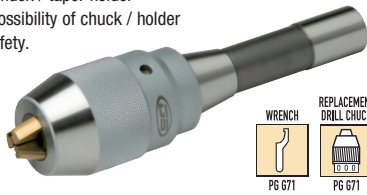
| Shank  | Gripping Dia. (mm) | Chuck Dia. | Gauge Length | Code No. | Price \$      |
|--------|--------------------|------------|--------------|----------|---------------|
| M.T. 4 | 0-13               | 51         | 100          | 337426   | <b>282.52</b> |
| M.T. 4 | 3-16               | 57         | 120          | 337428   | <b>406.75</b> |

## R8 Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability



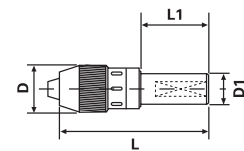
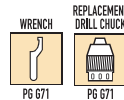
| Shank | Gripping Dia. (mm) | Chuck Dia. | Gauge Length | Draw Bar | Code No. | Price \$      |
|-------|--------------------|------------|--------------|----------|----------|---------------|
| R-8   | 0-13               | 51         | 100          | 7/16-20  | 337430   | <b>398.29</b> |
| R-8   | 3-16               | 57         | 120          | 7/16-20  | 337432   | <b>451.38</b> |

## Straight Shank Integral Keyless Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability



| Capacity | D1    | L    | L1   | D    | Code No. | Price \$      |
|----------|-------|------|------|------|----------|---------------|
| 1/4      | 3/4   | 5.87 | 2.56 | 1.34 | 534410   | <b>285.05</b> |
| 1/2      | 1-1/4 | 6.06 | 2.56 | 1.97 | 534414   | <b>396.02</b> |

## Replacement Drill Chucks



These chucks provide exceptionally high torque - up to three times the gripping strength of conventional drill chuck / taper holder combinations. The design eliminates any possibility of chuck / holder misalignment, and it assures separation safety.



| Description                   | Code No. | Price \$      |
|-------------------------------|----------|---------------|
| 1/4" chuck                    | 534422   | <b>182.71</b> |
| 1/2" chuck for BT40 / CAT50   | 534424   | <b>217.98</b> |
| 1/2" chuck for CAT40 / NMTB40 | 534425   | <b>217.98</b> |
| 5/8" chuck for CAT40/50, BT40 | 534427   | <b>372.49</b> |

## Super Heavy Duty Ball Bearing Drill Chucks



GS Ball Bearing Chucks are specially designed for HEAVY DUTY drilling applications on production drilling machines, jig borers, milling machines, lathes and radials. The ideal choice for those jobs that require close tolerance drilling. The ball thrust bearing reduces friction in the chuck's closing mechanism, so the operator can apply more gripping power on the twist drill shank.

- High precision, premium tolerance



| Chuck Model | Capacity (in.) | Mount | Code No. | Price \$      |
|-------------|----------------|-------|----------|---------------|
| 13BXH       | 3/64-1/2       | JT6   | 536500   | <b>76.40</b>  |
| 16BXH       | 3/64-5/8       | JT3   | 536502   | <b>94.39</b>  |
| 19BXH       | 3/64-3/4       | JT4   | 536504   | <b>183.12</b> |

## Plain Bearing Drill Chucks



GS Plain Bearing Chucks are specially designed for stationary drilling, turning, milling, and woodworking machines.

- Sleeve design eliminates the possibility of tooth breakage
- Hardened jaws and body help to avoid wear and lengthen the life of the chuck
- Each chuck supplied with a key



| Chuck Model | Capacity (in.) | Mount | Code No. | Price \$     |
|-------------|----------------|-------|----------|--------------|
| 13GH        | 3/64-1/2       | JT6   | 536516   | <b>49.17</b> |
| 16GH        | 3/64-5/8       | JT3   | 536520   | <b>65.84</b> |

## Replacement Chuck Wrenches



| Description      | Code No. | Price \$     |
|------------------|----------|--------------|
| Fits 1/4" chucks | 534418   | <b>10.94</b> |
| Fits 1/2" chucks | 534420   | <b>13.88</b> |
| Fits 5/8" chucks | 534431   | <b>13.88</b> |

## Super Precision Keyless Drill Chucks



Keyless chucks are engineered to quickly loosen and tighten a tool on the chuck collar of the drill, either by manual operation or when torque is applied. Rotating the chuck collar in a counterclockwise direction will loosen the tool.

- High precision, premium tolerance
- The jaws feature a TiN coated surface treatment to assure durability



| Chuck Model | Capacity (in.) | Mount   | Code No. | Price \$      |
|-------------|----------------|---------|----------|---------------|
| 6XH         | 1/64-1/4       | JT1     | 536524   | <b>321.44</b> |
| 6XH         | 1/64-1/4       | 3/8 -24 | 536526   | <b>252.99</b> |
| 10XH        | 1/64-3/8       | JT2     | 536528   | <b>270.51</b> |
| 10XH        | 1/64-3/8       | JT33    | 536530   | <b>258.94</b> |
| 13XH        | 1/64-1/2       | JT6     | 536534   | <b>304.20</b> |
| 13XH        | 1/64-1/2       | JT33    | 536536   | <b>290.95</b> |
| 13XH        | 1/64-1/2       | 1/2 -20 | 536538   | <b>135.02</b> |
| 16XH        | 1/8-5/8        | JT6     | 536540   | <b>373.86</b> |
| 16XH        | 1/8-5/8        | JT33    | 536542   | <b>342.71</b> |

## Drill Chuck Keys



- Nickel thumb grip
- The potential for fracturing under excessive load is limited due to soft steel handles



| Chuck Model   | Key No. | Code No. | Price \$     |
|---------------|---------|----------|--------------|
| 13GH 1/2 JT33 | P6      | 536548   | <b>8.41</b>  |
| 13GH 1/2 JT6  | P6      | 536548   | <b>8.41</b>  |
| 16GH 5/8      | P7      | 536550   | <b>11.99</b> |
| 19GH 3/4      | P7      | 536550   | <b>11.99</b> |
| 13BXH         | P6      | 536548   | <b>8.41</b>  |
| 16BXH         | P7      | 536550   | <b>11.99</b> |
| 19BXH         | P7      | 536550   | <b>11.99</b> |

## Drill Chuck Arbors



| Taper | Jacobs Taper | Code No. | Price \$ |
|-------|--------------|----------|----------|
| MT1   | 2            | 326900   | 11.21    |
| MT2   | 1            | 326901   | 11.68    |
| MT2   | 2            | 326902   | 11.68    |
| MT2   | 3            | 326904   | 11.68    |
| MT2   | 6            | 326906   | 11.68    |
| MT2   | 33           | 326908   | 11.68    |
| MT3   | 2            | 326910   | 13.39    |
| MT3   | 3            | 326912   | 13.73    |
| MT3   | 4            | 326914   | 16.25    |
| MT3   | 6            | 326916   | 13.85    |
| MT3   | 33           | 326918   | 13.97    |
| MT4   | 3            | 326920   | 17.97    |
| MT4   | 4            | 326922   | 18.21    |
| MT4   | 6            | 326924   | 17.97    |
| MT4   | 33           | 326926   | 17.97    |
| MT5   | 3            | 326928   | 35.27    |
| MT5   | 6            | 326930   | 35.27    |
| R8    | 2            | 326932   | 23.01    |
| R8    | 3            | 326934   | 23.01    |
| R8    | 6            | 326936   | 23.01    |
| 1/2   | 1            | 326938   | 9.52     |
| 1/2   | 2            | 326940   | 9.52     |
| 1/2   | 6            | 326942   | 9.52     |
| 1/2   | 33           | 326944   | 9.52     |
| 5/8   | 3            | 326946   | 10.07    |
| 3/4   | 3            | 326948   | 10.51    |
| 3/4   | 6            | 326950   | 12.06    |

## Jaw & Nut Assembly



| Description | Code No. | Price \$ |
|-------------|----------|----------|
| U-3         | 610274   | 256.17   |
| U-33        | 610282   | 132.46   |
| U-34        | 610285   | 151.00   |
| U-36        | 610286   | 212.37   |
| U-8-1/2 N   | 610475   | 126.94   |
| U-11 N      | 610477   | 148.52   |
| U-14 N      | 610479   | 333.29   |
| U-16 N      | 610481   | 390.75   |
| U-18 N      | 610483   | 524.85   |
| U-20 N      | 610485   | 818.60   |

## Service Kits For Newer Models

- Includes jaws, nut, caged bearing, and thrust washer



| Description   | Code No. | Price \$ |
|---------------|----------|----------|
| 30343 8-1/2 N | 610460   | 256.88   |
| 30344 11N     | 610462   | 303.04   |
| 30345 14N     | 610464   | 416.12   |
| 30346 16N     | 610466   | 487.83   |
| 30347 18N     | 610468   | 721.15   |
| 30348 20N     | 610470   | 995.12   |

## Jacobs Plain Bearing Geared Key Chucks



- Exceptionally high accuracy, gripping power and durability
- Wide range of capacities for use on threaded and taper-mounted spindles
- Jaws treated to ensure thread life and high gripping surface hardness

| Chuck Model   | Capacity (in.) | Key | Mount (in.) | Code No. | Price \$ |
|---------------|----------------|-----|-------------|----------|----------|
| 0             | 0-5/32         | K0  | JT0         | 610000   | 234.29   |
| †0B, 5/16-24  | 0-5/32         | K0  | 5/16-24     | 610001   | 289.12   |
| 1B, 3/8-24    | 0-1/4          | K1  | 3/8-24      | 610002   | 193.43   |
| 1A            | 0-1/4          | K1  | JT1         | 610004   | 183.26   |
| 7BA, 3/8-24   | 0-1/4          | K7  | 3/8-24      | 610008   | 207.68   |
| 41BA, 3/8-24  | 1/16-3/8       | K30 | 3/8-24      | 610014   | 85.07    |
| †41BA, 1/2-20 | 1/16-3/8       | K30 | 1/2-20      | 610015   | 301.51   |
| 2A            | 0-3/8          | K2  | JT2         | 610016   | 252.81   |
| 2BA, 3/8-24   | 0-3/8          | K2  | 3/8-24      | 610018   | 247.14   |
| 32BA, 1/2-20  | 0-3/8          | K32 | 1/2-20      | 610020   | 285.18   |
| 33            | 5/64-1/2       | K32 | JT33        | 610022   | 330.10   |
| 33KD**        | 5/64-1/2       | K32 | JT33        | 610024   | 325.44   |
| 33BA, 3/8-24  | 5/64-1/2       | K32 | 3/8-24      | 610025   | 205.79   |
| 33BA, 1/2-20  | 5/64-1/2       | K32 | 1/2-20      | 610027   | 197.23   |
| 33BA, 5/8-16  | 5/64-1/2       | K32 | 5/8-16      | 610028   | 205.46   |
| 34-02         | 0-1/2          | K3  | JT2         | 610029   | 199.71   |
| 34-33         | 0-1/2          | K3  | JT33        | 610030   | 225.73   |
| 34-33C*       | 0-1/2          | K3C | JT33        | 610031   | 269.54   |
| 34-06         | 0-1/2          | K3  | JT6         | 610033   | 265.27   |
| 3A            | 1/8-5/8        | K3  | JT3         | 610039   | 317.98   |
| †3KD**        | 1/8-5/8        | K3  | JT3         | 610040   | 546.36   |
| †3PD***       | 1/8-5/8        | K3  | JT3         | 610041   | 664.02   |
| 3B, 5/8-16    | 1/8-5/8        | K3  | 5/8-16      | 610042   | 433.04   |
| 36            | 3/16-3/4       | K4  | JT3         | 610043   | 401.34   |
| †36B, 5/8-16  | 3/16-3/4       | K4  | 5/8-16      | 610044   | 620.44   |
| †36B, 3/4-16  | 3/16-3/4       | K4  | 3/4-16      | 610045   | 579.44   |
| 36KD**        | 1/4-13/16      | K4  | JT3         | 610046   | 496.90   |

† Special manufactured items. Delivery information upon request.

With the exception of Models 0 and 0B Chucks which have a minimum capacity of No. 80 drill, all medium and heavy duty plain bearing chucks and ball bearing chucks having a nominal capacity of 0 will hold a No. 70 drill.

Key type chuck prices include the chuck and its key.

\* Equipped with Threaded Locking Collar 1-1/16"-20 Thread

\*\* Equipped with Positive Driving Slot

\*\*\* Equipped with Pin Type Positive Drive

BA Models are drilled and countersunk for Retaining Screw

## Chuck Removal Wedge Sets



- For removing taper mount chucks from arbors or chucks

| Description | Jacobs Taper | Code No. | Price \$ |
|-------------|--------------|----------|----------|
| 13266       | 1            | 610224   | 23.76    |
| 13267       | 2            | 610225   | 23.76    |
| 13268       | 3            | 610226   | 23.76    |
| 13269       | 6            | 610227   | 24.40    |

## Jacobs Ball Bearing Key Type Super Chucks

Extra accuracy, extra gripping power, for extra heavy duty work.

The ball bearing super chuck is especially designed for EXTRA HEAVY DUTY drilling applications on production drilling machines, jig borers, milling machines, lathes and radials. The ideal choice for those jobs that require close tolerance drilling. The ball thrust bearing reduces friction in the chuck's closing mechanism, so the operator can apply more gripping power on the twist drill shank.

| Chuck Model | Capacity  |       |            | Taper Mount | Uses Key | Weight |         | Length |         |     |         | Diameter |        | Code No. | Price \$ |
|-------------|-----------|-------|------------|-------------|----------|--------|---------|--------|---------|-----|---------|----------|--------|----------|----------|
|             | Inch      | mm    | lbs        |             |          | Gr.    | Closed  |        | Open    |     | Inch    | mm       |        |          |          |
|             |           |       |            |             |          |        | Inch    | mm     | Inch    | mm  |         |          |        |          |          |
| 8-1/2N      | 0-1/4     | 0-6.4 | JT2S & JT2 | K30         | 0.6      | 255    | 2-13/32 | 61     | 1-7/8   | 48  | 1-9/16  | 40       | 610050 | 351.28   |          |
| 11N         | 0-3/8     | 0-10  | JT2        | K32         | 1.2      | 510    | 2-7/8   | 73     | 2-1/4   | 57  | 1-15/16 | 49       | 610051 | 376.55   |          |
| 14N         | 0-1/2     | 0-13  | JT3        | K3          | 2.4      | 1077   | 3-7/8   | 98     | 2-31/32 | 75  | 2-7/16  | 62       | 610052 | 526.27   |          |
| 16N         | 1/8 - 5/8 | 3-16  | JT3        | K4          | 2.9      | 1332   | 4-5/16  | 110    | 3-1/4   | 83  | 2-5/8   | 67       | 610053 | 604.14   |          |
| 18N         | 1/8 - 3/4 | 3-19  | JT4        | K4          | 4.2      | 1928   | 5-1/8   | 130    | 3-31/32 | 101 | 3-1/64  | 76       | 610054 | 908.45   |          |
| 20N         | 3/8-1     | 10-25 | JT5        | K5          | 7.0      | 3175   | 5-1/2   | 140    | 4-1/4   | 108 | 3-21/32 | 93       | 610055 | 1,223.42 |          |



## Jacobs Arbors & Adapters

Always specify Jacobs arbors to serve the finest performance from Jacobs drill and tap chucks. They are precision ground to our master gauges and guarantee the finest possible accuracy and fit.

### When Ordering Arbors

Any of the following is correct; Show style and size of the mounting shank and the model number of the Jacobs chuck to which the arbor will be fitted.

Example: A #2 Morse taper shank arbor for #34 Jacobs chuck.

Show the style and size of the mounting shank plus the actual Jacobs taper desired.

Example: A #2 Morse taper shank with a #3 Jacobs taper.

Simply use the part number price in the standard arbor charts shown below.

Example: One #610153 Jacobs chuck arbor



Bridgeport to Jacobs Taper



Morse Taper to Jacobs Taper



Straight Shank to Jacobs Taper

### Taper Shank Arbors

| Taper Shank      | 0 | Price \$ | 1      | Price \$ | 2      | Price \$ | 3      | Price \$ | 4      | Price \$ | 5      | Price \$ | 6      | Price \$ | 33     | Price \$ |
|------------------|---|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| M.T. 1           | - | -        | 610144 | 53.70    | 610145 | 61.68    | -      | -        | -      | -        | -      | -        | 610148 | 69.11    | -      | -        |
| M.T. 2           | - | -        | 610151 | 61.16    | 610152 | 49.53    | 610153 | 46.68    | 610154 | 62.52    | -      | -        | 610156 | 63.92    | 610157 | 49.53    |
| M.T. 3           | - | -        | -      | -        | -      | -        | 610160 | 63.13    | 610161 | 76.91    | 610162 | 90.69    | 610163 | 66.52    | 610164 | 67.01    |
| M.T. 4           | - | -        | -      | -        | 610165 | 116.58   | 610166 | 99.27    | 610167 | 102.45   | 610168 | 143.23   | 610169 | 104.37   | -      | -        |
| M.T. 5           | - | -        | -      | -        | -      | -        | 610172 | 221.30   | 610173 | 210.48   | 610174 | 207.83   | -      | -        | -      | -        |
| R-8 (Bridgeport) | - | -        | -      | -        | 610184 | 266.56   | 610185 | 256.31   | -      | -        | -      | -        | 610187 | 266.56   | 610188 | 256.29   |

### Straight Shank Arbors

| Inches | 0      | Price \$ | 1      | Price \$ | 2      | Price \$ | 3      | Price \$ | 4 | Price \$ | 5 | Price \$ | 6      | Price \$ | 33     | Price \$ |
|--------|--------|----------|--------|----------|--------|----------|--------|----------|---|----------|---|----------|--------|----------|--------|----------|
| 1/2    | 610189 | 48.48    | 610190 | 48.64    | 610191 | 48.64    | 610192 | 48.64    | - | -        | - | -        | 610194 | 63.02    | 610195 | 50.57    |
| 5/8    | -      | -        | -      | -        | 610197 | 59.81    | 610198 | 82.54    | - | -        | - | -        | 610200 | 64.29    | 610201 | 57.24    |
| 3/4    | -      | -        | -      | -        | 610202 | 85.84    | 610203 | 75.40    | - | -        | - | -        | 610205 | 88.66    | 610206 | 93.36    |
| 1      | -      | -        | -      | -        | -      | -        | 610208 | 89.81    | - | -        | - | -        | -      | -        | -      | -        |

### Threaded Shank Arbors

- Precision machined and ground to master gauges for maximum performance
- Ideal for use with custom tool and work holder designs and for specialized machining applications



| Morse Taper | Thread   | Code No. | Price \$ |
|-------------|----------|----------|----------|
| MT2         | 3/8 - 24 | 610221   | 179.37   |
| MT2         | 1/2 - 20 | 610222   | 179.37   |
| MT2         | 5/8 - 16 | 610223   | 173.04   |



### Keys For Plain Bearing & Ball Bearing Chucks

- Nickel thumb grip
- The potential for fracturing under excessive load is limited due to soft steel handles



|               | Key No. | Code No. | Price \$ |
|---------------|---------|----------|----------|
| Plain Bearing | K0M     | 610118   | 27.22    |
|               | K1      | 610119   | 7.78     |
|               | K1M     | 610120   | 43.08    |
|               | K2      | 610121   | 13.64    |
|               | K3      | 610122   | 16.14    |
|               | S-K3C   | 610123   | 31.89    |
| Ball Bearing  | K7      | 610124   | 11.56    |
|               | K30     | 610126   | 10.70    |
|               | K32     | 610127   | 11.26    |
|               | K4      | 610129   | 19.14    |
|               | K5      | 610130   | 53.12    |
|               | KG1     | 610131   | 7.12     |
|               | KK      | 610132   | 9.84     |

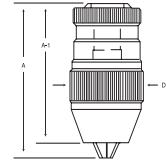
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## High Precision Industrial Keyless Chucks

Precision design combines keyless operation with the ultimate in drill chuck accuracy.

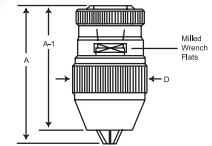
- Precision tested and certified to 0.0016" TIR or better
- All components exposed to wear are completely hardened to maintain accuracy and extend chuck life
- Permits use on a wide range of high accuracy drill presses, jig borers, milling machines and production drilling equipment
- Self-tightening feature automatically increases gripping force proportional to increased torque to prevent tool shank slippage
- For general machining applications



| Chuck Model | Capacity Range |              |               |              | Mount Jacobs | Dimensions   |     |              |    | Sleeve Dia. (D) |      | Weight (oz.) | Code No. | Price \$ |
|-------------|----------------|--------------|---------------|--------------|--------------|--------------|-----|--------------|----|-----------------|------|--------------|----------|----------|
|             | Minimum (in.)  | Minimum (mm) | Maximum (in.) | Maximum (mm) |              | Closed L (A) |     | Open L (A-1) |    | (in.)           | (mm) |              |          |          |
| JKP65-J1    | 0.000          | 0            | 0.255         | 6.5          | JT1          | 2.76         | 70  | 2.44         | 62 | 1.28            | 32.5 | 11           | 610500   | 441.17   |
| JKP80-J2S   | 0.000          | 0            | 0.315         | 8.0          | J2S          | 2.91         | 74  | 2.64         | 67 | 1.46            | 37.0 | 14           | 610502   | 453.16   |
| JKP100-J2   | 0.000          | 0            | 0.394         | 10.0         | J2           | 3.50         | 89  | 3.19         | 81 | 1.61            | 41.0 | 22           | 610504   | 484.34   |
| JKP100-J33  | 0.000          | 0            | 0.394         | 10.0         | J33          | 3.50         | 89  | 3.19         | 81 | 1.61            | 41.0 | 22           | 610506   | 465.71   |
| JKP130-J2   | 0.039          | 1            | 0.512         | 13.0         | J2           | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610508   | 497.81   |
| JKP130-J33  | 0.039          | 1            | 0.512         | 13.0         | J33          | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610510   | 497.80   |
| JKP130-J6   | 0.039          | 1            | 0.512         | 13.0         | J6           | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610512   | 497.81   |
| JKP160-J6   | 0.118          | 3            | 0.630         | 16.0         | J6           | 4.21         | 107 | 3.74         | 95 | 2.17            | 55.0 | 42           | 610514   | 598.65   |

## High Torque/High Precision Industrial Keyless Chucks

- Furnished with milled wrench flats and spanner wrench to allow the application of supplementary gripping torque
- Light tightening increases gripping torque up to 3 times higher than hand tightening
- Resists tool loosening on high speed machines with right hand rotation and instant spindle stop



| Chuck Model | Capacity Range |              |               |              | Mount Jacobs | Dimensions   |     |              |    | Sleeve Dia. (D) |      | Weight (oz.) | Code No. | Price \$ |
|-------------|----------------|--------------|---------------|--------------|--------------|--------------|-----|--------------|----|-----------------|------|--------------|----------|----------|
|             | Minimum (in.)  | Minimum (mm) | Maximum (in.) | Maximum (mm) |              | Closed L (A) |     | Open L (A-1) |    | (in.)           | (mm) |              |          |          |
| JKT65-J1    | 0.000          | 0            | 0.255         | 6.5          | JT1          | 2.76         | 70  | 2.44         | 62 | 1.28            | 32.5 | 11           | 610516   | 487.90   |
| JKT80-J2S   | 0.000          | 0            | 0.315         | 8.0          | J2S          | 2.91         | 74  | 2.64         | 67 | 1.46            | 37.0 | 14           | 610518   | 678.58   |
| JKT130-J2   | 0.039          | 1            | 0.512         | 13.0         | J2           | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610520   | 601.30   |
| JKT130-J33  | 0.039          | 1            | 0.512         | 13.0         | J33          | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610522   | 578.17   |
| JKT130-J6   | 0.039          | 1            | 0.512         | 13.0         | J6           | 3.90         | 99  | 3.46         | 88 | 1.81            | 46.0 | 32           | 610524   | 578.16   |
| JKT160-J6   | 0.118          | 3            | 0.630         | 16.0         | J6           | 4.21         | 107 | 3.74         | 95 | 2.17            | 55.0 | 42           | 610526   | 699.61   |

## Jacobs Tap Chucks

Complete range of flexible collet tap chucks for tapping machines and portable tappers. Simplify tap changing and provide unmatched accuracy.

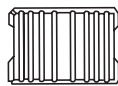
- Designed for use with the versatile Jacobs® Rubber-Flex® collet which accepts and precisely centers both decimal and metric shank diameters
- Simple operation – one quarter turn of chuck screw allows nut to disengage back jaws
- Tap shank sighting hole presents full view of tap square during changeovers
- Each chuck, with one interchangeable Rubber-Flex® collet, handles a wide range of tap sizes to speed tap size changes
- Positive-drive chuck jaws always locate square of tap shank to ensure superior performance
- Available with choice of Jacobs®, round or square hole mounts



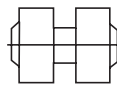
| Model | Tap Capacity |            |                | Mount | O.A.L. at Max. Cap. (in/mm) | Max Dia. (in/mm) | Round Shank Cap. |              | Available Rubber-Flex® Collets | Weight (oz.) | Code No. | Price \$ |
|-------|--------------|------------|----------------|-------|-----------------------------|------------------|------------------|--------------|--------------------------------|--------------|----------|----------|
|       | (in.)        | (mm)       |                |       |                             |                  | Min. (in/mm)     | Max. (in/mm) |                                |              |          |          |
| 41-01 | #0-1/4       | 1.00-6.35  |                | JT1   | 2.00/51                     | 0.84/21          | 0.09/2           | 0.25/6       | J116, J117                     | 2            | 610562   | 462.29   |
| 42-02 | #10-5/16     | 4.83-7.94  |                | JT2S  | 2.50/64                     | 1.06/27          | 0.09/2           | 0.38/10      | J420, J421, J422, J423         | 5            | 610566   | 853.64   |
| 42-24 | #10-5/16     | 4.83-7.94  | 0.3675 Dia.    |       | 2.50/64                     | 1.06/27          | 0.09/2           | 0.38/10      | J420, J421, J422, J423         | 6            | 610568   | 640.39   |
| 42-J8 | #0-1/4       | 1.00-6.36  | 0.375 Sq. Hole |       | 2.50/64                     | 1.06/27          | 0.09/2           | 0.38/10      | J420, J421, J422, J423         | 6            | 610570   | 642.69   |
| 44-J9 | #10-1/2      | 4.83-12.70 | 0.500 Sq. Hole |       | 3.12/79                     | 1.47/37          | 0.11/3           | 0.50/13      | J440, J441, J443               | 12           | 610576   | 886.03   |

† Rubber-Flex Collets® are not included. Must be ordered separately

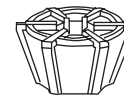
## Replacement Parts For Tap Chucks



Nut



Back Jaws



Rubber-Flex® Collet

| Model | Nut Code No. | Price  | Rubber-Flex® Collet    | Back Jaws Code No. | Price \$ | Nut Wrench Code No. | Price \$ | Body Wrench Code No. | Price \$ |
|-------|--------------|--------|------------------------|--------------------|----------|---------------------|----------|----------------------|----------|
| 41-01 | 610578       | 184.65 | J116, J117             | 610594             | 370.00   | 610610              | 45.58    | 610626               | 16.99    |
| 42-01 | -            | -      | J420, J421, J422, J423 | 610596             | 225.99   | 610612              | 46.57    | 610628               | 40.38    |
| 42-02 | -            | -      | J420, J421, J422, J423 | 610596             | 225.99   | 610612              | 46.57    | 610628               | 40.38    |
| 42-J8 | -            | -      | J420, J421, J422, J423 | 610596             | 225.99   | 610612              | 46.57    | 610628               | 40.38    |
| 42-24 | -            | -      | J420, J421, J422, J423 | 610596             | 225.99   | 610612              | 46.57    | 610628               | 40.38    |
| 44-J9 | -            | -      | J440, J441, J443       | -                  | -        | 610620              | 44.98    | -                    | -        |

## Jacobs Die Grinder Chucks

Compact tap chuck designed for use with Rubber-Flex® Collets holds mounted grinding burrs and rotary files on pneumatic and electric die grinders.

- Compact design facilitates use for a wide range of applications
- Integral seal protects collet components from abrasives and swarf
- Rubber-Flex® Collets furnished separately for tools with collet seating cones built into spindles

| Chuck Model | Capacity Range |              |               |              | Mount Jacobs | Dimensions       |                 |                      |                     | Sleeve Dia. (D) | Weight (oz.) | Code No. | Price \$ |        |
|-------------|----------------|--------------|---------------|--------------|--------------|------------------|-----------------|----------------------|---------------------|-----------------|--------------|----------|----------|--------|
|             | Minimum (in.)  | Minimum (mm) | Maximum (in.) | Maximum (mm) |              | Open L (A) (in.) | Open L (A) (mm) | Closed L (A-1) (in.) | Closed L (A-1) (mm) |                 |              |          |          |        |
| 100-61      | 0.09           | 2.3          | 0.25          | 6.4          | 3/8-24       | 1.77             | 45.0            | 1.88                 | 47.8                | 0.75            | 19.1         | 1.50     | 610642   | 184.53 |

Jacobs®



## Nut For Die Grinder Chuck

Jacobs®

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| N100      | 610644   | 109.72   |

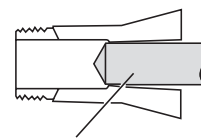
## Rubber-Flex® Collets

Unique in design and operation, the Jacobs® Rubber-Flex® Collet can generate two to three times the gripping power of a conventional split-steel collet.

- Parallel jaw insert surfaces exert uniform, accurate gripping force up to three times greater than can be achieved with split-steel collets
- Each collet accepts and precisely centers a wide range of both decimal or metric diameters (within individual capacity ranges) to speed setups and increase machining productivity
- Durable one-piece construction
- Synthetic rubber retains flexibility and resists deterioration from heat, coolants and cutting compounds
- Steel jaw inserts precision ground (after molding process) to assure maximum gripping accuracy (parallelism)
- Hardened for greater wear resistance than split-steel collets
- Each collet bore is held concentric to the O.D. tapers, both front and back, to minimize TIR
- Automatically seals tool O.D. to permit coolant flow through tool reducing wear
- Seals collets and machine spindles to protect from abrasive particles and swarf

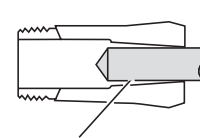


## Rubber-Flex® Collets vs Conventional Collets



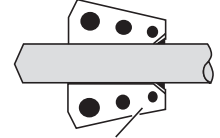
### Oversized Bar

Conventional split-steel collets provide maximum gripping efficiency only at actual bored or nominal capacity.



### Undersized Bar

They lose parallelism when chucking bars even a few thousandths over or under this capacity. This significantly reduces gripping strength and accuracy.



### Rubber-Flex® Collet

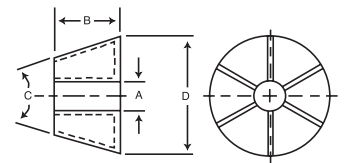
Rubber-Flex® Collets exert uniform gripping pressure throughout the collet contact length (within individual collet capacity ranges) regardless of bar tolerance deviations

## Tap Chuck Collets

- Each collet accepts and precisely centers a wide range of both decimal or metric diameters to speed setups and increase machining productivity
- Synthetic rubber retains flexibility and resists deterioration from heat, coolants, and cutting compounds
- Steel jaw inserts precision ground to ensure maximum gripping accuracy, and hardened for greater wear resistance than split steel collets
- Seals collets and machine spindles to protect from abrasive particles and swarf

| Model | Capacity Range |           |                |               | Contact Length (B) |      | Cone Angle (C) (deg) | Outside Dia. (D) |      | No. of Inserts | Weight (oz.) | Code No. | Price \$ |
|-------|----------------|-----------|----------------|---------------|--------------------|------|----------------------|------------------|------|----------------|--------------|----------|----------|
|       | Min. (in.)     | Min. (mm) | Max. (A) (in.) | Max. (A) (mm) | (in.)              | (mm) |                      | (in.)            | (mm) |                |              |          |          |
| J116  | 0.094          | 2.4       | 0.177          | 4.5           | 0.468              | 11.9 | 26                   | 0.590            | 15.1 | 6              | 0.10         | 610646   | 103.06   |
| J117  | 0.177          | 4.5       | 0.256          | 6.5           | 0.468              | 11.9 | 26                   | 0.590            | 15.1 | 8              | 0.10         | 610648   | 107.18   |
| J420  | 0.176          | 4.5       | 0.320          | 8.1           | 0.500              | 12.7 | 40                   | 0.941            | 23.9 | 6              | 0.20         | 610351   | 91.47    |
| J421  | 0.139          | 3.5       | 0.257          | 6.5           | 0.500              | 12.7 | 40                   | 0.941            | 23.9 | 6              | 0.20         | 610352   | 87.94    |
| J422  | 0.253          | 6.4       | 0.383          | 9.7           | 0.500              | 12.7 | 40                   | 0.941            | 23.9 | 6              | 0.30         | 610355   | 87.94    |
| J423  | 0.090          | 2.3       | 0.090          | 4.6           | 0.500              | 12.7 | 40                   | 0.860            | 21.8 | 4              | 0.30         | 610656   | 89.95    |
| J440  | 0.280          | 7.1       | 0.280          | 12.7          | 0.630              | 16.0 | 45                   | 1.296            | 32.9 | 6              | 0.30         | 610353   | 104.67   |
| J441  | 0.176          | 4.5       | 0.176          | 9.7           | 0.630              | 16.0 | 45                   | 1.296            | 32.9 | 6              | 0.30         | 610354   | 185.55   |

Jacobs®



## Die Grinder Collets

- Each collet accepts and precisely centers a wide range of both decimal or metric diameters to speed setups and increase machining productivity
- Synthetic rubber retains flexibility and resists deterioration from heat, coolants, and cutting compounds
- Steel jaw inserts precision ground to ensure maximum gripping accuracy, and hardened for greater wear resistance than split steel collets
- Seals collets and machine spindles to protect from abrasive particles and swarf

| Model | Capacity Range |           |                |               | Contact Length (B) |      | Cone Angle (C) (deg) | Outside Dia. (D) |      | No. of Inserts | Weight (oz.) | Code No. | Price \$ |
|-------|----------------|-----------|----------------|---------------|--------------------|------|----------------------|------------------|------|----------------|--------------|----------|----------|
|       | Min. (in.)     | Min. (mm) | Max. (A) (in.) | Max. (A) (mm) | (in.)              | (mm) |                      | (in.)            | (mm) |                |              |          |          |
| J116  | 0.094          | 2.4       | 0.177          | 4.5           | 0.468              | 11.9 | 26                   | 0.590            | 15.1 | 6              | 0.10         | 610646   | 103.06   |
| J117  | 0.177          | 4.5       | 0.256          | 6.5           | 0.468              | 11.9 | 26                   | 0.590            | 15.1 | 8              | 0.10         | 610648   | 107.18   |

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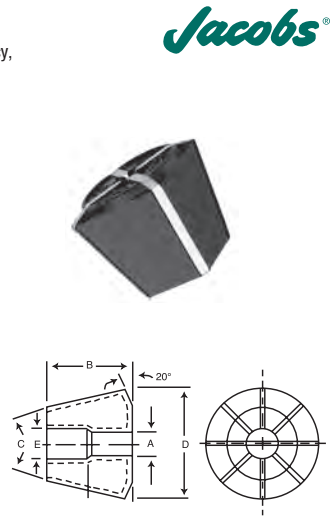




## Lathe Chuck Collets

- Each collet accepts and precisely centers a wide range of both decimal or metric diameters to speed setups and increase machining productivity
- Synthetic rubber retains flexibility and resists deterioration from heat, coolants, and cutting compounds
- Collets J910, J911 and J912 have a contact length of 0.90" (23mm)
- Steel jaw inserts precision ground to ensure maximum gripping accuracy, and hardened for greater wear resistance than split steel collets
- Seals collets and machine spindles to protect from abrasive particles and swarf
- All other lathe chuck collets have full length contact

| Model | Capacity Range |            |           |           | Contact Length (B) |      | Cone Angle (C) (deg) | Outside Dia. (D) |      | Clearance Dia. (E) |      | No. of Inserts | Weight (oz.) | Code No. | Price \$ |
|-------|----------------|------------|-----------|-----------|--------------------|------|----------------------|------------------|------|--------------------|------|----------------|--------------|----------|----------|
|       | Min. (in.)     | Max. (in.) | Min. (mm) | Max. (mm) | (in.)              | (mm) |                      | (in.)            | (mm) | (in.)              | (mm) |                |              |          |          |
| J910  | 0.060          | 1.5        | 0.125     | 3.2       | 1.74               | 44.5 | 26                   | 2.25             | 57   | 0.60               | 15.2 | 4              | 0.53         | 610668   | 1,749.12 |
| J911  | 0.125          | 3.2        | 0.250     | 6.4       | 1.74               | 44.5 | 26                   | 2.25             | 57   | 0.60               | 15.2 | 6              | 0.53         | 610670   | 840.11   |
| J912  | 0.250          | 6.4        | 0.375     | 9.5       | 1.74               | 44.5 | 26                   | 2.25             | 57   | 0.60               | 15.2 | 6              | 0.47         | 610672   | 1,492.55 |
| J913  | 0.375          | 9.5        | 0.500     | 12.7      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 8              | 0.47         | 610674   | 1,572.20 |
| J914  | 0.500          | 12.7       | 0.625     | 15.9      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 10             | 0.47         | 610676   | 1,519.47 |
| J915  | 0.625          | 15.9       | 0.750     | 19.1      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 10             | 0.47         | 610678   | 826.05   |
| J916  | 0.750          | 19.1       | 0.875     | 22.2      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 12             | 0.47         | 610680   | 837.86   |
| J917  | 0.875          | 22.2       | 1.000     | 27.9      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 16             | 0.55         | 610682   | 830.02   |
| J918  | 1.000          | 25.4       | 1.125     | 28.6      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 20             | 0.52         | 610684   | 883.71   |
| J919  | 1.125          | 28.6       | 1.250     | 31.8      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 24             | 0.43         | 610686   | 914.37   |
| J920  | 1.250          | 31.8       | 1.375     | 34.9      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 24             | 0.40         | 610688   | 864.13   |
| J921  | 1.375          | 34.9       | 1.500     | 38.1      | 1.74               | 44.5 | 26                   | 2.25             | 57   |                    |      | 24             | 0.27         | 610690   | 1,084.85 |



## Hand-Tite® Keyless Drill Chucks

Increases operator productivity and convenience by speeding bit changeovers and eliminated downtime caused by loss of chuck keys.

- Keyless operation permits fast bit changes without lost key delays
- Superior gripping force provides high mechanical advantage to convert hand tightening torque into superior bit gripping force
- Ergonomic design increases hand tightening efficiency and user comfort

- Versatile models available to fit all 10mm (3/8") and 13mm (1/2") variable speed corded and cordless portable drills
- Precision operation by meeting or exceeding stringent DIN run-out and dimensional specifications
- Constructed of high performance materials to maximize durability and performance

| Model                        | Features                | Capacity Range |            |           |           | Mount Thread | Dimensions           |                   |                  |       | Boss/Body Clearance |              | Code No. | Price \$ |        |
|------------------------------|-------------------------|----------------|------------|-----------|-----------|--------------|----------------------|-------------------|------------------|-------|---------------------|--------------|----------|----------|--------|
|                              |                         | Min. (in.)     | Max. (in.) | Min. (mm) | Max. (mm) |              | Overall Length (in.) | Sleeve Dia. (in.) | Sleeve Dia. (mm) | (in.) | (mm)                | Weight (oz.) |          |          |        |
| <b>10 mm Capacity (3/8")</b> |                         |                |            |           |           |              |                      |                   |                  |       |                     |              |          |          |        |
| 30354                        | Hard nose, dark finish  | 0.040          | 1.0        | 0.375     | 10        | 3/8-24       | 2.00                 | 54.6              | 1.67             | 42.7  | 0.126               | 3.00         | 6.5      | 610700   | 68.74  |
| <b>13 mm Capacity (1/2")</b> |                         |                |            |           |           |              |                      |                   |                  |       |                     |              |          |          |        |
| 31038                        | Hard nose, black finish | 0.062          | 2.0        | 0.500     | 13        | 1/2-20       | 2.90                 | 73.7              | 1.68             | 42.7  | 0.082               | 2.08         | 12.0     | 610702   | 101.72 |
| 31037                        | Hard nose, black finish | 0.062          | 2.0        | 0.500     | 13        | 3/8-24       | 2.90                 | 73.7              | 1.68             | 42.7  | 0.082               | 2.08         | 12.0     | 610704   | 141.04 |



## Adapt-A-Drive® Chuck

Converts any cordless screwdriver to a multi-purpose mini-drill for bit sizes up to 1/4".

- Easy conversion – integral hex mount locks the Adapt-A-Drive® chuck into the screwdriver bit socket
- Ideal for use in starting screw holes for use in hard-to-reach spaces

| Model | Capacity Range |            |           |           | Mount Thread | Key No. | Sleeve Finish     | Sleeve Dia. |      | Weight (oz.) | Code No. | Price \$ |
|-------|----------------|------------|-----------|-----------|--------------|---------|-------------------|-------------|------|--------------|----------|----------|
|       | Min. (in.)     | Max. (in.) | Min. (mm) | Max. (mm) |              |         |                   | (in.)       | (mm) |              |          |          |
| 30248 | 0.028          | 0.7        | 0.250     | 6.5       | 0.250-Hex    | KG1     | Ground-Matte Band | 1.13        | 28.6 | 3.5          | 610708   | 48.89    |



## Jacobs Stainless Steel Chucks

- For special applications on either portable air operated or stationary machine tools

| Chuck Model | Capacity Range |               |              |              | Mount Jacobs | Key | Dimensions     |              |                  |                 | Weight (oz.) | Code No. | Price \$ |        |        |
|-------------|----------------|---------------|--------------|--------------|--------------|-----|----------------|--------------|------------------|-----------------|--------------|----------|----------|--------|--------|
|             | Minimum (in.)  | Maximum (in.) | Minimum (mm) | Maximum (mm) |              |     | Closed L (in.) | Open L (in.) | Sleeve Dia (in.) | Sleeve Dia (mm) |              |          |          |        |        |
| OM          | 0*             | 0             | 0.156        | 4            | JT0          | KOM | 1.45           | 37           | 1.10             | 28              | 0.85         | 22       | 2.0      | 610710 | 473.94 |
| OBM 5/16    | 0*             | 0             | 0.156        | 4            | 5/16-24      | KOM | 1.53           | 39           | 1.17             | 30              | 0.85         | 22       | 2.0      | 610712 | 465.61 |
| 1M          | 0*             | 0             | 0.250        | 6            | JT1          | K1M | 1.92           | 49           | 1.54             | 39              | 1.12         | 28       | 5.0      | 610714 | 432.29 |
| 1BM 5/16    | 0*             | 0             | 0.250        | 6            | 5/16-24      | K1M | 1.95           | 50           | 1.57             | 40              | 1.12         | 28       | 5.0      | 610716 | 472.56 |
| 1BM 3/8     | 0*             | 0             | 0.250        | 6            | 3/8-24       | K1M | 1.95           | 50           | 1.57             | 40              | 1.12         | 28       | 5.0      | 610718 | 461.25 |



## Jacobs Drain Chucks

- Specifically designed for use with flexible coil spring tools
- Allows coil spring to pass through chuck
- Chuck may be hand tightened to secure coil spring at desired length transmitting tool rotation to shaft
- Ideal for soil pipe and sewer cleaning tools

| Chuck Model | Capacity Range |               |              |              | Mount Thread | Dimensions     |              |                   |                  | Weight (oz.) | Code No. | Price \$ |        |        |
|-------------|----------------|---------------|--------------|--------------|--------------|----------------|--------------|-------------------|------------------|--------------|----------|----------|--------|--------|
|             | Minimum (in.)  | Maximum (in.) | Minimum (mm) | Maximum (mm) |              | Closed L (in.) | Open L (in.) | Sleeve Dia. (in.) | Sleeve Dia. (mm) |              |          |          |        |        |
| DC4595      | 0.25           | 6.4           | .500         | 13           | 13/16-20     | 2.49           | 63.2         | 2.49              | 63.2             | 1.70         | 43.2     | 4.5      | 610720 | 251.56 |

\* Minimum capacity will hold #70 drill



## Rohm Prima Key Type Drill Chucks



Impact resistant key-type drill chuck. Conical/ threaded mount in accordance with DIN ISO ping force due to proven transmission principle by means of drill chuck key. Hardened keyholes and clamping prisms.



| Rohm Id. No. | Cap. (in.)  | Mount  | Chuck Key | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|-------------|--------|-----------|-----------|--------------------|--------------------|----------|----------|
| 072806       | 1/64-5/32   | B10    | S1        | 24        | 39                 | 47.5               | 390005   | 65.01    |
| 245586*      | 1/64-1/4    | B10    | S1        | 29.5      | 43                 | 53                 | 390020   | 63.83    |
| 072811*      | 1/64-1/4    | 3/8-24 | S1        | 29.5      | 42.5               | 53                 | 390025   | 63.83    |
| 245548       | 1/64-1/4    | B12    | S1        | 29.5      | 47.5               | 57.5               | 390030   | 37.19    |
| 245485*      | 1/64-5/16   | B10    | S1        | 29.5      | 43                 | 53                 | 390040   | 37.19    |
| 245550*      | 1/64-5/16   | B12    | S1        | 29.5      | 47.5               | 57.5               | 390045   | 63.83    |
| 245552*      | 1/64-5/16   | 3/8-24 | S1        | 29.5      | 42.5               | 53                 | 390050   | 63.83    |
| 072653*      | 1/32-3/8    | B12    | S2        | 34.5      | 50                 | 60.5               | 390070   | 71.83    |
| 317255**     | 1/32-3/8    | 3/8-24 | S2        | 34.5      | 49.5               | 61                 | 390085   | 55.85    |
| 317256**     | 1/32-3/8    | 1/2-20 | S2        | 34.5      | 49.5               | 61                 | 390090   | 59.85    |
| 072687       | 1/32-3/8    | B16    | S2        | 42.8      | 63                 | 77                 | 390100   | 71.83    |
| 072693       | 1/32-3/8    | JT2    | S2        | 42.8      | 59                 | 75.5               | 390105   | 95.76    |
| 072897*      | 1/16-1/2    | B12    | S2        | 42.8      | 58                 | 72                 | 390150   | 83.80    |
| 072800*      | 1/16-1/2    | B16    | S2        | 42.8      | 63                 | 77                 | 390155   | 83.80    |
| 064527*      | 1/16-1/2    | 3/8-24 | S2        | 42.8      | 59                 | 74                 | 390125   | 65.17    |
| 317257**     | 1/16-1/2    | 1/2-20 | S2        | 42.8      | 59                 | 74                 | 390140   | 65.17    |
| 072818*      | 1/32-1/2    | JT6    | S3        | 52        | 67.5               | 86                 | 390165   | 118.37   |
| 072819*      | 1/32-1/2    | JT33   | S3        | 52        | 67.5               | 86                 | 390170   | 118.37   |
| 072825       | 1/32-5/8    | B18    | S3        | 56.5      | 79                 | 98                 | 390195   | 165.55   |
| 072827       | 1/32-5/8    | JT3    | S3        | 56.5      | 79                 | 98                 | 390200   | 188.93   |
| 072831       | 3/16-3/4    | B22    | S4        | 65        | 92.5               | 113.5              | 390225   | 331.18   |
| 072833       | 3/16-3/4    | JT3    | S4        | 65        | 82.5               | 103.5              | 390230   | 377.87   |
| 072834       | 3/16-1-1/32 | B24    | S4        | 80        | 120                | 147                | 390240   | 668.99   |

\* Smaller, intermediate sizes primarily for hand-operated percussion drilling machines

\*\* With through hole for right and left hand rotation

## Rohm Ball Bearing Drill Chucks



- Bodies and jaws hardened and ground
- One piece gear/scroll ring eliminates loss of clamping torque
- Dependable and accurate performance
- Easy operation
- Extended life



| Rohm Id. No. | Cap. (in.) | Mount | Chuck Key | O.D. (in.) | Opened Length (in.) | Closed Length (in.) | Code No. | Price \$ |
|--------------|------------|-------|-----------|------------|---------------------|---------------------|----------|----------|
| 215000       | 1/32-1/2   | JT3   | S10       | 2.24       | 3.11                | 3.86                | 390245   | 256.21   |
| 215001       | 1/32-5/8   | JT3   | S10       | 2.44       | 3.15                | 3.94                | 390250   | 273.66   |
| 215002       | 3/16-3/4   | JT4   | S13       | 2.80       | 3.82                | 4.65                | 390255   | 652.61   |

## Rohm Chuck Keys



- Hand tools used to tighten and loosen screwed elements
- Manual tools are used for construction and repair work that requires simple execution with low energy use



| Rohm Id. No. | Model No. | Jacobs Equiv. | Code No. | Price \$ |
|--------------|-----------|---------------|----------|----------|
| 26411        | S1        | -             | 390300   | 6.64     |
| 205989       | S2A       | -             | 390315   | 6.64     |
| 309380       | S2AT      | -             | 390320   | 9.30     |
| 25835        | S3        | -             | 390325   | 9.30     |
| 309382       | S3AT      | -             | 390330   | 11.98    |
| 25839        | S4        | -             | 390335   | 11.98    |
| 228692       | S7        | K1            | 390340   | 7.77     |
| 228693       | S8        | K30           | 390345   | 7.87     |
| 228695       | S10       | K3            | 390355   | 9.70     |
| 68007        | S13       | K4            | 390360   | 22.86    |
| 500694       | S14       | KG            | 390365   | 9.30     |
| 500511       | S17       | K2            | 390370   | 5.82     |
| 228698       | S18       | K7            | 390380   | 5.57     |
| 212057       | S19       | KK            | 390385   | 4.83     |

## Rohm Supra Keyless Drill Chucks



- Self-tightening for higher clamping torque
- High percussion design
- All metal construction for extended life
- Jaws and bodies are hardened and ground
- Rapid clamping and releasing without use of a wrench



| Rohm Id. No. | Cap. (in.) | Mount  | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|------------|--------|-----------|--------------------|--------------------|----------|----------|
| 020089       | 0-1/4      | JT1    | 35        | 62.5               | 68.6               | 390940   | 195.50   |
| 020147       | 0-1/4      | 3/8-24 | 35        | 62.5               | 68.6               | 390945   | 182.20   |
| 215059*      | 0-5/16     | 3/8-24 | 35        | 62.5               | 68.6               | 390950   | 140.98   |
| 871019       | 0-5/32     | B10    | 26        | 45.5               | 50.8               | 391176   | 182.20   |
| 871031       | 0-5/16     | B10    | 35        | 67                 | 73.5               | 391177   | 105.94   |
| 871032       | 0-5/16     | B12    | 35.8      | 67                 | 73.4               | 391178   | 179.56   |
| 020093       | 0-5/16     | JT1    | 35.8      | 70.5               | 76.9               | 390970   | 114.36   |
| 871034       | 0-5/16     | 3/8-24 | 35.8      | 67                 | 73.4               | 391179   | 105.94   |
| 871038*      | 1/64-3/8   | 3/8-24 | 35.8      | 70.5               | 76.9               | 390985   | 152.96   |
| 871040       | 0-3/8      | B12    | 40.2      | 79.5               | 86.1               | 390995   | 72.28    |
| 871041       | 0-3/8      | B16    | 40.2      | 82.5               | 89.1               | 391000   | 195.50   |
| 871045       | 0-3/8      | 1/2-20 | 40.2      | 79.5               | 86.1               | 391015   | 114.36   |
| 871049*      | 1/32-1/2   | 3/8-24 | 42.5      | 81.5               | 89.8               | 391020   | 167.58   |
| 871050*      | 1/32-1/2   | 1/2-20 | 42.5      | 81.5               | 89.8               | 391025   | 167.58   |
| 871051       | 1/32-1/2   | B16    | 46        | 93                 | 101.5              | 391030   | 210.14   |
| 871052       | 1/32-1/2   | JT2    | 46        | 91                 | 99.5               | 391035   | 223.44   |
| 871054       | 1/32-1/2   | JT6    | 46        | 94                 | 102.5              | 391040   | 223.44   |
| 871053       | 1/32-1/2   | JT33   | 46        | 94                 | 102.5              | 391045   | 223.44   |
| 871055       | 1/32-1/2   | 1/2-20 | 46        | 93                 | 101.5              | 391050   | 157.69   |
| 871062       | 1/8-5/8    | 1/2-20 | 46        | 87.5               | 97.5               | 391060   | 182.20   |
| 871063       | 1/8-5/8    | 5/8-16 | 46        | 87.5               | 97.5               | 391065   | 195.50   |
| 871064       | 1/8-5/8    | B16    | 51        | 96.5               | 106.8              | 391070   | 223.44   |
| 871066       | 1/8-5/8    | JT6    | 51        | 96.5               | 106.8              | 391075   | 239.41   |

\* Lightweight version mainly for hand operated drilling machines

## Spare Parts for Supra Keyless Drill Chucks



| Cap. (in.) | Set of Jaws Code No. | Price \$ | Retaining Ring Code No. | Price \$ | Driver Code No. | Price \$ | Set of Balls Code No. | Price \$ |
|------------|----------------------|----------|-------------------------|----------|-----------------|----------|-----------------------|----------|
| 1/4        | 390780               | 21.24    | -                       | -        | -               | -        | -                     | -        |
| 5/16*      | 390780               | 21.24    | -                       | -        | 390852          | 9.31     | -                     | -        |
| 5/16       | 391100               | 26.63    | -                       | -        | -               | -        | -                     | -        |
| 3/8*       | 391100               | 26.63    | -                       | -        | -               | -        | -                     | -        |
| 3/8        | -                    | -        | 390820                  | 2.86     | -               | -        | -                     | -        |
| 1/2*       | 391110               | 29.87    | 390820                  | 2.86     | 391205          | 13.62    | -                     | -        |
| 1/2        | 391115               | 42.89    | 391140                  | 3.59     | -               | -        | 391235                | 21.89    |
| 5/8*       | -                    | -        | 391140                  | 3.59     | 391215          | 18.61    | 391235                | 21.89    |
| 5/8        | 391125               | 38.68    | 391145                  | 5.06     | -               | -        | 391240                | 5.57     |

\* Lightweight version mainly for hand operated drilling machines

## Rohm Spiro Keyless Drill Chucks



### Design:

Pointed shape of sleeve, high runout precision 0.05mm, wearing parts are hardened.

### Usage:

Permanent self tightening action perfectly suitable for use with high speeds on drilling machines, machining centres and special drilling heads.



| Rohm Id. No. | Cap. (in.) | Mount | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|------------|-------|-----------|--------------------|--------------------|----------|----------|
| 019816       | 0-1/4      | B10   | 35        | 62.5               | 68.6               | 390700   | 154.66   |
| 019832       | 0-1/4      | B12   | 35        | 62.5               | 68.6               | 390705   | 154.66   |
| 019847       | 0-3/8      | B12   | 43        | 82.5               | 90.1               | 390725   | 173.57   |
| 019864       | 0-3/8      | B16   | 43        | 82.5               | 90.1               | 390730   | 329.85   |
| 019868       | 1/32-1/2   | B16   | 50        | 94                 | 102.5              | 390745   | 352.45   |
| 019884       | 1/8-5/8    | B16   | 55        | 96.5               | 106.8              | 390765   | 379.05   |

## Spare Parts for Spiro Keyless Drill Chucks



| Cap. (in.) | Set of Jaws Code No. | Price \$ | Retaining Ring Code No. | Price \$ | Driver Code No. | Price \$ | Set of Balls Code No. | Price \$ |
|------------|----------------------|----------|-------------------------|----------|-----------------|----------|-----------------------|----------|
| 5/32       | 390775               | 30.70    | 390805                  | 2.19     | 390870          | 8.77     | 390900                | 6.08     |
| 1/4        | 390780               | 21.24    | 390810                  | 2.36     | 390875          | 9.25     | 390905                | 4.54     |
| 3/8        | 390790               | 35.43    | 390820                  | 2.86     | 390885          | 10.77    | 390915                | 4.54     |
| 1/2        | 390795               | 37.26    | -                       | -        | 390890          | 18.45    | 390920                | 4.88     |
| 5/8        | 390800               | 41.10    | -                       | -        | 390895          | 23.70    | 390925                | 5.55     |

## Rohm Ejectors



- Taper drift
- Utensils designed to facilitate the use of the different measurement, calibration or tracing systems



| Rohm Id. No. | For Morse Taper | Length (mm) | Code No. | Price \$ |
|--------------|-----------------|-------------|----------|----------|
| 017076       | 1 & 2           | 140         | 391831   | 9.31     |
| 017077       | 3               | 190         | 391832   | 13.30    |
| 017078       | 4               | 225         | 391833   | 19.95    |
| 017079       | 5 & 6           | 265         | 391834   | 33.47    |

## Rohm Hand Ejectors



- Taper drift for one-hand-operation
- Utensils designed to facilitate the use of the different measurement, calibration or tracing systems



| Rohm Id. No. | For Morse Taper | Length (mm) | Code No. | Price \$ |
|--------------|-----------------|-------------|----------|----------|
| 317236       | 1-3             | 320         | 391836   | 114.37   |
| 317258       | 4-6             | 380         | 391837   | 138.32   |

## Rohm Extra-RV 80 Portable Keyless Drill Chucks



### Radial Locking

Keyless drill chucks in plastic or metal design with radial locking, for corded and cordless drills, for percussion drilling, with hexagon for assembling and disassembling on the machine spindle.

- No further locking when drilling and screwing, especially percussion drilling
- Very ergonomical, easy to handle, with metal nose piece
- With carbide inserts in the clamping jaws (size 13)
- For all drills with a maximum torque of 100Nm and up to 1500 W
- With through-hole for clockwise and anti-clockwise rotation (thread M5 and M6)
- The plastic parts carry the material description and can therefore be easily recycled
- If necessary, use maintenance spray



With Retaining Ring

### Metal Design Without Retaining Ring

| Rohm Id. No. | Cap. (mm) | Mount  | Notes  | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|-----------|--------|--|-----------|--------------------|--------------------|----------|----------|
| 893350       | 1-10      | 1/2-20 | with through hole                            | 42.70     | 55                 | 60.90              | 390525   | 45.62    |
| 893351       | 1-10      | 3/8-24 | with through hole                            | 42.70     | 55                 | 60.90              | 390515   | 45.62    |
| 893352       | 1.5-13    | 1/2-20 | with through hole/ jaws with carbide inserts | 42.70     | 64.50              | 72.40              | 390520   | 93.10    |

### Plastic Design With Retaining Ring

| Rohm Id. No. | Cap. (mm) | Mount  | Notes  | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|-----------|--------|--|-----------|--------------------|--------------------|----------|----------|
| 767639       | 1-10      | 1/2-20 | with through hole                            | 42.70     | 55                 | 60.90              | 390465   | 34.11    |
| 664467       | 1-10      | 3/8-24 | with through hole                            | 42.70     | 55                 | 60.90              | 390450   | 41.42    |
| 767692       | 1.5-13    | 1/2-20 | with through hole/ jaws with carbide inserts | 42.70     | 64.50              | 72.40              | 390490   | 83.80    |
| 767657       | 1.5-13    | 3/8-24 | with through hole/ jaws with carbide inserts | 42.70     | 64.50              | 72.40              | 390475   | 83.80    |

### Plastic Design Without Retaining Ring

| Rohm Id. No. | Cap. (mm) | Mount   | Notes  | O.D. (mm) | Opened Length (mm) | Closed Length (mm) | Code No. | Price \$ |
|--------------|-----------|---------|--|-----------|--------------------|--------------------|----------|----------|
| 767651       | 1-10      | 1/2"-20 | with through hole                            | 42.70     | 55                 | 60.90              | 390425   | 41.42    |
| 767573       | 1-10      | 3/8"-24 | with through hole                            | 42.70     | 55                 | 60.90              | 390455   | 41.42    |
| 767580       | 1.5-13    | 1/2"-20 | with through hole/ jaws with carbide inserts | 42.70     | 64.50              | 72.40              | 390495   | 48.44    |
| 767641       | 1.5-13    | 3/8"-24 | with through hole/ jaws with carbide inserts | 42.70     | 64.50              | 72.40              | 390480   | 80.00    |

## Rohm Morse Taper Drill Chuck Arbors



- Completely hardened and ground
- Ideal for use with custom tool and work holder designs

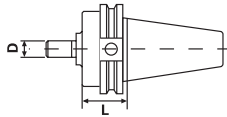


| Rohm Id. No. | Morse Taper | Chuck Taper | Overall Length (in.) | Code No. | Price \$ |
|--------------|-------------|-------------|----------------------|----------|----------|
| 14970        | 1           | JT1         | 3.41                 | 391485   | 18.62    |
| 14971        | 1           | JT2         | 3.62                 | 391490   | 18.62    |
| 14972        | 1           | JT3         | 3.98                 | 391495   | 18.62    |
| 14974        | 1           | JT6         | 3.74                 | 391500   | 18.62    |
| 14976        | 2           | JT1         | 3.98                 | 391510   | 22.61    |
| 14977        | 2           | JT2         | 4.19                 | 391515   | 22.61    |
| 14978        | 2           | JT3         | 4.55                 | 391520   | 22.61    |
| 14981        | 2           | JT6         | 4.31                 | 391530   | 22.61    |
| 14980        | 2           | JT33        | 4.31                 | 391535   | 22.61    |
| 14983        | 3           | JT2         | 4.96                 | 391545   | 29.27    |
| 14984        | 3           | JT3         | 5.31                 | 391550   | 29.27    |
| 14988        | 3           | JT6         | 5.08                 | 391565   | 29.27    |
| 14987        | 3           | JT33        | 5.08                 | 391570   | 29.27    |
| 14991        | 4           | JT3         | 6.34                 | 391580   | 41.22    |
| 14995        | 4           | JT6         | 6.10                 | 391595   | 41.22    |

## CAT Taper Jacobs Taper Adapter

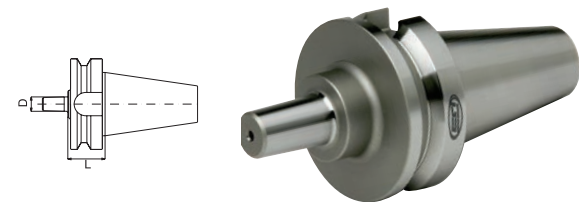


- Shank traverse ground to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- 0.0002" or better ensures the best possible cutting tool life



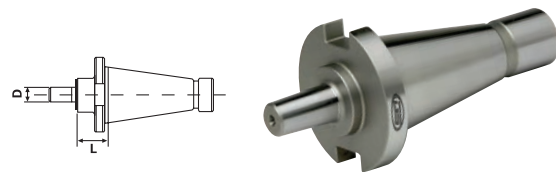
| Taper | JT Size | L    | D     | Code No. | Price \$      |
|-------|---------|------|-------|----------|---------------|
| CT40  | JT#2    | 1.61 | 0.560 | 531490   | <b>152.73</b> |
| CT40  | JT#3    | 1.58 | 0.812 | 531492   | <b>152.73</b> |
| CT40  | JT#4    | 1.49 | 1.13  | 531494   | <b>152.73</b> |
| CT40  | JT#6    | 1.61 | 0.677 | 531496   | <b>152.73</b> |
| CT40  | JT#33   | 1.61 | 0.625 | 531498   | <b>152.73</b> |
| CT50  | JT#2    | 1.61 | 0.560 | 531500   | <b>222.15</b> |
| CT50  | JT#3    | 1.58 | 0.812 | 531502   | <b>222.15</b> |
| CT50  | JT#4    | 1.49 | 1.13  | 531504   | <b>222.15</b> |
| CT50  | JT#6    | 1.61 | 0.677 | 531506   | <b>222.15</b> |
| CT50  | JT#33   | 1.61 | 0.625 | 531508   | <b>222.15</b> |

## BT Taper Jacobs Taper Adapter



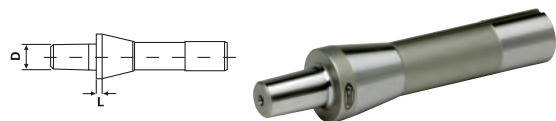
| Taper | JT Size | L    | D     | Code No. | Price \$      |
|-------|---------|------|-------|----------|---------------|
| BT30  | JT#6    | 1.02 | 0.677 | 532224   | <b>134.67</b> |
| BT40  | JT#2    | 1.61 | 0.560 | 532230   | <b>151.34</b> |
| BT40  | JT#3    | 1.57 | 0.812 | 532232   | <b>151.34</b> |
| BT40  | JT#6    | 1.61 | 0.677 | 532234   | <b>151.34</b> |
| BT40  | JT#33   | 1.61 | 0.625 | 532236   | <b>151.34</b> |
| BT50  | JT#6    | 1.77 | 0.677 | 532237   | <b>238.81</b> |

## NMTB Taper Jacobs Taper Adapter



| Taper  | JT Size | L    | D      | Code No. | Price \$      |
|--------|---------|------|--------|----------|---------------|
| NMTB40 | JT#2    | 0.65 | 0.560  | 534442   | <b>154.42</b> |
| NMTB40 | JT#3    | 0.61 | 0.812  | 534444   | <b>154.42</b> |
| NMTB40 | JT#6    | 0.65 | 0.677  | 534446   | <b>154.42</b> |
| NMTB40 | JT#33   | 0.65 | 0.625  | 534448   | <b>154.42</b> |
| NMTB50 | JT#3    | 1.30 | 0.812  | 534452   | <b>215.57</b> |
| NMTB50 | JT#4    | 1.22 | 0.1.13 | 534454   | <b>215.57</b> |

## R8 Jacobs Taper Adapter

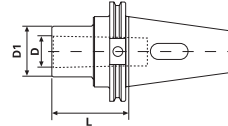


| Taper | JT Size | L    | D     | Code No. | Price \$      |
|-------|---------|------|-------|----------|---------------|
| R8    | JT#2    | 0.13 | 0.560 | 534462   | <b>105.94</b> |
| R8    | JT#3    | 0.13 | 0.812 | 534464   | <b>105.94</b> |
| R8    | JT#6    | 0.13 | 0.677 | 534466   | <b>105.94</b> |
| R8    | JT#33   | 0.13 | 0.625 | 534468   | <b>105.94</b> |

## CAT Morse Taper Adapters



- Shank traverse ground to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- 0.0002" or better ensures the best possible cutting tool life

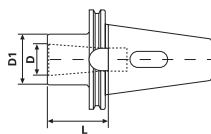


| Taper | Size | L    | D     | D1   | Code No. | Price \$      |
|-------|------|------|-------|------|----------|---------------|
| CT40  | MT#1 | 1.75 | 0.475 | 1.00 | 531510   | <b>173.56</b> |
| CT40  | MT#2 | 2.36 | 0.700 | 1.25 | 531512   | <b>173.56</b> |
| CT40  | MT#3 | 3.00 | 0.938 | 1.57 | 531514   | <b>187.44</b> |
| CT40  | MT#4 | 3.54 | 1.23  | 1.97 | 531516   | <b>197.16</b> |
| CT50  | MT#2 | 1.75 | 0.700 | 1.25 | 531518   | <b>255.46</b> |
| CT50  | MT#3 | 1.75 | 0.938 | 1.57 | 531520   | <b>255.46</b> |
| CT50  | MT#4 | 3.00 | 1.23  | 1.97 | 531522   | <b>261.02</b> |
| CT50  | MT#5 | 4.13 | 1.75  | 2.75 | 531524   | <b>301.29</b> |

## BT Morse Taper Adapters

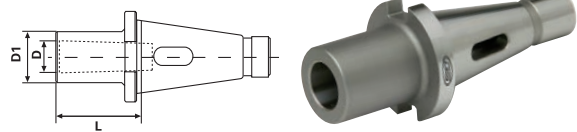


- Shank traverse ground to obtain optimum accuracy
- Meets or exceeds ANSI specifications
- 0.0002" or better ensures the best possible cutting tool life



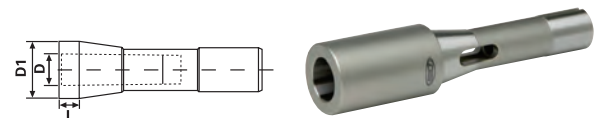
| Taper | Size | L    | D     | D1   | Code No. | Price \$      |
|-------|------|------|-------|------|----------|---------------|
| BT30  | MT#1 | 1.75 | 0.475 | 1.00 | 532238   | <b>163.83</b> |
| BT40  | MT#1 | 1.75 | 0.475 | 1.00 | 532242   | <b>194.37</b> |
| BT40  | MT#2 | 2.36 | 0.700 | 1.25 | 532244   | <b>194.37</b> |
| BT40  | MT#3 | 3.00 | 0.938 | 1.57 | 532246   | <b>188.82</b> |
| BT40  | MT#4 | 3.54 | 1.23  | 1.97 | 532248   | <b>194.37</b> |
| BT50  | MT#2 | 1.75 | 0.700 | 1.25 | 532241   | <b>286.01</b> |
| BT50  | MT#3 | 1.75 | 0.928 | 1.57 | 532243   | <b>286.01</b> |
| BT50  | MT#4 | 3.00 | 1.231 | 1.89 | 532245   | <b>323.49</b> |
| BT50  | MT#5 | 4.00 | 1.748 | 2.48 | 532247   | <b>329.05</b> |

## NMTB Morse Taper Adapters



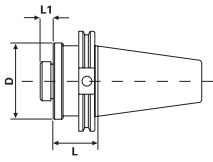
| Taper  | Size | L    | D    | D1   | Code No. | Price \$      |
|--------|------|------|------|------|----------|---------------|
| NMTB40 | MT#2 | 1.75 | 0.70 | 1.25 | 534472   | <b>165.33</b> |
| NMTB40 | MT#3 | 2.25 | 0.94 | 1.57 | 534474   | <b>165.33</b> |
| NMTB40 | MT#4 | 3.00 | 1.23 | 1.97 | 534476   | <b>165.33</b> |
| NMTB50 | MT#2 | 1.88 | 0.70 | 1.25 | 534478   | <b>243.32</b> |
| NMTB50 | MT#3 | 2.38 | 0.94 | 1.57 | 534480   | <b>250.56</b> |
| NMTB50 | MT#4 | 3.25 | 1.23 | 1.97 | 534482   | <b>257.77</b> |
| NMTB50 | MT#5 | 4.63 | 1.75 | 2.75 | 534484   | <b>282.00</b> |

## R8 Morse Taper Adapters



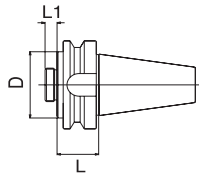
| Taper | Size | L    | D    | D1   | Code No. | Price \$      |
|-------|------|------|------|------|----------|---------------|
| R8    | MT#1 | 0.44 | 0.48 | 1.00 | 534486   | <b>109.15</b> |
| R8    | MT#2 | 0.44 | 0.70 | 1.25 | 534488   | <b>109.15</b> |
| R8    | MT#3 | 2.56 | 0.94 | 1.57 | 534490   | <b>119.89</b> |

## CT Taper Boring Head Holders



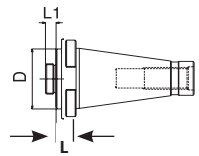
| Taper | Thread     | L    | L1   | D    | Code No. | Price \$ |
|-------|------------|------|------|------|----------|----------|
| CT40  | 7/8 - 20   | 1.75 | 0.44 | 1.75 | 531526   | 137.38   |
| CT40  | 1-1/2 - 18 | 1.75 | 0.50 | 2.96 | 531528   | 140.12   |
| CT50  | 1-1/2 - 18 | 1.75 | 0.50 | 2.96 | 531532   | 197.10   |

## BT Taper Boring Head Holders



| Taper | Thread   | L    | L1   | D    | Code No. | Price \$ |
|-------|----------|------|------|------|----------|----------|
| BT30  | 1-1/2-18 | 1.75 | 0.50 | 2.96 | 532252   | 138.85   |

## NMTB Taper Boring Head Holders



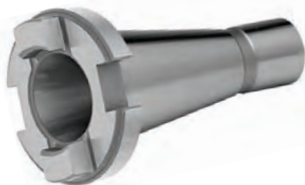
| Taper  | Thread   | L    | L1   | D    | Code No. | Price \$ |
|--------|----------|------|------|------|----------|----------|
| NMTB40 | 7/8-20   | 1.75 | 0.44 | 1.75 | 534492   | 139.40   |
| NMTB50 | 7/8-20   | 1.75 | 0.44 | 1.75 | 534496   | 204.77   |
| NMTB50 | 1-1/2-18 | 1.75 | 0.50 | 2.94 | 534498   | 197.58   |

## NMTB30 JT6 Jacobs Taper Adapter



| Taper | Size  | Draw Bar | Code No. | Price \$ |
|-------|-------|----------|----------|----------|
| 30    | JT-3  | 1/2-13   | 420147   | 228.45   |
| 30    | JT-33 | 1/2-13   | 420148   | 241.31   |
| 30    | JT-6  | 1/2-13   | 420149   | 241.31   |

## NMTB To NMTB Taper Open End Adapters



| Outside Taper | Inside Taper | Code No. | Price \$ |
|---------------|--------------|----------|----------|
| 40            | 30           | 420035   | 466.95   |
| 50            | 30           | 420040   | 548.49   |
| 50            | 40           | 420045   | 601.66   |

## NMTB To R8 Taper Adapters

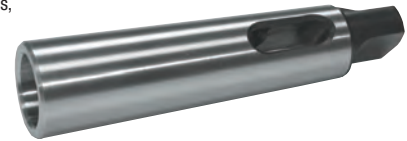


| Outside Taper | Inside Taper | Draw Bar | Code No. | Price \$ |
|---------------|--------------|----------|----------|----------|
| 40            | R-8          | 5/8-11   | 420060   | 482.62   |

## Morse Taper Sleeves

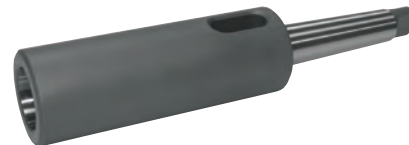


**Hardened and Ground Throughout**  
Used to convert spindles to smaller tapers and to extend the spindles of drill presses, radial drills, boring mills, turret lathes and similar machines.



| Sleeve No. | Morse Taper Hole | Morse Taper Outside | Overall Length | Code No. | Price \$ |
|------------|------------------|---------------------|----------------|----------|----------|
| 12         | 1                | 2                   | 3-5/8          | 420305   | 10.40    |
| 13         | 1                | 3                   | 3-7/8          | 420310   | 11.84    |
| 23         | 2                | 3                   | 4-3/8          | 420315   | 11.29    |
| 14         | 1                | 4                   | 4-7/8          | 420320   | 13.38    |
| 24         | 2                | 4                   | 5              | 420325   | 12.72    |
| 34         | 3                | 4                   | 5-1/2          | 420330   | 12.39    |
| 15         | 1                | 5                   | 6-1/8          | 420335   | 27.77    |
| 25         | 2                | 5                   | 6-1/8          | 420340   | 27.77    |
| 35         | 3                | 5                   | 6-1/8          | 420345   | 26.11    |
| 45         | 4                | 5                   | 6-3/4          | 420350   | 26.11    |
| 36         | 3                | 6                   | 8-5/8          | 420353   | 46.03    |
| 46         | 4                | 6                   | 8-5/8          | 420355   | 46.03    |
| 56         | 5                | 6                   | 8-5/8          | 420360   | 46.03    |

## Extension Length Sockets



| Sleeve No. | Morse Taper Hole | Morse Taper Shank | Overall Length | Soft, Hard. Tang Code No. | Price \$ |
|------------|------------------|-------------------|----------------|---------------------------|----------|
| 21         | 2                | 1                 | 6-1/4          | 420405                    | 165.44   |
| 12         | 1                | 2                 | 6-1/4          | 420410                    | 167.31   |
| 22         | 2                | 2                 | 6-7/8          | 420415                    | 157.65   |
| 32         | 3                | 2                 | 7-3/4          | 420420                    | 180.18   |
| 23         | 2                | 3                 | 7-5/8          | 420435                    | 186.62   |
| 33         | 3                | 3                 | 8-1/2          | 420440                    | 189.83   |
| 43         | 4                | 3                 | 9-1/2          | 420445                    | 260.61   |
| 53         | 5                | 3                 | 10-1/2         | 420450                    | 408.30   |
| 34         | 3                | 4                 | 9-1/2          | 420465                    | 225.22   |
| 44         | 4                | 4                 | 10-1/2         | 420470                    | 299.22   |
| 54         | 5                | 4                 | 11-7/8         | 420475                    | 424.71   |
| 35         | 3                | 5                 | 10-1/2         | 420480                    | 291.05   |
| 45         | 4                | 5                 | 11-7/8         | 420485                    | 337.83   |
| 55         | 5                | 5                 | 13-1/4         | 420490                    | 489.06   |
| 65         | 6                | 5                 | 15-3/8         | 420495                    | 823.67   |
| 46         | 4                | 6                 | 14             | 420500                    | 518.05   |
| 56         | 5                | 6                 | 15-3/8         | 420505                    | 620.07   |

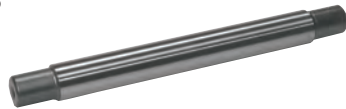
## Solid Sockets

Hardened and ground throughout.



| Socket No. | Overall Length (in.) | Morse Taper Hole | Outside Dia. (in.) | Code No. | Price \$ |
|------------|----------------------|------------------|--------------------|----------|----------|
| 1          | 3-1/2                | 1                | 1                  | 420805   | 148.01   |
| 2          | 3-1/2                | 1                | 1-1/4              | 420810   | 134.08   |
| 3          | 3-1/2                | 1                | 1-1/2              | 420815   | 173.92   |
| 4          | 4                    | 2                | 1                  | 420820   | 205.92   |
| 5          | 4                    | 2                | 1-1/4              | 420825   | 205.92   |
| 6          | 4                    | 2                | 1-1/2              | 420830   | 205.92   |
| 7          | 4                    | 2                | 1-3/4              | 420835   | 172.94   |
| 8          | 4                    | 2                | 2                  | 420840   | 229.14   |
| 9          | 4-3/4                | 3                | 1-1/4              | 420845   | 222.00   |
| 10         | 4-3/4                | 3                | 1-1/2              | 420850   | 222.00   |
| 11         | 4-3/4                | 3                | 1-3/4              | 420855   | 222.00   |
| 12         | 4-3/4                | 3                | 2                  | 420860   | 254.18   |
| 13         | 6                    | 4                | 1-1/2              | 420865   | 276.70   |
| 14         | 6                    | 4                | 1-3/4              | 420870   | 276.70   |
| 15         | 6                    | 4                | 2                  | 420875   | 315.31   |
| 16         | 7-3/8                | 5                | 2-1/4              | 420880   | 346.58   |
| 17         | 7-3/8                | 5                | 2-1/2              | 420885   | 229.06   |
| 18         | 10-1/8               | 6                | 3-1/4              | 420890   | 734.97   |
| 19         | 10-1/8               | 6                | 3-1/2              | 420895   | 849.42   |

## Lathe Mandrels



| Diameter (in.) | Overall Length (in.) | Code No. | Price \$ |
|----------------|----------------------|----------|----------|
| 1-5/8          | 9-1/2                | 425295   | 83.99    |

## Annular Cutter Holders



Straight Shank

R8 Shank

Morse Taper Shank

- Holder shank allows different machines to drive cutter
- Select adapter lengths reduce the number of machine set ups



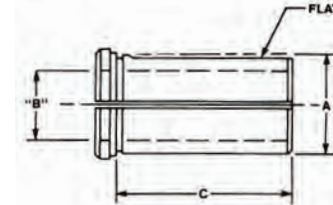
See page D6 for Annular Cutters

| Model No.                       | Shank | Cutter Shank Size | Gauge Length | Code No. | Price \$ |
|---------------------------------|-------|-------------------|--------------|----------|----------|
| <b>Straight Shank - 3 Flats</b> |       |                   |              |          |          |
| HEN-1                           | 1/2   | 3/4               | 2-1/8        | 425435   | 273.49   |
| HEN-2                           | 3/4   | 3/4               | 2            | 425436   | 273.49   |
| HEN-2-6                         | 3/4   | 3/4               | 6            | 425437   | 293.05   |
| HEN-2-12                        | 3/4   | 3/4               | 12           | 425438   | 334.61   |
| HEN-6-6                         | 3/4   | 1-1/4             | 6            | 425440   | 336.22   |
| HEN-6-12                        | 3/4   | 1-1/4             | 12           | 425441   | 296.01   |
| <b>Straight Shank - 2 Flats</b> |       |                   |              |          |          |
| HEN-9-6                         | 3/4   | 3/4               | 6            | 425442   | 341.35   |
| <b>Morse Taper Shank</b>        |       |                   |              |          |          |
| HEN-3                           | MT2   | 3/4               | 2            | 425444   | 329.91   |
| HEN-3-6                         | MT2   | 3/4               | 6            | 425445   | 366.79   |
| HEN-3-12                        | MT2   | 3/4               | 12           | 425446   | 331.40   |
| HEN-4                           | MT3   | 3/4               | 2            | 425447   | 363.58   |
| HEN-4-6                         | MT3   | 3/4               | 6            | 425448   | 415.05   |
| HEN-4-12                        | MT3   | 3/4               | 12           | 425449   | 521.23   |
| HEN-8                           | MT3   | 1-1/4             | 2-3/4        | 425450   | 415.05   |
| HEN-8-6                         | MT3   | 1-1/4             | 6            | 425451   | 452.27   |
| <b>R8 Shank</b>                 |       |                   |              |          |          |
| HEN-5                           | R8    | 3/4               | 1-3/4        | 425453   | 389.32   |
| HEN-7-6                         | R8    | 1-1/4             | 6            | 425457   | 445.30   |
| HEN-7-12                        | R8    | 1-1/4             | 12           | 425458   | 590.76   |

## Type B CNC Toolholder Bushings



- Split style
- Shorter length
- Clamp on flat
- Bushing collapses to hold tool
- Used for drills, boring bars, and other tools

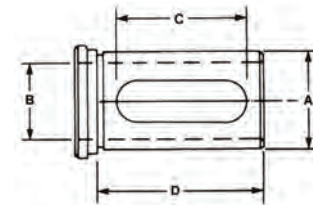


| Bushing Type | Dia. (A) | Bore (B) | Length Under Head (C) | Code No. | Price \$ |
|--------------|----------|----------|-----------------------|----------|----------|
| B            | 1-1/2"   | 1/2"     | 2-1/2"                | 470510   | 103.05   |
| B            | 1-1/2"   | 5/8"     | 2-1/2"                | 470511   | 103.05   |
| B            | 1-1/2"   | 3/4"     | 2-1/2"                | 470512   | 103.05   |
| B            | 1-1/2"   | 1"       | 2-1/2"                | 470513   | 103.05   |
| B            | 1-1/2"   | 1-1/4"   | 2-1/2"                | 470514   | 103.05   |
| B            | 2"       | 5/8"     | 3-1/2"                | 470515   | 167.34   |
| B            | 2"       | 3/4"     | 3-1/2"                | 470516   | 167.34   |
| B            | 2"       | 1"       | 3-1/2"                | 470517   | 167.34   |
| B            | 2"       | 1-1/4"   | 3-1/2"                | 470518   | 167.34   |
| B            | 2"       | 1-1/2"   | 3-1/2"                | 470519   | 167.34   |
| B            | 2"       | 1-3/4"   | 3-1/2"                | 470520   | 167.34   |

## Type C CNC Toolholder Bushings



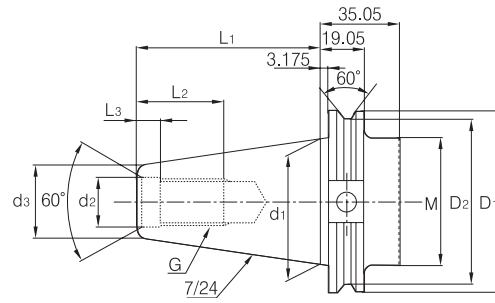
- Designed for use on all CNC Turning Machines
- Elongated slot
- For use with drills, boring bars, reamers, etc.
- Precision ground throughout



| Bushing Type | Dia. (A) | Bore (B) | Length of Slot (C) | Length Under Head (D) | Code No. | Price \$ |
|--------------|----------|----------|--------------------|-----------------------|----------|----------|
| C            | 1-1/2"   | 1/2"     | 3"                 | 3-3/8"                | 470500   | 112.07   |
| C            | 1-1/2"   | 5/8"     | 3"                 | 3-3/8"                | 470501   | 112.07   |
| C            | 1-1/2"   | 3/4"     | 3"                 | 3-3/8"                | 470502   | 112.07   |
| C            | 1-1/2"   | 1"       | 3"                 | 3-3/8"                | 470503   | 112.07   |
| C            | 1-1/2"   | 1-1/4"   | 3"                 | 3-3/8"                | 470504   | 112.07   |
| C            | 2"       | 3/4"     | 3-5/8"             | 4"                    | 470505   | 170.48   |
| C            | 2"       | 1"       | 3-5/8"             | 4"                    | 470506   | 170.48   |
| C            | 2"       | 1-1/4"   | 3-5/8"             | 4"                    | 470507   | 170.48   |
| C            | 2"       | 1-1/2"   | 3-5/8"             | 4"                    | 470508   | 170.48   |
| C            | 2"       | 1-3/4"   | 3-5/8"             | 4"                    | 470509   | 170.48   |

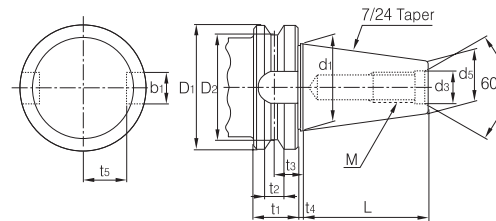


## CAT Taper Dimensions



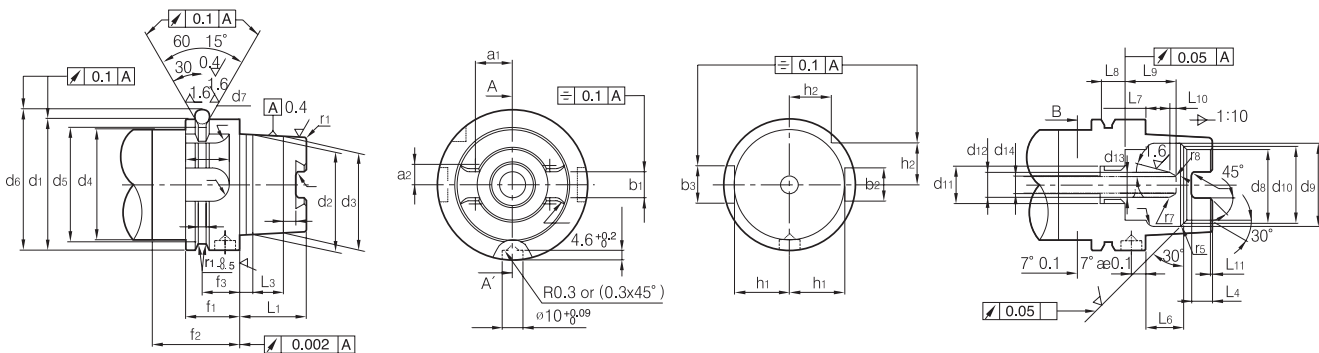
| Shank No. | D1    | D2    | M     | d1    | d2    | d3    | L1    | L2    | L3   | G      |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| CAT40     | 63.5  | 56.36 | 44.45 | 44.45 | 16.28 | 21.84 | 68.25 | 28.45 | 4.78 | 5/8-11 |
| CAT45     | 82.55 | 75.41 | 57.15 | 57.15 | 19.46 | 27.69 | 82.55 | 38.1  | 4.78 | 3/4-10 |
| CAT50     | 98.43 | 91.29 | 69.85 | 69.85 | 26.19 | 35.05 | 101.6 | 44.45 | 6.35 | 1-8    |

## BT Taper Dimensions



| Shank No. | D1  | D2  | t1 | t2 | t3   | t4 | d1     | d3 | L     | M        | b1   | t5   | d5    |
|-----------|-----|-----|----|----|------|----|--------|----|-------|----------|------|------|-------|
| BT35      | 53  | 43  | 22 | 10 | 14.6 | 2  | 38.1   | 13 | 56.5  | M12x1.75 | 16.1 | 19.6 | 21.62 |
| BT40      | 63  | 52  | 25 | 10 | 16.6 | 2  | 44.45  | 17 | 65.4  | M16x2    | 16.1 | 22.6 | 25.3  |
| BT45      | 85  | 73  | 30 | 12 | 21.2 | 3  | 57.15  | 21 | 82.8  | M20x25   | 9.3  | 29.1 | 33.1  |
| BT50      | 100 | 85  | 35 | 15 | 23.2 | 3  | 69.85  | 25 | 101.8 | M24x3    | 25.7 | 35.4 | 40.1  |
| BT60      | 155 | 135 | 45 | 20 | 28.2 | 3  | 107.95 | 31 | 161.8 | M30x3.5  | 25.7 | 60.1 | 60.7  |

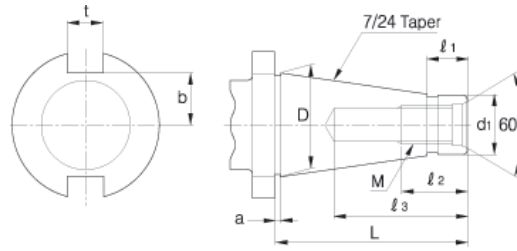
## HSK Taper Dimensions



| Shank No. | b1    | b2 | b3 | d1  | d2 | d3    | d4 | d5 | d6     | d7 | d8 | d9 | d10 | d11     | d12 | d13 | d14 | a1     | a2    |
|-----------|-------|----|----|-----|----|-------|----|----|--------|----|----|----|-----|---------|-----|-----|-----|--------|-------|
| HSK50     | 10.54 | 12 | 14 | 50  | 38 | 36.9  | 42 | 43 | 59.3   | 7  | 26 | 32 | 29  | M16X1   | 10  | 6.8 | 6.8 | 13.997 | 7.648 |
| HSK63     | 12.5  | 16 | 14 | 63  | 48 | 46.53 | 53 | 55 | 72.3   | 7  | 34 | 40 | 37  | M18X1   | 12  | 8   | 8.4 | 17.862 | 9.25  |
| HSK100    | 20    | 20 | 14 | 100 | 75 | 72.80 | 85 | 92 | 109.75 | 7  | 53 | 63 | 58  | M24X1.5 | 16  | 12  | 12  | 27.329 | 15    |

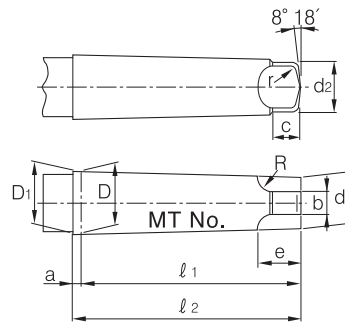
| Shank No. | f1 | f2 | f3 | f4   | b1   | b2   | L1 | L2  | L3   | L4  | L5  | L6    | L7   | L8 | L9   | L10 | L11 | L12 | r1  | r2  | r3   | r4 | r5  | r6  | r7 | r8 |
|-----------|----|----|----|------|------|------|----|-----|------|-----|-----|-------|------|----|------|-----|-----|-----|-----|-----|------|----|-----|-----|----|----|
| HSK50     | 26 | 42 | 18 | 3.75 | 2    | 15.5 | 25 | 5   | 11   | 7.5 | 4.5 | 14.13 | 10   | 10 | 23   | 3   | 1   | 19  | 1   | 1.5 | 2.38 | 6  | 0.5 | 1   | 2  | 6  |
| HSK63     | 26 | 42 | 18 | 3.75 | 28.5 | 20   | 32 | 6.3 | 14.7 | 10  | 6   | 18.13 | 10   | 12 | 24.5 | 3   | 1   | 21  | 1.2 | 1.5 | 3    | 8  | 0.6 | 1.5 | 3  | 8  |
| HSK100    | 29 | 45 | 20 | 3.75 | 44   | 31.5 | 50 | 10  | 24   | 15  | 10  | 28.56 | 12.5 | 16 | 28   | 3   | 1.5 | 24  | 2   | 2   | 3    | 12 | 1   | 1.5 | 3  | 10 |

## NMTB Taper Dimensions



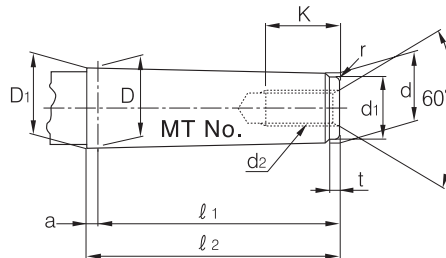
| MT No. | D             | d1                   | L   | l1 | M        | l2 | l3  | a   | t    | b    |
|--------|---------------|----------------------|-----|----|----------|----|-----|-----|------|------|
| 30     | 1-1/4"-31.75  | 17.40 (-0.29/-0.36)  | 70  | 20 | UNC-1/2" | 24 | 50  | 1.6 | 15.9 | 6    |
| 40     | 1-3/4"-44.45  | 25.32 (-0.30/-0.387) | 95  | 25 | UNC-5/8" | 30 | 60  | 1.6 | 15.9 | 22.5 |
| 50     | 2-3/4"-69.85  | 39.60 (-0.31/-0.41)  | 130 | 25 | UNC-1"   | 45 | 90  | 3.2 | 25.4 | 35   |
| 60     | 4-1/4"-107.95 | 60.20 (-0.34/-0.46)  | 210 | 45 | UNC1/4"  | 56 | 110 | 3.2 | 25.4 | 60   |

## Morse Taper With Tang



| MT No. | Taper    | Taper Angle(a) | D      | a   | D1     | d1     | l1    | l2   | d2   | b    | c   | e    | R  | r   |
|--------|----------|----------------|--------|-----|--------|--------|-------|------|------|------|-----|------|----|-----|
| 0      | 1/19.212 | 1°29'27"       | 9.045  | 3   | 9.201  | 6.104  | 56.5  | 59.5 | 6    | 3.9  | 6.5 | 10.5 | 4  | 1   |
| 1      | 1/20.047 | 1°25'43"       | 12.065 | 3.5 | 12.24  | 8.972  | 62    | 65.5 | 8.7  | 5.2  | 8.5 | 13.5 | 5  | 1.2 |
| 2      | 1/20.020 | 1°25'50"       | 17.78  | 5   | 18.03  | 14.034 | 75    | 80   | 13.5 | 6.3  | 10  | 16   | 6  | 1.6 |
| 3      | 1/19.922 | 1°26'16"       | 23.825 | 5   | 24.076 | 19.107 | 94    | 99   | 18.5 | 7.9  | 13  | 20   | 7  | 2   |
| 4      | 1/19.254 | 1°29'15"       | 31.267 | 6.5 | 31.605 | 25.164 | 117.5 | 124  | 24.5 | 11.9 | 16  | 24   | 8  | 2.5 |
| 5      | 1/19.002 | 1°30'26"       | 44.399 | 6.5 | 4.741  | 36.531 | 149.5 | 156  | 35.7 | 15.9 | 19  | 29   | 10 | 3   |
| 6      | 1/19.180 | 1°29'36"       | 63.348 | 8   | 63.765 | 52.399 | 210   | 218  | 51   | 19   | 27  | 40   | 13 | 4   |
| 7      | 1/19.231 | 1°29'22"       | 83.058 | 10  | 83.578 | 68.186 | 286   | 296  | 66.8 | 28.6 | 35  | 54   | 19 | 5   |

## Morse Taper Screw Type



| MT No. | Taper    | Taper Angle(a) | D      | a   | D1     | d1     | l1    | l2  | d1   | d2  | k  | t    | r   |
|--------|----------|----------------|--------|-----|--------|--------|-------|-----|------|-----|----|------|-----|
| 0      | 1/19.212 | 1°29'27"       | 9.045  | 3   | 9.201  | 6.442  | 50    | 53  | 6    | -   | -  | 4    | 0.2 |
| 1      | 1/20.047 | 1°25'43"       | 12.065 | 3.5 | 12.23  | 9.396  | 53.5  | 57  | 9    | M6  | 16 | 5    | 0.2 |
| 2      | 1/20.020 | 1°25'50"       | 17.78  | 5   | 18.03  | 14.583 | 64    | 69  | 14   | M10 | 24 | 5    | 0.2 |
| 3      | 1/19.922 | 1°26'16"       | 23.825 | 5   | 24.076 | 19.759 | 81    | 86  | 19   | M12 | 28 | 7    | 0.6 |
| 4      | 1/19.254 | 1°29'15"       | 31.267 | 6.5 | 31.605 | 25.943 | 2.5   | 109 | 25   | M16 | 32 | 9    | 1   |
| 5      | 1/19.002 | 1°30'26"       | 44.399 | 6.5 | 4.741  | 37.584 | 129.5 | 136 | 35.7 | M20 | 40 | 9    | 2.5 |
| 6      | 1/19.180 | 1°29'36"       | 63.348 | 8   | 63.765 | 53.859 | 182   | 190 | 51   | M24 | 50 | 12   | 4   |
| 7      | 1/19.231 | 1°29'22"       | 83.058 | 10  | 83.578 | 70.058 | 250   | 260 | 65   | M33 | 80 | 18.5 | 5   |





## Universal Boring And Facing Masterhead

### Solve ALL Your Boring and Facing Problems

- Ideal for boring in a wide range of diameters
- Hardened and precision ground for long life and extreme accuracy
- Allows for multi-tool boring
- Suitable for precision boring of cylindrical holes and for machining of external cylindrical surfaces



| Model No.  | 1-3/8"   |          | 2-1/8"   |          | 3-1/8"   |          | 4-7/8"   |           | 6-1/4"   |           |
|--|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|
|  | VHU 36   | Price \$ | VHU 56   | Price \$ | VHU 80   | Price \$ | VHU 125  | Price \$  | VHU 160  | Price \$  |
| Code No.   | 300007   | 6,496.79 | 300055   | 8,257.54 | 300105   | 9,509.16 | 300155   | 10,499.30 | 300205   | 12,292.75 |
| <b>QUICK RETURN MOVEMENT QUICK RETURN ADJUSTMENT THROUGH SLIDE SETTING SCREW</b> |          |          |          |          |          |          |          |           |          |           |
| Operating Accuracy   | ± 0.0002 |          | ± 0.0002 |          | ± 0.0002 |          | ± 0.0002 |           | ± 0.0002 |           |
| Boring and facing range from 0 up to   | 9        |          | 13       |          | 16       |          | 24       |           | 31       |           |
| Max. adjustability of slide  | 1.375    |          | 2.125    |          | 3.125    |          | 4.875    |           | 6.250    |           |
| Max. dia. of slide   | 2.750    |          | 4.250    |          | 6.250    |          | 9.750    |           | 11.500   |           |
| Various automatic slide – feeds per revolution                                   | 0.0016   |          | 0.004    |          | 0.004    |          | 0.004    |           | 0.004    |           |
|  | 0.0032   |          | 0.006    |          | 0.006    |          | 0.006    |           | 0.006    |           |
|  | 0.0048   |          | 0.008    |          | 0.008    |          | 0.008    |           | 0.008    |           |
| 1 graduation of sensitive adjustments ins. on dia.                               | 0.0005   |          | 0.0005   |          | 0.0005   |          | 0.0005   |           | 0.0005   |           |
| 1 Revolution of sensitive adjustment   | 0.016    |          | 0.016    |          | 0.016    |          | 0.016    |           | 0.016    |           |
| Quick return per revolution  | 0.030    |          | 0.120    |          | 0.120    |          | 0.160    |           | 0.160    |           |
| Diameter of tool post holes in slide   | 5/8      |          | 1        |          | 1        |          | 1-1/4    |           | 1-1/4    |           |
| Height of Head without shank   | 3.125    |          | 4.350    |          | 4.350    |          | 5.000    |           | 5.000    |           |
| Width of Head  | 2.875    |          | 4.500    |          | 5.500    |          | 7.000    |           | 8.725    |           |
| Weight of head without shank   | 4 lb     |          | 12 lb    |          | 16 lb    |          | 26.6 lb  |           | 31 lb    |           |
| Accessories  | 300003   | 1,571.59 | 300053   | 2,920.17 | 300104   | 2,920.17 | -        | -         | -        | -         |
| Head only  | 300004   | 6,330.06 | 300054   | 7,690.59 | 300103   | 8,148.01 | 300154   | 10,255.14 | 300203   | 11,420.45 |
| Case only  | -        | -        | 300052   | 367.66   | 300102   | 979.50   | 300204   | 1,195.71  | 300204   | 1,195.71  |
| Shank M.T. 2   | 300010   | 601.69   | -        | -        | -        | -        | -        | -         | -        | -         |
| Shank M.T. 3   | 300015   | 634.02   | -        | -        | -        | -        | -        | -         | -        | -         |
| Shank M.T. 4   | 300020   | 732.12   | 300110   | 811.13   | 300110   | 811.13   | -        | -         | -        | -         |
| Shank M.T. 5   | -        | -        | 300115   | 986.81   | 300115   | 986.81   | 300115   | 986.81    | 300115   | 986.81    |
| Shank M.T. 6   | -        | -        | -        | -        | 300165   | 1,381.54 | 300165   | 1,381.54  | 300165   | 1,381.54  |
| Shank ISA - 30   | 300025   | 555.03   | -        | -        | -        | -        | -        | -         | -        | -         |
| Shank ISA - 40   | 300030   | 601.69   | 300070   | 775.98   | 300070   | 775.98   | -        | -         | -        | -         |
| Shank ISA - 50   | -        | -        | 300075   | 980.77   | 300075   | 980.77   | 300075   | 980.77    | 300075   | 980.77    |
| Shank R - 8  | 300035   | 620.81   | 300080   | 637.75   | -        | -        | -        | -         | -        | -         |
| Shank Straight 3/4"  | 300039   | 346.64   | -        | -        | -        | -        | -        | -         | -        | -         |
| Shank Straight 1"  | 300040   | 452.56   | -        | -        | -        | -        | -        | -         | -        | -         |
| Shank Cat - 40   | 300033   | 811.13   | 300073   | 934.49   | -        | -        | -        | -         | -        | -         |
| Shank Cat - 50   | -        | -        | 300076   | 1,013.11 | 300076   | 1,013.11 | 300076   | 1,013.11  | 300076   | 1,013.11  |
| Shank BT - 40  | 300034   | 984.11   | 300074   | 1,062.99 | -        | -        | -        | -         | -        | -         |
| Shank BT - 50  | -        | -        | 300077   | 1,130.70 | 300077   | 1,130.70 | 300077   | 1,130.70  | 300077   | 1,130.70  |
| Tang M.T. 2  | 300245   | 88.08    | -        | -        | -        | -        | -        | -         | -        | -         |
| Tang M.T. 3  | 300250   | 115.80   | -        | -        | -        | -        | -        | -         | -        | -         |
| Tang M.T. 4  | 300255   | 159.65   | 300255   | 159.65   | 300255   | 159.65   | -        | -         | -        | -         |
| Tang M.T. 5  | -        | -        | 300260   | 221.85   | 300260   | 221.85   | 300260   | 221.85    | 300260   | 221.85    |
| Tang M.T. 6  | -        | -        | -        | -        | 300265   | 214.67   | 300265   | 214.67    | 300265   | 214.67    |

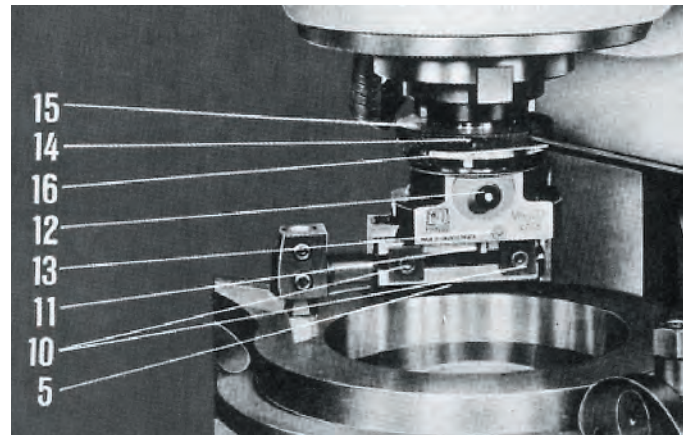
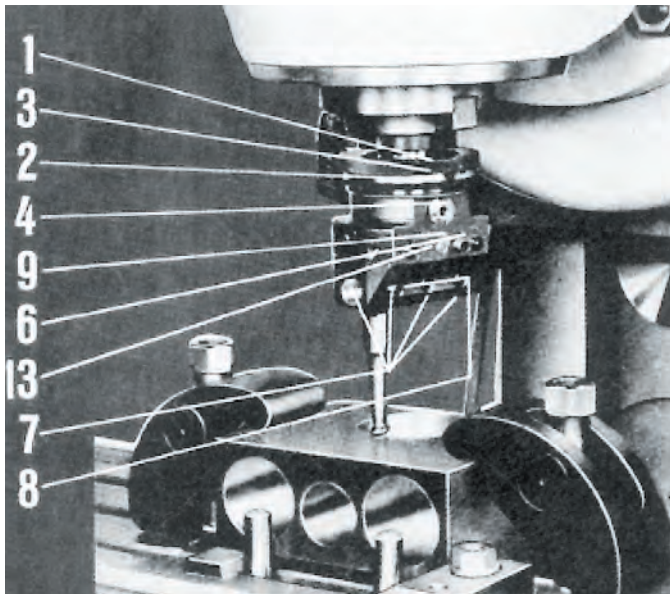
## Standard Equipment Supplied With The Master Head In Case



|                                   |             |                         |                         |                          |                          |
|-----------------------------------|-------------|-------------------------|-------------------------|--------------------------|--------------------------|
| Boring bars                       | 3/8 2pcs    | 1 x 4                   | 1 x 4                   | 1-1/4 x 6                | 1-1/4 x 6                |
| Boring bars                       | 5/8 2pcs    | 1 x 6                   | 1 x 6                   | 1-1/4 x 9-3/4            | 1-1/4 x 9-3/4            |
| Boring bar holders                |             | *1 x 5-1/2<br>*2pcs     | *1 x 5-1/2<br>*2pcs     | *1-1/4 x 6-5/16<br>*2pcs | *1-1/4 x 6-5/16<br>*2pcs |
| Extension holder                  | 5/8 x 3-7/8 | 1 x 6-7/8               | 1 x 6-5/8               | 1-1/4 x 11-13/16         | 1-1/4 x 11-13/16         |
| Complete set of reinforcing rings | 5/8         | 1                       | 1                       | 1-1/4                    | 1-1/4                    |
| Carbide round tool bits           | *5/8        | *1                      | *1                      | *1-1/4                   | *1-1/4                   |
|                                   | *4pcs       | *4pcs                   | *4pcs                   | *4pcs                    | *4pcs                    |
| HSS square tool bits              |             | *5/16 x 1-3/16<br>*4pcs | *5/16 x 1-3/16<br>*4pcs | *3/8 x 1-13/32<br>*4pcs  | *3/8 x 1-13/32<br>*4pcs  |
| Reducing sleeve                   | 5/8 x 3/8   | 1 x 3/4                 | 1 x 3/4                 | 1-1/4 x 3/4              | 1-1/4 x 3/4              |
| Reducing sleeve                   |             | 1 x 5/8                 | 1 x 5/8                 | 1-1/4 x 5/8              | 1-1/4 x 5/8              |

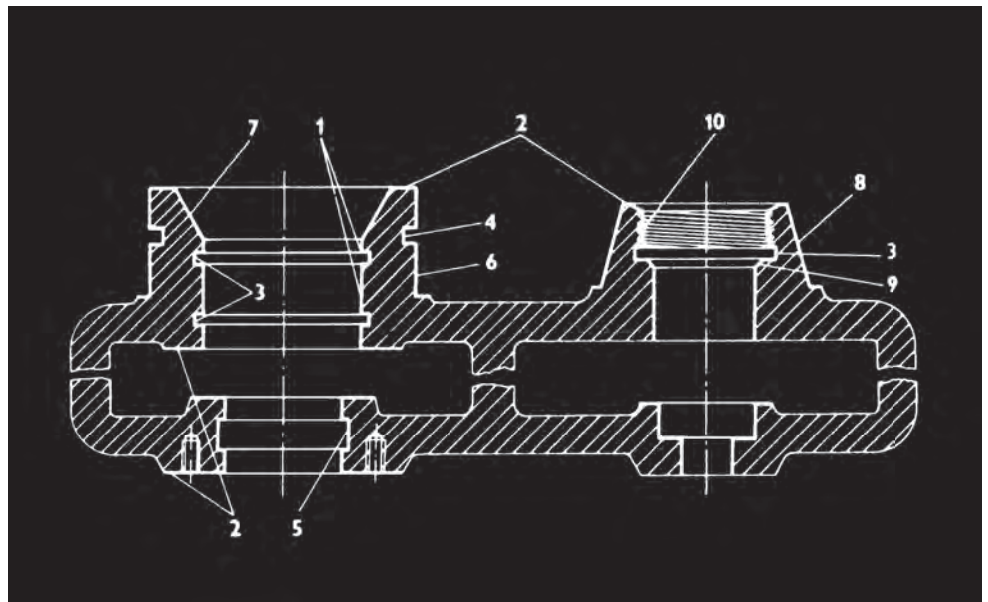
## Principal Component Part of Head Vhu-36

- |  |   |
|--|---|
| 1. Braking ring                        | 10. Stop dog  |
| 2. Engaging ring                       | 11. Stop dog pin  |
| 3. Control ring                        | 12. Knob for rapid traverse control (only in Vhu 1-1/4) |
| 4. Scale                               | 13. Lubricator  |
| 5. Slide                               | 14. Screw for clutch adjustment                         |
| 6. Setting screw                       | 15. Clutch  |
| 7. Holes for tools                     | 16. Retaining rod                                       |
| 8. Clamping screws                     |   |
| 9. Screw for locking slide in position |   |

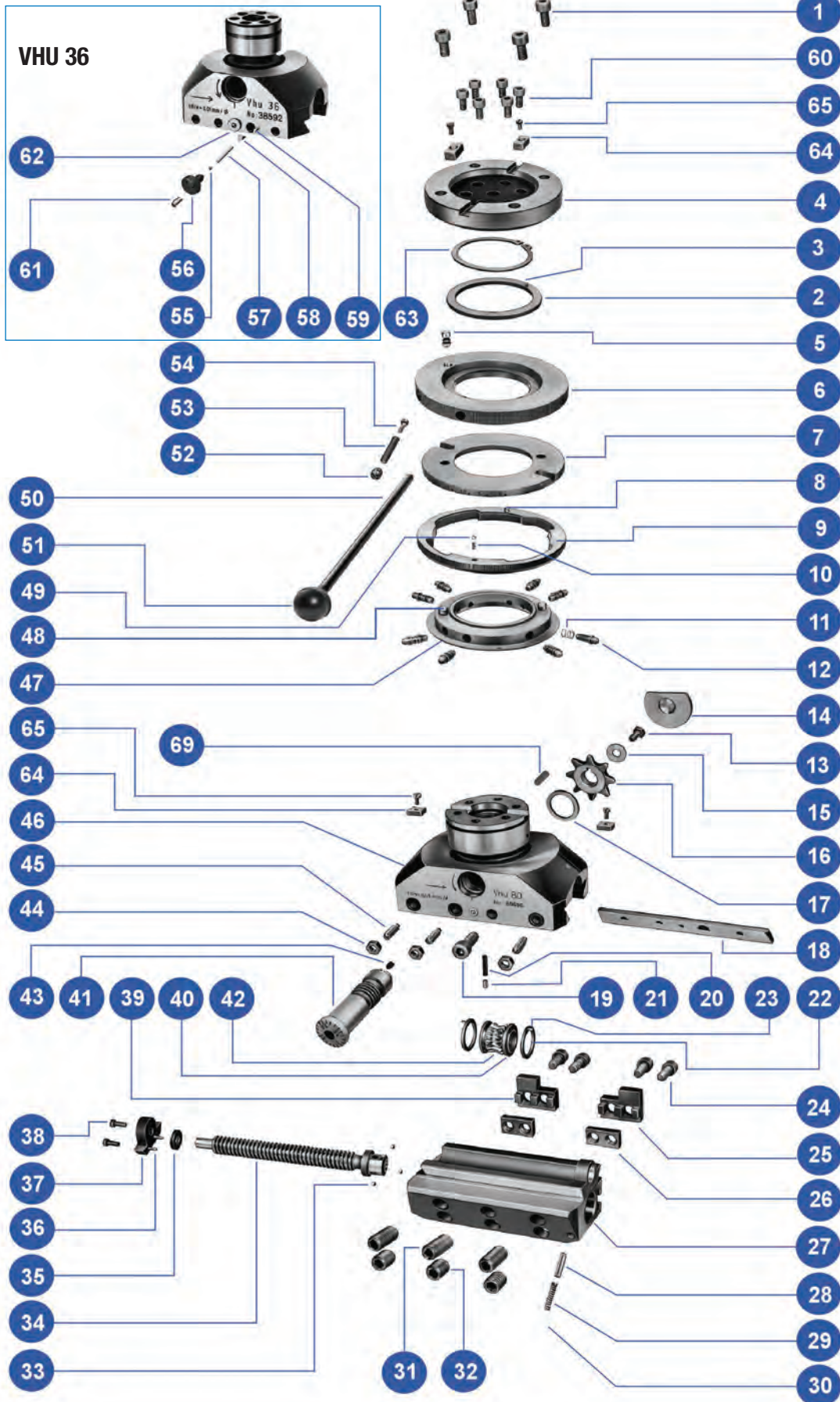


## Basic machining operations shown for the Vhu type universal boring heads:

1. Boring of holes
2. Spotfacing of small end large-diameter end faces
3. Recessing inside holes
4. Recessing on surfaces of parts
5. Free recessing
6. External diameter machining
7. Boring of tapered holes
8. External machining of taper
9. Facing of rear end faces
10. Thread cutting



NAREX BORING HEAD PARTS BREAKDOWN FOR VHU 36, 56, 80, 125, 160



NAREX BORING HEAD PARTS BREAKDOWN FOR VHU 36, 56, 80, 125, 160 CONTINUED



## Narex Boring And Facing Head Parts



| New ID No. | Description                     | pcs | VHU-36 (1-3/8") |          | pcs | VHU-56 (2-1/8") |          | pcs | VHU-125 (4-7/8") |          | Price \$ |
|------------|---------------------------------|-----|-----------------|----------|-----|-----------------|----------|-----|------------------|----------|----------|
|            |                                 |     | Code No.        | Price \$ |     | Code No.        | Price \$ |     | Code No.         | Price \$ |          |
| 1          | Cap Screw                       | 4   | 300770          | 2.36     | 4   | 300588          | 3.83     | 4   | 300588           | 3.83     |          |
| 2          | Ring                            | 1   | 300702          | 106.44   | 1   | 300503          | 395.76   | 1   | 300603           | 211.50   |          |
| 3          | Pin                             | 1   | 300736          | 2.36     | 1   | 300551          | 2.36     | 1   | 300655           | 2.36     |          |
| 4          | Flange (Hold-Ring)              | 1   | 300771          | 712.95   | 1   | 300480(vhu-56)  | 747.25   | 1   | 300691           | 1,318.84 |          |
|            |                                 |     |                 |          | 1   | 300591(vhu-80)  | 1,230.73 |     | -                | -        |          |
| 5          | Clutch Pin (Safety pin)         | 1   | 300726          | 87.97    | 1   | 300505          | 114.98   | 1   | 300605           | 114.98   |          |
| 6          | Hold Ring (Brake ring)          | 1   | 300703          | 510.24   | 1   | 300504          | 967.19   | 1   | 300604           | 879.34   |          |
| 7          | Set Ring                        | 1   | 300704          | 483.72   | 1   | 300506          | 642.32   | 1   | 300606           | 721.49   |          |
| 8          | Pin                             | 2   | 300736          | 2.36     | 2   | 300554          | 1.62     | 2   | 300658           | 1.62     |          |
| 9          | Ring (Control Ring)             | 1   | 300705          | 342.96   | 1   | 300507          | 668.97   | 1   | 300607           | 782.70   |          |
| 10         | Spring                          | 2   | 300720          | 2.36     | 1   | 300540          | 3.10     | 1   | 300640           | 3.10     |          |
| 11         | Spring                          | 6   | 300707          | 2.36     | 8   | 300511          | 1.62     | 8   | 300611           | 1.62     |          |
| 12         | Pin                             | 6   | 300708          | 42.87    | 8   | 300509          | 105.68   | 8   | 300609           | 105.68   |          |
| 13         | Cap Screw                       | 1   | 300764          | 2.36     | 1   | 300546          | 26.76    | 1   | 300650           | 26.76    |          |
| 14         | Cover (Lid)                     | 1   | 300716          | 56.63    | 1   | 300518          | 42.87    | 1   | 300618           | 68.51    |          |
| 15         | Washer                          | 1   | 300765          | 21.43    | 1   | 300541          | 31.23    | 1   | 300646           | 31.23    |          |
| 16         | Star Gear (Ratchet Wheel)       | 1   | 300715          | 150.18   | 1   | 300520          | 185.48   | 1   | 300620           | 194.17   |          |
| 17         | Washer (Ring)                   | 1   | 300718          | 539.96   | 1   | 300522          | 179.67   | 1   | 300622           | 179.67   |          |
| 18         | Slideguide                      | 1   | 300710          | 263.79   | 1   | 300413(vhu-56)  | 317.81   | 1   | 300613           | 439.61   |          |
|            |                                 |     |                 |          | 1   | 300513(vhu-80)  | 334.54   |     | -                | -        |          |
| 19         | Screw                           | -   | -               | -        | 1   | 300577          | 7.31     | 1   | 300653           | 3.83     |          |
| 20         | Spring                          | -   | -               | -        | 1   | 300536          | 3.10     | 1   | 300670           | 3.10     |          |
| 21         | Brake                           | -   | -               | -        | 1   | 300521          | 31.23    | 1   | 300621           | 31.23    |          |
| 22         | Washer (Ring)                   | 2   | 300722          | 123.53   | 2   | 300525          | 150.18   | 2   | 300625           | 150.18   |          |
| 23         | Pin                             | 2   | 300769          | 1.62     | 2   | 300551          | 2.36     | 2   | 300655           | 2.36     |          |
| 24         | Stop Screw                      | 2   | 300739          | 2.36     | 4   | 300549          | 3.83     | 4   | 300644           | 3.83     |          |
| 25         | Stop (Dog) - L.H. Stop          | 2   | 300728          | 158.59   | 1   | 300515          | 237.78   | 1   | 300615           | 237.78   |          |
| 26         | Stop Nut (Insert)               | 2   | 300742          | 99.12    | 2   | 300514          | 71.49    | 2   | 300614           | 71.49    |          |
| 27         | Slide                           | 1   | 300713          | 4,929.62 | 1   | 300402(vhu-56)  | 5,649.27 | 1   | 300602           | 7,370.79 |          |
|            |                                 |     |                 |          | 1   | 300502(vhu-80)  | 6,000.54 | 1   | 300680           | 7,429.53 |          |
| 28         | Pin (Bar)                       | 1   | 300747          | 41.25    | 1   | 300524          | 41.25    | 1   | 300624           | 51.54    |          |
| 29         | Spring                          | 1   | 300746          | 1.62     | 1   | 300570          | 4.71     | 1   | 300670           | 3.10     |          |
| 30         | Set Screw                       | 1   | 300774          | 2.36     | 1   | 300508          | 3.10     | 1   | 300671           | 2.36     |          |
| 31         | Set Screw                       | 3   | 300735          | 11.90    | 3   | 300568          | 23.54    | 3   | 300674(vhu-125)  | 23.54    |          |
|            |                                 |     |                 |          |     |                 |          | 5   | 300674(vhu-160)  | 23.54    |          |
| 32         | Set Screw                       | 3   | 300741          | 11.90    | 3   | 300567          | 23.54    | 3   | 300673(vhu-125)  | 23.54    |          |
|            |                                 |     |                 |          |     |                 |          | 5   | 300673(vhu-160)  | 23.54    |          |
| 33         | Ball                            | 3   | 300775          | 1.62     | 3   | 300558          | 1.62     | 3   | 300661           | 1.62     |          |
| 34         | Worm Rod (Screw)                | 1   | 300712          | 1,143.26 | 1   | 300423(vhu-56)  | 1,406.67 | 1   | 300623           | 1,934.02 |          |
|            |                                 |     |                 |          | 1   | 300523(vhu-80)  | 1,758.32 | 1   | 300692           | 2,197.81 |          |
| 35         | Washer (Distance Ring) - Spacer | 1   | 300727          | 106.44   | 1   | 300537          | 106.44   | 1   | 300637           | 106.44   |          |
| 36         | Pin                             | 2   | 300777          | 2.36     | 2   | 300553          | 2.36     | 2   | 300657           | 1.62     |          |
| 37         | End Stop (Back Bearing)         | 1   | 300717          | 141.51   | 1   | 300538          | 123.53   | 1   | 300638           | 150.18   |          |
| 38         | End Screw                       | 2   | 300776          | 2.36     | 2   | 300543          | 2.36     | 2   | 300648           | 2.36     |          |
| 39         | Stop (Dog) - R.H. Stop          | -   | -               | -        | 1   | 300516          | 237.78   | 1   | 300616           | 237.78   |          |
| 40         | Gear Ring                       | 2   | 300721          | 123.53   | 2   | 300526          | 123.53   | 2   | 300626           | 123.53   |          |
| 41         | Spindle (Worm)                  | 1   | 300709          | 782.70   | 1   | 300512          | 1,055.17 | 1   | 300612           | 1,143.26 |          |
| 42         | Worm Gear (Worm Wheel)          | 1   | 300723          | 1,003.37 | 1   | 300417          | 1,213.76 | 1   | 300617           | 1,055.79 |          |
| 43         | Pin (Parallel Key)              | 1   | 300766          | 21.43    | 1   | 300519          | 21.43    | 1   | 300619           | 21.43    |          |
| 44         | Head Nut                        | 3   | 300749          | 2.36     | 3   | 300572          | 2.36     | 4   | 300647           | 2.36     |          |
| 45         | Head Screw                      | 3   | 300748          | 3.47     | 3   | 300545          | 3.83     | 4   | 300649           | 3.83     |          |
| 47         | Ring (Control Ring)             | 1   | 300706          | 607.01   | 1   | 300510          | 967.19   | 1   | 300610           | 1,055.17 |          |
| 48         | Pin                             | 2   | 300738          | 1.35     | 2   | 300556          | 7.31     | 2   | 300659           | 7.31     |          |
| 49         | Ball                            | 2   | 300744          | 1.62     | 2   | 300558          | 1.62     | 2   | 300661           | 1.62     |          |
| 50         | Stop Rod (Bar)                  | 1   | 300734          | 41.25    | 1   | 300535          | 77.56    | 1   | 300635           | 103.34   |          |
| 51         | Knob (Ball)                     | -   | -               | -        | 1   | 300559          | 5.58     | 1   | 300662           | 5.58     |          |
| 52         | Screw                           | 1   | 300763          | 2.36     | 1   | 300547          | 2.36     | 1   | 300651           | 2.36     |          |
| 53         | Spring                          | 1   | 300724          | 2.36     | 1   | 300529          | 2.36     | 1   | 300629           | 2.36     |          |
| 54         | Pin Point                       | 1   | 300725          | 71.49    | 1   | 300530          | 87.97    | 1   | 300630           | 87.97    |          |
| 55         | Ball                            | 1   | 300751          | 1.62     | -   | -               | -        | -   | -                | -        |          |
| 56         | Cap Screw                       | 1   | 300740          | 114.86   | -   | -               | -        | -   | -                | -        |          |
| 57         | Pin                             | 1   | 300732          | 31.23    | -   | -               | -        | -   | -                | -        |          |
| 58         | Pin                             | 1   | 300719          | 31.23    | -   | -               | -        | -   | -                | -        |          |
| 59         | Pin                             | 1   | 300779          | 1.62     | -   | -               | -        | -   | -                | -        |          |
| 60         | Cap Screw                       | 6   | 300770          | 2.36     | 6   | 300481(vhu-56)  | 3.83     | 6   | 300689           | 3.83     |          |
|            |                                 |     |                 |          | 6   | 300589(vhu-80)  | 2.36     |     | -                | -        |          |
| 61         | Pin                             | 1   | 300778          | 1.62     | -   | -               | -        | -   | -                | -        |          |
| 62         | Plug                            | 2   | 300780          | 12.64    | 2   | 300592          | 12.64    | 2   | 300694           | 12.64    |          |
| 63         | Ring Clip (Circlip)             | 1   | 300750          | 5.94     | 1   | 300560          | 21.43    | 1   | 300663           | 27.51    |          |
| 64         | Parallel key                    | -   | -               | -        | 4   | 300587          | 61.33    | 4   | 300687           | 61.33    |          |
| 65         | Screw                           | -   | -               | -        | 4   | 300590          | 2.36     | 4   | 300690           | 2.36     |          |
| 66         | Pin                             | 1   | 300781          | 16.60    | 1   | 300593          | 29.86    | 1   | 300695           | 28.38    |          |
| 67         | Set Screw                       | 2   | 300741          | 11.90    | 2   | 300567          | 23.54    | 2   | 300673           | 23.54    |          |
| 68         | Screw                           | -   | -               | -        | 2   | 300548          | 11.90    | 2   | 300652           | 11.90    |          |

| New ID No. | Description                        | pcs | VHU-36 (1-3/8") |          |     | VHU-56 (2-1/8")<br>VHU-80 (3-1/8") |          |     | VHU-125 (4-7/8")<br>VHU-160 (6-1/4") |          |  |
|------------|------------------------------------|-----|-----------------|----------|-----|------------------------------------|----------|-----|--------------------------------------|----------|--|
|            |                                    |     | Code No.        | Price \$ | pcs | Code No.                           | Price \$ | pcs | Code No.                             | Price \$ |  |
| 69         | Pin                                | 1   | 300782          | 2.36     | 1   | 300594                             | 2.36     | 1   | 300696                               | 2.36     |  |
| 101        | Boring tool Ø5mmx3/8"x60mm         | 1   | 300754          | 478.21   |     | -                                  | -        |     | -                                    | -        |  |
| 102        | Boring tool Ø13mmx5/8"x90mm        | 1   | 300752          | 491.67   |     | -                                  | -        |     | -                                    | -        |  |
| 103        | Internal corner tool Ø5mmx3/8"x60  | 1   | 300755          | 696.86   |     | -                                  | -        |     | -                                    | -        |  |
| 104        | Internal corner tool Ø13mmx5/8"x90 | 1   | 300753          | 655.70   |     | -                                  | -        |     | -                                    | -        |  |
| 105        | Right hand tool S20                | 1   | -               | -        | 1   | -                                  | -        | 1   | -                                    | -        |  |
| 106        | Right hand tool H10                | 1   | -               | -        | 1   | -                                  | -        | 1   | -                                    | -        |  |
| 107        | Left hand tool S20                 | 1   | -               | -        | 1   | -                                  | -        | 1   | -                                    | -        |  |
| 108        | Left hand tool H10                 | 1   | -               | -        | 1   | -                                  | -        | 1   | 300676                               | 383.05   |  |
| 109        | Tool HSS                           |     | -               | -        | 2   | 300564                             | 146.45   | 2   | 300667                               | 173.38   |  |
| 110        | Tool S20                           |     | -               | -        | 2   | 300563                             | 100.79   | 2   | 300669                               | 278.53   |  |
| 111        | Extension (Boring bar)             |     | -               | -        | 1   | 300528                             | 491.67   | 1   | 300628                               | 792.14   |  |
| 112        | Extension (Boring bar)             |     | -               | -        | 1   | 300527                             | 491.67   | 1   | 300627                               | 846.64   |  |
| 113        | Toolholder (Holder with screw)     |     | -               | -        | 2   | L=185 300534                       | 1,225.30 | 2   | 300634                               | 1,417.19 |  |
| 114        | Toolholder (Holder with screw)     | 1   | 300731          | 1,001.04 | 1   | L=220 300533                       | 1,347.34 | 1   | L=350 300633                         | 1,549.04 |  |
| 115        | Collar Set (Set of spacing tubes)  | 1   | 300730          | 123.53   | 1   | 300532                             | 198.49   | 1   | 300632                               | 207.91   |  |
| 116        | Reducer (Reduction sleeve)         | 1   | 300733          | 342.96   | 1   | 300542                             | 395.76   | 1   | 300641                               | 475.05   |  |
| 117        | Reducer (Reduction sleeve)         |     | -               | -        | 1   | 300544                             | 395.76   | 1   | 300608                               | 483.59   |  |
| 118        | Allen (Hexagon) Wrench "NAREX"     | 1   | 300773          | 126.63   |     | -                                  | -        |     | -                                    | -        |  |
| 119        | Allen (Hexagon) Wrench 4           | 1   | 300760          | 97.38    | 1   | 300561                             | 97.38    | 1   | 300664                               | 97.38    |  |
| 120        | Hexagon wrench 6                   |     | -               | -        | 1   | 300562                             | 119.06   | 1   | 300665                               | 307.78   |  |
| 121        | Washer                             | 1   | 300729          | 75.84    | 1   | 300531                             | 114.98   | 1   | 300631                               | 114.98   |  |
| 122        | Hex Screw                          | 1   | 300743          | 2.36     | 1   | 300550                             | 5.46     | 1   | 300654                               | 5.46     |  |

## Boring Bar Sets for Boring & Facing Heads



| Diameter | Pieces | Code No. | Price \$ |
|----------|--------|----------|----------|
| 5/8      | 6      | 300835   | 1,974.14 |
| 1        | 6      | 300837   | 2,303.97 |
| 1-1/4    | 6      | 300839   | 2,838.09 |

## Individual Bars



| Model       | Shank Dia. | Style | O.A.L. | Boring Head      | Code No. | Price \$ |
|-------------|------------|-------|--------|------------------|----------|----------|
| R5/8-0945   | 5/8        | SCBCR | 50mm   | VHU-36           | 300840   | 552.72   |
| R5/8-0946   | 5/8        | SCBCR | 50mm   | VHU-36           | 300845   | 552.72   |
| L5/8-0947   | 5/8        | SCACL | 50mm   | VHU-36           | 300850   | 552.72   |
| L5/8-0948   | 5/8        | SCACL | 50mm   | VHU-36           | 300855   | 552.72   |
| R5/8-0949   | 5/8        | SCBCR | 90mm   | VHU-36           | 300860   | 770.47   |
| R5/8-0950   | 5/8        | SCACR | 90mm   | VHU-36           | 300865   | 770.47   |
| R1-0951     | 1          | SCBCR | 80mm   | VHU-56, VHU-80   | 300870   | 693.90   |
| R1-0952     | 1          | SCBCR | 80mm   | VHU-56, VHU-80   | 300875   | 693.90   |
| L1-0953     | 1          | SCACL | 80mm   | VHU-56, VHU-80   | 300880   | 693.90   |
| L1-0954     | 1          | SCACL | 80mm   | VHU-56, VHU-80   | 300885   | 693.90   |
| R1-0955     | 1          | SCBCR | 150mm  | VHU-56, VHU-80   | 300890   | 770.33   |
| R1-0956     | 1          | SCACR | 150mm  | VHU-56, VHU-80   | 300895   | 770.33   |
| R1-1/4-0957 | 1-1/4      | SCBCR | 100mm  | VHU-125, VHU-160 | 300900   | 939.24   |
| R1-1/4-0958 | 1-1/4      | SCBCR | 100mm  | VHU-125, VHU-160 | 300905   | 939.24   |
| L1-1/4-0959 | 1-1/4      | SCACL | 100mm  | VHU-125, VHU-160 | 300910   | 939.24   |
| L1-1/4-0960 | 1-1/4      | SCACL | 100mm  | VHU-125, VHU-160 | 300915   | 939.24   |
| R1-1/4-0961 | 1-1/4      | SCBCR | 180mm  | VHU-125, VHU-160 | 300920   | 986.94   |
| R1-1/4-0962 | 1-1/4      | SCACR | 180mm  | VHU-125, VHU-160 | 300925   | 986.94   |

## Precision Boring Heads



- Ideal for mill or jig bore operation
- These heads readily adapt to many different machines due to interchangeable shanks



| Head Dia. | Hole Size | Offset | Code No. | Price \$ |
|-----------|-----------|--------|----------|----------|
| 2         | 1/2       | 1/2    | 356001   | 192.37   |
| 3         | 3/4       | 3/4    | 356002   | 277.28   |
| 4         | 1         | 1      | 356003   | 472.52   |

## Shanks for Boring Heads



See page G80 for GS Boring Head Holders

| Size      | Thread      | Code No. | Price \$ |
|-----------|-------------|----------|----------|
| R8        | 1-1/2-18TPI | 356010   | 122.32   |
| ISA40     | 1-1/2-18TPI | 356012   | 149.51   |
| MT3       | 1-1/2-18TPI | 356014   | 122.32   |
| ISA30     | 1-1/2-18TPI | 356016   | 61.83    |
| 3/4" S.S. | 1-1/2-18TPI | 356018   | 95.23    |
| MT4       | 1-1/2-18TPI | 356020   | 135.91   |
| 1" S.S.   | 1-1/2-18TPI | 356025   | 95.23    |

## Height Presetter

**Fast Accurate Measurement of Vertical Height Magnetic Base for Horizontal Operation.**  
Reference point of work can be measured very quickly and accurately without damage to tool teeth.



| Size | Description      | Code No. | Price \$ |
|------|------------------|----------|----------|
| 4"   | Height Presetter | 337950   | 1,371.19 |

## Height Presetter — Optical Type

- Height 50mm
- With magnetic base
- The red lamp will light up when touched
- Accuracy 0.005 mm
- Combined vertical and horizontal in a unit
- Weight: 0.3 kg



| Model No.               | Code No. | Price \$ |
|-------------------------|----------|----------|
| HP-50ZM (Magnetic Base) | 337970   | 741.55   |
| HP-50Z (Standard Base)  | 337971   | 662.68   |

## Electronic Tool Length Setter

- High accuracy
- Easy operation
- Be sure to remove all chips and oil from the sensor plate and the base of the HP-50E as well as from the workpiece and tool
- To move the tool approaching the sensor plate slowly
- When touching, the "LED" turns on immediately and "H" is just 50.00 mm (or 2")
- LED will not function if batteries are not set in correctly
- Designed to be used on ferrous and non-ferrous materials

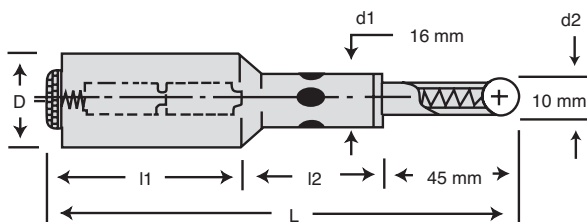


| Model No.                 | H      | Base Dia. | Sensor Plate Dia. | Code No. | Price \$ |
|---------------------------|--------|-----------|-------------------|----------|----------|
| <b>With Magnetic Base</b> |        |           |                   |          |          |
| HP-50EM                   | 50 mm  | 40mm      | 12.7mm            | 337976   | 999.52   |
| HP-100 EM                 | 100 mm | 40mm      | 12.7mm            | 337978   | 1,554.56 |

## Touch Point Sensor

**Model No. VPS-20**

- Red pilot can be seen clearly
- High sensitivity location sensor
- Location of end surface, outside circle dia., inside circle dia. of the workpiece for processing can be detected with full effect
- Whole travel of red pilot is illuminating, detecting also can be done during turning while spindle stops

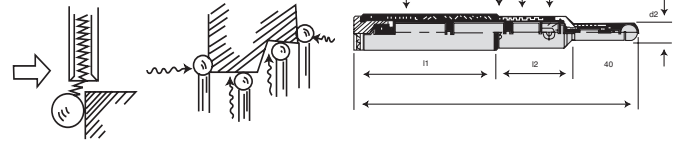


| D  | d1 | d2 | L   | I1 | I2 | Type      | Code No. | Price \$ |
|----|----|----|-----|----|----|-----------|----------|----------|
| 20 | 18 | 10 | 160 | 79 | 41 | UM-5#(SP) | 337955   | 239.19   |

## Touch Point Sensor (With Beeper)

**Model No. VPS-20B / VPS-3/4B**

- Unit will sound at the same time when the red lamp lights up
- Accuracy: within 0.005 mm



| D   | d1    | d2    | L    | I1   | I2    | Type  | Code No. | Price \$ |
|-----|-------|-------|------|------|-------|-------|----------|----------|
| 20  | 16    | 10    | 157  | 77   | 35    | UM-5# | 337960   | 318.68   |
| 3/4 | 0.629 | 0.394 | 6.18 | 3.03 | 1.378 | UM-5# | 337962   | 350.33   |

## Machinists' Mate

**Self-Contained Visual Aid - 1/2" Shank**

For Machine Set-Up

- Checks machine, tool and workpiece set-up
- Acts as edge finder on vertical milling machines
- Trams table quickly
- Parallels vise
- Checks "spindle run out" – simply, quickly, accurately
- Emits light to indicate precise contact of part at ±0.0001"



| Shank Dia. | Code No. | Price \$ |
|------------|----------|----------|
| 1/2        | 145600   | 55.28    |

## NC/CNC Trolley

Complete Tool Trolley with 4 Tool Trays and Inserts.

- Trays bolt in
- (w)1002mm x (D)650mm x (H)830mm
- Weight: 51kgs



| Desc.                            | Taper Type | Inserts Per Tray | Replacement Plastic Inserts Code No. | Price \$ | Tool Cart Code No. | Price \$ |
|----------------------------------|------------|------------------|--------------------------------------|----------|--------------------|----------|
| Trolley, 4 trays hold 28 inserts | 40         | 7                | 326986                               | 9.28     | 326985             | 1,176.75 |
| Trolley, 4 trays hold 20 inserts | 50         | 5                | 326996                               | 8.95     | 326995             | 1,176.75 |

## Standard Draw Bar — SDB-2J

- 7/16-20 thread
- 4140 heat treated Alloy Steel



| Machine Type                      | Bar Length (in.) | Hex Length (in.) | Code No. | Price \$ |
|-----------------------------------|------------------|------------------|----------|----------|
| 2J Head Bridgeport Variable Speed | 18               | 5.5              | 151700   | 114.44   |



## Deluxe Tool Setting Stand

Quick and easy way to change cutters and pull studs.  
Protects the taper of holder with protective insert.  
Available in all tapers.

- Select between horizontal or vertical tool holding; quick and simple operation
- For CAT, BT & NMTB Tapers



| Vertical | Horizontal                    | Code No. | Price \$ |
|----------|-------------------------------|----------|----------|
| 40 Taper | 40 Taper x 2 (only BT & NMTB) | 335250   | 992.35   |
| 50 Taper | 50 Taper x 2 (only BT & NMTB) | 335260   | 992.35   |
| 50 Taper | 50 Taper x 1 / 40 Taper x 1   | 335240   | 253.99   |
| 40 Taper | 50 Taper x 1 / 40 Taper x 1   | 335230   | 253.99   |

## Tool Holder Locking Device

- For CAT, BT & NMTB Tapers



| Description                    | Code No. | Price \$ |
|--------------------------------|----------|----------|
| 30 Taper                       | 335270   | 398.42   |
| 40 Taper                       | 335275   | 398.42   |
| 50 Taper (Only CAT50 & NMTB50) | 335280   | 398.42   |

## Tool Holder Locking Fixture

- Weight: 4.5 kg



| Description | Code No. | Price \$ |
|-------------|----------|----------|
| HSK63       | 335225   | 1,384.99 |

## Simple Tool Setting Stand

Quick and easy way to change cutters and retention knobs.  
Protects the taper of holder with protective insert.  
Available in all tapers.

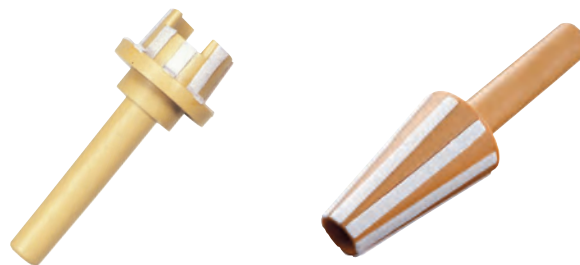
- This is an excellent helping tool for simple, rapid and safe tool holding
- For CAT, BT & NMTB Tapers



| Model | Code No. | Price \$ |
|-------|----------|----------|
| TL-30 | 335200   | 533.84   |
| TL-35 | 335205   | 533.30   |
| TL-40 | 335210   | 533.84   |
| TL-50 | 335220   | 533.84   |

## Spindle Taper Wipers

- For easily and quickly cleaning spindle holes
- Plastic body, the taper wiper is made of special cotton material therefore not damaging the spindle
- The BT & DIN tapers are the same



| Model No. | Taper | Total Length | Code No. | Price \$ |
|-----------|-------|--------------|----------|----------|
| VTW-30    | #30   | 168mm        | 326210   | 57.63    |
| VTW-40    | #40   | 159mm        | 326215   | 57.63    |
| VTW-50    | #50   | 265mm        | 326220   | 83.55    |
| VTW-50H   | HSK50 | 159mm        | 326225   | 249.68   |
| VTW-63H   | HSK63 | 167mm        | 326230   | 262.32   |



Workholding, Clamping & Fixturing



# Workholding, Clamping & Fixturing

## VICES

|  |      |
|--|------|
| GS Milling Machine Vises . . . . .             | H2-3 |
| GS Modular Vises & Accessories/Parts . . . . . | H3-4 |
| GS Double Clamp Vises. . . . .                 | H5-6 |
| Multi-Tasking 5-Axis Modular Vise . . . . .    | H7-8 |
| Milling Vises . . . . .                        | H9   |
| Power Machine Vises . . . . .                  | H11  |
| Toolmaker Vises, EDM Vises . . . . .           | H12  |
| Bench Vises . . . . .                          | H12  |
| Drill Press Vises . . . . .                    | H13  |

## WORKHOLDING

|  |        |
|--|--------|
| C-Clamps, U/N Work Stoppers, Pullers . . . . . | H13-14 |
| Vee Blocks . . . . .                           | H14-15 |
| Angle Plates & Cross Tables . . . . .          | H16    |
| Sine Bars, Plates, Vises. . . . .              | H17-18 |
| Arbor Presses . . . . .                        | H19    |

## LATHE CHUCKS

|   |          |
|---|----------|
| Bison Lathe Chuck Index . . . . .                 | H23-26   |
| Fine Adjustment Lathe Chucks & Adapters . . . . . | H29-35   |
| Self Centering Scroll Chucks & Adapters. . . . .  | H36-66   |
| Independent Lathe Chucks & Adapters . . . . .     | H67-80   |
| STM Lathe Chucks . . . . .                        | H81-84   |
| Power Chucks . . . . .                            | H85-89   |
| Lathe Chuck Jaws, T-Nuts . . . . .                | H90-97   |
| Rohm Lathe Chucks, Adapters, Jaws . . . . .       | H98-108  |
| Autoblok Power Chucks . . . . .                   | H109-112 |

## LATHE ACCESSORIES

|                                      |          |
|--------------------------------------|----------|
| GS Live Centres . . . . .            | H114-118 |
| STM / Skoda Live Centres . . . . .   | H119-123 |
| Rohm Centres & Face Drivers. . . . . | H124-131 |
| Toolposts & Holders . . . . .        | H132-135 |

## CLAMPING & FIXTURING

|  |          |
|--|----------|
| Clamping Kits . . . . .                  | H136-137 |
| Clamps . . . . .                         | H137     |
| STM / Te-Co Tooling Components . . . . . | H137-146 |
| Mitee-Bite Workholding . . . . .         | H147-156 |
| Fixturing . . . . .                      | H157-159 |
| Vacuum & Magnetic Chucks. . . . .        | H160-161 |

## GS160G 6" Precision Milling Machine Vise

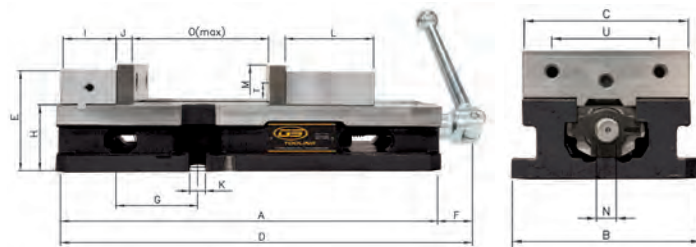


This vise has been redesigned with new industry leading workholding features.

- Jaw opening: 9.13" / 232mm
- Bed height: 2.875" ±0.0005"
- Weight: 68lbs / 31kg
- Narrower body style to allow more vises on a machine table
- The bearing pack has been relocated to help reduce oil/water/chip leakage into the vise body
- The thrust bearings have been replaced with ball bearings to make the pack stronger and more stable
- Spherical segment creates all-directional alignment and reduces jaw lift for improved performance
- Spindle does not protrude past the end of the body
- Brush seal design
- Perpendicularity (running face and jaw plate): 0.0004"
- Parallelism (running face to bottom of bed): 0.0006"
- Material: FCD-60 (80,000psi)
- Stationary jaw: 4 bolt stationary design reduces lift
- Pull-type design: Reduces stress on body during clamping
- Chip evacuation: Straight through the body on sides and ends. Locations strategically chosen to not reduce body strength
- Max. Clamping Force: 30378 ft/lbs



### 10 YEAR WARRANTY!



| Model   | Code No. | Price \$ |
|---|----------|----------|
| GS160G  | 327320   | 950.00   |
| #2 Main Screw   | 327322   | 139.07   |
| #4 Sliding Spindle Nut  | 327324   | 153.55   |
| #5 Movable Jaw  | 327326   | 175.92   |
| #6 Fixed Jaw  | 327328   | 151.55   |
| #7 Jaw Plate (2pcs)   | 327330   | 112.74   |
| Repair Kit - consists of #8 segment, #20 bearing, #21 o-ring, 2pc #10 brush, 2pc #19 c-clip | 327332   | 70.09    |
| Handle Assembly - consists of #11 socket, #12 bar, #13 pin                                  | 327334   | 66.27    |
| #14 Slide Cover (Back)  | 327336   | 9.23     |
| #14 Slide Cover (Front)   | 327338   | 17.78    |
| #16 Bolt for Jaw Plate (piece)  | 327340   | 4.61     |
| #17 Bolt (long) for Fixed Jaw   | 327342   | 4.58     |
| #18 Bolt (short) for Fixed Jaw  | 327344   | 4.61     |

| A   | B   | C   | D   | E       | F  | G     | H      | I    | J     | K     | L     | M    | N  | O   | T    | U    | Weight | Code No. | Price \$ |
|-----|-----|-----|-----|---------|----|-------|--------|------|-------|-------|-------|------|----|-----|------|------|--------|----------|----------|
| 427 | 186 | 151 | 466 | 111.025 | 39 | 90.53 | 73.025 | 58.7 | 18.42 | 17.46 | 101.6 | 44.5 | 19 | 232 | 23.8 | 98.4 | 31kg   | 327320   | 950.00   |

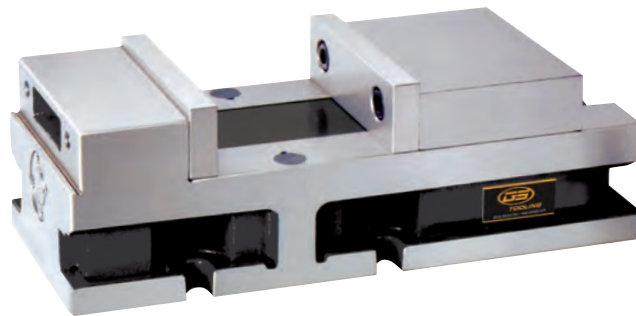
### Capacity

| I                  | II                       | III                     | IV                       |
|--------------------|--------------------------|-------------------------|--------------------------|
| 0-9.13"<br>0~232mm | 4.68~13.82"<br>119~351mm | 3.03~12.16"<br>77~309mm | 7.72~16.85"<br>196~428mm |

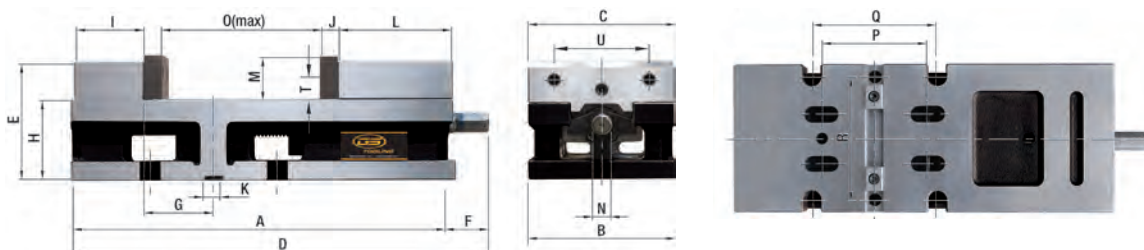
## GSV60 6" Versatile Vise



- 6" vise with 6-1/2" opening
- High accuracy vise for single station CNC centres specially designed to prevent workpiece lift
- 2 operating positions for Vertical Machine Centres: Upright & Lay Down
- 1 operating position for Horizontal Machine Centres: Horizontal
- Bed height: 81mm ±0.012mm (3.189" ±0.0005")
- Material: FCD-60
- Weight: 68lbs / 31kg



### LIFETIME WARRANTY!

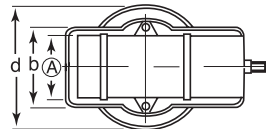
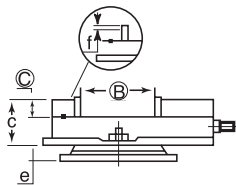


| A   | B      | C   | D     | E     | F    | G     | H  | I    | J  | K  | L     | M    | N  | O   | P      | Q   | R   | T    | U    | Weight | Code No. | Price \$ |
|-----|--------|-----|-------|-------|------|-------|----|------|----|----|-------|------|----|-----|--------|-----|-----|------|------|--------|----------|----------|
| 385 | 152.45 | 151 | 431.8 | 118.7 | 46.8 | 69.84 | 81 | 69.9 | 18 | 18 | 114.3 | 44.5 | 19 | 163 | 107.95 | 127 | 127 | 23.8 | 98.4 | 31kg   | 382620   | 1,350.00 |

## GS675 6" Precision Milling Machine Vise



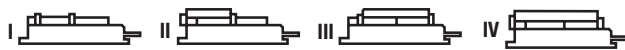
- Vises are matched (Bed Height: 2.875")
- An integral key and large fasteners reduce deflection by 50%
- 4-jaw plate positions allow extra capacity with the jaw plates in the outside position
- The swivel base is graduated 360° in one degree increments
- Chip cover protects leadscrew from damage
- The quality movable jaw does not lift off the bed, and the deflection of the stationary jaw is minimized



(Inch)

| Model   | Jaw Width A | Jaw Open B | C    | O.A.L. | b    | c   | d  | e    | f    | Plain Ship Wt | Code No. | Price \$ |
|---|-------------|------------|------|--------|------|-----|----|------|------|---------------|----------|----------|
| GS675   | 6           | 7.5        | 1.77 | 17.2   | 9.13 | 4.6 | 12 | 1.65 | 0.39 | 80lbs         | 327275M  | 833.29   |
| Jaw Plates (2pcs)                               |             |            |      |        |      |     |    |      |      |               | 327330   | 112.74   |
| Swivel Base Only                                |             |            |      |        |      |     |    |      |      |               | 327280   | 231.78   |
| Replacement Handle                              |             |            |      |        |      |     |    |      |      |               | 327334   | 66.27    |
| Main Screw, Collar & Collar Set Screw for GS675 |             |            |      |        |      |     |    |      |      |               | 327284   | 142.90   |
| Chip Cover                                      |             |            |      |        |      |     |    |      |      |               | 327338   | 17.78    |
| Vise Nut for GS675                              |             |            |      |        |      |     |    |      |      |               | 327288   | 194.93   |
| Jaw Plate Screws (4pcs)                         |             |            |      |        |      |     |    |      |      |               | 327286   | 23.35    |
| Ball Bearing Thrust Collar                      |             |            |      |        |      |     |    |      |      |               | 327292   | 26.59    |

### Capacity

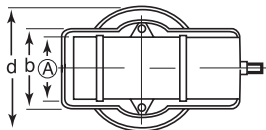
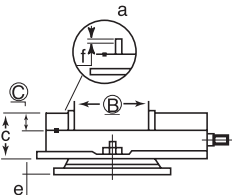


| Model  | I                   | II                           | III                         | IV                          |
|--------|---------------------|------------------------------|-----------------------------|-----------------------------|
| GS 675 | 0-7-1/2"<br>0-192mm | 2-1/8" - 10-1/4"<br>54-262mm | 5" - 13-1/8"<br>125-333mm   | 7" - 15-7/8"<br>177-403mm   |
| GS 810 | 0-10.43"<br>0-265mm | 2.36" - 3.66"<br>60-347mm    | 6.25" - 16.61"<br>159-422mm | 8.58" - 20.79"<br>218-528mm |

## GS810 8" Precision Milling Machine Vise



- Vises are matched (Bed Height: 3.310")
- An integral key and large fasteners reduce deflection by 50%
- 4-jaw plate positions allow extra capacity with the jaw plates in the outside position
- The swivel base is graduated 360° in one degree increments
- Chip cover protects leadscrew from damage
- The other quality movable jaw does not lift off the bed, and the deflection of the stationary jaw is minimized



(Inch)

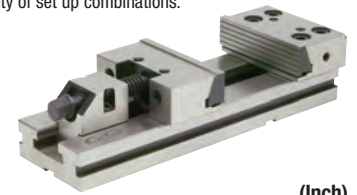
| Model              | Jaw Width A | Jaw Open B | C    | O.A.L. | b     | c    | d    | e    | f    | Plain Ship Wt | Code No. | Price \$ |
|--------------------|-------------|------------|------|--------|-------|------|------|------|------|---------------|----------|----------|
| GS810              | 8           | 10.0       | 2.25 | 21.8   | 11.62 | 5.55 | 15.0 | 1.85 | 0.43 | 158lbs        | 327300   | 2,621.30 |
| Swivel Base Only   |             |            |      |        |       |      |      |      |      |               | 327310   | 413.89   |
| Jaw Plates         |             |            |      |        |       |      |      |      |      |               | 327311   | 270.85   |
| Replacement Handle |             |            |      |        |       |      |      |      |      |               | 327305   | 102.62   |

## GS Plain Base Modular Vises



Manufactured under rigid quality control. As a result of the high standard construction, GS Vises can be depended upon to maintain their accuracy under the most severe operating conditions. The modular design and the concept of interchangeability makes possible a wide variety of set up combinations.

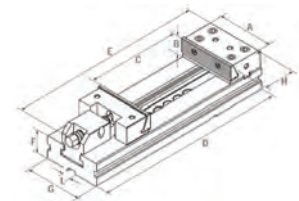
- High accuracy
- Unlimited clamping range
- High quality alloy steel
- High clamping pressure
- No jaw lift
- All vises are matched



(Inch)

| Model | Jaw Width (A) | Opening (C) | Jaw Height (B) | Code No. | Price \$ |
|-------|---------------|-------------|----------------|----------|----------|
| 1     | 4             | 4           | 1.2            | 382005   | 1,244.09 |
| 2     | 5             | 6           | 1.6            | 382010   | 1,369.50 |
| 3     | 6             | 8           | 1.97           | 382015   | 1,494.92 |
| 3     | 6             | 12          | 1.97           | 382017   | 1,739.69 |
| 4     | 7             | 8           | 2.4            | 382020   | 2,117.97 |
| 4     | 7             | 12          | 2.4            | 382025   | 2,239.34 |
| 4     | 7             | 16          | 2.4            | 382030   | 2,488.16 |
| 4     | 7             | 20          | 2.4            | 382032   | 2,983.77 |
| 5     | 8             | 8           | 2.6            | 382035   | 2,734.96 |
| 5     | 8             | 12          | 2.6            | 382040   | 3,234.61 |
| 5     | 8             | 16          | 2.6            | 382045   | 3,732.25 |
| 5     | 8             | 20          | 2.6            | 382050   | 4,478.69 |
| 5     | 8             | 24          | 2.6            | 382052   | 5,223.12 |
| 6     | 12            | 8           | 3.2            | 382055   | 4,227.85 |
| 6     | 12            | 12          | 3.2            | 382060   | 5,223.12 |
| 6     | 12            | 16          | 3.2            | 382065   | 6,220.41 |
| 6     | 12            | 20          | 3.2            | 382070   | 6,966.85 |
| 6     | 12            | 24          | 3.2            | 382075   | 7,711.28 |
| 6     | 12            | 28          | 3.2            | 382080   | 8,455.70 |
| 6     | 12            | 32          | 3.2            | 382085   | 9,202.15 |

### Modular Vise Specs



(Inch)

| Vise Size | Code No. | D      | E     | F     | G    | H     | I     | Kgs  |
|-----------|----------|--------|-------|-------|------|-------|-------|------|
| 4 x 4     | 382005   | 10.63  | 12.5  | 1.378 | 2.95 | 3.07  | 0.628 | 6.8  |
| 5 x 6     | 382010   | 13.583 | 16.4  | 1.575 | 3.8  | 3.04  | 0.64  | 12.9 |
| 6 x 6     | 382015   | 16.535 | 20.86 | 1.968 | 4.92 | 3.574 | 0.64  | 25.5 |
| 6 x 12    | 382017   | 20.472 | 20.86 | 1.968 | 4.92 | 3.574 | 0.64  | 29   |
| 7 x 8     | 382020   | 17.913 | 24.80 | 2.283 | 5.8  | 3.876 | 0.64  | 37   |
| 7 x 12    | 382025   | 21.85  | 24.80 | 2.283 | 5.8  | 3.876 | 0.64  | 42   |
| 7 x 16    | 382030   | 25.787 | 24.80 | 2.283 | 5.8  | 3.876 | 0.64  | 47   |
| 7 x 20    | 382032   | 29.724 | 24.80 | 2.283 | 5.8  | 3.876 | 0.64  | 52   |
| 8 x 8     | 382035   | 19.488 | 28.74 | 2.756 | 6.8  | 4.536 | 0.64  | 64   |
| 8 x 12    | 382040   | 23.425 | 28.74 | 2.756 | 6.8  | 4.536 | 0.64  | 69   |
| 8 x 16    | 382045   | 27.362 | 28.74 | 2.756 | 6.8  | 4.536 | 0.64  | 74   |
| 8 x 20    | 382050   | 31.299 | 28.74 | 2.756 | 6.8  | 4.536 | 0.64  | 79   |
| 8 x 24    | 382052   | 35.236 | 28.74 | 2.756 | 6.8  | 4.536 | 0.64  | 84   |
| 12 x 8    | 382055   | 21.063 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 95   |
| 12 x 12   | 382060   | 25.000 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 105  |
| 12 x 16   | 382065   | 28.937 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 115  |
| 12 x 20   | 382070   | 32.874 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 125  |
| 12 x 24   | 382075   | 36.811 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 135  |
| 12 x 28   | 382080   | 40.748 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 145  |
| 12 x 32   | 382085   | 44.685 | 32.67 | 3.07  | 7.67 | 4.74  | 0.64  | 155  |

### Parts For GS 8" Precision Milling Machine Vises



| Description                           | Code No. | Price \$ |
|---------------------------------------|----------|----------|
| Main Screw, Collar & Collar Set Screw | 327306   | 325.37   |
| Ball Bearing Thrust Collar            | 327292   | 26.59    |
| Needle Bearing Thrust Collar          | 327307   | 73.30    |
| Chip Cover                            | 327308   | 11.73    |
| Vise Nut                              | 327309   | 464.67   |
| Jaw Plate Screws (4pcs)               | 327312   | 17.69    |

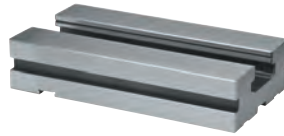
## Parts & Accessories For GS Modular Vises



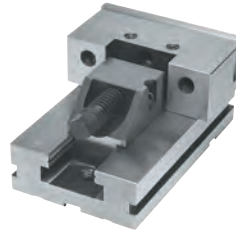
Mechanical Blocking Device



Swivel Base



Extension Base



Moveable Jaw Section and Base



Fixed Jaw Section and Base

| Part Description                        | #1 Code No.    | Price \$ | #2 Code No.  | Price \$ | #3 Code No.     | Price \$ | #4 Code No.     | Price \$ | #5 Code No.    | Price \$ | #6 Code No.      | Price \$ |
|---|----------------|----------|--------------|----------|-----------------|----------|-----------------|----------|----------------|----------|------------------|----------|
| Swivel Base                             | 382380         | 718.13   | 382385       | 821.29   | 382390          | 977.06   | 382395          | 1,072.14 | 382400         | 1,551.56 | 382405           | 1,933.89 |
| Extension Base                          | 382260         | 594.74   | 382265       | 668.51   | 382270          | 743.20   | 382275          | 817.89   | 382280         | 1,025.82 | 382285           | 1,438.28 |
| Mechanical Blocking Device              | 382470         | 289.28   | 382475       | 339.85   | 382480          | 412.67   | 382485          | 465.26   | 382490         | 578.55   | 382495           | 863.78   |
| Moveable Jaw                            | 382412         | 289.28   | 382417       | 368.16   | 382422          | 438.97   | 382427          | 664.82   | 382432         | 1,004.15 | 382437           | 1,487.32 |
| Fixed Jaw                               | 382410         | 289.28   | 382415       | 368.16   | 382420          | 438.97   | 382425          | 664.82   | 382430         | 1,004.15 | 382435           | 1,487.32 |
| Main Screw                              | 382850         | 86.98    | 382852       | 119.35   | 382854          | 141.60   | 382856          | 141.60   | 382859         | 200.26   | 382860           | 200.26   |
| T-Wrench                                | 382820         | 28.33    | 382822       | 28.33    | 382824          | 30.34    | 382826          | 30.34    | 382828         | 36.41    | 382830           | 36.41    |
| Box Wrench                              | 382874         | 54.62    | 382876       | 54.62    | 382878          | 62.71    | 382880          | 62.71    | 382882         | 111.26   | 382884           | 111.26   |
| Box Wrench (Old Version)                |                |          |              |          |                 |          |                 |          | 382883         | 111.26   | 382883           | 111.26   |
| Vise Holding Jaws (Pair)                | 382685         | 104.66   | 382690       | 104.66   | 382695          | 146.61   | 382700          | 146.61   | 382705         | 157.79   | 382710           | 157.79   |
| Positioning Keys                        | 382655         | 60.69    | 382660       | 60.69    | 382665          | 60.69    | 382670          | 60.69    | 382675         | 60.69    | 382680           | 60.69    |
| Work Stop                               | 382770         | 65.00    | 382775       | 65.00    | 382780          | 65.00    | 382785          | 65.00    | 382790         | 80.92    | 382795           | 80.92    |
| Jaw Plate for Fixed Jaw                 | 382862         | 119.35   | 382864       | 129.46   | 382866          | 186.27   | 382868          | 203.32   | 382870         | 262.98   | 382872           | 351.98   |
| Jaw Plate for Moveable Jaw              | 382863         | 119.35   | 382865       | 129.46   | 382867          | 186.27   | 382869          | 203.32   | 382871         | 262.98   | 382873           | 351.98   |
| Machineable Smooth Soft Jaw Plate       |                |          | 382885       | 129.46   | 382886          | 186.27   | 382887          | 203.32   | 382888         | 223.96   |                  |          |
| Lock Screw for Blocking Device          | 382471         | 16.18    | 382476       | 16.18    | 382481          | 20.23    | 382486          | 20.23    | 382491         | 22.25    | 382496           | 22.25    |
|   | M6x1 x 25mm    |          | M12x1 x 25mm |          | M14x2 x 35mm    |          | M12x1.75 x 40mm |          | M20x2.5 x 60mm |          | M20x2.5mm x 50mm |          |
|   | 382472         | 9.40     |              |          | 382482          | 16.71    |                 |          |                |          |                  |          |
|   | M8x1.25 x 25mm |          |              |          | M12x1.75 x 30mm |          |                 |          |                |          |                  |          |
| Chrome Locking Ball for Blocking Device | 382473         | 15.91    | 382477       | 15.50    | 382483          | 17.49    | 382483          | 17.49    | 382492         | 23.21    | 382492           | 23.21    |
|   | 9/16" dia.     |          | 3/4" dia.    |          | 7/8" dia.       |          | 7/8" dia.       |          | 1-1/8" dia.    |          | 1-1/8" dia.      |          |
| <b>Pre-Assembled Groups</b>             |                |          |              |          |                 |          |                 |          |                |          |                  |          |
| Overall Length                          | 5.5"           |          | 6.30"        |          | 9"              |          | 10"             |          | 12"            |          | 13.75"           |          |
| Leadscrew Overhang                      | 2.08"          |          | 2.3"         |          | 2.8"            |          | 2.0"            |          | 3"             |          | 2.16"            |          |
| Moveable Jaw Section and Base Assembly  | 382290         | 687.78   | 382295       | 855.68   | 382300          | 1,076.19 | 382305          | 1,260.27 | 382310         | 1,877.25 | 382315           | 3,789.38 |

## Prismatic Jaws

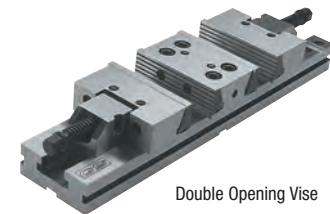


| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| #3        | 382890   | 446.75   |
| #4        | 382892   | 594.74   |
| #5        | 382894   | 743.20   |

## GS Modular Vises — Single & Double Opening



- High accuracy
- No length limitations
- Unlimited clamping range
- No jaw lift
- High quality alloy steel
- Low profile
- High clamping pressure
- All vises are matched
- Mechanical and pneumohydraulic blocking devices
- Extra long base



Double Opening Vise

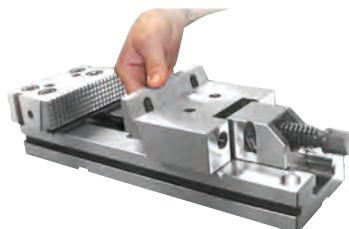
## Modular Vise w/ Quick Interchangeable Pulldown Jaws



No tools needed for quick hand change of downward jaw plates



Soft Jaws

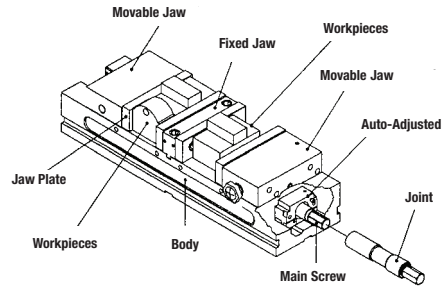


| Description        | Code No. | Price \$ |
|--------------------|----------|----------|
| 6 x 8 Modular Vise | 382896   | 2,093.90 |
| Pair Soft Jaws     | 382897   | 326.30   |

| Model                              | Opening | O.A.L. | Jaw Width | Weight (kg) | Code No. | Price \$  |
|------------------------------------|---------|--------|-----------|-------------|----------|-----------|
| <b>Single Opening Modular Vise</b> |         |        |           |             |          |           |
| 1                                  | 11.4    | 18     | 4         | 10          | 382101   | 1,547.51  |
| 2                                  | 12.6    | 20.5   | 5         | 17          | 382102   | 2,083.59  |
| 3                                  | 14.7    | 23     | 6         | 31          | 382103   | 2,589.31  |
| 3                                  | 18.11   | 27     | 6         | 34          | 382104   | 2,868.47  |
| 4                                  | 16      | 26     | 7         | 46          | 382105   | 3,022.21  |
| 4                                  | 20      | 30     | 7         | 51          | 382106   | 3,321.60  |
| 5                                  | 24      | 36     | 8         | 92          | 382110   | 5,720.74  |
| <b>Double Opening Modular Vise</b> |         |        |           |             |          |           |
| 3                                  | 2 x 4.3 | 23     | 6         | 38          | 382153   | 3,141.55  |
| 3                                  | 2 x 6.3 | 27     | 6         | 41          | 382154   | 3,428.81  |
| 4                                  | 2 x 6.7 | 30     | 7         | 63          | 382156   | 3,968.92  |
| 5                                  | 2 x 10  | 40     | 8         | 107         | 382172   | 7,148.91  |
| 6                                  | 2 x 6.3 | 35     | 12        | 154         | 382175   | 8,518.41  |
| 6                                  | 2 x 16  | 55     | 12        | 194         | 382180   | 14,072.40 |

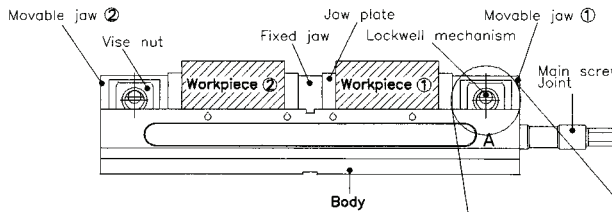
## Double Clamp Vise

- Double clamp set - one handle can simultaneously operate two moveable jaws and clamps 2 workpieces of same or different size or one large workpiece
- This model can increase efficiency and productivity of CNC machines
- The movable jaw ANTI-LIFT mechanism provides alignment to workpiece without jaw lift
- There are 6 kinds of clamping ways to meet workpieces of different shapes and sizes
- The whole body is precisely ground and height tolerance is within  $\pm 0.025\text{mm}$  ( $\pm 0.001''$ ), therefore several vises can be lined up for production
- The vise is made of FDC-80,000 psi (55kg/cm<sup>2</sup>) Ductile iron, and slide ways are hardened to 45HRC
- The rigid construction prevents base distortion
- Precision made to high accuracy standard

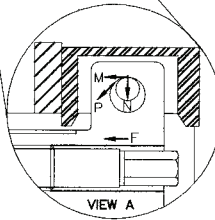


| Model No.       | Code No. | Price \$ |
|-----------------|----------|----------|
| 4" - TLD-40G/HV | 382610   | 2,325.00 |
| 6" - TLD-60G/HV | 382600   | 3,060.00 |

## ANTI-LIFT MECHANISM



- Clamping force equalization and ANTI-LIFT mechanism features virtually eliminate the deflection of fixed centre jaw and movable jaw lift
- Clamping range for clamping 2 workpieces simultaneously is 125 mm (4.9") each or 275 mm (10.8") for one large workpiece
- Double clamp seat



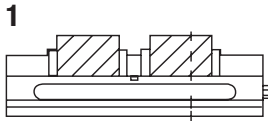
### ANTI-LIFT Mechanism

- M: Jaws forward movement force
- N: Gravity
- P: Resultant 45° component force forces the workpiece down while clamping
- F: Direction of jaw movement

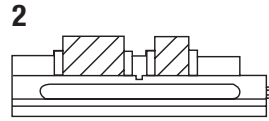


GS Double Clamp Vise  
(TLD-40G/HV, TLD-60G/HV)

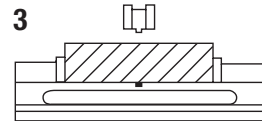
## Clamping Examples For Different Applications:



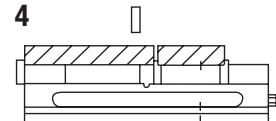
Clamping 2 pieces of same size workpieces.  
Max. Capacity: 90mm (3.5")  
125mm (4.9")



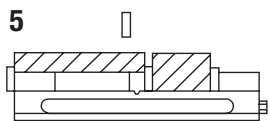
Clamping 2 pieces of different size of workpieces.  
Max. Capacity: 90mm (3.5")  
125mm (4.9")



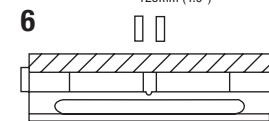
Large workpieces are able to be clamped after moving fixed jaw.  
Max. Capacity: 237mm (9.3")  
1315mm (12.4")



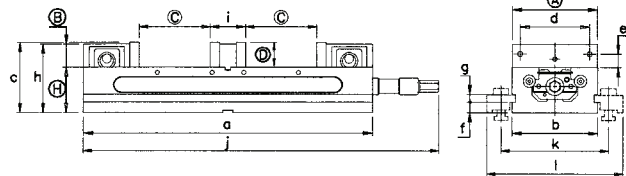
Stepped jaw plate for thin workpiece.  
Max. Capacity: 215mm (8.4")  
275mm (10.8")



Clamping 2 different workpieces.  
Max. Capacity: 215mm (8.4")  
275mm (10.8")



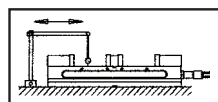
Large thin workpiece is able to be clamped after removing jaw plate on fixed jaw.  
Max. Capacity: 405mm (15.9")  
520mm (20.5")



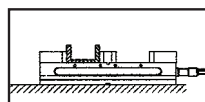
## Dimensional Information For Double Clamp Visers:

| Model No.  | A    | B    | C    | D    | a     | b    | c     | d     | e    | f    | g    | h     | H     | i    | j     | k    | l    | Guide Block | Weight (kg/lb) |
|------------|------|------|------|------|-------|------|-------|-------|------|------|------|-------|-------|------|-------|------|------|-------------|----------------|
| TLD-40G    | 103  | 33   | 90   | 38   | 405   | 104  | 101.5 | 63.5  | 17.5 | 13   | 31   | 96.5  | 63.5  | 55   | 430   | 143  | 195  | 18          | 20             |
| (TLD-40HV) | 4.05 | 1.29 | 3.54 | 1.49 | 15.9  | 4.09 | 3.99  | 2.5   | 0.68 | 0.51 | 1.22 | 3.79  | 2.5   | 2.16 | 16.9  | 5.62 | 7.67 | 0.709       | 44             |
| TLD-60G    | 152  | 41.5 | 125  | 44.5 | 520   | 154  | 123.5 | 98.42 | 23.8 | 18   | 16   | 126.5 | 82.55 | 64   | 639   | 193  | 245  | 18          | 48             |
| (TLD-60HV) | 5.98 | 1.6  | 4.9  | 1.75 | 20.47 | 6    | 4.98  | 3.87  | 0.94 | 0.7  | 0.63 | 4.86  | 3.25  | 2.52 | 25.15 | 7.59 | 9.64 | 0.709       | 105.6          |

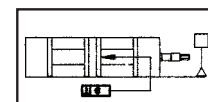
## TLD-40G, TLD-60G; match vise, TLD-40HV, TLD-60H (horizontal and vertical 2 way) Inspection Specification:



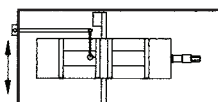
- 1 Parallelism: running face to bottom of bed.  
Guaranteed: 0.01 mm (0.0004")



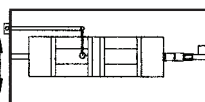
- 2 Squareness: between running face and jaw plate.  
Guaranteed: 0.03 mm (0.0012")



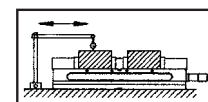
- 3 Squareness both sides to fixed jaw plate.  
Guaranteed: 0.02 mm (0.0008")



- 4 Parallelism: keyways on bottom of bed to jaw plate.  
Guaranteed: 0.02 mm (0.0008")



- 5 Squareness: keyways on bottom of bed to jaw plate.  
Guaranteed: 0.02 mm (0.0008")

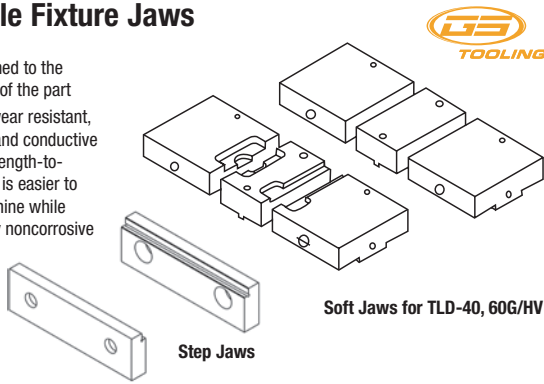


- 6 Parallelism: running face of the test block to bottom.  
Guaranteed: 0.02 mm (0.0008")

# Workholding, Clamping & Fixturing

## Machinable Fixture Jaws

- Can be machined to the precise shape of the part
- Aluminum is wear resistant, nonmagnetic and conductive with a high strength-to-weight ratio. It is easier to form and machine while being naturally noncorrosive



Soft Jaws for TLD-40, 60G/HV

| Description                      | Code No. | Price \$ |
|----------------------------------|----------|----------|
| 4" aluminum soft jaws            | 382612   | 737.75   |
| 4" step jaws                     | 382614   | 332.41   |
| 6" aluminum soft jaws (10mm key) | 382602   | 1,127.27 |
| 6" aluminum soft jaws (14mm key) | 382609   | 1,127.27 |
| 6" step jaws                     | 382604   | 381.48   |

## Steel Jaw Plate Set

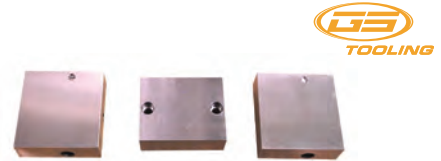
Steel offers high tensile strength and corrosion resistance.



| Description                             | Code No. | Price \$ |
|---|----------|----------|
| 6" steel jaw plate set (4pcs) for TLD60 | 382617   | 377.05   |

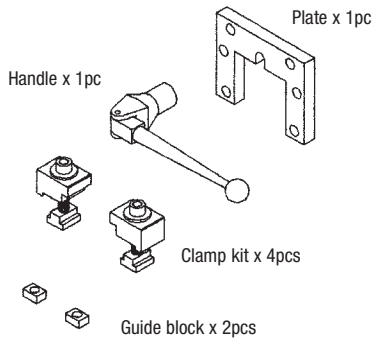
## Steel Jaw Sets

Steel offers high tensile strength and corrosion resistance.

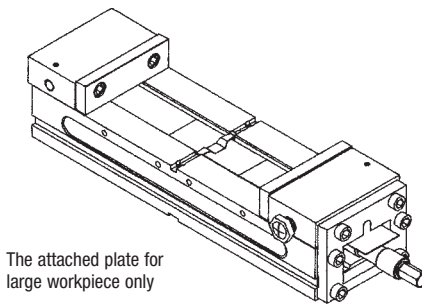


| Description                | Code No. | Price \$ |
|----------------------------|----------|----------|
| 4" steel jaw set for TLD40 | 382615   | 448.76   |
| 6" steel jaw set for TLD60 | 382605   | 568.75   |

## Standard Accessories

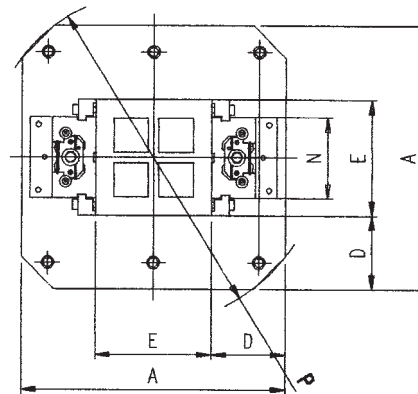
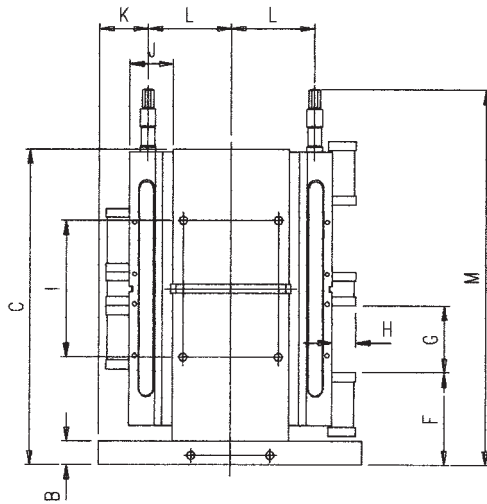
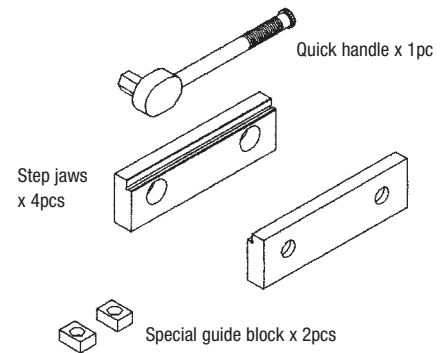


## Usage of "Plate"



The attached plate for large workpiece only

## Optional Accessories



## Jig Block Dimensional Specifications

(mm/in.)

| Model NO. | Use Vise | Pallet Size | A     | B    | C     | D    | E    | F    | G    | H    | I     | J    | K     | L     | M     | N    | P     | Weight (kg/lb) |
|-----------|----------|-------------|-------|------|-------|------|------|------|------|------|-------|------|-------|-------|-------|------|-------|----------------|
| GS-40-4C  | TLD-40   | 400 x 400   | 400   | 40   | 500   | 110  | 180  | 168  | 90   | 38   | 203   | 63.5 | 75.5  | 124.5 | 543   | 104  | 506   | 118            |
| GS-40-4C  | TLD-40   | 400 x 400   | 15.74 | 1.57 | 19.68 | 4.33 | 7.08 | 6.61 | 3.54 | 1.49 | 7.99  | 2.5  | 2.907 | 4.90  | 21.3  | 4.09 | 19.92 | 259.6          |
| GS-60-4C  | TLD-60   | 500 x 500   | 500   | 45   | 600   | 140  | 220  | 175  | 125  | 44.5 | 260   | 82.5 | 92    | 158   | 714   | 154  | 628   | 233            |
| GS-60-4C  | TLD-60   | 500 x 500   | 19.68 | 1.77 | 23.62 | 5.51 | 8.66 | 6.88 | 4.92 | 1.75 | 10.23 | 3.25 | 3.62  | 6.25  | 28.11 | 6.02 | 24.72 | 512.6          |

## GS Multi-Tasking Modular Vises for 5-Axis Machining Centers

The MULTI-TASKING range of vises has been specially designed for 5-axis machines. Working on 5 sides of the workpiece, it allows the best optimization of the machining cycle. Thanks to the compact design this kind of vise can be installed on all machining centres. The use of GRIP jaws is strongly recommended with multitasking vises.

- Self-centering or eccentric
- Eccentric jaw adjustment in steps of 2mm
- Highest accuracy in positioning and alignment ( $\pm 0.02\text{mm}$ ) due to ground rack teeth on both the base and the fixed jaws
- Minimum deflection
- Solid, rigid construction and maximum clamping ratio to the total length
- Positioning through ground holes or keyways
- All case hardened to 60HRC for durability

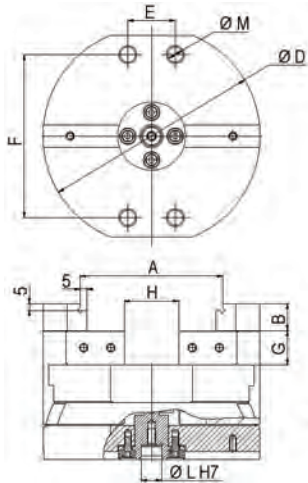


Type 1 & 2

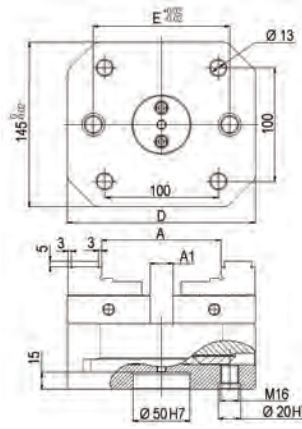
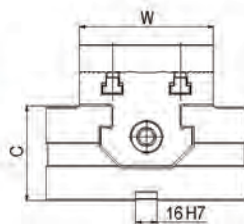


Type 3

Vise shown with riser



Type 1 & 2



Type 3

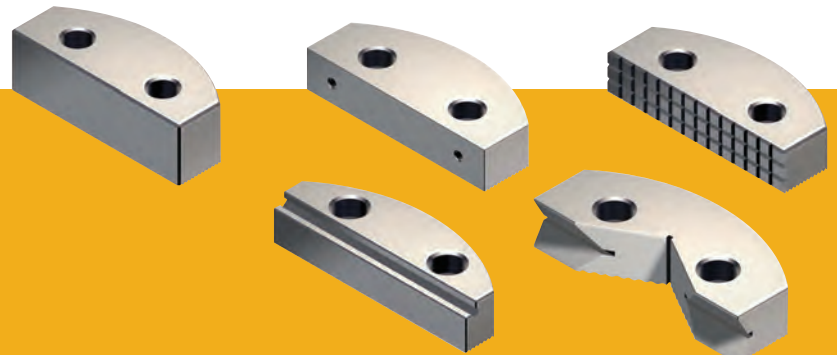
|                 | Type 1          | Type 2          | Type 3x166      | Type 3x266      |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Code No.</b> | <b>382520</b>   | <b>382522</b>   | <b>382524</b>   | <b>382526</b>   |
| <b>Price \$</b> | <b>3,117.81</b> | <b>4,156.74</b> | <b>4,780.41</b> | <b>4,988.28</b> |
| A               | 74              | 104             | 108             | 208             |
| A1              | -               | -               | 20              | 60              |
| W               | 74              | 99              | 138             | 138             |
| B               | 15              | 20              | 30              | 30              |
| C               | 50              | 70              | 58              | 58              |
| ØD/D            | 120             | 160             | 166             | 266             |
| E               | 5               | 35              | 120             | 200             |
| F               | 92              | 120             | -               | -               |
| G               | 20              | 25              | -               | -               |
| H               | 20              | 40              | -               | -               |
| ØL H7           | 20              | 20              | -               | -               |
| M               | 9               | 11              | -               | -               |
| kg              | 4.9             | 11              | 13              | 20              |
| kN              | 16              | 20              | 30              | 30              |



Also available:

Smooth, Soft, Serrated, Step,  
Prismatic, and Grip Jaws

Call for more information





# Workholding, Clamping & Fixturing

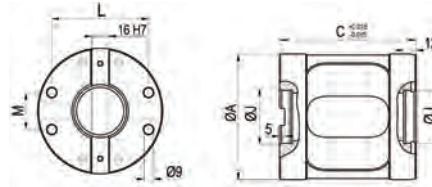
## Steel Risers

Allow greater access to machine hard to reach areas of the workpiece



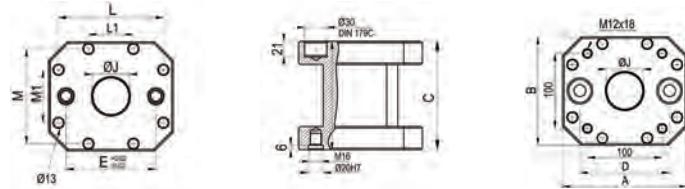
Type 1

Type 1 & 2

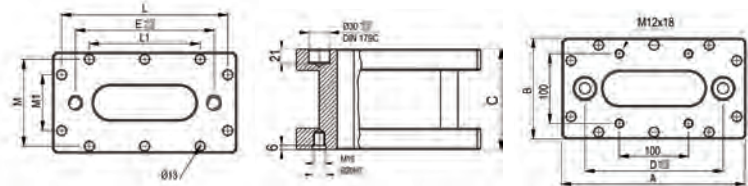


Type 3 x 166

Type 3 x 166



Type 3 x 266



| Model      | A   | B   | C   | D   | E   | L   | L1  | M   | M1 | ØJ    | kg   | Code No | Price \$ |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-------|------|---------|----------|
| Type 1     | 119 | -   | 130 | -   | -   | 92  | -   | 35  | -  | 50 H7 | 6    | 382521  | 2,036.18 |
| Type 2     | 158 | -   | 130 | -   | -   | 120 | -   | 35  | -  | 50 H7 | 10   | 382523  | 5,048.57 |
| Type 3x166 | 166 | 145 | 145 | 120 | 120 | 140 | 60  | 126 | 70 | 50 H7 | 14   | 382525  | 4,271.42 |
| Type 3x266 | 266 | 125 | 145 | 200 | 200 | 240 | 160 | 125 | 80 | -     | 21.5 | 382527  | 9,433.05 |

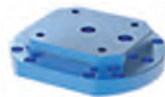
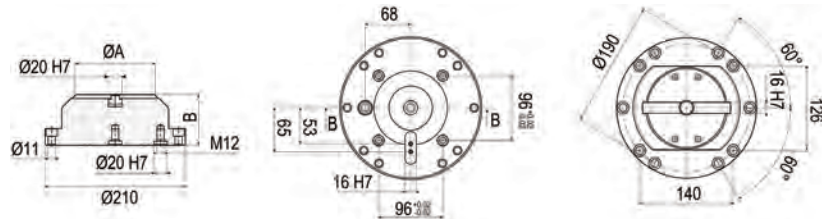
## Aluminum Risers

Allow greater access to machine hard to reach areas of the workpiece



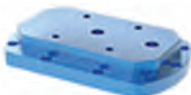
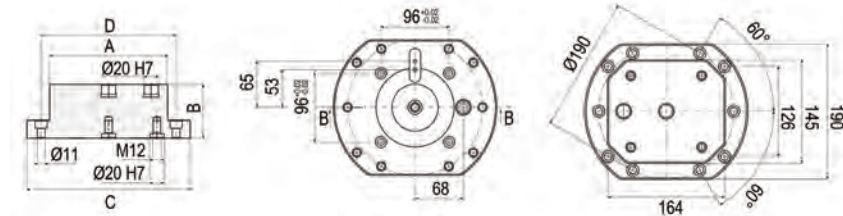
Type 1 & 2

Type 1 & 2



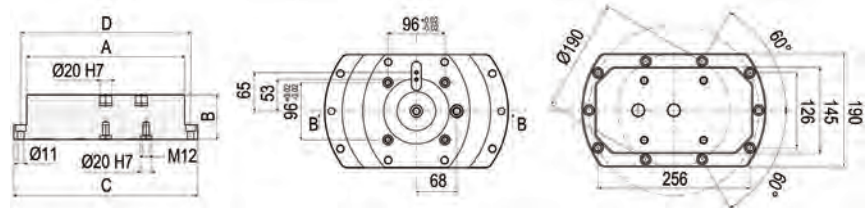
Type 3 x 166

Type 3 x 166



Type 3 x 266

Type 3 x 266



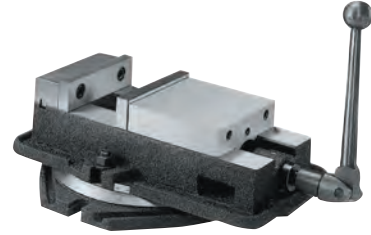
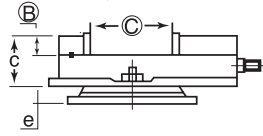
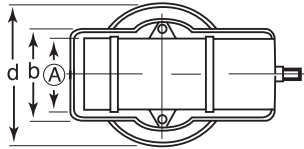
| Model  | A    | B   | C | D | kg  | Code No | Price \$ |
|--------|------|-----|---|---|-----|---------|----------|
| Type 1 | Ø120 | 50  | - | - | 3   | 382531  | 1,004.58 |
| Type 1 | Ø120 | 75  | - | - | 4.5 | 382532  | 1,059.86 |
| Type 1 | Ø120 | 100 | - | - | 5.4 | 382533  | 1,118.95 |
| Type 2 | Ø160 | 50  | - | - | 3.5 | 382534  | 1,004.58 |
| Type 2 | Ø160 | 75  | - | - | 4.9 | 382535  | 1,059.86 |
| Type 2 | Ø160 | 100 | - | - | 6.4 | 382536  | 1,118.95 |

| Model        | A   | B   | C   | D   | kg   | Code No | Price \$ |
|--------------|-----|-----|-----|-----|------|---------|----------|
| Type 3 x 166 | 166 | 50  | 230 | 190 | 3.8  | 382541  | 1,164.70 |
| Type 3 x 166 | 166 | 75  | 230 | 190 | 5.3  | 382542  | 1,240.95 |
| Type 3 x 166 | 166 | 100 | 230 | 190 | 6.8  | 382543  | 1,321.00 |
| Type 3 x 266 | 266 | 50  | 310 | 286 | 5.8  | 382544  | 1,791.84 |
| Type 3 x 266 | 266 | 75  | 310 | 286 | 8.3  | 382545  | 1,892.86 |
| Type 3 x 266 | 266 | 100 | 310 | 286 | 10.7 | 382546  | 1,999.61 |



## Milling Vises

- During machining operations, horizontal vises provide secure and accurate positioning of the workpiece
- An operator controls the opening and closing of the jaws on the workpiece for manual vises

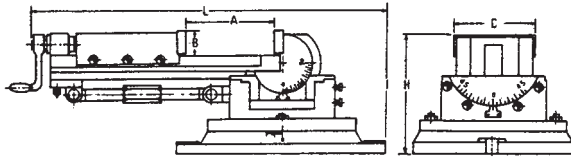


| Model No. | A | B     | C     | Overall Length | b      | c      | d      | e     | With Swivel | Price \$ | Without Swivel | Price \$ | Swivel Only | Price \$ |
|-----------|---|-------|-------|----------------|--------|--------|--------|-------|-------------|----------|----------------|----------|-------------|----------|
| CH-4      | 4 | 1-1/8 | 4     | 12-9/16        | 6-1/2  | 3-1/2  | 9-3/4  | 1-1/4 | 326405      | 1,135.28 | 326420         | 1,074.68 | 326423      | 124.76   |
| CH-6      | 6 | 1-1/2 | 5-3/4 | 16-3/4         | 8-1/4  | 4-3/8  | 11-3/4 | 1-5/8 | 326410      | 1,349.99 | 326425         | 1,221.25 | 326427      | 265.80   |
| CH-8      | 8 | 2     | 8     | 21-3/4         | 11-5/8 | 5-5/16 | 15     | 1-7/8 | 326415      | 2,888.98 | 326430         | 2,742.37 | 326433      | 459.07   |

## 3-Way Angle Milling Vises

The universal 3-way angle vise is a new design which makes the angle setting in all directions possible to meet the needs of elaborate work.

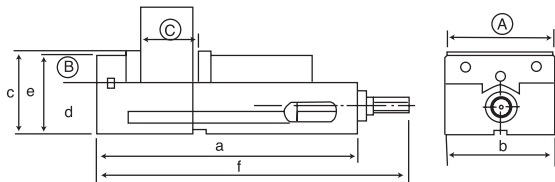
- Operation is smooth and easy
- Swivel base is scaled in 360°
- Each base can be fixed by four special bolts
- Precision angle setting is scaled in all directions
- Moveable part touches the bore in V-shape and is adjustable
- Upper angle setting base can incline from the horizontal position to the vertical position



| Model No. | Width C | Jaw A | B  | H   | L   | Height at Vertical Position | Gross Weight (kg) | Measure CFT | Code No. | Price \$ |
|-----------|---------|-------|----|-----|-----|-----------------------------|-------------------|-------------|----------|----------|
| KAV-75    | 80      | 90    | 30 | 144 | 400 | 385                         | (C) 15            | 0.7         | 326100   | 928.08   |
| KAV-100   | 106     | 105   | 38 | 172 | 460 | 470                         | (C) 32            | 1.2         | 326102   | 1,128.61 |
| KAV-125   | 132     | 140   | 40 | 205 | 625 | 590                         | (W) 50            | 1.6         | 326104   | 1,554.94 |

## Precision Milling Vises

This vise has a feature which guarantees that the movable jaw stays securely down during machining.



| Model No. | A   | B  | C   | a   | b   | c   | d  | e   | f   | Weight | Code No. | Price \$ |
|-----------|-----|----|-----|-----|-----|-----|----|-----|-----|--------|----------|----------|
| AMC-40    | 102 | 40 | 120 | 332 | 105 | 108 | 68 | 100 | 372 | 20 kg  | 327150   | 942.69   |
| AMC-60    | 152 | 44 | 146 | 370 | 154 | 117 | 73 | 111 | 438 | 30 kg  | 327155   | 1,198.83 |

## Tilting Hydraulic Machine Vises



- Angle setting ranges from 0° ~ 50°  
Tilting degrees graduated for easy reading
- Swivel base graduated to 360° and fixable in any position
- Accuracy within 0.02mm
- Tilting seat set by two locking screws



| Model | Jaw Width | Jaw Height | Jaw Opening | Weight (kg) | Code No. | Price \$ |
|-------|-----------|------------|-------------|-------------|----------|----------|
| VHT-4 | 110mm     | 36mm       | 170mm       | 33.3        | 326105   | 3,841.51 |
| VHT-6 | 154mm     | 54mm       | 300mm       | 88          | 326107   | 4,647.34 |

## ReLock Double Station Workholding System

### Unique Modular Design is Efficient and Accurate

Stay competitive in today's demanding manufacturing environment.

- Reduce set-up time with ReLock's modular design
- SnapLock feature allows to change or index jaws quickly
- Accurate and durable; precision manufactured from high grade materials
- Versatile array of jaws and accessories to vertical or horizontal machining applications

## ReLock Workholding Systems



| Size (in.) | Base Height (in.) | Base Width (in.) | Base Length (in.) | Code No. | Price \$  |
|------------|-------------------|------------------|-------------------|----------|-----------|
| 4          | 2.500             | 4.000            | 16.000            | 608400   | 9,273.60  |
| 6          | 3.250             | 6.000            | 20.500            | 608405   | 11,738.28 |
| 8          | 4.000             | 8.000            | 28.500            | 608410   | 30,720.18 |

## Single Station Conversion Plates



| Size (in.) | Weight (lb) | Thickness | Code No. | Price \$ |
|------------|-------------|-----------|----------|----------|
| 4          | 33          | 0.750     | 608415   | 202.31   |
| 6          | 68          | 0.750     | 608420   | 225.49   |
| 8          | 110         | 1.00      | 608425   | 361.84   |

## Double Station Workholding Vises



| Size (in.) | Weight (lb) | Clamp Pres. (lb) | Code No. | Price \$ |
|------------|-------------|------------------|----------|----------|
| 4          | 33          | 6000             | 608600   | 2,123.82 |
| 6          | 68          | 12000            | 608605   | 2,620.62 |

## SnapLock Machinable Fixture Jaw Sets



- Set of 3; 2 outside jaws, 1 centre jaw

| Model No.  | Size (in.) | Thickness (in.) | Code No. | Price \$ |
|------------|------------|-----------------|----------|----------|
| SSJ - 4000 | 4          | 1.500           | 608445   | 282.97   |
| SSJ - 6000 | 6          | 2.000           | 608450   | 550.62   |
| SSJ - 8000 | 8          | 2.500           | 608455   | 938.40   |

## SnapLock Carrier Jaws



- Set of 2 outside jaws
- Aluminum, threaded

| Model No.  | Size (in.) | Thread | Code No. | Price \$ |
|------------|------------|--------|----------|----------|
| SCJ - 4000 | 4          | 3/8-16 | 608460   | 252.89   |
| SCJ - 6000 | 6          | 1/2-13 | 608465   | 509.43   |
| SCJ - 8000 | 8          | 5/8-11 | 608470   | 920.46   |

## Quick Change ToolMaker/ MoldMaker Packages



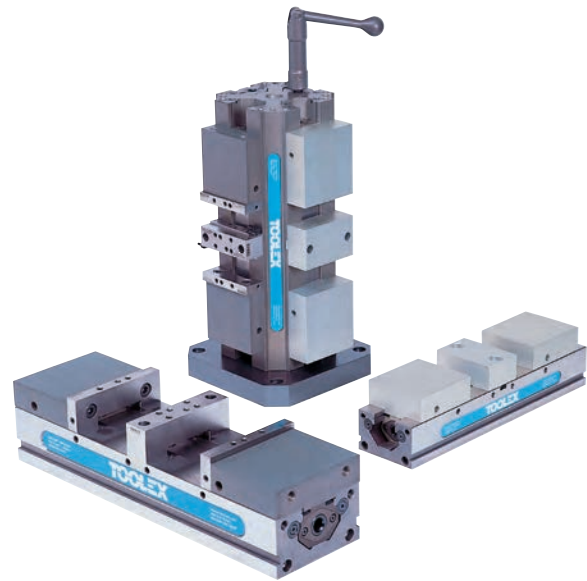
| Model No. | Size (in.) | Code No. | Price \$ |
|-----------|------------|----------|----------|
| QTM-4000  | 4          | 608490   | 2,805.54 |
| QTM-6000  | 6          | 608492   | 3,178.14 |
| QTM-8000  | 8          | 608494   | 4,173.12 |

## AccuSnap Master Jaws



- Only available for ReLock Workholding System

| Model No.  | Size (in.) | Width (in.) | Code No. | Price \$ |
|------------|------------|-------------|----------|----------|
| AMJ - 4035 | 4          | 3.98        | 608475   | 646.74   |
| AMJ - 6035 | 6          | 5.98        | 608480   | 693.11   |
| AMJ - 8035 | 8          | 7.98        | 608485   | 945.30   |



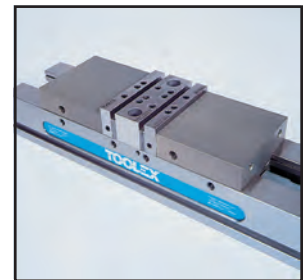
## AccuSnap Parallel Sets



| Model No.  | Spec. | Size (in.) | Parallels | Code No. | Price \$ |
|------------|-------|------------|-----------|----------|----------|
| APS - 4000 | Basic | 4          | 5 Pairs   | 608500   | 604.92   |
| APS - 4001 | Adv.  | 4          | 8 Pairs   | 608505   | 1,009.47 |
| APS - 6000 | Basic | 6          | 5 Pairs   | 608510   | 719.33   |
| APS - 6001 | Adv.  | 6          | 9 Pairs   | 608515   | 1,277.54 |
| APS - 8000 | Basic | 8          | 6 Pairs   | 608520   | 2,079.66 |
| APS - 8001 | Adv.  | 8          | 10 Pairs  | 608525   | 3,367.20 |

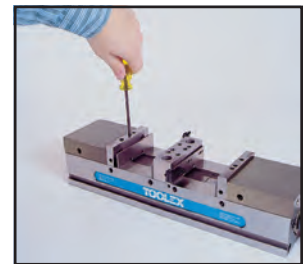
## SnapLock Machinable Fixture Jaws

- Versatile to allow job customization
- Remove or index in a matter of seconds



## AccuSnap Vise Jaw System

- Picture shows master jaw, parallels and modular workstop
- Highly accurate set-up and changeover



## ReLock-8 Station

- Unibody design
- Ideal for horizontal machining centres and rotary indexers on vertical machining centres

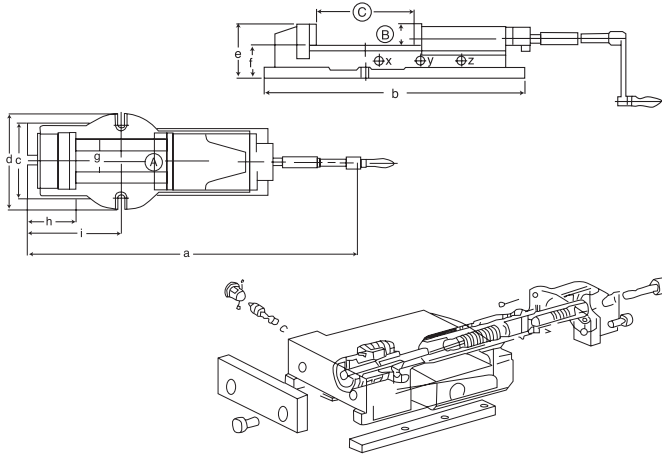




## Precision Hydra Power Machine Vises

### Hydraulic Booster System

Hydraulic Booster provides a steady clamping force against shocks and vibrations during the operations, since it fastens the work piece resiliently with the aid of the disc-springs mounted inside. (see fig. A)



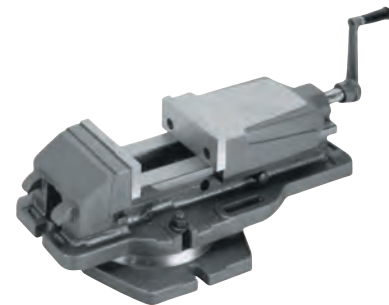
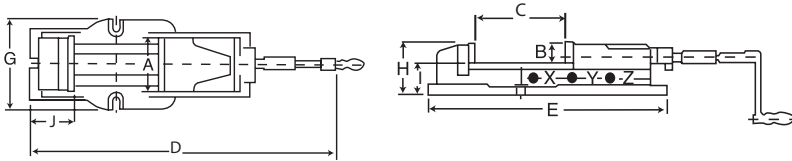
### Seal Kits

| Vise Model | Code No. | Price \$ |
|------------|----------|----------|
| HP-40      | 327201   | 77.87    |
| HP-50      | 327211   | 90.88    |
| HP-60      | 327221   | 85.79    |
| HP-80      | 327231   | 106.80   |

| Model No. | A   | B  | C   | a   | b   | c   | d   | e   | f   | g   | h   | i   | Clamp Force | Wt. (kg) Plain | Plain Base Code No. | Price \$ | Wt (kg) with Swivel Base | With Swivel Base Code No. | Price \$ |
|-----------|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|----------------|---------------------|----------|--------------------------|---------------------------|----------|
| HP-40     | 100 | 36 | 170 | 525 | 430 | 130 | 160 | 94  | 60  | 78  | 100 | 155 | 2500kg      | 16             | 327200              | 1,844.26 | 22                       | 327205                    | 1,987.76 |
| HP-50     | 125 | 46 | 220 | 670 | 540 | 165 | 185 | 118 | 72  | 97  | 117 | 185 | 3500kg      | 32             | 327210              | 1,875.01 | 42                       | 327215                    | 2,192.59 |
| HP-60     | 150 | 51 | 300 | 800 | 620 | 200 | 240 | 133 | 82  | 116 | 125 | 247 | 4400kg      | 54             | 327220              | 1,946.59 | 70                       | 327225                    | 2,264.29 |
| HP-80     | 200 | 62 | 300 | 900 | 700 | 240 | 280 | 162 | 100 | 160 | 165 | 266 | 6600kg      | 95             | 327230              | 3,606.53 | 125                      | 327235                    | 4,057.23 |

## Hydraulic Machine Vises

- Ruggedly constructed for milling, drilling, shaping, grinding and many other machine shop applications
- Body is made of high quality ductile cast iron, resists deflection or bending

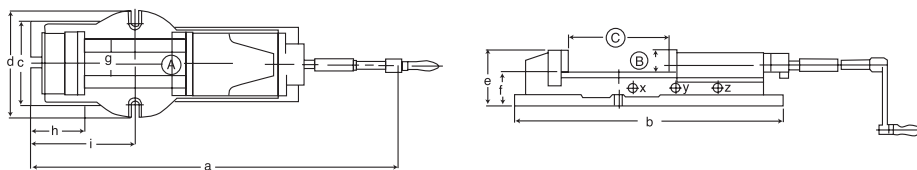


| Model No. | A   | B  | C   | D   | E   | G   | H   | I   | J   | Clamp Force | G.W. (kg) | Plain Base Code No. | Price \$ | Wt (kg) with Swivel Base | With Swivel Base Code No. | Price \$ |
|-----------|-----|----|-----|-----|-----|-----|-----|-----|-----|-------------|-----------|---------------------|----------|--------------------------|---------------------------|----------|
| HP-40G    | 100 | 36 | 170 | 525 | 430 | 160 | 94  | 60  | 78  | 2500kg      | 22        | 329205              | 1,459.80 | 26                       | 329200                    | 2,121.81 |
| HP-50G    | 127 | 46 | 220 | 670 | 540 | 185 | 118 | 72  | 97  | 4500kg      | 45        | 329215              | 1,544.37 | 52                       | 329210                    | 1,867.46 |
| HP-60G    | 150 | 51 | 300 | 800 | 620 | 240 | 133 | 82  | 116 | 6000kg      | 64        | 329225              | 1,662.62 | 74                       | 329220                    | 2,062.95 |
| HP-80G    | 200 | 65 | 300 | 800 | 710 | 280 | 158 | 100 | 161 | 8500kg      | 109       | 329235              | 3,296.66 | 125                      | 329230                    | 4,061.94 |

## Mechanical Power Machine Vises

### Mechanical Power Booster System

The Ball-Design mechanical booster provides steady clamping forces against shocks and vibrations. It helps vises clamp workpieces resiliently, during operations, with an aid of the inside-mounted disc-spring.

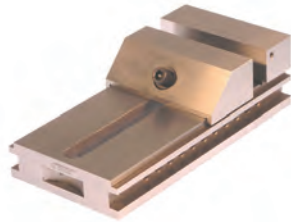


| Model No. | A   | B  | C   | a   | b   | c   | d   | e   | f  | g   | h   | i   | Clamp Force | Wt. (kg) Plain | Plain Base Code No. | Price \$ | Wt (kg) Swivel Base | Swivel Base Code No. | Price \$ |
|-----------|-----|----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-------------|----------------|---------------------|----------|---------------------|----------------------|----------|
| HP-60 II  | 150 | 51 | 300 | 800 | 620 | 200 | 240 | 133 | 82 | 116 | 125 | 247 | 4400        | 54             | 327240              | 1,946.59 | 16                  | 327245               | 246.00   |

## Suburban Precision Vises



Angled channel provides extra jaw capacity. Jaw can be opened or closed without unbolting from work surface. Squareness and parallelism within 0.0002". Models V-411 & V-612 squareness and parallelism within 0.0003". V-237 has recessed pockets at both ends for clamping, vees machined in face of movable jaw and 12 stepped channel which eliminates side holes.



| Model No. | Dimensions (in.)  | Jaw Capacity (in.) | Code No. | Price \$ |
|-----------|-------------------|--------------------|----------|----------|
| V-225     | 2 x 5-1/2 x 2     | 3-1/8              | 251200   | 919.30   |
| V-237     | 3 x 7-1/2 x 2-3/8 | 4                  | 251206   | 1,175.95 |
| V-411     | 4 x 11 x 3        | 7-1/2              | 251216   | 2,047.40 |
| V-612     | 6 x 12 x 3-1/2    | 8-1/2              | 251224   | 3,040.65 |

## Toolmaker Vises

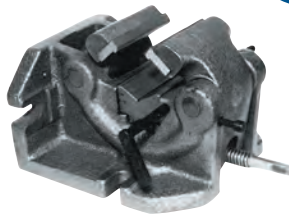
- Solid one piece body
- High quality alloy steel, surface hardened to 58-62 HRC
- Parallelism: 0.005mm / 100mm
- Perpendicularity: 0.005mm
- Angled centre channel provides extra jaw capacity



| Model No. | Length (mm) | Width (mm) | Jaw Opening (mm) | Jaw Height (mm) | Code No. | Price \$ |
|-----------|-------------|------------|------------------|-----------------|----------|----------|
| QKG50     | 140         | 50         | 65               | 25              | 230815   | 138.58   |
| QKG63     | 175         | 63         | 85               | 32              | 230820   | 169.47   |
| QKG73     | 190         | 73         | 100              | 35              | 230825   | 183.86   |
| QKG88     | 235         | 88         | 125              | 40              | 230830   | 282.17   |
| QKG100    | 245         | 100        | 125              | 45              | 230835   | 372.48   |
| QKG125    | 285         | 125        | 160              | 50              | 230836   | 562.10   |

## Milling Machine Vises For Round Workpieces

These vises are used for clamping round workpieces with diameters from 2" to 6.3" for use on a milling machine or drill press.



| Jaw Width | Shaft Capacity | Weight (lb) | Code No. | Price \$ |
|-----------|----------------|-------------|----------|----------|
| 6         | 2 to 6.3       | 165         | 401003   | 2,965.01 |

## EDM Tool Maker Vises

- Parallelism: ±0.002mm / 100mm
- Squareness: ±0.002mm / 100mm
- Stainless Steel
- VSTV-50W designed specifically for wire cutter use



VSTV-50W



VSTV-100W



VSTV-150W

| Model     | Max Opening | Thickness | Jaw Depth | Weight (kg) | Code No. | Price \$ |
|-----------|-------------|-----------|-----------|-------------|----------|----------|
| VSTV-50W  | 55mm        | 27mm      | 25mm      | 1.0         | 230840   | 1,192.21 |
| VSTV-100W | 100mm       | 24mm      | 50mm      | 4.9         | 230842   | 3,092.65 |
| VSTV-150W | 150mm       | 24mm      | 60mm      | 6.8         | 230844   | 6,193.18 |

## Heavy Duty Bench Vises With Swivel



Manufactured from high quality grey iron castings - a very strong material with excellent shock absorbing capacity and immense strength under compression. These rigid and robust vises, machined to close tolerances, are designed for smooth operation and reliability.



| Jaw Width (in.) | Max. Jaw Opening (mm) | Throat Depth (mm) | Code No. | Price \$ |
|-----------------|-----------------------|-------------------|----------|----------|
| 4               | 127                   | 55                | 231400   | 309.97   |
| 5               | 152                   | 70                | 231405   | 449.60   |
| 6               | 178                   | 80                | 231410   | 599.47   |

## Drill Press Vises

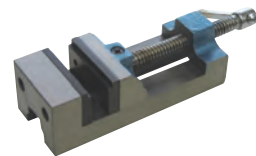
- High tensile iron casting
- Cold rolled screw thread
- Plain jaws of special steel



| Jaw Width (in.) | Opening (in.) | Jaw Depth (in.) | Weight (lb) | Code No. | Price \$ |
|-----------------|---------------|-----------------|-------------|----------|----------|
| 3               | 3             | 1-1/8           | 6           | 370206   | 105.09   |
| 4               | 4             | 1-3/8           | 10          | 370211   | 136.89   |
| 5               | 5             | 1-1/2           | 17-1/2      | 370216   | 241.33   |
| 6               | 6             | 1-1/2           | 23          | 370221   | 280.70   |

## Drill Press Vise P250

- High tensile iron casting
- Jaw plates - one grooved and one plain
- Accurate machining and assembling
- Four sides and one end machined



| Jaw Width (in.) | Jaw Depth (in.) | Opening (in.) | Length (in.) | Weight (lb) | Code No. | Price \$ |
|-----------------|-----------------|---------------|--------------|-------------|----------|----------|
| 2-1/2           | 1-1/2           | 2-9/16        | 7-1/4        | 5-1/2       | 370226   | 139.47   |

## Drill Press Vises P350 & P400

- Rugged 3 inch and 4 inch
- Precision cut ACME thread screw
- Hexagonal screw head for tight clamping



| Jaw Width | Jaw Depth | Opening (in.) | Length | Weight (lb) | Code No. | Price \$ |
|-----------|-----------|---------------|--------|-------------|----------|----------|
| 3         | 1-3/4     | 3             | 9-1/4  | 9-3/4       | 370236   | 161.98   |
| 4         | 1-3/4     | 4             | 10-3/4 | 17          | 370241   | 252.72   |

## Unigrip Drill Press Vises

- Manufactured from graded cast iron, these vises have a precision ground base and vise bed for smooth lateral movement of the movable jaw.
- Longitudinal and transversal prisms in the fixed jaw allow for firm gripping of round jobs of different sizes both horizontally and vertically. Special seat in jaws facilitates retaining of flat workpieces.
- Equipped with a convenient unigrip mechanism which increases the scope of application of this range of vises. Spindle moves inside the hollow hand grip allowing the vise to be used at a location away from the table edge.
- Available with 3 mounting options via 2 additional precisely ground surfaces: end face and side face. This allows for drilling along all axes with a single setting of the job and holding of long workpieces which are difficult to manage in regular vises.



| Model No.  | Jaw Width | Opening (in.) | Jaw Depth | Code No. | Price \$ |
|------------|-----------|---------------|-----------|----------|----------|
| DPV/UG-75  | 3         | 2-3/4         | 13/16     | 370925   | 179.97   |
| DPV/UG-100 | 4         | 3-1/2         | 13/16     | 370930   | 209.76   |
| DPV/UG-125 | 5         | 4-15/32       | 1-3/8     | 370935   | 319.77   |

**3 WAY Drill Press Vise**

| Model No.    | Jaw Width | Opening (in.) | Jaw Depth | Code No. | Price \$ |
|--------------|-----------|---------------|-----------|----------|----------|
| DPV/UG/3/100 | 4         | 3-1/2         | 13/16     | 370940   | 284.80   |

## SG Iron Unigrip Drill Press Vise

- Manufactured from SG Iron, making them amongst the strongest vises in the market - virtually unbreakable
- Only drill vise that can also be used as a milling vise
- Equipped with long mounting slots for easy adjustment on the machine table
- Fixed jaw has horizontal and vertical V slots for holding round jobs
- Both jaws have a seat for retaining flat and low height workpieces
- Movable steel jaw is supported by a jaw seat imparting rigidity and further strength



| Model No. | Jaw Width | Opening (in.) | Code No. | Price \$ |
|-----------|-----------|---------------|----------|----------|
| DPV/SG-80 | 3-3/16    | 3-9/64        | 370945   | 210.15   |

## Piston Vises

- Easy and speedy
- Quick grip drill press vises



| Model No. | Jaw Width | Jaw Depth | Opening (in.) | Code No. | Price \$ |
|-----------|-----------|-----------|---------------|----------|----------|
| V-75      | 3         | 1-1/4     | 3             | 326485   | 574.78   |
| V-100     | 4         | 1-15/16   | 4-11/16       | 326490   | 683.70   |

## "G" Clamps

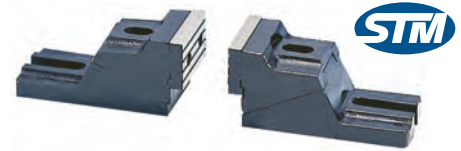
- SG iron with a tensile strength over 60,000 psi
- Powder coated finish
- Swiveling pad
- Handle designed to bend before the frame can be overstressed



| Model       | Clamp Capacity (in.) | Throat Depth (in.) | Load Capacity (lb) | Code No. | Price \$ |
|-------------|----------------------|--------------------|--------------------|----------|----------|
| GCL/13D/100 | 4                    | 2-11/32            | 1200               | 231442   | 43.70    |
| GCL/13D/150 | 6                    | 3                  | 1400               | 231443   | 55.63    |
| GCL/13D/200 | 8                    | 3-1/8              | 1700               | 231444   | 70.45    |
| GCL/13D/250 | 10                   | 3-1/2              | 2200               | 231445   | 98.35    |

## Free Style Vises

- Free style clamping
- Light duty



| Model  | Dimensions WxHxL | Clamping Capacity HxL | Weight (2pcs) (kg) | Code No. | Price \$ |
|--------|------------------|-----------------------|--------------------|----------|----------|
| FV-350 | 75x67x150mm      | 140x350mm             | 7.5                | 326450   | 577.95   |
| FV-450 | 100x90x200mm     | 180x450mm             | 14                 | 326455   | 687.63   |
| FV-550 | 125x120x250mm    | 250x550mm             | 23                 | 326460   | 990.14   |

## Heavy Duty Free Style Vises

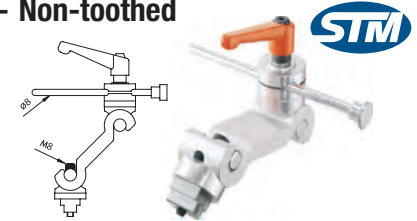
- Free style clamping
- Heavy duty



| Model  | Height (mm) | Width (mm) | Length (mm) | Weight (2pcs) (kg) | Code No. | Price \$ |
|--------|-------------|------------|-------------|--------------------|----------|----------|
| SV-62  | 59.5-80.5   | 64         | 139         | 5.8                | 326465   | 802.34   |
| SV-85  | 86-110      | 86.5       | 192         | 11                 | 326470   | 1,275.16 |
| SV-125 | 84-117      | 127        | 218         | 21                 | 326475   | 1,774.77 |

## U/N Work Stopper — Non-toothed

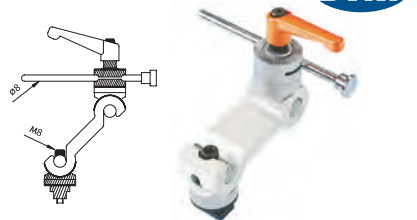
- Locking lever can be rotated a full 360°
- Arm made of anodized aluminum
- Steel hinge pins



| Model   | T-Slot Size | Stop Pin Length | Height | Arm Length | Code No. | Price \$ |
|---------|-------------|-----------------|--------|------------|----------|----------|
| WVS-123 | 16mm        | 160mm           | 200mm  | 132mm      | 326440   | 572.91   |

## U/N Work Stopper — Toothed

- Locking lever can be rotated a full 360°
- Arm made of anodized aluminum
- Steel hinge pins
- Slip adjustment of the stop pin before it is locked into place



| Model   | T-Slot Size | Stop Pin Length | Height | Arm Length | Code No. | Price \$ |
|---------|-------------|-----------------|--------|------------|----------|----------|
| WVS-125 | 16mm        | 160mm           | 200mm  | 132mm      | 326445   | 600.76   |

## "C" Clamps

- Drop forged steel construction for maximum clamping power
- High strength ACME screw with black oxide plating for corrosion resistance



| Opening Cap. | Throat Depth | Spindle Dia. | Clamping Force (lb) | Dynamic EDP | Code No. | Price \$ |
|--------------|--------------|--------------|---------------------|-------------|----------|----------|
| 0-2          | 2-1/4        | 15/32        | 2700                | D090001     | 861666   | 19.84    |
| 0-3          | 2-1/2        | 45/64        | 3000                | D090002     | 866021   | 31.78    |
| 0-4          | 3-1/4        | 45/64        | 3700                | D090003     | 861667   | 38.15    |
| 0-8          | 5            | 45/64        | 5200                | D090005     | 865486   | 92.11    |
| 0-10         | 6            | 15/16        | 6000                | D090006     | 866927   | 158.84   |
| 0-12         | 6-5/16       | 15/16        | 8000                | D090007     | 866928   | 201.23   |

## Pullers



- Spring-loaded jaws for quick and easy set-up for different applications
- Two or three jaw design for added flexibility
- Solid Chrome-Vanadium forged construction for increased durability
- Heavy duty forcing screw with live centre for strong even pulls



| Pulling Cap. | Max. Reach (in.) | Max. Spread (in.) | Dynamic EDP | Code No. | Price \$ |
|--------------|------------------|-------------------|-------------|----------|----------|
| 2 tons       | 3-1/2            | 4                 | D093001     | 865873   | 154.56   |
| 5 tons       | 5-1/4            | 7                 | D093002     | 866076   | 302.48   |

## 9" Locking Chain Clamp



- Flexible heavy duty chain adjusts quickly around any shape providing a secure hold even in hard to reach areas



| Weight (lbs) | Overall Length (in.) | Dynamic EDP | Code No. | Price \$ |
|--------------|----------------------|-------------|----------|----------|
| 1.57         | 9                    | D055311     | 865877   | 54.48    |

## Suburban Cube

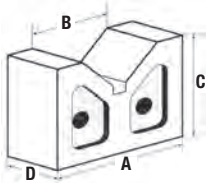


- Solid, one-piece hardened steel construction providing durable strength
- Ground on six sides with the ground surfaces flat, the cube is square and parallel within 0.0002"



| Model No. | Dimensions    | Code No. | Price \$ |
|-----------|---------------|----------|----------|
| C-36      | 3-1/2 x 6 x 3 | 251302   | 887.40   |

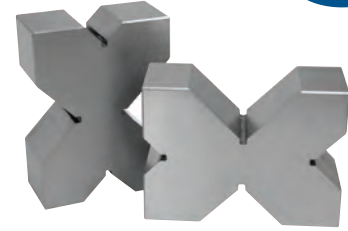
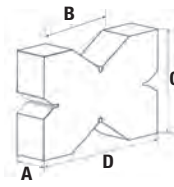
## Vee Blocks — Cast Iron



- Made from close grained cast iron, these blocks are precisely ground and machined square and parallel
- The vee's are 90° centered and true
- The blocks are manufactured and supplied in numbered pairs and come in handy for holding large jobs where clamping is not necessary
- Squareness and Parallelism of Vee grooves: within 0.0012" (30 microns)

| Width (A) (in.) | Vee Width (B) (in.) | Height (C) (in.) | Thickness (D) (in.) | Model No. | Code No. | Price \$ |
|-----------------|---------------------|------------------|---------------------|-----------|----------|----------|
| 3               | 1-3/4               | 2-3/8            | 1-5/16              | VB/C-3    | 231102   | 95.69    |
| 4               | 2-3/16              | 2-9/16           | 1-9/16              | VB/C-4    | 231104   | 124.16   |
| 5               | 2-7/16              | 3-1/8            | 2                   | VB/C-5    | 231106   | 169.29   |
| 6               | 3-1/16              | 3-1/2            | 2-7/16              | VB/C-6    | 231108   | 270.68   |
| 8               | 4-1/2               | 5-1/2            | 4                   | VB/C-8    | 231110   | 656.37   |
| 10              | 5                   | 6-1/2            | 5                   | VB/C-10   | 231112   | 1,164.06 |
| 12              | 5-1/8               | 8                | 6                   | VB/C-12   | 231114   | 1,705.55 |

## 4 Way Vee Blocks — Cast Iron



- Made from close grained cast iron, these Vee Blocks are precisely ground and machined square and parallel
- Each Block incorporates four different sized vee's thereby supporting a wide range of sizes
- Manufactured and supplied in matched and numbered pairs, these are very useful for marking and checking of cylindrical parts
- The larger sizes incorporate a cavity on either side for convenience in handling during usage

| Thickness (A) (mm) | Block Width (D) (mm) | Height (C) (mm) | Vee Cap. (B) (mm) | Model No.        | Code No. | Price \$ |
|--------------------|----------------------|-----------------|-------------------|------------------|----------|----------|
| 35                 | 95                   | 70              | 20 x 30 x 40 x 50 | VB/QD/95-70-35   | 231116   | 166.56   |
| 30                 | 100                  | 100             | 20 x 30 x 40 x 50 | VB/QD/100-100-30 | 231118   | 179.94   |
| 35                 | 120                  | 120             | 30 x 40 x 50 x 60 | VB/QD/120-120-35 | 231120   | 245.00   |

## Vee Blocks — Cast Iron



Supplied in matched and numbered pairs, these vee blocks are manufactured from high quality castings, properly seasoned against distortion, and are accurately machined square and parallel. The 90° vee is centered and true.



| Vee Width (in.) | Vee Depth (in.) | Width (in.) | Height (in.) | Thickness (in.) | Weight (lb) | Code No. | Price \$ |
|-----------------|-----------------|-------------|--------------|-----------------|-------------|----------|----------|
| 1               | 1/2             | 2           | 1-1/4        | 1-7/8           | 0.9         | 370556   | 75.25    |
| 1-3/4           | 7/8             | 3           | 2-3/8        | 2-5/8           | 2.5         | 370561   | 115.34   |
| 2-1/8           | 1               | 4           | 2-5/8        | 3-1/4           | 5           | 370566   | 154.82   |
| 2-3/8           | 1-1/8           | 5           | 3-1/8        | 4               | 8           | 370571   | 233.59   |
| 3-1/8           | 1-9/16          | 6           | 3-1/2        | 5               | 15          | 370576   | 289.57   |
| 3-5/8           | 1-13/16         | 7           | 4-1/2        | 6               | 28          | 370581   | 424.47   |
| 4-1/2           | 2-1/4           | 8           | 5-1/2        | 8               | 44          | 370586   | 575.65   |
| 5               | 2-1/2           | 10          | 6-5/8        | 10              | 69          | 370591   | 906.42   |
| 5-1/8           | 2-1/2           | 12          | 8            | 12              | 132         | 370596   | 1,760.71 |

## Magnetic V-Blocks



Used to hold cylindrical workpieces for grinding. Will hold both itself and the work on any flat ferrous surface, including a permanent magnet chuck (without energizing the chuck).

There are two vees:

- The smaller for workpieces up to 0.750" diameter and the larger for workpieces up to 2.500" diameter
- Sold Individually



| Description         | Code No. | Price \$ |
|---------------------|----------|----------|
| Magnetic Vee Blocks | 225710   | 173.89   |

## Magnetic V-Blocks

All Vee's and faces can be energized or de-energized simultaneously by turning the rotary action gun metal control knob. Gun metal construction of the knob ensures no interference with the magnetic field.

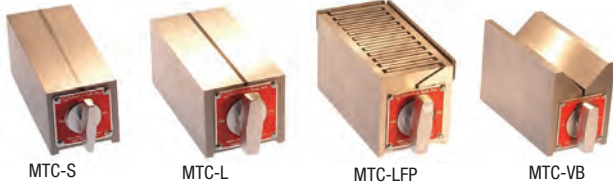


| Block Length (in.) | Block Width (in.) | Block Height (in.) | Type   | Model No. | Code No. | Price \$ |
|--------------------|-------------------|--------------------|--------|-----------|----------|----------|
| 4                  | 3                 | 3-3/4              | Single | MVB/4S    | 231084   | 531.93   |
| 4                  | 3                 | 3-3/4              | Pair   | MVB/4P    | 231086   | 1,063.70 |
| 3-3/16             | 2-3/8             | 3-3/4              | Single | MVB/5S    | 231088   | 411.11   |
| 3-3/16             | 2-3/8             | 3-3/4              | Pair   | MVB/5P    | 231090   | 822.18   |

## Suburban Magnetic Toolmaker's Chucks



- All models precision ground flat, square and parallel to an overall accuracy of 0.0005"
- Top, bottom and end magnetize simultaneously
- Model MTC-VB has "V" capacity of 2-3/4" diameter
- Model MTC-LFP has 3/16" x 1/16" fine pole construction for holding small or thin parts; and removable side and end rails



| Model No.  | Length (in.) | Width (in.) | Height (in.) | Weight (lb) | Code No. | Price \$        |
|------------|--------------|-------------|--------------|-------------|----------|-----------------|
| MTC-S      | 5"           | 2"          | 2"           | 6           | 251868   | <b>1,036.75</b> |
| MTC-L      | 5-1/2"       | 2-3/4"      | 2-1/2"       | 11          | 251869   | <b>1,238.30</b> |
| MTC-LFP    | 5-1/2"       | 2-3/4"      | 3"           | 12          | 251870   | <b>1,347.05</b> |
| MTC-VB     | 5-1/2"       | 2-3/4"      | 3-5/8"       | 13          | 251871   | <b>1,347.05</b> |
| MTC-VB-M** | 5-1/2"       | 2-3/4"      | 3-5/8"       | 26          | 251872   | <b>3,094.30</b> |

\*\* Matched pair of MTC-VB

## Tool Maker's V-Block & Clamp Sets — Precision



This range of Vee blocks is made from finely selected tool steel fully hardened to 55-60 HRC. Manufactured and numbered in matched pairs, each pair has two 90° Vees of different capacities which are identical to the Vees of its matching block. The Vee's are ground central, parallel and square with the ends and sides.



| Block Length (in.) | Block Width (in.) | Block Height (in.) | Type    | Model No.  | Code No. | Price \$      |
|--------------------|-------------------|--------------------|---------|------------|----------|---------------|
| 1-19/32            | 1-1/4             | 1-1/4              | Regular | VB/SP/T-30 | 231072   | <b>119.10</b> |
| 2                  | 1-1/2             | 1-1/2              | Regular | VB/SP/T-35 | 231074   | <b>142.52</b> |
| 2-3/4              | 1-3/4             | 1-5/8              | Regular | VB/SP/T-70 | 231076   | <b>202.03</b> |

## Precision V-Block Sets



Our ultra precision V-block set offers a quick, accurate and positive means of holding work pieces for layout, machining, grinding or inspection. One reversible swing-away clamp is provided with each V-block. The versatile clamp, plus the unique offset hole pattern in the top of the V-block, offers a large variety of clamping to almost any work surface.



- All V-blocks are parallel, square and centered within 0.0002"

| 90° V-Block Dimensions |       |        | Dia. To Be Inspected or Scribed |        | Code No. | Price \$      |
|------------------------|-------|--------|---------------------------------|--------|----------|---------------|
| Length                 | Width | Height | Min.                            | Max.   |          |               |
| 2-3/8                  | 2-3/8 | 2      | 13/64                           | 1-3/16 | 230135   | <b>171.58</b> |

## Ultimate V-Block & Clamp Set



Manufactured from selected steel, Vee Blocks are fully hardened and ground. Adjustable side screw with cap in the clamp supports the block and prevents tilting. Four 3/8"-16 tapped holes, two in the base and one on each side allow attachment to an angle iron which can then be attached to a lathe face plate or held by a magnetic chuck.

- Sold Individually



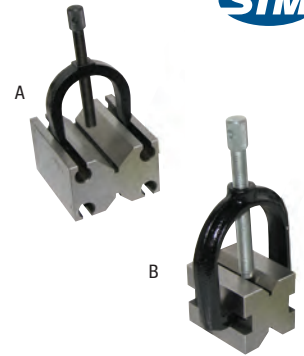
| Block Length (in.) | Block Height (in.) | Block Width (in.) | Model No. | Code No. | Price \$      |
|--------------------|--------------------|-------------------|-----------|----------|---------------|
| 3-19/32            | 1-7/8              | 1-7/8             | VB/S-48   | 231082   | <b>178.35</b> |

## V-Blocks & Clamps



All sides are ground square and parallel to each other. Models are designed so the clamps do not protrude over the sides; thus the tool can be used on its sides.

- Compares with other V-blocks costing twice as much
- Matched accuracy 0.0002". 90° vees are ground central, parallel and square with the ends precision ground
- Clamps included
- Matched and numbered in pairs
- Hardened and ground chrome steel
- Sold in precision matched pairs only



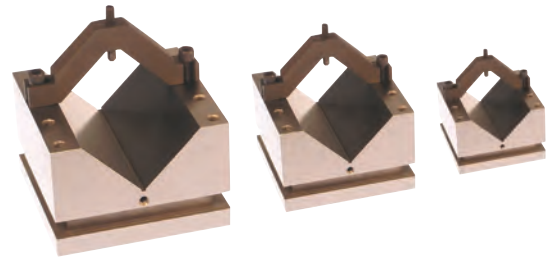
| Cap.  | Dimensions (W x H x L) | Type | Code No. | Price \$        |
|-------|------------------------|------|----------|-----------------|
| 2-1/8 | 2-3/4 x 3-1/2 x 4-7/8  | A    | 205120   | <b>1,661.69</b> |
| 1     | 1-3/8 x 1-5/8 x 1-3/4  | B    | 205105   | <b>255.96</b>   |

## Suburban V-Blocks



Each block comes with one clamp and blocks are available in matched pairs. All models are made of hardened steel. Sizes other than those priced are available by special order.

- M = Matched pairs



| Model No.             | Dimensions        | Parallel, Square & Central | Capacity | Code No. | Price \$        |
|-----------------------|-------------------|----------------------------|----------|----------|-----------------|
| <b>90° Vee Blocks</b> |                   |                            |          |          |                 |
| VB-222                | 2-1/2 x 2-1/2 x 2 | 0.0002"                    | 1-3/8    | 251232   | <b>406.00</b>   |
| VB-222-M              | 2-1/2 x 2-1/2 x 2 | 0.0002"                    | 1-3/8    | 251234   | <b>951.20</b>   |
| VB-334                | 4 x 3 x 3         | 0.0002"                    | 2-1/4    | 251236   | <b>556.80</b>   |
| VB-334-M              | 4 x 3 x 3         | 0.0002"                    | 2-1/4    | 251238   | <b>1,294.85</b> |
| VB-466                | 4 x 6 x 6         | 0.0003"                    | 4-3/8    | 251244   | <b>1,463.05</b> |
| VB-466-M              | 4 x 6 x 6         | 0.0003"                    | 4-3/8    | 251246   | <b>3,404.60</b> |
| VB-666                | 6 x 6 x 6         | 0.0005"                    | 4-3/8    | 251256   | <b>2,141.65</b> |
| VB-666-M              | 6 x 6 x 6         | 0.0005"                    | 4-3/8    | 251258   | <b>5,141.70</b> |
| <b>60° Vee Blocks</b> |                   |                            |          |          |                 |
| VB-602                | 2-1/2 x 2-1/2 x 2 | 0.0002"                    | 1-3/8    | 251248   | <b>707.60</b>   |
| VB-602-M              | 2-1/2 x 2-1/2 x 2 | 0.0002"                    | 1-3/8    | 251250   | <b>1,932.85</b> |
| VB-604                | 4 x 3 x 3         | 0.0002"                    | 2-1/4    | 251252   | <b>1,025.15</b> |
| VB-604-M              | 4 x 3 x 3         | 0.0002"                    | 2-1/4    | 251254   | <b>2,611.45</b> |

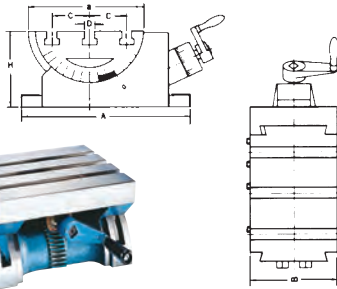


## Adjustable Swivel Angle Plate



### Special Features:

- The CL Adjustable Swivel Angle Plate is mainly used for precise angle finishing, suitable for wide purposes
- CL-1 is Bolt Lock Style



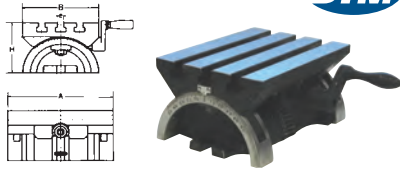
| Model No. | A   | a   | B   | C  | D  | H   | T-Slots | Weight Capacity | Code No. | Price \$ |
|-----------|-----|-----|-----|----|----|-----|---------|-----------------|----------|----------|
| CL-1      | 252 | 180 | 125 | 55 | 14 | 115 | 3       | 20 kg           | 326126   | 1,884.69 |
| CL-2      | 300 | 240 | 180 | 65 | 16 | 150 | 3       | 30 kg           | 326128   | 1,769.18 |

## Angle Plate



### BRA-180 BRA-250 BRA-380

- Low profile
- Micro reading 5 min
- Adjustable 45° each side
- Special design for angle setting on various machine tools



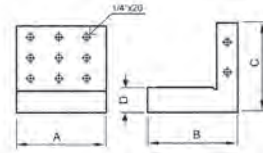
| Table     |     |     |     |          |             |          |          |
|-----------|-----|-----|-----|----------|-------------|----------|----------|
| Model No. | B   | A   | H   | T-Slot E | Weight (kg) | Code No. | Price \$ |
| BRA-180   | 130 | 180 | 91  | 10       | 7.5 kg      | 326120   | 921.51   |
| BRA-250   | 178 | 250 | 133 | 12       | 22.5 kg     | 326122   | 1,537.80 |
| BRA-380   | 260 | 380 | 185 | 16       | 69 kg       | 326124   | 2,669.74 |

## Precision Steel Angle Plates



### VRS Precision Steel Angle Plates

- Material: YK30 Alloy Steel
- Hardness: 58HRC
- Accuracy: 0.005/100mm

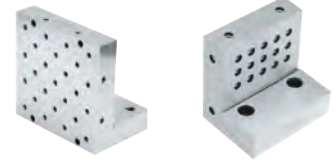


| Model No. | A   | B   | C   | D  | Net Wt. | Code No. | Price \$ |
|-----------|-----|-----|-----|----|---------|----------|----------|
| VRS-33    | 75  | 75  | 100 | 25 | 2.2 kg  | 370400   | 615.45   |
| VRS-44    | 100 | 100 | 100 | 25 | 3.7 kg  | 370402   | 670.05   |
| VRS-46    | 100 | 100 | 150 | 25 | 4.5 kg  | 370404   | 771.67   |
| VRS-85    | 200 | 120 | 200 | 40 | 14.3 kg | 370406   | 2,087.99 |
| VRS-1206  | 300 | 150 | 300 | 50 | 32.3 kg | 370408   | 3,091.04 |

## Suburban Precision Ground Angle Plates



- Solid one piece angle plates are made from hardened steel
- Square and parallel within 0.0002"
- Tapped holes



| Model No. | Dimensions (in.)  | Weight (lb) | Code No. | Price \$ |
|-----------|-------------------|-------------|----------|----------|
| AP-334    | 3 x 3 x 4 x 1     | 6 lb        | 251260   | 514.75   |
| AP-444-S1 | 4 x 4 x 4 x 1     | 10 lb       | 251264   | 784.45   |
| AP-446-S2 | 4 x 4 x 6 x 1     | 14 lb       | 251276   | 962.80   |
| AP-664-S1 | 6 x 6 x 4 x 1-1/4 | 20 lb       | 251278   | 1,448.55 |

## Suburban Compound Angle Plate



Solid, single piece, hardened steel construction provides stable and reliable positioning for compound use. Comes with one clamp and all holes are tapped. Plate is square and parallel within 0.0002".



| Model No. | Dimensions    | Weight (lb) | Code No. | Price \$ |
|-----------|---------------|-------------|----------|----------|
| CAP-46    | 6 x 4 x 4 x 1 | 11          | 251280   | 1,741.45 |

## Cross Table VCT-512

Applied in general machines such as compounding machine, drilling machine, etc., or large objects of special shape which cannot be clamped by common vises.

- Lateral moving travel on surface: 11"
- Longitude moving travel on surface: 6"



| Model No. | Table (mm) | Height (mm) | Travel (mm) | Base (mm) | Dial Grad. (mm) | Net Weight (kg) | Code No. | Price \$ |
|-----------|------------|-------------|-------------|-----------|-----------------|-----------------|----------|----------|
| VCT-512   | 300 x 140  | 115         | 200 x 125   | 225 x 200 | 0.03            | 16.6            | 230965   | 1,606.69 |

## Sine Bar

- Effectively cancels the angle being measured to check its accuracy
- Ground flat, square and parallel within 0.0002"
- Steel hardened to 52HRC

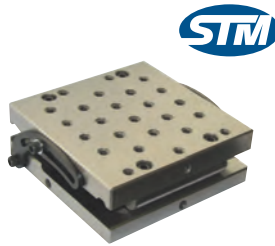


| Model No. | Length (in.) | Width (in.) | Height (in.) | Centre Distance (in.) | Parallel | Hardness | Block Dia. | Material | Net Wt. | Code No. | Price \$ |
|-----------|--------------|-------------|--------------|-----------------------|----------|----------|------------|----------|---------|----------|----------|
| YCT-S25   | 6-3/8        | 1           | 1-1/4        | 5"                    | 0.00012  | 52HRC    | 3/4        | SK2      | 1.0kg   | 230760   | 183.77   |
| YCT-S50   | 6-3/8        | 2           | 1-1/4        | 5"                    | 0.00012  | 52HRC    | 3/4        | SK2      | 1.9kg   | 230765   | 236.24   |

## Sine Plates

### YCT-66/YCT-47 Sine Plates

Precision ground, hardened to 58HRC and normalized by a sub-zero treatment. Rolls are hardened and ground to an accuracy of 0.001mm. High precision of parallelism within 0.002mm and squareness within 0.005mm. Set-up and dressing time reduced to a bare minimum due to simplicity of set up. (Angle 0°, 60°)



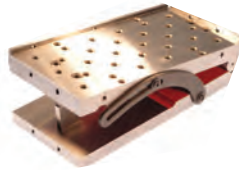
| Model No.        | Width x Length (in./mm) | H (in./mm) | Code No. | Price \$ |
|------------------|-------------------------|------------|----------|----------|
| YCT-47           | 4 x 7                   | 2.37       | 230780   | 846.86   |
| YCT-66           | 6 x 6                   | 2.37       | 230785   | 903.08   |
| YCT-47M Magnetic | 100 x 175 mm            | 60 mm      | 230770   | 1,975.25 |
| YCT-66M Magnetic | 150 x 150 mm            | 60 mm      | 230775   | 2,172.61 |

# Suburban SineSet® System

The complete system of bolt-together tools

## Suburban Sine Plates

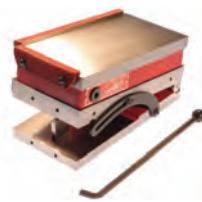
All plates are made of hardened steel. Squareness and parallelism 0.0002" and 0.0003". Locking strap always remains below top surface (pat. pending). Adjustable side rails drop below surface without unbolting. A 0.200 minute stepped gauge block roll eliminates steps in base plate. Strong, large hinge pins. Tapped holes in top plate. Side rails and locking straps included.



| Model No.             | Dimensions      | Centre Distance of Rolls | Code No. | Price \$  |
|-----------------------|-----------------|--------------------------|----------|-----------|
| SP-44-S0              | 4 x 4 x 2       | 3" ± 0.0002"             | 251942   | 1,162.90  |
| SP-136 (not SineSet®) | 6 x 3 x 2       | 5" ± 0.0002"             | 251126   | 1,162.90  |
| SP-555 (not SineSet®) | 6 x 5 x 2-1/4   | 5" ± 0.0002"             | 251132   | 1,937.20  |
| SP-66-S1              | 6 x 6 x 2       | 5" ± 0.0002"             | 251136   | 1,703.75  |
| SP-612-S2             | 6 x 12 x 2-5/8  | 5" ± 0.0002"             | 251134   | 3,420.55  |
| SP-618-S2             | 6 x 18 x 3-3/8  | 5" ± 0.0002"             | 251944   | 10,181.90 |
| SP-812-S2             | 8 x 12 x 2-5/8  | 5" ± 0.0002"             | 251140   | 4,296.35  |
| SP-1212-S2            | 12 x 12 x 2-5/8 | 10" ± 0.0002"            | 251122   | 7,719.80  |
| SP-126-S2             | 12 x 6 x 2-5/8  | 10" ± 0.0002"            | 251124   | 3,388.65  |

## Suburban Magnetic Sine Plates

Ceramic permanent magnetic chucks can't lose their magnetism. Removable handle for on/off operation, end rails and side rails all included. Sine plate angles lock rigidly with locking straps. Squareness, parallelism and roll centre distances within 0.0002" and 0.0003". Unit features 0.200 minute angle steps.



| Model No.                        | Dimensions      | Centre Distance of Rolls | Code No. | Price \$  |
|----------------------------------|-----------------|--------------------------|----------|-----------|
| MSP-66 (not SineSet®)            | 6 x 6 x 4-1/4   | 5" ± 0.0002"             | 251086   | 3,690.25  |
| MSP-66-S1                        | 6 x 6 x 4-5/8   | 5" ± 0.0002"             | 251936   | 3,929.50  |
| MSP-126-S2                       | 6 x 12 x 5-1/4  | 10" ± 0.0002"            | 251066   | 6,034.90  |
| MSP-612-S2                       | 6 x 12 x 5-1/4  | 5" ± 0.0002"             | 251082   | 6,066.80  |
| MSP-618-S2                       | 6 x 18 x 6      | 5" ± 0.0002"             | 251938   | 13,295.05 |
| MSP-1212-S2                      | 12 x 12 x 5-1/4 | 10" ± 0.0002"            | 251062   | 12,838.30 |
| <b>Magnetic Fine Pole Plates</b> |                 |                          |          |           |
| MSP-363-FP (not SineSet®)        | 3 x 6 x 4-1/4   | 5" ± 0.0002"             | 251072   | 2,652.05  |
| MSP-66-FP (not Sine Set®)        | 6 x 6 x 4-1/4   | 5" ± 0.0002"             | 251088   | 4,006.35  |
| MSP-126-FP-S2                    | 6 x 12 x 5-1/4  | 10" ± 0.0002"            | 251068   | 6,407.55  |
| MSP-612-FP-S2                    | 6 x 12 x 5-1/4  | 5" ± 0.0002"             | 251084   | 6,439.45  |
| MSP-1212-FP-S2                   | 12 x 12 x 5-1/4 | 10" ± 0.0002"            | 251064   | 13,398.00 |

## Sine Visers

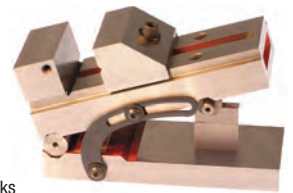
- Body is one solid piece of steel, hardened like the rest of the sine vise to 58-62 HRC
- Dual 0.200" minute steps for setting small angles with standard gauge blocks are built into the gauge block roll
- All 7" x 3-1/2" sine visers have small horizontal and vertical vees in the moveable jaw
- Provides a quick and accurate means of holding a workpiece at an angle for machining, drilling or grinding



| Model No. | Size (in.)    | Code No. | Price \$ |
|-----------|---------------|----------|----------|
| YCT-SV25  | 3-1/2 x 2-1/2 | 230705   | 303.81   |
| YCT-SV30  | 3-1/2 x 2-7/8 | 230710   | 340.14   |
| YCT-SV200 | 2-3/8 x 2     | 230715   | 987.78   |
| YCT-SV250 | 2-7/8 x 2-1/2 | 230720   | 931.24   |
| YCT-SC300 | 3-3/8 x 3     | 230725   | 1,269.85 |

## Suburban Sine Visers

- Solid, one piece body
- Locking strap included
- Made from steel hardened to 58-62 HRC
- Square and parallel within 0.0002" and 0.0003"
- Angled centre channel provides extra jaw capacity
- Provides a quick and accurate means of holding a workpiece at an angle for grinding or inspection
- Dual 0.200 minutes steps built into the gauge roll allow setting small angles with standard gauge blocks
- Moveable jaw pulls into base at 45° to 60° to insure maximum holding power and hold-down force, eliminating tilting and lifting



| Model No.             | Size (in.)        | Code No. | Price \$ |
|-----------------------|-------------------|----------|----------|
| SV-337 (not SineSet®) | 7-1/2 x 3 x 3-5/8 | 251160   | 1,925.60 |
| SV-337-S1             | 7-1/2 x 3 x 3-5/8 | 251162   | 2,009.70 |
| SV-411 (not SineSet®) | 11 x 4 x 4-5/8    | 251166   | 3,142.15 |
| SV-411-S2             | 11 x 4 x 4-5/8    | 251168   | 3,258.15 |
| SV-612 (not SineSet®) | 12 x 6 x 5-1/8    | 251170   | 5,385.30 |
| SV-612-S2             | 12 x 6 x 5-1/8    | 251172   | 5,559.30 |

## Suburban Compound Sine Plates

Compound sine plates include two end rails and two straps for locking angle settings. Made of hardened steel, each compound sine plate has 0.002" deep step for minute angles and tapped holes in top plate. Squareness and parallelism 0.0003".



| Model No.   | Dimensions      | Centre Distance of Rolls | Code No. | Price \$  |
|-------------|-----------------|--------------------------|----------|-----------|
| SPC-66-S1   | 6 x 6 x 3       | 5" ± 0.0002"             | 251150   | 3,671.40  |
| SPC-612-S2  | 6 x 12 x 4-1/8  | 5" within 0.0002"        | 251148   | 6,034.90  |
| SPC-618-S2  | 6 x 18 x 5-3/8  | 5" within 0.0002"        | 251940   | 14,218.70 |
| SPC-1212-S2 | 12 x 12 x 4-1/8 | 10" within 0.0002"       | 251144   | 12,503.35 |

## Suburban Compound Magnetic Sine Plates

Ceramic permanent magnetic chuck. Removable handle for position on/off control, side rails, end rails all included. Strap locks sine plate securely. 0.200 minute angle steps with 0.0002" and 0.0003" tolerance in squareness, parallelism and roll centre distances.

- Fine Pole: (marked FP) 1/8" poles and 1/8" separators produce shallow flux lines for holding small and thin parts

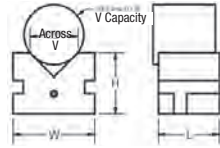
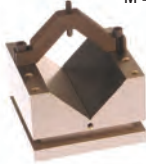


| Model No.       | Dimensions        | Centre Distance of Rolls | Code No. | Price \$  |
|-----------------|-------------------|--------------------------|----------|-----------|
| MSPC-66-S1      | 6 x 6 x 5-3/4     | 5" ± 0.0002"             | 251102   | 5,892.80  |
| MSPC-612-S2     | 6 x 12 x 6-13/16  | 5" & 10" ± 0.0002"       | 251098   | 8,681.15  |
| MSPC-1212-S2    | 12 x 12 x 6-13/16 | 10" ± 0.0002"            | 251094   | 21,797.65 |
| MSPC-66-FP-S1   | 6 x 6 x 5-3/4     | 5" ± 0.0002"             | 251104   | 6,171.20  |
| MSPC-612-FP-S2  | 6 x 12 x 6-13/16  | 5" & 10" ± 0.0002"       | 251100   | 9,052.35  |
| MSPC-1212-FP-S2 | 12 x 12 x 6-13/16 | 10" ± 0.0002"            | 251096   | 22,490.04 |

## Suburban SineSet® V-Blocks



- Provides a quick, accurate and positive means of holding workpieces for layout, machining, grinding or inspection
- Solid one-piece steel construction, hardened to 58-60 HRC
- One reversible, swing-away clamp is provided with each v-block
- Side slots allow easy clamping to almost any work surface
- SineSet® models bolt directly to a SineSet® sine plate or compound sine plate of the same series. S1 models also bolt to the AP-664-S1 90° conversion plate
- Available in both 60° and 90° models and as single vee blocks or matched pairs
- M = Matched pairs

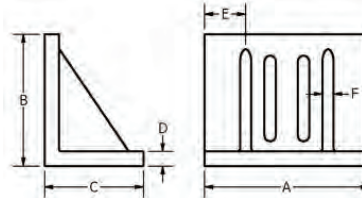


| Model No.             | L      | W      | H  | Across Vee | Vee Cap. | Square Parallel & Central | Code No. | Price \$ |
|-----------------------|--------|--------|----|------------|----------|---------------------------|----------|----------|
| <b>90° Vee Blocks</b> |        |        |    |            |          |                           |          |          |
| VB-222-S0             | 2-1/2" | 2-1/2" | 2" | 1-15/32"   | 1-5/8"   | 0.0002"                   | 251946   | 461.10   |
| VB-222-M-S0           | 2-1/2" | 2-1/2" | 2" | 1-15/32"   | 1-5/8"   | 0.0002"                   | 251948   | 1,162.90 |
| VB-334-S1             | 3"     | 4"     | 3" | 2-7/32"    | 2-7/8"   | 0.0002"                   | 251950   | 669.90   |
| VB-334-M-S1           | 3"     | 4"     | 3" | 2-7/32"    | 2-7/8"   | 0.0002"                   | 251952   | 1,531.20 |
| VB-466-S2             | 6"     | 6"     | 4" | 3-31/32"   | 4-3/8"   | 0.0003"                   | 251954   | 1,593.55 |
| VB-466-M-S2           | 6"     | 6"     | 4" | 3-31/32"   | 4-3/8"   | 0.0003"                   | 251956   | 3,770.00 |
| <b>60° Vee Blocks</b> |        |        |    |            |          |                           |          |          |
| VB-602-M-S0           | 2-1/2" | 2-1/2" | 2" | 1-15/32"   | 1-3/8"   | 0.0002"                   | 251930   | 2,118.45 |
| VB-604-S1             | 3"     | 4"     | 3" | 1-31/32"   | 2-1/8"   | 0.0002"                   | 251932   | 1,162.90 |
| VB-604-M-S1           | 3"     | 4"     | 3" | 1-31/32"   | 2-1/8"   | 0.0002"                   | 251934   | 2,740.50 |

## Slotted Angle Plates — Webbed Style



- Made from class 35-40 cast iron
- Multiple clamping slots for easy mounting of workpieces
- Ground finish (up to 20"), square and parallel within 0.0005" per 6"

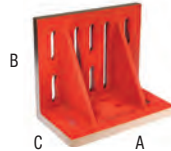


| Model        | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | F (in.) | No. Webs | Slots (in.) | Wt. (lb) | Code No. | Price \$ |
|--------------|---------|---------|---------|---------|---------|---------|----------|-------------|----------|----------|----------|
| SAW-030302-G | 3-1/2   | 3       | 2-1/2   | 9/16    | 1-3/4   | 1/2     | 1        | (4) 7/16    | 4        | 251601   | 345.10   |
| SAW-040303-G | 4-1/2   | 3-1/2   | 3       | 9/16    | 2-1/4   | 1/2     | 1        | (4) 9/16    | 5        | 251603   | 203.00   |
| SAW-060504-G | 6       | 5       | 4-1/2   | 11/16   | 3       | 9/16    | 1        | (4) 11/16   | 13       | 251605   | 437.90   |
| SAW-070504-G | 7       | 5-1/2   | 4-1/2   | 11/16   | 3-1/2   | 9/16    | 1        | (4) 11/16   | 14       | 251607   | 624.95   |
| SAW-080605-G | 8       | 6       | 5       | 3/4     | 2       | 5/8     | 2        | (4) 9/16    | 22       | 251609   | 778.65   |
| SAW-090706-G | 9       | 7       | 6       | 3/4     | 2-1/4   | 5/8     | 2        | (4) 11/16   | 28       | 251611   | 957.00   |
| SAW-100806-G | 10      | 8       | 6       | 7/8     | 2-1/2   | 11/16   | 2        | (4) 11/16   | 37       | 251613   | 1,064.30 |
| SAW-120908-G | 12      | 9       | 8       | 1       | 3       | 3/4     | 2        | (11) 11/16  | 63       | 251615   | 1,703.75 |

## Giant Slotted Webbed Angle Plates



- Made of high quality fine grained cast iron, stress relieved
- Machined finish - square and parallel within 0.002" per 6"
- Extra thickness and heavy ribbed construction
- Multiple slots for many bolting and clamping possibilities

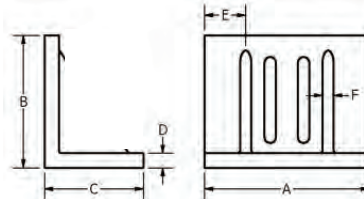


| Model No.  | A (in.) | B (in.) | C (in.) | Wall Thickness | Weight (lb) | Code No. | Price \$  |
|------------|---------|---------|---------|----------------|-------------|----------|-----------|
| GAW-161209 | 16      | 12      | 9       | 1-1/8          | 112         | 251630   | 2,834.75  |
| GAW-201612 | 20      | 16      | 12      | 1-1/8          | 200         | 251632   | 4,062.90  |
| GAW-122418 | 12      | 24      | 18      | 1-1/2          | 300         | 251634   | 5,272.20  |
| GAW-183024 | 18      | 30      | 24      | 1-3/4          | 700         | 251636   | 10,239.90 |

## Slotted Angle Plates — Open End Style



- Made from class 35-40 cast iron
- Multiple clamping slots for easy mounting of workpieces
- Ground finish (up to 20"), square and parallel within 0.0005" per 6"

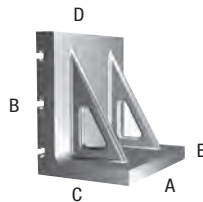


| Model        | A (in.) | B (in.) | C (in.) | D (in.) | Slots (in.) | Weight (lb) | Code No. | Price \$ |
|--------------|---------|---------|---------|---------|-------------|-------------|----------|----------|
| SAO-040303-G | 4-1/2   | 3-1/2   | 3       | 5/8     | (4) 9/16    | 4           | 251617   | 319.00   |
| SAO-060504-G | 6       | 5       | 4-1/2   | 13/16   | (7) 9/16    | 12          | 251619   | 439.35   |
| SAO-070504-G | 7       | 5-1/2   | 4-1/2   | 13/16   | (8) 9/16    | 14          | 251621   | 514.75   |
| SAO-080605-G | 8       | 6       | 5       | 15/16   | (8) 9/16    | 20          | 251623   | 600.30   |
| SAO-090706-G | 9       | 7       | 6       | 15/16   | (13) 11/16  | 24          | 251625   | 743.85   |
| SAO-100806-G | 10      | 8       | 6       | 1-1/16  | (13) 11/16  | 33          | 251627   | 1,154.20 |
| SAO-120908-G | 12      | 9       | 8       | 1-3/16  | (13) 11/16  | 62          | 251629   | 1,876.30 |

## Giant T-Slotted Webbed Angle Plates



- Provides an accurate vertical base for mounting vises, sub-plates, parts or fixtures
- Standard 5/8" T-slots on a 6" grid pattern are provided on both faces
- Made from one piece, class 40 cast iron that has been stress relieved
- Extra heavy 2-1/2" wall thickness provides stability during milling operations
- Faces and edges machined flat, square and parallel within 0.001" per 12"



| Model No.  | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | Weight (lb) | Code No. | Price \$ |
|------------|---------|---------|---------|---------|---------|-------------|----------|----------|
| TAP-121818 | 18      | 18      | 12      | 2-1/2   | 2       | 450         | 251638   | 8,420.15 |
| TAP-122424 | 24      | 24      | 12      | 2-1/2   | 2       | 700         | 251640   | 9,610.60 |

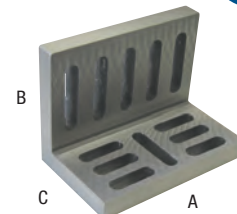
## Slotted Angle Plates — Webbed & Open



Made of high-tensile cast iron seasoned against distortion, skillfully machined square and parallel, these plates are supplied in two types, Type A and Type B, the former having side webs.

Type A-Webbed: Machined on outside surfaces and edges only.

Type B-Opened: Machined all over, except slots.



| A     | B     | C     | Webbed Code No. | Price \$ | Open Code No. | Price \$ |
|-------|-------|-------|-----------------|----------|---------------|----------|
| 3     | 2-1/2 | 2     | 370306          | 104.49   | -             | -        |
| 3-1/2 | 3     | 2-1/2 | 370311          | 117.46   | -             | -        |
| 4-1/2 | 3-1/2 | 3     | 370316          | 133.62   | 370356        | 166.06   |
| 6     | 5     | 4-1/2 | 370321          | 211.54   | 370361        | 244.19   |
| 7     | 5-1/2 | 4-1/2 | 370326          | 257.26   | 370366        | 312.36   |
| 8     | 6     | 5     | 370331          | 330.47   | 370371        | 364.13   |
| 9     | 7     | 6     | 370336          | 411.58   | 370376        | 502.29   |
| 10    | 8     | 6     | 370341          | 507.06   | 370381        | 569.00   |
| 12    | 9     | 8     | 370346          | 778.25   | 370386        | 864.30   |

## Magnetic Angle Iron



- A versatile tool for layout, inspection and squaring operations
- Combines the advantages of a universal right angle iron and a permanent magnetic chuck
- Magnetic face is energized by turning a recessed control knob
- Can be placed on any side for workholding
- Heavy support rib provides structural strength and acts as a carrying handle
- Body made from class 35-40 cast iron



| Model No. | Length | Width | Height | Flat, Square & Parallel | Weight (lbs) | Code No. | Price \$ |
|-----------|--------|-------|--------|-------------------------|--------------|----------|----------|
| MAI-644   | 4-3/4  | 4-1/4 | 6-1/2  | 0.0003"                 | 18           | 251370   | 4,496.45 |

## Universal Right Angle Irons

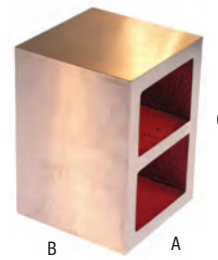
- Made of high quality fine grained cast iron, stress relieved
- All faces and ends finished square and parallel
- Machined finish - Square and parallel within 0.002" per 6"
- Ground finish - Square within 0.0005" per 6", Parallel within 0.00025" per 6"



| Model No.  |              | A     | B     | C     | Wall Thickness | Weight | Machined Code No. | Price \$ | Ground Code No. | Price \$ |
|------------|--------------|-------|-------|-------|----------------|--------|-------------------|----------|-----------------|----------|
| Machined   | Ground       | (in.) | (in.) | (in.) |                | (lb)   |                   |          |                 |          |
| URA-030405 | URA-030405-G | 3-3/4 | 4     | 5     | 3/4            | 10     | 251642            | 229.10   | 251662          | 600.30   |
| URA-040406 | URA-040406-G | 4     | 4     | 6     | 7/8            | 13     | 251644            | 281.30   | 251664          | 672.80   |
| URA-040506 | URA-040506-G | 4-1/2 | 5     | 6     | 7/8            | 16     | 251646            | 314.65   | 251666          | 717.75   |
| URA-040508 | URA-040508-G | 4     | 5     | 8     | 1"             | 21     | 251648            | 424.85   | 251668          | 809.10   |
| URA-050710 | URA-050710-G | 5-1/2 | 7     | 10    | 1-1/8          | 37     | 251650            | 651.05   | 251670          | 1,138.25 |
| URA-050810 | URA-050810-G | 5/1/2 | 8     | 10    | 1-1/8          | 40     | 251652            | 651.05   | 251672          | 1,232.50 |
| URA-050812 | URA-050812-G | 5     | 8     | 12    | 1-1/4          | 44     | 251654            | 667.00   | 251674          | 1,278.90 |
| URA-060608 | URA-060608-G | 6     | 6     | 8     | 7/8            | 32     | 251656            | 601.75   | 251676          | 1,190.45 |
| URA-080916 | URA-080916-G | 8     | 9     | 16    | 1-3/8          | 94     | 251658            | 1,190.45 | 251678          | 2,263.45 |
| URA-081012 | URA-081012-G | 8     | 10    | 12    | 1-1/4          | 75     | 251660            | 1,045.45 | 251680          | 1,702.30 |

## Box Parallels

- Made of high quality fine grained cast iron, stress relieved
- All faces and ends finished square and parallel
- Machined finish - Size  $\pm 0.015$ ", Square and parallel within 0.002" per 6"
- Ground finish - Size  $\pm 0.002$ ", Square and parallel within 0.0005" per 6"



| Model No.  |              | A     | B     | C     | Wall Thickness | Centre Web | Weight | Machined Code No. | Price \$ | Ground Code No. | Price \$ |
|------------|--------------|-------|-------|-------|----------------|------------|--------|-------------------|----------|-----------------|----------|
| Machined   | Ground       | (in.) | (in.) | (in.) |                |            | (lb)   |                   |          |                 |          |
| BXP-040404 | BXP-040404-G | 4     | 4     | 4     | 5/8            | No         | 12     | 251682            | 474.15   | 251700          | 784.45   |
| BXP-040406 | BXP-040406-G | 4     | 4     | 6     | 3/4            | No         | 16     | 251684            | 536.50   | 251702          | 881.60   |
| BXP-040606 | BXP-040606-G | 4     | 6     | 6     | 3/4            | No         | 20     | 251686            | 803.30   | 251704          | 1,336.90 |
| BXP-050505 | BXP-050505-G | 5     | 5     | 5     | 3/4            | No         | 17     | 251688            | 601.75   | 251706          | 1,141.15 |
| BXP-051010 | BXP-051010-G | 5     | 10    | 10    | 3/4            | No         | 73     | 251690            | 1,632.70 | 251708          | 2,140.20 |
| BXP-060606 | BXP-060606-G | 6     | 6     | 6     | 3/4            | Yes        | 25     | 251692            | 835.20   | 251710          | 1,367.35 |
| BXP-060608 | BXP-060608-G | 6     | 6     | 8     | 3/4            | Yes        | 35     | 251694            | 983.10   | 251712          | 1,439.85 |
| BXP-061212 | BXP-061212-G | 6     | 12    | 12    | 3/4            | Yes        | 105    | 251696            | 2,064.80 | 251714          | 3,449.55 |
| BXP-080808 | BXP-080808-G | 8     | 8     | 8     | 5/8            | Yes        | 71     | 251698            | 1,655.90 | 251716          | 2,770.95 |

## Arbor Presses

| Capacity Ton | Shipping Weight (lb) | Throat Depth (in.) | Height of Press | Base Dimensions | Largest Arbor | Size          | Length | Stroke | Code No. | Price \$ |
|--------------|----------------------|--------------------|-----------------|-----------------|---------------|---------------|--------|--------|----------|----------|
| 1/2          | 22                   | 2-7/8              | 10              | 4 x 9-1/2       | 1-1/8         | 3/4 x 3/4     | 7-1/2  | 4-1/2  | 326090   | 164.61   |
| 1            | 37                   | 3-1/4              | 12              | 5 x 11          | 1-3/8         | 1 x 1         | 9-1/2  | 5-1/4  | 326092   | 237.00   |
| 2            | 86                   | 5                  | 17              | 6-3/4 x 17      | 1-3/4         | 1-1/4 x 1-1/4 | 14     | 8-1/2  | 326094   | 540.03   |
| 3            | 152                  | 5-3/4              | 21-1/2          | 8 x 18          | 2-1/2         | 1-1/2 x 1-1/2 | 18     | 12-1/2 | 326096   | 855.14   |
| 5            | 308                  | 8-3/4              | 35-3/4          | 10 x 26-3/4     | 3-1/4         | 2 x 2         | 26-3/4 | 18-1/8 | 326098   | 2,739.02 |

## Ratchet Type Arbor Press

| Capacity Ton | Shipping Weight (lb) | Throat Depth (in.) | Height of Press | Base Dimensions | Max. Height | Largest Arbor | Size          | Length | Stroke | Code No. | Price \$ |
|--------------|----------------------|--------------------|-----------------|-----------------|-------------|---------------|---------------|--------|--------|----------|----------|
| 3            | 152                  | 5-3/4              | 21-1/2          | 8 x 18          | 12-1/2      | 2-1/2         | 1-1/2 x 1-1/2 | 18     | 12-1/2 | 326099   | 994.46   |



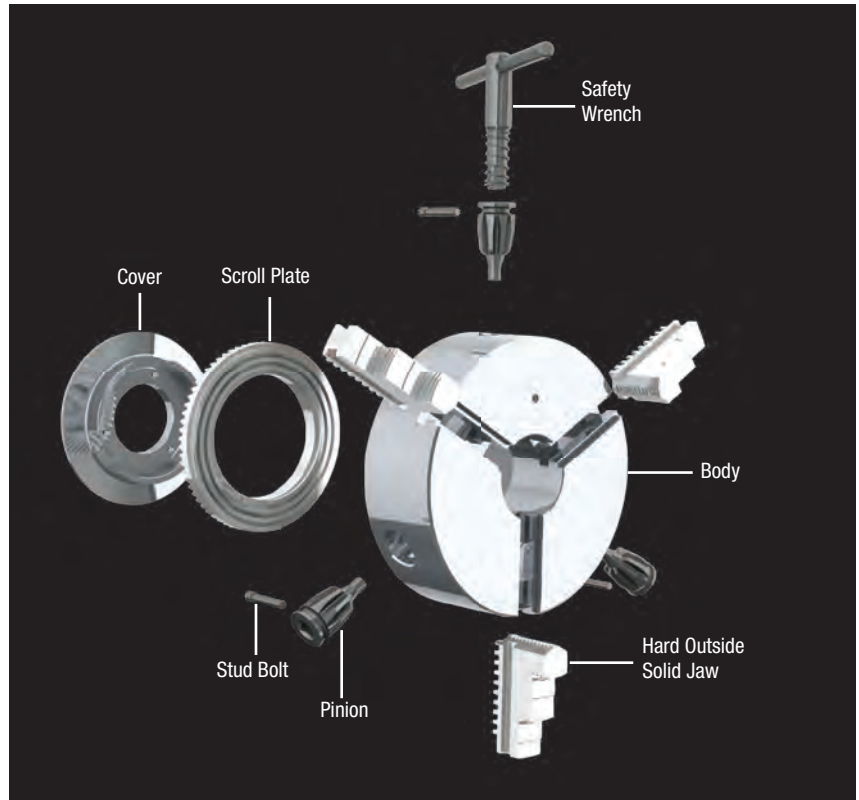
## Lathe Chucks

|   |          |
|---|----------|
| <b>BISON LATHE CHUCKS</b> .....                         | H21-80   |
| Lathe Chuck Index .....                                 | H23-26   |
| Machine Spindle Nose Specifications .....               | H27      |
| <b>FINE ADJUSTMENT SCROLL CHUCKS</b>                    |          |
| 3 & 6-Jaw Fine Adjustment Scroll Chucks .....           | H30-32   |
| Adapters, Jaws & Parts For F/A Chucks .....             | H33-35   |
| <b>SELF CENTERING SCROLL CHUCKS</b>                     |          |
| 3 & 4-Jaw Self Centering Scroll Chucks .....            | H37-46   |
| 2-Jaw Cast Iron Body Scroll Chucks .....                | H46      |
| 6-Jaw Self Centering Scroll Chucks .....                | H47-50   |
| 5C Collet Chucks .....                                  | H50      |
| 3-Jaw Live Morse Taper Scroll Chucks .....              | H51      |
| High Precision 3-Jaw Scroll Chucks .....                | H52-53   |
| 3 & 4-Jaw Combination Lathe Chucks .....                | H54      |
| 3-Jaw Large Through Hole Scroll Chucks .....            | H55-57   |
| Adapters, Jaws & Parts For Self Centering Chucks .....  | H58-61   |
| Specifications For Scroll Chucks, Jaws & Adapters ..... | H62-66   |
| <b>INDEPENDENT LATHE CHUCK INTRODUCTION</b> .....       | H67      |
| 4-Jaw Independent Oil Country Chucks .....              | H68      |
| Jaws & Parts For Oil Country Chucks .....               | H68-69   |
| Specifications For Oil Country Chucks .....             | H69      |
| 4-Jaw Independent Chucks .....                          | H70-73   |
| Jaws & Parts For Independent Chucks .....               | H74      |
| Specifications For Independent Chuck Jaws .....         | H75-76   |
| Technical Data For Independent Chucks .....             | H76-79   |
| 4-Jaw Manual Gripping Independent Chucks .....          | H80      |
| <b>STM LATHE CHUCKS</b> .....                           | H81      |
| 3-Jaw Self Centering Scroll Chucks .....                | H81-82   |
| 4-Jaw Independent Chucks .....                          | H83      |
| Technical Data For STM Chucks .....                     | H84      |
| <b>POWER CHUCKS</b>                                     |          |
| Power Chucks Introduction .....                         | H85      |
| Bison 2405-K Power Chucks .....                         | H86      |
| Adapters, Jaws & T-Nuts For 2405-K Power Chucks .....   | H87      |
| Special Insert Sets For 2405-K .....                    | H88      |
| Drawbar Nuts .....                                      | H88      |
| Technical Data For 2405-K Power Chucks .....            | H89      |
| Soft Top Jaws .....                                     | H90-93   |
| Soft Jaw Forming Ring .....                             | H94      |
| Pie Jaws .....  | H95      |
| Hard Top Jaws .....                                     | H96      |
| T-Nuts .....  | H97      |
| Rohm Lathe Chucks .....                                 | H98-104  |
| Rohm Power Chucks .....                                 | H105-108 |
| Autoblok Power Chucks .....                             | H109-112 |

# BISON LATHE CHUCKS

Bison chucks are made from forged steel or cast iron; all of the working surfaces are hardened and ground ensuring that the finished product is a rugged chuck that meets high sliding, stability, and durability parameters.

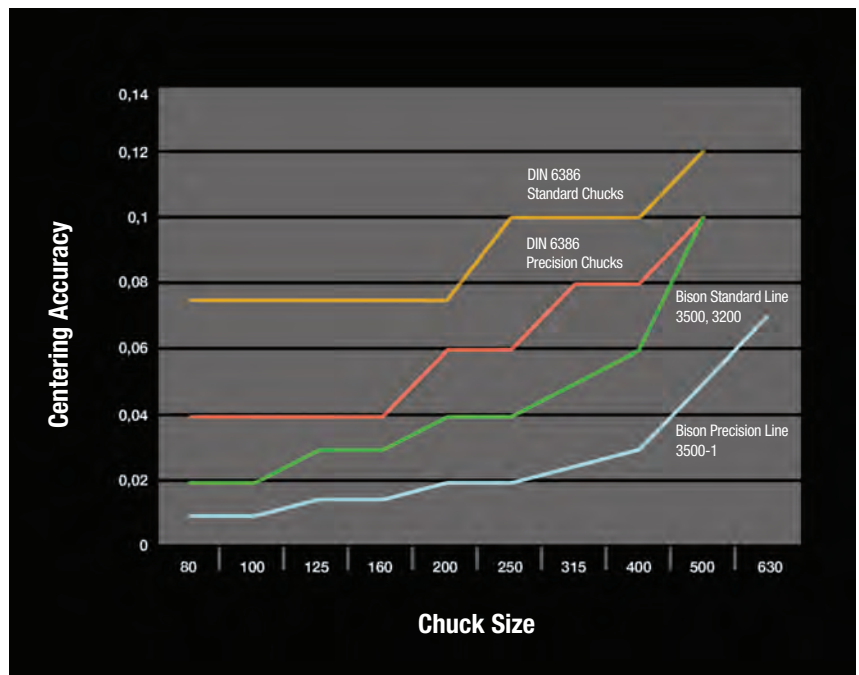
Each chuck is thoroughly inspected before the product leaves the factory. We check gripping force and run-out to ensure accuracy in order to meet Bison's quality standards that are even more stringent than DIN standards. Only then the chuck is given the Bison label of quality. This is our commitment to you that you have purchased the best workholding products on the market today.



We want to give you more. So when greater precision will be necessary you can choose Bison lathe chucks from our precision line.

Centering accuracy of Bison standard and precision lines are shown in the chart below in comparison to the requirements of DIN standards. Both our standard and precision line fall below the required DIN standards throughout the various sizes.

For high precision operations we recommend the precision line of Bison chucks. High quality products for demanding companies.





## Precision 3-Jaw Self-Centering Scroll Chucks Forged Steel Body

Precision lathe chucks have a top accuracy at work and the guarantee to maintain this accuracy for an extended period of time. These chucks have modern and compact design. They are able to fulfill the highest demands of our customers. They can be used wherever precision and high precision machining is demanded.

- BODY** - drop-forged of highest grade steel and put through precise machining operations. All bearings surfaces are carefully hardened and precision ground
- SCROLL PLATE** - drop-forged of fine alloy steel, carefully hardened. Thread flanks ground on both sides
- JAWS** - teeth and guides are hardened and fully ground on both sides
- PINIONS** - hardened and ground
- BUSHINGS** - hardened and ground, pressed into the pinion seats

Jaws, pinions and bushings are made of fine alloy steel. Precision grinding of scroll and jaws teeth will:

- eliminate possible deformation as a result of heat treatment
- reach uniform radial gripping force on all teeth of jaws
- increase guarantee period for high centering accuracy
- increase gripping force

Each chuck is provided with lubricator enabling current maintenance and extending chuck components life. Each scroll and assembled chuck are statically balanced within fine limits. Interstage and final inspection assure high quality of our chucks.

## Precision 3 and 6-Jaw Self-Centering F/A Scroll Chucks Forged Steel Body

A unique micro-adjustment feature enables concentricity to be adjusted to 0.0002 inch of full indicator movement. F/A chucks can be used at many machining operations for which ordinary scroll chucks are unsuitable and at all the operations for which ordinary chucks are normally used. Require original Bison F/A backplates.

## 4-Jaw Independent Lathe Chucks

These chucks feature jaws that are individually adjustable, allow firm gripping of odd shaped work, and the four jaws allow a square component to be perfectly centered to the chuck while achieving maximum gripping force. The chuck bodies are made of semi-steel. The jaws are made of high quality carbon steel and hardened. Thrust bearings and operating screws are made of case hardened steel.

## Universal 2, 3 and 4-Jaw Self-Centering Scroll Chucks



These chucks have modern, precision and standardized construction. They may be used on all types of lathes and on different kinds of milling and drilling attachments.

- BODY** - is made of high quality cast iron. All bearing surfaces are precision machined
- SCROLL PLATE** - drop-forged of fine alloy steel, carefully hardened. Thread flanks ground on both sides
- JAWS** - the teeth and guides are hardened and fully ground on both sides
- PINIONS** - hardened and ground

These chucks are equipped with lubricator, enabling their current maintenance. Versatile inspections assure high quality of our chucks.


## F/A Fine Adjustment Precision Self-Centering Scroll Chucks



|              |   | Body           | Jaw Type                 | Type | Page |
|--------------|---|----------------|--------------------------|------|------|
| <b>3-Jaw</b> |  | Steel Body     | 2pc Hard Reversible Jaws | 3565 | H30  |
|              |   | Steel Body     | Hard Solid Jaws          | 3564 | H30  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3265 | H31  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3264 | H31  |
| <b>6-Jaw</b> |  | Steel Body     | 2pc Hard Reversible Jaws | 3865 | H32  |
|              |   | Steel Body     | Hard Solid Jaws          | 3864 | H32  |


## Standard 3-Jaw Self-Centering Scroll Chucks



|                       |   | Body                     | Jaw Type                 | Type | Page |
|-----------------------|---|--------------------------|--------------------------|------|------|
| <b>3-Jaw</b>          |  | Steel Body               | 2pc Hard Reversible Jaws | 3505 | H37  |
|                       |   | Steel Body               | Hard Solid Jaws          | 3504 | H38  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3205 | H39  |
|                       |   | Cast Iron Body           | Hard Solid Jaws          | 3204 | H41  |
|                       | <b>A Taper Mount</b>  | Steel Body               | 2pc Hard Reversible Jaws | 3515 | H37  |
|                       |   | Steel Body               | Hard Solid Jaws          | 3514 | H38  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3215 | H39  |
|                       |   | Cast Iron Body           | Hard Solid Jaws          | 3214 | H41  |
|                       | <b>Camlock Mount</b>  | Steel Body               | 2pc Hard Reversible Jaws | 3545 | H37  |
|                       |   | Steel Body               | Hard Solid Jaws          | 3544 | H38  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3245 | H39  |
|                       |   | Cast Iron Body           | Hard Solid Jaws          | 3244 | H41  |
|                       | <b>DIN Mount</b>  | Steel Body               | 2pc Hard Reversible Jaws | 3535 | H37  |
|                       |   | Steel Body               | Hard Solid Jaws          | 3534 | H38  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3235 | H39  |
|                       |   | Cast Iron Body           | Hard Solid Jaws          | 3234 | H41  |
|                       | <b>Front Mounting</b>   | Steel Body               | 2pc Hard Reversible Jaws | 3575 | H37  |
|                       |   | Steel Body               | Hard Solid Jaws          | 3574 | H38  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3275 | H40  |
|                       | <b>L Mounting</b>   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3274 | H41  |
|                       |   | Cast Iron Body           | 2pc Hard Reversible Jaws | 3255 | H40  |
| <b>Threaded Mount</b> | Cast Iron Body  | 2pc Hard Reversible Jaws | 3285                     | H40  |      |

## Standard 4-Jaw Self-Centering Scroll Chucks





|              |   | Body           | Jaw Type                 | Type | Page |
|--------------|---|----------------|--------------------------|------|------|
| <b>4-Jaw</b> |  | Steel Body     | 2pc Hard Reversible Jaws | 3705 | H42  |
|              |   | Steel Body     | Hard Solid Jaws          | 3704 | H43  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3605 | H44  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3604 | H45  |
|              | <b>A Taper Mount</b>  | Steel Body     | 2pc Hard Reversible Jaws | 3715 | H42  |
|              |   | Steel Body     | Hard Solid Jaws          | 3714 | H43  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3615 | H44  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3614 | H45  |
|              | <b>Camlock Mount</b>  | Steel Body     | 2pc Hard Reversible Jaws | 3745 | H42  |
|              |   | Steel Body     | Hard Solid Jaws          | 3744 | H43  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3645 | H44  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3644 | H45  |
|              | <b>DIN Mount</b>  | Steel Body     | 2pc Hard Reversible Jaws | 3735 | H42  |
|              |   | Steel Body     | Hard Solid Jaws          | 3734 | H43  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3635 | H44  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3634 | H45  |
|              | <b>Front Mounting</b>   | Steel Body     | 2pc Hard Reversible Jaws | 3775 | H42  |
|              |   | Steel Body     | Hard Solid Jaws          | 3774 | H43  |
|              |   | Cast Iron Body | 2pc Hard Reversible Jaws | 3675 | H44  |
|              |   | Cast Iron Body | Hard Solid Jaws          | 3674 | H45  |







## Standard Self-Centering Scroll Chucks



|  |  | Body             | Jaw Type                 | Type                     | Page |
|--|--|------------------|--------------------------|--------------------------|------|
| 2-Jaw<br> | 2-Jaw Plain Back   | Cast Iron Body   | 2pc Jaws                 | 3105                     | H46  |
|  | 6-Jaw<br> | 6-Jaw Plain Back | Steel Body               | 2pc Hard Reversible Jaws | 3807 |
| Steel Body   |  |                  | Hard Solid Jaws          | 3806                     | H47  |
| Cast Iron Body   |  |                  | 2pc Hard Reversible Jaws | 3805                     | H48  |
| Cast Iron Body   |  |                  | Hard Solid Jaws          | 3804                     | H48  |


## Lathe Chucks For Sharpening Drills



|   |                              | Body                              | Jaw Type        | Type | Page |
|---|------------------------------|-----------------------------------|-----------------|------|------|
| 3-Jaw<br>                | 3-Jaw Plain Back             | Cast Iron Body                    | Hard Solid Jaws | 3266 | H49  |
| 6-Jaw<br>                | 6-Jaw Plain Back             | Cast Iron Body (Lever Controlled) | Hard Solid Jaws | 3866 | H49  |
|   |                              | Cast Iron Body                    | Hard Solid Jaws | 3867 | H50  |
| 5C Collet Chucks<br>     | Plain Back                   | Steel Body                        | -               | 3911 | H50  |
|   | Plain Back w/fine adjustment | Steel Body                        | -               | 3960 | H50  |
| Mini Workshop Chuck<br> | Threaded Mount               | Steel Body                        | Hard Solid Jaws | 3286 | H46  |


## Morse Taper 3-Jaw Self-Centering Scroll Chucks



|  |                     | Body       | Jaw Type        | Chuck Type | Spindle Type | Page |
|--|---------------------|------------|-----------------|------------|--------------|------|
| 3-Jaw<br> | 3-Jaw MT2-MT5 Shank | Steel Body | 2pc Hard Jaws   | 3275       | 9157         | H51  |
|  |                     | Steel Body | Hard Solid Jaws | 3274       | 9157         | H51  |



## High Precision Steel Body 3-Jaw Scroll Chucks



|  |                | Body       | Jaw Type                 | Type   | Page |
|--|----------------|------------|--------------------------|--------|------|
| 3-Jaw<br> | Plain Back     | Steel Body | 2pc Hard Reversible Jaws | 3505-I | H52  |
|  |                | Steel Body | Hard Solid Jaws          | 3504-I | H53  |
|  | A Taper Mount  | Steel Body | 2pc Hard Reversible Jaws | 3515-I | H52  |
|  |                | Steel Body | Hard Solid Jaws          | 3514-I | H53  |
|  | Camlock Mount  | Steel Body | 2pc Hard Reversible Jaws | 3545-I | H52  |
|  |                | Steel Body | Hard Solid Jaws          | 3544-I | H53  |
|  | DIN Mount      | Steel Body | 2pc Hard Reversible Jaws | 3535-I | H52  |
|  |                | Steel Body | Hard Solid Jaws          | 3534-I | H53  |
|  | Front Mounting | Steel Body | 2pc Hard Reversible Jaws | 3575-I | H52  |
|  |                | Steel Body | Hard Solid Jaws          | 3574-I | H53  |


## Combination Chucks



|  |                  | Body           | Jaw Type        | Type | Page |
|--|------------------|----------------|-----------------|------|------|
| 3-Jaw<br> | 3-Jaw Plain Back | Steel Body     | Hard Solid Jaws | 4705 | H54  |
|  |                  | Cast Iron Body | Hard Solid Jaws | 4505 | H54  |
| 4-Jaw<br> | 4-Jaw Plain Back | Steel Body     | Hard Solid Jaws | 4805 | H54  |
|  |                  | Cast Iron Body | Hard Solid Jaws | 4605 | H54  |




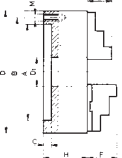
## 3-Jaw Oil Country Self-Centering Scroll Chucks



|  |                            | Body           | Jaw Type | Type    | Page |
|--|----------------------------|----------------|----------|---------|------|
| 3-Jaw<br> | Plain Back                 | Steel Body     | 2pc Jaws | 3597    | H55  |
|  |                            | Cast Iron Body | 2pc Jaws | 3295    | H56  |
|  | Heavy Duty A 2 Taper Mount | Steel Body     | 2pc Jaws | 3515 HD | H57  |


## Adapter Plates, Jaws, Parts & Data For Self-Centering Scroll Chucks



|   | Page           |        |  | Page              |        |
|---|----------------|--------|--|-------------------|--------|
|  | Adapter Plates | J43-44 |  | Replacement Parts | H61    |
|  | Jaws           | J45    |  | Engineering Data  | H62-66 |

## 4-Jaw Oil Country Independent Chucks



|  |                 | Body       | Jaw Type | Type | Page |
|--|-----------------|------------|----------|------|------|
| 4-Jaw<br> | Plain Back      | Steel Body | 2pc Jaws | 4307 | H68  |
|  | A 2 Taper Mount | Steel Body | 2pc Jaws | 4317 | H68  |
|  | Camlock Mount   | Steel Body | 2pc Jaws | 4347 | H68  |

## 4-Jaw Independent Lathe Chucks



| 4-Jaw                | Image | Body           |                | Jaw Type                 | Type            | Page |
|----------------------|-------|----------------|----------------|--------------------------|-----------------|------|
|                      |       | Steel Body     | Cast Iron Body | 2pc Hard Reversible Jaws | Hard Solid Jaws |      |
| <b>Plain Back</b>    |       | Steel Body     |                | 2pc Hard Reversible Jaws | 4307            | H70  |
|                      |       | Steel Body     |                | Hard Solid Jaws          | 4306            | H71  |
|                      |       | Cast Iron Body |                | 2pc Hard Reversible Jaws | 4305            | H72  |
|                      |       | Cast Iron Body |                | Hard Solid Jaws          | 4304            | H73  |
| <b>A Taper Mount</b> |       | Steel Body     |                | 2pc Hard Reversible Jaws | 4317            | H70  |
|                      |       | Cast Iron Body |                | 2pc Hard Reversible Jaws | 4315            | H72  |
|                      |       | Cast Iron Body |                | Hard Solid Jaws          | 4314            | H73  |
| <b>Camlock Mount</b> |       | Steel Body     |                | 2pc Hard Reversible Jaws | 4347            | H70  |
|                      |       | Cast Iron Body |                | 2pc Hard Reversible Jaws | 4345            | H72  |
|                      |       | Cast Iron Body |                | Hard Solid Jaws          | 4344            | H73  |
| <b>DIN Mount</b>     |       | Steel Body     |                | 2pc Hard Reversible Jaws | 4337            | H70  |
|                      |       | Cast Iron Body |                | 2pc Hard Reversible Jaws | 4335            | H72  |
|                      |       | Cast Iron Body |                | Hard Solid Jaws          | 4334            | H73  |
| <b>L Mount</b>       |       | Cast Iron Body |                | Hard Solid Jaws          | 4354            | H73  |

## Adapter Plates, Jaws, Parts & Data For 4-Jaw Independent Lathe Chucks



| Image | Page           |        | Image | Page                    |        |
|-------|----------------|--------|-------|-------------------------|--------|
|       | Adapter Plates | H58-59 |       | Replacement Parts       | H74    |
|       | <b>Jaws</b>    | H74    |       | <b>Engineering Data</b> | H75-79 |

## 4-Jaw Manual Gripping Independent Steel Body Chucks



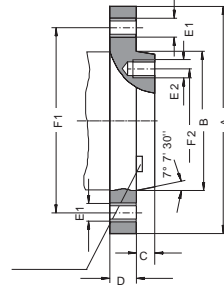
| 4-Jaw                  | Image | Body       | Jaw Type | Type    | Page |
|------------------------|-------|------------|----------|---------|------|
| <b>A 2 Taper Mount</b> |       | Steel Body | 2pc Jaws | 4317MSP | H80  |

## Bison 2405-K Power Chucks With 1.5mm x 60° Serrations



| 3-Jaw             | Image | Body       | Jaw Type | Type   | Page |
|-------------------|-------|------------|----------|--------|------|
| <b>Plain Back</b> |       | Steel Body | 2pc Jaws | 2405-K | H86  |

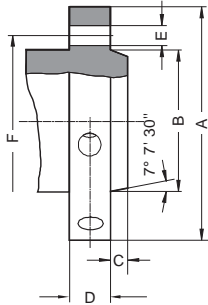
# Machine Spindle Noses



## A Taper Mount



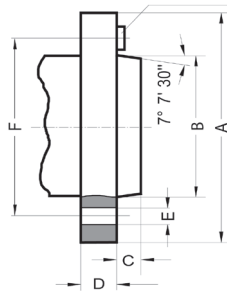
| Spindle Nose Size | A       | B max.  | C<br>-0.001 | D      | E1<br>(A-2 Outer)      | F1      | E2<br>(A-1 Inner)     | F2      |
|-------------------|---------|---------|-------------|--------|------------------------|---------|-----------------------|---------|
| 5                 | 5.2520  | 3.2510  | 0.5625      | 0.8740 | 11 holes x 7/16-14 UNC | 4.1260  | 8 holes x 7/16-14 UNC | 2.4370  |
| 6                 | 6.5000  | 4.1886  | 0.6250      | 1.0000 | 11 holes x 1/2-13 UNC  | 5.2520  | 8 holes x 1/2-13 UNC  | 3.2520  |
| 8                 | 8.2480  | 5.5014  | 0.6875      | 1.1260 | 11 holes x 5/8-11 UNC  | 6.7480  | 8 holes x 5/8-11 UNC  | 4.3740  |
| 11                | 11.000  | 7.7502  | 0.7500      | 1.3740 | 11 holes x 3/4-10 UNC  | 9.2520  | 8 holes x 3/4-10 UNC  | 6.5000  |
| 15                | 15.000  | 11.2520 | 0.8125      | 1.6260 | 12 holes x 7/8-9 UNC   | 13.0000 | 11 holes x 7/8-9 UNC  | 9.7480  |
| 20                | 20.4724 | 16.2520 | 0.8750      | 1.8740 | 12 holes x 1-8 UNC     | 18.2520 | 11 holes x 1-8 UNC    | 14.5000 |



## Camlock Mount



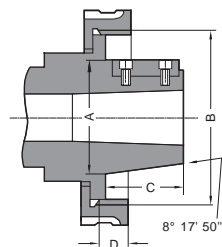
| Spindle Nose Size | A       | B max.  | C      | D      | E                | F       |
|-------------------|---------|---------|--------|--------|------------------|---------|
| 3                 | 3.6220  | 2.1253  | 0.4331 | 1.2598 | 3 holes x 0.5945 | 2.7795  |
| 4                 | 4.6063  | 2.5008  | 0.4331 | 1.3386 | 3 holes x 0.6575 | 3.2520  |
| 5                 | 5.7480  | 3.2509  | 0.5118 | 1.4961 | 6 holes x 0.7795 | 4.1260  |
| 6                 | 7.1260  | 4.1884  | 0.5512 | 1.7717 | 6 holes x 0.9055 | 5.2520  |
| 8                 | 8.8583  | 5.5012  | 0.6299 | 1.9685 | 6 holes x 1.0315 | 6.7480  |
| 11                | 11.7323 | 7.7513  | 0.7087 | 2.3622 | 6 holes x 1.2205 | 9.2520  |
| 15                | 15.8661 | 11.2516 | 0.7480 | 2.7559 | 6 holes x 1.4055 | 13.0000 |
| 20                | 21.4961 | 16.2518 | 0.8268 | 3.2283 | 6 holes x 1.6575 | 18.2520 |



## DIN Mount



| Spindle Nose Size | A       | B max.  | C      | D      | E                | F       |
|-------------------|---------|---------|--------|--------|------------------|---------|
| 3                 | 4.0157  | 2.1253  | 0.4331 | 0.6299 | 3 holes x 0.8268 | 2.9528  |
| 4                 | 4.4094  | 2.5008  | 0.4331 | 0.7874 | 3 holes x 0.8268 | 3.3465  |
| 5                 | 5.3150  | 3.2509  | 0.5118 | 0.8661 | 4 holes x 0.8268 | 4.1260  |
| 6                 | 6.6929  | 4.1884  | 0.5512 | 0.9843 | 4 holes x 0.9055 | 5.2520  |
| 8                 | 8.6614  | 5.5012  | 0.6299 | 1.1024 | 4 holes x 1.1417 | 6.7480  |
| 11                | 11.4173 | 7.7513  | 0.7087 | 1.3780 | 6 holes x 1.4173 | 9.2520  |
| 15                | 15.7480 | 11.2516 | 0.7480 | 1.6535 | 6 holes x 1.6929 | 13.0000 |
| 20                | 21.2598 | 16.2518 | 0.8268 | 1.8898 | 6 holes x 1.6929 | 18.2520 |



## L Mount



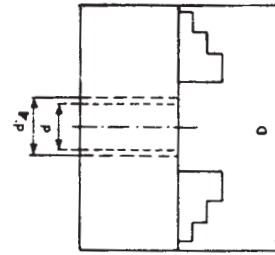
| Spindle Nose Size | A<br>+ 0.0020 | B            | C      | D      | Driving Block     |
|-------------------|---------------|--------------|--------|--------|-------------------|
| L00               | 2.7500        | 3 3/4-6 UNS  | 2.0000 | 0.5625 | Δ 0.3750 x 1.5000 |
| L0                | 3.2500        | 4 1/2-6 UNS  | 2.3750 | 0.6250 | Δ 0.3750 x 1.7500 |
| L1                | 4.1250        | 6-6 UNS      | 2.8750 | 0.7500 | Δ 0.6250 x 2.3748 |
| L2                | 5.2500        | 7 3/4-5 UNS  | 3.3750 | 1.0000 | Δ 0.7500 x 2.8748 |
| L3                | 6.5004        | 10 3/8-4 UNS | 3.7175 | 1.1250 | Δ 1.000 x 3.2500  |

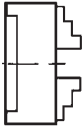
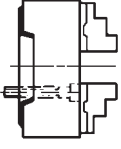
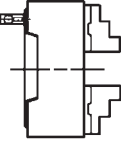
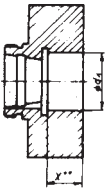
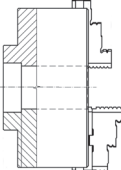
## Through Hole Permissible Enlargements

### For Chucks 3200, 3500

d\* - through hole diameter made by manufacturer

d1 - permissible enlargement of through hole



| Mounting  | Hole Dia. | Chuck Size      | 3-1/2" | 4"     | 5"     | 6-1/4" | 8"     | 10"    | 12-1/2" | 15-3/4" | 20"    | 25"     | 32-1/2" |        |  |
|---|-----------|-----------------|--------|--------|--------|--------|--------|--------|---------|---------|--------|---------|---------|--------|--|
| 3505<br>3204/5<br>                       | d*        | plain back      | 0.6299 | 0.7874 | 1.2598 | 1.6535 | 2.1654 | 2.9922 | 4.0551  | 5.3543  | 7.4803 | 9.9213  | 12.5984 |        |  |
|   | d1        |                 | 0.6299 | 0.7874 | 1.2598 | 1.7717 | 2.5591 | 3.3465 | 4.252   | 5.5118  | 7.874  | 10.6299 | 12.5984 |        |  |
| 3515<br>3214/5<br><br>Short<br>Taper "A" | d*        | Taper<br>1 in 4 |        |        |        | 1.6535 | 1.6535 | 2.9921 |         |         |        |         |         |        |  |
|   |           |                 |        |        |        |        |        | 2.1635 | 2.1635  | 4.0551  | 4.0551 |         |         |        |  |
|   |           |                 |        |        |        |        |        |        |         | 2.9921  | 3.1496 | 5.3543  | 5.3543  |        |  |
|   |           |                 |        |        |        |        |        |        |         |         |        | 5.1181  | 7.5905  | 5.1181 |  |
|   | d1        |                 |        |        |        |        | 1.6535 | 1.6535 | 3.0708  | 4.252   | 4.252  |         |         |        |  |
|   |           |                 |        |        |        |        |        |        | 2.2835  | 2.2835  | 3.1496 | 5.3543  | 5.3543  |        |  |
|   |           |                 |        |        |        |        |        |        |         | 3.1496  |        | 5.1969  | 7.5905  |        |  |
|   |           |                 |        |        |        |        |        |        |         |         |        |         |         | 5.1181 |  |
| 3545<br>3244/5<br><br>Camlock "D"      | d*        | Taper<br>1 in 4 | 3      |        | 0.7847 | 1.2598 | 1.6535 | 2.0236 |         |         |        |         |         |        |  |
|   |           |                 | 4      |        |        | 1.2598 | 1.6535 | 2.1654 | 2.9922  |         |        |         |         |        |  |
|   |           |                 | 5      |        |        |        | 1.6535 | 2.1654 | 2.9922  | 4.0551  | 4.0551 |         |         |        |  |
|   |           |                 | 6      |        |        |        |        |        | 2.1654  | 2.9922  | 4.0551 | 5.3543  | 5.3543  |        |  |
|   |           |                 | 8      |        |        |        |        |        |         |         |        | 5.3543  | 7.5984  | 7.5984 |  |
|   | d1        |                 | 3      |        | 0.7847 | 1.2598 | 1.9685 | 2.0236 |         |         |        |         |         |        |  |
|   |           |                 | 4      |        |        | 1.2598 | 1.9685 | 2.3622 | 2.9922  |         |        |         |         |        |  |
|   |           |                 | 5      |        |        |        | 1.9685 | 2.6378 | 3.7402  | 4.0551  | 4.0551 |         |         |        |  |
|   |           |                 | 6      |        |        |        |        | 2.6378 | 3.7402  | 4.5276  | 5.3543 | 5.3543  |         |        |  |
|   |           |                 | 8      |        |        |        |        |        |         |         | 5.9055 | 7.5984  | 7.5984  |        |  |
|   |           |                 | 11     |        |        |        |        |        |         |         |        |         |         |        |  |
| 3254/5<br>                             | d*        | L00             |        |        | 1.2598 | 1.6535 | 2.1654 | 2.2047 |         |         |        |         |         |        |  |
|   |           | L0              |        |        |        | 1.6535 | 2.1654 | 2.5984 | 2.5984  | 2.5984  |        |         |         |        |  |
|   |           | L1              |        |        |        | 1.6535 | 2.1654 | 2.9921 | 3.3464  | 3.3464  |        |         |         |        |  |
|   |           | L2              |        |        |        |        |        | 2.9921 | 4.0551  | 4.2913  |        |         |         |        |  |
|   |           | L3              |        |        |        |        |        |        |         | 5.3543  |        |         |         |        |  |
|   | d1        | L00             |        |        | 1.2598 | 1.7717 | 2.1654 | 2.2047 |         |         |        |         |         |        |  |
|   |           | L0              |        |        |        | 1.7717 | 2.1654 | 2.5984 | 2.5984  | 2.5984  |        |         |         |        |  |
|   |           | L1              |        |        |        | 1.7717 | 2.559  | 2.9921 | 3.3464  | 3.3464  |        |         |         |        |  |
|   |           | L2              |        |        |        |        |        | 2.9921 | 4.0551  | 4.2913  |        |         |         |        |  |
|   |           | L3              |        |        |        |        |        |        |         | 5.3543  |        |         |         |        |  |
| 3284/5<br>                             | d*        | 1"-10           |        | 0.7874 | 0.88   |        |        |        |         |         |        |         |         |        |  |
|   |           | 1-1/2"-8        |        | 0.7874 | 1.2598 | 1.3647 | 1.3647 |        |         |         |        |         |         |        |  |
|   |           | 2-1/4"-8        |        |        |        | 1.6535 | 2.1147 | 2.1147 |         |         |        |         |         |        |  |
|   |           | 2-3/8"-6        |        |        |        |        | 2.1654 |        | 2.1946  |         |        |         |         |        |  |
|   |           | 2-3/8"-8        |        |        |        |        |        |        | 2.2397  |         |        |         |         |        |  |
|   | d1        | 1"-10           |        | 0.7874 | 0.88   |        |        |        |         |         |        |         |         |        |  |
|   |           | 1-1/2"-8        |        | 0.7874 | 1.2598 | 1.3647 | 1.3647 |        |         |         |        |         |         |        |  |
|   |           | 2-1/4"-8        |        |        |        | 1.7717 | 2.1147 | 2.1147 |         |         |        |         |         |        |  |
|   |           | 2-3/8"-6        |        |        |        |        | 2.5591 |        | 2.1946  |         |        |         |         |        |  |
|   |           | 2-3/8"-8        |        |        |        |        |        |        | 2.2397  |         |        |         |         |        |  |



## F/A FINE ADJUSTMENT

# Self-Centering Scroll Chucks

## Precision Three and Six-Jaw Self-Centering F/A Scroll Chucks Forged Steel Body

A unique micro-adjustment feature enables concentricity to be adjusted to 0.0002" of full indicator movement.

F/A chucks can be used at many machining operations for which ordinary scroll chucks are unsuitable and at all the operations for which ordinary chucks are normally used. Require original F/A backplates.



## 3-Jaw F/A Precision Steel Body Scroll Chucks — 2pc Hard Rev. Jaws



### Features:

- 3-Jaw, self-centering scroll chuck
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 4 (8 for sizes 16", 20" & 25") radially arranged adjusting screws

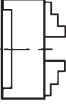
### Application:

- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads, and lathes
- Especially suitable for machining parts with top concentricity







**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



| Mounting<br><b>3565</b><br>Plain Back |  | Chuck Size | 4"       | 5"       | 6"       | 8"       | 10"      | 12"       | 16"       | 20"  | 25"  |
|---------------------------------------|---|------------|----------|----------|----------|----------|----------|-----------|-----------|------|------|
|                                       |   | Hole Size  | 0.787    | 1.2598   | 1.6535   | 2.1653   | 2.9921   | 4.0551    | 5.3543    | 7.48 | 9.92 |
| Weight lbs.                           | 7.26  | 11         | 20       | 35       | 57       | 103      | 198      | 376       | 664       |      |      |
| Code No.                              | 435623  | 435624     | 435625   | 435630   | 435635   | 435640   | 435641   | 435642    | 435643    |      |      |
| Price \$                              | 1,457.96  | 2,098.10   | 2,143.34 | 2,345.69 | 2,661.68 | 3,950.37 | 8,016.00 | 15,284.81 | 22,780.82 |      |      |

### Spare Parts - See Pages: H35

| Standard Accessories   | Optional Accessories   |
|--|--|
|  <p>1 set of hard top jaws</p>    |  <p>Soft top jaws</p> |
|  <p>1 set of hard master jaws</p> |  <p>1 wrench</p>        |

Engineering Data See Pages: H62-66

## 3-Jaw F/A Precision Steel Body Scroll Chucks — Hard Solid Jaws



### Features:

- 3-Jaw, self-centering scroll chuck
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 4 (8 for sizes 16", 20" & 25") radially arranged adjusting screws

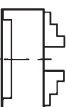
### Application:

- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads and lathes
- Especially suitable for machining parts with top concentricity







**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



| Mounting<br><b>3564</b><br>Plain Back |  | Chuck Size | 4"       | 5"       | 6"       | 8"       | 10"      | 12"       | 16"       | 20"  | 25"  |
|---------------------------------------|---|------------|----------|----------|----------|----------|----------|-----------|-----------|------|------|
|                                       |   | Hole Size  | 0.787    | 1.2598   | 1.6535   | 2.1653   | 2.9921   | 4.0551    | 5.3543    | 7.48 | 9.92 |
| Weight lbs.                           | 7.26  | 11         | 20       | 35       | 57       | 103      | 198      | 376       | 664       |      |      |
| Code No.                              | 435423  | 435424     | 435425   | 435430   | 435435   | 435440   | 435441   | 435442    | 435443    |      |      |
| Price \$                              | 1,523.81  | 1,975.17   | 2,051.50 | 2,211.30 | 2,991.63 | 4,272.66 | 7,935.06 | 15,880.10 | 18,491.45 |      |      |

### Spare Parts - See Pages: H35

| Standard Accessories  | Optional Accessories  |
|---|---|
|  <p>1 set of outside hard solid jaws</p> |  <p>1 set of soft solid jaws</p> |
|  <p>1 set of inside hard solid jaws</p>  |  <p>1 wrench</p>                   |

Engineering Data See Pages: H62-66



### 3-Jaw F/A Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws

**Features:**

- 3-Jaw, self-centering scroll chuck
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 3 tangentially arranged adjusting spindles

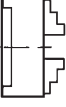
**Application:**

- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads, and lathes
- Especially suitable for machining parts with top concentricity







**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



|  |                    |                 |                 |                 |                 |                 |
|--|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Mounting<br/>3265</b><br>Plain Back  | <b>Chuck Size</b>  | 5"              | 6"              | 8"              | 10"             | 12"             |
|  | <b>Hole Size</b>   | 1.2598          | 1.6535          | 2.1653          | 2.9921          | 4.0551          |
|  | <b>Weight lbs.</b> | 11              | 20              | 35              | 57              | 103             |
|  | <b>Code No.</b>    | 443084          | 443086          | 443088          | 443090          | 443092          |
|  | <b>Price \$</b>    | <b>1,967.32</b> | <b>2,360.54</b> | <b>2,754.16</b> | <b>3,934.24</b> | <b>5,508.25</b> |

**Spare Parts - See Pages: H35**

|                             |   |                        |   |                           |  |          |                             |   |               |
|-----------------------------|---|------------------------|---|---------------------------|--|----------|-----------------------------|---|---------------|
| <b>Standard Accessories</b> |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | <b>Optional Accessories</b> |  | Soft top jaws |
|-----------------------------|---|------------------------|---|---------------------------|--|----------|-----------------------------|---|---------------|

Engineering Data See Pages: H62-66

### 3-Jaw F/A Cast Iron Body Scroll Chucks — Hard Solid Jaws



**Features:**

- 3-Jaw, self-centering scroll chuck
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 3 tangentially arranged adjusting spindles

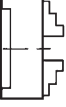
**Application:**

- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads, and lathes
- Especially suitable for machining parts with top concentricity







**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



|  |                    |                 |                 |                 |                 |                 |                 |                 |
|--|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Mounting<br/>3264</b><br>Plain Back  | <b>Chuck Size</b>  | 3"              | 4"              | 5"              | 6"              | 8"              | 10"             | 12"             |
|  | <b>Hole Size</b>   | 0.630           | 0.787           | 1.2598          | 1.6535          | 2.1653          | 2.9921          | 4.0551          |
|  | <b>Weight lbs.</b> | 6.16            | 7.26            | 11              | 20              | 35              | 57              | 103             |
|  | <b>Code No.</b>    | 441080          | 441082          | 441084          | 441086          | 441088          | 441090          | 441092          |
|  | <b>Price \$</b>    | <b>1,376.75</b> | <b>1,573.70</b> | <b>1,672.02</b> | <b>1,967.32</b> | <b>2,360.54</b> | <b>3,246.02</b> | <b>4,622.77</b> |

**Spare Parts - See Pages: H35**

|                             |   |                                  |   |                                 |  |          |                             |   |                          |
|-----------------------------|---|----------------------------------|---|---------------------------------|--|----------|-----------------------------|---|--------------------------|
| <b>Standard Accessories</b> |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | <b>Optional Accessories</b> |  | 1 set of soft solid jaws |
|-----------------------------|---|----------------------------------|---|---------------------------------|--|----------|-----------------------------|---|--------------------------|

Engineering Data See Pages: H62-66



## 6-Jaw F/A Precision Steel Body Scroll Chucks — 2pc Hard Rev. Jaws



### Features:

- 6-Jaw, self-centering scroll chuck
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 4 (8 for sizes 16", 20" & 25") radially arranged adjusting screws

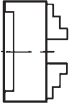
### Application:





- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads, and lathes
- Especially suitable for machining parts with top concentricity
- Gripping force is equally distributed over 6 jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



| Mounting<br><b>3865</b><br>Plain Back |  | Chuck Size      | 5"              | 6"              | 8"              | 10"              | 12"              | 16"              | 20"  | 25"  |
|---------------------------------------|---|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------|------|
|                                       |   | Hole Size       | 1.378           | 1.6535          | 2.1653          | 2.9921           | 4.0551           | 5.3543           | 7.48 | 9.92 |
| Weight lbs.                           | 14  | 23              | 39              | 72              | 123             | 218              | 396              | 718              |      |      |
| Code No.                              | 435599  | 435600          | 435605          | 435610          | 435615          | 435616           | 435617           | 435618           |      |      |
| Price \$                              | <b>3,038.36</b>   | <b>3,561.24</b> | <b>3,897.47</b> | <b>4,873.15</b> | <b>5,274.96</b> | <b>10,985.82</b> | <b>19,907.59</b> | <b>29,777.35</b> |      |      |

| Spare Parts - See Pages: H35 |  |                        |  |                           |   |          |                         |  |               |
|------------------------------|--|------------------------|--|---------------------------|---|----------|-------------------------|--|---------------|
| Standard<br>Accessories      |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional<br>Accessories |  | Soft top jaws |
|                              | Engineering Data See Pages: H62-66   |                        |  |                           |   |          |                         |  |               |

## 6-Jaw F/A Precision Steel Body Scroll Chucks — Hard Solid Jaws



### Features:

- 6-Jaw, self-centering scroll chuck
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Repeatability: 0.0006"
- Superior accuracy: small screws on the outside enable the chuck to be adjusted to position with nearly zero runout (adjusting accuracy within 0.0002")
- The clamped workpiece is adjusted to the required concentricity by means of 4 (8 for sizes 16", 20" & 25") radially arranged adjusting screws

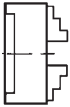
### Application:





- This precision chuck, with increased gripping accuracy, is made for universal use, but particularly advantageous for grinding machines, indexing heads, and lathes
- Especially suitable for machining parts with top concentricity
- Gripping force is equally distributed over 6 jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



**F/A Chuck  
ADAPTER PLATES**  
Pages: H33-34



| Mounting<br><b>3864</b><br>Plain Back |  | Chuck Size      | 5"              | 6"              | 8"              | 10"             | 12"              | 16"              | 20"  | 25"  |
|---------------------------------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------|------|
|                                       |   | Hole Size       | 1.378           | 1.6535          | 2.1653          | 2.9921          | 4.0551           | 5.3543           | 7.48 | 9.92 |
| Weight lbs.                           | 14  | 23              | 39              | 72              | 123             | 218             | 396              | 718              |      |      |
| Code No.                              | 435550  | 435555          | 435560          | 435565          | 435570          | 435576          | 435580           | 435585           |      |      |
| Price \$                              | <b>2,714.59</b>   | <b>2,057.32</b> | <b>3,625.16</b> | <b>4,045.38</b> | <b>6,050.16</b> | <b>9,922.95</b> | <b>19,959.49</b> | <b>29,508.32</b> |      |      |

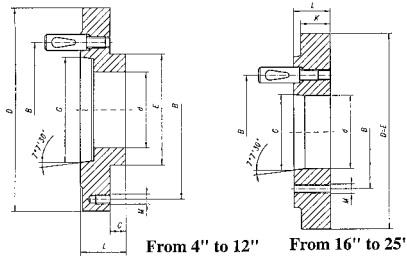
| Spare Parts - See Pages: H35 |   |                                  |   |                                 |   |          |                         |   |                          |
|------------------------------|---|----------------------------------|---|---------------------------------|---|----------|-------------------------|---|--------------------------|
| Standard<br>Accessories      |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | Optional<br>Accessories |  | 1 set of soft solid jaws |
|                              | Engineering Data See Pages: H62-66  |                                  |   |                                 |   |          |                         |   |                          |

## Camlock Mount Adapters For F/A Chucks

### D - Type

#### FULLY MACHINED TYPE D STEEL ADAPTERS FOR F/A CHUCKS

- Type D1 American Standard Camlock Spindles
- Type 8245



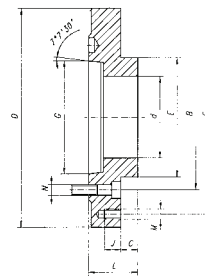
| Chuck Dia. | Taper Size | Studs Qty | Dia.   | D     | B     | G       | d     | E     | F      | M         | C    | L    | K    | Weight lbs. | Code No. | Price \$ |
|------------|------------|-----------|--------|-------|-------|---------|-------|-------|--------|-----------|------|------|------|-------------|----------|----------|
| 4"         | D1-3       | 3         | 9/16   | 3.94  | 2.78  | 2.1250  | 0.787 | 1.771 | 3.268  | M8 X 1.25 | 0.47 | 1.50 |      | 3.31        | 435690   | 685.11   |
|            | D1-4       |           | 5/8    | 4.25  | 3.25  | 2.5005  |       |       |        |           |      | 1.57 |      | 3.97        | 435691   | 685.11   |
| 5"         | D1-3       | 3         | 9/16   | 4.92  | 2.78  | 2.1250  | 1.378 | 2.164 | 4.252  | M8 X 1.25 | 0.55 | 1.57 |      | 5.95        | 435692   | 644.30   |
|            | D1-4       | 3         | 5/8    | 4.92  | 3.25  | 2.5005  |       |       |        |           |      | 1.54 |      | 5.73        | 435693   | 644.30   |
|            | D1-5       | 6         | 3/4    | 5.31  | 4.13  | 3.2503  |       |       |        |           |      | 1.73 |      | 6.92        | 435694   | 644.30   |
| 6-1/4"     | D1-6       | 6         | 7/8    | 7.12  | 5.25  | 4.1878  |       |       |        |           |      | 1.89 |      | 13.06       | 435695   | 644.30   |
|            | D1-3       | 3         | 9/16   | 6.30  | 2.78  | 2.1250  | 1.654 | 3.385 | 5.512  | M10 X 1.5 | 0.63 | 1.81 |      | 10.80       | 435700   | 793.92   |
|            | D1-4       | 3         | 5/8    | 6.30  | 3.25  | 2.5005  |       |       |        |           |      | 1.81 |      | 9.92        | 435705   | 793.92   |
| 8"         | D1-5       | 6         | 3/4    | 6.30  | 4.13  | 3.2503  |       |       |        |           |      | 1.81 |      | 9.89        | 435710   | 793.92   |
|            | D1-6       | 6         | 7/8    | 6.69  | 5.25  | 4.1878  |       |       |        |           |      | 1.97 |      | 13.00       | 435712   | 793.92   |
|            | D1-3       | 3         | 9/16   | 7.87  | 2.78  | 2.1250  | 2.024 | 4.330 | 6.929  | M10 X 1.5 | 0.67 | 1.30 |      | 10.36       | 435715   | 840.55   |
| 10"        | D1-4       | 3         | 5/8    |       | 3.25  | 2.5005  | 2.165 |       |        |           |      | 1.30 |      | 10.36       | 435720   | 840.55   |
|            | D1-5       | 6         | 3/4    |       | 4.13  | 3.2503  | 2.165 |       |        |           |      | 1.85 |      | 15.87       | 435725   | 907.39   |
|            | D1-6       | 6         | 7/8    |       | 5.25  | 4.1878  | 2.165 |       |        |           |      | 2.01 |      | 17.64       | 435730   | 907.39   |
| 12-1/2"    | D1-6       | 6         | 7/8    | 12.40 | 5.25  | 4.1878  | 4.055 | 7.086 | 11.260 | M16 X 2   | 0.75 | 1.50 |      | 28.44       | 435750   | 1,425.83 |
|            | D1-8       |           | 1      |       | 6.75  | 5.50055 |       |       |        |           |      | 2.24 |      | 47.84       | 435755   | 1,425.83 |
|            | D1-11      |           | 1-3/16 |       | 9.25  | 7.75055 |       |       |        |           |      | 2.52 |      | 52.91       | 435760   | 1,425.83 |
| 15-3/4"    | D1-6       | 6         | 7/8    | 11.75 | 5.25  | 4.1878  | 4.055 | 11.75 | 6.718  | 5/8-11    |      | 1.38 | 0.87 | 29.0        | 435762   | 1,553.40 |
|            | D1-8       |           | 1      |       | 6.75  | 5.50055 | 5.358 |       |        |           |      | 1.50 |      | 27.2        | 435764   | 1,553.40 |
|            | D1-11      |           | 1-3/16 |       | 9.25  | 7.75055 | 5.358 |       |        |           |      | 1.89 |      | 26.8        | 435766   | 1,553.40 |
| 20"        | D1-8       | 6         | 1      | 16.02 | 6.75  | 5.50055 | 5.358 | 16.02 | 9.252  | 3/4-10    |      | 1.50 | 1.50 | 74          | 435768   | 3,653.27 |
|            | D1-11      |           | 1-3/16 |       | 9.25  | 7.75055 | 7.590 |       |        |           |      | 1.73 | 1.73 | 78          | 435770   | 3,653.27 |
|            | D1-15      |           | 1-3/8  |       | 13.00 | 11.2505 | 7.480 |       |        |           |      | 2.05 | 2.05 | 83          | 435772   | 4,201.08 |
| 25"        | D1-8       | 6         | 1      | 16.02 | 6.75  | 5.50055 | 5.358 | 16.02 | 13.071 | 3/4-10    |      | 1.50 | 1.50 | 74          | 435774   | 4,004.88 |
|            | D1-11      |           | 1-3/16 |       | 9.25  | 7.75055 | 7.590 |       |        |           |      | 1.73 | 1.73 | 78          | 435776   | 4,004.88 |
|            | D1-15      |           | 1-3/8  |       | 13.00 | 11.2505 | 9.920 |       |        |           |      | 2.05 | 2.05 | 83          | 435778   | 2,848.15 |

## A Taper Mount Adapters For F/A Chucks Type 8215

### A - Type

#### STEEL ADAPTERS FOR F/A CHUCKS

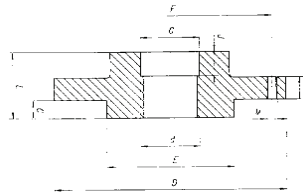
- Type 8215



| Chuck Dia. | Taper Size | D     | G       | d     | B      | E     | F      | M        | J    | C    | L    | N       | # of Bolts | Weight lbs. | Code No. | Price \$ |
|------------|------------|-------|---------|-------|--------|-------|--------|----------|------|------|------|---------|------------|-------------|----------|----------|
| 5"         | A4         | 4.92  | 2.5005  | 1.378 | 3.252  | 2.164 | 4.252  | M8x1.25  | 0.87 | 0.55 | 1.42 | 7/16-14 | 4          | 4.8         | 435790   | 253.70   |
|            | A5         | 4.92  | 3.2505  |       | 4.126  |       |        |          | 0.87 |      | 1.42 | 7/16-14 |            | 4.2         | 435792   | 253.70   |
|            | A6         | 6.30  | 4.1880  |       | 5.252  |       |        |          | 0.53 |      | 1.89 | 1/2-13  |            | 9.1         | 435794   | 253.70   |
| 6-1/4"     | A5         | 6.30  | 3.2505  | 1.654 | 4.126  | 3.385 | 5.512  | M10x1.5  | 0.82 | 0.62 | 1.45 | 7/16-14 | 4          | 6.77        | 435800   | 386.01   |
| 8"         | A5         | 7.87  | 3.2505  | 2.165 | 4.126  | 4.330 | 6.929  | M10x1.5  | 0.62 | 0.66 | 1.29 | 3/8-16  | 4          | 9.3         | 435805   | 519.97   |
|            | A6         |       | 4.1880  |       | 5.252  |       |        |          | 1.10 |      | 1.77 | 1/2-13  |            | 13.5        | 435810   | 519.97   |
| 10"        | A5         | 9.84  | 3.2505  | 2.992 | 4.126  | 5.708 | 8.819  | M12x1.75 | 0.74 | 0.74 | 1.49 | 7/16-14 | 4          | 17.3        | 435815   | 719.15   |
|            | A8         |       | 5.5007  |       | 6.748  |       |        |          | 1.06 |      | 1.81 | 5/8-11  |            | 20.2        | 435825   | 719.15   |
| 12-1/2"    | A6         | 12.40 | 4.1880  | 4.055 | 5.252  | 7.086 | 11.260 | M16x2    | 0.74 | 0.74 | 1.49 | 1/2-13  | 4          | 27.3        | 435830   | 1,273.17 |
|            | A8         |       | 5.5007  |       | 6.748  |       |        |          | 1.06 |      | 1.81 | 5/8-11  |            | 35.7        | 435835   | 1,273.17 |
|            | A11        |       | 7.7507  |       | 9.252  |       |        |          | 1.42 |      | 2.19 | 3/4-10  |            | 41.20       | 435836   | 1,273.17 |
| 15-3/4"    | A6         | 11.75 | 4.1880  | 4.055 | 5.252  | 11.75 | 6.748  | 5/8-11   | 1.38 |      | 1.38 | 1/2-13  | 6          | 31.4        | 435837   | 1,346.45 |
|            | A8         |       | 5.5007  | 5.346 | 6.748  |       |        |          | 1.14 |      | 1.46 | 5/8-11  |            | 28.8        | 435838   | 1,346.45 |
|            | A11        |       | 7.7507  | 5.354 | 9.252  |       |        |          | 1.06 |      | 1.89 | 3/4-10  |            | 35.8        | 435839   | 1,346.45 |
| 20"        | A8         | 16.02 | 5.5007  | 5.346 | 6.748  | 16.02 | 9.252  | 3/4-10   | 1.42 |      | 1.42 | 5/8-11  | 6          | 69          | 435844   | 2,026.58 |
|            | A11        |       | 7.7507  | 7.590 | 9.252  |       |        |          | 1.18 |      | 1.42 | 3/4-10  |            | 61          | 435846   | 2,026.58 |
|            | A15        |       | 11.2505 | 7.480 | 13.000 |       |        |          | 1.18 |      | 2.05 | 7/8-9   |            | 76          | 435848   | 2,026.58 |
| 25"        | A8         | 16.02 | 5.5007  | 5.346 | 6.748  | 16.02 | 13.000 | 3/4-10   | 1.42 |      | 1.42 | 5/8-11  | 6          | 69          | 435850   | 3,359.84 |
|            | A11        | 16.02 | 7.7507  | 7.590 | 9.252  |       |        |          | 1.42 |      | 1.42 | 3/4-10  |            | 61          | 435852   | 3,511.52 |
|            | A15        | 13.02 | 11.2505 | 9.921 | 13.000 |       |        |          | 1.42 |      | 2.05 | 7/8-9   |            | 76          | 435854   | 3,511.52 |
|            | A20        | 21.00 | 16.2518 | 9.921 | 18.252 |       |        |          | 2.76 |      | 2.76 | 1-8     |            | 90          | 435856   | 4,775.37 |

## Threaded Adapters For F/A Chucks

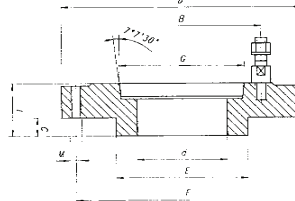
### Threaded Type 8285



| Chuck Dia. | D    | Thread d             | G      | E     | F     | L    | C    | K    | M         | # of Bolts | Weight lbs. | Code No. | Price \$ |
|------------|------|----------------------|--------|-------|-------|------|------|------|-----------|------------|-------------|----------|----------|
| 4"         | 3.94 | 1-10 UNS-2B          | 1.0150 | 1.771 | 3.268 | 1.54 | 0.47 | 0.51 | M8 X 1.25 | 3          | 4.85        | 435860   | 271.74   |
|            |      | 1-1/2 - 8 UN-2B      | 1.5150 |       |       |      |      |      |           |            |             | 5.29     | 435861   |
| 5"         | 4.92 | 1-1/2 - 8 UN-2B      | 1.5150 | 2.164 | 4.252 | 1.54 | 0.55 | 0.51 | M8 X 1.25 | 3          | 6.61        | 435863   | 261.48   |
|            |      | 2-3/16 - 10 Hardinge | 2.1889 |       |       | 2.44 |      |      |           |            |             | 7.05     | 435864   |
| 6-1/4"     | 6.30 | 2-1/4 - 8 UN-2B      | 2.260  |       |       | 1.54 |      |      |           |            | 6.8         | 435865   | 336.25   |
|            |      | 1-1/2 - 8 UN-2B      | 1.5150 | 3.385 | 5.512 | 1.50 | 0.63 | 0.59 | M10 X 1.5 | 3          | 7.05        | 435866   | 320.66   |
| 8"         | 7.87 | 2-3/16 - 10 Hardinge | 2.1889 |       |       | 1.61 |      |      |           |            | 7.50        | 435867   | 409.30   |
|            |      | 2-1/4 - 8 UN-2B      | 2.2600 |       |       | 1.75 |      |      |           |            | 7.94        | 435868   | 311.31   |
| 8"         | 7.87 | 1-1/2 - 8 UN 2B      | 1.5150 | 4.330 | 6.929 | 1.50 | 0.67 | 0.59 | M10 X 1.5 | 3          | 9.92        | 435869   | 483.20   |
|            |      | 2-1/4 - 8 UN-2B      | 2.2600 |       |       | 1.75 |      |      |           |            | 11.46       | 435870   | 358.12   |
|            |      | 2-3/8 - 6 UN-2B      | 2.3850 |       |       | 2.00 |      |      |           |            | 13.89       | 435871   | 403.44   |

## DIN Mount Adapters For F/A Chucks

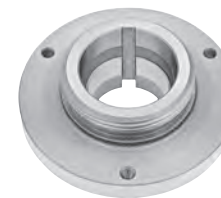
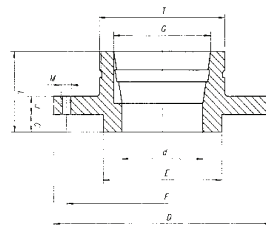
### C - Type/DIN 55027 Type 8235



| Chuck Dia. | Taper Size | D     | G      | d    | E     | F     | B     | C    | L      | M          | # of Studs | Weight lbs. | Code No. | Price \$ |
|------------|------------|-------|--------|------|-------|-------|-------|------|--------|------------|------------|-------------|----------|----------|
| 5"         | C-5        | 4.92  | 3.251  | 1.38 | 2.164 | 4.252 | 4.126 | 0.55 | 1.46   | M8 X 1.25  | 4          | 3.4         | 435874   | 451.58   |
| 6-1/4"     | C-6        | 6.30  | 4.189  | 1.65 | 3.385 | 5.512 | 3.346 | 0.63 | 1.26   | M10 X 1.5  | 4          | 6.0         | 435875   | 428.88   |
| 8"         | C-6        | 7.87  | 4.188  | 2.17 | 4.330 | 6.929 | 5.252 | 0.67 | 1.57   | M10 X 1.5  | 4          | 12.0        | 435876   | 1,153.40 |
| 10"        | C-6        | 9.84  | 4.188  | 2.99 | 5.708 | 8.819 | 5.252 | 0.75 | 1.50   | M12 X 1.75 | 4          | 28.0        | 435877   | 1,224.97 |
| 12-1/2"    | C-8        | 12.4  | 5.501  | 4.06 | 7.086 | 11.26 | 6.748 | 0.75 | 1.69   | M16 X 2    | 4          | 48.0        | 435878   | 1,542.45 |
| 15-3/4"    | C-8        | 11.75 | 5.501  | 5.35 | 11.75 | 6.75  | 6.75  | -    | 1.46   | 5/8-11     | 6          | 27          | 435879   | 1,765.10 |
|            |            |       | 7.751  | 4.72 |       | 9.25  | -     |      |        |            | 25         | 435880      | 1,765.10 |          |
| 20"        | C-8        | 16.02 | 5.501  | 5.35 | 16.02 | 9.25  | 6.75  | -    | 1.42   | 3/4-10     | 6          | 70          | 435881   | 2,361.39 |
|            |            |       | 7.751  | 7.57 |       | 9.25  | -     | 1.42 |        |            | 66         | 435882      | 3,267.19 |          |
| 25"        | C15        | 16.02 | 11.251 | 7.48 |       | 13.0  | -     | 2.05 |        |            | 86         | 435883      | 2,484.78 |          |
|            | C-8        |       | 5.501  | 5.35 | 16.02 | 13.0  | -     | 1.42 | 3/4-10 | 6          | 70         | 435884      | 4,015.53 |          |
|            |            |       | 7.751  | 7.57 |       | 9.25  | -     | 1.42 |        |            | 66         | 435885      | 4,015.53 |          |
|            | C-15       |       | 11.251 | 9.92 |       | 13.0  | -     | 2.05 |        |            | 75         | 435886      | 4,136.17 |          |

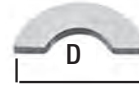
## L Mount Adapters For F/A Chucks

### L-Type 8255



| Chuck Dia. | D     | Taper Size | Thread T-UN33 | G     | d    | E     | F     | M          | J    | C    | L    | Weight lbs. | Code No. | Price \$ |
|------------|-------|------------|---------------|-------|------|-------|-------|------------|------|------|------|-------------|----------|----------|
| 6-1/4"     | 6.30  | L00        | 3-3/4 - 6     | 2.750 | 2.20 | 3.385 | 5.51  | M10 X 1.5  | 0.79 | 0.63 | 2.56 | 9.0         | 435887   | 668.46   |
|            |       | L0         | 4-1/2 - 6     | 3.250 | 2.60 |       |       |            |      |      |      | 9.5         | 435888   | 640.19   |
| 8"         | 7.87  | L00        | 3-3/4 - 6     | 2.750 | 2.20 | 4.330 | 6.93  | M10 X 1.5  | 0.79 | 0.67 | 2.56 | 15.0        | 435889   | 705.92   |
|            |       | L0         | 4-1/2 - 6     | 3.250 | 2.60 |       |       |            |      |      |      | 2.56        | 15.4     | 435890   |
| 10"        | 9.84  | L1         | 6 - 6         | 4.125 | 3.35 |       |       |            |      |      | 2.99 | 16.5        | 435891   | 757.54   |
|            |       | L00        | 3-3/4 - 6     | 2.750 | 2.20 | 5.708 | 8.82  | M12 X 1.75 | 0.91 | 0.75 | 2.76 | 25.0        | 435892   | 885.50   |
|            |       | L0         | 4-1/2 - 6     | 3.250 | 2.60 |       |       |            |      |      |      | 2.76        | 26.1     | 435893   |
| 12-1/2"    | 12.40 | L1         | 6 - 6         | 4.125 | 3.35 |       |       |            |      |      | 2.99 | 37.0        | 435894   | 784.01   |
|            |       | L0         | 4-1/2 - 6     | 3.250 | 2.60 | 7.086 | 11.26 | M16 X 2    | 0.91 | 0.75 | 2.76 | 37.0        | 435895   | 825.55   |
|            |       | L1         | 6 - 6         | 4.125 | 3.35 |       |       |            |      |      |      | 2.99        | 37.0     | 435896   |
| 15-3/4"    | 11.75 | L2         | 7-3/4 - 5     | 5.250 | 4.29 |       |       |            |      |      | 3.50 | 38.8        | 435897   | 909.06   |
|            |       | L1         | 6 - 6         | 4.125 | 3.35 | 11.75 | 6.75  | 5/8"-11    | 0.87 | -    | 2.95 | 34.2        | 435898   | 2,489.13 |
|            |       | L2         | 7-3/4 - 5     | 5.250 | 4.29 |       |       |            |      |      |      | 3.46        | 45.4     | 435899   |
| 20"        | 19.68 | L3         | 10-3/8 - 4    | 6.500 | 5.43 |       |       |            |      |      | 3.94 | 67.2        | 435901   | 2,489.13 |
|            |       | L2         | 7-3/4 - 5     | 5.250 | 4.29 | 16.02 | 9.25  | 3/4"-10    | 1.18 | -    | 3.66 | 60.2        | 435902   | 2,567.80 |
|            |       | L3         | 10-3/8 - 4    | 6.500 | 5.43 |       |       |            |      |      |      | 4.14        | 81.33    | 435903   |

## Spare Parts For 3 & 6-Jaw F/A Chucks



| Chuck Dia. | Scroll 3 & 6-Jaw |          |      |      |             | Pinion 3 & 6-Jaw |          |      |      |             | Wrench 3 & 6-Jaw |          |             | Pinion Sleeve 3 & 6-Jaw |          |      | Half Ring 3 & 6-Jaw |          |      |
|------------|------------------|----------|------|------|-------------|------------------|----------|------|------|-------------|------------------|----------|-------------|-------------------------|----------|------|---------------------|----------|------|
|            | Code No.         | Price \$ | D    | H    | Weight lbs. | Code No.         | Price \$ | D    | L    | Weight lbs. | Code No.         | Price \$ | Square Size | Code No.                | Price \$ | ID   | Code No.            | Price \$ | D    |
| 4          | 467105           | 293.72   | 2.74 | 0.49 | 0.34        | 467305           | 90.71    | 0.98 | 1.40 | 0.12        | 460405           | 98.37    | 0.35        | -                       | -        | -    | 460458              | 25.04    | -    |
| 5          | 467829           | 385.94   | 3.70 | 0.63 | 0.84        | 467799           | 93.75    | 0.98 | 1.44 | 0.13        | 460405           | 98.37    | 0.35        | 460450                  | 35.36    | 0.98 | 460459              | 26.94    | 1.52 |
| 6          | 467830           | 457.66   | 4.88 | 0.83 | 2.03        | 467800           | 98.46    | 1.1  | 1.57 | 0.18        | 460415           | 104.67   | 0.43        | 460451                  | 42.19    | 1.1  | 460460              | 28.25    | 1.72 |
| 8          | 467835           | 567.09   | 6.24 | 0.94 | 3.62        | 467805           | 115.69   | 1.2  | 1.99 | 0.37        | 460415           | 104.67   | 0.43        | 460452                  | 42.19    | 1.2  | 460461              | 29.79    | 1.85 |
| 10         | 467840           | 773.14   | 7.82 | 1.1  | 4.54        | 467810           | 142.29   | 1.4  | 2.36 | 0.44        | 460425           | 126.56   | 0.55        | 460453                  | 57.78    | 1.4  | 460462              | 29.79    | 1.94 |
| 12         | 467845           | 1,021.45 | 10.1 | 1.2  | 10.2        | 467815           | 167.20   | 1.5  | 2.85 | 0.71        | 460425           | 126.56   | 0.55        | 460454                  | 70.43    | 1.5  | 460463              | 29.79    | 2.17 |
| 16         | 467850           | 2,241.17 | 12.9 | 1.3  | 22.7        | 467820           | 229.69   | 1.7  | 3.66 | 1.3         | 460435           | 189.06   | 0.67        | 460455                  | 100.01   | 1.7  | 460464              | 34.35    | 2.42 |
| 20         | -                | -        | -    | -    | -           | 467821           | 378.10   | 2.0  | 4.45 | 2.1         | 460440           | 274.90   | 0.75        | 460456                  | 109.32   | 2.0  | 460465              | 39.09    | 2.76 |
| 25         | -                | -        | -    | -    | -           | 467822           | 601.44   | 2.0  | 5.24 | 2.5         | 460440           | 274.90   | 0.75        | 460457                  | 121.90   | 2.0  | 460466              | 42.10    | 2.95 |

## Hard Top Jaws

Sold in sets

3pc set



6pc set



| Chuck Dia. | 3-Jaw Code No. | Price \$ | 6-Jaw Code No. | Price \$ |
|------------|----------------|----------|----------------|----------|
| 5          | 460705         | 399.19   | 460908         | 988.60   |
| 6          | 460710         | 467.72   | 460910         | 1,133.40 |
| 8          | 460715         | 497.25   | 460915         | 1,248.80 |
| 10         | 460720         | 541.07   | 460920         | 1,261.33 |
| 12         | 460725         | 659.51   | 460925         | 1,549.69 |
| 16         | 460730         | 901.15   | 460926         | 1,965.94 |
| 20         | 460735         | 1,406.26 | 460927         | 2,770.47 |
| 25         | 460740         | 1,788.30 | 460928         | 3,084.74 |

## Hard Master Jaws

Sold in sets

3pc set



6pc set



| Chuck Dia. | 3-Jaw Code No. | Price \$ | 6-Jaw Code No. | Price \$ |
|------------|----------------|----------|----------------|----------|
| 5          | 467355         | 369.65   | 467505         | 971.25   |
| 6          | 467360         | 469.28   | 467510         | 977.54   |
| 8          | 467365         | 509.86   | 467515         | 1,278.47 |
| 10         | 467370         | 576.84   | 467520         | 1,381.32 |
| 12         | 467375         | 667.23   | 467525         | 1,431.19 |
| 16         | 467380         | 796.76   | 460527         | 2,157.66 |
| 20         | 467385         | 1,392.18 | 460529         | 3,079.08 |
| 25         | 467390         | 1,806.93 | 460530         | 4,486.96 |

## Soft Top Jaws

Sold Individually



Sold Individually



| Chuck Dia. | 3-Jaw Code No. | Price \$ | 6-Jaw Code No. | Price \$ |
|------------|----------------|----------|----------------|----------|
| 5          | 465105         | 65.43    | -              | -        |
| 6          | 465110         | 71.73    | 467532         | 105.99   |
| 8          | 465115         | 84.24    | 467534         | 120.13   |
| 10         | 465120         | 104.44   | 467536         | 144.93   |
| 12         | 465125         | 115.40   | 467538         | 160.64   |
| 16         | 465130         | 162.12   | 467540         | 266.57   |
| 20         | 465135         | 212.07   | -              | -        |
| 25         | 465140         | 291.64   | -              | -        |

## O.D. Hard Solid Jaws

Sold in sets



| Chuck Dia. | 3-Jaw Code No. | Price \$ | 6-Jaw Code No. | Price \$ |
|------------|----------------|----------|----------------|----------|
| 4          | 467708         | 239.88   | -              | -        |
| 5          | 467710         | 316.42   | 467915         | 1,002.92 |
| 6          | 467715         | 364.93   | 467916         | 798.23   |
| 8          | 467720         | 378.72   | 467918         | 993.06   |
| 10         | 467725         | 444.36   | 467920         | 1,078.87 |
| 12         | 467730         | 740.51   | 467922         | 1,379.70 |
| 16         | 467735         | 816.89   | 467923         | 1,663.55 |
| 20         | 467740         | 1,884.95 | -              | -        |
| 25         | 467745         | 2,313.11 | -              | -        |

## I.D. Hard Solid Jaws

Sold in sets



| Chuck Dia. | 3-Jaw Code No. | Price \$ | 6-Jaw Code No. | Price \$ |
|------------|----------------|----------|----------------|----------|
| 4          | 467605         | 261.89   | -              | -        |
| 5          | 467610         | 272.78   | 467939         | 601.12   |
| 6          | 467615         | 355.51   | 467940         | 910.53   |
| 8          | 467620         | 364.93   | 467942         | 1,028.96 |
| 10         | 467625         | 420.98   | 467944         | 1,055.53 |
| 12         | 467630         | 643.85   | 467946         | 1,412.56 |
| 16         | 467635         | 826.32   | 467947         | 2,199.82 |
| 20         | 467640         | 1,887.93 | -              | -        |
| 25         | 467645         | 2,416.52 | -              | -        |

## Soft Solid Jaws

Sold in sets



| Chuck Dia. | Code No. | Price \$ |
|------------|----------|----------|
| 4          | 467750   | 182.45   |
| 5          | 467755   | 188.69   |
| 6          | 467760   | 210.51   |
| 8          | 467765   | 235.40   |
| 10         | 467770   | 349.17   |
| 12         | 467775   | 466.16   |
| 16         | 467780   | 497.25   |
| 20         | 467785   | 1,191.08 |
| 25         | 467790   | 1,711.82 |

## Camlock Studs

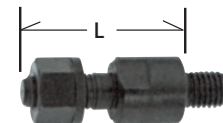
Sold Individually



| Taper Size | Dia.    | Camlock Studs Thread | No. of Studs | Code No. | Price \$ |
|------------|---------|----------------------|--------------|----------|----------|
| D1-3       | 9/16"   | M10 X 1              | 3            | 467230   | 64.13    |
| D1-4       | 5/8"    | M10 X 1              | 3            | 467232   | 64.13    |
| D1-5       | 3/4"    | M12 X 1              | 6            | 467234   | 65.68    |
| D1-6       | 7/8"    | M16 X 1.5            | 6            | 467236   | 70.34    |
| D1-8       | 1"      | M20 X 1.5            | 6            | 467238   | 81.28    |
| D1-11      | 1-3/16" | M22 X 1.5            | 6            | 467240   | 117.16   |
| D1-15      | 1-3/8"  | M24 X 1.5            | 6            | 467241   | 185.94   |

## DIN Studs

Sold Individually



| Taper Size | Thread mm | L (mm) | No. of Studs | Code No. | Price \$ |
|------------|-----------|--------|--------------|----------|----------|
| C - 4      | M10x1.5   | 39     | 3            | 467277   | 73.52    |
| C - 5      | M10x1.5   | 43     | 4            | 467279   | 75.06    |
| C - 6      | M12x1.75  | 50     | 4            | 467280   | 78.26    |
| C - 8      | M16x2     | 60     | 4            | 467282   | 82.56    |
| C - 11     | M20x2.5   | 75     | 6            | 467284   | 100.01   |

## STANDARD SELF CENTERING SCROLL CHUCKS



### Cast Iron Body Self-Centering Scroll Chucks

These chucks have modern, precision and standardized construction. They may be used on all types of lathes and on different kinds of milling and drilling attachments.

- BODY** - is made of high quality cast iron. All bearing surfaces are precision machined
- SCROLL PLATE** - drop-forged of fine alloy steel, carefully case hardened  
Thread flanks ground on both sides
- JAWS** - the teeth and guides are hardened and fully ground on both sides
- PINIONS** - hardened and ground

These chucks are equipped with lubricator, enabling their current maintenance. Versatile inspections assure high quality of our chucks.

### Precision Steel Body Self-Centering Scroll Chucks

Precision lathe chucks have a top accuracy at work and the guarantee to maintain this accuracy for an extended period of time. These chucks have modern and compact design. They are able to fulfill the highest demands of our customers. They can be used wherever precision and high precision machining is demanded.

- BODY** - drop-forged of highest grade steel and put through precise machining operations. All bearings surfaces are carefully hardened and precision ground
- SCROLL PLATE** - drop-forged of fine alloy steel, carefully case hardened.  
Thread flanks ground on both sides
- JAWS** - teeth and guides are hardened and fully ground on both sides
- PINIONS** - hardened and ground
- BUSHINGS** - hardened and ground, pressed into the pinion seats

Jaws, pinions and bushings are made of fine alloy steel.

Precision grinding of scroll and jaws teeth will:

- eliminate possible deformation as a result of heat treatment
- reach uniform radial gripping force on all teeth of jaws
- increase guarantee period for high centering accuracy
- increase gripping force

Each chuck is provided with lubricator enabling current maintenance and extending chuck components life. Each scroll and assembled chuck are statically balanced within fine limits. Interstage and final inspection assure high quality of our chucks.

## 3-Jaw Precision Steel Body Scroll Chucks — 2pc Hard Rev. Jaws



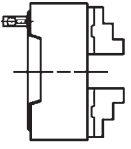
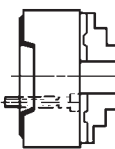
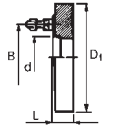

### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate





### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes



| Mounting  | Chuck Size | 5"        | 6"       | 8"       | 10"      | 12"       | 16"       | 20"       | 25"       |
|---|------------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|
|   |            | Hole Size | 1.2598   | 1.6535   | 2.1653   | 2.9921    | 4.0551    | 5.3543    | 7.48      |
| Weight lbs.   |            | 11        | 22       | 39       | 64       | 110       | 187       | 320       | 551       |
| Code No.  |            | 440750    | 440755   | 440760   | 440765   | 440770    | 440775    | 440776    | 440783    |
| Price \$  |            | 1,752.58  | 1,852.21 | 2,232.05 | 2,635.14 | 3,793.11  | 7,206.63  | 15,199.16 | 21,800.23 |
| <b>3545</b><br>Camlock                   | D1-3       | 440955    | 440963   |          |          |           |           |           |           |
|   | Price \$   | 1,868.69  | 2,091.92 |          |          |           |           |           |           |
|   | D1-4       | 440960    | 440965   |          |          |           |           |           |           |
|   | Price \$   | 1,868.69  | 2,001.57 |          |          |           |           |           |           |
|   | D1-5       |           | 440970   |          |          |           |           |           |           |
|   | Price \$   |           | 2,001.57 |          |          |           |           |           |           |
|   | D1-6       |           |          | 440980   | 440985   | 440992    |           |           |           |
|   | Price \$   |           |          | 2,317.79 | 2,787.67 | 3,972.16  |           |           |           |
|   | D1-8       |           |          |          | 440990   | 440994    | 440996    | 440777    | 440785    |
|   | Price \$   |           |          |          | 2,787.67 | 3,972.16  | 7,888.27  | 17,764.31 | 22,396.62 |
| D1-11   |            |           |          |          | 440995   | 440998    | 440778    | 440787    |           |
| Price \$  |            |           |          |          | 3,800.66 | 7,888.27  | 17,764.31 | 24,061.85 |           |
| <b>3515</b><br>Short Taper             | A1-4       |           |          | 440881   |          |           |           |           |           |
|   | Price \$   |           |          | 2,448.87 |          |           |           |           |           |
|   | A1-5       |           | 440780   | 440782   | 440885   |           |           |           |           |
|   | Price \$   |           | 2,890.38 | 3,685.84 | 3,814.68 |           |           |           |           |
|   | A1-6       |           |          | 440784   | 440786   |           | 440795    |           |           |
|   | Price \$   |           |          | 3,685.84 | 3,986.26 |           | 8,619.16  |           |           |
|   | A2-6       |           |          |          |          | 440790    |           |           |           |
|   | Price \$   |           |          |          |          | 4,848.50  |           |           |           |
|   | A1-8       |           |          |          | 440888   | 440892    |           |           |           |
|   | Price \$   |           |          |          | 3,814.68 | 4,640.23  |           |           |           |
| A2-8  |            |           |          |          |          | 440794    | 440779    |           |           |
| Price \$  |            |           |          |          |          | 10,081.54 | 18,063.17 |           |           |
| A2-11   |            |           |          |          |          |           | 440781    | 440789    |           |
| Price \$  |            |           |          |          |          |           | 18,063.17 | 21,971.49 |           |
| A2-15   |            |           |          |          |          |           |           | 440791    |           |
| Price \$  |            |           |          |          |          |           |           | 21,971.49 |           |
| A1-11   |            |           |          |          |          |           | 440896    |           |           |
| Price \$  |            |           |          |          |          |           | 9,648.07  |           |           |
| <b>3535</b><br>DIN Taper               | DIN 6      |           |          | 440850   | 440855   | 440865    |           |           |           |
|   | Price \$   |           |          | 1,868.69 | 2,705.01 | 3,737.61  |           |           |           |
|   | DIN 8      |           |          |          | 440860   | 440870    | 440875    |           |           |
|   | Price \$   |           |          |          | 2,705.01 | 3,737.61  | 7,081.94  |           |           |
| DIN 11  |            |           |          |          |          | 440880    |           |           |           |
| Price \$  |            |           |          |          |          | 7,081.94  |           |           |           |
| <b>3575</b><br>Front Mount Plain Back  | Code No.   | 440160    | 440165   | 440170   | 440175   | 440180    | 440185    |           |           |
|   | Price \$   | 1,894.19  | 1,937.87 | 2,091.29 | 2,944.90 | 3,995.42  | 8,082.84  |           |           |

### Spare Parts - See Pages: H60-61

| Standard Accessories   | Optional Accessories   |
|--|--|
|  <p>1 set of hard top jaws</p>    |  <p>Soft top jaws</p> |
|  <p>1 set of hard master jaws</p> |  <p>1 wrench</p>       |

Engineering Data See Pages: H62-66

## 3-Jaw Precision Steel Body Scroll Chucks — Hard Solid Jaws



### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes



| Mounting   | Chuck Size  | 3"        | 4"       | 5"       | 6"       | 8"       | 10"      | 12"      | 16"      |
|------------|-------------|-----------|----------|----------|----------|----------|----------|----------|----------|
|            |             | Hole Size | 0.630    | 0.787    | 1.2598   | 1.6535   | 2.1653   | 2.9921   | 4.0551   |
| Plain Back | Weight lbs. | 3.30      | 6.16     | 11       | 22       | 39       | 64       | 110      | 187      |
|            | Code No.    |           | 440751   | 440752   | 440756   | 440761   | 440766   | 440771   |          |
|            | Price \$    |           | 1,125.32 | 1,469.38 | 1,663.92 | 2,034.38 | 2,434.48 | 3,632.89 |          |
|            | D1-3        |           |          | 440956   | 440964   |          |          |          |          |
|            | Price \$    |           |          | 1,524.86 | 1,770.34 |          |          |          |          |
|            | D1-4        |           |          | 440961   | 440966   | 440973   |          |          |          |
|            | Price \$    |           |          | 1,524.86 | 1,770.34 | 2,163.92 |          |          |          |
|            | D1-5        |           |          |          | 440971   | 440976   |          |          |          |
|            | Price \$    |           |          |          | 1,770.34 | 2,163.92 |          |          |          |
|            | D1-6        |           |          |          |          | 440981   | 440986   | 440988   |          |
|            | Price \$    |           |          |          |          | 2,163.92 | 2,950.76 | 4,229.54 |          |
|            | D1-8        |           |          |          |          | 440987   | 440989   |          | 440997   |
|            | Price \$    |           |          |          |          | 2,950.76 | 4,229.54 |          | 7,573.88 |
|            | D1-11       |           |          |          |          |          | 440991   | 440999   |          |
|            | Price \$    |           |          |          |          |          | 4,229.54 | 7,573.88 |          |
|            | A1-4        |           |          |          |          | 440657   |          |          |          |
|            | Price \$    |           |          |          |          | 2,448.87 |          |          |          |
|            | A1-5        |           |          |          | 440656   | 440658   | 440660   |          |          |
|            | Price \$    |           |          |          | 1,714.14 | 2,448.87 | 3,253.02 |          |          |
|            | A1-6        |           |          |          |          | 440659   | 440661   | 440664   | 440668   |
|            | Price \$    |           |          |          |          | 2,448.87 | 3,253.02 | 4,229.54 | 7,835.55 |
|            | A1-8        |           |          |          |          |          | 440662   | 440666   | 440670   |
|            | Price \$    |           |          |          |          |          | 3,253.02 | 4,229.54 | 7,376.94 |
|            | A1-11       |           |          |          |          |          |          |          | 440672   |
|            | Price \$    |           |          |          |          |          |          |          | 7,376.94 |
|            | DIN 3       |           |          | 440851   |          |          |          |          |          |
|            | Price \$    |           |          | 1,278.47 |          |          |          |          |          |
|            | DIN 4       |           |          | 440852   | 440853   |          |          |          |          |
|            | Price \$    |           |          | 1,598.15 | 1,843.94 |          |          |          |          |
|            | DIN 5       |           |          |          | 440854   | 440856   |          |          |          |
|            | Price \$    |           |          |          | 1,843.94 | 2,090.05 |          |          |          |
|            | DIN 6       |           |          |          |          | 440857   | 440858   | 440861   |          |
|            | Price \$    |           |          |          |          | 2,090.05 | 2,827.73 | 3,246.02 |          |
|            | DIN 8       |           |          |          |          |          | 440859   | 440862   | 440864   |
|            | Price \$    |           |          |          |          |          | 2,827.73 | 3,246.02 | 7,868.57 |
|            | DIN 11      |           |          |          |          |          | 440863   | 440866   |          |
|            | Price \$    |           |          |          |          |          | 3,621.07 | 7,869.72 |          |
|            | Code No.    | 440050    | 440055   | 440060   | 440065   | 440070   | 440075   | 440080   | 440085   |
|            | Price \$    | 1,082.10  | 1,180.46 | 1,180.46 | 1,376.75 | 1,672.02 | 2,458.86 | 3,344.34 | 5,803.24 |

| Spare Parts - See Pages: H60-61    |  |                                  |  |                                 |                      |          |
|------------------------------------|--|----------------------------------|--|---------------------------------|----------------------|----------|
| Standard Accessories               |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |                      | 1 wrench |
|                                    |  |                                  |  |                                 | Optional Accessories |          |
| Engineering Data See Pages: H62-66 |  |                                  |  |                                 |                      |          |

## 3-Jaw Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws



### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and milling fixtures



| Mounting<br>3205<br>Plain Back | Size of Chuck | 5"        | 6"       | 8"       | 10"      | 12"       | 16"       | 20"       | 25"       | 32"                     | 36"                     | 40"                     |
|--------------------------------|---------------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|-------------------------|-------------------------|-------------------------|
|                                |               | Hole Size | 1.2598   | 1.6535   | 2.1654   | 2.9921    | 4.0551    | 5.3543    | 7.4803    | 9.92"                   | 12.60                   | 16.06                   |
| Weight lbs                     |               | 11        | 22       | 39       | 55       | 110       | 187       | 320       | 550       | 884                     | 1,232                   | 1,584                   |
| Code No.                       |               | 440705    | 440710   | 440715   | 440720   | 440725    | 435135    | 435140    | 435145    | 435480<br>(front mount) | 435155<br>(front mount) | 435160<br>(front mount) |
| Price \$                       |               | 1,146.65  | 1,221.33 | 1,487.69 | 2,000.23 | 2,791.51  | 5,361.84  | 8,793.62  | 13,599.17 | 26,039.17               | 39,139.53               | 47,582.05               |
| 3215<br>A Taper                | A1-5          |           | 440805   | 440810   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      |           | 1,708.73 | 3,012.76 |          |           |           |           |           |                         |                         |                         |
|                                | A2-5          |           |          |          | 440820   |           |           |           |           |                         |                         |                         |
|                                | Price \$      |           |          |          | 3,193.38 |           |           |           |           |                         |                         |                         |
|                                | A1-6          |           |          | 440815   | 440825   |           |           |           |           |                         |                         |                         |
|                                | Price \$      |           |          | 3,012.76 | 3,193.38 |           |           |           |           |                         |                         |                         |
|                                | A2-6          |           |          |          |          | 440835    | 435245    |           |           |                         |                         |                         |
|                                | Price \$      |           |          |          |          | 4,241.88  | 8,784.27  |           |           |                         |                         |                         |
|                                | A1-8          |           |          |          | 440830   | 440840    |           |           |           |                         |                         |                         |
|                                | Price \$      |           |          |          | 3,056.10 | 4,241.88  |           |           |           |                         |                         |                         |
|                                | A2-8          |           |          |          |          |           | 435252    |           |           |                         |                         |                         |
|                                | Price \$      |           |          |          |          |           | 8,406.62  |           |           |                         |                         |                         |
| A1-11                          |               |           |          |          |          | 435255    |           |           |           |                         |                         |                         |
| Price \$                       |               |           |          |          |          | 8,784.27  |           |           |           |                         |                         |                         |
| A2-11                          |               |           |          |          |          |           | 435256    | 435257    |           |                         |                         |                         |
| Price \$                       |               |           |          |          |          |           | 14,166.37 | 20,444.17 |           |                         |                         |                         |
| A2-20                          |               |           |          |          |          |           |           |           | 435259    |                         |                         |                         |
| Price \$                       |               |           |          |          |          |           |           |           | 30,504.30 |                         |                         |                         |
| 3245<br>Camlock                | D1-3          | 440900    | 440905   | 440915   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      | 2,252.95  | 1,496.90 | 1,913.00 |          |           |           |           |           |                         |                         |                         |
|                                | D1-4          | 440903    | 440910   | 440920   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      | 2,403.72  | 1,496.90 | 1,913.00 |          |           |           |           |           |                         |                         |                         |
|                                | D1-5          |           | 440912   | 440925   | 440935   |           |           |           |           |                         |                         |                         |
|                                | Price \$      |           | 1,573.70 | 1,913.00 | 2,593.70 |           |           |           |           |                         |                         |                         |
|                                | D1-6          |           | 440930   | 440940   | 440945   | 435360    |           |           |           |                         |                         |                         |
|                                | Price \$      |           | 1,913.00 | 2,593.70 | 3,702.87 | 7,212.61  |           |           |           |                         |                         |                         |
|                                | D1-8          |           |          | 440941   | 440950   | 435365    | 435368    |           |           |                         |                         |                         |
|                                | Price \$      |           |          | 2,593.70 | 3,702.87 | 6,653.27  | 12,675.63 |           |           |                         |                         |                         |
| D1-11                          |               |           |          | 440951   | 435367   | 435370    | 435372    |           |           |                         |                         |                         |
| Price \$                       |               |           |          | 3,702.87 | 6,653.27 | 12,675.63 | 16,992.23 |           |           |                         |                         |                         |
| D1-15                          |               |           |          |          |          |           | 435373    |           |           |                         |                         |                         |
| Price \$                       |               |           |          |          |          |           | 15,619.00 |           |           |                         |                         |                         |
| 3235<br>DIN Taper              | DIN 3         | 440102    |          | 440114   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      | 1,327.90  |          | 2,098.88 |          |           |           |           |           |                         |                         |                         |
|                                | DIN 4         | 440104    | 440108   | 440116   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      | 1,327.90  | 1,475.38 | 1,770.34 |          |           |           |           |           |                         |                         |                         |
|                                | DIN 5         |           | 440110   | 440118   |          |           |           |           |           |                         |                         |                         |
|                                | Price \$      |           | 1,475.38 | 1,770.34 |          |           |           |           |           |                         |                         |                         |
|                                | DIN 6         |           | 440112   | 440120   | 440122   | 440126    | 440132    |           |           |                         |                         |                         |
|                                | Price \$      |           | 1,748.86 | 1,770.34 | 2,458.86 | 3,196.87  | 5,508.25  |           |           |                         |                         |                         |
|                                | DIN 8         |           |          |          | 440124   | 440128    | 440134    | 440138    |           |                         |                         |                         |
|                                | Price \$      |           |          |          | 2,458.86 | 3,196.87  | 5,508.25  | 14,458.89 |           |                         |                         |                         |
|                                | DIN 11        |           |          |          |          | 440130    | 440136    | 440140    | 440142    |                         |                         |                         |
|                                | Price \$      |           |          |          |          | 3,295.18  | 5,655.72  | 14,458.89 | 19,671.92 |                         |                         |                         |
| DIN 15                         |               |           |          |          |          |           |           | 440144    |           |                         |                         |                         |
| Price \$                       |               |           |          |          |          |           |           | 20,262.10 |           |                         |                         |                         |

Workholding, Clamping & Fixturing



# Workholding, Clamping & Fixturing

## 3-Jaw Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws — Cont'd



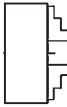
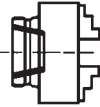
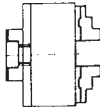
**Features:**

- 3-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate





**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes and milling fixtures



|  | Size of Chuck               | 4"                  | 5"                 | 6"                 | 8"                 | 10"                | 12"                | 16"                | 20"       | 25"       |
|--|-----------------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|-----------|
|  | Hole Size                   | 0.787               | 1.2598             | 1.6535             | 2.1654             | 2.9921             | 4.0551             | 5.3543             | 7.4803    | 9.92"     |
|  | Weight lbs                  | 6.17                | 11                 | 22                 | 39                 | 55                 | 110                | 187                | 320       | 550       |
| <b>3275</b><br>Front Mount<br>      | Code No.                    |                     | 440806             | 440808             | 440813             | 440811             | 440812             | 440809             | 440833    | 440834    |
|  | Price \$                    |                     | 1,218.71           | 1,300.63           | 1,553.11           | 2,104.52           | 3,129.60           | 7,295.09           | 12,344.45 | 19,112.29 |
| <b>3255</b><br>L Mount<br>          | L00<br>Price \$             |                     |                    | 445105<br>1,878.74 | 445115<br>1,979.91 |                    |                    |                    |           |           |
|  | L0<br>Price \$              |                     |                    | 445110<br>1,805.32 | 445120<br>1,989.39 | 445130<br>2,680.92 | 445145<br>4,724.84 |                    |           |           |
|  | L1<br>Price \$              |                     |                    |                    |                    | 445135<br>2,807.09 | 445150<br>3,903.75 | 435460<br>7,910.44 |           |           |
|  | L2<br>Price \$              |                     |                    |                    |                    | 445140<br>3,808.80 | 445155<br>3,899.07 | 435465<br>7,958.65 |           |           |
| <b>3285</b><br>Threaded Mount<br> | Thread 1"-10<br>Price \$    | 440605*<br>1,116.84 | 440615<br>1,920.59 |                    |                    |                    |                    |                    |           |           |
|  | Thread 1-1/2"-8<br>Price \$ | 440610<br>1,439.34  | 440620<br>2,073.44 | 440625<br>2,384.91 | 440635<br>2,450.39 |                    |                    |                    |           |           |
|  | Thread 2-1/4"-8<br>Price \$ |                     |                    | 440630<br>2,384.91 | 440640<br>2,450.39 | 440645<br>3,894.47 |                    |                    |           |           |
|  | Thread 2-3/8"-6<br>Price \$ |                     |                    |                    | 440642<br>2,450.39 |                    | 440650<br>3,076.65 |                    |           |           |
|  | Thread 2-3/4"-8<br>Price \$ |                     |                    |                    |                    |                    | 440655<br>3,076.65 |                    |           |           |

\* 2 sets of solid jaws

| Spare Parts - See Pages: H60-61 |   |                        |   |                           |   |          |                      |   |               |
|---------------------------------|---|------------------------|---|---------------------------|---|----------|----------------------|---|---------------|
| Standard Accessories            |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |  | Soft top jaws |
|                                 | Engineering Data See Pages: H62-66  |                        |   |                           |   |          |                      |   |               |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## 3-Jaw Cast Iron Scroll Chucks — Hard Solid Jaws



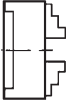

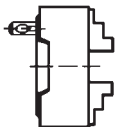
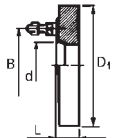

### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate





### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and milling fixtures



| Mounting  | Size of Chuck | 3"     | 4"       | 5"       | 6"       | 8"       | 10"      | 12"      | 16"       | 20"       | 25"       |
|---|---------------|--------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| <b>3204</b><br>Plain Back<br>    | Hole Size     | 0.630  | 0.787    | 1.2598   | 1.6535   | 2.1654   | 2.9921   | 4.0551   | 5.3543    | 7.4803    | 9.92"     |
|   | Weight lbs    | 3.3    | 6.17     | 11       | 22       | 39       | 55       | 110      | 187       | 320       | 550       |
|   | Code No.      | 440504 | 440505   | 440510   | 440515   | 440520   | 440525   | 440530   | 440535    | 440540    | 440545    |
|   | Price \$      | 749.37 | 855.21   | 912.92   | 1,073.36 | 1,345.88 | 1,830.31 | 2,743.16 | 5,475.56  | 9,044.40  | 14,594.79 |
| <b>3214</b><br>A Taper<br>       | A1-5          |        |          |          | 440200   | 440205   | 440215   |          |           |           |           |
|   | Price \$      |        |          |          | 1,457.70 | 1,748.86 | 2,448.87 |          |           |           |           |
|   | A1-6          |        |          |          |          | 440210   | 440220   | 440230   | 440240    |           |           |
|   | Price \$      |        |          |          |          | 1,475.38 | 2,065.60 | 3,049.39 | 5,589.51  |           |           |
|   | A1-8          |        |          |          |          |          | 440225   | 440235   | 440245    | 440255    |           |
|   | Price \$      |        |          |          |          |          | 2,448.87 | 3,614.88 | 5,262.19  | 14,626.09 |           |
| A1-11   |               |        |          |          |          |          |          | 440250   | 440260    | 440265    |           |
| Price \$  |               |        |          |          |          |          |          | 5,589.51 | 13,770.37 | 18,934.54 |           |
| A1-15   |               |        |          |          |          |          |          |          |           | 440270    |           |
| Price \$  |               |        |          |          |          |          |          |          |           | 20,059.55 |           |
| <b>3244</b><br>Camlock<br>     | D1-3          |        | 440902   | 440904   | 440907   | 440916   |          |          |           |           |           |
|   | Price \$      |        | 1,272.30 | 1,180.46 | 1,278.47 | 1,865.72 |          |          |           |           |           |
|   | D1-4          |        |          | 440906   | 440911   | 440921   |          |          |           |           |           |
|   | Price \$      |        |          | 1,180.46 | 1,278.47 | 1,791.43 |          |          |           |           |           |
|   | D1-5          |        |          |          | 440913   | 440926   | 440936   |          |           |           |           |
|   | Price \$      |        |          |          | 1,278.47 | 1,573.70 | 2,565.44 |          |           |           |           |
|   | D1-6          |        |          |          |          | 440931   | 440942   | 440943   | 440631    |           |           |
|   | Price \$      |        |          |          |          | 1,791.43 | 2,163.92 | 3,490.97 | 6,268.65  |           |           |
|   | D1-8          |        |          |          |          |          | 440944   | 440953   | 435636    | 435369    |           |
|   | Price \$      |        |          |          |          |          | 2,163.92 | 3,049.39 | 5,901.88  | 15,619.00 |           |
| D1-11   |               |        |          |          |          |          | 440962   | 435366   | 440371    | 440374    |           |
| Price \$  |               |        |          |          |          |          | 3,049.39 | 6,805.92 | 15,619.00 | 20,114.62 |           |
| D1-15   |               |        |          |          |          |          |          |          |           | 440575    |           |
| Price \$  |               |        |          |          |          |          |          |          |           | 20,718.39 |           |
| <b>3234</b><br>DIN Taper<br>   | DIN 3         |        | 440000   | 440002   | 440006   | 440014   |          |          |           |           |           |
|   | Price \$      |        | 1,132.42 | 1,082.10 | 1,229.54 | 1,748.86 |          |          |           |           |           |
|   | DIN 4         |        |          | 440004   | 440008   | 440016   |          |          |           |           |           |
|   | Price \$      |        |          | 1,082.10 | 1,229.54 | 1,475.38 |          |          |           |           |           |
|   | DIN 5         |        |          |          | 440010   | 440018   |          |          |           |           |           |
|   | Price \$      |        |          |          | 1,229.54 | 1,475.38 |          |          |           |           |           |
|   | DIN 6         |        |          |          | 440012   | 440020   | 440022   | 440026   | 440032    |           |           |
|   | Price \$      |        |          |          | 1,457.70 | 1,475.38 | 2,065.60 | 3,049.39 | 5,262.19  |           |           |
|   | DIN 8         |        |          |          |          |          | 440024   | 440028   | 440034    | 440038    |           |
|   | Price \$      |        |          |          |          |          | 2,065.60 | 3,049.39 | 5,262.19  | 13,770.37 |           |
| DIN 11  |               |        |          |          |          |          | 440030   | 440036   | 440040    | 440042    |           |
| Price \$  |               |        |          |          |          |          | 3,049.39 | 5,262.19 | 13,770.37 | 18,934.54 |           |
| DIN 15  |               |        |          |          |          |          |          |          |           | 440044    |           |
| Price \$  |               |        |          |          |          |          |          |          |           | 19,502.63 |           |
| <b>3274</b><br>Front Mount<br> | Code No.      | 440797 | 440800   | 440743   | 440745   | 440802   | 440804   | 440747   | 440793    | 440822    | 440807    |
|   | Price \$      | 954.84 | 1,062.31 | 1,176.02 | 1,219.64 | 1,383.26 | 1,911.45 | 2,815.37 | 4,130.92  | 11,212.86 | 17,360.54 |

### Spare Parts - See Pages: H60-61

|                      |   |                                  |   |                                 |  |          |                      |   |                          |
|----------------------|---|----------------------------------|---|---------------------------------|--|----------|----------------------|---|--------------------------|
| Standard Accessories |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | Optional Accessories |  | 1 set of soft solid jaws |
|                      | Engineering Data See Pages: H62-66  |                                  |   |                                 |  |          |                      |   |                          |

## 4-Jaw Precision Steel Body Scroll Chucks — 2pc Hard Rev. Jaws



### Features:

- 4-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Suitable for machining square and round workpieces, granting greater flexibility to machining operations



| Mounting   | Chuck Size  | 5"        | 6"       | 8"       | 10"      | 12"       | 16"       | 20"       | 25"       |
|------------|-------------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|
|            |             | Hole Size | 1.2598   | 1.6535   | 2.1653   | 2.9921    | 4.0551    | 5.3543    | 7.48      |
| Plain Back | Weight lbs. | 11        | 22       | 39       | 64       | 110       | 187       | 320       | 551       |
| 3705       | Code No.    | 440222    | 440224   | 440226   | 440228   | 440231    | 440232    | 440234    | 440236    |
| Plain Back | Price \$    | 1,455.96  | 2,725.41 | 3,217.28 | 3,766.71 | 4,898.27  | 9,897.73  | 20,955.13 | 27,229.30 |
| 3745       | D1-3        | 440700    | 440704   |          |          |           |           |           |           |
|            | Price \$    | 2,453.00  | 2,938.40 |          |          |           |           |           |           |
|            | D1-4        | 440702    | 440706   | 440712   |          |           |           |           |           |
|            | Price \$    | 2,065.60  | 2,539.84 | 3,125.62 |          |           |           |           |           |
|            | D1-5        |           | 440708   | 440714   |          |           |           |           |           |
|            | Price \$    |           | 2,539.84 | 3,125.62 |          |           |           |           |           |
|            | D1-6        |           |          | 440716   | 440718   | 440724    |           |           |           |
|            | Price \$    |           |          | 3,125.62 | 4,130.92 | 6,436.40  |           |           |           |
|            | D1-8        |           |          |          | 440722   | 440726    | 440728    | 440734    |           |
|            | Price \$    |           |          |          | 4,130.92 | 5,428.51  | 9,983.28  | 19,327.77 |           |
| D1-11      |             |           |          |          |          | 440732    | 440736    |           |           |
| Price \$   |             |           |          |          |          | 9,983.59  | 18,196.85 |           |           |
| D1-15      |             |           |          |          |          |           |           | 440741    |           |
| Price \$   |             |           |          |          |          |           |           | 28,012.93 |           |
| 3715       | A1-5        |           | 440264   | 440266   | 440271   |           |           |           |           |
|            | Price \$    |           | 2,856.31 | 2,856.31 | 4,664.29 |           |           |           |           |
|            | A1-6        |           |          |          | 440272   | 440276    | 440281    |           |           |
|            | Price \$    |           |          |          | 4,664.29 | 6,718.68  | 10,405.43 |           |           |
|            | A1-8        |           |          |          | 440274   | 440278    | 440282    |           |           |
| Price \$   |             |           |          | 4,664.29 | 6,718.68 | 10,405.43 |           |           |           |
| A1-11      |             |           |          |          |          | 440284    |           | 440286    |           |
| Price \$   |             |           |          |          |          | 10,405.43 |           | 23,543.15 |           |
| 3735       | DIN 3       | 440400    |          |          |          |           |           |           |           |
|            | Price \$    | 1,947.81  |          |          |          |           |           |           |           |
|            | DIN 4       | 440402    | 440404   | 440408   |          |           |           |           |           |
|            | Price \$    | 1,947.81  | 2,237.83 | 2,772.67 |          |           |           |           |           |
|            | DIN 5       |           | 440406   |          |          |           |           |           |           |
|            | Price \$    |           | 2,237.83 |          |          |           |           |           |           |
|            | DIN 6       |           |          | 440410   | 440412   | 440416    |           |           |           |
|            | Price \$    |           |          | 2,772.67 | 3,835.93 | 5,312.20  |           |           |           |
|            | DIN 8       |           |          |          | 440414   | 440418    | 440420    | 440424    |           |
|            | Price \$    |           |          |          | 3,835.93 | 5,312.20  | 8,918.51  | 18,491.76 |           |
| DIN 11     |             |           |          |          |          | 440422    | 440426    | 440428    |           |
| Price \$   |             |           |          |          |          | 8,918.51  | 17,409.69 | 24,934.33 |           |
| DIN 15     |             |           |          |          |          |           |           | 440430    |           |
| Price \$   |             |           |          |          |          |           |           | 25,682.64 |           |
| 3775       | Code No.    | 441120    | 441122   | 441124   | 441126   | 441128    | 441130    |           |           |
|            | Price \$    | 1,893.37  | 2,117.12 | 2,571.36 | 3,491.85 | 4,918.04  | 8,753.97  |           |           |

| Spare Parts - See Pages: H60-61    |  |                        |  |                           |                      |          |
|------------------------------------|--|------------------------|--|---------------------------|----------------------|----------|
| Standard Accessories               |  | 1 set of hard top jaws |  | 1 set of hard master jaws |                      | 1 wrench |
|                                    |  |                        |  |                           | Optional Accessories |          |
| Engineering Data See Pages: H62-66 |  |                        |  |                           |                      |          |

## 4-Jaw Precision Steel Body Scroll Chucks — Hard Solid Jaws



### Features:

- 4-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Suitable for machining square and round workpieces, granting greater flexibility to machining operations



| Mounting                                     | Chuck Size  | 4"        | 5"       | 6"       | 8"       | 10"      | 12"      | 16"       | 20"       | 25"       |
|--|-------------|-----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
|  |             | Hole Size | 0.787    | 1.2598   | 1.6535   | 2.1653   | 2.9921   | 4.0551    | 5.3543    | 7.48      |
| Plain Back                                   | Weight lbs. | 6.16      | 11       | 22       | 39       | 64       | 110      | 187       | 320       | 551       |
|  | Code No.    | 440201    | 440202   | 440204   | 440206   | 440208   | 440209   | 440212    | 440214    | 440216    |
|  | Price \$    | 1,574.37  | 1,229.54 | 1,411.51 | 1,778.60 | 2,262.23 | 3,393.49 | 5,852.66  | 15,836.24 | 22,082.21 |
| <b>3744</b><br>Camlock<br>                   | D1-3        |           | 440600   | 440604   |          |          |          |           |           |           |
|  | Price \$    |           | 2,042.03 | 2,448.87 |          |          |          |           |           |           |
|  | D1-4        |           | 440602   | 440606   | 440612   |          |          |           |           |           |
|  | Price \$    |           | 1,721.48 | 2,117.12 | 2,621.36 |          |          |           |           |           |
|  | D1-5        |           |          | 440608   | 440614   |          |          |           |           |           |
|  | Price \$    |           |          | 2,117.12 | 2,621.36 |          |          |           |           |           |
|  | D1-6        |           |          |          | 440616   | 440618   | 440624   |           |           |           |
|  | Price \$    |           |          |          | 2,621.36 | 3,246.02 | 5,364.03 |           |           |           |
|  | D1-8        |           |          |          |          | 440622   | 440626   | 440628    | 440634    |           |
|  | Price \$    |           |          |          |          | 3,246.02 | 4,524.50 | 9,048.97  | 17,551.53 |           |
| D1-11  |             |           |          |          |          |          | 440632   | 440636    | 440638    |           |
| Price \$                                     |             |           |          |          |          |          | 9,048.97 | 16,524.53 | 25,918.13 |           |
| D1-15  |             |           |          |          |          |          |          |           | 440641    |           |
| Price \$                                     |             |           |          |          |          |          |          |           | 26,695.60 |           |
| <b>3714</b><br>A Taper<br>                   | A1-5        |           |          | 440241   | 440242   | 440246   |          |           |           |           |
|  | Price \$    |           |          | 2,380.28 | 2,857.16 | 3,906.56 |          |           |           |           |
|  | A1-6        |           |          |          |          | 440248   | 440252   | 440256    |           |           |
|  | Price \$    |           |          |          |          | 3,906.56 | 5,598.60 | 8,671.25  |           |           |
|  | A1-8        |           |          |          |          | 440251   | 440254   | 440258    |           |           |
| Price \$                                     |             |           |          |          | 3,906.56 | 5,598.60 | 8,671.25 |           |           |           |
| A1-11  |             |           |          |          |          |          | 440261   |           | 440262    |           |
| Price \$                                     |             |           |          |          |          |          | 8,671.02 |           | 21,402.78 |           |
| <b>3734</b><br>DIN Taper<br>                 | DIN 3       |           | 440300   |          |          |          |          |           |           |           |
|  | Price \$    |           | 1,623.17 |          |          |          |          |           |           |           |
|  | DIN 4       |           | 440302   | 440304   | 440308   |          |          |           |           |           |
|  | Price \$    |           | 1,623.17 | 1,865.42 | 2,319.02 |          |          |           |           |           |
|  | DIN 5       |           |          | 440306   |          |          |          |           |           |           |
|  | Price \$    |           |          | 1,865.42 |          |          |          |           |           |           |
|  | DIN 6       |           |          |          | 440310   | 440312   | 440316   |           |           |           |
|  | Price \$    |           |          |          | 2,319.02 | 3,196.87 | 4,426.18 |           |           |           |
|  | DIN 8       |           |          |          |          | 440314   | 440318   | 440320    | 440324    |           |
|  | Price \$    |           |          |          |          | 3,196.87 | 4,426.18 | 8,114.90  | 16,820.32 |           |
| DIN 11                                       |             |           |          |          |          |          | 440322   | 440326    | 440328    |           |
| Price \$                                     |             |           |          |          |          |          | 8,114.90 | 15,836.24 | 23,754.27 |           |
| DIN 15                                       |             |           |          |          |          |          |          |           | 440330    |           |
| Price \$                                     |             |           |          |          |          |          |          |           | 24,466.93 |           |
| <b>3774</b><br>Front Mount<br>Plain Back<br> | Code No.    |           | 441020   | 441022   | 441024   | 441026   | 441028   | 441030    |           |           |
|  | Price \$    |           | 1,571.02 | 1,764.78 | 2,168.04 | 2,950.76 | 4,180.65 | 7,868.80  |           |           |

| Spare Parts - See Pages: H60-61 |                                 |                                  |  |                                 |  |          |                      |  |                          |
|---------------------------------|---------------------------------|----------------------------------|--|---------------------------------|--|----------|----------------------|--|--------------------------|
| Standard Accessories            |                                 | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | Optional Accessories |  | 1 set of soft solid jaws |
|                                 | Spare Parts - See Pages: H62-66 |                                  |  |                                 |  |          |                      |  |                          |

## 4-Jaw Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws



### Features:

- 4-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Suitable for machining square and round workpieces, granting greater flexibility to machining operations



| Mounting                          | Chuck Size  | 5"        | 6"       | 8"       | 10"      | 12"      | 16"       | 20"       | 25"       |
|-----------------------------------|-------------|-----------|----------|----------|----------|----------|-----------|-----------|-----------|
|                                   |             | Hole Size | 1.2598   | 1.6535   | 2.1653   | 2.9921   | 4.0551    | 5.3543    | 7.48      |
| Plain Back                        | Weight lbs. | 11        | 22       | 39       | 64       | 110      | 187       | 320       | 551       |
|                                   |             | Code No.  | 445882   | 445884   | 445886   | 445888   | 445890    | 445892    | 445894    |
| Plain Back                        | Price \$    | 1,676.10  | 1,733.80 | 1,917.68 | 2,346.10 | 3,385.12 | 7,136.29  | 11,532.17 | 16,412.72 |
|                                   |             |           |          |          |          |          |           |           |           |
| 3645<br>Camlock                   | D1-3        | 441100    | 441104   | 441110   |          |          |           |           |           |
|                                   | Price \$    | 1,828.91  | 1,982.30 | 2,448.87 |          |          |           |           |           |
|                                   | D1-4        | 441102    | 441106   | 441112   |          |          |           |           |           |
|                                   | Price \$    | 1,654.99  | 1,814.78 | 2,241.96 |          |          |           |           |           |
|                                   | D1-5        |           | 441108   | 441114   |          |          |           |           |           |
|                                   | Price \$    |           | 1,814.78 | 2,448.87 |          |          |           |           |           |
| 3615<br>A Taper                   | A1-5        |           |          |          | 440152   |          |           |           |           |
|                                   | Price \$    |           |          |          | 3,265.13 |          |           |           |           |
|                                   | A1-6        |           |          | 440147   | 440157   | 440167   | 440177    |           |           |
|                                   | Price \$    |           |          | 2,135.06 | 3,265.13 | 4,606.33 | 6,843.22  |           |           |
|                                   | A1-8        |           |          |          | 440162   | 440172   | 440182    | 440192    |           |
|                                   | Price \$    |           |          |          | 3,265.13 | 4,606.33 | 6,843.22  | 17,708.43 |           |
| 3635<br>DIN Taper                 | A1-11       |           |          |          |          |          | 440187    | 440197    |           |
|                                   | Price \$    |           |          |          |          |          | 6,843.22  | 17,708.43 |           |
|                                   | DIN 3       | 440432    | 440436   | 440444   |          |          |           |           |           |
|                                   | Price \$    | 1,654.06  | 1,865.72 | 2,332.01 |          |          |           |           |           |
|                                   | DIN 4       | 440434    | 440438   | 440446   |          |          |           |           |           |
|                                   | Price \$    | 1,654.06  | 1,707.97 | 2,332.01 |          |          |           |           |           |
| 3675<br>Front Mount<br>Plain Back | DIN 5       | 440440    | 440448   |          |          |          |           |           |           |
|                                   | Price \$    |           | 1,707.97 | 2,332.01 |          |          |           |           |           |
|                                   | DIN 6       | 440442    | 440450   | 440452   | 440456   | 440460   |           |           |           |
|                                   | Price \$    | 1,865.72  | 2,332.01 | 2,655.80 | 3,835.93 | 6,790.54 |           |           |           |
|                                   | DIN 8       |           |          | 440454   | 440458   | 440462   | 440466    |           |           |
|                                   | Price \$    |           |          | 2,655.80 | 3,835.93 | 6,790.54 | 17,708.43 |           |           |
| Front Mount<br>Plain Back         | DIN 11      |           |          |          |          | 440464   | 440468    |           |           |
|                                   | Price \$    |           |          |          |          | 6,790.54 | 17,708.43 |           |           |
| Front Mount<br>Plain Back         | Code No.    | 441132    | 441134   | 441136   | 441138   | 441140   | 441142    |           |           |
|                                   | Price \$    | 2,043.71  | 2,500.23 | 2,568.70 | 2,878.81 | 4,078.20 | 7,324.69  |           |           |

| Spare Parts - See Pages: H60-61    |  |                        |  |                           |  |          |                      |  |               |
|------------------------------------|--|------------------------|--|---------------------------|--|----------|----------------------|--|---------------|
| Standard Accessories               |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |  | Soft top jaws |
| Engineering Data See Pages: H62-66 |  |                        |  |                           |  |          |                      |  |               |

## 4-Jaw Cast Iron Body Scroll Chucks — Hard Solid Jaws



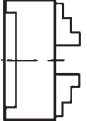
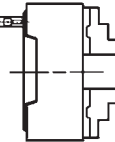
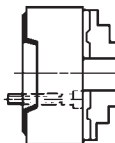
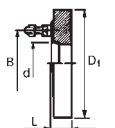
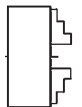
### Features:

- 4-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate





### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Suitable for machining square and round workpieces, granting greater flexibility to machining operations



| Mounting<br><b>3604</b><br>Plain Back    |    | Chuck Size      | 5"              | 6"              | 8"              | 10"             | 12"              | 16"              | 20"              |
|--|---|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
|  |   | Hole Size       | 1.2598          | 1.6535          | 2.1653          | 2.9921          | 4.0551           | 5.3543           | 7.48             |
| Weight lbs.                              |   | 11              | 22              | 39              | 64              | 110             | 187              | 320              |                  |
| Code No.                                 |   | 445850          | 445855          | 445860          | 445865          | 445870          | 445875           | 445880           |                  |
| Price \$                                 |   | <b>1,221.33</b> | <b>1,341.28</b> | <b>1,562.46</b> | <b>2,081.15</b> | <b>3,124.93</b> | <b>6,668.92</b>  | <b>11,661.53</b> |                  |
| <b>3644</b><br>Camlock                   |    | D1-3            | 441000          | 441004          | 441010          |                 |                  |                  |                  |
|  |   | Price \$        | <b>1,551.07</b> | <b>1,749.18</b> | <b>1,982.30</b> |                 |                  |                  |                  |
|  |   | D1-4            | 441002          | 441006          | 441012          |                 |                  |                  |                  |
|  |   | Price \$        | <b>1,387.69</b> | <b>1,494.49</b> | <b>1,814.78</b> |                 |                  |                  |                  |
|  |   | D1-5            |                 | 441008          | 441014          |                 |                  |                  |                  |
| Price \$                                 |   | <b>1,632.28</b> | <b>1,982.30</b> |                 |                 |                 |                  |                  |                  |
| D1-6                                     |   |                 | 441016          |                 |                 |                 |                  |                  |                  |
| Price \$                                 |   |                 | <b>1,982.30</b> |                 |                 |                 |                  |                  |                  |
| <b>3614</b><br>A Taper                   |  | A1-5            |                 |                 |                 | 440052          |                  |                  |                  |
|  |   | Price \$        |                 |                 |                 | <b>2,681.98</b> |                  |                  |                  |
|  |   | A1-6            |                 |                 | 440047          | 440057          | 440067           | 440077           |                  |
|  |   | Price \$        |                 |                 | <b>1,979.32</b> | <b>2,681.98</b> | <b>3,848.32</b>  | <b>6,216.20</b>  |                  |
|  |   | A1-8            |                 |                 |                 | 440062          | 440072           | 440082           | 440092           |
| Price \$                                 |   |                 |                 | <b>2,681.98</b> | <b>3,848.32</b> | <b>6,216.20</b> | <b>16,088.86</b> |                  |                  |
| A1-11                                    |   |                 |                 |                 |                 | 440087          | 440097           |                  |                  |
| Price \$                                 |   |                 |                 |                 |                 | <b>6,216.20</b> | <b>16,088.86</b> |                  |                  |
| <b>3634</b><br>DIN Taper                 |  | DIN 3           | 440332          | 440336          | 440344          |                 |                  |                  |                  |
|  |   | Price \$        | <b>1,487.47</b> | <b>1,574.31</b> | <b>1,865.72</b> |                 |                  |                  |                  |
|  |   | DIN 4           | 440334          | 440338          | 440346          |                 |                  |                  |                  |
|  |   | Price \$        | <b>1,487.47</b> | <b>1,441.24</b> | <b>1,865.72</b> |                 |                  |                  |                  |
|  |   | DIN 5           |                 | 440340          | 440348          |                 |                  |                  |                  |
|  |   | Price \$        |                 | <b>1,441.24</b> | <b>1,864.56</b> |                 |                  |                  |                  |
|  |   | DIN 6           |                 | 440342          | 440350          | 440352          | 440356           | 440360           |                  |
|  |   | Price \$        |                 | <b>1,574.31</b> | <b>1,979.32</b> | <b>2,311.70</b> | <b>3,344.34</b>  | <b>6,686.06</b>  |                  |
|  |   | DIN 8           |                 |                 |                 | 440354          | 440358           | 440362           | 440366           |
|  |   | Price \$        |                 |                 |                 | <b>2,311.70</b> | <b>3,344.34</b>  | <b>6,686.06</b>  | <b>16,715.83</b> |
| DIN 11                                   |   |                 |                 |                 |                 | 440364          | 440368           |                  |                  |
| Price \$                                 |   |                 |                 |                 |                 | <b>6,686.06</b> | <b>16,715.83</b> |                  |                  |
| <b>3674</b><br>Front Mount<br>Plain Back |  | Code No.        | 441032          | 441034          | 441036          | 441038          | 441040           | 441042           |                  |
|  |   | Price \$        | <b>1,239.59</b> | <b>1,337.06</b> | <b>1,494.49</b> | <b>1,819.80</b> | <b>2,803.33</b>  | <b>4,991.60</b>  |                  |

### Spare Parts - See Pages: H60-61

|                      |   |                                  |   |                                 |  |          |                      |   |                          |
|----------------------|---|----------------------------------|---|---------------------------------|--|----------|----------------------|---|--------------------------|
| Standard Accessories |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | Optional Accessories |  | 1 set of soft solid jaws |
|                      | Engineering Data See Pages: H62-66  |                                  |   |                                 |  |          |                      |   |                          |

## 3-Jaw Steel Body Scroll Chucks With Threaded Mounting



**Features:**

- Special compact design
- Very small turning diameter
- Hard reversible jaws
- Maximum 4000rpm

**Application:**

- Especially designed for household and non-professional use
- Suitable for lathes with a threaded spindle
- Can be used with both metal and wood



|  |  |                       |        |        |
|--|--|-----------------------|--------|--------|
| <b>Mounting</b><br><b>3286</b><br>Threaded |  | <b>Chuck Size</b>     | 2"     | 2.362" |
|  |  | <b>Threaded Mount</b> | M12x1  | M14x1  |
|  |  | <b>Weight lbs.</b>    | 1.10   | 1.50   |
|  |  | <b>Code No.</b>       | 468980 | 468985 |
|  |  | <b>Price \$</b>       | 886.30 | 678.13 |

## 2-Jaw Cast Iron Body Scroll Chucks — 3105



**Features:**

- 2-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Chucks are equipped with soft, steel top jaws, which can be individually shaped by the user and clamp irregularly-shaped workpieces
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes



|                            |          |          |          |          |          |
|----------------------------|----------|----------|----------|----------|----------|
| <b>Chuck Size</b>          | 6"       | 8"       | 10"      | 12"      | 16"      |
| <b>Hole</b>                | 1.6535   | 2.1654   | 2.9921   | 4.0551   | 5.3453   |
| <b>Weight lbs.</b>         | 20.3     | 34.5     | 56.7     | 93.9     | 172.8    |
| <b>Plain Back Code No.</b> | 435500   | 435505   | 435510   | 435515   | 435520   |
| <b>Price \$</b>            | 1,051.48 | 1,285.20 | 1,715.04 | 2,769.78 | 9,469.64 |

| Spare Parts - See Pages: H60-61 |                                    |                   |  |                           |  |          |
|---------------------------------|------------------------------------|-------------------|--|---------------------------|--|----------|
| <b>Standard Accessories</b>     |                                    | 1 set of top jaws |  | 1 set of hard master jaws |  | 1 wrench |
|                                 | Engineering Data See Pages: H62-66 |                   |  |                           |  |          |

## 6-Jaw Precision Steel Body Scroll Chucks — 2pc Hard Rev. Jaws



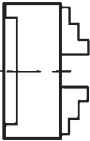
### Features:

- 6-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate



### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Gripping force is equally distributed over 6-Jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



|   |                                    |                    |                    |                    |                    |                     |                     |
|---|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting 3807</b><br>Plain Back<br> | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|   | <b>Hole Size</b>                   | 2.1653             | 2.9921             | 4.0551             | 5.3543             | 7.48                | 9.92                |
|   | <b>Weight lbs.</b>                 | 39                 | 64                 | 110                | 187                | 320                 | 551                 |
|   | <b>Code No.</b><br><b>Price \$</b> | 441146<br>3,317.59 | 441148<br>4,028.43 | 441150<br>5,402.87 | 441152<br>9,241.76 | 441154<br>19,671.92 | 441156<br>33,006.30 |

### Spare Parts - See Pages: H60-61

|  |   |                           |          |   |               |
|--|---|---------------------------|----------|---|---------------|
| <b>Standard Accessories</b><br> | 1 set of hard top jaws                    | 1 set of hard master jaws | 1 wrench | <b>Optional Accessories</b><br> | Soft top jaws |
|  | <b>Engineering Data See Pages: H62-66</b> |                           |          |   |               |

## 6-Jaw Precision Steel Body Scroll Chucks — Hard Solid Jaws



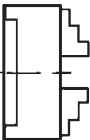
### Features:

- 6-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

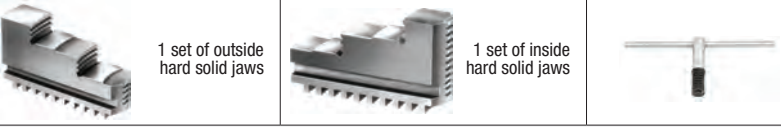

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Gripping force is equally distributed over 6-Jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



|   |                                    |                    |                    |                    |                    |                     |                     |
|---|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting 3806</b><br>Plain Back<br> | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|   | <b>Hole Size</b>                   | 2.1653             | 2.9921             | 4.0551             | 5.3543             | 7.48                | 9.92                |
|   | <b>Weight lbs.</b>                 | 39                 | 64                 | 110                | 187                | 320                 | 551                 |
|   | <b>Code No.</b><br><b>Price \$</b> | 440046<br>2,884.85 | 440048<br>3,503.01 | 440051<br>4,698.15 | 440053<br>8,036.31 | 440054<br>17,105.90 | 440056<br>28,701.15 |

### Spare Parts - See Pages: H60-61

|   |   |                                 |          |  |                          |
|---|---|---------------------------------|----------|--|--------------------------|
| <b>Standard Accessories</b><br> | 1 set of outside hard solid jaws          | 1 set of inside hard solid jaws | 1 wrench | <b>Optional Accessories</b><br> | 1 set of soft solid jaws |
|   | <b>Engineering Data See Pages: H62-66</b> |                                 |          |  |                          |



## 6-Jaw Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws



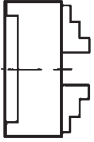
**Features:**





- 6-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Gripping force is equally distributed over 6-Jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



|   |                                    |                    |                    |                    |                    |                     |                     |
|---|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting 3805</b><br>Plain Back<br> | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|   | <b>Hole Size</b>                   | 2.1653             | 2.9921             | 4.0551             | 5.3543             | 7.48                | 9.92                |
|   | <b>Weight lbs.</b>                 | 39                 | 64                 | 110                | 187                | 320                 | 551                 |
|   | <b>Code No.</b><br><b>Price \$</b> | 441160<br>2,369.69 | 441162<br>2,877.47 | 441164<br>3,859.21 | 441166<br>7,109.07 | 441168<br>15,132.08 | 441170<br>25,389.48 |

| Spare Parts - See Pages: H60-61   |                                    |  |                           |   |          |   |               |
|---|------------------------------------|--|---------------------------|---|----------|---|---------------|
| <b>Standard Accessories</b><br> | 1 set of hard top jaws             |  | 1 set of hard master jaws |  | 1 wrench | <b>Optional Accessories</b><br> | Soft top jaws |
|   | Engineering Data See Pages: H62-66 |  |                           |   |          |   |               |

## 6-Jaw Cast Iron Body Scroll Chucks — Hard Solid Jaws



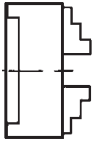
**Features:**





- 6-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes and grinders
- Gripping force is equally distributed over 6-Jaws, allowing the chuck to machine thin-walled workpieces and clamp without deformation



|   |                                    |                    |                    |                    |                    |                     |                     |
|---|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting 3804</b><br>Plain Back<br> | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|   | <b>Hole Size</b>                   | 2.1653             | 2.9921             | 4.0551             | 5.3543             | 7.48                | 9.92                |
|   | <b>Weight lbs.</b>                 | 39                 | 64                 | 110                | 187                | 320                 | 551                 |
|   | <b>Code No.</b><br><b>Price \$</b> | 441060<br>2,060.61 | 441062<br>2,502.15 | 441064<br>3,355.81 | 441066<br>6,181.80 | 441068<br>13,158.37 | 441070<br>22,077.81 |

| Spare Parts - See Pages: H60-61  |                                    |   |                                 |   |          |  |                          |
|--|------------------------------------|---|---------------------------------|---|----------|--|--------------------------|
| <b>Standard Accessories</b><br> | 1 set of outside hard solid jaws   |  | 1 set of inside hard solid jaws |  | 1 wrench | <b>Optional Accessories</b><br> | 1 set of soft solid jaws |
|  | Engineering Data See Pages: H62-66 |   |                                 |   |          |  |                          |



### 3-Jaw Scroll Chucks For Sharpening Drills

**Application:**

- Lever scroll chuck is specially designed for grinding twist drills and other cutting tools



|  |  |                                    |                    |                    |                    |                    |                    |
|--|--|------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Mounting</b><br><b>3266</b><br>Plain Back |  | <b>Chuck Size</b>                  | 3"                 | 4"                 | 5"                 | 6"                 | 8"                 |
|  |  | <b>Hole Size</b>                   | 0.945              | 1.26               | 1.50               | 2.05               | 2.52               |
|  |  | <b>Weight lbs.</b>                 | 2.50               | 7                  | 9                  | 16                 | 30                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 441200<br>1,679.38 | 441202<br>1,751.02 | 441204<br>1,961.16 | 441206<br>3,344.34 | 441208<br>4,032.57 |

| Spare Parts - See Pages: H60-61 |                                    |                                  |  |                                 |  |                   |
|---------------------------------|------------------------------------|----------------------------------|--|---------------------------------|--|-------------------|
| <b>Standard Accessories</b>     |                                    | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 operating lever |
|                                 | Engineering Data See Pages: H62-66 |                                  |  |                                 |  |                   |

### 6-Jaw Scroll Chucks For Sharpening Drills

**Application:**

- Lever scroll chuck is specially designed for grinding twist drills and other cutting tools



|  |  |                                    |                    |                    |                    |                    |
|--|--|------------------------------------|--------------------|--------------------|--------------------|--------------------|
| <b>Mounting</b><br><b>3866</b><br>Plain Back |  | <b>Chuck Size</b>                  | 3"                 | 4"                 | 5"                 | 6"                 |
|  |  | <b>Hole Size</b>                   | 0.945              | 1.26               | 1.50               | 2.05               |
|  |  | <b>Weight lbs.</b>                 | 4.40               | 6.16               | 8.80               | 16                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 441210<br>1,825.73 | 441212<br>2,264.75 | 441214<br>2,635.14 | 441216<br>5,178.49 |

*Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.*

*Images are representational only and may not reflect actual product.*

# Workholding, Clamping & Fixturing

## 6-Jaw Scroll Chucks For Sharpening Drills — Front Mounted



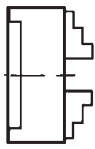
**Features:**

- Plain Back (Front Mounting)

**Application:**

- The wrench operated scroll chuck is specially designed for grinding twist drills and other cutting tools



|   |                                    |                    |                    |                    |
|---|------------------------------------|--------------------|--------------------|--------------------|
| <b>Mounting</b><br><b>3867</b><br>Front Mount  | <b>Chuck Size</b>                  | 3.35"              | 4.33"              | 6.30"              |
|   | <b>Hole Size</b>                   | 1.000              | 1.280              | 2.00               |
|   | <b>Weight lbs.</b>                 | 4.18               | 7.70               | 9.90               |
|   | <b>Code No.</b><br><b>Price \$</b> | 441218<br>2,213.38 | 441220<br>2,458.86 | 441222<br>2,950.76 |

## 5C Collet Chucks



**Features:**

- The simple wrench operated scroll provides uniform, distortion free clamping of workpieces and low collet exchange times

**Application:**

- The type 3911 collet chuck is designed for use with 5C collets and can be used for turning, facing, boring, grinding and milling operations
- The type 3960 collet chuck allows for fine adjustment to the required concentricity by means of 4 radially arranged adjusting screws

**Options:**

- Camlock and threaded mounts available on request



|                                |                                    |                    |
|--------------------------------|------------------------------------|--------------------|
| <b>3911</b>                    | <b>Chuck Size</b>                  | 5"                 |
|                                | <b>Capacity</b>                    | 1/16-1-1/8         |
|                                | <b>Weight lbs.</b>                 | 10                 |
|                                | <b>Code No.</b><br><b>Price \$</b> | 425405<br>1,117.56 |
| <b>3960</b><br>Fine Adjustment | <b>Chuck Size</b>                  | 5"                 |
|                                | <b>Capacity</b>                    | 1/16-1-1/8         |
|                                | <b>Weight lbs.</b>                 | 12                 |
|                                | <b>Code No.</b><br><b>Price \$</b> | 440409<br>1,285.71 |

## Adapters For 5C Collet Chucks



| Chuck Size (in.) | Spindle | Code No. | Price \$ |
|------------------|---------|----------|----------|
| 5                | A6      | 425410   | 915.18   |
| 5                | A8      | 425415   | 843.59   |



### 3-Jaw Live Morse Taper Scroll Chucks — 2pc Hard Rev. Jaws


**Features:**





- Able to work in horizontal and vertical positions
- Hardened and ground MT shank
- Sealed ball bearings, lubrication through oiler
- Rotating spindle can also be used with 4-Jaw Front Mount Chucks

**Application:**

- Designed for simultaneously supporting and gripping long objects (tubes, shafts etc.) during turning, milling and grinding operations
- Can replace typical center in machine tailstock



|   |   |                    |
|---|---|--------------------|
| <b>3275</b><br>Front Mount<br>Plain Back<br>2pc Jaws<br> | <b>Chuck Size</b>                                 | 6"                 |
|   | <b>Morse Taper</b>                                | 5                  |
|   | <b>Max RPM</b>                                    | 3000               |
|   | <b>Weight lbs.</b>                                | 32                 |
|   | <b>Code No. (chuck only)</b><br><b>Price \$</b>   | 440808<br>1,300.63 |
| <b>9157</b><br>Rotating Spindle   | <b>Code No. (spindle only)</b><br><b>Price \$</b> | 436018<br>828.41   |

| Spare Parts - See Pages: H60-61    |   |                        |   |                           |  |   |
|------------------------------------|---|------------------------|---|---------------------------|--|---|
| Standard Accessories               |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench  |
|                                    |   |                        |   |                           | Optional Accessories   |  Soft top jaws |
| Engineering Data See Pages: H62-66 |   |                        |   |                           |  |   |

### 3-Jaw Live Morse Taper Scroll Chucks — Hard Solid Jaws




**Features:**





- Able to work in horizontal and vertical positions
- Hardened and ground MT shank
- Sealed ball bearings, lubrication through oiler
- Rotating spindle can also be used with 4-Jaw Front Mount Chucks (only 5" & 6")

**Application:**

- Designed for simultaneously supporting and gripping long objects (tubes, shafts etc.) during turning, milling and grinding operations
- Can replace typical centre in machine tailstock



|   |   |                  |                    |                    |                    |
|---|---|------------------|--------------------|--------------------|--------------------|
| <b>3274</b><br>Front Mount<br>Plain Back<br>Solid Jaws<br> | <b>Chuck Size</b>                                 | 3"               | 4"                 | 5"                 | 6"                 |
|   | <b>Morse Taper</b>                                | 2                | 3                  | 4                  | 5                  |
|   | <b>Max RPM</b>                                    | 4000             | 3500               | 3200               | 3000               |
|   | <b>Weight lbs.</b>                                | 8                | 12                 | 18                 | 32                 |
|   | <b>Code No. (chuck only)</b><br><b>Price \$</b>   | 440797<br>954.84 | 440800<br>1,062.31 | 440743<br>1,176.02 | 440745<br>1,219.64 |
| <b>9157</b><br>Rotating Spindle   | <b>Code No. (spindle only)</b><br><b>Price \$</b> | 436012<br>338.01 | 436014<br>1,602.44 | 436016<br>742.02   | 436018<br>828.41   |

| Spare Parts - See Pages: H60-61    |   |                                  |   |                                 |  |  |
|------------------------------------|---|----------------------------------|---|---------------------------------|--|--|
| Standard Accessories               |  | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench   |
|                                    |   |                                  |   |                                 | Optional Accessories   |  1 set of soft solid jaws |
| Engineering Data See Pages: H62-66 |   |                                  |   |                                 |  |  |

Workholding, Clamping & Fixturing

## High Precision 3-Jaw Steel Body Scroll Chucks — 2pc Hard Rev. Jaws

Twice the Centering Accuracy Over Regular Steel Body Chucks — See Page: H64



**Features:**

- 3-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes



| Mounting             | Chuck Size                          | 5"                 | 6"                 | 8"                 | 10"                | 12"                | 16"                 | 20"                 | 25"                 |  |
|----------------------|-------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--|
| 3505-I<br>Plain Back | Hole Size                           | 1.2598             | 1.6535             | 2.1653             | 2.9921             | 4.0551             | 5.3543              | 7.48                | 9.92                |  |
|                      | Weight lbs.                         | 11                 | 22                 | 39                 | 64                 | 110                | 187                 | 320                 | 550                 |  |
|                      | Code No.<br>Price \$                | 441404<br>1,512.14 | 441406<br>1,843.94 | 441408<br>2,213.07 | 441410<br>3,098.54 | 441412<br>4,426.41 | 441414<br>7,377.22  | 441416<br>14,545.32 | 441418<br>24,150.15 |  |
| 3545-I<br>Camlock    | D1-3<br>Price \$                    | 441602<br>2,335.83 | 441606<br>3,206.86 |                    |                    |                    |                     |                     |                     |  |
|                      | D1-4<br>Price \$                    | 441604<br>2,813.86 | 441608<br>2,705.01 | 441612<br>3,790.05 |                    |                    |                     |                     |                     |  |
|                      | D1-5<br>Price \$                    |                    | 441610<br>2,705.01 | 441614<br>3,196.87 |                    |                    |                     |                     |                     |  |
|                      | D1-6<br>Price \$                    |                    |                    | 441616<br>3,196.87 | 441618<br>4,426.41 | 441622<br>3,663.98 |                     |                     |                     |  |
|                      | D1-8<br>Price \$                    |                    |                    |                    | 441620<br>4,426.41 | 441624<br>6,147.63 | 441628<br>10,389.53 | 441632<br>16,998.61 | 441636<br>26,528.66 |  |
|                      | D1-11<br>Price \$                   |                    |                    |                    |                    | 441626<br>6,147.63 | 441630<br>10,389.53 | 441634<br>16,998.61 | 441638<br>23,025.14 |  |
|                      | D1-15<br>Price \$                   |                    |                    |                    |                    |                    |                     | 441640<br>16,998.61 | 441644<br>26,528.66 |  |
|                      | A2-5<br>Price \$                    |                    | 441420<br>2,458.86 | 441422<br>2,581.89 | 441426<br>4,303.37 |                    |                     |                     |                     |  |
|                      | A2-6<br>Price \$                    |                    |                    | 441424<br>2,581.89 | 441428<br>4,303.37 | 441432<br>5,963.65 |                     |                     |                     |  |
| 3515-I<br>A Taper    | A2-8<br>Price \$                    |                    |                    |                    | 441430<br>4,303.37 | 441434<br>7,069.87 | 441436<br>10,773.95 | 441440<br>17,285.21 |                     |  |
|                      | A2-11<br>Price \$                   |                    |                    |                    |                    |                    | 441438<br>10,773.95 | 441442<br>17,285.21 | 441444<br>21,025.13 |  |
|                      | A2-15<br>Price \$                   |                    |                    |                    |                    |                    |                     |                     | 441446<br>21,025.13 |  |
|                      | DIN 3<br>Price \$                   | 441450<br>2,372.01 |                    |                    |                    |                    |                     |                     |                     |  |
|                      | DIN 4<br>Price \$                   | 441452<br>1,967.32 | 441454<br>2,090.05 |                    |                    |                    |                     |                     |                     |  |
|                      | DIN 5<br>Price \$                   |                    | 441456<br>2,090.05 | 441458<br>2,335.83 |                    |                    |                     |                     |                     |  |
| 3535-I<br>DIN Taper  | DIN 6<br>Price \$                   |                    |                    | 441460<br>2,335.83 | 441462<br>3,381.14 | 441466<br>4,671.93 |                     |                     |                     |  |
|                      | DIN 8<br>Price \$                   |                    |                    |                    | 441464<br>3,381.14 | 441468<br>4,671.93 | 441472<br>8,852.28  | 441476<br>20,784.92 |                     |  |
|                      | DIN 11<br>Price \$                  |                    |                    |                    |                    | 441470<br>4,671.93 | 441474<br>8,852.28  | 441478<br>20,784.92 | 441480<br>25,676.78 |  |
|                      | DIN 15<br>Price \$                  |                    |                    |                    |                    |                    |                     |                     | 441482<br>26,447.41 |  |
|                      | Code No.<br>Price \$                | 441666<br>1,475.38 | 441668<br>1,788.21 | 441670<br>2,163.92 | 441672<br>2,950.76 | 441674<br>3,688.71 | 441676<br>6,393.11  | 441678<br>15,442.69 | 441680<br>22,819.63 |  |
|                      | 3575-I<br>Front Mount<br>Plain Back | DIN 3<br>Price \$  | 441450<br>2,372.01 |                    |                    |                    |                     |                     |                     |  |
|                      |                                     | DIN 4<br>Price \$  | 441452<br>1,967.32 | 441454<br>2,090.05 |                    |                    |                     |                     |                     |  |
| DIN 5<br>Price \$    |                                     |                    | 441456<br>2,090.05 | 441458<br>2,335.83 |                    |                    |                     |                     |                     |  |

| Spare Parts - See Pages: H60-61    |  |                        |  |                           |  |          |                      |  |               |
|------------------------------------|--|------------------------|--|---------------------------|--|----------|----------------------|--|---------------|
| Standard Accessories               |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |  | Soft top jaws |
| Engineering Data See Pages: H62-66 |  |                        |  |                           |  |          |                      |  |               |

# High Precision 3-Jaw Steel Body Scroll Chucks — Hard Solid Jaws

Twice the Centering Accuracy Over Regular Steel Body Chucks — See Page: H64

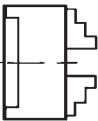
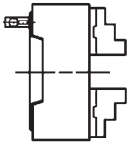
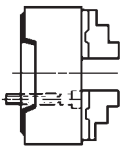
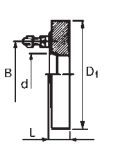



**Features:**





- 3-Jaw, self-centering scroll chuck with manual gripping
- Steel body extends machine life while providing higher rigidity and greater wear resistance
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Balanced scroll plate and chuck allows higher rotation speeds without excess vibration
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

**Application:**

- This chuck is designed for all types of workshop machining operations on conventional lathes

| Mounting  | Chuck Size  | 3"                 | 4"                 | 5"                 | 6"                 | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |           |
|---|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|-----------|
| <b>3504-I</b><br>Plain Back<br>  | Hole Size   | 0.630              | 0.787              | 1.2598             | 1.6535             | 2.1653             | 2.9921             | 4.0551             | 5.3543             | 7.48                | 9.92                |           |
|   | Weight lbs.   | 3.30               | 6.16               | 11                 | 22                 | 39                 | 64                 | 110                | 187                | 320                 | 550                 |           |
|   | Code No.<br>Price \$  | 441300<br>1,131.00 | 441302<br>1,291.10 | 441304<br>1,352.97 | 441306<br>1,537.20 | 441308<br>1,843.94 | 441310<br>2,581.89 | 441312<br>3,811.53 | 441314<br>6,762.29 | 441316<br>16,967.23 | 441318<br>23,188.45 |           |
| <b>3544-I</b><br>Camlock<br>     | D1-3<br>Price \$  |                    |                    | 441502<br>1,905.76 | 441506<br>2,623.71 |                    |                    |                    |                    |                     |                     |           |
|   | D1-4<br>Price \$  |                    |                    | 441504<br>2,296.09 | 441508<br>2,213.07 | 441512<br>3,206.86 |                    |                    |                    |                     |                     |           |
|   | D1-5<br>Price \$  |                    |                    |                    | 441510<br>2,213.07 | 441514<br>2,705.01 |                    |                    |                    |                     |                     |           |
|   | D1-6<br>Price \$  |                    |                    |                    |                    | 441516<br>2,705.01 | 441518<br>3,688.71 | 441522<br>6,267.41 |                    |                     |                     |           |
|   | D1-8<br>Price \$  |                    |                    |                    |                    |                    | 441520<br>3,688.71 | 441524<br>5,286.59 | 441528<br>9,467.24 | 441532<br>16,977.22 | 441536<br>23,414.55 |           |
|   | D1-11<br>Price \$   |                    |                    |                    |                    |                    |                    | 441526<br>5,286.59 | 441530<br>9,467.24 | 441534<br>15,983.71 | 441538<br>23,414.55 |           |
|   | D1-15<br>Price \$   |                    |                    |                    |                    |                    |                    |                    |                    | 441540<br>24,117.23 |                     |           |
|   | <b>3514-I</b><br>A Taper<br>                   | A2-5<br>Price \$   |                    |                    |                    | 441320<br>2,143.02 | 441322<br>2,581.89 | 441326<br>3,614.58 |                    |                     |                     |           |
|   |   | A2-6<br>Price \$   |                    |                    |                    |                    | 441324<br>2,581.89 | 441328<br>3,614.58 | 441332<br>5,286.59 |                     |                     |           |
|   |   | A2-8<br>Price \$   |                    |                    |                    |                    |                    | 441330<br>3,614.58 | 441334<br>6,267.41 | 441336<br>9,794.61  | 441340<br>19,823.53 |           |
| A2-11<br>Price \$   |   |                    |                    |                    |                    |                    |                    |                    | 441338<br>9,794.61 | 441342<br>19,823.53 | 441344<br>22,170.21 |           |
| A2-15<br>Price \$   |   |                    |                    |                    |                    |                    |                    |                    |                    |                     | 441346<br>23,534.65 |           |
| <b>3534-I</b><br>DIN Taper<br> |   | DIN 3<br>Price \$  |                    |                    | 441350<br>1,911.95 |                    |                    |                    |                    |                     |                     |           |
|   | DIN 4<br>Price \$   |                    |                    | 441352<br>1,598.15 | 441354<br>1,843.94 |                    |                    |                    |                    |                     |                     |           |
|   | DIN 5<br>Price \$   |                    |                    |                    | 441356<br>2,090.05 | 441358<br>2,090.05 |                    |                    |                    |                     |                     |           |
|   | DIN 6<br>Price \$   |                    |                    |                    |                    | 441360<br>2,090.05 | 441362<br>2,827.73 | 441366<br>4,057.32 |                    |                     |                     |           |
|   | DIN 8<br>Price \$   |                    |                    |                    |                    |                    | 441364<br>2,827.73 | 441368<br>4,057.32 | 441372<br>7,868.57 | 441376<br>15,491.84 |                     |           |
|   | DIN 11<br>Price \$  |                    |                    |                    |                    |                    |                    | 441370<br>4,057.32 | 441374<br>7,869.72 | 441378<br>15,491.84 | 441380<br>20,360.71 |           |
|   | DIN 15<br>Price \$  |                    |                    |                    |                    |                    |                    |                    |                    |                     | 441382<br>20,971.56 |           |
|   | <b>3574-I</b><br>Front Mount<br>Plain Back<br> | Code No.           | 441642             | 441644             | 441646             | 441648             | 441650             | 441652             | 441654             | 441656              | 441658              | 441660    |
|   |   | Price \$           | 1,082.10           | 1,180.46           | 1,180.46           | 1,376.75           | 1,672.02           | 2,458.86           | 3,344.34           | 5,803.24            | 15,442.69           | 20,754.03 |

**Spare Parts - See Pages: H60-61**

|  |                                  |   |                                 |  |          |  |                          |
|--|----------------------------------|---|---------------------------------|--|----------|--|--------------------------|
| <b>Standard Accessories</b><br> | 1 set of outside hard solid jaws |  | 1 set of inside hard solid jaws |  | 1 wrench | <b>Optional Accessories</b><br> | 1 set of soft solid jaws |
|--|----------------------------------|---|---------------------------------|--|----------|--|--------------------------|

Engineering Data See Pages: H62-66

## Combination 3 & 4-Jaw Lathe Chucks — Hard Solid Jaws



### Features:

- Combines features of both self-centering scroll and independent chucks: user can adjust chuck once and the self-centering option assures repeatability throughout the rest of the batch
- 4-Jaw chuck (type 4605 and type 4805) is able to machine both square and round workpieces, granting greater flexibility
- Steel body (type 4705 and type 4805) extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces

### Application:

- Particularly suitable for lining up and gripping workpieces of irregular shape



## 3-Jaw Steel Body Combination Chucks — Hard Solid Jaws



|  |  |                                    |                    |                    |                    |                    |                     |                     |
|--|--|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting</b><br><b>4705</b><br>Plain Back |  | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|  |  | <b>Hole Size</b>                   | 2.165              | 2.992              | 4.055              | 5.354              | 7.480               | 9.921               |
|  |  | <b>Weight lbs.</b>                 | 40                 | 68                 | 120                | 194                | 330                 | 540                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 440570<br>3,584.28 | 440572<br>4,666.06 | 440574<br>5,820.28 | 440576<br>8,890.59 | 440578<br>16,646.94 | 440580<br>24,647.38 |

## 3-Jaw Cast Iron Body Combination Chucks — Hard Solid Jaws



|  |  |                                    |                    |                    |                    |                    |                     |                     |
|--|--|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting</b><br><b>4505</b><br>Plain Back |  | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|  |  | <b>Hole Size</b>                   | 2.165              | 2.992              | 4.055              | 5.354              | 7.480               | 9.921               |
|  |  | <b>Weight lbs.</b>                 | 40                 | 68                 | 120                | 194                | 330                 | 540                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 440470<br>2,605.22 | 440472<br>4,398.12 | 440474<br>4,229.54 | 440476<br>6,726.65 | 440478<br>12,717.41 | 440480<br>21,437.54 |

## 4-Jaw Steel Body Combination Chucks — Hard Solid Jaws



|  |  |                                    |                    |                    |                    |                     |                     |                     |
|--|--|------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|
| <b>Mounting</b><br><b>4805</b><br>Plain Back |  | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                 | 20"                 | 25"                 |
|  |  | <b>Hole Size</b>                   | 2.165              | 2.992              | 4.055              | 5.354               | 7.480               | 9.921               |
|  |  | <b>Weight lbs.</b>                 | 40                 | 68                 | 120                | 194                 | 330                 | 540                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 455930<br>4,325.47 | 455935<br>4,756.73 | 455940<br>6,450.21 | 455945<br>11,486.95 | 455950<br>17,373.62 | 455955<br>22,768.52 |

## 4-Jaw Cast Iron Body Combination Chucks — Hard Solid Jaws



|  |  |                                    |                    |                    |                    |                    |                     |                     |
|--|--|------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <b>Mounting</b><br><b>4605</b><br>Plain Back |  | <b>Chuck Size</b>                  | 8"                 | 10"                | 12"                | 16"                | 20"                 | 25"                 |
|  |  | <b>Hole Size</b>                   | 2.165              | 2.992              | 4.055              | 5.354              | 7.480               | 9.921               |
|  |  | <b>Weight lbs.</b>                 | 40                 | 68                 | 120                | 194                | 330                 | 540                 |
|  |  | <b>Code No.</b><br><b>Price \$</b> | 455900<br>3,252.65 | 455905<br>3,755.70 | 455910<br>5,439.80 | 455915<br>9,167.46 | 455920<br>16,241.23 | 455925<br>24,112.78 |



## 3-Jaw Steel Body Large Through Hole Scroll Chucks

### Features:

- Steel body extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces
- Chucks may work individually or in pairs, mounted on opposite sides of the lathe spindle, ensuring the same vertical position of the jaws in both chucks
- Large through hole compared to the outside diameter of the chuck body
- High gripping force and high machining accuracy
- Able to machine very long workpieces
- Heavy duty components

### Application:




- This chuck is designed for gripping long pipes during medium duty machining for conventional and specialized machine-tools



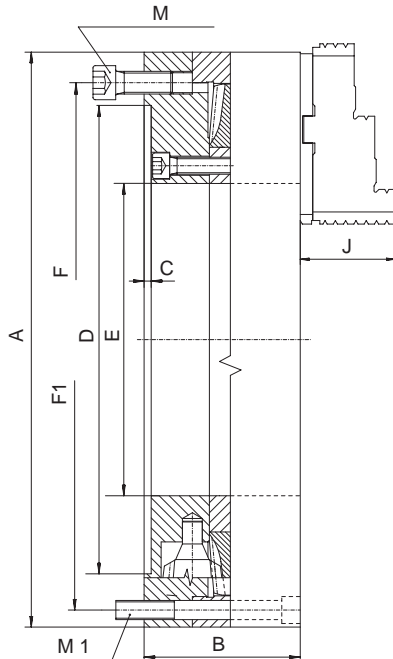
**ADAPTER PLATES**  
Pages: H58-59

4-Jaw Independent large through hole chucks also available. See page: H68

| Mounting<br>3597<br>Plain Back | Chuck Size | 12"       | 16"       | 20"       | 26"    | 32"    |
|--------------------------------|------------|-----------|-----------|-----------|--------|--------|
|                                |            | Hole Size | 5.709     | 8.661     | 12.598 | 15.984 |
| Weight lbs.                    | 104        | 161       | 264       | 506       | 875    |        |
| Code No.                       | 441248     | 441250    | 441252    | 441253    | -      |        |
| Price \$                       | 5,007.28   | 9,645.59  | 20,103.10 | 28,786.52 | -      |        |

| Spare Parts - See Pages: H35       |  |                           |  |                        |  |          |
|------------------------------------|--|---------------------------|--|------------------------|--|----------|
| Standard Accessories               |  | 1 set of hard master jaws |  | 1 set of hard top jaws |  | 1 wrench |
| Engineering Data See Pages: H62-66 |  |                           |  |                        |  |          |

## Specifications



| Chuck Size     | 12"       | 16"       | 20"         | 26"         | 32"         |
|----------------|-----------|-----------|-------------|-------------|-------------|
| A              | 12.4016   | 15.9449   | 20.2756     | 25.9843     | 31.4961     |
| B              | 3.8189    | 4.3307    | 4.7244      | 5.5118      | 5.9055      |
| C              | 0.1969    | 0.1969    | 0.1969      | 0.2756      | 0.2756      |
| D              | 10.2362   | 12.9921   | 16.5354     | 21.4567     | 27.9528     |
| E              | 5.7087    | 8.6614    | 12.5984     | 15.9843     | 18.1102     |
| F              | 11.2598   | 14.2520   | 18.0315     | 23.0709     | 29.9213     |
| F1             | 11.2598   | 15.0000   | 18.9567     | 24.4094     | 29.9213     |
| J              | 2.2402    | 2.6378    | 3.1102      | 3.4252      | -           |
| M              | 3xM16x30  | 6xM16x40  | 6xM16x40    | 6xM16x40    | 6xM20x50    |
| M1             | 3xM16x100 | 6xM12x120 | 6xM16x130   | 6xM16x150   | 6xM20x160   |
| Gripping Range | 1.57-5.51 | 2.64-5.43 | 10.40-20.31 | 13.74-24.80 | 10.23-18.11 |
| Max. Speed rpm | 2500      | 1000      | 800         | 600         | 700         |
| Approx. weight | 103       | 160       | 264         | 506         | 875         |





## 3-Jaw Cast Iron Body Large Through Hole Scroll Chucks

### Features:

- Cast Iron body
- Chucks may work individually or in pairs, mounted on opposite sides of the lathe spindle, ensuring the same vertical position of the jaws in both chucks
- Large through hole compared to the outside diameter of the chuck body
- Able to machine very long workpieces

### Application:

- Designed for gripping long pipes during machining for conventional and specialized machine-tools



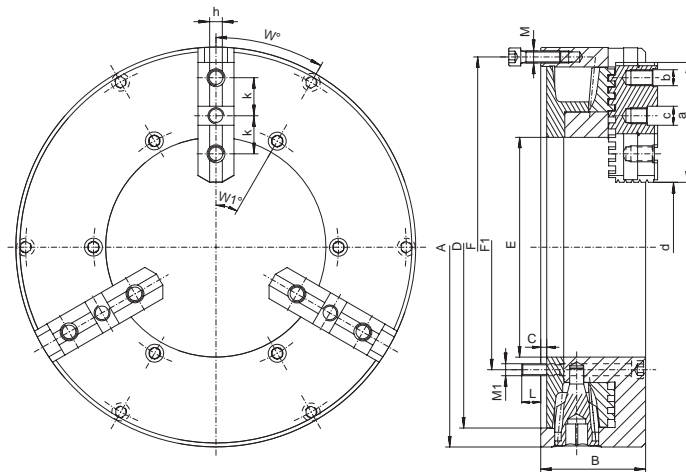
**ADAPTER PLATES**  
Pages: H58-59

4-Jaw Independent large through hole chucks also available. See page: H68

| Mounting<br>3295<br>Plain Back | Chuck Size | 16"       | 20"       | 26"       | 32"    |
|--------------------------------|------------|-----------|-----------|-----------|--------|
|                                |            | Hole Size | 8.661     | 12.598    | 15.984 |
| Weight lbs.                    | 127        | 167       | 284       | 467       |        |
| Code No.                       | 435530     | 435535    | 435540    | 435545    |        |
| Price \$                       | 5,609.58   | 8,274.85  | 13,635.07 | 27,757.32 |        |

| Spare Parts - See Pages: H35       |  |                           |  |          |                      |
|------------------------------------|--|---------------------------|--|----------|----------------------|
| Standard Accessories               |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |
|                                    |  | 1 set of soft top jaws    |  |          |                      |
| Engineering Data See Pages: H62-66 |  |                           |  |          |                      |

## Specifications



| Chuck Size        | 16"     | 20"     | 26"     | 32"     |
|-------------------|---------|---------|---------|---------|
| A                 | 15.7480 | 20.000  | 25.9843 | 31.4961 |
| B                 | 4.1339  | 4.7244  | 5.3150  | 5.9449  |
| C                 | 0.2362  | 0.3150  | 0.5512  | 0.2756  |
| D                 | 14.2520 | 18.1890 | 22.8346 | 27.9528 |
| E                 | 8.6614  | 12.5984 | 15.9843 | 16.1417 |
| F                 | 15.0000 | 18.9567 | 24.4094 | -       |
| F1                | -       | -       | -       | 18.1102 |
| M                 | 6xM12   | 6xM16   | 6xM16   | -       |
| M1                | -       | -       | -       | 6xM24   |
| W                 | 30°     | 30°     | 30°     | -       |
| W1                | -       | -       | -       | 30°     |
| L                 | -       | -       | -       | 0.9843  |
| a                 | 4.7244  | 4.7244  | 5.000   | 8.8583  |
| b                 | M16     | M20     | M20     | M20     |
| c                 | 0.7496  | 0.7496  | 0.7496  | 0.7496  |
| h                 | 0.5000  | 0.5000  | 0.5000  | 0.5000  |
| d min.            | 6.6142  | 9.8425  | 14.8031 | 10.2362 |
| d max.            | 11.3386 | 14.9606 | 19.5669 | 22.2835 |
| Max Speed rpm     | 500     | 350     | 250     | 200     |
| Approx weight lbs | 127     | 167     | 284     | 467     |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## 3-Jaw Steel Body Heavy Duty Large Through Hole Scroll Chucks

### Features:

- Steel body extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces
- Chucks may work individually or in pairs, mounted on opposite sides of the lathe spindle, ensuring the same vertical position of the jaws in both chucks
- Large through hole compared to the outside diameter of the chuck body
- High gripping force and high machining accuracy
- Able to machine very long workpieces

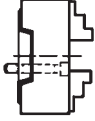
### Application:




- This precision chuck, with increased gripping accuracy, is designed for gripping long pipes during heavy duty machining for conventional and specialized machine-tools



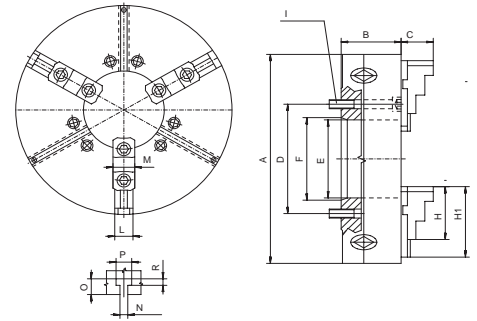
4-Jaw Independent large through hole chucks also available see page: H68

| Mounting<br>3515 HD<br>Short Taper | Chuck Size          | 15-1/4"             | 15-1/4"             | 15-3/4"             | 20"                 | 25"                 | 25"                 | 31-1/2"             | 31-1/2" |
|------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------|
|                                    |                     | Hole Size           | 4.00"               | 5.30"               | 5.00"               | 7.50"               | 10.75"              | 12.50"              | 10.75"  |
| Weight lbs.                        | 225                 | 217                 | 212                 | 344                 | 612                 | 552                 | 1,104               | 1,076               |         |
| A2-6<br>Price \$                   | 441230<br>14,908.08 |                     |                     |                     |                     |                     |                     |                     |         |
| A2-8<br>Price \$                   |                     | 441232<br>14,908.08 |                     |                     |                     |                     |                     |                     |         |
| A2-11<br>Price \$                  |                     |                     | 441234<br>14,908.08 | 441236<br>19,940.29 |                     |                     |                     |                     |         |
| A2-15<br>Price \$                  |                     |                     |                     |                     | 441238<br>29,354.95 |                     | 441242<br>43,430.33 |                     |         |
| A2-20<br>Price \$                  |                     |                     |                     |                     |                     | 441240<br>33,279.45 |                     | 441244<br>45,384.39 |         |



| Spare Parts - See Pages: H35       |  |                           |   |
|------------------------------------|--|---------------------------|---|
| Standard Accessories               |  | 1 set of hard master jaws |   |
|                                    |  |                           | 1 set of hard top jaws  |
|                                    |  |                           |  |
|                                    |  |                           | 1 wrench  |
| Engineering Data See Pages: H62-66 |  |                           |   |

## Specifications



| Chuck Size         | 15-1/4 A6        | 15-1/4 A8        | 15-3/4 A11     | 20" A11        | 25" A15        | 25" A20        | 31-1/2 A15     | 31-1/2 A20     |
|--------------------|------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| A                  | 15.7480          | 15.7480          | 15.7480        | 19.6850        | 24.8031        | 24.8031        | 31.4961        | 31.4961        |
| B                  | 4.3701           | 4.3701           | 4.3701         | 4.6850         | 5.6693         | 5.6693         | 5.9055         | 5.9055         |
| C                  | 3.4252           | 3.4252           | 3.4252         | 3.4252         | 3.6417         | 3.6417         | 3.6417         | 3.6417         |
| D                  | 4.4646           | 6.7480           | 6.5000         | 9.2520         | 13.0000        | 14.5000        | 13.0000        | 18.2480        |
| E                  | 4.0551           | 5.3543           | 5.1181         | 7.5591         | 10.8268        | 12.5984        | 10.8268        | 12.5984        |
| F                  | 4.1880           | 5.5007           | 7.7507         | 7.7507         | 11.2510        | 16.2510        | 11.2510        | 16.2510        |
| H                  | 5.3150           | 5.3150           | 5.3150         | 5.3150         | 5.3150         | 5.3150         | 5.3150         | 5.3150         |
| H1                 | -                | -                | -              | 6.6535         | 8.2677         | 8.2677         | 8.8583         | 8.8583         |
| I                  | 6x1/2"-13x4-1/2" | 6x5/8"-11x4-1/2" | 6x3/4"-10x4"   | 6x3/4"-10x5"   | 6x7/8"-9x6"    | 6x1"-8x5"      | 6x7/8"-9x6"    | 6x1"-8x5"      |
| L                  | 1.9685           | 1.9685           | 1.9685         | 1.9685         | 2.7559         | 2.7559         | 2.7559         | 2.7559         |
| M                  | 2.1260           | 2.1260           | 2.1260         | 2.1260         | 2.9528         | 2.9528         | 2.9528         | 2.9528         |
| N                  | 0.5512x0.3937    | 0.5512x0.3937    | 0.5512x0.3937  | 0.5512x0.3937  | 0.661x0.3937   | 0.661x0.3937   | 0.661x0.3937   | 0.661x0.3937   |
| O                  | 0.8268           | 0.8268           | 0.8268         | 0.8268         | 1.2992         | 1.2992         | 1.2992         | 1.2992         |
| P                  | 0.9055           | 0.9055           | 0.9055         | 0.9055         | 1.4567         | 1.4567         | 1.4567         | 1.4567         |
| R                  | 0.3937           | 0.3937           | 0.3937         | 0.3937         | 0.6299         | 0.6299         | 0.6299         | 0.6299         |
| Gripping Range     | 0.9843-15.7480   | 0.9843-15.7480   | 0.9843-15.7480 | 1.7717-19.6850 | 3.1496-24.8031 | 6.2992-24.8031 | 5.1181-31.4961 | 7.0866-31.4961 |
| Gripping Force daN | 6200             | 6200             | 6200           | 7700           | 8200           | 8200           | 9000           | 9000           |
| Max. Speed         | 1400             | 1400             | 1400           | 1000           | 850            | 850            | 600            | 600            |
| Approx Weight lbs  | 225              | 217              | 211            | 344            | 611            | 552            | 1,104          | 1,076          |

## 8210X Fully Machined A2 Mounts (Backplates)



### 8210X Fully Machined Adapters

For plain back, self-centering chucks - designed for direct mounting on A spindle noses.

| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 4"         | A2-3         | 442400   | 298.01   |
| 5"         | A2-3         | 442402   | 323.80   |
| 6"         | A2-3         | 442404   | 412.81   |
| 6"         | A2-4         | 442406   | 412.81   |
| 6"         | A2-5         | 442408   | 412.81   |
| 8"         | A2-3         | 442410   | 437.29   |
| 8"         | A2-4         | 442412   | 437.29   |
| 8"         | A2-5         | 442414   | 313.50   |
| 8"         | A2-6         | 442416   | 437.80   |
| 10"        | A2-5         | 442418   | 543.72   |
| 10"        | A2-6         | 442420   | 543.72   |
| 10"        | A2-8         | 442422   | 543.72   |
| 12"        | A2-6         | 442424   | 805.22   |
| 12"        | A2-8         | 442426   | 805.22   |
| 12"        | A2-11        | 442432   | 805.22   |
| 16"        | A2-6         | 442434   | 1,628.11 |
| 16"        | A2-8         | 442436   | 1,553.40 |
| 16"        | A2-11        | 442438   | 1,553.40 |
| 20"        | A2-8         | 442440   | 2,337.11 |
| 20"        | A2-11        | 442442   | 2,337.11 |
| 20"        | A2-15        | 442444   | 3,301.39 |
| 25"        | A2-8         | 442446   | 3,435.32 |
| 25"        | A2-11        | 442448   | 3,435.32 |
| 25"        | A2-15        | 442450   | 3,934.07 |

## 8240X Fully Machined Camlock Mounts (Backplates)



### 8240X Fully Machined Adapters

For plain back, self-centering chucks - designed for direct mounting on Camlock spindle noses.

| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 5"         | D1-3         | 455300   | 482.50   |
| 5"         | D1-4         | 455302   | 482.50   |
| 5"         | D1-5         | 455303   | 714.54   |
| 6"         | D1-3         | 455305   | 560.33   |
| 6"         | D1-4         | 455310   | 560.33   |
| 6"         | D1-5         | 455315   | 560.33   |
| 6"         | D1-6         | 455317   | 639.64   |
| 8"         | D1-3         | 455320   | 632.40   |
| 8"         | D1-4         | 455325   | 614.80   |
| 8"         | D1-5         | 455330   | 614.80   |
| 8"         | D1-6         | 455335   | 614.80   |
| 10"        | D1-5         | 455340   | 763.25   |
| 10"        | D1-6         | 455345   | 798.36   |
| 10"        | D1-8         | 455350   | 798.36   |
| 12"        | D1-6         | 455355   | 1,052.26 |
| 12"        | D1-8         | 455360   | 1,052.26 |
| 12"        | D1-11        | 455365   | 1,052.26 |
| 16"        | D1-6         | 455370   | 2,131.71 |
| 16"        | D1-8         | 455375   | 2,131.71 |
| 16"        | D1-11        | 455380   | 2,131.71 |
| 20"        | D1-8         | 455385   | 4,264.84 |
| 20"        | D1-11        | 455390   | 4,456.26 |
| 20"        | D1-15        | 455391   | 2,366.29 |
| 25"        | D1-8         | 455393   | 3,116.78 |
| 25"        | D1-15        | 455396   | 5,267.96 |

## 8230X Fully Machined DIN Mounts (Backplates)



### 8230X Fully Machined Adapters

For plain back, self-centering chucks - designed for direct mounting on DIN spindle noses.

| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 4"         | DIN-3        | 442452   | 253.59   |
| 5"         | DIN-3        | 442454   | 278.50   |
| 5"         | DIN-4        | 442456   | 278.50   |
| 6"         | DIN-3        | 442458   | 349.41   |
| 6"         | DIN-4        | 442460   | 349.41   |
| 6"         | DIN-5        | 442462   | 349.41   |
| 8"         | DIN-3        | 442464   | 407.60   |
| 8"         | DIN-5        | 442468   | 407.60   |
| 8"         | DIN-6        | 442470   | 407.60   |
| 10"        | DIN-5        | 442472   | 524.87   |
| 10"        | DIN-6        | 442474   | 535.45   |
| 10"        | DIN-8        | 442476   | 524.87   |
| 12"        | DIN-6        | 442478   | 882.39   |
| 12"        | DIN-11       | 442482   | 657.84   |
| 16"        | DIN-6        | 442484   | 1,226.19 |
| 16"        | DIN-8        | 442486   | 1,226.19 |
| 16"        | DIN-11       | 442488   | 1,226.19 |
| 20"        | DIN-8        | 442490   | 2,211.88 |
| 20"        | DIN-11       | 442492   | 2,211.88 |
| 20"        | DIN-15       | 442494   | 2,211.88 |
| 25"        | DIN-8        | 442496   | 3,059.44 |
| 25"        | DIN-11       | 442498   | 3,059.44 |
| 25"        | DIN-15       | 442500   | 3,059.44 |

## 8250 Fully Machined L Mounts (Backplates)



### 8250 Fully Machined Adapters

For plain back, self-centering chucks - designed for direct mounting on L-type spindle noses.

| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 6"         | L00          | 455405   | 524.81   |
| 6"         | L0           | 455410   | 524.81   |
| 8"         | L00          | 455415   | 559.13   |
| 8"         | L0           | 455420   | 559.13   |
| 8"         | L1           | 455425   | 690.31   |
| 10"        | L00          | 455430   | 1,467.30 |
| 10"        | L0           | 455435   | 799.73   |
| 10"        | L1           | 455440   | 799.73   |
| 10"        | L2           | 455445   | 1,133.82 |
| 12"        | L1           | 455455   | 1,418.08 |
| 12"        | L2           | 455460   | 1,418.08 |
| 16"        | L0           | 455465   | 1,570.11 |
| 16"        | L1           | 455470   | 1,641.40 |
| 16"        | L2           | 455475   | 1,683.67 |
| 16"        | L3           | 455480   | 1,785.04 |
| 20"        | L2           | 455485   | 2,934.60 |
| 20"        | L3           | 455490   | 2,808.45 |

## 8212 Semi-Machined A Mounts (Backplates)

**A-Mount Semi-Machined Adapters**  
For self-centering plain back chucks with spotted holes.



| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 5"         | A-6          | 455500   | 269.01   |
| 5"         | A-8          | 455502   | 480.13   |
| 6"         | A-5          | 455504   | 249.09   |
| 6"         | A-6          | 455505   | 238.33   |
| 8"         | A-5          | 455506   | 334.62   |
| 8"         | A-6          | 455508   | 334.62   |
| 10"        | A-6          | 455510   | 493.42   |
| 10"        | A-8          | 455512   | 493.42   |
| 12"        | A-6          | 455514   | 877.80   |
| 12"        | A-8          | 455516   | 877.80   |
| 16"        | A-8          | 455518   | 1,757.33 |
| 16"        | A-11         | 455520   | 1,757.33 |
| 20"        | A-11         | 455521   | 2,940.84 |
| 25"        | A-11         | 455522   | 2,775.72 |
| 25"        | A-15         | 455523   | 3,034.30 |
| 36"-49"    | A-15         | 455524   | 3,789.24 |
| 36"-49"    | A-20         | 455525   | 3,901.54 |

## 8232 Semi-Machined DIN Mounts (Backplates)

**DIN-Mount Semi-Machined Adapters**  
For plain back, self-centering chucks – designed for direct mounting on DIN spindle noses.



| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 8"         | DIN 6        | 455600   | 435.76   |
| 10"        | DIN 6        | 455605   | 599.80   |
| 10"        | DIN 8        | 455610   | 599.80   |
| 12"        | DIN 6        | 455615   | 966.78   |
| 12"        | DIN 8        | 455620   | 966.78   |
| 12"        | DIN 11       | 455623   | 835.17   |
| 16"        | DIN 8        | 455625   | 1,713.41 |
| 16"        | DIN 11       | 455630   | 1,182.03 |
| 20"        | DIN 11       | 455635   | 2,057.91 |

## 8206 Semi-Machined Threaded Mounts (Backplates)

**8206 Threaded Adapters**  
Semi-machined for self-centering plain back chucks.



| Chuck Size | Thread     | Code No. | Price \$ |
|------------|------------|----------|----------|
| 4"         | 1" - 10    | 455205   | 181.83   |
| 4"         | 1-1/2" - 8 | 455210   | 181.83   |
| 5"         | 1" - 10    | 455215   | 181.83   |
| 5"         | 1-1/2" - 8 | 455217   | 172.83   |
| 6"         | 1-1/2" - 8 | 455225   | 219.49   |
| 6"         | 2-1/4" - 8 | 455230   | 207.02   |
| 8"         | 1-1/2" - 8 | 455235   | 309.75   |
| 8"         | 2-1/4" - 8 | 455240   | 434.24   |
| 10"        | 2-1/4" - 8 | 455245   | 922.13   |
| 10"        | 2-3/8" - 6 | 455247   | 1,139.43 |
| 12"        | 2-3/8" - 6 | 455250   | 1,260.87 |
| 12"        | 2-3/4" - 8 | 455255   | 362.10   |

## 8242 Semi-Machined Camlock Mounts (Backplates)

**Camlock Mount Semi-Machined Adapters**  
For plain back, self-centering chucks – designed for direct mounting on Camlock spindle noses.



| Chuck Size | Spindle Nose | Code No. | Price \$ |
|------------|--------------|----------|----------|
| 4"         | D1-3         | 442502   | 342.06   |
| 5"         | D1-3         | 442504   | 496.54   |
| 5"         | D1-4         | 442506   | 496.54   |
| 6"         | D1-3         | 442508   | 527.62   |
| 6"         | D1-4         | 442510   | 527.62   |
| 6"         | D1-5         | 442512   | 527.62   |
| 8"         | D1-4         | 442514   | 580.59   |
| 8"         | D1-5         | 442516   | 527.81   |
| 8"         | D1-6         | 442518   | 580.59   |
| 10"        | D1-5         | 442520   | 629.06   |
| 10"        | D1-6         | 442522   | 674.04   |
| 10"        | D1-8         | 442524   | 674.04   |
| 12"        | D1-6         | 442526   | 1,007.03 |
| 12"        | D1-8         | 442528   | 1,007.03 |
| 16"        | D1-8         | 442532   | 1,480.20 |
| 16"        | D1-11        | 442534   | 1,480.20 |
| 20"        | D1-8         | 442536   | 3,738.73 |
| 20"        | D1-11        | 442538   | 3,738.73 |
| 25"        | D1-11        | 442540   | 4,804.95 |
| 25"        | D1-15        | 442542   | 3,158.01 |

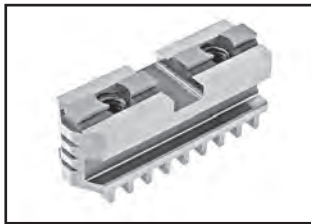
## 8205 Rough Casting Mounts (Backplates)

**8205 Rough Casting Adapters**  
For self-centering/plain back chucks.

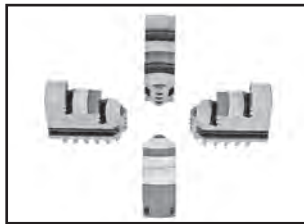


| Chuck Size | Code No. | Price \$ |
|------------|----------|----------|
| 6"         | 455105   | 188.41   |
| 8"         | 455110   | 277.12   |
| 10"        | 455115   | 512.13   |
| 12"        | 455120   | 786.61   |
| 16"        | 455125   | 1,222.75 |
| 20"        | 455130   | 2,400.24 |
| 25"        | 455135   | 4,723.52 |

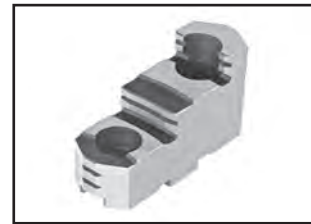
## Replacement Jaws For Self-Centering Chucks



Hard Master Jaws



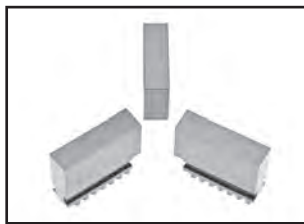
Hard Solid O.D.



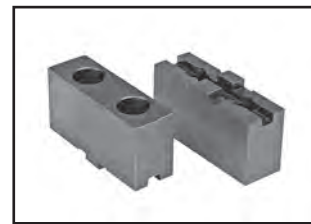
Hard Top Jaws



Hard Solid I.D.



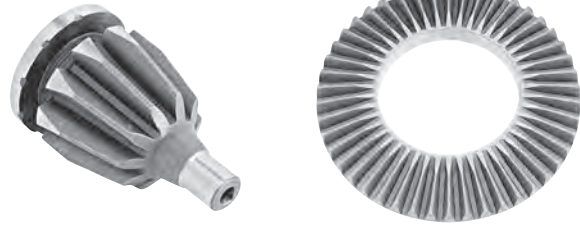
Soft Solid Jaws


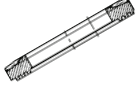
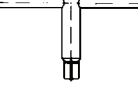


Soft Top Jaws

| Parts                           | For Chuck Series | Qty. per set | 3"                        | 4"               | 5"                 | 6"                 | 8"                 | 10"                | 12"                | 16"                | 20"                | 25"                | 32"                |
|---------------------------------|------------------|--------------|---------------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <b>HARD SOLID O.D. JAWS</b><br> | 3200             | 3            | 467700<br>Price \$ 219.84 | 467705<br>251.07 | 467710<br>316.42   | 467715<br>364.93   | 467720<br>378.72   | 467725<br>444.36   | 467730<br>740.51   | 467735<br>816.89   | 467740<br>1,884.95 | 467745<br>2,313.11 |                    |
|                                 | 3600 & 3700      | 4            |                           |                  | 467900<br>545.67   | 467902<br>590.91   | 467904<br>614.28   | 467906<br>654.85   | 467908<br>990.18   | 467910<br>1,130.36 | 467912<br>2,315.25 | 467914<br>4,130.40 |                    |
|                                 | 3800             | 6            |                           |                  | 467915<br>1,002.92 | 467916<br>798.23   | 467918<br>993.06   | 467920<br>1,078.87 | 467922<br>1,379.70 | 467923<br>1,663.55 |                    |                    |                    |
| Sold in Sets                    |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>HARD SOLID I.D. JAWS</b><br> | 3200             | 3            | 467600<br>Price \$ 213.61 | 467605<br>261.89 | 467610<br>272.78   | 467615<br>355.51   | 467620<br>364.93   | 467625<br>420.98   | 467630<br>643.85   | 467635<br>826.32   | 467640<br>1,887.93 | 467645<br>2,416.52 | 467647<br>2,416.52 |
|                                 | 3600 & 3700      | 4            |                           |                  | 467924<br>406.97   | 467926<br>456.72   | 467928<br>486.33   | 467930<br>603.29   | 467932<br>857.46   | 467934<br>1,110.09 | 467936<br>2,516.28 | 467938<br>4,401.24 |                    |
|                                 | 3800             | 6            |                           |                  | 467939<br>601.12   | 467940<br>910.53   | 467942<br>1,028.96 | 467944<br>1,055.53 | 467946<br>1,412.56 | 467947<br>2,199.82 |                    |                    |                    |
| Sold in Sets                    |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>SOFT SOLID JAWS</b><br>      | 3200 & 3500      | 3            | 467749<br>Price \$ 166.82 | 467750<br>182.45 | 467755<br>188.69   | 467760<br>210.51   | 467765<br>235.40   | 467770<br>349.17   | 467775<br>466.16   | 467780<br>497.25   | 467785<br>1,191.08 | 467790<br>1,711.82 |                    |
|                                 | 3600 & 3700      | 4            |                           |                  | 467948<br>282.23   | 467950<br>314.87   | 467952<br>363.37   | 467954<br>541.07   | 467956<br>790.49   | 467958<br>818.46   | 467960<br>2,240.39 |                    |                    |
| Sold in Sets                    |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>HARD TOP JAWS</b><br>        | 3200 & 3500      | 3            |                           |                  | 460705<br>399.19   | 460710<br>467.72   | 460715<br>497.25   | 460720<br>541.07   | 460725<br>659.51   | 460730<br>901.15   | 460735<br>1,406.26 | 460740<br>1,788.30 | 460745<br>1,711.86 |
|                                 | 3600 & 3700      | 4            |                           |                  | 460805<br>631.42   | 460810<br>687.56   | 460815<br>738.96   | 460820<br>798.23   | 460825<br>943.24   | 460830<br>1,378.28 | 460835<br>1,983.10 | 460840<br>2,508.57 |                    |
|                                 | 3800             | 6            |                           |                  | 460908<br>988.60   | 460910<br>1,133.40 | 460915<br>1,248.80 | 460920<br>1,261.33 | 460925<br>1,549.69 | 460926<br>1,965.94 | 460927<br>2,770.47 | 460928<br>3,084.74 |                    |
| Sold in Sets                    |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>SOFT TOP JAW</b><br>         | 3100             | 1            |                           |                  |                    | 460930<br>116.95   | 460935<br>120.13   |                    |                    |                    |                    |                    |                    |
|                                 | 3200 & 3500      | 1            |                           |                  | 465105<br>65.43    | 465110<br>71.73    | 465115<br>84.24    | 465120<br>104.44   | 465125<br>115.40   | 465130<br>162.12   | 465135<br>212.07   | 465140<br>291.64   | 465145<br>466.16   |
| Sold Per Piece                  |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| <b>HARD MASTER JAWS</b><br>     | 3100             | 2            |                           |                  |                    | 465170<br>254.12   | 465175<br>286.89   | 465180<br>464.61   | 465185<br>668.78   | 465190<br>933.51   |                    |                    |                    |
|                                 | 3200 & 3500      | 3            |                           |                  | 467355<br>369.65   | 467360<br>469.28   | 467365<br>509.86   | 467370<br>576.84   | 467375<br>667.23   | 467380<br>796.76   | 467385<br>1,392.18 | 467390<br>1,806.93 | 467395<br>2,199.82 |
|                                 | 3600 & 3700      | 4            |                           |                  | 467405<br>883.90   | 467410<br>963.47   | 467415<br>1,025.84 | 467420<br>1,085.09 | 467425<br>1,116.18 | 467430<br>1,412.48 | 467435<br>2,312.04 | 467440<br>2,996.59 |                    |
|                                 | 3800             | 6            |                           |                  | 467505<br>971.25   | 467510<br>977.54   | 467515<br>1,278.47 | 467520<br>1,381.32 | 467525<br>1,431.19 | 460527<br>2,157.66 | 460529<br>3,079.08 | 460530<br>4,486.96 |                    |
| Sold in Sets                    |                  |              |                           |                  |                    |                    |                    |                    |                    |                    |                    |                    |                    |

## Spare Parts For Self-Centering Chucks



| Parts   | For Chuck Series   | Qty. per set  | 3"               | 4"               | 5"               | 6"               | 8"               | 10"              | 12"                | 16"                | 20"                | 25"                | 32"                |
|---|--------------------|---------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| <br>PINION       | 3200 & 3600        | 1<br>Price \$ | 467300<br>78.26  | 467305<br>90.71  | 467310<br>90.34  | 467315<br>95.01  | 467320<br>105.92 | 467325<br>130.84 | 467330<br>152.65   | 467335<br>218.07   | 467340<br>381.21   | 467345<br>652.95   | 467346<br>871.60   |
|   | 3500 & 3700        | 1<br>Price \$ |                  |                  | 467799<br>93.75  | 467800<br>98.46  | 467805<br>115.69 | 467810<br>142.29 | 467815<br>167.20   | 467820<br>229.69   | 467821<br>378.10   | 467822<br>601.44   |                    |
| <br>SCROLL PLATE | 3200 & 3600        | 1<br>Price \$ | 467104<br>245.22 | 467105<br>293.72 | 467110<br>318.71 | 467115<br>356.18 | 467120<br>392.07 | 467125<br>565.52 | 467130<br>965.55   | 467135<br>1,468.11 | 467140<br>4,205.89 | 467145<br>6,582.95 | 467146<br>8,635.08 |
|   | 3500 & 3865 & 3700 | 1<br>Price \$ |                  |                  | 467829<br>385.94 | 467830<br>457.66 | 467835<br>567.09 | 467840<br>773.14 | 467845<br>1,021.45 | 467850<br>2,241.17 |                    |                    |                    |
| <br>WRENCH     | 3200 & 3700        | 1<br>Price \$ | 460400<br>78.18  | 460405<br>98.37  | 460405<br>98.37  | 460415<br>104.67 | 460415<br>104.67 | 460425<br>126.56 | 460425<br>126.56   | 460435<br>189.06   | 460440<br>274.90   | 460440<br>274.90   | 460445<br>320.12   |
|   | Square Sizes       |               | 0.2344"          | 0.3543"          | 0.3543"          | 0.4331"          | 0.4331"          | 0.5512"          | 0.5512"            | 0.6693"            | 0.7480"            | 0.7480"            | 0.7480"            |

## Camlock Studs & Screws



| Size  | Diameter | Thread    | No. of Studs | Code No. | Price \$ | Camlock Stud Locking Screw | Code No. | Price \$ |
|-------|----------|-----------|--------------|----------|----------|----------------------------|----------|----------|
| D1-3  | 9/16     | M10 x 1   | 3            | 467230   | 64.13    | 3                          | 467242   | 31.04    |
| D1-4  | 5/8      | M10 x 1   | 3            | 467232   | 64.13    | 3                          | 467244   | 31.04    |
| D1-5  | 3/4      | M12 x 1   | 6            | 467234   | 65.68    | 6                          | 467246   | 31.04    |
| D1-6  | 7/8      | M16 x 1.5 | 6            | 467236   | 70.34    | 6                          | 467248   | 31.04    |
| D1-8  | 1        | M20 x 1.5 | 6            | 467238   | 81.28    | 6                          | 467250   | 31.04    |
| D1-11 | 1-3/16   | M22 x 1.5 | 6            | 467240   | 117.16   | 6                          | 467252   | 31.04    |



## Jaw Mounting Screws



| Chuck Size | Screw 1          | Code No. | Price \$ | Screw 2          | Code No. | Price \$ |
|------------|------------------|----------|----------|------------------|----------|----------|
| 5          | 5/16 - 18 x 3/4  | 467254   | 12.74    | 5/16 - 18 x 1    | 467266   | 12.78    |
| 6 & 8      | 3/8 - 16 x 3/4   | 467256   | 12.90    | 3/8 - 16 x 1-1/4 | 467268   | 13.44    |
| 10 & 12    | 1/2 - 13 x 1     | 467260   | 14.40    | 1/2 - 13 x 1-1/2 | 467272   | 14.49    |
| 16         | 5/8 - 11 x 1-1/4 | 467262   | 23.90    | 5/8 - 11 x 1-3/4 | 467274   | 18.30    |
| 20         | 3/4 - 10 x 1-1/2 | 467264   | 44.22    | 3/4 - 10 x 3     | 467276   | 53.91    |
| 25         | 3/4 - 10 x 1-1/2 | 467264   | 44.22    | 3/4 - 10 x 3-1/4 | 467271   | 56.61    |
| 32         | 3/4 - 10 x 1-3/4 | 467273   | 47.54    | 3/4 - 10 x 3     | 467278   | 53.91    |



## DIN Studs



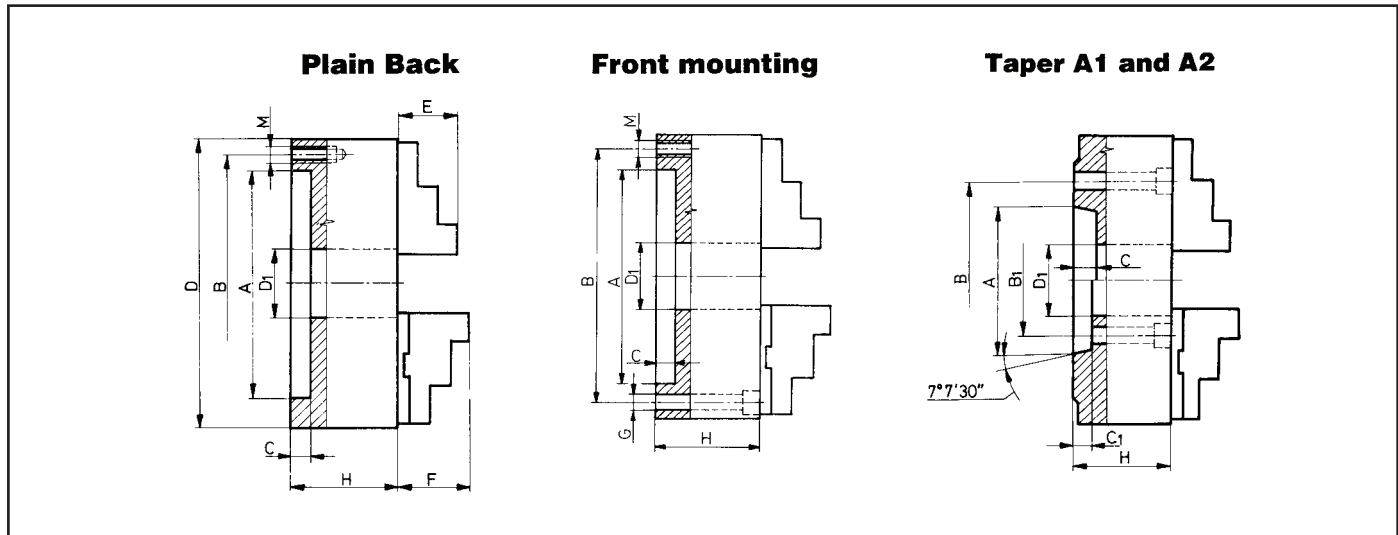
| Size   | Code No. | Price \$ |
|--------|----------|----------|
| DIN 6  | 467280   | 78.26    |
| DIN 8  | 467282   | 82.56    |
| DIN 11 | 467284   | 100.01   |



## Specifications For Scroll Chucks



### UNIVERSAL AND PRECISION CHUCKS – SERIES 3200, 3500 & 3600



### MAIN DIMENSIONS

Plain Back (two-piece or solid jaws)

| Size of Chuck | 3"     | 4"     | 5"     | 6"     | 8"     | 10"    | 12"     | 16"     | 20"     | 25"     |
|---------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| D             | 3-1/4  | 4      | 5      | 6-1/4  | 8      | 10     | 12-1/2  | 15-3/4  | 20      | 25      |
| A             | 2.2047 | 2.7559 | 3.7402 | 4.9213 | 6.2992 | 7.8740 | 10.2362 | 12.9921 | 16.5354 | 21.4567 |
| B             | 2.6378 | 3.2677 | 4.2520 | 5.5118 | 6.9291 | 8.8189 | 11.2598 | 14.2519 | 18.0314 | 23.0709 |
| C             | 0.1181 | 0.1181 | 9.1575 | 0.1575 | 0.1575 | 0.1969 | 0.1969  | 0.1969  | 0.1969  | 0.2756  |
| D1            | 0.6299 | 0.7874 | 1.2598 | 1.6535 | 2.1654 | 2.9921 | 4.0551  | 5.3543  | 7.4803  | 9.9212  |
| E             | 0.5118 | 0.6693 | 0.7874 | 1.2598 | 1.1417 | 1.3386 | 1.6929  | 2.1654  | 2.3622  | 2.7559  |
| F             | —      | —      | 1.5748 | 1.6929 | 1.7716 | 2.0866 | 2.2441  | 2.6378  | 3.1496  | 3.4252  |
| H 3500        | 1.7322 | 1.9685 | 2.4221 | 2.7559 | 3.1496 | 3.5433 | 3.9370  | 4.3307  | —       | —       |
| H 3200        | 1.7323 | 1.9685 | 2.2047 | 2.5591 | 2.9528 | 3.3465 | 3.7008  | 4.1339  | 4.7244  | 5.3150  |
| H 3600        | 1.7323 | 1.9685 | 2.2047 | 2.5591 | 2.9528 | 3.3465 | 3.7008  | 4.1339  | 4.7244  | 5.3150  |
| M             | 3xM6   | 3xM8   | 3xM8   | 6xM10  | 6xM10  | 6xM12  | 6xM16   | 6xM16   | 6xM16   | 6xM16   |

### A-Type Mounting, ASA Standard B5.9

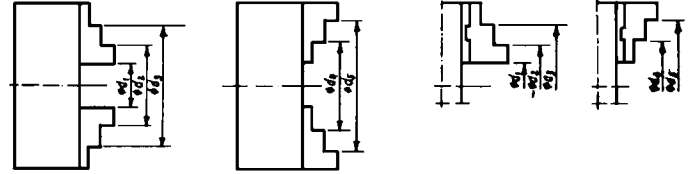
| Chuck Size        | 6"     |        |         | 8"     |         |        | 10"    |        |        | 12"    |        |        | 16"    |        |         | 20"    |  | 25" |  |
|-------------------|--------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--|-----|--|
|                   | 6-1/2  |        |         | 8      |         |        | 10     |        |        | 12-1/2 |        |        | 15-3/4 |        |         | 20     |  | 25  |  |
| Taper Acc. to ASA | 5      | 5      | 6       | 5      | 6       | 8      | 6      | 8      | 6      | 8      | 11     | 8      | 11     | 11     | 15      |        |  |     |  |
| A                 | 3.2505 | 3.2505 | 4.1880  | 3.2505 | 4.1880  | 5.5007 | 4.1880 | 5.5007 | 4.1880 | 5.5007 | 7.7507 | 5.5007 | 7.7507 | 7.7507 | 11.2509 |        |  |     |  |
| B                 | —      | —      | —       | 4.1260 | —       | —      | 5.2520 | —      | 5.2520 | 6.7480 | —      | 6.7480 | 9.2520 | —      | —       |        |  |     |  |
| B1                | 2-7/16 | 2-7/16 | 3 1/4   | —      | 3-1/4   | 4-3/8  | —      | 4-3/8  | —      | —      | 6-1/2  | —      | —      | —      | 6-1/2   | 9-3/4  |  |     |  |
| C                 | —      | —      | —       | 0.5629 | —       | —      | 0.6299 | —      | 0.6299 | 0.7087 | —      | 0.7087 | 0.7874 | —      | —       |        |  |     |  |
| C1                | 9/16   | 9/16   | 5/8     | —      | 5/8     | 11/16  | —      | 11/16  | —      | —      | 3/4    | —      | —      | 3/4    | 13/16   |        |  |     |  |
| D1                | 1.6535 | 1.6535 | 2.16535 | 2.9921 | 2.16535 | 2.9921 | 4.0551 | 3.1496 | 4.0551 | 5.3543 | 5.1181 | 5.3543 | 7.5905 | 5.1181 | 7.5905  |        |  |     |  |
| H 3500            | 2.6881 | 3.0709 |         |        | 3.5309  |        |        | 3.7874 |        |        | 4.2520 |        |        | —      |         | —      |  |     |  |
| H 3200            | 3.2087 | 3.5827 |         |        | 4.0748  |        |        | 4.6338 |        |        | 5.0591 |        |        | 5.7480 |         | 6.4960 |  |     |  |
| H 3600            | 3.2087 | 3.5827 |         |        | 4.0748  |        |        | 4.6338 |        |        | 5.0591 |        |        | 5.7480 |         | 6.4960 |  |     |  |

# Technical Data For Self-Centering Scroll Chucks



## SELF-CENTERING SCROLL CHUCKS

### Clamping Ranges (Inches)



| Chuck Size |      | Jaws       |            |             |            |             |             |             |            |             |            |
|------------|------|------------|------------|-------------|------------|-------------|-------------|-------------|------------|-------------|------------|
|            |      | D1         |            | D2          |            | D3 Max.     |             | D4 Max.     |            | D5 Max.     |            |
| mm         | Inch | Solid      | Reversible | Solid       | Reversible | Solid       | Reversible  | Solid       | Reversible | Solid       | Reversible |
| 80         | 3    | 0.08-1.06  | —          | 0.87-1.81   | —          | 1.77-2.72   | —           | 0.98-1.97   | —          | 1.89-2.80   | —          |
| 100        | 4    | 0.12-1.30  | —          | 0.98-2.20   | —          | 2.20-3.43   | —           | 1.26-2.44   | —          | 2.44-3.66   | —          |
| 125        | 5    | 0.12-1.97  | 0.12-1.97  | 1.34-2.91   | 1.34-2.99  | 2.83-4.53   | 2.95-4.65   | 1.50-3.27   | 2.05-3.78  | 3.15-4.92   | 3.74-4.92  |
| 160        | 6    | 0.12-2.52  | 0.12-2.52  | 1.65-3.94   | 1.65-3.82  | 3.70-6.06   | 3.46-5.75   | 1.97-4.21   | 2.44-4.76  | 3.86-6.30   | 4.53-6.30  |
| 200        | 8    | 0.16-3.54  | 0.16-3.54  | 2.05-5.31   | 1.97-5.12  | 4.72-7.95   | 4.13-7.48   | 2.36-5.71   | 2.83-6.14  | 5.12-7.87   | 5.24-7.87  |
| 250        | 10   | 0.20-4.65  | 0.20-4.65  | 2.44-6.85   | 2.28-6.30  | 5.70-10.43  | 4.92-9.25   | 3.03-7.40   | 3.38-7.75  | 6.30-9.84   | 6.30-9.84  |
| 315        | 12   | 0.20-5.16  | 0.20-5.16  | 3.07-7.87   | 2.56-7.16  | 6.77-11.77  | 5.70-10.43  | 3.54-8.46   | 4.06-8.90  | 7.48-12.40  | 7.48-12.40 |
| 400        | 16   | 0.39-7.09  | 0.39-7.09  | 3.38-9.92   | 2.83-8.98  | 8.27-14.96  | 5.50-12.95  | 4.05-10.71  | 5.00-11.57 | 9.05-15.75  | 9.05-15.75 |
| 500        | 20   | 0.79-9.25  | 0.79-9.25  | 4.72-13.19  | 4.72-16.14 | 18.74       | 7.87-19.10  | 14.76       | 4.33-15.75 | 19.69       | 7.48-19.69 |
| 630        | 25   | 1.18-13.19 | 1.18-13.19 | 6.30-18.31  | 5.51-23.23 | 24.80       | 8.27-26.20  | 19.17       | 4.72-22.44 | 24.80       | 7.88-24.80 |
| 800        | 32   | 3.54-12.00 | 3.46-15.59 | 11.50-26.77 | 7.87-25.75 | 18.03-31.50 | 10.79-28.74 | 10.79-21.02 | 7.09-25.12 | 17.32-27.56 | 10"-31"    |

### Gripping Power of the Self-Centering Chucks (lbs)

| Size of Chuck (in.)                | 3    | 4    | 5    | 6    | 8    | 10    | 12    | 16    | 20    | 25    | 32    |
|------------------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| Universal Chucks (Semi-steel body) | 2200 | 3750 | 5300 | 6800 | 8200 | 10000 | 12000 | 14300 | 16000 | 17600 | 19800 |
| Precision Chucks (Steel body)      | 2200 | 3750 | 5300 | 6800 | 8200 | 10000 | 12000 | 14300 |       |       |       |

### Recommended Max. Speeds for Self-Centering Chucks (rpm)

| Size of Chuck (in.)                | 3    | 4    | 5    | 6    | 8    | 10   | 12   | 16   | 20  | 25  | 32  |
|------------------------------------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Universal Chucks (Semi-steel body) | 4000 | 3500 | 3200 | 3000 | 2500 | 2000 | 1500 | 1000 | 700 | 500 | 350 |
| Precision Chucks (Steel body)      | 6000 | 5200 | 4800 | 4500 | 4000 | 3500 | 2800 | 2000 |     |     |     |

### Value of Balancing – for Precision Self-Centering Chucks Only

| Size of Chuck (in.)    | 3    | 4    | 5    | 6    | 8    | 10   | 12   | 16   |
|------------------------|------|------|------|------|------|------|------|------|
| Balancing (ounce-inch) | 0.15 | 0.22 | 0.32 | 0.44 | 0.62 | 0.87 | 1.25 | 1.94 |

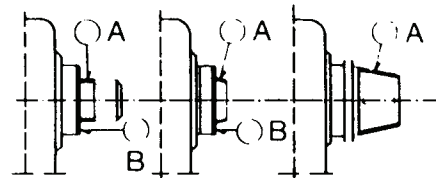
## SELF-CENTERING SCROLL CHUCKS

### Spindle Runout

To obtain the specified centering accuracy of a chuck mounted on a machine tool it is necessary:

- to reduce play in the spindle bearings to the allowable minimum;
- to ensure the machine spindle nose runout not to exceed the values specified
- to meet the basic requirements for correct mounting of chuck on the spindle nose, according to the chuck installation instruction

| Size of Chuck | Runouts on Universal and Precision Chucks |                 |                |
|---------------|---|-----------------|----------------|
|               | Radial Runout A                           | Radial Runout B | Axial Runout C |
| 3             | 0.0008                                    | 0.0010          | 0.0006         |
| 4             | 0.0008                                    | 0.0010          | 0.0006         |
| 5             | 0.0012                                    | 0.0014          | 0.0008         |
| 6             | 0.0012                                    | 0.0014          | 0.0008         |
| 8             | 0.0016                                    | 0.0018          | 0.0010         |
| 10            | 0.0016                                    | 0.0018          | 0.0010         |
| 12            | 0.0020                                    | 0.0022          | 0.0012         |
| 16            | 0.0024                                    | 0.0025          | 0.0012         |
| 20            | 0.0040                                    | 0.0040          | 0.0020         |
| 25            | 0.0040                                    | 0.0040          | 0.0020         |
| 32            | 0.0059                                    | 0.0059          | 0.0024         |



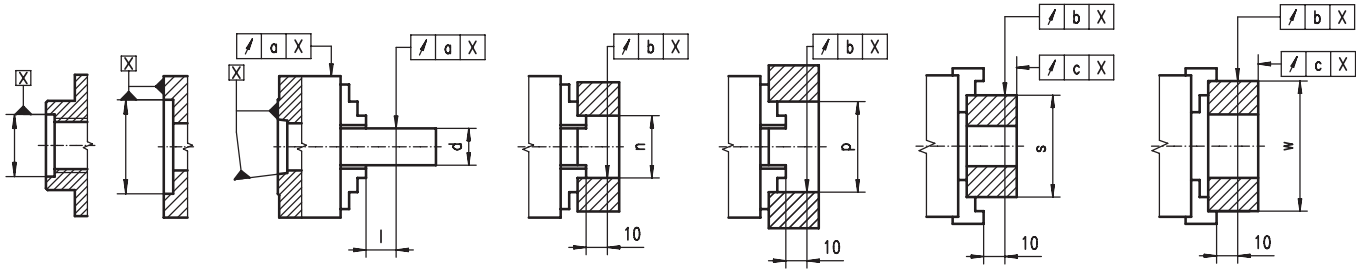
| Radial Runout A | Radial Runout B |
|-----------------|-----------------|
| 0.0002          | 0.00012         |



## Centering Accuracy For Self-Centering Scroll Chucks



Type: 3200, 3500, 3600, 3700, 3800

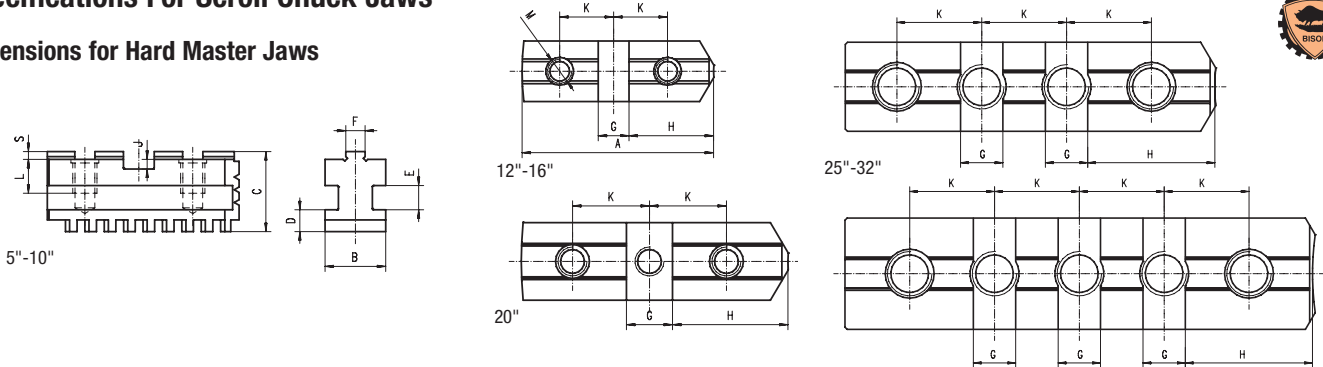


| Chuck Size               | 3-1/2" | 4"     | 5"     | 6"     | 8"     | 10"    | 12"     | 16"     | 20"     | 25"     | 32"     | 36"     | 40"     |
|--------------------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| d (in)                   | 0.3937 | 0.3937 | 0.7087 | 0.7087 | 1.1811 | 1.1811 | 2.0866  | 2.0866  | 2.9528  | 2.9528  | 6.2992  | 9.8425  | 9.8425  |
| d (in)                   | -      | 0.5512 | 0.9843 | 1.1811 | 1.5748 | 2.0866 | 2.9528  | 3.9370  | 3.9370  | 4.9213  | 7.8740  | 12.4016 | 12.4016 |
| d (in)                   | 0.5512 | 0.7087 | 1.1811 | 1.5748 | 2.0866 | 2.9528 | 3.9370  | 4.9213  | 4.9213  | 6.2992  | 9.8425  | 15.7480 | 15.7480 |
| l (in)                   | 1.5748 | 1.5748 | 2.3622 | 2.3622 | 3.1496 | 3.1496 | 4.7244  | 4.7244  | 6.2992  | 6.2992  | 6.2992  | 6.2992  | 6.2992  |
| n (in)                   | 1.5748 | 1.5748 | 1.9685 | 1.9685 | 3.1496 | 3.1496 | 4.9213  | 4.9213  | 7.8740  | 7.8740  | 12.7953 | 19.6850 | 19.6850 |
| p (in)                   | 2.3622 | 2.9528 | 3.9370 | 5.3150 | 6.3780 | 7.8740 | 9.9213  | 11.1024 | 11.1024 | 12.7953 | 19.6850 | 24.8031 | 24.8031 |
| s (in)                   | 1.3780 | 1.9685 | 2.4409 | 3.4646 | 3.7795 | 5.9055 | 8.2677  | 9.8425  | 11.8110 | 15.7480 | 15.7480 | 19.6850 | 19.6850 |
| w - Hard Solid Jaws (in) | 2.4803 | 3.1496 | 3.9370 | 3.9370 | 6.2992 | 6.2992 | 9.8425  | 9.8425  | 15.7480 | 15.7480 | 19.6850 | -       | -       |
| w - Hard 2pc Jaws (in)   | -      | -      | 4.7244 | 5.9055 | 7.2835 | 8.8583 | 11.8110 | 13.7795 | 15.7480 | 15.7480 | 19.6850 | 24.8031 | 24.8031 |

| Chuck Type                                     |   | Centering Accuracy (in) |        |        |        |        |        |        |        |        |        |        |        |
|--|---|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>High Precision Series</b>                   |   |                         |        |        |        |        |        |        |        |        |        |        |        |
| 3500-l   | a | 0.0004                  | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0020 | 0.0028 |        |        |        |        |        |
| 3500-l   | b | 0.0005                  | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0022 | 0.0030 |        |        |        |        |        |
| 3500-l   | c | 0.0003                  | 0.0004 | 0.0005 | 0.0006 | 0.0006 | 0.0012 | 0.0020 |        |        |        |        |        |
| <b>Fine Adjustment &amp; Steel Body Chucks</b> |   |                         |        |        |        |        |        |        |        |        |        |        |        |
| 3500   | a | 0.0008                  | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0039 | 0.0039 |        |        |        |        |        |
| 3700   | b | 0.0010                  | 0.0014 | 0.0018 | 0.0022 | 0.0026 | 0.0039 | 0.0039 |        |        |        |        |        |
| 3800   | c | 0.0006                  | 0.0008 | 0.0010 | 0.0012 | 0.0012 | 0.0020 | 0.0020 |        |        |        |        |        |
| <b>Cast Iron Body Chucks</b>                   |   |                         |        |        |        |        |        |        |        |        |        |        |        |
| 3200   | a | 0.0008                  | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0039 | 0.0039 | 0.0059 | 0.0059 | 0.0059 | 0.0059 | 0.0059 |
| 3600   | b | 0.0010                  | 0.0014 | 0.0018 | 0.0022 | 0.0026 | 0.0039 | 0.0039 | 0.0059 | 0.0059 | 0.0059 | 0.0059 | 0.0059 |
|  | c | 0.0006                  | 0.0008 | 0.0010 | 0.0012 | 0.0012 | 0.0020 | 0.0020 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0024 |
| 3284   | a |                         | 0.0020 |        | 0.0031 |        |        |        |        |        |        |        |        |
| 3285   | b |                         | 0.0030 |        | 0.0030 |        |        |        |        |        |        |        |        |
|  | c |                         | 0.0016 |        | 0.0028 |        |        |        |        |        |        |        |        |

## Specifications For Scroll Chuck Jaws

### Dimensions for Hard Master Jaws

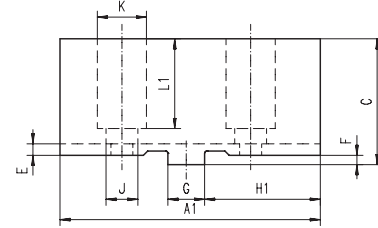
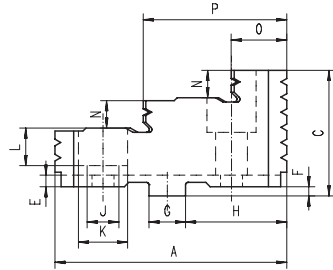
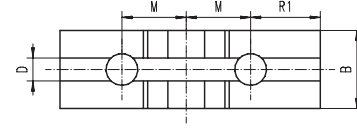
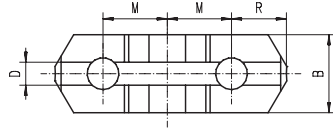


| Chuck Size           | 5"       | 6"        | 8"        | 10"    | 12"    | 16"    | 20"    | 25"    | 32"    | 36"     | 40"     |
|----------------------|----------|-----------|-----------|--------|--------|--------|--------|--------|--------|---------|---------|
| A                    | 2.1260   | 2.5591    | 3.1102    | 3.6220 | 4.3307 | 5.1181 | 6.5354 | 8.2677 | 8.8583 | 11.1417 | 12.9134 |
| B                    | 0.7874   | 0.7874    | 0.9843    | 1.1024 | 1.2598 | 1.4173 | 1.5748 | 1.9685 | 1.9685 | 2.7559  | 2.7559  |
| C                    | 1.1024   | 1.1417    | 1.2992    | 1.4173 | 1.5748 | 1.9291 | 2.1260 | 2.1457 | 2.1457 | 2.5197  | 2.5197  |
| D                    | 0.3150   | 0.3150    | 0.3543    | 0.4331 | 0.5000 | 0.5906 | 0.6299 | 0.6299 | 0.6299 | 0.8661  | 0.8661  |
| E                    | 0.3150   | 0.3150    | 0.3937    | 0.4724 | 0.4724 | 0.5512 | 0.5512 | 0.5512 | 0.5512 | 0.7874  | 0.7874  |
| F - 0.03             | 0.3126   | 0.3126    | 0.3126    | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000 | 0.5000  | 0.5000  |
| G + 0.01             | 0.4996   | 0.4996    | 0.4996    | 0.7496 | 0.7638 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496  | 0.7496  |
| H                    | 0.8898   | 1.1260    | 1.3740    | 1.5630 | 1.8740 | 2.2480 | 2.2480 | 2.2480 | 2.2480 | 2.2480  | 2.2480  |
| J                    | 0.1575   | 0.1575    | 0.1575    | 0.1575 | 0.1575 | 0.2835 | 0.2835 | 0.2835 | 0.2835 | 0.2835  | 0.2835  |
| K                    | 0.6299   | 0.7500    | 0.8760    | 1.0630 | 1.2500 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000  | 1.5000  |
| L                    | 0.5315   | 0.5512    | 0.5512    | 0.6299 | 0.6299 | 0.8661 | 1.2795 | 1.2795 | 1.2795 | 1.4173  | 1.4173  |
| M                    | M8 / M6* | M10 / M8* | M10 / M8* | M12    | M12    | M16    | M20    | M20    | M20    | M22     | M22     |
| S                    | 0.1260   | 0.1260    | 0.1260    | 0.1260 | 0.1260 | 0.1260 | 0.1260 | 0.1260 | 0.1260 | 0.1260  | 0.1260  |
| Approx. weight (lbs) | 0.220    | 0.396     | 0.660     | 1.06   | 1.69   | 2.42   | 4.80   | 7.35   | 7.48   | 14.63   | 16.94   |

\* for 3865

# Specifications For Scroll Chuck Jaws

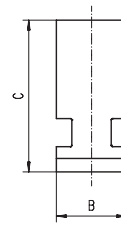
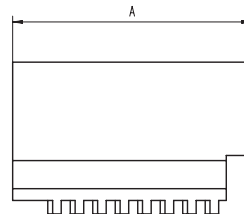
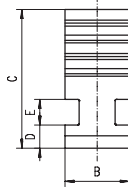
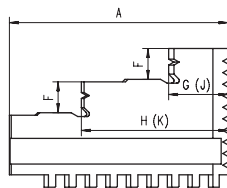
## Dimensions for Hard Top Jaws & Soft Top Jaws



| Chuck Size           | 5"              | 6"              | 8"              | 10"    | 12"    | 16"    | 20"    | 25"    | 32"    | 36"    | 40"    |
|----------------------|-----------------|-----------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| A                    | 2.2047          | 2.6378          | 3.1496          | 3.7402 | 4.3307 | 5.000  | 5.000  | 5.000  | 5.000  | 6.8898 | 6.8898 |
| A1                   | 2.5197          | 3.0709          | 3.5433          | 4.1732 | 4.7244 | 5.5118 | 5.5118 | 6.2992 | 6.2992 | 7.4803 | 7.4803 |
| B                    | 0.8661          | 0.9843          | 1.0630          | 1.2795 | 1.4567 | 1.6535 | 1.6535 | 2.0472 | 2.0472 | 2.9528 | 2.9528 |
| B 3100               | -               | 1.5748          | 1.5748          | 1.8504 | 2.0472 | 2.0472 | -      | -      | -      | -      | -      |
| C                    | 1.5157          | 1.6339          | 1.6339*/1.7126  | 2.0276 | 2.1654 | 2.5394 | 2.9331 | 3.2283 | 3.2283 | 3.8189 | 3.8189 |
| D                    | 0.3130          | 0.3130          | 0.3130          | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 |
| E                    | 0.1575          | 0.1575          | 0.1575          | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1772 | 0.1772 |
| F                    | 0.1260          | 0.1260          | 0.1260          | 0.1260 | 0.1260 | 0.2480 | 0.2480 | 0.2480 | 0.2480 | 0.2480 | 0.2480 |
| G                    | 0.4996          | 0.4996          | 0.4996          | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 |
| H                    | 0.8898          | 1.1260          | 1.3740          | 1.5630 | 1.8740 | 2.2480 | 2.2480 | 2.2480 | 2.2480 | 3.7480 | 3.7480 |
| H1                   | 0.9843          | 1.3386          | 1.5748          | 1.7717 | 2.0866 | 2.4803 | 2.4803 | 2.4803 | 2.4803 | 4.1339 | 4.1339 |
| J                    | 0.3543/0.2598** | 0.4331/0.3543** | 0.4331/0.3543** | 0.5512 | 0.5512 | 0.7087 | 0.8661 | 0.8661 | 0.8661 | 0.9449 | 0.9449 |
| K                    | 0.5906/0.4331** | 0.7087/0.5512** | 0.7087/0.5512** | 0.7874 | 0.7874 | 1.0236 | 1.2992 | 1.2992 | 1.2992 | 1.3780 | 1.3780 |
| L                    | 0.3937          | 0.4724          | 0.4724          | 0.5709 | 0.5709 | 0.7283 | 0.8268 | 0.8268 | 0.8268 | 0.9055 | 0.9055 |
| L1                   | 1.0236          | 1.1417          | 1.2205          | 1.4961 | 1.5748 | 1.7913 | 2.2047 | 2.5197 | 2.5197 | 3.0709 | 3.0709 |
| M                    | 0.6299          | 0.7500          | 0.8760          | 1.0630 | 1.2500 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000 |
| N                    | 0.3150          | 0.3346          | 0.3740          | 0.4724 | 0.5118 | 0.5315 | 0.6693 | 0.8268 | 0.8268 | 1.1024 | 1.1024 |
| O                    | 0.5709          | 0.7087          | 0.8465          | 0.9646 | 1.0433 | 1.0630 | 1.9685 | 2.0079 | 2.0079 | 1.8898 | 1.8898 |
| P                    | 1.3780          | 1.6339          | 2.0079          | 2.3228 | 2.3772 | 3.0118 | 3.4646 | 3.5039 | 3.5039 | 4.8819 | 4.8819 |
| R                    | 0.5118          | 0.6299          | 0.7480          | 0.8661 | 1.3937 | 1.1220 | 1.1220 | 1.1220 | 1.1220 | 2.6378 | 2.6378 |
| R1                   | 0.5906          | 0.8268          | 0.9449          | 1.0827 | 1.2087 | 1.3543 | 1.3543 | 1.3543 | 1.3543 | 3.0118 | 3.0118 |
| Approx. Weight (lbs) |                 |                 |                 |        |        |        |        |        |        |        |        |
| Hard Jaws            | 0.3740          | 0.5720          | 0.7920          | 1.364  | 1.98   | 2.97   | 3.41   | 4.93   | 4.93   | 12.10  | 12.10  |
| Soft Jaws            | 0.6600          | 1.012           | 1.430           | 2.530  | 3.52   | 4.84   | 5.28   | 9.24   | 9.24   | -      | -      |

\* for 3100 \*\* for 3865

## Dimensions for Hard Solid & Soft Solid Jaws



| Chuck Size           | 3"     | 4"     | 5"     | 6"     | 8"     | 10"    | 12"    | 16"    | 20"    | 25"    | 32"    |
|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A                    | 1.2598 | 1.6535 | 2.0079 | 2.7559 | 3.3465 | 4.1339 | 4.9213 | 5.7087 | 7.0866 | 8.8583 | 8.8583 |
| B                    | 0.4331 | 0.5906 | 0.7874 | 0.7874 | 0.9843 | 1.1024 | 1.2598 | 1.4173 | 1.5748 | 1.9685 | 1.9685 |
| C                    | 1.1024 | 1.2598 | 1.5748 | 2.0866 | 2.1260 | 2.4803 | 2.8740 | 3.6220 | 3.9370 | 4.3307 | 4.3307 |
| D                    | 0.2362 | 0.2362 | 0.3150 | 0.3150 | 0.3543 | 0.4331 | 0.5000 | 0.5906 | 0.6299 | 0.6299 | 0.6299 |
| E                    | 0.2362 | 0.2362 | 0.3150 | 0.3150 | 0.3937 | 0.4724 | 0.4724 | 0.5512 | 0.5512 | 0.5512 | 0.5512 |
| F                    | 0.2362 | 0.2756 | 0.3150 | 0.3937 | 0.4724 | 0.5512 | 0.7087 | 0.8661 | 1.0236 | 1.1024 | 1.1024 |
| G                    | 0.3740 | 0.4331 | 0.5118 | 0.7480 | 0.9055 | 1.1024 | 1.3583 | 1.4173 | 1.9685 | 2.5984 | 2.5984 |
| H                    | 0.8268 | 1.0630 | 1.3189 | 1.7717 | 2.2441 | 2.7362 | 3.2677 | 3.8976 | 4.7047 | 5.8661 | 5.8661 |
| J                    | 0.3740 | 0.4724 | 0.5118 | 0.8661 | 0.9055 | 1.1024 | 1.3583 | 1.4173 | 1.9685 | 2.5984 | 2.5984 |
| K                    | 0.8268 | 1.0827 | 1.3189 | 1.8701 | 2.2441 | 2.7362 | 3.2677 | 3.8976 | 4.7047 | 5.8661 | 5.8661 |
| Approx. Weight (lbs) |        |        |        |        |        |        |        |        |        |        |        |
| Hard Jaws            | 0.066  | 0.198  | 0.396  | 0.792  | 1.10   | 1.76   | 2.90   | 5.17   | 7.39   | 12.76  | 12.76  |
| Soft Jaws            | 0.154  | 0.286  | 0.572  | 1.10   | 1.76   | 2.99   | 4.18   | 5.41   | 11.00  | 18.39  | 18.39  |

## Specifications For Chuck Adapters

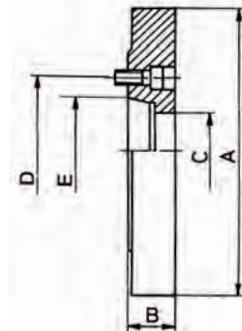


### CAST IRON ADAPTERS (BACK PLATES)

For Plain Back Lathe Chucks

#### 8212 A Mount

| Chuck Size (in.) | Taper Size | A     | B    | C    | D     | E    | Weight lbs. |
|------------------|------------|-------|------|------|-------|------|-------------|
| 5                | A-6        | 5.00  | 1.02 | 2.13 | 5.25  | 4.19 | 6.5         |
| 5                | A-8        | 5.00  | 1.81 | 3.15 | 6.75  | 5.50 | 3.3         |
| 6                | A-5        | 6.40  | 1.00 | 3.13 | 4.125 | 3.25 | 6.5         |
| 8                | A-5        | 7.99  | 1.50 | 2.17 | 4.125 | 3.25 | 19.0        |
| 8                | A-6        | 7.99  | 1.30 | 2.17 | 5.25  | 4.19 | 15.5        |
| 10               | A-6        | 9.96  | 1.97 | 3.17 | 5.25  | 4.19 | 38.0        |
| 10               | A-8        | 9.96  | 1.81 | 3.17 | 6.75  | 5.50 | 33.0        |
| 12               | A-6        | 12.52 | 1.30 | 4.06 | 5.25  | 4.19 | 45.0        |
| 12               | A-8        | 12.52 | 2.17 | 4.06 | 6.75  | 5.50 | 61.7        |
| 16               | A-8        | 15.94 | 1.70 | 5.36 | 6.75  | 5.50 | 85.0        |
| 16               | A-11       | 15.94 | 2.95 | 5.36 | 9.25  | 7.75 | 140.9       |
| 20               | A-11       | 19.88 | 1.77 | 7.59 | 9.25  | 7.75 | 133.0       |
| 25               | A-11       | 25.00 | 1.77 | 7.59 | 9.25  | 7.75 | 223.0       |



#### Semi-machined Adapters

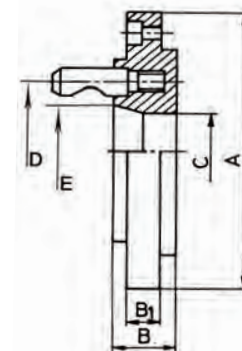
For plain back chucks, with spotted holes for A1 and A2 spindle noses.

#### 8207 A2 Mount

| Chuck Size (in.) | Taper Size | A     | B    | C    | Weight lbs. |
|------------------|------------|-------|------|------|-------------|
| 36, 40, 49       | A2-15      | 21.85 | 2.76 | 7.48 | 242.0       |
| 36, 40, 49       | A2-20      | 21.85 | 3.15 | 7.48 | 249.0       |

#### 8240

| Chuck Size (in.) | Taper Size | A     | B    | B1   | C    | D    | E     | Weight lbs. |
|------------------|------------|-------|------|------|------|------|-------|-------------|
| 5                | D-3        | 4.94  | 1.02 | 0.57 | 2.02 | 2.78 | 2.13  | 5.3         |
| 5                | D-4        | 4.94  | 1.02 | 0.87 | 2.40 | 3.25 | 2.50  | 5.3         |
| 6                | D-3        | 6.32  | 1.06 | 0.71 | 2.02 | 2.78 | 2.13  | 9.5         |
| 6                | D-4        | 6.32  | 1.06 | 0.71 | 2.40 | 3.25 | 2.50  | 9.5         |
| 6                | D-5        | 6.32  | 1.18 | 1.00 | 3.13 | 4.13 | 3.25  | 9.5         |
| 8                | D-3        | 7.89  | 1.06 | 0.71 | 2.02 | 2.78 | 2.13  | 15.4        |
| 8                | D-4        | 7.98  | 1.06 | 0.71 | 2.40 | 3.25 | 2.50  | 15.4        |
| 8                | D-5        | 7.98  | 1.18 | 0.71 | 3.13 | 4.13 | 3.25  | 15.4        |
| 8                | D-6        | 7.89  | 1.44 | 1.26 | 4.06 | 5.25 | 4.19  | 15.4        |
| 10               | D-5        | 9.86  | 1.18 | 0.87 | 3.13 | 4.13 | 3.25  | 24.3        |
| 10               | D-6        | 9.86  | 1.44 | 0.87 | 4.06 | 5.25 | 4.19  | 24.3        |
| 10               | D-8        | 9.86  | 1.54 | 1.36 | 5.35 | 6.75 | 5.50  | 39.7        |
| 12               | D-6        | 12.42 | 1.56 | 0.94 | 4.06 | 5.25 | 4.19  | 39.7        |
| 12               | D-8        | 12.42 | 1.65 | 0.94 | 5.35 | 6.75 | 5.50  | 39.7        |
| 12               | D-11       | 12.42 | 1.85 | 1.63 | 7.59 | 9.25 | 7.75  | 39.7        |
| 16               | D-6        | 15.77 | 1.44 | 1.10 | 4.06 | 5.25 | 4.19  | 79.0        |
| 16               | D-8        | 15.77 | 1.54 | 1.10 | 5.35 | 6.75 | 5.50  | 79.0        |
| 16               | D-11       | 15.77 | 1.85 | 1.10 | 7.59 | 9.25 | 7.75  | 79.0        |
| 20               | D-8        | 19.70 | 1.54 | 1.14 | 5.35 | 6.75 | 5.50  | 132.0       |
| 20               | D-11       | 19.70 | 1.85 | 1.14 | 7.59 | 9.25 | 7.75  | 132.0       |
| 25               | D-8        | 24.82 | 1.54 | 1.14 | 5.35 | 9.25 | 7.75  | 232.0       |
| 25               | D-11       | 24.82 | 1.85 | 1.14 | 7.59 | 13.0 | 11.25 | 232.0       |

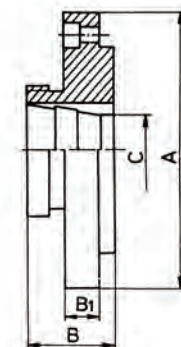


#### Fully-machined Adapters

For plain back, self-centering chucks – designed for direct mounting on camlock spindle noses.

#### 8250

| Chuck Size (in.) | Taper Size | Thread    | A     | B    | B1   | C    | Weight lbs. |
|------------------|------------|-----------|-------|------|------|------|-------------|
| 6                | L00        | 3-3/4"-6  | 6.32  | 2.13 | 2.20 | 0.71 | 13.0        |
| 6                | L0         | 4-1/2"-6  | 6.32  | 2.52 | 2.60 | 0.71 | 13.0        |
| 8                | L00        | 3-3/4"-6  | 7.91  | 2.13 | 2.20 | 0.71 | 22.0        |
| 8                | L0         | 4-1/2"-6  | 7.91  | 2.52 | 2.60 | 0.71 | 22.0        |
| 8                | L1         | 6"-6      | 7.91  | 2.99 | 3.35 | 0.71 | 22.0        |
| 10               | L00        | 3-3/4"-6  | 9.88  | 2.13 | 2.20 | 0.83 | 33.0        |
| 10               | L0         | 4-1/2"-6  | 9.88  | 2.52 | 2.60 | 0.83 | 33.0        |
| 10               | L1         | 6"-6      | 9.88  | 2.99 | 3.35 | 0.83 | 33.0        |
| 10               | L2         | 7-3/4"-5  | 9.88  | 3.50 | 4.29 | 0.83 | 33.0        |
| 12               | L0         | 4-1/2"-6  | 12.44 | 2.52 | 2.60 | 1.10 | 57.0        |
| 12               | L1         | 6"-6      | 12.44 | 2.99 | 3.35 | 1.10 | 57.0        |
| 12               | L2         | 7-3/4"-5  | 12.44 | 3.50 | 4.29 | 1.10 | 57.0        |
| 16               | L0         | 4-1/2"-6  | 15.83 | 2.52 | 2.60 | 1.10 | 95.0        |
| 16               | L1         | 6"-6      | 15.83 | 2.99 | 3.35 | 1.10 | 95.0        |
| 16               | L2         | 7-3/4"-5  | 15.83 | 3.50 | 4.29 | 1.10 | 95.0        |
| 16               | L3         | 10-3/8"-4 | 15.83 | 4.02 | 5.43 | 1.10 | 95.0        |
| 20               | L2         | 7-3/4"-5  | 19.76 | 3.50 | 4.29 | 1.14 | 159.0       |
| 20               | L3         | 10-3/8"-4 | 19.76 | 4.02 | 5.43 | 1.14 | 159.0       |



#### Fully-machined Adapters

For plain back, self-centering chucks – designed for direct mounting on L-type spindle noses.



# Independent Lathe Chucks

## Bison 4-Jaw Independent Lathe Chucks

Four-jaw standard duty independent lathe chucks with solid reversible jaws, spheroidal graphite iron body. These chucks feature jaws that are individually adjustable, allow firm gripping of odd shaped work, and the four jaws allow a square component to be perfectly centered to the chuck while achieving maximum gripping force. The jaws are made of high quality carbon steel and hardened. Thrust bearings and operating screws are made of case hardened steel.

Large chucks (diameter 10" to 32") are supplied with T-slots

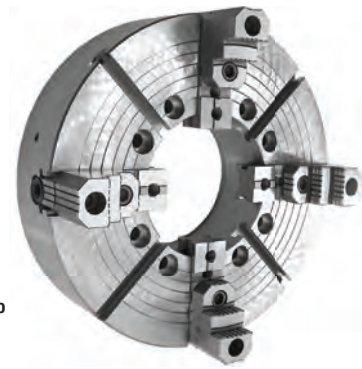
## 4-Jaw Independent Steel Body Oil Country Chucks

### Features:

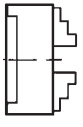
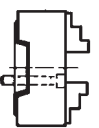
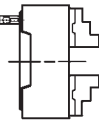
- Steel body extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces
- Chucks may work individually or in pairs, mounted on opposite sides of the lathe spindle, ensuring the same vertical position of the jaws in both chucks
- Large through hole compared to the outside diameter of the chuck body
- High gripping force
- Able to machine very long workpieces
- High machining accuracy

### Application:

- This precision chuck, with increased gripping accuracy, is designed for gripping long pipes during heavy duty machining for conventional and specialized machine-tools



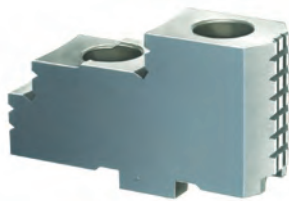
3-Jaw self-centering scroll large through hole chucks also available see page's: H55-57

| Mounting  | Chuck Size | 16"       | 16"       | 20"                        | 20"       | 25"       | 25"       | 25"                        | 28"       | 28"       | 31-1/2"   | 31-1/2"   | 31-1/2"   | 40"       |           |
|---|------------|-----------|-----------|----------------------------|-----------|-----------|-----------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|   |            | Hole      | 5.3"      | 6.5"                       | 6.5"      | 8"        | 10.5"     | 10.5"                      | 12.5"     | 10.5"     | 12.5"     | 10.5"     | 12.5"     | 14.5"     | 20.5"     |
|   |            | Wt. lbs.  | 320       | 302                        | 449       | 414       | 682       | 649                        | 660       | 913       | 870       | 1,287     | 1,243     | 1,199     | 1,683     |
| <b>4307</b><br>Plain Back<br>      | Code No.   |           |           |                            |           |           |           |                            |           |           |           |           |           | 450495    |           |
|   | Price \$   |           |           |                            |           |           |           |                            |           |           |           |           |           |           | 38,170.30 |
| <b>4317</b><br>Short Taper<br>    | A2-8       | 450500    |           |                            |           |           |           |                            |           |           |           |           |           |           |           |
|   | Price \$   | 13,035.69 |           |                            |           |           |           |                            |           |           |           |           |           |           |           |
|   | A2-11      |           | 450505    | 450510                     |           |           |           |                            |           |           |           |           |           |           |           |
|   | Price \$   |           | 13,035.69 | 13,686.31                  |           |           |           |                            |           |           |           |           |           |           |           |
|   | A2-15      |           |           |                            | 450515    | 450520    |           |                            | 450530    |           | 450540    |           |           |           |           |
|   | Price \$   |           |           |                            | 13,686.31 | 16,337.08 |           |                            | 22,233.04 |           | 29,271.40 |           |           |           |           |
| A2-20   |            |           |           |                            |           |           | 450522    | 450525                     |           | 450535    |           | 450545    | 450547    |           |           |
| Price \$  |            |           |           |                            |           |           | 16,337.08 | 16,337.08                  |           | 22,233.04 |           | 29,271.40 | 27,741.84 |           |           |
| A2-28   |            |           |           |                            |           |           |           |                            |           |           |           |           |           | 450549    |           |
| Price \$  |            |           |           |                            |           |           |           |                            |           |           |           |           |           | 56,417.99 |           |
| <b>4347</b><br>Camlock Mount<br> | D1-8       | 450550    |           | 450560<br>(5.3" Hole Dia.) |           |           |           |                            |           |           |           |           |           |           |           |
|   | Price \$   | 11,269.09 |           | 17,252.50                  |           |           |           |                            |           |           |           |           |           |           |           |
|   | D1-11      |           | 450555    | 450565                     |           |           |           | 450570<br>(7.5" Hole Dia.) |           |           |           |           |           |           |           |
| Price \$  |            | 11,269.09 | 13,264.53 |                            |           |           | 23,640.10 |                            |           |           |           |           |           |           |           |

Engineering Data See Page: H64

## Hard Top Jaws For Oil Country Chucks

- Sold in sets



| Chuck Size    | Code No. | Price \$ |
|---------------|----------|----------|
| 15-3/4", 20"  | 450572   | 1,886.37 |
| 25", 28", 32" | 450574   | 2,803.17 |

## Hard Master Jaws For Oil Country Chucks

- Sold in sets



| Chuck Size    | Code No. | Price \$ |
|---------------|----------|----------|
| 15-3/4"       | 450576   | 2,289.09 |
| 20"           | 450578   | 4,987.14 |
| 25", 28", 32" | 450580   | 3,515.63 |

## Operating Screws



| Chuck Size | Hole Dia. | Code No. | Price \$ |
|------------|-----------|----------|----------|
| 15-3/4"    | 5.3"      | 450594   | 224.04   |
| 15-3/4"    | 6.5"      | 450596   | 231.23   |
| 20"        | 5.3"      | 450598   | 270.24   |
| 20"        | 6.5"      | 450600   | 270.24   |
| 20"        | 8.0"      | 450602   | 270.24   |
| 25"        | 10.5"     | 450604   | 356.18   |
| 25"        | 12.5"     | 450606   | 356.18   |
| 28"        | 10.5"     | 450608   | 381.21   |
| 28"        | 12.5"     | 450610   | 381.21   |
| 32"        | 10.5"     | 450612   | 457.66   |
| 32"        | 12.5"     | 450614   | 457.66   |

## Thrust Bearings



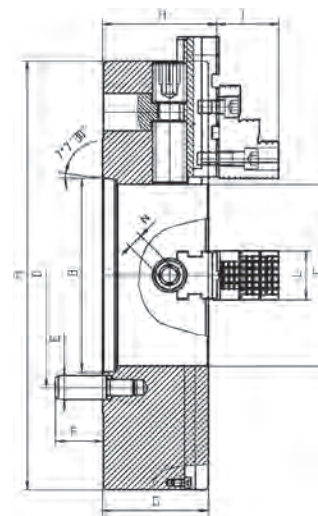
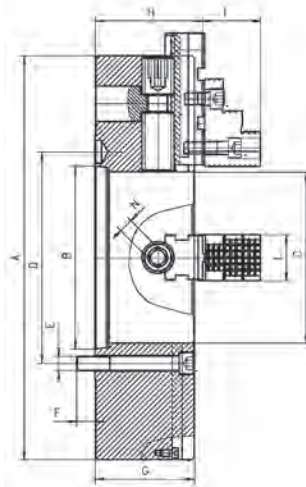
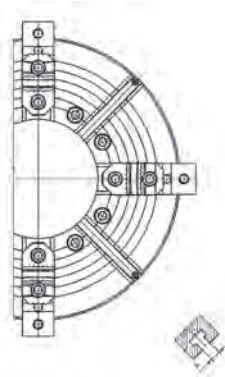
| Chuck Size | Code No. | Price \$ |
|------------|----------|----------|
| 15-3/4"    | 450582   | 226.51   |
| 20"        | 450584   | 217.11   |
| 25", 28"   | 450586   | 229.87   |
| 32"        | 450588   | 290.54   |

## Wrenches



| Chuck Size    | Code No. | Price \$ |
|---------------|----------|----------|
| 15-3/4", 20"  | 450590   | 189.13   |
| 25", 28", 32" | 450592   | 179.87   |

## Specifications For Oil Country Chucks



| Chuck Dia. A                     | Type of Mounting | Hole Dia. C (In.) | B +0.001" | D       | G    | H     | I     | K     | L     | N     | E       | F     | Max. RPM | Weight lbs. |
|----------------------------------|------------------|-------------------|-----------|---------|------|-------|-------|-------|-------|-------|---------|-------|----------|-------------|
| <b>Plain Back Type 4307</b>      |                  |                   |           |         |      |       |       |       |       |       |         |       |          |             |
| 40"                              | Plain Back       | 22.05             | 28.5433   | 25.4961 | 6.89 | 7.366 | 3.571 | 1.10  | 2.953 | 0.866 | 1-1/4-7 | 1.53  | 430      | 1690        |
| <b>A2 Direct Mount Type 4317</b> |                  |                   |           |         |      |       |       |       |       |       |         |       |          |             |
| 15-3/4"                          | A2-8             | 5.3               | 5.50075   | 6.750   | 5.71 | 6.067 | 2.981 | 0.709 | 2.362 | 0.748 | 5/8-11  | 0.961 | 1200     | 320         |
| 15-3/4"                          | A2-11            | 6.5               | 7.75075   | 9.250   | 5.71 | 6.067 | 2.981 | 0.709 | 2.362 | 0.748 | 3/4-10  | 1.118 | 1200     | 302         |
| 20"                              | A2-11            | 6.5               | 7.75075   | 9.250   | 5.71 | 6.067 | 2.981 | 0.866 | 2.362 | 0.748 | 3/4-10  | 1.118 | 1000     | 450         |
| 20"                              | A2-15            | 8.0               | 16.251    | 18.250  | 5.71 | 6.067 | 2.981 | 0.866 | 2.362 | 0.748 | 7/8-9   | 1.276 | 1000     | 414         |
| 25"                              | A2-15            | 10.5              | 11.251    | 13.00   | 6.10 | 6.579 | 3.571 | 0.866 | 2.953 | 0.866 | 7/8-9   | 1.343 | 850      | 684         |
| 25"                              | A2-20            | 12.55             | 16.251    | 18.252  | 6.10 | 6.579 | 3.571 | 0.866 | 2.953 | 0.866 | 1-8     | 1.50  | 850      | 662         |
| 28"                              | A2-15            | 10.5              | 11.251    | 13.00   | 6.10 | 6.579 | 3.571 | 0.866 | 2.953 | 0.866 | 7/8-9   | 1.34  | 750      | 915         |
| 28"                              | A2-20            | 12.55             | 16.251    | 18.252  | 6.10 | 6.579 | 3.571 | 0.866 | 2.953 | 0.866 | 1-8     | 1.50  | 750      | 873         |
| 32"                              | A2-15            | 10.5              | 11.251    | 13.00   | 6.10 | 6.972 | 3.571 | 0.866 | 2.953 | 0.866 | 7/8-9   | 1.34  | 600      | 1290        |
| 32"                              | A2-20            | 12.55             | 16.251    | 18.252  | 6.10 | 6.972 | 3.571 | 0.866 | 2.953 | 0.866 | 1-8     | 1.50  | 600      | 1246        |
| <b>D1 Direct Mount Type 4347</b> |                  |                   |           |         |      |       |       |       |       |       |         |       |          |             |
| 15-3/4"                          | D1-8             | 5.3               | 5.50075   | 6.75    | 5.71 | 6.067 | 2.981 | 0.709 | 2.362 | 0.748 | 1       | 2     | 1200     | 300         |
| 15-3/4"                          | D1-11            | 6.5               | 7.75075   | 9.25    | 5.71 | 6.067 | 2.981 | 0.709 | 2.362 | 0.748 | 1.25    | 2.4   | 1200     | 282         |
| 20"                              | D1-8             | 5.3               | 5.50075   | 6.75    | 5.71 | 6.067 | 2.981 | 0.866 | 2.362 | 0.748 | 1       | 2     | 1000     | 468         |
| 20"                              | D1-11            | 6.5               | 7.75075   | 9.252   | 5.71 | 6.067 | 2.981 | 0.866 | 2.362 | 0.748 | 1.25    | 2.4   | 1000     | 452         |
| 28"                              | D1-11            | 7.5               | 7.75075   | 9.252   | 6.10 | 6.579 | 3.57  | 0.866 | 2.953 | 0.866 | 1.25    | 2.4   | 750      | 993         |

Workholding, Clamping & Fixturing

## 4-Jaw Steel Body Independent Chucks — 2pc Hard Rev. Jaws



### Features:

- 4-Jaw, independent chuck with manual gripping, and a high quality steel body
- Steel body extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces
- 4-Jaws ensure the precise centering of square-shaped workpieces with maximum permitted gripping force
- Chucks with diameters 10" and above are equipped with additional T-slots, permitting the addition of extra jaws
- Mounted on the machine tool spindle from the back of the chuck, using the adapter plate

### Application:

- This precision chuck, with increased gripping accuracy, is made for all types of very high precision workshop machining operations on conventional lathes
- Suitable for machining square and round workpieces



| Mounting<br>4307<br>Plain Back | Chuck Size | 8"        | 10"      | 12"       | 16"       | 20"       | 25"       | 32"       | 36"       | 40"       | 49"       |       |
|--------------------------------|------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
|                                |            | Hole Size | 1.969    | 2.559     | 3.149     | 3.930     | 4.921     | 6.299     | 7.874     | 7.480     | 7.480     | 7.480 |
| Weight lbs.                    |            | 30        | 55       | 86        | 135       | 231       | 359       | 702       | 770       | 902       | 2090      |       |
|                                | Code No.   | 451005    | 451010   | 451015    | 451020    | 451025    | 451030    | 451035    | 451040    | 451045    | 451050    |       |
|                                | Price \$   | 2,709.90  | 3,050.74 | 4,138.78  | 5,857.08  | 9,994.29  | 13,765.60 | 25,542.32 | 34,837.61 | 40,275.82 | 33,852.61 |       |
|                                |            | D1-3      | 451202   | 451204    |           |           |           |           |           |           |           |       |
|                                |            | Price \$  | 2,361.09 | 2,773.44  |           |           |           |           |           |           |           |       |
|                                |            | D1-4      | 451200   | 451206    |           |           |           |           |           |           |           |       |
|                                |            | Price \$  | 2,361.09 | 2,818.69  |           |           |           |           |           |           |           |       |
|                                |            | D1-5      | 451205   | 451208    | 451212    |           |           |           |           |           |           |       |
|                                |            | Price \$  | 2,361.09 | 2,818.69  | 4,594.00  |           |           |           |           |           |           |       |
|                                |            | D1-6      | 451210   |           | 451225    |           |           |           |           |           |           |       |
|                                |            | Price \$  | 3,427.49 |           | 4,468.77  |           |           |           |           |           |           |       |
|                                |            | D1-8      |          | 451220    | 451230    | 451240    | 451250    | 451265    |           |           |           |       |
|                                |            | Price \$  |          | 2,268.09  | 4,468.77  | 6,518.60  | 9,535.14  | 14,752.04 |           |           |           |       |
| D1-11                          |            |           |          |           | 451245    | 451255    | 451270    | 451280    |           | 451226    |           |       |
| Price \$                       |            |           |          |           | 6,518.60  | 10,350.79 | 13,017.59 | 25,016.33 |           | 43,935.30 |           |       |
| D1-15                          |            |           |          |           | 451260    | 451275    | 451285    |           | 451228    | 451326    |           |       |
| Price \$                       |            |           |          |           | 2,174.08  | 14,752.04 | 25,016.33 |           | 43,935.30 | 55,986.81 |           |       |
| D1-20                          |            |           |          |           |           |           | 451218    |           | 451232    |           |           |       |
| Price \$                       |            |           |          |           |           |           | 25,016.33 |           | 43,935.30 |           |           |       |
|                                | A1-4       |           | 451059   |           |           |           |           |           |           |           |           |       |
|                                | Price \$   |           | 2,586.64 |           |           |           |           |           |           |           |           |       |
|                                | A1-5       |           | 451061   | 451063    |           |           |           |           |           |           |           |       |
|                                | Price \$   |           | 2,120.39 | 4,513.65  |           |           |           |           |           |           |           |       |
|                                | A2-6       | 451100    | 451105   | 451115    | 451125    |           |           |           |           |           |           |       |
|                                | Price \$   | 2,361.09  | 4,011.11 | 5,785.59  | 6,117.74  |           |           |           |           |           |           |       |
|                                | A2-8       | 451110    | 451120   | 451130    | 451140    |           |           |           |           |           |           |       |
|                                | Price \$   | 3,053.55  | 5,444.49 | 6,324.09  | 9,841.94  |           |           |           |           |           |           |       |
|                                | A2-11      |           |          | 451135    | 451145    | 451155    | 451165    |           |           | 451080    |           |       |
|                                | Price \$   |           |          | 6,324.09  | 11,838.77 | 14,752.04 | 31,530.72 |           |           | 55,986.81 |           |       |
| A2-15                          |            |           |          | 451150    | 451160    | 451170    |           | 451175    | 451082    |           |           |       |
| Price \$                       |            |           |          | 11,838.77 | 13,974.00 | 28,011.18 |           | 41,918.17 | 55,986.81 |           |           |       |
| A2-20                          |            |           |          |           |           | 451070    |           | 451078    | 451084    |           |           |       |
| Price \$                       |            |           |          |           |           | 25,016.33 |           | 41,708.48 | 55,986.81 |           |           |       |
|                                | DIN 5      | 442100    | 442104   | 442110    |           |           |           |           |           |           |           |       |
|                                | Price \$   | 2,482.46  | 2,586.64 | 4,512.26  |           |           |           |           |           |           |           |       |
|                                | DIN 6      | 442102    | 442106   | 442112    | 442120    |           |           |           |           |           |           |       |
|                                | Price \$   | 2,361.09  | 2,586.64 | 4,512.26  | 6,342.56  |           |           |           |           |           |           |       |
|                                | DIN 8      | 442108    | 442114   | 442122    | 442128    | 442134    |           |           |           |           |           |       |
|                                | Price \$   | 2,586.64  | 4,512.26 | 6,342.56  | 9,841.94  | 14,752.04 |           |           |           |           |           |       |
|                                | DIN 11     |           | 442116   | 442124    | 442130    | 442136    | 442142    |           | 442150    | 442156    |           |       |
|                                | Price \$   |           | 4,512.26 | 6,342.79  | 9,841.94  | 14,752.04 | 25,016.33 |           | 41,915.90 | 55,986.81 |           |       |
|                                | DIN 15     |           |          | 442132    | 442138    | 442144    |           |           | 442152    | 442158    |           |       |
|                                | Price \$   |           |          | 9,841.94  | 14,752.04 | 25,016.33 |           |           | 41,915.90 | 55,986.81 |           |       |
|                                | DIN 20     |           |          |           |           |           |           |           | 442154    |           |           |       |
|                                | Price \$   |           |          |           |           |           |           |           | 41,915.90 |           |           |       |

### Spare Parts - See Page: H74

|                      |                                    |                        |  |                           |  |          |                      |  |               |
|----------------------|------------------------------------|------------------------|--|---------------------------|--|----------|----------------------|--|---------------|
| Standard Accessories |                                    | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |  | Soft top jaws |
|                      | Engineering Data See Pages: H75-79 |                        |  |                           |  |          |                      |  |               |

## 4-Jaw Steel Body Independent Chucks — Hard Solid Jaws




### Features:

- 4-Jaw, independent chuck with manual gripping, and a high quality steel body
- Steel body extends machine life while providing higher rigidity and greater wear resistance, enabling the chuck to withstand higher machining forces
- 4-Jaws ensure the precise centering of square-shaped workpieces with maximum permitted gripping force
- Chucks with diameters 10" and above are equipped with additional T-slots, permitting the addition of extra jaws
- Mounted on the machine tool spindle from the back of the chuck, using the adapter plate

### Application:

- This precision chuck, with increased gripping accuracy, is made for all types of very high precision workshop machining operations on conventional lathes
- Suitable for machining square and round workpieces



| Mounting  | Chuck Size  | 3-1/2"   | 5"       | 6"       | 8"       | 10"      | 12"      | 16"      | 20"      | 25"       | 32"       | 36"       | 40"       | 49"       |
|---|-------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| 4306<br>Plain Back  | Hole Size   | 1.000    | 1.023    | 1.653    | 1.969    | 2.559    | 3.149    | 3.930    | 4.921    | 6.299     | 7.874     | 7.480     | 7.480     | 7.480     |
|   | Weight lbs. | 3        | 8        | 9        | 30       | 55       | 86       | 135      | 231      | 359       | 702       | 770       | 902       | 2090      |
|  | Code No.    | 445800   | 445803   | 445804   | 451007   | 451012   | 451017   | 451022   | 451027   | 451032    | 451037    | 451042    | 451047    | 451052    |
|   | Price \$    | 1,268.50 | 1,567.37 | 1,288.89 | 1,746.53 | 2,109.04 | 3,947.53 | 5,359.62 | 7,960.48 | 11,937.39 | 22,117.00 | 34,033.77 | 37,151.16 | 54,628.22 |

### Spare Parts - See Page: H74

| Standard Accessories   | Optional Accessories  |
|--|---|
|  <p>1 set of solid jaws</p> |  <p>1 wrench</p>                   |
|  |  <p>1 set of soft solid jaws</p> |

Engineering Data See Pages: H75-79



## Indexable Boring Bars

Reduce machine time.  
Save on tooling costs.

See Pages E62-73



Workholding, Clamping & Fixturing



## 4-Jaw Cast Iron Body Independent Chucks — 2pc Hard Rev. Jaws



### Features:





- 4-Jaw, independent chuck with manual gripping, and a high quality cast iron body
- Chuck bodies in sizes up to 6" diameter, are made from steel
- 4-Jaws ensure the precise centering of square-shaped workpieces with maximum permitted gripping force
- Chucks with diameters 10" and above are equipped with additional T-slots, permitting the addition of extra jaws
- Mounted on the machine tool spindle from the back of the chuck, using the adapter plate

### Application:

- This precision chuck, with increased gripping accuracy, is made for all types of very high precision workshop machining operations on conventional lathes
- Suitable for machining square and round workpieces



| Mounting           | Chuck Size  | 8"       | 10"      | 12"      | 16"      | 20"                         | 25"                         | 32"       | 40"       |
|--------------------|-------------|----------|----------|----------|----------|-----------------------------|-----------------------------|-----------|-----------|
|                    |             | Hole***  | 1.968    | 2.559    | 3.149    | 3.937                       | 4.931                       | 6.299     | 7.874     |
| 4305<br>Plain Back | Weight lbs. | 32       | 55       | 88       | 140      | 233                         | 366                         | 700       | 902       |
|                    | Code No.    | 441264   | 441266   | 441268   | 441274   | 441276                      | 441278                      |           | 441284    |
|                    | Price \$    | 1,516.27 | 1,614.05 | 2,340.81 | 3,076.77 | 8,154.73                    | 6,343.72                    |           | 30,699.14 |
| 4315<br>A Taper    | A2-4        | 441800   | 441806   |          |          |                             |                             |           |           |
|                    | Price \$    | 1,784.52 | 2,004.08 |          |          |                             |                             |           |           |
|                    | A2-5        | 441802   | 441808   | 441814   |          |                             |                             |           |           |
|                    | Price \$    | 1,784.52 | 2,004.08 | 2,785.90 |          |                             |                             |           |           |
|                    | A2-6        | 441804   | 441810   | 441816   | 441820   | 441826                      |                             |           |           |
|                    | Price \$    | 1,784.52 | 2,004.08 | 2,785.90 | 3,629.60 | 5,051.99                    |                             |           |           |
|                    | A2-8        |          | 441812   | 441818   | 441822   | 441828                      | 441834                      |           |           |
|                    | Price \$    |          | 2,004.08 | 2,785.90 | 3,629.60 | 5,051.99                    | 6,491.74                    |           |           |
|                    | A2-11       |          |          |          | 441824   | 441830                      | 441836                      | 441842    |           |
|                    | Price \$    |          |          |          | 3,629.60 | 5,051.99                    | 7,630.81                    | 13,159.07 |           |
| A2-15              |             |          |          |          | 441832   | 441838                      | 441844                      |           |           |
| Price \$           |             |          |          |          | 5,176.19 | 6,846.48                    | 13,159.07                   |           |           |
| 4345<br>Camlock    | D1-3        | 442604   | 442612   |          |          |                             |                             |           |           |
|                    | Price \$    | 1,821.57 | 2,006.44 |          |          |                             |                             |           |           |
|                    | D1-4        | 442606   | 442614   |          |          |                             |                             |           |           |
|                    | Price \$    | 1,821.57 | 2,187.66 |          |          |                             |                             |           |           |
|                    | D1-5        | 442608   | 442616   | 442622   |          |                             |                             |           |           |
|                    | Price \$    | 1,821.57 | 2,006.44 | 2,711.19 |          |                             |                             |           |           |
|                    | D1-6        | 442610   | 442618   | 442624   | 442630   |                             |                             |           |           |
|                    | Price \$    | 1,821.57 | 2,006.44 | 2,711.19 | 3,578.62 |                             |                             |           |           |
|                    | D1-8        |          | 442620   | 442626   | 442632   | 442636                      | 442642<br>(5.00" hole dia.) |           |           |
|                    | Price \$    |          | 2,006.44 | 3,037.00 | 5,298.97 | 5,368.16                    | 6,737.88                    |           |           |
| D1-11              |             |          | 442628   |          | 442638   | 442644<br>(6.30" hole dia.) |                             |           |           |
| Price \$           |             |          | 2,711.19 |          | 3,906.49 | 10,493.55                   |                             |           |           |
| D1-15              |             |          |          |          | 442640   | 442646<br>(6.30" hole dia.) |                             |           |           |
| Price \$           |             |          |          |          | 5,529.18 | 6,940.12                    |                             |           |           |
| 4335<br>DIN Taper  | DIN 4       | 442200   |          |          |          |                             |                             |           |           |
|                    | Price \$    | 1,784.52 |          |          |          |                             |                             |           |           |
|                    | DIN 5       | 442202   | 442206   | 442212   | 442220   |                             |                             |           |           |
|                    | Price \$    | 1,784.52 | 2,004.08 | 2,785.90 | 3,629.60 |                             |                             |           |           |
|                    | DIN 6       | 442204   | 442208   | 442214   | 442222   | 442228                      |                             |           |           |
|                    | Price \$    | 1,784.52 | 2,004.08 | 2,785.90 | 3,629.60 | 5,051.99                    |                             |           |           |
|                    | DIN 8       |          | 442210   | 442216   | 442224   | 442230                      | 442236<br>(5.00" hole dia.) |           |           |
|                    | Price \$    |          | 2,004.08 | 2,785.90 | 3,629.60 | 5,051.99                    | 6,491.74                    |           |           |
|                    | DIN 11      |          |          | 442218   | 442226   | 442232                      | 442238<br>(6.30" hole dia.) |           |           |
|                    | Price \$    |          |          | 2,785.90 | 3,629.60 | 5,051.99                    | 6,491.74                    |           |           |
| DIN 15             |             |          |          |          | 442234   | 442240<br>(6.30" hole dia.) |                             |           |           |
| Price \$           |             |          |          |          | 5,704.69 | 6,846.48                    |                             |           |           |

| Spare Parts - See Page: H74 |   |                        |   |                           |   |          |                      |   |               |
|-----------------------------|---|------------------------|---|---------------------------|---|----------|----------------------|---|---------------|
| Standard Accessories        |  | 1 set of hard top jaws |  | 1 set of hard master jaws |  | 1 wrench | Optional Accessories |  | Soft top jaws |

Engineering Data See Pages: H75-79

## 4-Jaw Cast Iron Body Independent Chucks — Hard Solid Jaws



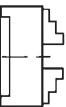
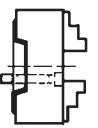
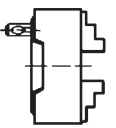
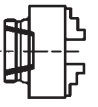
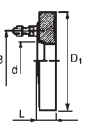
### Features:

- 4-Jaw, independent chuck with manual gripping, and a high quality cast iron body
- Chuck bodies in sizes up to 6" diameter, are made from steel
- 4-Jaws ensure the precise centering of square-shaped workpieces with maximum permitted gripping force
- Chucks with diameters 10" and above are equipped with additional T-slots, permitting the addition of extra jaws
- Mounted on the machine tool spindle from the back of the chuck, using the adapter plate

### Application:

- This precision chuck, with increased gripping accuracy, is made for all types of very high precision workshop machining operations on conventional lathes
- Suitable for machining square and round workpieces



| Mounting   | Chuck Size  | 6"              | 8"              | 10"             | 12"             | 16"             | 20"              | 25"                         | 32"              | 32"              | 36"              |
|--|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|-----------------------------|------------------|------------------|------------------|
|  |             | Hole            | 1.653           | 1.968           | 2.559           | 3.149           | 3.937            | 4.931                       | 6.299            | 7.874            | 10.500           |
| <b>4304</b><br>Plain Back<br>   | Weight lbs. | 9               | 32              | 55              | 88              | 140             | 233              | 366                         | 700              | 672              | 800              |
|  | Code No.    |                 | 445805          | 445810          | 445815          | 445820          | 445825           | 445830                      | 445835           | 445840           | 445842           |
|  | Price \$    |                 | <b>1,649.76</b> | <b>2,037.61</b> | <b>2,635.68</b> | <b>3,871.05</b> | <b>7,148.60</b>  | <b>9,229.76</b>             | <b>17,155.78</b> | <b>18,836.33</b> | <b>28,133.44</b> |
|  |             |                 |                 |                 |                 |                 |                  |                             |                  |                  |                  |
| <b>4314</b><br>A Taper<br>      | A2-4        |                 | 445900          | 445912          |                 |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>1,464.22</b> | <b>1,572.54</b> |                 |                 |                  |                             |                  |                  |                  |
|  | A2-5        |                 | 445905          | 445915          | 445930          |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,060.98</b> | <b>2,464.48</b> | <b>3,121.75</b> |                 |                  |                             |                  |                  |                  |
|  | A2-6        |                 | 445910          | 445920          | 445935          | 445945          | 445957           |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,060.98</b> | <b>2,464.48</b> | <b>3,121.75</b> | <b>5,093.93</b> | <b>4,500.36</b>  |                             |                  |                  |                  |
|  | A2-8        |                 |                 | 445925          | 445940          | 445950          | 445959           | 445971                      |                  |                  |                  |
|  | Price \$    |                 |                 | <b>2,464.48</b> | <b>3,121.75</b> | <b>5,093.93</b> | <b>4,500.36</b>  | <b>5,901.88</b>             |                  |                  |                  |
|  | A2-11       |                 |                 |                 |                 | 445955          |                  | 445965                      | 445970           |                  |                  |
|  | Price \$    |                 |                 |                 |                 | <b>5,093.93</b> |                  | <b>10,148.92</b>            | <b>17,077.88</b> |                  |                  |
| A2-15  |             |                 |                 |                 |                 | 445961          | 445973           | 445975                      |                  |                  |                  |
| Price \$   |             |                 |                 |                 |                 | <b>4,635.75</b> | <b>6,297.96</b>  | <b>12,534.10</b>            |                  |                  |                  |
| <b>4344</b><br>Camlock<br>    | D1-3        | 450095          | 450105          | 450119          |                 |                 |                  |                             |                  |                  |                  |
|  | Price \$    | <b>2,120.39</b> | <b>1,917.68</b> | <b>2,493.72</b> |                 |                 |                  |                             |                  |                  |                  |
|  | D1-4        | 450100          | 450110          | 450120          |                 |                 |                  |                             |                  |                  |                  |
|  | Price \$    | <b>2,148.47</b> | <b>1,917.68</b> | <b>2,341.29</b> |                 |                 |                  |                             |                  |                  |                  |
|  | D1-5        |                 | 450115          | 450125          | 450132          |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>1,917.68</b> | <b>2,341.29</b> | <b>3,255.10</b> |                 |                  |                             |                  |                  |                  |
|  | D1-6        |                 | 450117          | 450130          | 450135          | 450145          |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,286.07</b> | <b>2,341.29</b> | <b>2,894.32</b> | <b>4,097.02</b> |                  |                             |                  |                  |                  |
|  | D1-8        |                 |                 |                 | 450140          | 450150          | 450160           | 450169<br>(5.00" hole dia.) |                  |                  |                  |
|  | Price \$    |                 |                 |                 | <b>2,894.32</b> | <b>4,097.02</b> | <b>7,100.32</b>  | <b>12,535.50</b>            |                  |                  |                  |
| D1-11  |             |                 |                 | 450142          | 450155          | 450165          | 450170           | 450185<br>(7.00" hole dia.) |                  |                  |                  |
| Price \$   |             |                 |                 | <b>2,790.89</b> | <b>4,097.02</b> | <b>7,100.32</b> | <b>10,511.86</b> | <b>12,534.10</b>            |                  |                  |                  |
| D1-15  |             |                 |                 |                 |                 | 450167          | 450175           | 450190<br>(8.00" hole dia.) |                  |                  |                  |
| Price \$   |             |                 |                 |                 |                 | <b>4,802.65</b> | <b>6,271.46</b>  | <b>12,534.10</b>            |                  |                  |                  |
| <b>4354</b><br>Long Taper<br> | L00         |                 | 450205          | 450215          |                 |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,070.25</b> | <b>2,607.63</b> |                 |                 |                  |                             |                  |                  |                  |
|  | L0          |                 | 450210          | 450220          | 450230          |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,073.44</b> | <b>3,213.71</b> | <b>2,552.98</b> |                 |                  |                             |                  |                  |                  |
|  | L1          |                 |                 | 450225          | 450235          | 450245          |                  |                             |                  |                  |                  |
|  | Price \$    |                 |                 | <b>3,265.11</b> | <b>4,988.08</b> | <b>5,555.13</b> |                  |                             |                  |                  |                  |
| L2   |             |                 |                 | 450240          | 450250          | 450255          |                  |                             |                  |                  |                  |
| Price \$   |             |                 |                 | <b>4,894.54</b> | <b>5,620.49</b> | <b>9,592.77</b> |                  |                             |                  |                  |                  |
| <b>4334</b><br>DIN Taper<br>  | DIN 4       |                 | 450340          |                 |                 |                 |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>1,486.16</b> |                 |                 |                 |                  |                             |                  |                  |                  |
|  | DIN 5       |                 | 450345          | 450360          | 450370          | 450380          |                  |                             |                  |                  |                  |
|  | Price \$    |                 | <b>2,802.84</b> | <b>2,788.06</b> | <b>3,319.71</b> | <b>4,818.87</b> |                  |                             |                  |                  |                  |
|  | DIN 6       |                 | 450350          | 450300          | 450305          | 450385          | 450400           |                             |                  |                  |                  |
|  | Price \$    |                 | <b>1,464.22</b> | <b>2,788.06</b> | <b>3,485.73</b> | <b>5,032.41</b> | <b>7,880.78</b>  |                             |                  |                  |                  |
|  | DIN 8       |                 |                 | 450365          | 450310          | 450315          | 450320           | 450330                      |                  |                  |                  |
|  | Price \$    |                 |                 | <b>2,788.06</b> | <b>3,485.73</b> | <b>4,069.25</b> | <b>8,368.81</b>  | <b>9,379.73</b>             |                  |                  |                  |
|  | DIN 11      |                 |                 |                 | 450375          | 450390          | 450325           | 450335                      |                  |                  |                  |
|  | Price \$    |                 |                 |                 | <b>3,485.73</b> | <b>5,032.41</b> | <b>8,368.81</b>  | <b>10,341.97</b>            |                  |                  |                  |
| DIN 15   |             |                 |                 |                 |                 |                 | 450405           |                             |                  |                  |                  |
| Price \$   |             |                 |                 |                 |                 |                 | <b>10,652.39</b> |                             |                  |                  |                  |

### Spare Parts - See Page: H74

| Standard Accessories |   |                     |   | Optional Accessories |   |
|----------------------|---|---------------------|---|----------------------|---|
|                      |  | 1 set of solid jaws |  | 1 wrench             |  |
|                      |   |                     |   |                      | 1 set of soft solid jaws  |

## Hard Solid Rev. Jaws



| Chuck Size (in.) | 4pc Set Code No. | Price \$ | Individual Code No. | Price \$ |
|------------------|------------------|----------|---------------------|----------|
| 8"               | 465705           | 790.42   | 465706              | 209.80   |
| 10"              | 465710           | 852.73   | 465711              | 226.76   |
| 12"              | 465715           | 926.08   | 465716              | 245.28   |
| 16"              | 465720           | 1,389.06 | 465721              | 368.70   |
| 20"              | 465725           | 2,221.61 | 465726              | 589.29   |
| 25"              | 465730           | 2,941.89 | 465731              | 774.42   |
| 32"              | 465735           | 3,967.71 | 465736              | 1,016.62 |

## Soft Solid Jaws



| Chuck Size (in.) | 4pc Set Code No. | Price \$ |
|------------------|------------------|----------|
| 8"               | 468600           | 394.46   |
| 10"              | 468602           | 717.30   |
| 12"              | 468604           | 825.39   |
| 16"              | 468606           | 1,020.60 |
| 20"              | 468608           | 1,530.72 |
| 25"              | 468610           | 2,224.54 |
| 32"              | 468612           | 4,263.83 |

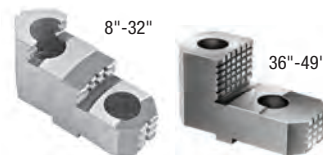


## Hard Master Jaws



| Chuck Size (in.) | 4pc Set Code No. | Price \$ | Individual Code No. | Price \$ |
|------------------|------------------|----------|---------------------|----------|
| 8"               | 465880           | 662.63   | 465860              | 175.86   |
| 10"              | 465882           | 724.95   | 465862              | 192.84   |
| 12"              | 465884           | 833.34   | 465864              | 229.87   |
| 16"              | 465886           | 1,540.29 | 465866              | 401.09   |
| 20"              | 465888           | 2,250.80 | 465868              | 612.44   |
| 25"              | 465890           | 2,697.18 | 465870              | 701.91   |
| 32"              | 465892           | 3,129.01 | 465872              | 814.53   |
| 36"/40"/49"      | 465894           | 3,613.86 | 465874              | 924.06   |

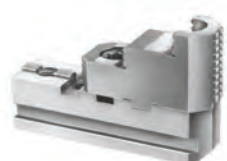
## Hard Top Jaws



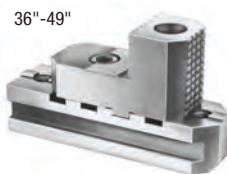
| Chuck Size (in.) | 4pc Set Code No. | Price \$ | Individual Code No. | Price \$ |
|------------------|------------------|----------|---------------------|----------|
| 8"               | 465900           | 724.95   | 465840              | 191.29   |
| 10"              | 465902           | 768.63   | 465842              | 728.14   |
| 12"              | 465904           | 1,050.82 | 465844              | 277.68   |
| 16"              | 465906           | 1,097.58 | 465846              | 290.03   |
| 20"              | 465908           | 1,416.08 | 465848              | 439.67   |
| 25"              | 465908           | 1,416.08 | -                   | -        |
| 32"              | 465911           | 2,631.81 | 465851              | 774.42   |
| 36"/40"/49"      | 465912           | 2,941.89 | 465852              | 774.42   |

## Hard 2pc Rev. Jaws

| Chuck Size (in.) | Per Set Code No. | Price \$  |
|------------------|------------------|-----------|
| 8"               | 468616           | 1,270.21  |
| 10"              | 468618           | 1,563.39  |
| 12"              | 468619           | 1,979.95  |
| 16"              | 468620           | 2,800.36  |
| 20"              | 468622           | 3,833.89  |
| 25"              | 468624           | 4,632.47  |
| 32"              | 468625           | 4,872.97  |
| 36"              | 468626           | 11,105.32 |
| 40"/49"          | 468628           | 11,105.32 |



36"-49"



## Operating Screws



| Chuck Size (in.) | Code No. | Price \$ |
|------------------|----------|----------|
| 5"               | 465500   | 124.61   |
| 6"               | 465495   | 132.76   |
| 8"               | 465505   | 127.72   |
| 10"              | 465510   | 140.73   |
| 12"              | 465515   | 153.15   |
| 14"              | 465517   | 454.67   |
| 16"              | 465520   | 182.84   |
| 20"              | 465525   | 243.74   |
| 25"              | 465530   | 326.47   |
| 32"              | 465535   | 420.22   |
| 36"              | 465540   | 454.67   |
| 40"              | 465545   | 602.98   |
| 49"              | 465550   | 691.94   |



## Thrust Bearings

| Chuck Size (in.) | Code No. | Price \$ |
|------------------|----------|----------|
| 5"               | 465585   | 126.16   |
| 6"               | 465585   | 126.16   |
| 8"               | 465605   | 164.01   |
| 10"              | 465610   | 181.21   |
| 12"              | 465615   | 189.06   |
| 16"              | 465620   | 192.17   |
| 20"              | 465625   | 207.17   |
| 25"              | 465630   | 232.72   |
| 32"              | 465635   | 276.46   |
| 36"              | 465640   | 320.12   |
| 40"              | 465640   | 320.12   |
| 49"              | 465640   | 320.12   |



## Wrenches

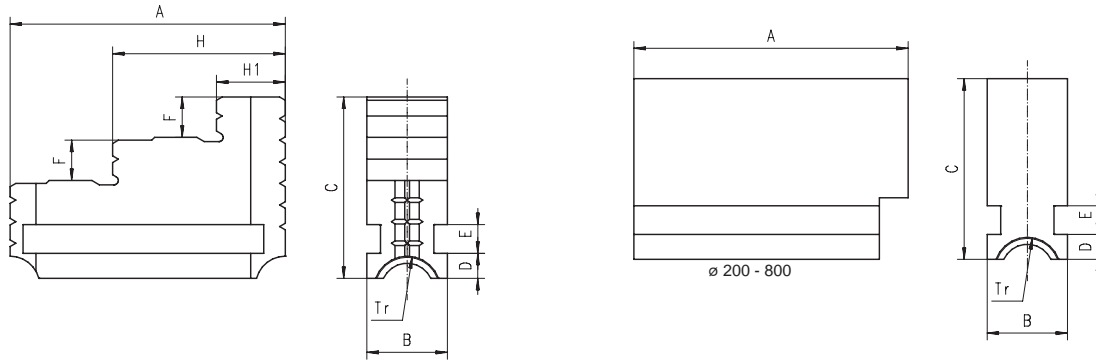


| Chuck Size | Square | Code No. | Price \$ |
|------------|--------|----------|----------|
| 5"         |        | 465800   | 82.89    |
| 6"         |        | 465800   | 82.89    |
| 8"         | 0.4331 | 465805   | 86.00    |
| 10"        | 0.4331 | 465805   | 86.00    |
| 12"        | 0.5512 | 465815   | 92.19    |
| 16"        | 0.5512 | 465815   | 92.19    |
| 20"        | 0.6693 | 465825   | 153.15   |
| 25"        | 0.6693 | 465825   | 153.15   |
| 32"        | 0.7480 | 465835   | 206.27   |
| 36"        |        | 465836   | 336.04   |
| 40"        |        | 465836   | 336.04   |
| 49"        |        | 465836   | 336.04   |

# Specifications For Independent Chuck Jaws

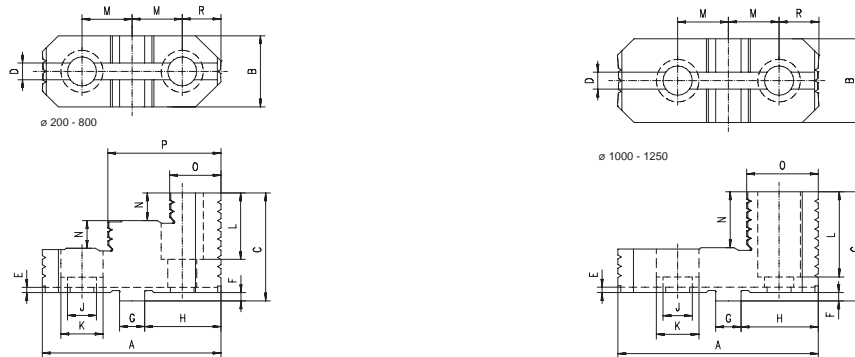


## Solid Reversible Jaws



| Chuck Size   | 8"      | 10"     | 12"     | 16"     | 20"     | 25"     | 32"     | 36"     | 40"     | 49"     |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| A            | 3.1102  | 3.7008  | 4.3307  | 5.0787  | 6.6142  | 8.1102  | 8.1102  | 9.6063  | 9.6063  | 9.6063  |
| B            | 1.2598  | 1.2598  | 1.5748  | 1.5748  | 2.0472  | 2.0472  | 2.7559  | 2.7559  | 2.7559  | 2.7559  |
| C            | 1.2598  | 1.4961  | 1.5354  | 1.7323  | 2.3228  | 2.3228  | 2.3228  | 2.3228  | 2.3228  | 2.3228  |
| D            | 0.3425  | 0.3425  | 0.3819  | 0.3819  | 0.4606  | 0.4606  | 0.6181  | 0.6181  | 0.6181  | 0.6181  |
| E            | 0.3937  | 0.3937  | 0.4724  | 0.4724  | 0.5906  | 0.5906  | 0.7874  | 0.7874  | 0.7874  | 0.7874  |
| F-0.03       | 0.3126  | 0.5000  | 0.5000  | 0.5000  | 0.5000  | 0.5000  | 0.5000  | 0.5000  | 0.5000  | 0.5000  |
| G+0.01       | 0.4996  | 0.7496  | 0.7496  | 0.7496  | 0.7496  | 0.7496  | 0.7496  | 0.7496  | 0.7496  | 0.7496  |
| H            | 1.3071  | 1.4764  | 1.7874  | 2.1614  | 2.1850  | 2.1850  | 2.1850  | 2.1850  | 2.1850  | 2.1850  |
| J            | 0.1575  | 0.1575  | 0.1575  | 0.2835  | 0.2835  | 0.2835  | 0.2835  | 0.2835  | 0.2835  | 0.2835  |
| K            | 0.8760  | 1.0630  | 1.2500  | 1.5000  | 1.5000  | 1.5000  | 1.5000  | 1.5000  | 1.5000  | 1.5000  |
| L            | 0.5512  | 0.7874  | 0.6890  | 0.8661  | 1.3189  | 1.3189  | 1.3189  | 1.3189  | 1.3189  | 1.3189  |
| M            | M10     | M12     | M12     | M16     | M20     | M20     | M20     | M20     | M20     | M20     |
| M            | 3/8-16  | 1/2-13  | 1/2-13  | 5/8-11  | 3/4-10  | 3/4-10  | 3/4-10  | 3/4-10  | 3/4-10  | 3/4-10  |
| Tr-left hand | Tr 28x5 | Tr 28x5 | Tr 32x6 | Tr 32x6 | Tr 36x6 | Tr 40x6 | Tr 44x8 | Tr 44x6 | Tr 44x6 | Tr 44x8 |
| Weight lbs   | 1.32    | 1.98    | 2.42    | 2.64    | 3.3     | 5.28    | 5.28    | 11.88   | 11.88   | 11.88   |

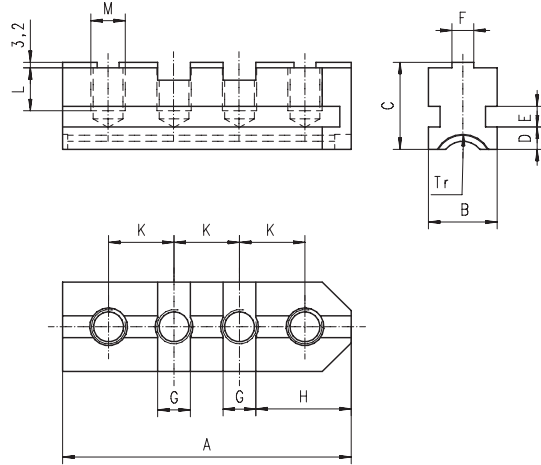
## Hard Top Jaws



| Chuck Size | 8"     | 10"    | 12"    | 16"    | 20"    | 25"    | 32"    | 36"    | 40"    | 49"    |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A          | 3.2283 | 3.7992 | 4.4291 | 5.0787 | 5.3543 | 5.3543 | 5.3543 | 6.2992 | 6.2992 | 6.2992 |
| B          | 1.3386 | 1.3386 | 1.6535 | 1.6535 | 2.1260 | 2.1260 | 2.8346 | 2.8346 | 2.8346 | 2.8346 |
| C          | 1.7126 | 2.0276 | 2.1654 | 2.5394 | 2.9331 | 3.2283 | 3.4646 | 3.8189 | 3.8189 | 3.8189 |
| D          | 0.3130 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 | 0.5004 |
| E          | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 | 0.1575 |
| F-0.03     | 0.1260 | 0.1260 | 0.1260 | 0.2480 | 0.2480 | 0.2480 | 0.2480 | 0.2480 | 0.2480 | 0.2480 |
| G+0.01     | 0.4996 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 | 0.7496 |
| H          | 1.3858 | 1.5748 | 1.8858 | 2.2598 | 2.2835 | 2.2835 | 2.2835 | 2.2835 | 2.2835 | 2.2835 |
| J          | 0.4331 | 0.5512 | 0.5512 | 0.7087 | 0.8661 | 0.8661 | 0.8661 | 0.8661 | 0.8661 | 0.8661 |
| K          | 0.7087 | 0.7874 | 0.7874 | 1.0236 | 1.2992 | 1.2992 | 1.2992 | 1.2992 | 1.2992 | 1.2992 |
| L          | 0.8465 | 1.0433 | 1.0827 | 1.2598 | 1.5551 | 1.6929 | 1.8110 | 2.7953 | 2.7953 | 2.7953 |
| M          | 0.8760 | 1.0630 | 1.2500 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000 | 1.5000 |
| N          | 0.3740 | 0.4724 | 0.5118 | 0.5315 | 0.7087 | 0.8268 | 0.9449 | 1.9685 | 1.9685 | 1.9685 |
| O          | 0.8661 | 0.9843 | 1.0630 | 1.0433 | 1.4764 | 1.4764 | 1.5748 | 2.3622 | 2.3622 | 2.3622 |
| P          | 2.0866 | 2.4409 | 2.7756 | 3.1102 | 3.4252 | 3.4252 | 3.5039 | -      | -      | -      |
| R          | 0.7598 | 0.8858 | 1.0118 | 1.1339 | 1.1575 | 1.1575 | 1.1575 | 1.1575 | 1.1575 | 1.1575 |
| Weight lbs | 1.10   | 1.54   | 2.86   | 4.62   | 6.60   | 6.60   | 9.24   | 9.24   | 9.24   | 9.24   |

## Specifications For Independent Chuck Jaws — Cont'd

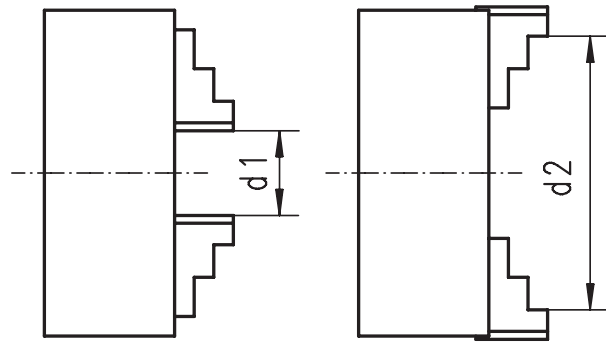
### Master Base Jaws



| Chuck Size   | 3"      | 4"      | 5"      | 6"      | 8"      | 10"     | 12"     | 14"     | 16"     | 20"     | 25"     | 32"     |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| A            | 1.3386  | 1.3386  | 2.0079  | 2.0079  | 3.1890  | 3.7992  | 4.3701  | 4.3701  | 5.0787  | 6.0039  | 6.9685  | 7.9528  |
| B            | 0.5118  | 0.5118  | 0.6299  | 0.6299  | 1.2598  | 1.2598  | 1.5748  | 1.5748  | 1.5748  | 2.0472  | 2.0472  | 2.7559  |
| C            | 1.1811  | 1.1811  | 1.3583  | 1.3583  | 2.4803  | 2.4803  | 3.0118  | 3.0118  | 3.0118  | 3.6811  | 3.6811  | 4.5079  |
| D            | 0.1772  | 0.1772  | 0.2362  | 0.2362  | 0.3425  | 0.3425  | 0.3819  | 0.3819  | 0.3819  | 0.4606  | 0.4606  | 0.6181  |
| E            | 0.1969  | 0.1969  | 0.1969  | 0.1969  | 0.3937  | 0.3937  | 0.4724  | 0.4724  | 0.4724  | 0.5906  | 0.5906  | 0.7874  |
| F            | 0.2756  | 0.2756  | 0.3150  | 0.3150  | 0.5512  | 0.5512  | 0.7087  | 0.7087  | 0.7087  | 0.8661  | 0.9843  | 0.9843  |
| H1           | 0.3150  | 0.3150  | 0.4921  | 0.4921  | 0.6890  | 0.9055  | 1.0630  | 1.0630  | 1.2795  | 1.3780  | 1.7717  | 1.7323  |
| H            | 0.6890  | 0.6890  | 1.2402  | 1.2402  | 1.9094  | 2.3228  | 2.6378  | 2.6378  | 3.0906  | 3.6614  | 4.2913  | 4.8031  |
| Tr-left hand | Tr 16x2 | Tr 16x2 | Tr 18x4 | Tr 18x4 | Tr 28x5 | Tr 28x5 | Tr 32x6 | Tr 32x6 | Tr 32x6 | Tr 36x6 | Tr 40x6 | Tr 44x8 |
| Weight lbs   | 0.220   | 0.220   | 0.264   | 0.264   | 1.590   | 2.860   | 3.300   | 3.330   | 3.960   | 7.480   | 8.800   | 17.160  |

## Technical Data For Independent Chucks

### Gripping Ranges for Independent Chucks



| Chuck Size          | 3"    | 4"    | 5"    | 6"    | 8"    | 10"    | 12"    | 14"    | 16"    | 20"    | 25"    | 32"    | 36"    | 40"    | 49"    |
|---------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| d1 min.             | 0.118 | 0.118 | 0.315 | 0.315 | 0.393 | 0.393  | 0.590  | 0.590  | 0.787  | 1.771  | 1.968  | 1.968  | 4.724  | 6.692  | 6.692  |
| d2 max.             | 3.346 | 3.937 | 4.921 | 6.299 | 7.874 | 9.842  | 12.401 | 13.779 | 15.748 | 19.685 | 24.803 | 31.496 | 36.023 | 39.370 | 49.212 |
| Max. Swing Diameter | 3.976 | 4.566 | 5.905 | 7.283 | 9.252 | 11.653 | 14.527 | 15.905 | 18.307 | 22.440 | 28.346 | 34.960 | 39.488 | 42.834 | 52.677 |

### Maximum Permissible Rotation Speeds (rpm) for Independent Chucks

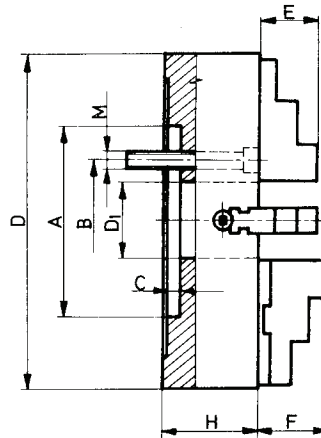
| Chuck Size     | 3"   | 4"   | 5"   | 6"   | 8"   | 10"  | 12"  | 14"  | 16"  | 20" | 25" | 32" | 36" | 40" | 49" |
|----------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| Steel Body     | 4000 | 3800 | 3500 | 3200 | 2500 | 2000 | 1500 | 1500 | 1100 | 700 | 550 | 450 | 200 | 200 | 150 |
| Cast Iron Body | -    | -    | -    | -    | 1800 | 1500 | 1200 | 1200 | 800  | 500 | 400 | 300 | 150 | 150 | 100 |



# Independent Chuck Mounting Dimensions

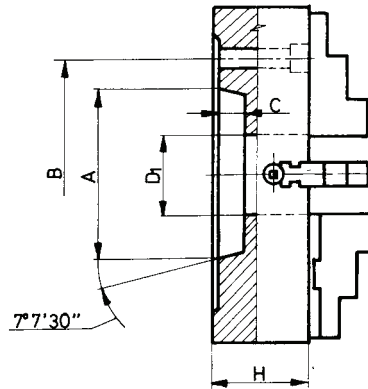
## 4-JAW INDEPENDENT SERIES 4300

### Mounting Dimensions



### Plain Back

| Chuck Size | 3"      | 5"       | 6"      | 8"       | 10"     | 12"     | 16"     | 20"     | 25"     | 32"     | 36"     | 40"     | 49"     |
|------------|---------|----------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| D          | 3.35    | 5        | 6-1/4   | 8        | 10      | 12-1/2  | 15-3/4  | 20      | 25      | 31-1/2  | 36.02   | 39.37   | 49.21   |
| A          | 2.4409  | 2.7500   | 3.2500  | 4.3307   | 5.9055  | 5.8898  | 7.8740  | 10.6299 | 10.6299 | 14.9606 | 14.5669 | 14.5669 | 21.6535 |
| B          | 2.8346  | 2.1260   | 2.7500  | 3.2520   | 4.1260  | 5.2520  | 6.7480  | 9.2520  | 9.2520  | 13.0000 | 12.9921 | 12.9921 | 19.6850 |
| C          | 0.1969  | 0.0984   | 0.0984  | 0.1969   | 0.2756  | 0.2756  | 0.3937  | 0.4724  | 0.4724  | 0.4724  | 0.7090  | 0.7090  | 0.7090  |
| D1         | 0.9843  | 1.0236   | 1.6535  | 1.9685   | 2.5591  | 3.1496  | 3.9370  | 4.9213  | 6.2992  | 7.8740  | 7.4803  | 7.4803  | 7.4803  |
| E          | 0.6693  | 0.7874   | 0.7864  | 0.7874   | 1.5866  | 1.5866  | 1.9606  | 1.9606  | 2.3543  | 2.7874  | -       | -       | -       |
| F          | -       | -        | -       | 1.8268   | 2.3780  | 2.3976  | 2.8465  | 3.5551  | 3.8504  | 2.3629  | 4.0472  | 4.0472  | 4.0472  |
| H          | 1.5748  | 1.6929   | 1.6929  | 3.1496   | 3.3465  | 3.7402  | 4.1339  | 4.7244  | 5.5118  | 6.2992  | 6.6929  | 6.6929  | 7.4803  |
| M          | 1/4"-20 | 5/16"-18 | 3/8"-16 | 7/16"-14 | 1/2"-13 | 5/8"-11 | 5/8"-11 | 3/4"-10 | 3/4"-10 | 7/8"-9  | 1"xB    | 1"xB    | 1"xB    |



### A-Type Mounting, ASA Standard B5.9

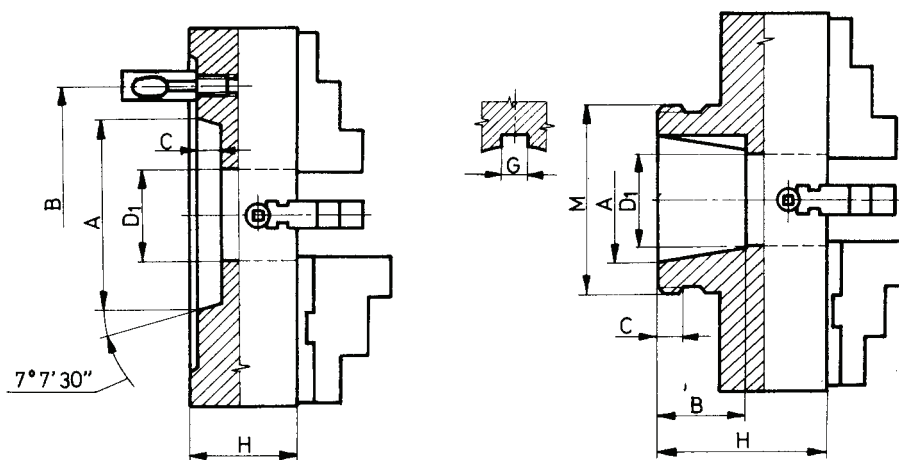
| Chuck Size        | 8"     |        | 10"    |        |         | 12"    |         | 16"    |         |         | 20"     |         | 25"     |         | 32"     |         |
|-------------------|--------|--------|--------|--------|---------|--------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| D                 | 8      |        | 10     |        |         | 12-1/2 |         | 15-3/4 |         |         | 20      |         | 25      |         | 31-1/2  |         |
| Taper Acc. to ASA | 5      | 6      | 5      | 6      | 8       | 6      | 8       | 6      | 8       | 11      | 8       | 11      | 11      | 15      | 11      | 15      |
| A                 | 3.2503 | 4.1878 | 3.2503 | 4.1878 | 5.50055 | 4.1878 | 5.50055 | 4.1878 | 5.50055 | 7.75055 | 5.50055 | 7.75055 | 7.75055 | 11.2505 | 7.75055 | 11.2505 |
| B(A1)             | 2-7/16 | -      | 2-7/16 | 3-1/4  | 4-3/8   | 3-1/4  | 4-3/8   | 3-1/4  | 4-3/8   | 6-1/2   | 4-3/8   | 6-1/2   | 6-1/2   | 9-3/4   | 6-1/2   | 9-3/4   |
| B(A2)             | -      | 5-1/4  | 4-1/8  | 5-1/4  | 6-3/4   | 5-1/4  | 6-3/4   | 5-1/4  | 6-3/4   | 9-1/4   | 6-3/4   | 9-1/4   | 9-1/4   | 13      | 9-1/4   | 13      |
| C                 | 0.6299 | 0.6693 | 0.6299 | 0.6693 | 0.7480  | 0.6693 | 0.7480  | 0.6693 | 0.7480  | 0.8268  | 0.7480  | 0.8268  | 0.8628  | 0.8661  | 0.8268  | 0.8661  |
| D1                | 1.969  | 2.559  | 3.150  | 3.937  | 4.921   | 6.299  | 7.087   |        |         |         |         |         |         |         |         |         |
| H                 | 3.1496 | 3.3465 | 3.7402 | 4.1339 | 4.7244  | 5.5118 | 6.2992  |        |         |         |         |         |         |         |         |         |

## Independent Chuck Mounting Dimensions — Cont'd



### 4-JAW INDEPENDENT SERIES 4300

#### Mounting Dimensions



#### D-Type Mounting, ASA Standard B5.9

| Chuck Size | 8"     |        |        | 10"    |        |        | 12"    |        | 16"    |        |        | 20"     |        | 25"    |        |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|            | 8      |        |        | 10     |        |        | 12-1/2 |        | 15-3/4 |        |        | 20      |        | 25     |        |
| Taper 1:4  | 3      | 4      | 5      | 4      | 5      | 6      | 6      | 8      | 6      | 8      | 11     | 8       | 11     | 8      | 11     |
| A          | 2.1250 | 2.5005 | 3.2505 | 2.5005 | 3.2505 | 4.1880 | 4.1880 | 5.5007 | 4.1880 | 5.5007 | 7.7507 | 5.57007 | 7.7505 | 5.5007 | 7.7507 |
| B          | 2.7795 | 3.2520 | 4.1260 | 3.2520 | 4.1260 | 5.2520 | 5.2520 | 6.7480 | 5.2520 | 6.7480 | 9.2520 | 6.7480  | 9.2520 | 6.7480 | 9.2520 |
| C          | 0.5118 | 0.5118 | 0.5906 | 0.5118 | 0.5906 | 0.6299 | 0.6299 | 0.7087 | 0.6299 | 0.7087 | 0.7874 | 0.7087  | 0.7874 | 0.7087 | 0.7874 |
| D1         | 1.9685 |        |        | 2.3622 | 2.5591 |        | 3.1496 |        | 3.9370 |        |        | 4.9213  |        | 4.9213 | 6.2992 |
| H          | 3.1496 |        |        | 3.3465 |        |        | 3.7402 |        | 4.1339 |        |        | 4.7244  |        | 5.5118 |        |

#### L-Type Mounting, ASA Standard B5.9

| Chuck Size | 8"       |          |          | 10"      |        |          | 12"      |        |          |          | 16"    |          |           |          | 20"    |          |           |  |
|------------|----------|----------|----------|----------|--------|----------|----------|--------|----------|----------|--------|----------|-----------|----------|--------|----------|-----------|--|
|            | 8        |          |          | 10       |        |          | 12-1/2   |        |          |          | 15-3/4 |          |           |          | 20     |          |           |  |
| Taper      | L00      | L0       | L00      | L0       | L1     | L00      | L0       | L1     | L2       | L0       | L1     | L2       | L3        | L0       | L1     | L2       | L3        |  |
| A          | 2.7500   | 3.2500   | 2.750    | 3.2500   | 4.1250 | 2.7500   | 3.2500   | 4.1250 | 5.2500   | 3.2500   | 4.1250 | 5.2500   | 6.5000    | 3.2500   | 4.1250 | 5.2500   | 6.5000    |  |
| B          | 2.1260   | 2.5000   | 2.1260   | 2.5000   | 2.9921 | 2.1260   | 2.5000   | 2.9921 | 3.5039   | 2.5000   | 2.9921 | 3.5039   | 4.0157    | 2.5000   | 2.9921 | 3.5039   | 4.0157    |  |
| C          | 0.5512   | 0.5905   | 0.5512   | 0.5905   | 0.6299 | 0.5512   | 0.5905   | 0.6299 | 0.8661   | 0.5905   | 0.6299 | 0.8661   | 0.9449    | 0.5905   | 0.6299 | 0.8661   | 0.9449    |  |
| D1         | 1.9885   | 2.5591   | 3.1496   | 3.9370   | 4.9213 |          |          |        |          |          |        |          |           |          |        |          |           |  |
| G          | 0.3839   | 0.3839   | 0.3839   | 0.3839   | 0.6358 | 0.3839   | 0.3839   | 0.6358 | 0.7598   | 0.3839   | 0.6358 | 0.7598   | 1.0098    | 0.3839   | 0.6358 | 0.7598   | 1.0098    |  |
| H          | 4.0051   | 4.4488   | 4.0551   | 4.4488   | 4.9606 | 4.0551   | 4.7244   | 5.1969 | 5.7087   | 4.7244   | 5.1969 | 5.7087   | 6.2205    | 4.7244   | 5.5118 | 6.0630   | 6.5748    |  |
| M          | 3-3/4"-6 | 4-1/2"-6 | 3-3/4"-6 | 4-1/2"-6 | 6"-6   | 3-3/4"-6 | 4-1/2"-6 | 6"-6   | 7-3/4"-5 | 4-1/2"-6 | 6"-6   | 7-3/4"-5 | 10-3/8"-4 | 4-1/2"-6 | 6"-6   | 7-3/4"-6 | 10-3/8"-4 |  |

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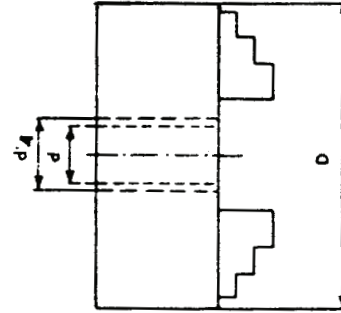
## Independent Chuck Through Hole Diameters

### Independent Jaw Chucks Through Hole Diameters

\*d – through hole diameter made by manufacturer

d1 – permissible enlargement of through hole

\*\*Hole diameter d1 may be made only to depth X



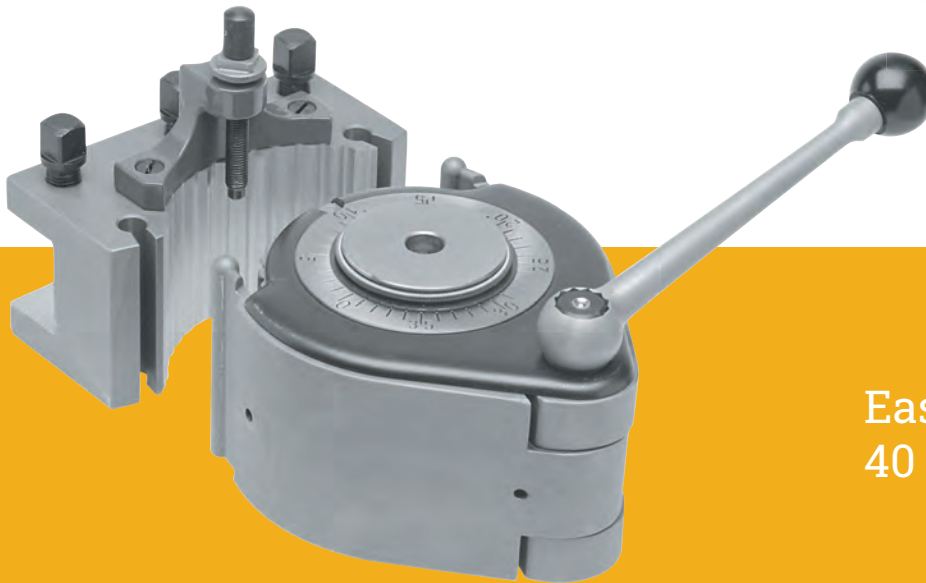
| Mounting | Hole Dia. | Chuck Size      | D   | 5"     | 6"     | 8"     | 10"    | 12"    | 16"    | 20"    | 25"    | 32"    | 48"     |  |
|----------|-----------|-----------------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--|
|          | d*        | plain back      |     | 1.0236 | 1.6535 | 1.9685 | 2.5591 | 3.1496 | 3.9370 | 4.9213 | 6.2992 | 7.8740 | 10.4725 |  |
|          | d1        | plain back      |     | 1.3780 | 1.8504 | 1.9685 | 2.9528 | 3.7402 | 4.7244 | 6.1024 | 6.8898 | 7.8740 | 10.4725 |  |
|          | d         | Short Taper "A" | 5   |        |        | 1.9685 | 2.5591 | 3.1496 |        |        |        |        |         |  |
|          |           |                 | 6   |        |        | 1.9685 | 2.5591 | 3.1496 | 3.9370 | 3.9370 |        |        |         |  |
|          |           |                 | 8   |        |        |        |        |        |        | 3.9370 | 4.9213 | 6.2992 | 7.0866  |  |
|          |           |                 | 15  |        |        |        |        |        |        | 4.9213 | 6.2992 | 7.8740 |         |  |
|          | d1        |                 | 5   |        |        |        | 1.9685 | 2.9528 | 3.1496 |        |        |        |         |  |
|          |           |                 | 6   |        |        |        | 1.9685 | 2.9528 | 3.7402 | 3.9370 | 3.9370 |        |         |  |
|          |           |                 | 8   |        |        |        |        | 2.9528 | 3.7402 | 4.7244 | 3.9370 | 4.9213 | 4.9213  |  |
|          |           |                 | 11  |        |        |        |        |        |        | 4.7244 | 6.1024 | 6.8898 | 7.0866  |  |
|          |           |                 |     |        |        |        |        | 4.7244 | 6.1024 | 6.8878 | 7.8740 |        |         |  |
|          | d         | Camlock "D"     | 3   |        |        | 1.9685 | 1.9685 |        |        |        |        |        |         |  |
|          |           |                 | 4   |        |        | 1.9685 | 2.3622 |        |        |        |        |        |         |  |
|          |           |                 | 5   |        |        | 1.9685 | 2.5591 | 3.1496 |        |        |        |        |         |  |
|          |           |                 | 6   |        |        |        | 2.5591 | 3.1496 | 3.9370 | 3.9370 |        |        |         |  |
|          |           |                 | 8   |        |        |        |        | 3.1496 | 3.9370 | 4.9213 | 4.9213 | 4.9213 | 4.9213  |  |
|          |           |                 | 11  |        |        |        |        |        | 3.9370 | 4.9213 | 6.2992 | 7.0866 |         |  |
|          | d         |                 | 15  |        |        |        |        |        |        | 4.9213 | 6.2992 | 7.8740 |         |  |
|          |           |                 | 3   |        |        |        | 1.9685 | 1.9685 |        |        |        |        |         |  |
|          |           |                 | 4   |        |        |        | 1.9685 | 2.3622 |        |        |        |        |         |  |
|          |           |                 | 5   |        |        |        | 1.9685 | 2.9528 | 3.1496 |        |        |        |         |  |
|          |           |                 | 6   |        |        |        |        | 2.9528 | 3.7795 | 3.9370 | 3.9370 |        |         |  |
|          |           |                 | 8   |        |        |        |        |        | 3.7795 | 4.7244 | 5.3150 | 5.3150 | 5.3150  |  |
|          |           |                 | 11  |        |        |        |        |        |        | 4.7244 | 6.1024 | 6.8898 | 6.4903  |  |
|          |           |                 | 15  |        |        |        |        |        |        | 6.1024 | 6.8898 | 6.8740 |         |  |
|          | d         | Long Taper      | L00 |        |        | 1.9685 | 2.5591 | 3.1496 |        |        |        |        |         |  |
|          |           |                 | L0  |        |        | 1.9685 | 2.5591 | 3.1496 | 3.9370 | 4.9213 |        |        |         |  |
|          |           |                 | L1  |        |        |        | 2.5591 | 3.1496 | 3.9370 | 4.9213 |        |        |         |  |
|          |           |                 | L2  |        |        |        |        | 3.1496 | 3.9370 | 4.9213 | 6.2992 | 6.8740 |         |  |
|          |           |                 | L3  |        |        |        |        |        | 3.9370 | 4.9213 | 6.2992 | 6.8740 |         |  |
|          |           |                 | L00 |        |        | 1.9685 | 2.5591 | 3.1496 |        |        |        |        |         |  |
|          | d1        |                 | L0  |        |        | 1.9685 | 2.9528 | 3.3465 | 3.9370 | 4.9213 |        |        |         |  |
|          |           |                 | L1  |        |        |        | 2.9528 | 3.7795 | 4.1339 | 4.9213 |        |        |         |  |
|          |           |                 | L2  |        |        |        |        | 3.6220 | 4.7244 | 5.3150 | 6.2992 | 7.8740 |         |  |
|          |           |                 | L3  |        |        |        |        |        | 4.7244 | 6.1024 | 6.4961 | 7.8740 |         |  |
|          |           |                 | X** |        |        |        | -      | 1.9448 | 2.2047 | 2.2047 | 2.5590 | 2.7165 | -       |  |



## Quick Change Tool Posts & Holders

Fast tool changing and simplicity  
to increase machine production.

See Pages H132-135



Easy to operate with  
40 tool-bit positions.

See Pages H132-135



## Brazed Tool Bits

Used with quick change  
tool posts & holders.

See Pages D2-3

# PRECISION LATHE CHUCKS



## 3-Jaw Cast Iron Scroll Chucks — Hard Solid Jaws

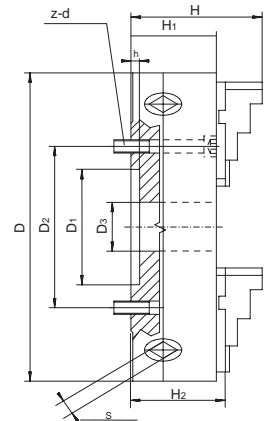
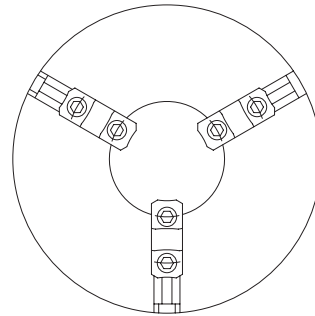
### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and milling fixtures

Replacement parts not available



Plain Back

| Chuck Size<br>D (in.) | D1<br>(in.) | D2<br>(in.) | D3<br>(in.) | H<br>(in.) | H1<br>(in.) | H2<br>(in.) | h<br>(in.) | S<br>(in.) | z-d   | Max.<br>Torque<br>(ft/lbs) | Max<br>Speed<br>(r/min.) | Weight<br>(lbs.) | Code No. | Price \$ |
|-----------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|------------|-------|----------------------------|--------------------------|------------------|----------|----------|
| 3                     | 2.165       | 2.598       | 0.630       | 2.598      | 1.969       | -           | 0.138      | 0.315      | 3-M6  | 29.50                      | 4,000                    | 4.18             | 4440504  | 192.49   |
| 4                     | 2.835       | 3.307       | 0.866       | 2.933      | 2.165       | -           | 0.138      | 0.315      | 3-M6  | 44.26                      | 3,500                    | 7.04             | 4440505  | 207.96   |
| 5                     | 3.740       | 4.252       | 1.181       | 3.307      | 2.283       | -           | 0.157      | 0.394      | 3-M8  | 73.76                      | 3,000                    | 11.00            | 4440510  | 232.06   |
| 6                     | 5.118       | 5.591       | 1.575       | 3.740      | 2.559       | -           | 0.197      | 0.394      | 3-M8  | 118.02                     | 2,500                    | 19.36            | 4440515  | 331.49   |
| 8                     | 6.496       | 7.087       | 2.559       | 4.291      | 2.953       | -           | 0.197      | 0.472      | 3-M10 | 184.40                     | 2,000                    | 34.10            | 4440520  | 435.11   |
| 10                    | 8.110       | 8.898       | 3.150       | 4.724      | 3.150       | -           | 0.197      | 0.472      | 3-M12 | 236.03                     | 1,600                    | 56.54            | 4440525  | 598.31   |
| 12                    | 10.236      | 11.22       | 3.937       | 5.787      | 3.543       | -           | 0.236      | 0.551      | 3-M16 | 295.04                     | 1,200                    | 103.40           | 4440530  | 1,399.69 |

## 3-Jaw Plain Back Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws



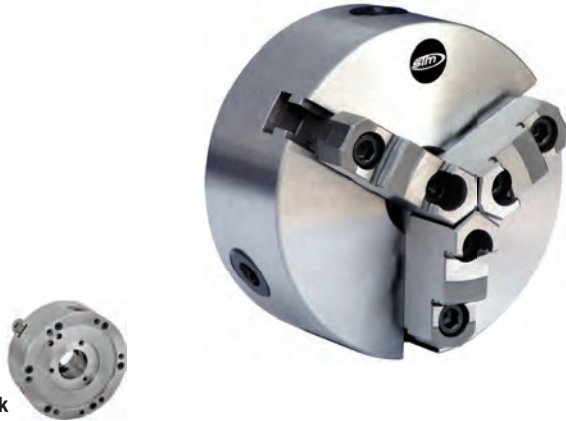
### Features:

- 3-Jaw, self-centering scroll chuck with manual gripping and a high quality cast iron body
- Smart design, allowing inner parts to be replaced quickly
- Mounted on the machine-tool spindle from the back of the chuck, using the adapter plate

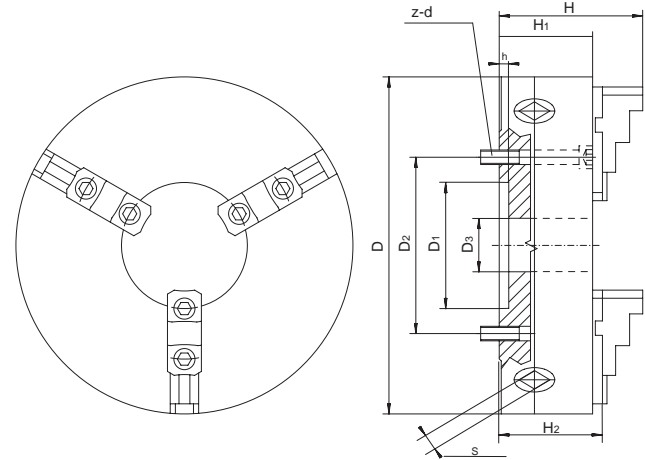
### Application:

- This chuck is designed for all types of workshop machining operations on conventional lathes and milling fixtures

Replacement parts not available

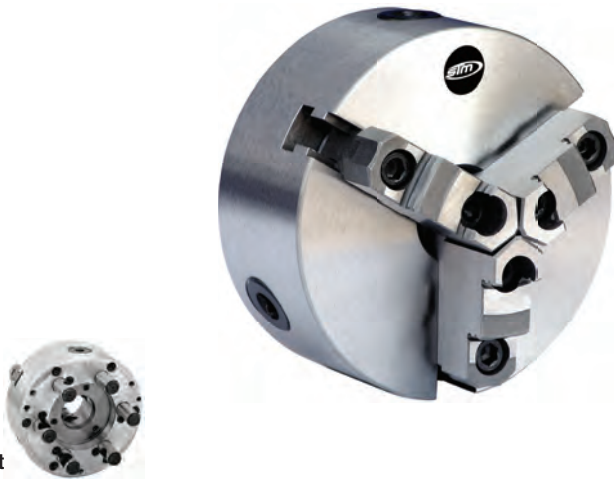


Plain Back

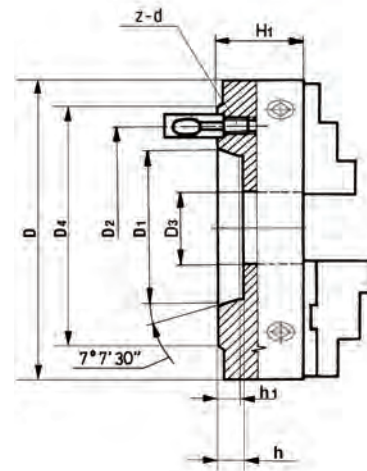


| Chuck Size<br>D (in.) | D1<br>(in.) | D2<br>(in.) | D3<br>(in.) | H<br>(in.) | H1<br>(in.) | H2<br>(in.) | h<br>(in.) | S<br>(in.) | z-d   | Max. Input<br>Torque<br>(ft/lbs) | Max Speed<br>(r/min.) | Weight<br>(lbs.) | Code No. | Price \$ |
|-----------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|------------|-------|----------------------------------|-----------------------|------------------|----------|----------|
| 6                     | 5.118       | 5.591       | 1.575       | 4.291      | 2.559       | 2.795       | 0.197      | 0.394      | 3-M8  | 118.02                           | 2,500                 | 18.26            | 4440710  | 380.05   |
| 8                     | 6.496       | 7.087       | 2.559       | 4.803      | 2.953       | 3.150       | 0.197      | 0.472      | 3-M10 | 184.40                           | 2,000                 | 31.02            | 4440715  | 498.79   |
| 10                    | 8.110       | 8.898       | 3.150       | 5.354      | 3.150       | 3.386       | 0.197      | 0.472      | 3-M12 | 236.03                           | 1,600                 | 50.60            | 4440720  | 662.12   |
| 12                    | 10.236      | 11.220      | 3.937       | 6.024      | 3.543       | 3.740       | 0.236      | 0.551      | 3-M16 | 295.04                           | 1,200                 | 90.20            | 4440725  | 1,196.53 |
| 16                    | 13.386      | 14.488      | 5.433       | 6.772      | 3.937       | 4.252       | 0.236      | 0.669      | 3-M16 | 368.80                           | 1,000                 | 156.20           | 4440730  | 1,541.46 |

## 3-Jaw Camlock Mount Cast Iron Body Scroll Chucks — 2pc Hard Rev. Jaws



Camlock Mount



| Chuck Size<br>D (in.) | D1<br>(in.) | D2<br>(in.) | D3<br>(in.) | D4<br>(in.) | H1<br>(in.) | h<br>(in.) | h1<br>(in.) | z-d       | Max. Input<br>Torque<br>(ft/lbs) | Max Speed<br>(r/min.) | Weight<br>(lbs.) | Code No. | Price \$ |
|-----------------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-----------|----------------------------------|-----------------------|------------------|----------|----------|
| 6 D1-4                | 2.501       | 3.252       | 1.575       | 4.606       | 2.756       | 0.512      | 0.394       | 3-M10x1   | 118.02                           | 2500                  | 22.00            | 4440910  | 526.85   |
| 8 D1-4                | 2.501       | 3.252       | 1.969       | 4.606       | 3.386       | 0.512      | 0.394       | 3-M10x1   | 184.40                           | 2000                  | 37.40            | 4440920  | 749.19   |
| 8 D1-6                | 4.188       | 5.252       | 1.969       | 7.126       | 3.386       | 0.630      | 0.512       | 6-M16x1.5 | 184.40                           | 2000                  | 37.40            | 4440930  | 711.55   |
| 10 D1-6               | 4.188       | 5.252       | 2.756       | 7.126       | 3.858       | 0.630      | 0.512       | 6-M16x1.5 | 236.03                           | 1600                  | 70.40            | 4440940  | 872.83   |
| 12 D1-8               | 5.501       | 6.748       | 4.134       | 8.858       | 4.075       | 0.709      | 0.551       | 6-M20x1.5 | 295.04                           | 1200                  | 112.20           | 4440950  | 2,076.81 |



## 4-Jaw Plain Back Cast Iron Body Independent Chucks — Hard Solid Jaws

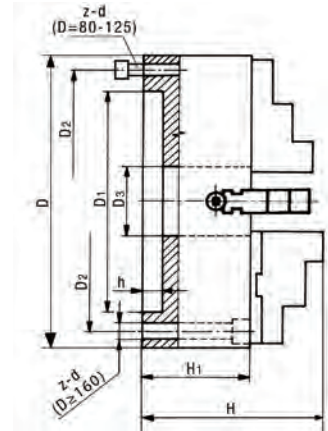
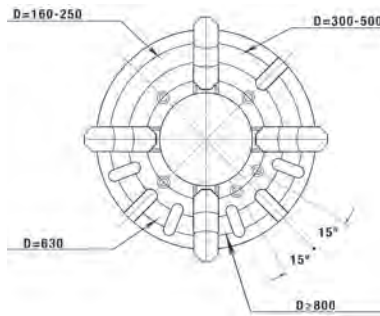
### Features:

- 4-Jaw, independent chuck with manual gripping, and a high quality cast iron body
- Chuck bodies in sizes up to 6" diameter, are made from steel
- 4-Jaws ensure the precise centering of square-shaped workpieces with maximum permitted gripping force
- Chucks with diameters 10" and above are equipped with additional T-slots, permitting the addition of extra jaws
- Mounted on the machine tool spindle from the back of the chuck, using the adapter plate

### Application:

- This precision chuck, with increased gripping accuracy, is made for all types of very high precision workshop machining operations on conventional lathes
- Suitable for machining square and round workpieces

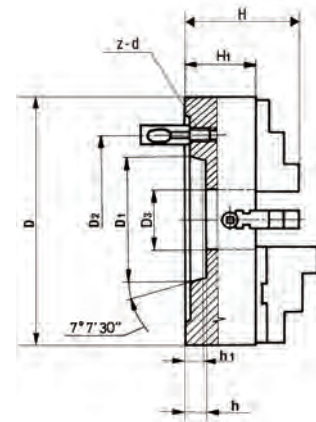
Replacement parts not available



### Plain Back

| Chuck Size<br>D (in.) | D1<br>(in.) | D2<br>(in.) | D3<br>(in.) | H<br>(in.) | H1<br>(in.) | h<br>(in.) | z-d   | Max. Input<br>Torque<br>(ft/lbs) | Max Speed<br>(r/min.) | Weight<br>(lbs.) | Code No. | Price \$ |
|-----------------------|-------------|-------------|-------------|------------|-------------|------------|-------|----------------------------------|-----------------------|------------------|----------|----------|
| 5                     | 3.740       | 4.252       | 1.181       | 3.071      | 2.205       | 0.177      | 4-M8  | 36.88                            | 3000                  | 11.00            | 4445803  | 232.06   |
| 6                     | 2.559       | 3.740       | 1.772       | 3.661      | 2.556       | 0.197      | 4-M10 | 51.63                            | 2500                  | 19.80            | 4445804  | 295.02   |
| 8                     | 3.150       | 4.409       | 2.205       | 4.213      | 2.953       | 0.236      | 4-M10 | 73.76                            | 2000                  | 33.00            | 4445805  | 334.60   |
| 10                    | 4.331       | 5.118       | 2.953       | 4.724      | 3.150       | 0.236      | 4-M12 | 110.64                           | 1600                  | 50.60            | 4445810  | 737.81   |

## 4-Jaw Camlock Mount Cast Iron Body Independent Chucks — Hard Solid Jaws



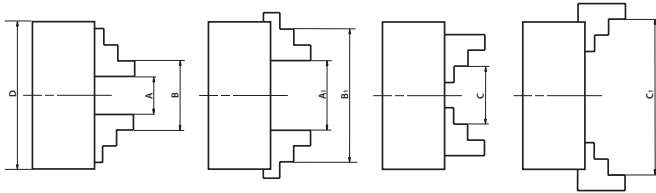
### Camlock Mount

| Chuck Size<br>D (in.) | D1<br>(in.) | D2<br>(in.) | D3<br>(in.) | H<br>(in.) | H1<br>(in.) | h<br>(in.) | h1<br>(in.) | z-d       | Max. Input<br>Torque<br>(ft/lbs) | Max Speed<br>(r/min.) | Weight<br>(lbs.) | Code No. | Price \$ |
|-----------------------|-------------|-------------|-------------|------------|-------------|------------|-------------|-----------|----------------------------------|-----------------------|------------------|----------|----------|
| 10 D1-6               | 4.188       | 5.252       | 2.953       | 4.724      | 3.150       | 0.630      | 0.512       | 6-M16x1.5 | 110.64                           | 1600                  | 50.60            | 4450130  | 703.75   |
| 12 D1-6               | 4.188       | 5.252       | 3.740       | 5.276      | 3.543       | 0.630      | 0.512       | 6-M16x1.5 | 132.77                           | 1200                  | 88.00            | 4450135  | 921.17   |
| 12 D1-8               | 5.501       | 6.748       | 3.740       | 5.276      | 3.543       | 0.709      | 0.551       | 6-M20x1.5 | 132.77                           | 1200                  | 88.00            | 4450140  | 921.17   |
| 16 D1-8               | 5.501       | 6.748       | 4.921       | 5.630      | 3.740       | 0.709      | 0.551       | 6-M20x1.5 | 206.53                           | 1000                  | 121.00           | 4450150  | 1,246.78 |
| 20 D1-11              | 7.751       | 9.252       | 6.299       | 6.339      | 4.173       | 0.787      | 0.630       | 6-M22x1.5 | 258.16                           | 800                   | 224.40           | 4450165  | 969.99   |



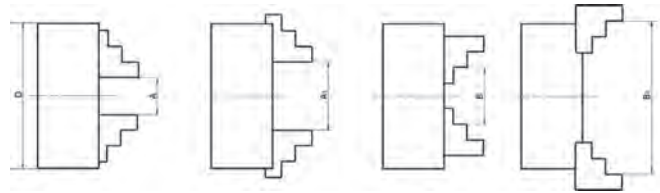
## Clamping Ranges for 3 & 4-Jaw Chucks

### Clamping Range — 3 Self Centering Scroll Chucks



| Chuck Size (in.) | Internal Jaws Clamping Range A-A <sub>1</sub> (in.) | Internal Jaw Jamming Range B-B <sub>1</sub> (in.) | External Jaws Clamping Range C-C <sub>1</sub> (in.) |
|------------------|---|---|---|
| 3                | 0.079 - 0.866                                       | 0.984 - 2.756                                     | 0.866 - 2.480                                       |
| 4                | 0.079 - 1.181                                       | 1.181 - 3.543                                     | 1.181 - 3.150                                       |
| 5                | 0.098 - 1.575                                       | 1.496 - 4.921                                     | 1.496 - 4.331                                       |
| 6                | 0.118 - 2.165                                       | 1.969 - 6.299                                     | 2.165 - 5.709                                       |
| 8                | 0.157 - 3.346                                       | 2.559 - 7.874                                     | 2.559 - 7.874                                       |
| 10               | 0.236 - 4.331                                       | 3.150 - 9.843                                     | 3.543 - 9.843                                       |
| 12               | 0.394 - 5.512                                       | 3.740 - 12.402                                    | 3.937 - 12.402                                      |
| 16               | 0.591 - 8.268                                       | 4.724 - 15.748                                    | 4.724 - 15.748                                      |
| 20               | 0.984 - 11.024                                      | 5.906 - 19.685                                    | 5.906 - 19.685                                      |
| 25               | 1.969 - 13.780                                      | 6.693 - 24.803                                    | 6.693 - 24.803                                      |

### Clamping Range — 4-Jaw Independent Chucks



| Chuck Size (in.) | Internal Jaws Clamping Range A-A <sub>1</sub> (in.) | External Jaws Clamping Range B-B <sub>1</sub> (in.) |
|------------------|---|---|
| 3                | 0.197 - 1.378                                       | 1.378 - 3.150                                       |
| 4                | 0.236 - 1.772                                       | 1.575 - 3.937                                       |
| 5                | 0.276 - 2.244                                       | 1.890 - 4.921                                       |
| 6                | 0.315 - 3.150                                       | 1.969 - 6.299                                       |
| 8                | 0.394 - 3.937                                       | 2.480 - 7.874                                       |
| 10               | 0.591 - 5.118                                       | 3.150 - 9.843                                       |
| 12               | 0.787 - 6.693                                       | 3.937 - 12.402                                      |
| 16               | 0.984 - 9.843                                       | 4.646 - 15.748                                      |
| 20               | 1.378 - 11.811                                      | 4.921 - 19.685                                      |
| 25               | 1.969 - 15.748                                      | 6.299 - 24.803                                      |
| 32               | 2.756 - 21.260                                      | 7.874 - 31.496                                      |

## Spindle Runout For Self-Centering Scroll Chucks & 4-Jaw Independent Lathe Chucks

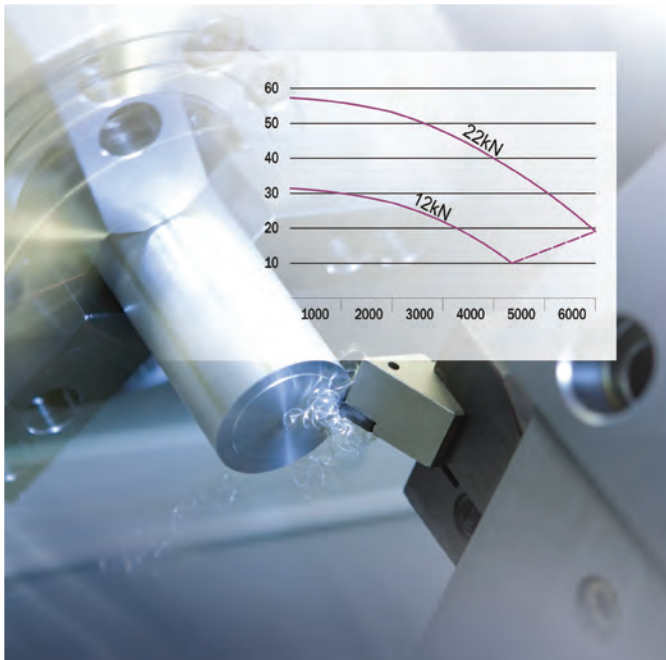


### 3-Jaw Self Centering

| Diagram of Test | Test Item                   | Chuck Diameter      |   |   |   |                                   |    |                  |    |                 |    |
|-----------------|-----------------------------|---------------------|---|---|---|-----------------------------------|----|------------------|----|-----------------|----|
|                 |                             | <6"                 |   |   |   | 8"~10"                            |    | 12"~16"          |    | 20"             |    |
|                 |                             | 3                   | 4 | 5 | 6 | 8                                 | 10 | 12               | 16 | 20              | 20 |
|                 | a. Radial run-out           | a : 0.0002"         |   |   |   |                                   |    |                  |    |                 |    |
|                 | b. Axial run-out            | b : 0.0002"         |   |   |   |                                   |    |                  |    |                 |    |
|                 | Radial run-out of chuck     | 0.0012"/            |   |   |   | 0.0016"/                          |    | 0.0024"/         |    | 0.0031"/        |    |
|                 | Axial run-out of chuck      | 0.0025"/<br>L=2.00" |   |   |   | 0.0031"/<br>L=2" (8"), L=3" (10") |    | 0.0039"/<br>L=3" |    | 0.005"/<br>L=4" |    |
|                 | Radial run-out of test bar  | 0.0024"/            |   |   |   | 0.0024"/                          |    | 0.0031"/         |    | 0.0039"/        |    |
|                 | Radial run-out of test ring | 0.0013"/            |   |   |   | 0.0016"/                          |    | 0.0019"/         |    | 0.0025"/        |    |
|                 | Axial run-out of test ring  | 0.0024"/            |   |   |   | 0.0024"/                          |    | 0.0031"/         |    | 0.0039"/        |    |
|                 | Radial run-out of test ring | 0.0013"/            |   |   |   | 0.0016"/                          |    | 0.0019"/         |    | 0.0025"/        |    |

### 4-Jaw Independent

| Diagram of Test | Test Item                        | Chuck Diameter |          |          |        |                 |                 |                 |                 |     |  |
|-----------------|----------------------------------|----------------|----------|----------|--------|-----------------|-----------------|-----------------|-----------------|-----|--|
|                 |                                  | 3"~5"          |          | 6"       | 8"~10" |                 | 12"             | 16"             | 20"~25"         |     |  |
|                 |                                  | 3"             | 5"       | 6"       | 8"     | 10"             | 12"             | 16"             | 20"             | 25" |  |
|                 | a. Radial run-out                | a : 0.0002"    |          |          |        |                 |                 |                 |                 |     |  |
|                 | b. Axial run-out                 | b : 0.0002"    |          |          |        |                 |                 |                 |                 |     |  |
|                 | Radial run-out of chuck          | 0.0013"/       | 0.0013"/ | 0.0024"/ |        | 0.0024"/        | 0.0024"/        | 0.0024"/        | 0.0031"/        |     |  |
|                 | Axial run-out of chuck           | 0.0006"/       | 0.0006"/ | 0.0009"/ |        | 0.0009"/        | 0.0009"/        | 0.0013"/        | 0.0013"/        |     |  |
|                 | Axial run-out of step of jaw     | 0.0009"/       | 0.0009"/ | 0.0013"/ |        | 0.0013"/        | 0.0013"/        | 0.0016"/        | 0.0016"/        |     |  |
|                 | Linearity of front face of chuck | —              | —        | —        |        | 0.0013"/<br>(—) | 0.0013"/<br>(—) | 0.0013"/<br>(—) | 0.0016"/<br>(—) |     |  |



# Power Chucks

## Features

- Manufactured from high grade alloy steel which extends machine life while providing higher rigidity and greater wear resistance
- The unique design of wedge nut results in its very rigid structure and enables direct power transmission to the master jaws in direct area of jaw guideways – effectively counteracting the loss of gripping force and resulting in high power transmission efficiency
- Hardened and ground working surfaces ensure longer life with maintained accuracy and repeatability
- Large through hole works well with high rotational speeds
- Master jaws secured against throw-off
- Master jaws lubricated directly
- Unbalance G 6,3
- Flat back mounting, dimensions according to DIN 6353
- Special insert set available that allows for easy transformation into a non-through hole model

## Application

- This first class chuck, with increased gripping accuracy, is made for very high precision machining on CNC lathes and turning centres
- Designed for high rotation speeds without compensating elements

## Options

- Special insert set allows for non through hole execution
- Chucks with diameters 500mm, 630mm and 800mm are available on request

## Standard Accessories

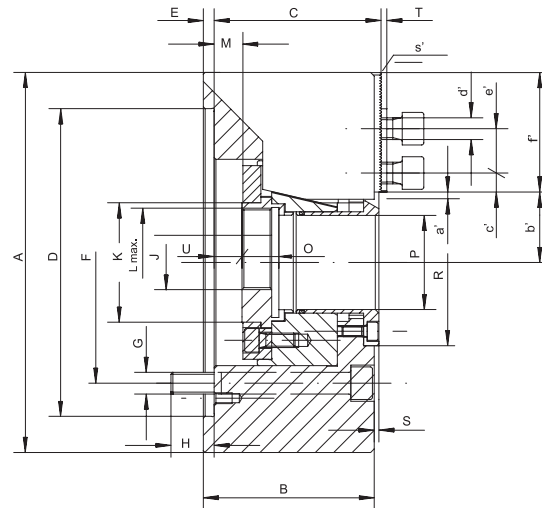
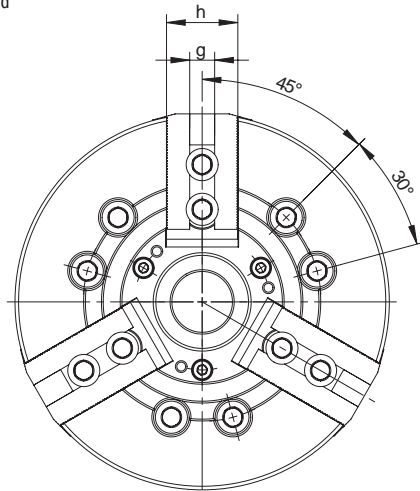
- Chuck and jaw mounting bolts
- Reversible top jaws hardened and ground
- T-nuts
- Key for chuck installation
- Eye bolt (for sizes greater than 8" - 200 mm)

## Bison 2405-K Power Chucks With 1.5mm x 60° Serrations



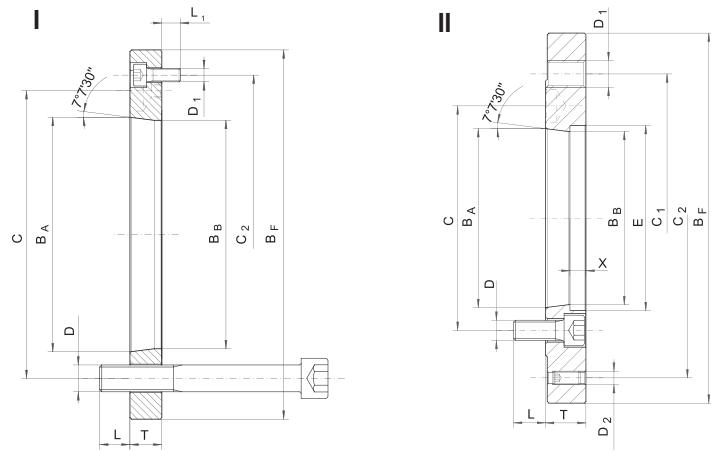
### Standard Accessories:

- Chuck and jaw mounting bolts
- Reversible top jaws hardened and ground
- T-nuts
- Blank draw bar nut
- Key for chuck installation
- Eye bolt

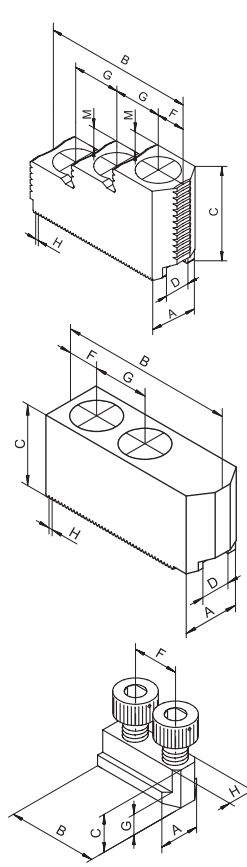


| Size (mm)                             | 160      | 200      | 250      | 315      |
|---------------------------------------|----------|----------|----------|----------|
| Size (inch)                           | 6        | 8        | 10       | 12       |
| Code No.                              | 468104   | 468116   | 468124   | 468129   |
| Price \$                              | 3,918.23 | 4,861.18 | 6,779.05 | 9,097.67 |
| A                                     | 169      | 210      | 254      | 315      |
| B                                     | 81       | 95       | 106      | 108      |
| C                                     | 79       | 93       | 104      | 106      |
| D (H4)                                | 140      | 170      | 220      | 220      |
| E                                     | 6        | 6        | 6        | 6        |
| F                                     | 104.8    | 133.4    | 171.4    | 171.4    |
| G                                     | 6xM10    | 6xM12    | 6xM16    | 6xM16    |
| H                                     | 13.5     | 18       | 28       | -        |
| J                                     | M27x2    | M36x2    | M50x2    | M56x2    |
| K                                     | 60       | 94       | 140      | -        |
| L max.                                | M55x2    | M60x2    | M85x2    | M100x2   |
| M max. (Wedge stroke)                 | 16       | 22.5     | 27       | 27       |
| O                                     | 19       | 20.5     | 25       | 28       |
| P (Through hole)                      | 45       | 52       | 75       | 91       |
| R                                     | 70       | 92       | 117      | 134      |
| S                                     | 2.6      | 2.6      | 2.6      | 0.6      |
| T                                     | 2.4      | 3.40     | 3.40     | 2.90     |
| U min.                                | -5.0     | -8.0     | -18.5    | -19.0    |
| U max.                                | 11.0     | 14.5     | 8.5      | 8.0      |
| a (Jaw stroke)                        | 3.5      | 5.0      | 6.0      | 6.0      |
| b min.                                | 30.2     | 35.5     | 47.9     | 56.9     |
| b max.                                | 33.7     | 40.5     | 53.9     | 62.9     |
| c min.                                | 9.0      | 10.5     | 11.7     | 13.2     |
| c max.                                | 25.5     | 33       | 41.7     | 60       |
| d                                     | M10      | M12      | M12      | M16      |
| e                                     | 20       | 25       | 30       | 30       |
| f                                     | 51       | 64.5     | 73       | 94       |
| g (H7)                                | 12       | 14       | 16       | 21       |
| h                                     | 38       | 40       | 45       | 52       |
| s                                     | 1.5x60°  | 1.5x60°  | 1.5x60°  | 1.5x60°  |
| Max. draw bar pull (daN)              | 2200     | 3400     | 4300     | 5600     |
| Max. total gripping force (daN)       | 5700     | 8600     | 11100    | 14400    |
| Max. speed (rpm)                      | 6000     | 5000     | 4200     | 3300     |
| Moment of inertia (kgm <sup>2</sup> ) | 0.057    | 0.15     | 0.31     | 0.73     |
| Weight without top jaws (kg)          | 12       | 22       | 35       | 56.5     |

# Adapters For 2405-K Power Chucks



| Type         | 160-A5 | 200-A6  | 250-A6  | 250-A8  | 315-A6  | 315-A8  |
|--------------|--------|---------|---------|---------|---------|---------|
| Code No.     | 468952 | 468956  | 468958  | 468960  | 468962  | 468964  |
| Price \$     | 709.72 | 792.35  | 968.20  | 786.19  | 968.20  | 968.20  |
| Spindle Nose | A5     | A6      | A6      | A8      | A6      | A8      |
| Drawing No.  | I      | I       | II      | I       | II      | I       |
| BF           | 140    | 170     | 220     | 220     | 220     | 220     |
| BA           | 82.563 | 106.375 | 106.375 | 139.719 | 106.375 | 139.719 |
| BB           | 79.5   | 103     | 103     | 136.1   | 103     | 136.1   |
| C            | 104.8  | 133.4   | 133.4   | 171.4   | 133.4   | 171.4   |
| C1           | -      | -       | 171.4   | -       | 171.4   | -       |
| C2           | 116    | 150     | 190     | 190     | 190     | 190     |
| D            | 6xM10  | 6xM12   | 6xM12   | 6xM16   | 6xM12   | 6xM16   |
| D1           | 3xM6   | 3xM6    | 6xM16   | 3xM8    | 6xM16   | 3xM8    |
| D2           | -      | -       | 3xM8    | -       | 3xM8    | -       |
| E            | -      | -       | 110     | -       | 110     | -       |
| L            | 13.5   | 19.5    | 19      | 20      | 18      | 20      |
| L1           | 8      | 7       | -       | 12      | -       | 12      |
| T            | 15     | 17      | 25      | 18      | 30      | 18      |
| X            | -      | -       | 10.5    | -       | 15.5    | -       |
| Weight (kg)  | 1.5    | 2.3     | 5.2     | 4.2     | 6.2     | 4.2     |



## 2405-K Hard Top Jaws



| Size | A  | B   | C  | D H7 | F    | G  | H        | M  | Screw | Weight kg | Code No. | Price \$ |
|------|----|-----|----|------|------|----|----------|----|-------|-----------|----------|----------|
| 160  | 32 | 64  | 43 | 12   | 12.5 | 20 | 1.5 x 60 | 10 | M10   | 0.31      | 468205   | 757.54   |
| 200  | 35 | 79  | 49 | 14   | 14.5 | 25 | 1.5 x 60 | 12 | M12   | 0.56      | 468210   | 827.74   |
| 250  | 40 | 102 | 54 | 16   | 19   | 30 | 1.5 x 60 | 14 | M12   | 1.02      | 468215   | 792.84   |
| 315  | 45 | 102 | 58 | 21   | 21   | 30 | 1.5 x 60 | 14 | M16   | 1.08      | 468220   | 905.84   |

## 2405-K Soft Top Jaws



| Size | A  | B   | C  | D H7 | F  | G  | H        | Screw | Weight kg | Code No. | Price \$ |
|------|----|-----|----|------|----|----|----------|-------|-----------|----------|----------|
| 160  | 26 | 66  | 28 | 12   | 12 | 20 | 1.5 x 60 | M10   | 0.265     | 468305   | 341.13   |
| 200  | 35 | 95  | 38 | 14   | 24 | 25 | 1.5 x 60 | M12   | 0.776     | 468310   | 370.73   |
| 250  | 40 | 110 | 42 | 16   | 30 | 30 | 1.5 x 60 | M12   | 1.194     | 468315   | 394.09   |
| 315  | 50 | 111 | 50 | 21   | 21 | 30 | 1.5 x 60 | M16   | 1.750     | 468320   | 465.43   |

Note: Other sizes available from stock - please call

## 2405-K T-Nuts



| Size | A    | B    | C    | F  | G    | H h6 | Screw    | Weight kg | Code No. | Price \$ |
|------|------|------|------|----|------|------|----------|-----------|----------|----------|
| 160  | 17.5 | 36   | 18.5 | 20 | 7.5  | 12   | M10 x 20 | 0.039     | 468405   | 44.12    |
| 200  | 20.5 | 46.5 | 20.5 | 25 | 8.5  | 14   | M12 x 25 | 0.091     | 468410   | 52.58    |
| 250  | 22.5 | 51   | 21.5 | 30 | 8.5  | 16   | M12 x 30 | 0.121     | 468415   | 63.15    |
| 315  | 29   | 55.5 | 27   | 30 | 10.5 | 21   | M16 x 30 | 0.209     | 468420   | 67.14    |



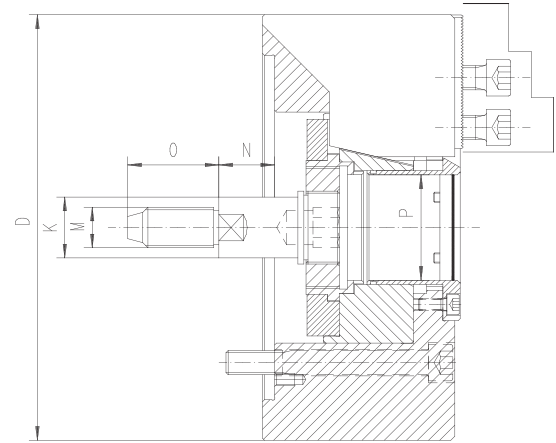
## Special Insert Sets For 2405-K



### Features:

- Special insert set for power chucks with through hole enable conversion to closed center option
- The set includes:
  - 1) Cover to be mounted on front surface of power chuck body instead of originally supplied hollowed cover
  - 2) Special screw for connecting threaded nut of power chuck body with the drawbar of actuating cylinder
- Sets are available in different sizes matching the chuck size

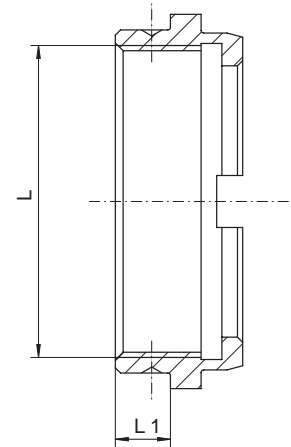
| Size     | 160    | 200    | 250    | 315    |
|----------|--------|--------|--------|--------|
| Code No. | 468902 | 468904 | 468906 | 468908 |
| Price \$ | 670.57 | 731.79 | 793.03 | 854.27 |
| D        | 169    | 210    | 254    | 315    |
| P        | 45     | 52     | 75     | 91     |
| K        | 24     | 30     | 36     | 36     |
| M        | M16    | M20    | M24    | M24    |
| N        | 25.5   | 27.5   | 33     | 34     |
| O        | 40     | 45     | 55     | 55     |



## Drawbar Nuts — Threaded



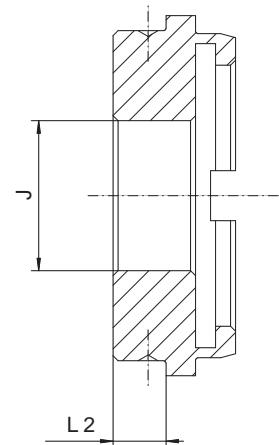
| Chuck Size | L        | L1   | Code No. | Price \$ |
|------------|----------|------|----------|----------|
| 160        | M42x1.5  | 8    | 468720   | 165.55   |
| 160        | M55x1.5  | 8    | 468722   | 165.55   |
| 160        | M42x2    | 8    | 468724   | 165.55   |
| 160        | M50x1.5  | 8    | 468726   | 165.55   |
| 160        | M55x2    | 8    | 468728   | 1,032.92 |
| 200        | M50x1.5  | 11.6 | 468730   | 181.84   |
| 200        | M55x1.5  | 11.6 | 468732   | 181.84   |
| 200        | M60x1.5  | 11.6 | 468734   | 181.84   |
| 200        | M50x2    | 11.6 | 468736   | 181.84   |
| 200        | M55x2    | 11.6 | 468738   | 181.84   |
| 200        | M60x2    | 11.6 | 468740   | 780.21   |
| 250        | M60x1.5  | 23   | 468742   | 214.90   |
| 250        | M85x1.5  | 23   | 468744   | 214.90   |
| 250        | M60x2    | 23   | 468746   | 214.90   |
| 250        | M80x2    | 23   | 468748   | 804.22   |
| 250        | M85x2    | 23   | 468750   | 818.51   |
| 315        | M100x1.5 | 19.5 | 468752   | 297.54   |
| 315        | M100x2   | 19.5 | 468754   | 297.54   |



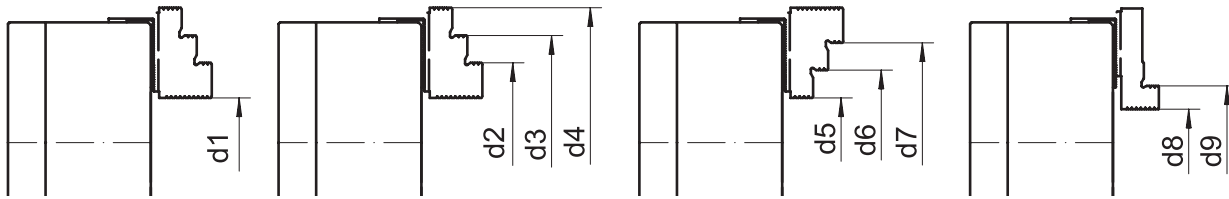
## Drawbar Nuts — Blank



| Chuck Size | J     | L2   | Code No. | Price \$ |
|------------|-------|------|----------|----------|
| 160        | M27x2 | 8    | 468702   | 165.55   |
| 160        | Ø20   | 28   | 468703   | 165.55   |
| 200        | M36x2 | 11.6 | 468704   | 181.84   |
| 200        | Ø30   | 31.6 | 468705   | 181.84   |
| 250        | M50x2 | 23   | 468706   | 214.90   |
| 250        | Ø45   | 43   | 468707   | 684.93   |
| 315        | M56x2 | 19.5 | 468708   | 297.54   |
| 315        | Ø50   | 39.5 | 468709   | 297.54   |

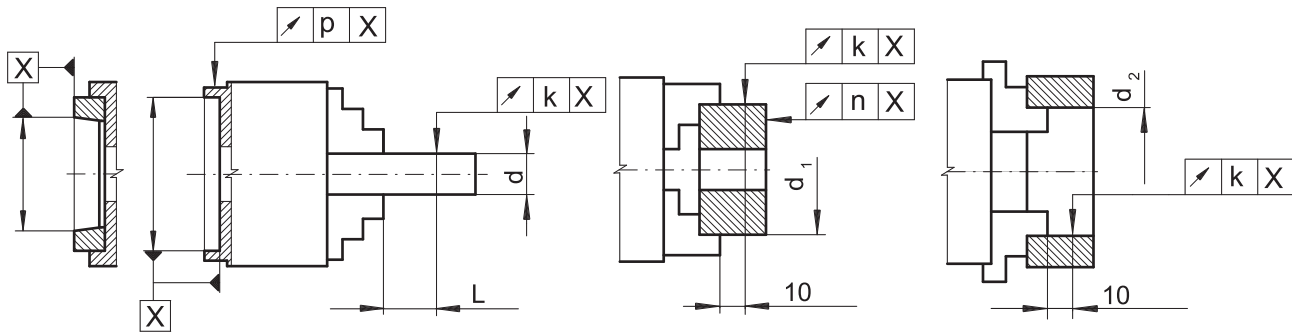


## Gripping Range With Hard Top Jaws For 2405-K



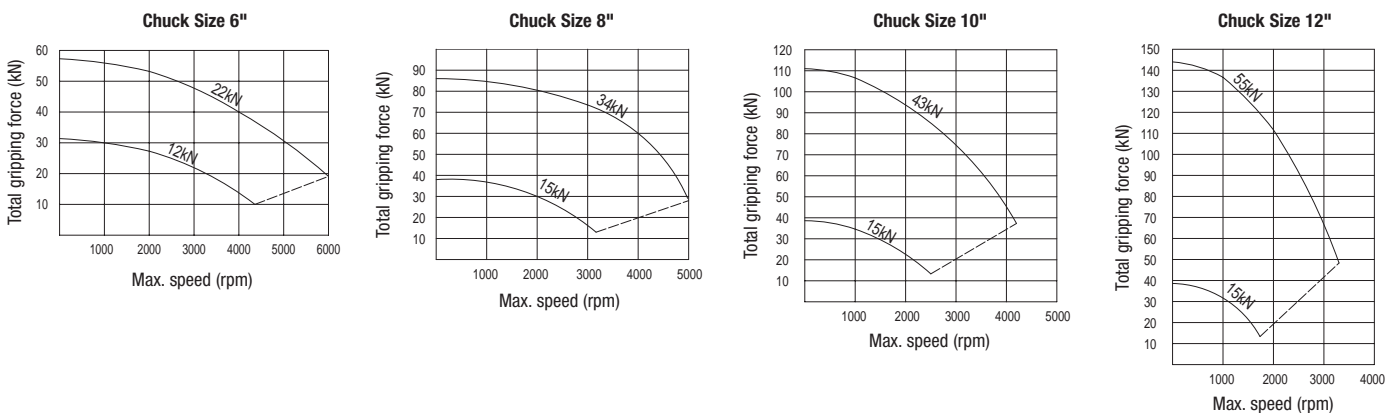
| Size | d1     | d2      | d3      | d4      | d5     | d6      | d7      |
|------|--------|---------|---------|---------|--------|---------|---------|
| 160  | 15-88  | 65-136  | 104-176 | 145-218 | 17-90  | 59-133  | 99-172  |
| 200  | 16-111 | 80-172  | 128-222 | 178-272 | 16-111 | 64-161  | 116-211 |
| 250  | 16-134 | 98-213  | 160-276 | 225-341 | 16-134 | 80-198  | 144-262 |
| 315  | 47-177 | 125-254 | 185-315 | 255-385 | 47-177 | 117-247 | 177-307 |

## Centering Accuracy For 2405-K



| Size | 160  | 200   | 250  | 315  |
|------|------|-------|------|------|
| d    | 20   | 32    | 32   | 50   |
| d    | 32   | 50    | 50   | 80   |
| d    | 50   | 80    | 80   | 125  |
| L    | 40   | 40    | 60   | 80   |
| d1   | 125  | 200   | 200  | 250  |
| d2   | 100  | 125   | 162  | 162  |
| k    | 0.02 | 0.025 | 0.03 | 0.04 |
| n    | 0.02 | 0.02  | 0.03 | 0.03 |
| p    | 0.01 | 0.01  | 0.01 | 0.01 |

## Gripping Force Properties During Chuck Rotation



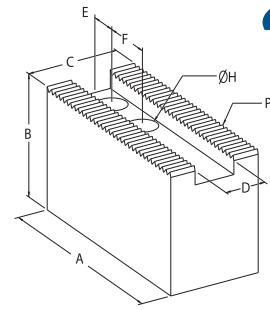
## Metric Serrated Soft Top Jaws — Rectangular

### STM Jaws

- For Autoblok, Howa, Kitagawa, Matsumoto, Shunk

### USA Jaws

- For Kitagawa power chucks



| Chuck Dia.   | Serration | A   | B   | C  | D    | E  | F  | H    | Wt. (kg) | Model No.       | USA Code No. | Individual Price \$ | STM Italy Code No. | Individual Price \$ | STM Italy Code No. | Set of 3 Price \$ |
|--------------|-----------|-----|-----|----|------|----|----|------|----------|-----------------|--------------|---------------------|--------------------|---------------------|--------------------|-------------------|
| 110          | 1.5x60°   | 50  | 25  | 20 | 8    | 15 | 7  | 0.15 | 0.15     | HKM.11.01/S     | -            | -                   | 491215             | 45.94               | -                  | -                 |
| 110          | 1.5x60°   | 55  | 25  | 25 | 10   | 13 | 14 | 9    | 0.196    | HKM.11.05/S     | -            | -                   | 491220             | 47.47               | -                  | -                 |
| 110          | 1.5x60°   | 55  | 50  | 25 | 10   | 13 | 14 | 9    | 0.412    | HKM.11.06/S     | -            | -                   | 491225             | 69.62               | -                  | -                 |
| 135          | 1.5x60°   | 55  | 30  | 25 | 10   | 10 | 18 | 9    | 0.239    | HKM.13.01/S     | -            | -                   | 491235             | 47.82               | -                  | -                 |
| 135          | 1.5x60°   | 55  | 40  | 25 | 10   | 10 | 18 | 9    | 0.316    | HKM.13.02/S     | -            | -                   | 491240             | 67.85               | -                  | -                 |
| 135          | 1.5x60°   | 55  | 25  | 25 | 10   | 14 | 19 | 9    | 0.192    | HKM.13.05/S     | -            | -                   | 491250             | 48.07               | -                  | -                 |
| 150(6")      | 1.5x60°   | 73  | 38  | 32 | 12   | 15 | 20 | 11   | -        | D6SSH38         | 656205       | 46.98               | -                  | -                   | -                  | -                 |
| 150(6")      | 1.5x60°   | 73  | 75  | 32 | 12   | 15 | 20 | 11   | -        | D6SEH38         | 656252       | 87.47               | -                  | -                   | -                  | -                 |
| 165(6")      | 1.5x60°   | 80  | 30  | 30 | 12   | 19 | 20 | 11   | 0.40     | HKM.16.05/S     | -            | -                   | 491265             | 49.94               | 491266             | 156.19            |
| 165(6")      | 1.5x60°   | 75  | 60  | 30 | 12   | 19 | 20 | 11   | 0.76     | HKM.16.08/S     | -            | -                   | 491280             | 80.81               | 491281             | 249.36            |
| 200(8")      | 1.5x60°   | 100 | 50  | 38 | 14   | 25 | 25 | 13   | -        | D8SSH1          | 656215       | 72.21               | -                  | -                   | -                  | -                 |
| 210(8")      | 3x60°     | 95  | 40  | 40 | 14   | 24 | 25 | 13   | 0.96     | HKM.21.3.01/S   | -            | -                   | 491395             | 69.62               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 40  | 35 | 14   | 24 | 25 | 13   | 0.80     | HKM.21.00/S     | -            | -                   | 491295             | 60.79               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 40  | 40 | 14   | 20 | 25 | 13   | 0.97     | HKM.21.01/AL    | -            | -                   | 491305             | 191.07              | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 40  | 40 | 14   | 20 | 25 | 13   | 0.97     | HKM.21.01/S     | -            | -                   | 491315             | 60.79               | 491316             | 178.34            |
| 210(8")      | 1.5x60°   | 95  | 50  | 40 | 14   | 20 | 25 | 13   | 1.20     | HKM.21.02/S     | -            | -                   | 491325             | 75.27               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 60  | 40 | 14   | 20 | 25 | 13   | 1.44     | HKM.21.03/S     | -            | -                   | 491335             | 84.81               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 80  | 40 | 14   | 20 | 25 | 13   | 1.82     | HKM.21.04/S     | -            | -                   | 491345             | 122.97              | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 100 | 40 | 14   | 20 | 25 | 13   | 2.43     | HKM.21.05/S     | -            | -                   | 491355             | 143.60              | -                  | -                 |
| 210-254(8")  | 1.5x60°   | 95  | 40  | 40 | 16   | 20 | 25 | 13   | 0.96     | HKM.21.10/S     | -            | -                   | 491375             | 62.89               | -                  | -                 |
| 210-254(8")  | 1.5x60°   | 95  | 50  | 40 | 16   | 20 | 25 | 13   | 1.19     | HKM.21.11/S     | -            | -                   | 491380             | 80.81               | -                  | -                 |
| 210-254(8")  | 1.5x60°   | 95  | 60  | 40 | 16   | 20 | 25 | 13   | 1.40     | HKM.21.12/S     | -            | -                   | 491385             | 90.71               | -                  | -                 |
| 254(10")     | 1.5x60°   | 118 | 50  | 38 | 16   | 25 | 30 | 13   | -        | D10SSH          | 656180       | 73.80               | -                  | -                   | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 40  | 40 | 16   | 30 | 30 | 13   | 1.11     | HKM.25.01/AL    | -            | -                   | 491405             | 256.79              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 40  | 40 | 16   | 30 | 30 | 13   | 1.11     | HKM.25.01/S     | -            | -                   | 491420             | 63.25               | 491421             | 197.54            |
| 254-270(10") | 1.5x60°   | 110 | 40  | 40 | 16   | -  | -  | -    | 1.11     | **HKM.25.01/SB  | -            | -                   | 491425             | 103.07              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 120 | 40  | 40 | 16   | 30 | 30 | 13   | 1.36     | HKM.25.01/SL120 | -            | -                   | 491430             | 68.56               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 130 | 40  | 40 | 16   | 30 | 30 | 13   | 1.61     | HKM.25.01/SL130 | -            | -                   | 491435             | 79.28               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 160 | 40  | 40 | 16   | 30 | 30 | 13   | 2.36     | HKM.25.01/SL160 | -            | -                   | 491437             | 384.47              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 60  | 40 | 16   | 30 | 30 | 13   | 1.70     | HKM.25.02/S     | -            | -                   | 491495             | 88.23               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 60  | 40 | 16   | -  | -  | -    | 1.70     | **HKM.25.02/SB  | -            | -                   | 491450             | 94.00               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 80  | 40 | 16   | 30 | 30 | 13   | 2.28     | HKM.25.03/S     | -            | -                   | 491465             | 126.87              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 80  | 40 | 16   | -  | -  | -    | 2.28     | **HKM.25.03/SB  | -            | -                   | 491470             | 128.98              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 100 | 40 | 16   | 30 | 30 | 13   | 2.90     | HKM.25.04/S     | -            | -                   | 491480             | 151.97              | 491481             | 461.85            |
| 304(12")     | 1.5x60°   | 118 | 50  | 38 | 18   | 25 | 30 | 15   | -        | D11SSH2         | 656193       | 103.80              | -                  | -                   | -                  | -                 |
| 304(12")     | 1.5x60°   | 140 | 63  | 50 | 21   | 19 | 30 | 17   | -        | D212SSH         | 656197       | 105.03              | -                  | -                   | -                  | -                 |
| 304(12")     | 1.5x60°   | 140 | 100 | 50 | 21   | 19 | 30 | 17   | -        | D212SEH         | 656242       | 196.21              | -                  | -                   | -                  | -                 |
| 304-381(12") | 1.5x60°   | 130 | 50  | 50 | 18   | 25 | 30 | 15   | 2.05     | HKM.30.01/S     | -            | -                   | 491445             | 95.30               | 491496             | 294.01            |
| 304-381(12") | 1.5x60°   | 130 | 80  | 50 | 18   | 25 | 30 | 15   | 3.44     | HKM.30.03/S     | -            | -                   | 491515             | 144.52              | -                  | -                 |
| 304-381(12") | 1.5x60°   | 130 | 100 | 50 | 18   | 25 | 30 | 15   | 4.30     | HKM.30.04/S     | -            | -                   | 491530             | 160.79              | 491531             | 463.51            |
| 304(12")     | 1.5x60°   | 130 | 50  | 50 | 21   | 22 | 30 | 17   | 2.04     | HKM.30.10/S     | -            | -                   | 491545             | 82.21               | 491546             | 294.24            |
| 304(12")     | 1.5x60°   | 130 | 80  | 50 | 21   | 22 | 30 | 17   | 3.33     | HKM.30.12/S     | -            | -                   | 491550             | 143.60              | 491551             | 413.45            |
| 304(12")     | 1.5x60°   | 130 | 100 | 50 | 21   | 22 | 30 | 17   | 4.20     | HKM.30.13/S     | -            | -                   | 491560             | 189.18              | 491561             | 576.01            |
| 304(12")     | 1.5x60°   | 130 | 50  | 50 | 21   | 22 | 35 | 17   | 2.04     | HKM.30.15/S     | -            | -                   | 491570             | 95.30               | -                  | -                 |
| 381(15")     | 1.5x60°   | 159 | 75  | 63 | 22   | 25 | 43 | 21   | -        | D15SSH1         | 656198       | 206.28              | -                  | -                   | -                  | -                 |
| 381(15")     | 1.5x60°   | 159 | 100 | 63 | 22   | 25 | 43 | 21   | -        | D15SEH1         | 656244       | 283.53              | -                  | -                   | -                  | -                 |
| 381(15")     | 1.5x60°   | 159 | 75  | 63 | 25.5 | 25 | 43 | 21   | -        | D215SSH         | 656199       | 206.28              | -                  | -                   | -                  | -                 |
| 381(15")     | 1.5x60°   | 155 | 60  | 60 | 22   | 37 | 43 | 21   | 3.65     | HKM.38.00/S     | -            | -                   | 491585             | 189.18              | 491586             | 578.23            |
| 381-454(15") | 1.5x60°   | 165 | 70  | 70 | 22   | 37 | 43 | 21   | 5.40     | HKM.38.01/S     | -            | -                   | 491605             | 232.51              | -                  | -                 |
| 381(15")     | 1.5x60°   | 155 | 100 | 60 | 22   | 37 | 43 | 21   | 6.00     | HKM.38.02/S     | -            | -                   | 491610             | 265.85              | 491611             | 771.78            |
| 381(15")     | 1.5x60°   | 155 | 60  | 60 | 22   | 30 | 60 | 21   | 3.65     | HKM.38.04/S     | -            | -                   | 491615             | 234.77              | -                  | -                 |
| 381(15")     | 1.5x60°   | 156 | 70  | 70 | 22   | 30 | 60 | 21   | 5.10     | HKM.38.05/S     | -            | -                   | 491630             | 232.51              | -                  | -                 |
| 381-454(15") | 3x60°     | 155 | 60  | 60 | 22   | 30 | 50 | 21   | 3.65     | HKM.38.3.00/S   | -            | -                   | 491670             | 189.18              | 491671             | 523.12            |
| 381-454(15") | 3x60°     | 156 | 70  | 70 | 22   | 30 | 50 | 21   | 5.10     | HKM.38.3.01/S   | -            | -                   | 491685             | 232.51              | -                  | -                 |
| 381(15")     | 3x60°     | 140 | 60  | 60 | 26   | 30 | 42 | 21   | 3.20     | HKM.38.3.05/S   | -            | -                   | 491695             | 157.60              | -                  | -                 |
| 381(15")     | 1.5x60°   | 135 | 60  | 50 | 25.5 | 26 | 43 | 21   | 2.49     | HKM.38.10/S     | -            | -                   | 491650             | 131.57              | 491651             | 388.95            |
| 381(15")     | 1.5x60°   | 135 | 100 | 50 | 25.5 | 26 | 43 | 21   | 4.14     | HKM.38.12/S     | -            | -                   | 491660             | 223.33              | 491661             | 643.75            |
| 454-610(18") | 3x60°     | 200 | 70  | 70 | 25   | 40 | 60 | 21   | 6.60     | HKM.53.3.01/S   | -            | -                   | 491705             | 285.05              | -                  | -                 |
| 381-610(18") | 3x60°     | 156 | 70  | 70 | 26   | 34 | 50 | 21   | 5.05     | HKM.61.3.01/S   | -            | -                   | 491710             | 255.62              | -                  | -                 |

\*\* Blank jaws



## Metric Serrated Soft Top Jaws — Pointed

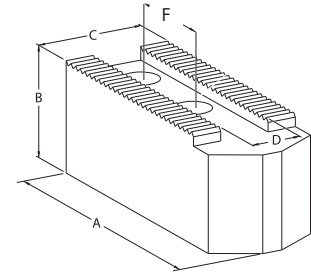
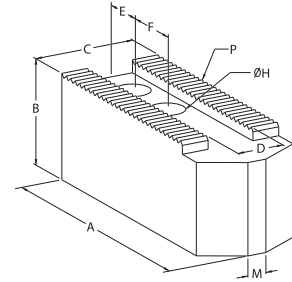
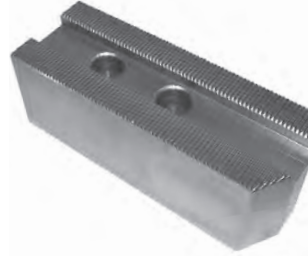
### STM Jaws

- For Autoblok, Howa, Kitagawa, Matsumoto, Shunk

**QUALITY  
IMPORT**

### Quality Import Jaws

- For Kitagawa power chucks  
Models B, BT, B200, BT200, HOH, HOB, N, NL



| Chuck Dia.   | Serration | A   | B   | C  | D    | E  | F  | H  | M  | Wt. (kg) | Model No.      | Quality Import Code No. | Individual Price \$ | STM Italy Code No. | Individual Price \$ | STM Italy Code No. | Set of 3 Price \$ |
|--------------|-----------|-----|-----|----|------|----|----|----|----|----------|----------------|-------------------------|---------------------|--------------------|---------------------|--------------------|-------------------|
| 135          | 1.5x60°   | 55  | 30  | 25 | 10   | 10 | 18 | 9  | 5  | 0.239    | HKM.13.01      | -                       | -                   | 491230             | 47.47               | -                  | -                 |
| 135          | 1.5x60°   | 55  | 25  | 25 | 10   | 14 | 19 | 9  | 4  | 0.192    | HKM.13.05      | -                       | -                   | 491245             | 48.07               | -                  | -                 |
| 150(6")      | 1.5x60°   | 70  | 38  | 25 | 12   |    | 20 | 11 |    |          |                | 656010                  | 35.62               | -                  | -                   | 656050**           | 83.29             |
| 165(6")      | 1.5x60°   | 80  | 30  | 30 | 12   | 19 | 20 | 11 | 7  | 0.40     | HKM.16.05      | -                       | -                   | 491255             | 49.94               | 491256             | 156.19            |
| 165(6")      | 1.5x60°   | 75  | 60  | 30 | 12   | 19 | 20 | 11 | 7  | 0.76     | HKM.16.08      | -                       | -                   | 491275             | 80.81               | -                  | -                 |
| 210(8")      | 1.5x60°   | 90  | 50  | 38 | 14   |    | 25 | 13 |    |          |                | -                       | -                   | -                  | -                   | 656055**           | 113.29            |
| 210(8")      | 1.5x60°   | 95  | 40  | 35 | 14   | 24 | 25 | 13 | 5  | 0.80     | HKM.21.00      | -                       | -                   | 491290             | 60.79               | -                  | -                 |
| 210(8")      | 3x60°     | 95  | 40  | 40 | 14   | 24 | 25 | 13 | 12 | 0.96     | HKM.21.3.01    | -                       | -                   | 491390             | 69.62               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 40  | 40 | 14   | 20 | 25 | 13 | 12 | 0.97     | HKM.21.01      | -                       | -                   | 491300             | 60.79               | 491301             | 188.35            |
| 210(8")      | 1.5x60°   | 95  | 50  | 40 | 14   | 20 | 25 | 13 | 12 | 1.20     | HKM.21.02      | -                       | -                   | 491320             | 75.27               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 60  | 40 | 14   | 20 | 25 | 13 | 12 | 1.44     | HKM.21.03      | -                       | -                   | 491330             | 84.81               | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 80  | 40 | 14   | 20 | 25 | 13 | 12 | 1.82     | HKM.21.04      | -                       | -                   | 491340             | 122.97              | -                  | -                 |
| 210(8")      | 1.5x60°   | 95  | 100 | 40 | 14   | 20 | 25 | 13 | 12 | 2.43     | HKM.21.05      | -                       | -                   | 491350             | 143.60              | -                  | -                 |
| 210-254(8")  | 1.5x60°   | 95  | 40  | 40 | 16   | 20 | 25 | 13 | 12 | 0.96     | HKM.21.10      | -                       | -                   | 491365             | 62.89               | -                  | -                 |
| 254(10")     | 1.5x60°   | 110 | 42  | 40 | 16   |    | 30 | 13 |    |          |                | 656020                  | 26.52               | -                  | -                   | 656060**           | 131.10            |
| 254-270(10") | 1.5x60°   | 110 | 40  | 40 | 16   | 30 | 30 | 13 | 12 | 1.11     | HKM.25.01      | -                       | -                   | 491400             | 63.25               | 491401             | 197.54            |
| 254-270(10") | 1.5x60°   | 130 | 40  | 40 | 16   | 30 | 30 | 13 | 12 | 1.36     | HKM.25.01 L130 | -                       | -                   | 491415             | 79.28               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 60  | 40 | 16   | 30 | 30 | 13 | 12 | 1.70     | HKM.25.02      | -                       | -                   | 491440             | 88.23               | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 80  | 40 | 16   | 30 | 30 | 13 | 12 | 2.28     | HKM.25.03      | -                       | -                   | 491455             | 126.87              | -                  | -                 |
| 254-270(10") | 1.5x60°   | 110 | 100 | 40 | 16   | 30 | 30 | 13 | 12 | 2.90     | HKM.25.04      | -                       | -                   | 491475             | 151.97              | 491476             | 455.91            |
| 254(10")     | 1.5x60°   | 110 | 45  | 45 | 18   | 25 | 30 | 15 | 15 | 1.57     | HKM.25.10      | -                       | -                   | 491485             | 71.14               | -                  | -                 |
| 304(12")     | 1.5x60°   | 120 | 50  | 38 | 18   |    | 30 | 15 |    |          |                | 656025                  | 89.99               | -                  | -                   | 656065**           | 205.80            |
| 304-381(12") | 1.5x60°   | 130 | 50  | 50 | 18   | 25 | 30 | 15 | 20 | 2.05     | HKM.30.01      | -                       | -                   | 491490             | 95.30               | 491491             | 294.01            |
| 304-381(12") | 1.5x60°   | 130 | 60  | 50 | 18   | 25 | 30 | 15 | 22 | 2.55     | HKM.30.02      | -                       | -                   | 491500             | 104.12              | -                  | -                 |
| 304-381(12") | 1.5x60°   | 130 | 80  | 50 | 18   | 25 | 30 | 15 | 22 | 3.44     | HKM.30.03      | -                       | -                   | 491505             | 144.52              | -                  | -                 |
| 304-381(12") | 1.5x60°   | 130 | 100 | 50 | 18   | 25 | 30 | 15 | 22 | 4.30     | HKM.30.04      | -                       | -                   | 491520             | 160.79              | 491521             | 491.32            |
| 304(12")     | 1.5x60°   | 130 | 50  | 50 | 21   | 22 | 30 | 17 | 20 | 2.04     | HKM.30.10      | -                       | -                   | 491535             | 95.30               | 491536             | 294.13            |
| 304(12")     | 1.5x60°   | 130 | 100 | 50 | 21   | 22 | 30 | 17 | 20 | 4.20     | HKM.30.13      | -                       | -                   | 491555             | 189.18              | 491556             | 576.01            |
| 304(12")     | 1.5x60°   | 130 | 50  | 50 | 21   | 22 | 35 | 17 | 20 | 2.04     | HKM.30.15      | -                       | -                   | 491565             | 95.30               | -                  | -                 |
| 381(15")     | 1.5x60°   | 165 | 62  | 62 | 22   |    | 43 | 21 |    |          |                | -                       | -                   | -                  | -                   | 656070**           | 535.17            |
| 381(15")     | 1.5x60°   | 155 | 60  | 60 | 22   | 37 | 43 | 21 | -  | 3.65     | HKM.38.00      | -                       | -                   | 491580             | 189.18              | 491581             | 578.23            |
| 381-454(15") | 1.5x60°   | 165 | 70  | 70 | 22   | 37 | 43 | 21 | -  | 5.40     | HKM.38.01      | -                       | -                   | 491590             | 232.51              | -                  | -                 |
| 381(15")     | 1.5x60°   | 156 | 70  | 70 | 22   | 30 | 60 | 21 | -  | 5.10     | HKM.38.05      | -                       | -                   | 491620             | 232.51              | -                  | -                 |
| 381-454(15") | 3x60°     | 155 | 60  | 60 | 22   | 30 | 50 | 21 | -  | 3.65     | HKM.38.3.00    | -                       | -                   | 491665             | 189.18              | 491666             | 519.10            |
| 381-454(15") | 3x60°     | 156 | 70  | 70 | 22   | 30 | 50 | 21 | -  | 5.10     | HKM.38.3.01    | -                       | -                   | 491675             | 232.51              | -                  | -                 |
| 381(15")     | 1.5x60°   | 135 | 60  | 50 | 25.5 | 26 | 43 | 21 | -  | 2.49     | HKM.38.10      | -                       | -                   | 491640             | 131.57              | 491641             | 378.70            |
| 381-454(15") | 1.5x60°   | 165 | 70  | 70 | 25.5 | 37 | 43 | 21 | -  | 5.40     | HKM.38.11      | -                       | -                   | 491655             | 232.51              | 491656             | 708.52            |
| 381(15")     | 1.5x60°   | 135 | 100 | 50 | 25.5 | 26 | 43 | 21 | -  | 4.14     | HKM.38.12      | -                       | -                   | 491672             | 223.33              | -                  | -                 |
| 454-610(18") | 3x60°     | 200 | 70  | 70 | 25   | 40 | 60 | 21 | -  | 6.60     | HKM.53.3.01    | -                       | -                   | 491700             | 285.05              | -                  | -                 |

\*\* Quality Import

## Inch Serrated Soft Top Jaws — Rectangular

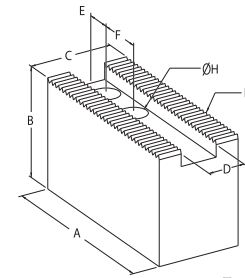


### STM Jaws (Type I, Ia, III)

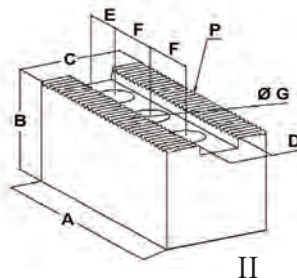
- Type I: For SMW, Berg, Gamet, Shunk, Rohm, Forkardt
- Type Ia: For self contained pneumatic power chucks
- Type III: For SMW Autoblok

### USA Jaws (Type II)

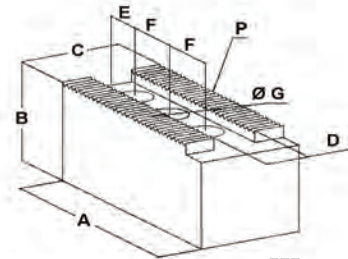
- For Autoblok, Erickson, Forkardt, Gamet, Powerhold, Pratt Burnerd, Rohm and Howa (Ho12M-Self Contained Air)



I, Ia



II



III

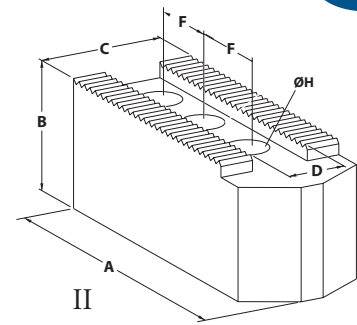
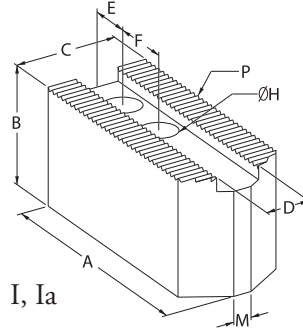
| Chuck Dia. | Serration | Type | A   | B   | C    | D    | E  | F  | G  | H     | Wt. (kg) | Model No.         | USA Code No. | Individual Price \$ | STM Code No. | Individual Price \$ |
|------------|-----------|------|-----|-----|------|------|----|----|----|-------|----------|-------------------|--------------|---------------------|--------------|---------------------|
| 125        | 1/16x90°  | I    | 68  | 40  | 30   | 11   | -  | 18 | -  | M8    | -        | 192200/S          | -            | -                   | 491848       | 68.79               |
| 150        | 1/16x90°  | II   | 75  | 38  | 29   | 11   | 11 | 18 | -  | 5/16" | -        | D6PSH             | 656300       | 58.99               | -            | -                   |
| 160        | 1/16x90°  | I    | 88  | 50  | 35   | 14   | -  | 25 | -  | M10   | -        | 192201/S          | -            | -                   | 491850       | 80.81               |
| 160        | 1/16x90°  | I    | 70  | 60  | 40   | 17   | 15 | 22 | -  | M12   | 1.05     | 242200/F          | -            | -                   | 491130       | 73.62               |
| 200        | 1/16x90°  | Ia   | 88  | 50  | 38   | 17   | -  | 28 | -  | 1/2"  | -        | HKM200            | -            | -                   | 491800       | 120.53              |
| 200        | 1/16x90°  | I    | 98  | 50  | 40   | 17   | -  | 29 | -  | M12   | -        | 192202/S          | -            | -                   | 491852       | 85.40               |
| 200        | 1/16x90°  | I    | 90  | 60  | 40   | 17   | 25 | 22 | -  | M12   | 1.40     | 242201/F          | -            | -                   | 491131       | 75.97               |
| 200-250    | 1/16x90°  | II   | 108 | 50  | 32   | 13   | 14 | 22 | -  | 3/8"  | -        | D10PSH            | 656305       | 86.68               | -            | -                   |
| 250        | 1/16x90°  | I    | 108 | 70  | 50   | 21   | -  | 30 | -  | M14   | -        | 192203/S          | -            | -                   | 491854       | 101.54              |
| 250        | 1/16x90°  | I    | 120 | 80  | 50   | 21   | 30 | 28 | -  | M16   | 3.08     | 242202/F          | -            | -                   | 491132       | 107.20              |
| 250HD      | 1/16x90°  | II   | 115 | 50  | 44.5 | 20   | 16 | 30 | -  | 1/2"  | -        | D11PSH            | 656310       | 129.45              | -            | -                   |
| 250-315    | 1/16x90°  | Ia   | 120 | 38  | 50   | 21   | -  | 30 | -  | 1/2"  | -        | HKM250-315        | -            | -                   | 491802       | 168.26              |
| 300        | 1/16x90°  | II   | 130 | 63  | 44.5 | 20   | 16 | 30 | -  | 1/2"  | -        | D12PSH            | 656315       | 144.83              | -            | -                   |
| 300        | 1/16x90°  | I    | 140 | 90  | 60   | 25.5 | 30 | 35 | -  | M20   | 4.70     | 242203/F          | -            | -                   | 491133       | 189.88              |
| 315        | 1/16x90°  | I    | 120 | 70  | 50   | 21   | -  | 30 | -  | M16   | -        | 192204/S          | -            | -                   | 491856       | 141.11              |
| 315        | 1/16x90°  | I    | 140 | 70  | 50   | 21   | -  | 30 | -  | M16   | -        | 192204/S L140     | -            | -                   | 491086       | 171.03              |
| 355-560    | 1/16x90°  | II   | 165 | 63  | 44.5 | 21   | 19 | 40 | -  | 5/8"  | -        | D15PSH            | 656320       | 218.36              | -            | -                   |
| 400        | 3/32x90°  | Ia   | 160 | 75  | 63   | 25   | -  | 40 | -  | 3/4"  | -        | HKM400            | -            | -                   | 491804       | 405.79              |
| 400        | 3/32x90°  | Ia   | 160 | 100 | 63   | 25   | -  | 35 | -  | M18   | -        | HKM400S           | -            | -                   | 491806       | 349.96              |
| 400        | 3/32x90°  | I    | 160 | 80  | 60   | 25.5 | -  | 40 | -  | M18   | -        | 192205/S          | -            | -                   | 491090       | 223.69              |
| 400-500    | 3/32x90°  | Ia   | 172 | 63  | 63   | 25   | -  | 38 | -  | M20   | -        | HKM400-500L6.75A  | -            | -                   | 491820       | 366.30              |
| 400-500    | 3/32x90°  | I    | 200 | 90  | 60   | 25.5 | -  | 35 | -  | M20   | -        | 242204/F L200     | -            | -                   | 491862       | 292.72              |
| 400-500    | 3/32x90°  | I    | 250 | 90  | 60   | 25.5 | -  | 35 | -  | M20   | -        | 242204/F L250     | -            | -                   | 491864       | 357.85              |
| 400-500    | 3/32x90°  | I    | 155 | 90  | 60   | 25.5 | 30 | 35 | -  | M20   | 6.40     | 242204/F          | -            | -                   | 491135       | 213.32              |
| 500        | 3/32x90°  | Ia   | 160 | 75  | 63   | 25   | -  | 40 | -  | 3/4"  | -        | HKM500            | -            | -                   | 491808       | 403.98              |
| 500        | 3/32x90°  | Ia   | 200 | 100 | 63   | 25   | -  | 40 | -  | M18   | -        | HKM500S           | -            | -                   | 491810       | 478.93              |
| 500        | 3/32x90°  | III  | 170 | 60  | 60   | 28   | 27 | 38 | 38 | M20   | 3.62     | 102210/A          | -            | -                   | 491050       | 231.34              |
| 500        | 3/32x90°  | III  | 170 | 60  | 60   | 25.5 | 27 | 38 | 38 | M20   | 3.62     | 102210/A c25.5    | -            | -                   | 491055       | 231.34              |
| 630        | 3/32x90°  | Ia   | 210 | 88  | 88   | 30   | -  | 63 | -  | 1"    | -        | HKM630            | -            | -                   | 491812       | 563.37              |
| 630        | 3/32x90°  | Ia   | 241 | 88  | 75   | 30   | -  | 65 | -  | M24   | -        | HKM630S           | -            | -                   | 491814       | 619.85              |
| 630        | 3/32x90°  | Ia   | 242 | 83  | 83   | 30   | -  | 50 | -  | M24   | -        | HKM630AL9.50      | -            | -                   | 491822       | 619.85              |
| 800        | 3/32x90°  | Ia   | 210 | 88  | 88   | 30   | -  | 63 | -  | 1"    | -        | HKM800            | -            | -                   | 491816       | 563.37              |
| 800        | 3/32x90°  | Ia   | 300 | 88  | 75   | 30   | -  | 65 | -  | M24   | -        | HKM800S           | -            | -                   | 491818       | 704.30              |
| 800-1000   | 3/32x90°  | Ia   | 318 | 83  | 83   | 30   | -  | 50 | -  | M24   | -        | HKM800-1000AL12.5 | -            | -                   | 491824       | 732.48              |



## Inch Serrated Soft Top Jaws — Pointed

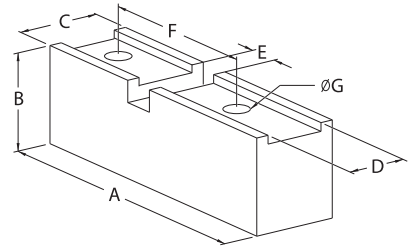
### STM Jaws

- Type I: For SMW Autoblok
- Type Ia: SMW, Berg, Gamet, Shunk, Rohm, Forkardt
- Type II: For self contained pneumatic power chucks



| Chuck Dia. | Serration P | Type | A     | B     | C     | D      | E    | F      | H     | M    | Wt. (kg) | Model No.      | Code No. | Individual Price \$ |
|------------|-------------|------|-------|-------|-------|--------|------|--------|-------|------|----------|----------------|----------|---------------------|
| 125        | 1/16x90°    | II   | 2.50" | 1.50" | 1.00" | 0.433" | -    | 0.660" | 5/16" | -    | -        | HKM125P        | 491826   | 197.51              |
| 125-130    | 1/16X90°    | Ia   | 60mm  | 30mm  | 30mm  | 12mm   | 15mm | 16mm   | 9mm   | 10mm | 0.32     | 102201/A       | 491126   | 41.23               |
| 160        | 1/16x90°    | II   | 3.25" | 1.50" | 1.50" | 0.522" | -    | 0.875" | 3/8"  | -    | -        | HKM160P        | 491828   | 197.51              |
| 165        | 1/16x90°    | I    | 75mm  | 35mm  | 35mm  | 14mm   | 16mm | 16mm   | 11mm  | 8mm  | 0.54     | 102202/A       | 491000   | 43.82               |
| 170-180    | 1/16X90°    | Ia   | 85mm  | 40mm  | 40mm  | 14mm   | 19mm | 20mm   | 11mm  | 10mm | 0.82     | 102203/A       | 491127   | 49.35               |
| 200        | 1/16x90°    | II   | 4.25" | 2.00" | 1.50" | 0.669" | -    | 0.875" | 1/2"  | -    | -        | HKM200P        | 491830   | 227.40              |
| 200-220    | 1/16x90°    | I    | 95mm  | 40mm  | 40mm  | 17mm   | 20mm | 23mm   | 13mm  | 12mm | 0.96     | 102205/A       | 491005   | 53.84               |
| 200-220    | 1/16x90°    | I    | 95mm  | 50mm  | 40mm  | 17mm   | 20mm | 23mm   | 13mm  | 12mm | 1.18     | 102205/A H50   | 491010   | 71.97               |
| 200-220    | 1/16x90°    | I    | 95mm  | 60mm  | 40mm  | 17mm   | 20mm | 23mm   | 13mm  | 12mm | 1.42     | 102205/A H60   | 491015   | 77.98               |
| 250        | 1/16x90°    | I    | 115mm | 50mm  | 50mm  | 21mm   | 20mm | 30mm   | 17mm  | 20mm | 1.76     | 102207/A       | 491020   | 73.39               |
| 250        | 1/16x90°    | I    | 115mm | 60mm  | 50mm  | 21mm   | 20mm | 30mm   | 17mm  | 20mm | 2.10     | 102207/A H60   | 491030   | 101.77              |
| 250-350    | 1/16x90°    | I    | 125mm | 80mm  | 50mm  | 21mm   | 20mm | 30mm   | 17mm  | 20mm | 3.15     | 102207-8/A H80 | 491025   | 134.88              |
| 300-350    | 1/16x90°    | I    | 130mm | 50mm  | 50mm  | 21mm   | 22mm | 30mm   | 17mm  | 20mm | 2.10     | 102208/A       | 491040   | 86.93               |
| 300-350    | 1/16x90°    | I    | 130mm | 60mm  | 50mm  | 21mm   | 22mm | 30mm   | 17mm  | 22mm | 2.38     | 102208/A H60   | 491045   | 116.48              |

## Soft Top Jaws For TOS Chucks



| Model No. | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Individual Price \$ |
|-----------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|---------------------|
| 282200/T  | 100        | 50     | 20     | 20     | 14     | 12     | 20     | 5.5    | 0.117      | 491196   | 53.14               |
| 282201/T  | 125        | 65     | 25     | 25     | 16     | 12     | 28     | 5.5    | 0.26       | 491197   | 55.13               |
| 282202/T  | 160        | 80     | 35     | 25     | 18     | 12     | 38     | 7      | 0.42       | 491198   | 58.21               |
| 282204/T  | 200        | 100    | 40     | 30     | 22     | 14     | 48     | 11     | 0.74       | 491200   | 66.42               |
| 282206/T  | 250        | 125    | 40     | 30     | 25     | 14     | 55     | 11     | 0.96       | 491205   | 72.80               |
| 282207/T  | 315        | 155    | 60     | 40     | 32     | 20     | 60     | 13     | 2.25       | 491210   | 111.78              |
| 282208/T  | 400-630    | 165    | 70     | 40     | 32     | 20     | 70     | 13     | 3.00       | 491211   | 152.32              |

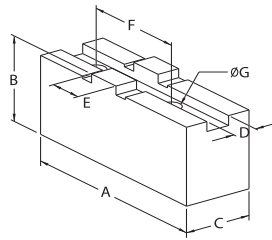
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

# Workholding, Clamping & Fixturing

## Soft Top Jaws — Metric Tongue & Groove

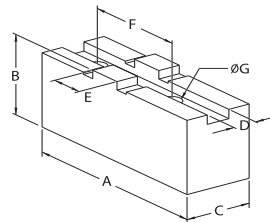
- For SMW/Autoblok, Berg, Forkardt, Rohm, Schunk



| Model No. | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Individual Price \$ |
|-----------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|---------------------|
| 232200/F  | 160        | 85     | 40     | 20     | 8      | 18     | 32     | 9      | 0.38       | 491095   | 56.78               |
| 232201/F  | 200        | 105    | 50     | 25     | 10     | 20     | 40     | 9      | 0.62       | 491102   | 62.54               |
| 232202/F  | 250        | 125    | 50     | 30     | 12     | 20     | 40     | 13     | 1.12       | 491105   | 79.98               |
| 232203/F  | 315        | 145    | 60     | 35     | 12     | 26     | 54     | 13     | 1.93       | 491115   | 110.14              |
| 232204/F  | 400        | 180    | 80     | 50     | 18     | 30     | 60     | 17     | 4.56       | 491125   | 198.36              |

## Soft Top Jaws — American Tongue & Groove

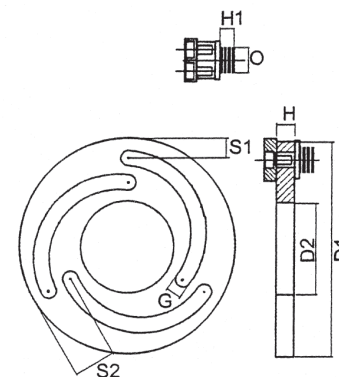
- For Rohm Models ZG, ZS, ZGU, ZSU



| Model No. | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Individual Price \$ |
|-----------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|---------------------|
| 262200/R  | 100        | 53     | 30     | 25     | 7.96   | 9.49   | 24     | 7      | 0.24       | 491151   | 55.13               |
| 262201/R  | 125        | 62     | 40     | 25     | 7.96   | 12.67  | 32     | 9      | 0.36       | 491155   | 58.90               |
| 262202/R  | 160        | 74     | 45     | 30     | 7.96   | 12.67  | 38.1   | 9      | 0.61       | 491160   | 68.21               |
| 262203/R  | 200        | 87     | 45     | 30     | 7.96   | 12.67  | 44.45  | 9      | 0.76       | 491165   | 72.56               |
| 262204/R  | 250        | 103    | 50     | 35     | 12.72  | 19.02  | 53.95  | 13     | 1.1        | 491170   | 79.16               |
| 262205/R  | 315        | 120    | 60     | 40     | 12.72  | 19.02  | 63.50  | 13     | 1.87       | 491180   | 98.94               |
| 262205/R  | 315        | 140    | 60     | 40     | 12.72  | 19.02  | 63.50  | 13     | 2.2        | 491181   | 166.32              |
| 262206/R  | 350-400    | 140    | 70     | 50     | 12.72  | 19.02  | 76.20  | 17     | 3.0        | 491190   | 189.88              |
| 262207/R  | 450-800    | 160    | 80     | 50     | 12.72  | 19.02  | 76.20  | 21     | 3.5        | 491195   | 249.60              |

## Soft Jaw Forming Ring

The forming ring is used for cutting soft jaws by clamping and extending the through hole to increase the accuracy of clamping the workpiece.

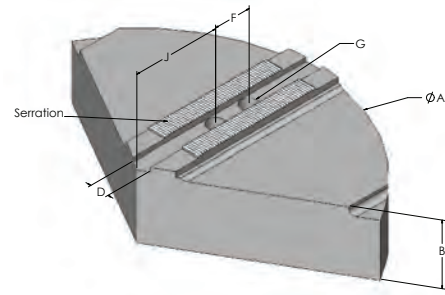


| Model No. | For Chuck Dia. | H (mm) | D1 (mm) | D2 (mm) | S1 (mm) | S2 (mm) | G (mm) | H1 (mm) | O (mm) | Weight kg. | Code No. | Price \$ |
|-----------|----------------|--------|---------|---------|---------|---------|--------|---------|--------|------------|----------|----------|
| VFR-05    | 5"             | 12     | 140     | 60      | 12      | 28      | 10     | 9       | 13.5   | 1          | 326250   | 511.72   |
| VFR-06    | 6"             | 12     | 168     | 80      | 12      | 32      | 10     | 9       | 16.5   | 1.5        | 326255   | 716.79   |
| VFR-08    | 8"             | 12     | 218     | 115     | 17      | 36      | 10     | 9       | 18.5   | 2.4        | 326260   | 825.17   |
| VFR-10    | 10"            | 12     | 258     | 150     | 15      | 40      | 10     | 9       | 18.5   | 3.2        | 326265   | 869.00   |
| VFR-12    | 12"            | 15     | 316     | 118     | 21      | 50      | 10     | 9       | 21.5   | 5          | 326270   | 1,303.14 |



## Pie Jaws 1.5mm x 60° Serrations

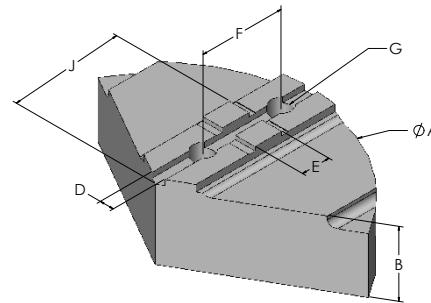
- Made with 6061 billet aluminum



| Chuck Dia. | Aluminum Model No. | A Diameter | B Height | D Slot | F Hole Spacing | G Bolt Size | J Dim   | Weight lbs. | Set of 3 Code No. | Set of 3 Price \$ |
|------------|--------------------|------------|----------|--------|----------------|-------------|---------|-------------|-------------------|-------------------|
| 6          | KTT6P              | 6          | 2        | 0.472  | 0.787          | 10mm        | 1-21/32 | 5.7         | 658236            | 168.29            |
| 6          | KTT6P1             | 6          | 4        | 0.472  | 0.787          | 10mm        | 1-21/32 | 10.8        | 658238            | 280.49            |
| 6          | KTT8-6P            | 8          | 2        | 0.472  | 0.787          | 10mm        | 1-21/32 | 10.2        | 658240            | 224.39            |
| 8          | KTT8P              | 8          | 2        | 0.551  | 0.984          | 12mm        | 2"      | 10.2        | 658242            | 224.39            |
| 8          | KTT8P1             | 8          | 4        | 0.551  | 0.984          | 12mm        | 2"      | 19.8        | 658244            | 364.63            |
| 8          | KTT10-8P           | 10         | 2        | 0.551  | 0.984          | 12mm        | 2"      | 16.2        | 658246            | 364.63            |
| 8          | KTT12-8P           | 12         | 2        | 0.551  | 0.984          | 12mm        | 2"      | 23.4        | 658248            | 476.83            |
| 10         | KTT10P             | 10         | 2        | 0.630  | 1.181          | 12mm        | 2-1/2   | 16.2        | 658250            | 364.63            |
| 10         | KTT10P1            | 10         | 4        | 0.630  | 1.181          | 12mm        | 2-1/2   | 31.5        | 658252            | 532.92            |
| 10         | KTT12-10P          | 12         | 2        | 0.630  | 1.181          | 12mm        | 2-1/2   | 23.4        | 658254            | 476.83            |
| 10         | KTT15-10P          | 15         | 3        | 0.630  | 1.181          | 12mm        | 2-1/2   | 53.7        | 658256            | 1,178.04          |
| 12         | KTT12P             | 12         | 2        | 0.709  | 1.181          | 14mm        | 3-1/2   | 23.4        | 658258            | 476.83            |
| 12         | KTT12P1            | 12         | 4        | 0.709  | 1.181          | 14mm        | 3-1/2   | 45.3        | 658260            | 757.31            |
| 12         | KTT15-12P          | 15         | 3        | 0.709  | 1.181          | 14mm        | 3-1/2   | 53.7        | 658262            | 1,178.04          |
| 12         | KTTB212P           | 12         | 2        | 0.827  | 1.181          | 14mm        | 3-1/2   | 23.4        | 658264            | 476.83            |
| 12         | KTTB212P1          | 12         | 4        | 0.827  | 1.181          | 14mm        | 3-1/2   | 45.3        | 658266            | 757.31            |
| 15         | KTT15P             | 15         | 3        | 0.866  | 1.693          | 20mm        | 4-5/16  | 36.6        | 658268            | 1,178.04          |
| 15         | KTT15P1            | 15         | 4        | 0.866  | 1.693          | 20mm        | 4-5/16  | 53.7        | 658270            | 1,458.52          |

## Pie Jaws American Standard Tongue & Groove

- Made with 6061 billet aluminum



| Chuck Dia. | Aluminum Model No. | A Dia. | B Height | D Slot | E Tongue | F Hole Spacing | G Bolt Size | J Dim. | Weight lbs. | Set of 3 Code No. | Set of 3 Price \$ |
|------------|--------------------|--------|----------|--------|----------|----------------|-------------|--------|-------------|-------------------|-------------------|
| 6          | TG6MDP             | 6      | 2        | 0.313  | 0.500    | 1.500          | 3/8         | 2"     | 5.7         | 658272            | 185.12            |
| 6          | TG6MDP1            | 6      | 4        | 0.313  | 0.500    | 1.500          | 3/8         | 2"     | 10.8        | 658274            | 308.54            |
| 6          | TG8-6MDP           | 8      | 2        | 0.313  | 0.500    | 1.500          | 3/8         | 2"     | 10.2        | 658276            | 252.43            |
| 8          | TG8MDP             | 8      | 2        | 0.313  | 0.500    | 1.750          | 3/8         | 2-3/4  | 10.2        | 658278            | 252.43            |
| 8          | TG8MDP1            | 8      | 4        | 0.313  | 0.500    | 1.750          | 3/8         | 2-3/4  | 19.8        | 658280            | 392.68            |
| 8          | TG10-8MDP          | 10     | 2        | 0.313  | 0.500    | 1.750          | 3/8         | 2-3/4  | 16.2        | 658282            | 392.68            |
| 10         | TG10MDP            | 10     | 2        | 0.500  | 0.750    | 2.125          | 1/2         | 3-1/2  | 16.2        | 658284            | 392.68            |
| 10         | TG10MDP1           | 10     | 4        | 0.500  | 0.750    | 2.125          | 1/2         | 3-1/2  | 31.5        | 658286            | 560.97            |
| 10         | TG12-10MDP         | 12     | 2        | 0.500  | 0.750    | 2.125          | 1/2         | 3-1/2  | 23.4        | 658288            | 504.88            |
| 10         | TG15-10MDP         | 15     | 3        | 0.500  | 0.750    | 2.125          | 1/2         | 3-1/2  | 45.3        | 658290            | 1,206.09          |
| 12         | TG12MDP            | 12     | 2        | 0.500  | 0.750    | 2.500          | 1/2         | 4-1/4  | 23.4        | 658292            | 504.88            |
| 12         | TG12MDP1           | 12     | 4        | 0.500  | 0.750    | 2.500          | 1/2         | 4-1/4  | 45.3        | 658294            | 785.35            |
| 12         | TG15-12MDP         | 15     | 3        | 0.500  | 0.750    | 2.500          | 1/2         | 4-1/4  | 53.7        | 658296            | 1,206.09          |
| 15         | TG15MDP            | 15     | 3        | 0.500  | 0.750    | 3.000          | 5/8         | 5-1/4  | 53.7        | 658298            | 1,206.09          |
| 15         | TG15MDP1           | 15     | 4        | 0.500  | 0.750    | 3.000          | 5/8         | 5-1/4  | 70.8        | 658300            | 1,486.57          |
| 15         | TG15HDP            | 15     | 3        | 0.500  | 0.750    | 3.000          | 3/4         | 5-1/4  | 53.7        | 658302            | 1,206.09          |
| 15         | TGHDP1             | 15     | 4        | 0.500  | 0.750    | 3.000          | 3/4         | 5-1/4  | 70.8        | 658304            | 1,486.57          |

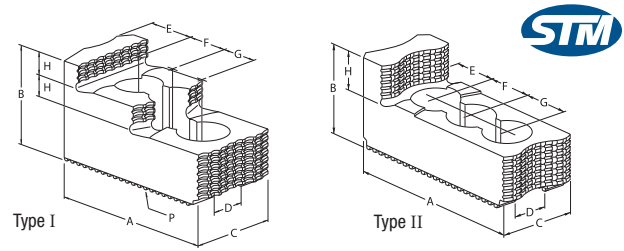


Workholding, Clamping & Fixturing



## Hard Top Jaws — 90° Serrations

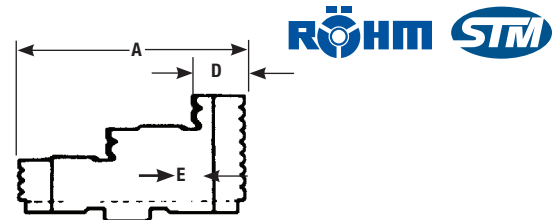
- Hard Top Jaws Serrated 90° for Autoblok, Berg, Forkardt, Gamet, M.P.T, Rohm, SMW



| Model No. | Chuck Dia. | Serration | Drawing No. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | H (mm) | Weight kg. | Set of 3 Code No. | Price \$ |
|-----------|------------|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|------------|-------------------|----------|
| 3101/MTR  | 125-160    | 1/16x90°  | I           | 58     | 34     | 29     | 12     | 14     | 16     | 16     | 8.5    | 0.2        | 491712            | 2,143.01 |
| 3102/MTR  | 160        | 1/16x90°  | I           | 65     | 39     | 34     | 14     | 18     | 16     | 16     | 10     | 0.3        | 491714            | 2,471.18 |
| 3103/MTR  | 200-220    | 1/16x90°  | I           | 82     | 45     | 40     | 17     | 19     | 23     | 23     | 10.5   | 0.6        | 492000            | 2,799.34 |
| 3104/MTR  | 250-315    | 1/16x90°  | I           | 105    | 56     | 45     | 21     | 28     | 30     | 30     | 13.5   | 0.98       | 492002            | 3,460.50 |
| 3105/MTR  | 315-350    | 1/16x90°  | I           | 122    | 56     | 50     | 21     | 43     | 30     | 30     | 13.5   | 1.43       | 492005            | 5,484.18 |
| 3106/MTR  | 400        | 1/16x90°  | I           | 120    | 74     | 55     | 21     | 31     | 34     | 34     | 22     | 1.9        | 492006            | 6,055.95 |
| 3107/MTR  | 400        | 1/16x90°  | I           | 152    | 74     | 55     | 21     | 57     | 34     | 34     | 22     | 2.58       | 492007            | 6,577.99 |
| 3108/MTR  | 500        | 3/32x90°  | II          | 147    | 73     | 55     | 28     | 46     | 38     | 38     | 32     | 2.23       | 492008            | 7,572.29 |
| 3109/MTR  | 610-800    | 3/32x90°  | II          | 147    | 75     | 70     | 28     | 46     | 38     | 38     | 32     | 3.2        | 492009            | 7,965.12 |
| 3110/MTR  | 500-630    | 3/32x90°  | II          | 147    | 73     | 55     | 25.5   | 46     | 38     | 38     | 32     | 2.25       | 492011            | 7,965.12 |
| 3111/MTR  | 610-800    | 3/32x90°  | II          | 147    | 75     | 70     | 25.5   | 46     | 38     | 38     | 32     | 3.23       | 492012            | 8,407.67 |

## Hard Top Jaws American Tongue And Groove

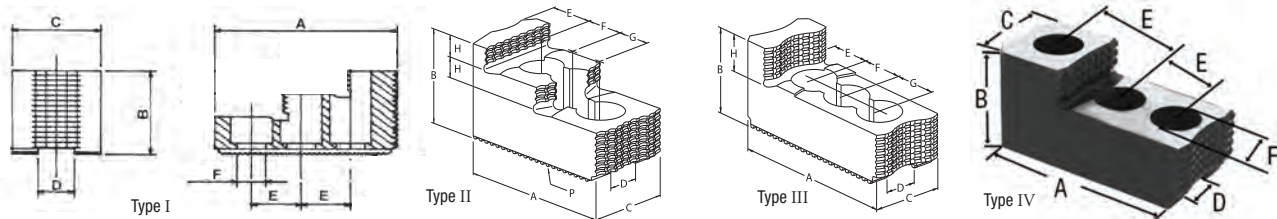
For most manual lathe chucks.



| Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | STM Code No. | Price \$ | Rohm Code No. | Price \$ |
|------------|--------|--------|--------|--------|--------|--------------|----------|---------------|----------|
| 125        | 56     | 12.68  | 32     | 13     | 9      |              |          | 399870        | 496.09   |
| 160        | 66.7   | 12.68  | 38.1   | 15.8   | 9      |              |          | 397020        | 496.09   |
| 200        | 79.5   | 12.68  | 44.45  | 19     | 9      |              |          | 397025        | 513.38   |
| 250        | 95.3   | 19.03  | 53.95  | 22.2   | 14     |              |          | 397030        | 543.97   |
| 250-315    | 90     | 20     | 40     | -      | -      | 492030       | 2,048.54 |               |          |
| 315        | 109.5  | 19.03  | 63.5   | 25.4   | 14     |              |          | 397035        | 813.95   |

## Hard Top Jaws — 60° Serrations

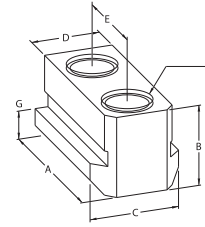
- Hard Top Jaws Serrated 60° for Kitagawa, Howa, Matsumoto, Suga, Nikko And Other Brands



| Chuck Dia. | Drawing No. | Serration | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | Sold By | STM Code No. | Price \$ | Rohm Code No. | Price \$ |
|------------|-------------|-----------|--------|--------|--------|--------|--------|--------|---------|--------------|----------|---------------|----------|
| 6"         | IV          | 1.5x60°   | 66     | 36     | 34.7   | 12     | 20     | 11     | Set     |              |          | 395505        | 856.52   |
| 6"         | III         | 1.5x60°   | 67.5   | 36     | 31     | 12     | 14.5   | 20     | Set     | 492010       | 2,307.09 |               |          |
| 8"         | I           | 1.5x60°   | 81     | 49     | 36     | 14     | 25     | 13     | Set     |              |          | 395510        | 856.52   |
| 10"        | I           | 1.5x60°   | 99.5   | 54     | 44.5   | 16     | 30     | 13     | Set     |              |          | 395515        | 992.18   |
| 12"        | IV          | 1.5x60°   | 97.5   | 50     | 55     | 18     | 30     | 15     | Piece   |              |          | 395517        | 554.97   |
| 12"        | III         | 1.5x60°   | 98     | 55     | 50     | 18     | 20     | 30     | Set     | 492015       | 4,335.71 |               |          |
| 12"        | IV          | 1.5x60°   | 103    | 55.5   | 50     | 21     | 30     | 17     | Set     |              |          | 395520        | 1,157.11 |
| 15"        | IV          | 1.5x60°   | 149    | 62     | 80     | 22     | 43     | 21     | Piece   |              |          | 395521        | 940.01   |
| 15"        | IV          | 1.5x60°   | 149    | 62     | 86     | 25.5   | 43     | 21     | Piece   |              |          | 395522        | 931.55   |
| 15"        | II          | 1.5x60°   | 149    | 86     | 62     | 22     | 27     | 43     | Set     | 492020       | 7,129.86 |               |          |
| 15"        | II          | 1.5x60°   | 149    | 86     | 62     | 25.5   | 27     | 43     | Set     | 492025       | 7,129.86 |               |          |

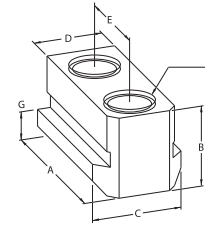


## T-Nuts For Matsumoto Chucks



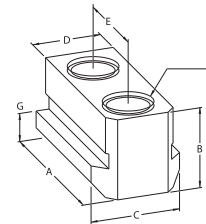
| Model No.   | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Price \$ |
|-------------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|----------|
| 2903/GT20   | 125-150    | 32     | 20     | 16.5   | 11     | 20     | M8     | 7      | 0.04       | 494126   | 73.97    |
| 2905/GT22   | 150-200    | 45     | 22     | 20     | 14     | 25     | M12    | 8.5    | 0.08       | 494124   | 84.70    |
| 2905/GT23   | 200-280    | 53     | 23     | 22     | 16     | 30     | M12    | 8      | 0.12       | 494075   | 81.83    |
| 2907/GT33.5 | 300        | 55     | 33.5   | 25     | 18     | 30     | M12    | 13.5   | 0.2        | 494110   | 89.34    |
| 2909/GT50   | 381-457    | 90     | 39.5   | 33     | 22     | 50     | M20    | 19.5   | 0.52       | 494130   | 334.03   |

## T-Nuts For Kitagawa Chucks



| Model No.    | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Price \$ |
|--------------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|----------|
| 2902/GT13.5  | 110        | 25     | 13.5   | 11.3   | 8      | 15     | M6     | 4.5    | 0.015      | 494052   | 73.97    |
| 2903/GT18    | 100        | 28     | 18     | 15     | 10     | 14     | M8     | 5.5    | 0.028      | 494053   | 73.97    |
| 2903/GT15-14 | 100-130    | 26     | 15     | 15     | 10     | 14     | M8     | 5.5    | 0.021      | 494055   | 71.47    |
| 2903/GT18-19 | 125        | 32     | 18     | 15     | 10     | 19     | M8     | 5.5    | 0.02       | 494056   | 73.97    |
| 2903/GT15.5  | 135        | 30     | 15     | 14     | 10     | 18     | M8     | 5.2    | 0.025      | 494057   | 73.97    |
| 2904/GT22    | 160        | 40     | 22     | 18     | 12     | 20     | M10    | 7      | 0.068      | 494073   | 73.97    |
| 2904/GT18.5  | 160        | 40     | 18.5   | 18     | 12     | 20     | M10    | 7.5    | 0.071      | 494060   | 71.47    |
| 2905/GT24.5  | 200-210    | 45     | 24.5   | 20     | 14     | 25     | M12    | 8.5    | 0.096      | 494080   | 81.83    |
| 2905/GT20.5  | 200-210    | 45     | 20     | 20     | 14     | 25     | M12    | 8      | 0.08       | 494070   | 81.83    |
| 2906/GT24.5  | 250        | 53     | 24.5   | 22     | 16     | 30     | M12    | 8.5    | 0.136      | 494095   | 81.83    |
| 2906/GT21.5  | 250        | 53     | 21.5   | 22     | 16     | 30     | M12    | 8.5    | 0.124      | 494085   | 81.83    |
| 2907/GT33.5  | 300        | 55     | 33.5   | 25     | 18     | 30     | M14    | 13.5   | 0.218      | 494110   | 89.34    |
| 2907/GT30    | 300        | 55     | 30     | 25     | 18     | 30     | M14    | 9.5    | 0.180      | 494111   | 92.47    |
| 2909/GT28    | 300        | 58     | 28     | 30     | 21     | 30     | M16    | 11.5   | 0.225      | 494115   | 107.32   |
| 2910/GT43    | 381-457    | 80     | 45.5   | 34     | 24     | 43     | M20    | 16.5   | 0.511      | 494135   | 328.11   |
| 2911/GT50    | 457        | 90     | 45     | 37.5   | 25     | 50     | M20    | 19     | 0.695      | 494140   | 334.49   |
| 2911/GT60    | 457        | 100    | 45     | 37.5   | 25     | 60     | M20    | 19     | 0.800      | 494141   | 345.72   |
| 2912/GT      | 381        | 80     | 39.2   | 35     | 25.5   | 43     | M20    | 19     | 0.548      | 494150   | 334.03   |
| 2912/GT60    | 457        | 100    | 54     | 37.5   | 25     | 60     | M20    | 19     | 0.925      | 494145   | 345.31   |

## T-Nuts For Howa Chucks



| Model No.    | Chuck Dia. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Weight kg. | Code No. | Price \$ |
|--------------|------------|--------|--------|--------|--------|--------|--------|--------|------------|----------|----------|
| 2904/GT22    | 160        | 40     | 22     | 18     | 12     | 20     | M10    | 7      | 0.068      | 494073   | 73.97    |
| 2905/GT23    | 200-210    | 45     | 23     | 20     | 14     | 25     | M12    | 8.5    | 0.083      | 494075   | 81.83    |
| 2906/GT23    | 250        | 53     | 23     | 22     | 16     | 30     | M12    | 8      | 0.12       | 494090   | 81.83    |
| 2906/GT26.5  | 250        | 45     | 26.5   | 22     | 16     | 25     | M12    | 8.5    | 0.12       | 494100   | 81.83    |
| 2907/GT27.5  | 300        | 55     | 27.5   | 25     | 18     | 30     | M14    | 9.5    | 0.161      | 494105   | 89.34    |
| 2907/GT33.5  | 300        | 55     | 33.5   | 25     | 18     | 30     | M14    | 13.5   | 0.2        | 494110   | 89.34    |
| 2909/GT29    | 300        | 68     | 29     | 30     | 21     | 40     | M16    | 10.5   | 0.264      | 494120   | 107.32   |
| 2909/GT29-35 | 300        | 61     | 29     | 30     | 21     | 35     | M16    | 10.5   | 0.24       | 494125   | 107.32   |
| 2909/GT40    | 381-610    | 82     | 40     | 34     | 26     | 50     | M20    | 23     | 0.52       | 494127   | 345.72   |

OTHER T-NUTS AVAILABLE ON REQUEST

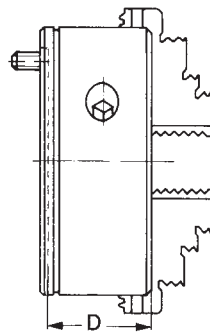


## LATHE CHUCKS

### Quick Change 3-Jaw Chucks

#### High Efficiency Hand Operated Chuck

- With reversible one-piece jaws, reversible top jaws, base jaws, thrust ring and key bars, self-centering, three jaw chucks, steel body



Cylindrical Centre Mount (Plain Back)



| Size (mm) | Size (inch) | Through Hole (mm) | D (mm) | With reversible 1pc jaws (type 000) |          |           | With reversible top jaws (type 003) |          |           |
|-----------|-------------|-------------------|--------|-------------------------------------|----------|-----------|-------------------------------------|----------|-----------|
|           |             |                   |        | Rohm Id No.                         | Code No. | Price \$  | Rohm Id No.                         | Code No. | Price \$  |
| 125       | 5           | 32                | 46.5   | 437475                              | 391181   | 4,470.13  | -                                   | -        | -         |
| 160       | 6-1/4       | 42                | 63     | 437476                              | 391182   | 5,713.68  | 437490                              | 391188   | 6,046.17  |
| 200       | 8           | 52                | 81     | 437477                              | 391183   | 6,152.58  | 437491                              | 391189   | 6,473.11  |
| 250       | 10          | 62                | 92     | 437478                              | 391184   | 8,037.18  | 437492                              | 391191   | 8,452.15  |
| 315       | 12-1/2      | 87                | 111    | 437479                              | 391185   | 11,996.59 | 437493                              | 391192   | 13,786.78 |
| 400       | 15-3/4      | 102               | 118    | 437480                              | 391186   | 18,694.48 | 437494                              | 391193   | 21,277.34 |
| 500       | 20          | 162               | 118    | 437481                              | 391187   | 28,993.99 | 437495                              | 391194   | 33,452.16 |
| 630       | 25          | 252               | 143    | -                                   | -        | -         | 437496                              | 391196   | 50,094.44 |

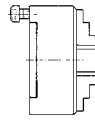
### 3-Jaw Chucks — Solid Jaws — Series ZG & ZS



ZG-Cast Iron Body - ZS-Steel Body

Includes:

- 1 set of outward stepped jaws mounted on the chuck
- 1 set of inward jaws
- 1 operating key, mounting bolts



#### Cylindrical Centre Mount (Plain Back)

| Size (mm) | Size (in.) | Through Hole (mm) | Cast Iron Body (Type 300) |          |          | Steel Body (Type 600) |          |           |
|-----------|------------|-------------------|---------------------------|----------|----------|-----------------------|----------|-----------|
|           |            |                   | Rohm Id No.               | Code No. | Price \$ | Rohm Id No.           | Code No. | Price \$  |
| 80        | 3-1/4      | 19                | -                         | -        | -        | 102513                | 389028   | 817.85    |
| 100       | 4          | 20                | 101781                    | 389006   | 713.99   | 101782                | 389030   | 889.25    |
| 125       | 5          | 32                | 101628                    | 389010   | 889.25   | 101672                | 389032   | 1,112.10  |
| 160       | 6-1/4      | 42                | 100300                    | 389014   | 1,138.07 | 100717                | 397055   | 1,370.23  |
| 200       | 8          | 55                | 100000                    | 389016   | 1,492.91 | 100186                | 389036   | 1,869.38  |
| 250       | 10         | 76                | 100200                    | 389018   | 1,955.92 | 100533                | 389038   | 2,444.91  |
| 315       | 12-1/2     | 103               | 101248                    | 399848   | 2,811.26 | 101344                | 389040   | 3,634.90  |
| 400       | 15-3/4     | 136               | -                         | -        | -        | 102062                | 389044   | 7,139.98  |
| 500       | 20         | 190               | -                         | -        | -        | 102555                | 389046   | 11,110.24 |
| 630       | 25         | 240               | -                         | -        | -        | 102720                | 389048   | 16,973.69 |

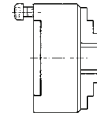
### 3-Jaw Chucks — 2pc Jaws — Series ZGU & ZSU



ZSU-Steel Body

Includes:

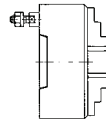
- Set of master base and top reversible jaws



#### Cylindrical Centre Mount (Plain Back)

Type 603

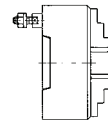
| Size (mm) | Size (in.) | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|------------|-------------------|-------------|---------------------|-----------|
| 100       | 4          | 20                | 101788      | 389302              | 1,021.24  |
| 125       | 5          | 32                | 101678      | 389303              | 1,278.71  |
| 160       | 6-1/4      | 42                | 100725      | 389305              | 1,635.71  |
| 200       | 8          | 55                | 100189      | 389306              | 1,857.47  |
| 250       | 10         | 76                | 100541      | 397049              | 2,707.14  |
| 315       | 12-1/2     | 103               | 101350      | 389307              | 4,197.44  |
| 400       | 15-3/4     | 136               | 102068      | 389309              | 8,189.34  |
| 500       | 20         | 190               | 102585      | 389310              | 12,797.88 |
| 630       | 25         | 240               | 102726      | 389311              | 19,429.40 |
| 700       | 27-1/2     | 310               | 147501      | 389312              | 22,488.81 |
| 800       | 31-1/2     | 380               | 104913      | 389313              | 32,692.46 |
| 1000      | 39-1/2     | 460               | 104925      | 389314              | 51,797.32 |
| 1250      | 49-1/2     | 550               | 104941      | 389315              | 73,758.17 |



#### DIN Mount

Type 615

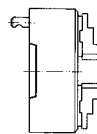
| Size (mm) | DIN Taper Mount | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|-----------------|-------------------|-------------|---------------------|-----------|
| 125       | 4               | 32                | 101692      | 389118              | 1,168.37  |
| 160       | 4               | 42                | 100740      | 389128              | 1,495.07  |
| 160       | 5               | 42                | 100744      | 389130              | 1,495.07  |
| 200       | 5               | 55                | 100152      | 389136              | 1,960.26  |
| 200       | 6               | 55                | 100156      | 389138              | 1,960.26  |
| 250       | 6               | 76                | 100555      | 389144              | 2,574.72  |
| 250       | 8               | 76                | 100556      | 389146              | 2,574.72  |
| 315       | 6               | 103               | 101364      | 389150              | 3,829.63  |
| 315       | 8               | 103               | 101365      | 389152              | 3,829.63  |
| 315       | 11              | 103               | 101366      | 389154              | 3,829.63  |
| 400       | 8               | 136               | 102202      | 389164              | 7,507.80  |
| 400       | 11              | 136               | 102210      | 389166              | 7,507.80  |
| 500       | 11              | 190               | 102548      | 389170              | 11,683.61 |
| 500       | 15              | 190               | 102915      | 389172              | 11,683.61 |
| 630       | 11              | 192.7             | 102752      | 389174              | 17,947.32 |
| 630       | 15              | 240               | 102760      | 389176              | 17,947.32 |



#### DIN Mount

Type 618

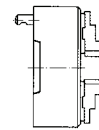
| Size (mm) | DIN Taper Mount | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|-----------------|-------------------|-------------|---------------------|-----------|
| 125       | 4               | 32                | 101695      | 389358              | 1,341.45  |
| 160       | 4               | 42                | 100743      | 389363              | 1,717.93  |
| 160       | 5               | 42                | 100747      | 389364              | 1,717.93  |
| 200       | 5               | 55                | 100155      | 389367              | 2,261.00  |
| 200       | 6               | 55                | 100159      | 389368              | 2,261.00  |
| 250       | 6               | 76                | 100564      | 389371              | 2,964.18  |
| 250       | 8               | 76                | 100565      | 389372              | 2,964.18  |
| 315       | 6               | 103               | 101373      | 389374              | 4,413.81  |
| 315       | 8               | 103               | 101374      | 389375              | 4,413.81  |
| 315       | 11              | 103               | 101375      | 389376              | 4,413.81  |
| 400       | 8               | 136               | 102208      | 389381              | 8,600.43  |
| 400       | 11              | 136               | 102216      | 389382              | 8,600.43  |
| 500       | 11              | 190               | 102554      | 389384              | 13,522.70 |
| 500       | 15              | 190               | 102921      | 389385              | 13,522.70 |
| 630       | 11              | 192.7             | 102758      | 389386              | 20,403.03 |
| 630       | 15              | 240               | 102766      | 389387              | 20,403.03 |



#### Camlock Mount

Type 630

| Size (mm) | Camlock Taper Mount | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|---------------------|-------------------|-------------|---------------------|-----------|
| 125       | 4                   | 32                | 108895      | 389258              | 1,220.29  |
| 160       | 4                   | 42                | 108897      | 389263              | 1,566.47  |
| 160       | 5                   | 42                | 109150      | 389264              | 1,566.47  |
| 200       | 5                   | 55                | 109151      | 389267              | 2,053.29  |
| 200       | 6                   | 55                | 109154      | 389268              | 2,053.29  |
| 250       | 6                   | 76                | 109155      | 389271              | 2,693.72  |
| 250       | 8                   | 76                | 109159      | 389272              | 2,693.72  |
| 315       | 6                   | 103               | 109156      | 399832              | 3,862.89  |
| 315       | 8                   | 103               | 109160      | 389274              | 4,013.54  |
| 315       | 11                  | 103               | 109165      | 389275              | 4,013.54  |
| 400       | 8                   | 136               | 109161      | 389280              | 7,853.98  |
| 400       | 11                  | 136               | 109166      | 389281              | 7,853.98  |
| 500       | 15                  | 190               | 109170      | 389284              | 12,246.15 |
| 630       | 11                  | 192.7             | 109168      | 389285              | 18,682.96 |
| 630       | 15                  | 240               | 109171      | 389286              | 18,682.96 |

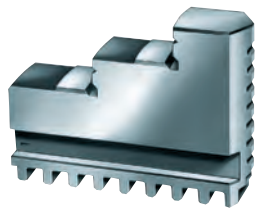


#### Camlock Mount

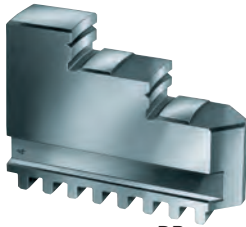
Type 633

| Size (mm) | Camlock Taper Mount | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|---------------------|-------------------|-------------|---------------------|-----------|
| 125       | 4                   | 32                | 105870      | 389486              | 1,406.36  |
| 160       | 3                   | 42                | 106310      | 389487              | 1,981.10  |
| 160       | 4                   | 42                | 105883      | 389488              | 1,493.76  |
| 160       | 5                   | 42                | 105898      | 389489              | 1,802.30  |
| 200       | 5                   | 55                | 106330      | 389492              | 2,358.36  |
| 200       | 6                   | 55                | 106346      | 397060              | 2,039.28  |
| 250       | 6                   | 76                | 106386      | 389495              | 3,104.81  |
| 250       | 8                   | 76                | 106402      | 397065              | 2,988.26  |
| 315       | 6                   | 103               | 106442      | 397102              | 4,466.78  |
| 315       | 8                   | 103               | 106458      | 397088              | 4,466.78  |
| 315       | 11                  | 103               | 106474      | 399828              | 4,466.78  |
| 400       | 8                   | 136               | 106498      | 399962              | 8,694.10  |
| 400       | 11                  | 136               | 106614      | 389501              | 9,033.17  |
| 500       | 11                  | 190               | 103274      | 389503              | 14,258.33 |
| 500       | 15                  | 190               | 103275      | 389504              | 14,258.33 |
| 630       | 11                  | 192.7             | 106658      | 389505              | 21,398.31 |
| 630       | 15                  | 240               | 103328      | 389506              | 21,398.31 |

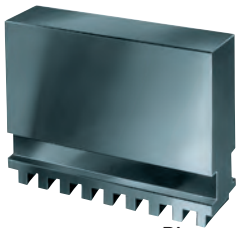
## Replacement Jaws For ZG, ZS, ZGU, ZSU Series Chucks



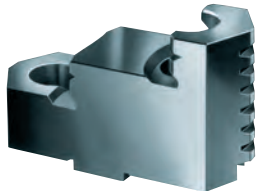
BB



DB



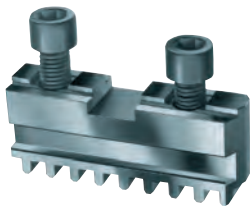
BL



UB



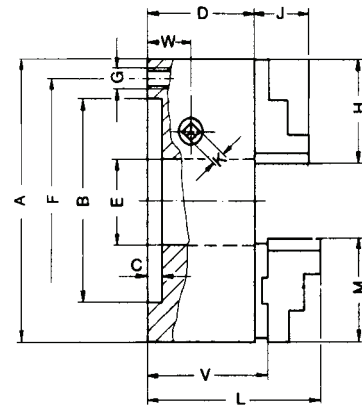
AB



GB

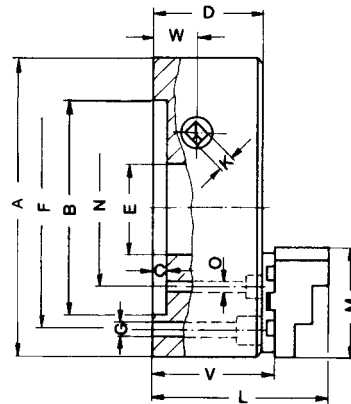
| Chuck Size  | Rohm Id No. | Code No. | Set of 3 Price \$ |
|---|-------------|----------|-------------------|
| <b>BB Inside Jaw Outward Step Hardened Set of 3</b> |             |          |                   |
| 80/85   | 110155      | 389521   | 356.45            |
| 100/110   | 110156      | 397075   | 356.45            |
| 125   | 110157      | 397077   | 356.45            |
| 160   | 110159      | 389525   | 396.35            |
| 200   | 110160      | 389526   | 462.84            |
| 250   | 110161      | 389527   | 543.97            |
| 315   | 110162      | 399868   | 810.03            |
| 350/400   | 110163      | 399867   | 1,346.01          |
| 500/630   | 110164      | 389528   | 2,831.35          |
| <b>DB Outside Jaw Inward Step Hardened Set of 3</b> |             |          |                   |
| 80/85   | 110165      | 389529   | 356.45            |
| 100/110   | 110166      | 389530   | 356.45            |
| 125   | 110167      | 389531   | 356.45            |
| 160   | 110169      | 399866   | 396.35            |
| 200   | 110170      | 399865   | 462.84            |
| 250   | 110171      | 397033   | 543.97            |
| 315   | 110016      | 389533   | 813.95            |
| 350/400   | 110017      | 399863   | 1,216.96          |
| 500/630   | 110018      | 389534   | 2,561.57          |
| <b>BL Block Jaw No Steps Soft Set of 3</b>          |             |          |                   |
| 80/85   | 107588      | 389536   | 240.74            |
| 100/110   | 107589      | 389537   | 240.74            |
| 125   | 107590      | 389538   | 240.74            |
| 160   | 107592      | 389540   | 262.00            |
| 200   | 107593      | 397076   | 313.87            |
| 250   | 107594      | 389541   | 359.10            |
| 315   | 107595      | 389542   | 543.97            |
| 350/400   | 107596      | 389543   | 811.30            |
| 500/630   | 107597      | 389544   | 1,216.96          |
| <b>UB Reversible Top Jaw Hardened Set of 3</b>      |             |          |                   |
| 100/110   | 108045      | 399871   | 496.09            |
| 125   | 108046      | 399870   | 496.09            |
| 140/160   | 107936      | 397020   | 496.09            |
| 200   | 107937      | 397025   | 513.38            |
| 250   | 108049      | 397030   | 543.97            |
| 315   | 108050      | 397035   | 813.95            |
| 350/400   | 108051      | 397098   | 1,216.96          |
| 500/630   | 108052      | 397068   | 1,826.09          |
| <b>AB Top Block Jaw No Step Soft Set of 3</b>       |             |          |                   |
| 100/110   | 107633      | 389548   | 180.89            |
| 125   | 107634      | 389549   | 180.89            |
| 140/160   | 108581      | 399842   | 111.72            |
| 200   | 108582      | 389550   | 118.37            |
| 250   | 107637      | 389551   | 180.89            |
| 315   | 107638      | 389552   | 271.31            |
| 350/400   | 107639      | 399862   | 535.99            |
| 500/630   | 107640      | 389553   | 807.32            |
| <b>GB Base Jaw with Mounting Bolts Set of 3</b>     |             |          |                   |
| 100/110   | 107500      | 399877   | 586.53            |
| 125   | 107501      | 399876   | 586.53            |
| 160   | 107503      | 399875   | 586.53            |
| 200   | 107504      | 397040   | 614.46            |
| 250   | 107505      | 399873   | 645.05            |
| 315   | 107506      | 397045   | 972.24            |
| 350/400   | 107507      | 397046   | 1,538.81          |
| 500   | 107508      | 399872   | 2,311.54          |
| 630   | 107509      | 389555   | 3,485.93          |

## Dimensions For ZG, ZS, ZGU, ZSU Series Chucks



| Chuck Size A     | 74     | 80     | 85     | 100    | 110    | 125    | 140    | 160      | 200     | 250     | 315     | 350     | 400     | 500     | 630     |
|------------------|--------|--------|--------|--------|--------|--------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| B <sup>H6</sup>  | 56     | 56     | 60     | 70     | 80     | 95     | 105    | 125      | 160     | 200     | 260     | 290     | 330     | 420     | 545     |
| C                | 2.5    | 3      | 3      | 3      | 3      | 4      | 4      | 4        | 4       | 5       | 5       | 6       | 5       | 5       | 7       |
| D                | 32.5   | 39.5   | 39.5   | 50     | 50     | 56     | 60     | 65       | 73.5    | 82      | 95      | 100     | 105     | 120     | 135     |
| E                | 15     | 19     | 19     | 20     | 27     | 32     | 40     | 42       | 55      | 76      | 103     | 115     | 136     | 190     | 240     |
| E <sub>max</sub> | -      | -      | -      | 21     | -      | 33     | 43     | 50       | 70      | 92      | 114     | 120     | 150     | 210     | 253     |
| F                | 63     | 67     | 72     | 83     | 95     | 108    | 120    | 140      | 176     | 224     | 286     | 318     | 362     | 458     | 586     |
| G                | 3 x M6 | 3 x M6 | 3 x M6 | 3 x M8 | 3 x M8 | 3 x M8 | 3 x M8 | 3 x M10  | 3 x M10 | 3 x M12 | 3 x M16 | 3 x M16 | 3 x M16 | 3 x M16 | 3 x M16 |
| G <sup>1</sup>   | -      | -      | -      | -      | -      | 3 x 9  | -      | 3 x 10.5 | 3 x 11  | 3 x 14  | 3 x 14  | -       | 3 x 18  | 6 x 18  | 6 x 18  |
| H                | 32     | 37     | 37     | 48     | 48     | 52     | 61     | 61       | 69      | 90      | 130     | 130     | 130     | 190     | 190     |
| J                | 14     | 14     | 14     | 18     | 18     | 22.5   | 22.5   | 26       | 32.5    | 40      | 46      | 45      | 43      | 54.5    | 54.5    |
| K                | 6      | 6      | 6      | 8      | 8      | 9      | 9      | 10       | 11      | 12      | 14      | 14      | 17      | 19      | 19      |
| L                | -      | -      | -      | 80.5   | -      | 95.5   | 106    | 108      | 119.6   | 139.3   | 155     | 168.5   | 171.5   | 201.5   | 216.5   |
| M                | -      | -      | -      | 47     | 47     | 56     | 66.7   | 66.7     | 79.5    | 95      | 109.5   | 127     | 127     | 127     | 127     |
| V                | -      | -      | -      | 53.6   | 53.6   | 61     | 67.7   | 69.7     | 80.2    | 89.9    | 100.4   | 110.4   | 113.4   | 128.4   | 143.3   |
| W                | 13     | 14.5   | 14.5   | 18     | 18     | 20     | 21     | 22.45    | 25.7    | 26.5    | 30      | 34      | 35      | 38      | 48      |
| Weight kg        | 1      | 1.3    | 1.9    | 2.9    | 3.4    | 4.5    | 5.8    | 8.2      | 14.6    | 25.7    | 44.2    | 56      | 80      | 126     | 208     |

E<sub>max</sub> - Enlarged bore max  
G<sup>1</sup> - Mounting from front



| Chuck Size A     | 700                | 800                | 1000               | 1250               |
|------------------|--------------------|--------------------|--------------------|--------------------|
| B                | 610                | 710                | 910                | 910                |
| C <sup>2</sup>   | 7 <sup>+0.03</sup> | 7 <sup>+0.03</sup> | 7 <sup>+0.03</sup> | 7 <sup>+0.03</sup> |
| D                | 147                | 147                | 157                | 157                |
| E                | 310                | 380                | 460                | 550                |
| E <sub>max</sub> | 330                | 420                | 580                | 580                |
| F                | 660                | 760                | 950                | 950                |
| G                | 6 x 22             | 6 x 22             | 6 x 26             | 6 x 26             |
| K                | 19                 | 19                 | 24                 | 24                 |
| L                | 240.6              | 240.6              | 269.6              | 269.6              |
| M                | 210                | 210                | 210                | 210                |
| N                | 360                | 460                | 610                | 610                |
| O                | 6 x 18             | 6 x 18             | 6 x 18             | 6 x 18             |
| V                | 158                | 158                | 166                | 166                |
| W                | 48                 | 48                 | 53                 | 53                 |
| Weight kg        | 280                | 350                | 590                | 850                |

C<sup>2</sup> - Adapter plate - 7<sup>+0.03</sup>  
E<sub>max</sub> - Enlarged bore max

## Parts For 3-Jaw Chucks



| Chuck Size | Scroll      |          |          | Driving Pinion |          |          | Pinion Holder Screw |          |          |
|------------|-------------|----------|----------|----------------|----------|----------|---------------------|----------|----------|
|            | Rohm Id No. | Code No. | Price \$ | Rohm Id No.    | Code No. | Price \$ | Rohm Id No.         | Code No. | Price \$ |
| 80         | -           | -        | -        | 102184         | 389568   | 61.17    | -                   | -        | -        |
| 100        | 101754      | 399998   | 384.38   | 101755         | 389570   | 94.42    | -                   | -        | -        |
| 125        | 101721      | 399999   | 446.87   | 101722         | 389572   | 126.35   | -                   | -        | -        |
| 160        | 100303      | 389560   | 545.30   | 100304         | 389574   | 158.28   | -                   | -        | -        |
| 200        | 100003      | 399899   | 638.40   | 100005         | 389575   | 190.20   | -                   | -        | -        |
| 250        | 100203      | 399898   | 800.33   | 100204         | 389577   | 223.43   | -                   | -        | -        |
| 270        | 100203      | 389562   | 804.64   | 112267         | 389578   | 256.69   | -                   | -        | -        |
| 315        | 101552      | 389563   | 1,126.52 | 101553         | 389579   | 256.69   | 101554              | 389587   | 13.31    |
| 350        | 105228      | 389564   | 1,929.83 | -              | -        | -        | -                   | -        | -        |
| 400        | 102497      | 399963   | 1,890.83 | 102498         | 397114   | 323.18   | -                   | -        | -        |
| 500        | -           | -        | -        | -              | -        | -        | 103300              | 389589   | 19.94    |
| 630        | -           | -        | -        | -              | -        | -        | 103300              | 389589   | 19.94    |

## Wrenches For 3-Jaw Chucks



| Chuck Size | Square (mm) | Length (mm) | Rohm Id No. | Code No. | Price \$ |
|------------|-------------|-------------|-------------|----------|----------|
| 74         | 6           |             | 006325      | 389590   | 11.96    |
| 80/85      | 6           | 62          | 107426      | 389591   | 61.17    |
| 100/110    | 8           | 75          | 107427      | 389592   | 60.87    |
| 125/140    | 9           | 80          | 107428      | 389593   | 61.17    |
| 160        | 10          | 90          | 107429      | 389594   | 78.48    |
| 200/230    | 11          | 100         | 107430      | 389595   | 78.48    |
| 250/270    | 12          | 100         | 107431      | 389596   | 94.42    |
| 315        | 14          | 110         | 107432      | 389597   | 126.35   |
| 350        | 14          | 140         | 107433      | 389598   | 126.35   |
| 400        | 17          | 140         | 107434      | 389599   | 158.28   |
| 500/630    | 19          | 150         | 107435      | 389600   | 256.69   |

## Camlock Backplates For 3-Jaw Chucks



- Finished on machine side, faced on chuck side



### Type 619-25

| Dia. (mm) | Taper | Diameter (in.) | Width (mm) | Rohm Id No. | Code No. | Price \$ |
|-----------|-------|----------------|------------|-------------|----------|----------|
| 125       | 3     | 5              | 27         | 319673      | 389903   | 535.99   |
| 125       | 4     | 5              | 28         | 319674      | 389904   | 535.99   |
| 160       | 4     | 6-1/4          | 22         | 176807      | 389905   | 1,472.64 |
| 160       | 5     | 6-1/4          | 22.5       | 176808      | 389906   | 1,553.56 |
| 200       | 3     | 8              | 25         | 102658      | 389907   | 910.57   |
| 200       | 5     | 8              | 22.5       | 176810      | 389908   | 856.29   |
| 200       | 6     | 8              | 21.5       | 176811      | 389909   | 1,829.78 |
| 250       | 5     | 10             | 21         | 176813      | 389910   | 2,032.24 |
| 250       | 6     | 10             | 26         | 176814      | 389911   | 2,032.24 |
| 250       | 8     | 10             | 26         | 176815      | 389912   | 2,032.24 |
| 315       | 6     | 12-1/4         | 31.5       | 176816      | 389913   | 2,537.63 |
| 315       | 8     | 12-1/4         | 31         | 176817      | 389914   | 2,549.61 |
| 315       | 11    | 12-1/4         | 31         | 176818      | 389915   | 2,549.61 |
| 400       | 6     | 15-3/4         | 32.5       | 176819      | 389916   | 3,165.40 |
| 400       | 8     | 15-3/4         | 32         | 176820      | 389917   | 3,165.40 |
| 400       | 11    | 15-3/4         | 32.5       | 176821      | 389918   | 3,165.40 |
| 500       | 8     | 20             | 36         | 176823      | 389919   | 3,995.32 |
| 500       | 11    | 20             | 36         | 176824      | 389920   | 3,995.32 |
| 500       | 15    | 20             | 36         | 176825      | 389921   | 3,995.32 |
| 630       | 11    | 25             | 39         | 176826      | 389922   | 4,955.59 |
| 630       | 15    | 25             | 39         | 176827      | 389923   | 4,955.59 |

## DIN Backplates For 3-Jaw Chucks



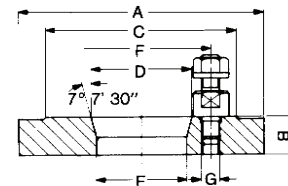
- Finished on machine side, faced on chuck side



### Type 619-25

| Dia. (mm) | Taper | Diameter (in.) | Width (mm) | Rohm Id No. | Code No. | Price \$ |
|-----------|-------|----------------|------------|-------------|----------|----------|
| 125       | 3     | 5              | 19         | 319650      | 389882   | 493.43   |
| 125       | 4     | 5              | 19         | 319651      | 389883   | 493.43   |
| 160       | 3     | 6-1/4          | 21         | 319652      | 389884   | 493.43   |
| 160       | 4     | 6-1/4          | 21         | 319653      | 389885   | 493.43   |
| 160       | 5     | 6-1/4          | 21         | 319654      | 389886   | 493.43   |
| 200       | 4     | 8              | 21         | 319655      | 389887   | 610.46   |
| 200       | 5     | 8              | 21         | 319656      | 389888   | 610.46   |
| 200       | 6     | 8              | 23         | 319657      | 389889   | 610.46   |
| 250       | 5     | 10             | 21         | 319659      | 389890   | 762.09   |
| 250       | 6     | 10             | 23         | 319660      | 389891   | 762.09   |
| 250       | 8     | 10             | 26         | 319661      | 389892   | 762.09   |
| 315       | 5     | 12-1/4         | 26         | 319662      | 389893   | 958.92   |
| 315       | 6     | 12-1/4         | 26         | 319663      | 389894   | 958.92   |
| 315       | 8     | 12-1/4         | 26         | 319664      | 389895   | 958.92   |
| 315       | 11    | 12-1/4         | 33         | 319665      | 389896   | 958.92   |
| 400       | 6     | 15-3/4         | 31         | 319666      | 389897   | 1,625.26 |
| 400       | 8     | 15-3/4         | 31         | 319667      | 389898   | 1,625.26 |
| 400       | 11    | 15-3/4         | 31         | 319668      | 389899   | 1,625.26 |
| 500       | 8     | 20             | 33         | 319669      | 389900   | 1,625.26 |
| 500       | 11    | 20             | 41         | 319671      | 389901   | 2,537.63 |
| 500       | 15    | 20             | 41         | 319672      | 389902   | 2,537.63 |

## DIN & Camlock Backplate Dimensions



| Short Taper Size  | 3         | 4         | 5      | 6       | 8       | 11      | 15    |
|-------------------|-----------|-----------|--------|---------|---------|---------|-------|
| C                 | 98        | 117       | 146    | 181     | 225     | 298     | 403   |
| D                 | 53.985    | 63.525    | 82.575 | 106.390 | 139.735 | 196.885 | 285.8 |
| E                 | 51.2      | 60.6      | 79.4   | 103     | 135.7   | 192.5   | 281   |
| F*                | 75(70.66) | 85(82.55) | 104.8  | 133.4   | 171.4   | 235     | 330.2 |
| G DIN             | M10       | M10       | M10    | M12     | M16     | M20     | M24   |
| G Camlock         | 7/16-20   | 7/16-20   | 1/2-20 | 5/8-18  | 3/4-16  | 7/8-14  | 1-14  |
| Set screws        | 3         | 3         | 4      | 4       | 4       | 6       | 6     |
| No. DIN Studs     | 3         | 3         | 4      | 4       | 4       | 6       | 6     |
| No. Camlock Studs | 3         | 3         | 6      | 6       | 6       | 6       | 6     |

\* F - DIN (Camlock)

## Jaw Cutting Attachment



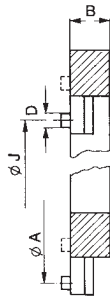
### BAV Type 091

For 3-Jaw chucks, for turning unhardened jaws and grinding hardened jaws, with reversible and stepless adjustable setting jaws.

| Size | Mainly with Chucks up to | Rohm Id No. | Code No. | Price \$ |
|------|--------------------------|-------------|----------|----------|
| 0*   | 125                      | 220206      | 389660   | 2,561.58 |
| 1    | 200                      | 220207      | 389661   | 2,892.75 |
| 2    | 250                      | 220208      | 389662   | 3,189.33 |
| 3    | 250                      | 220209      | 389663   | 3,532.48 |
| 4    | 315                      | 220210      | 389664   | 3,864.98 |
| 5    | 400                      | 220211      | 389665   | 5,156.42 |

\* light duty design

## Jaw Cutting Attachment Dimensions



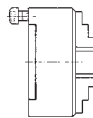
| Size | Outer (mm) | Inner (mm) | Overhang Distance |         |    |     | Screw Head Thread |
|------|------------|------------|-------------------|---------|----|-----|-------------------|
|      |            |            | J                 | A       | B  | D   |                   |
| 0    | 153        | 110        | 50-115            | 150-215 | 20 | 8.5 | M5                |
| 1    | 176        | 110        | 35-125            | 170-260 | 31 | 13  | M8                |
| 2    | 215        | 135        | 70-140            | 215-285 | 31 | 13  | M8                |
| 3    | 244        | 162        | 100-175           | 240-315 | 31 | 13  | M8                |
| 4    | 290        | 208        | 145-215           | 290-360 | 31 | 13  | M8                |
| 5    | 342        | 260        | 160-270           | 330-440 | 31 | 16  | M10               |

## Combination 3-Jaw Chucks — Solid Jaw



### 650-Steel Body

Lathe chucks with reversible jaws, with scroll, self-centering and individually adjustable. Particularly suitable for lining up and chucking workpieces of irregular shape.



### Cylindrical Centre Mount (Plain Back)

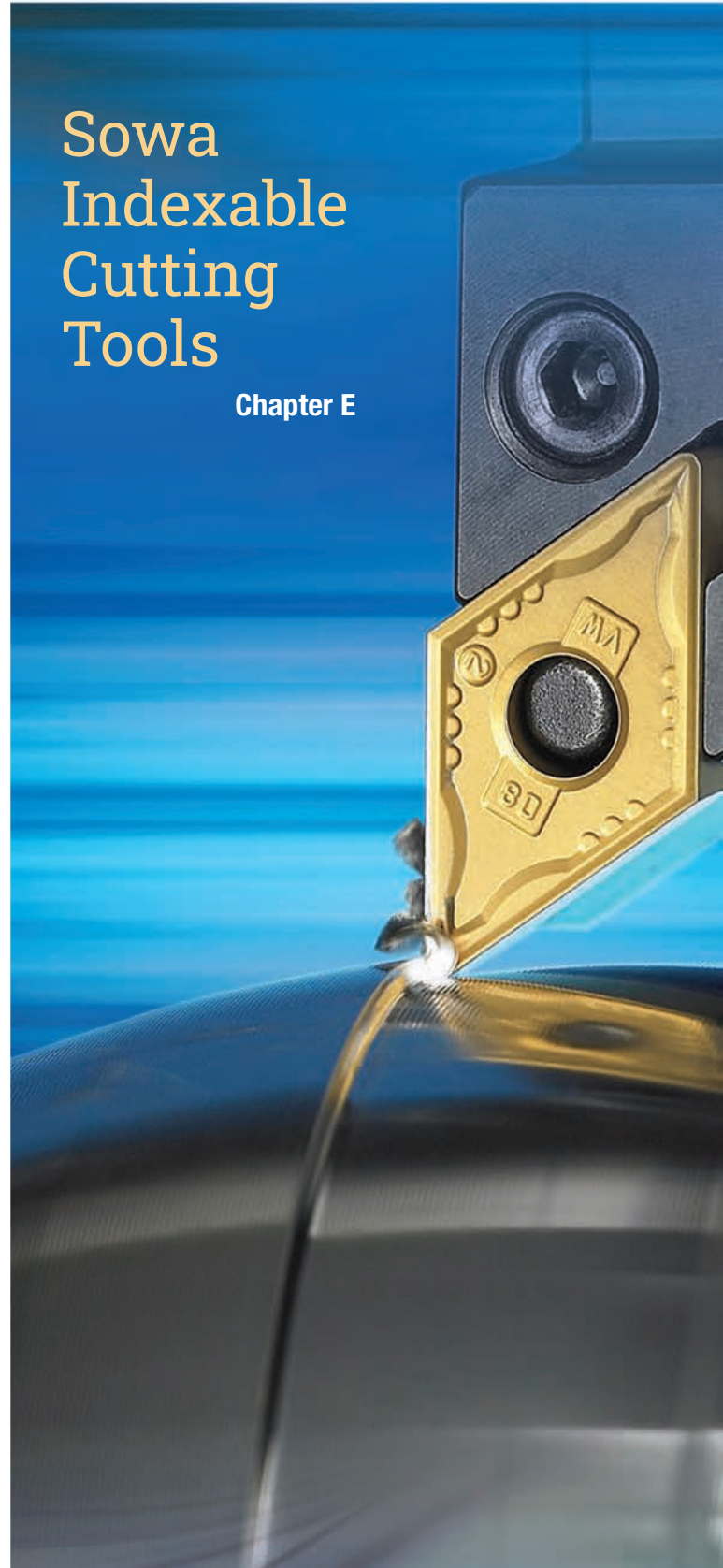
Type 650

| Size (mm) | Size (in.) | Through Hole (mm) | Rohm Id No. | Steel Body Code No. | Price \$  |
|-----------|------------|-------------------|-------------|---------------------|-----------|
| 160       | 6-1/4      | 42                | 111360      | 389675              | 3,271.81  |
| 200       | 8          | 55                | 111365      | 389676              | 3,662.82  |
| 250       | 10         | 76                | 111370      | 389677              | 4,825.25  |
| 315       | 12-1/2     | 103               | 111375      | 389678              | 7,160.72  |
| 400       | 15-3/4     | 136               | 111380      | 389679              | 11,652.12 |
| 500       | 20         | 190               | 111385      | 389680              | 18,373.95 |
| 630       | 25         | 240               | 111390      | 389681              | 27,714.55 |



# Sowa Indexable Cutting Tools

Chapter E





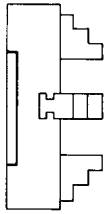
## 4-Jaw Independent Chucks



Type 499 - 1pc Solid Reversible Jaws - Steel Body

Type 497 - 2pc Top Reversible Jaws - Steel Body

- Jaws individually adjustable through threaded adjustable spindle
- Plain back



| Size (mm) | Size (in.) | Through Hole (mm) | Steel Body (Type 499) |          |           | Steel Body (Type 497) |          |           |
|-----------|------------|-------------------|-----------------------|----------|-----------|-----------------------|----------|-----------|
|           |            |                   | Rohm Id No.           | Code No. | Price \$  | Rohm Id No.           | Code No. | Price \$  |
| 260       | 10-1/4     | 70                | 139781                | 389924   | 5,518.18  | 137147                | 389932   | 6,356.07  |
| 310       | 12         | 75                | 139796                | 389925   | 6,562.22  | 139720                | 389933   | 7,549.08  |
| 400       | 16         | 95                | 139827                | 389926   | 8,489.39  | 135368                | 389934   | 9,751.56  |
| 450       | 18         | 95                | 139842                | 389927   | 9,568.02  | 136944                | 389935   | 10,979.16 |
| 500       | 20         | 95                | 139857                | 389928   | 13,238.81 | 135631                | 389936   | 15,211.20 |
| 630       | 25         | 135               | 139887                | 389929   | 20,258.56 | 139723                | 389937   | 23,080.81 |
| 710       | 28         | 135               | 140800                | 389930   | 26,476.30 | 141097                | 389938   | 30,238.88 |
| 800       | 31-1/2     | 190               | 140801                | 389931   | 34,230.20 | 141106                | 389939   | 39,071.40 |

## Adjusting Spindle & Chuck Keys



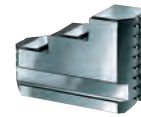
| Size (mm)   | Square Size (mm) | Adjusting Spindle (1pc) |          |          | Chuck Key   |          |          |
|-------------|------------------|-------------------------|----------|----------|-------------|----------|----------|
|             |                  | Rohm Id No.             | Code No. | Price \$ | Rohm Id No. | Code No. | Price \$ |
| 260         | 10               | -                       | -        | -        | 160096      | 399844   | 184.88   |
| 310         | 10               | -                       | -        | -        | 160096      | 399844   | 184.88   |
| 350         | 10               | -                       | -        | -        | 160096      | 399844   | 184.88   |
| 400         | 13               | -                       | -        | -        | 082144      | 399974   | 312.56   |
| 450         | 13               | -                       | -        | -        | 160098      | 389760   | 312.56   |
| 500         | 13               | -                       | -        | -        | 160098      | 389760   | 312.56   |
| 560         | 16               | -                       | -        | -        | 160099      | 389761   | 432.25   |
| 600/630/710 | 16               | -                       | -        | -        | 160099      | 389761   | 432.25   |
| 800         | 18               | 247826                  | 389753   | 298.94   | 160100      | 389762   | 618.45   |
| 900         | 18               | 150544                  | 389754   | 618.45   | 160100      | 389762   | 618.45   |
| 1000        | 18               | 150545                  | 389755   | 778.05   | 160100      | 389762   | 618.45   |
| 1100        | 18               | 150546                  | 389756   | 934.99   | 160100      | 389762   | 618.45   |
| 1200        | 24               | 149776                  | 389757   | 1,090.60 | 150548      | 389763   | 934.99   |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## EB Reversible Jaws

- Sold in sets



| Chuck Size  | Rohm Id No. | Code No. | Set Price \$ |
|-------------|-------------|----------|--------------|
| 150         | 022983      | 389710   | 457.45       |
| 200         | 022984      | 389711   | 501.42       |
| 260         | 022985      | 389712   | 1,439.06     |
| 310/350     | 022986      | 389713   | 2,159.92     |
| 400/450     | 022988      | 389714   | 3,225.25     |
| 500         | 022990      | 389715   | 1,374.10     |
| 560/600/630 | 022991      | 389716   | 1,780.54     |
| 710         | 026599      | 389717   | 2,072.59     |

## UB Reversible Top Jaws

- Sold in sets



| Chuck Size          | Rohm Id No. | Code No. | Set Price \$ |
|---------------------|-------------|----------|--------------|
| 200                 | 107939      | 389719   | 683.63       |
| 260                 | 108057      | 389720   | 720.85       |
| 310/350             | 108058      | 389721   | 1,079.96     |
| 400/450             | 108059      | 389722   | 1,625.26     |
| 500/560/600/630/710 | 108060      | 389723   | 2,431.24     |
| 800/900             | 105085      | 389724   | 3,652.19     |
| 1000/1100/1200      | 105101      | 389725   | 5,488.92     |

## AB Top Block Jaw

- Sold in Sets



| Chuck Size          | Rohm Id No. | Code No. | Set Price \$ |
|---------------------|-------------|----------|--------------|
| 200                 | 108584      | 389726   | 158.28       |
| 260                 | 107579      | 389727   | 242.06       |
| 310/350             | 107580      | 389728   | 359.10       |
| 400/450             | 107581      | 389729   | 716.87       |
| 500/560/600/630/710 | 107582      | 389730   | 1,069.32     |
| 800/900             | 105105      | 389731   | 1,607.98     |
| 1000/1100/1200      | 105109      | 389732   | 2,407.30     |

## GB Base Jaw With Mounting Bolts

- Sold in sets

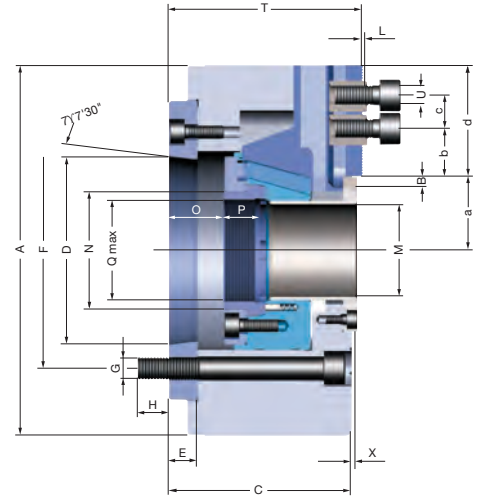
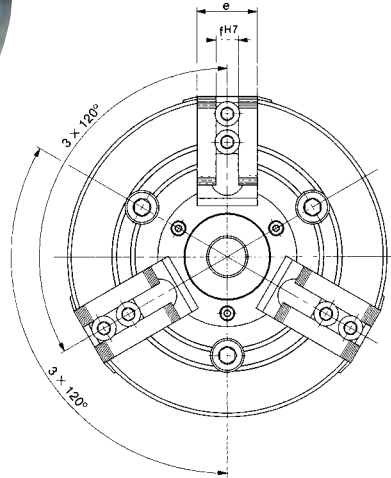


| Chuck Size        | Rohm Id No. | Code No. | Set Price \$ |
|-------------------|-------------|----------|--------------|
| 200               | 304655      | 389733   | 433.68       |
| 260               | 304656      | 389734   | 863.17       |
| 310/350           | 304657      | 389735   | 1,299.42     |
| 400/450           | 304658      | 389736   | 2,050.87     |
| 500               | 304659      | 389737   | 2,762.41     |
| 560/600/630       | 304660      | 389738   | 3,734.65     |
| 710               | 304661      | 389739   | 5,061.98     |
| 800/900/1000/1100 | 304662      | 389740   | 6,852.16     |
| 1200              | 150543      | 389741   | 2,315.03     |

## KFD 3-Jaw Power Chucks With 60° Serrations



**Type 440-92** - For use on modern lathes. With large through hole, suitable for both bar work and chucking of flange type parts. With 60° serrations and pre-machined draw tube connector.

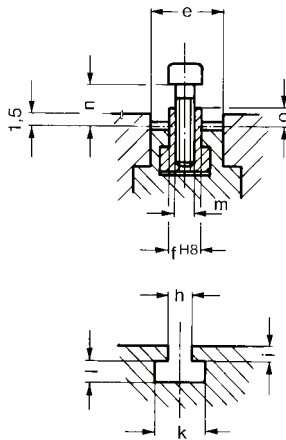


| Size (inch)                       |                        | 5            | 6          | 8          | 10         | 12          | 12          |
|-----------------------------------|------------------------|--------------|------------|------------|------------|-------------|-------------|
| Size (mm)                         |                        | 130          | 170        | 210        | 254        | 315         | 315         |
| Rohm ID No.                       |                        | 154809       | 154393     | 154394     | 154395     | 154813      | 154832      |
| Sowa Code No.                     |                        | 389800       | 389801     | 389802     | 389803     | 389804      | 389805      |
| Price \$                          |                        | 4,622.64     | 4,718.95   | 5,376.22   | 6,690.80   | 10,990.82   | 10,990.82   |
|                                   | A                      | 130          | 170        | 210        | 254        | 315         | 315         |
| Jaw travel                        | B                      | 2.7          | 3.4        | 4.3        | 5.1        | 5.3         | 5.3         |
|                                   | C                      | 67.5         | 90.6       | 103.2      | 112.8      | 121.8       | 127.4       |
| Short Taper                       | D                      | 4            | 5          | 6          | 8          | 8           | 11          |
|                                   | E                      | 11.5         | 15         | 16         | 17.8       | 17.8        | 19.4        |
|                                   | F                      | 82.6         | 104.8      | 133.4      | 171.4      | 171.4       | 235         |
|                                   | G                      | 3 x M10      | 3 x M10    | 3 x M12    | 3 x M16    | 3 x M16     | 3 x M20     |
|                                   | H                      | 13           | 15         | 18         | 23         | 24          | 29          |
| Wedge stroke                      | K                      | 10           | 14         | 16         | 19         | 23          | 23          |
|                                   | L                      | 2.9          | 3.2        | 3.2        | 3.2        | 3.2         | 3.2         |
| Large bore                        | M                      | 33           | 43         | 52         | 75         | 91          | 121         |
|                                   | N                      | 45           | 57         | 66         | 94         | 108         | 143         |
|                                   | min./max               | 2.5/12.5     | 12/26      | 15.5/31.5  | 7.5/26.5   | 3/26        | 10/33       |
|                                   | P                      | 20           | 19         | 20.5       | 28         | 32          | 26          |
|                                   | Q/Q max.               | 12/M40 X 1.5 | 20/M53 x 2 | 30/M60 x 2 | 45/M85 x 2 | 50/M100 x 2 | 60/M130 x 2 |
|                                   | T                      | 72.5         | 96.6       | 109.2      | 118.8      | 127.8       | 133.4       |
|                                   | U                      | M8           | M10        | M12        | M16        | M16         | M16         |
|                                   | V <sup>H7</sup> -0.05  | 57           | 74         | 92         | 125        | 135         | 170         |
|                                   | X                      | 3            | 3          | 3          | 3          | 3           | 3           |
|                                   | min./max               | 23.8/26.5    | 34.8/38    | 37.7/42    | 50.9/56    | 56/61.3     | 72.2/77.5   |
|                                   | min.                   | 7            | 4.5        | 9          | 10         | 12          | 12          |
|                                   | min./max               | 14           | 20         | 25         | 30         | 30          | 30          |
|                                   | d                      | 38.5         | 47         | 63         | 71         | 96          | 80          |
|                                   | e                      | 25           | 32         | 40         | 50         | 50          | 50          |
|                                   | f <sup>H7</sup> -0.025 | 10           | 12         | 14         | 16         | 21          | 21          |
| Max. swing of top jaws            | mm                     | 170          | 230        | 290        | 345        | 410         | 410         |
| Max. draw bar pull                | kN                     | 16           | 25         | 40         | 60         | 60          | 60          |
| Max. total clamping force approx. | kN                     | 36           | 66         | 90         | 135        | 150         | 150         |
| Max. admissible speed             | min <sup>-1</sup>      | 7000         | 6000       | 5000       | 4200       | 3300        | 3300        |
| Moment of inertia J               | kgm <sup>2</sup>       | 0.011        | 0.038      | 0.09       | 0.22       | 0.8         | 0.8         |
| Weight without top jaws approx.   | kg                     | 5.5          | 12         | 18         | 29         | 53          | 50          |

Workholding, Clamping & Fixturing



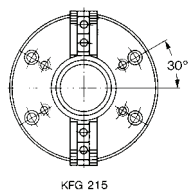
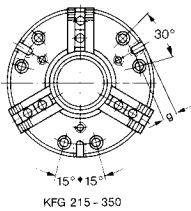
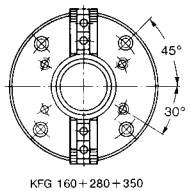
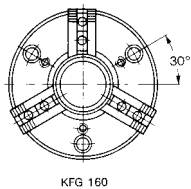
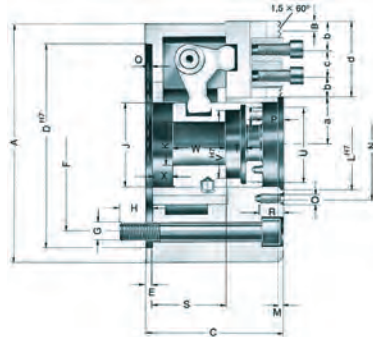
## KFG 2 & 3-Jaw Lever Type Power Chucks With 60° Serrations



Type 522-05 2-Jaw  
Type 532-05 3-Jaw

A highly versatile chuck with large through hole, suitable for both bar work and chucking the most varied parts. Toggle joint levers convert the axial operating force into radial jaw movements.

- Long jaw movement



| Size                                     |                    | 160       | 215        | 280        | 350        |            |
|--|--------------------|-----------|------------|------------|------------|------------|
| 2-Jaw Rohm ID No.                        |                    | 020686    | 020687     | 020688     | 020689     |            |
| Sowa Code No.                            |                    | 389820    | 389821     | 389822     | 389823     |            |
| Price \$                                 |                    | 10,899.33 | 13,099.90  | 16,728.19  | 24,622.80  |            |
| 3-Jaw Rohm ID No.                        |                    | 020666    | 020667     | 020668     | 020669     |            |
| Sowa Code No.                            |                    | 389824    | 389825     | 389826     | 389827     |            |
| Price \$                                 |                    | 12,832.29 | 16,894.02  | 22,842.04  | 35,880.86  |            |
| Jaw travel                               | A                  | 160       | 215        | 280        | 350        |            |
|  | B                  | 16        | 20         | 25         | 25         |            |
|  | C                  | 79        | 92         | 116.2      | 134.7      |            |
|  | D <sup>H7</sup>    | 140       | 190        | 255        | 320        |            |
|  | E                  | 4.2       | 4.2        | 5.7        | 5.7        |            |
|  | F                  | 104.8     | 133.4      | 133.4      | 171.4      |            |
|  | G                  | 3 x M10   | 6 x M12    | 6 x M12    | 6 x M16    |            |
| 2-Jaws                                   | G                  | 4 x M10   | 4 x M12    | 4 x M12    | 4 x M16    |            |
|  | H                  | 20        | 25         | 25         | 35         |            |
|  | J                  | 54        | 74         | 102        | 135        |            |
|  | K                  | 26        | 45.5       | 66.5       | 90.5       |            |
|  | L <sup>H7</sup>    | 66        | 80         | 105        | 140        |            |
|  | M                  | 2.5       | 2.5        | 2.5        | 2.5        |            |
|  | N                  | 76        | 90         | 120        | 156        |            |
|  | O                  | M6        | M8         | M8         | M10        |            |
|  | P                  | 14        | 16.5       | 18.7       | 13.1       |            |
|  | Q                  | 3.2       | 3.7        | 3.2        | 4.1        |            |
|  | R                  | 13        | 15         | 15         | 20         |            |
| Draw head stroke                         | min./max.          | S         | 19.8/39.8  | 25.3/50.3  | 28.8/63.8  | 32.9/77.9  |
|  | T                  |           | 8          | 12         | 18         | 22         |
|  | U                  |           | M46 x 1.25 | M65 x 1.25 | M90 x 1.25 | M112 x 1.5 |
|  | V <sup>H7</sup>    |           | 43         | 62         | 87         | 109        |
|  | W                  |           | 23         | 29         | 32         | 37         |
|  | min./max.          | a         | 23/39      | 31.5/51.5  | 47.5/72.5  | 69.5/94.5  |
|  | min./max.          | b         | 8          | 10         | 13         | 14         |
|  | min./max.          | c         | 16/41      | 20/46      | 26/54      | 28/65      |
|  | d                  |           | 57         | 66         | 80         | 93         |
|  | e                  |           | 28         | 35         | 45         | 50         |
|  | f <sup>H8</sup>    |           | 11         | 14         | 20         | 21         |
|  | g                  |           | -          | 35         | 63         | 73.5       |
|  | h                  |           | -          | 16         | 16         | 22         |
|  | i                  |           | --         | 10         | 10         | 15         |
|  | k                  |           | --         | 24         | 24         | 35         |
|  | l                  |           | --         | 10         | 10         | 17         |
|  | m                  |           | M8         | M10        | M12        | M16        |
|  | n                  |           | 7.5        | 8.5        | 13         | 15         |
|  | o                  |           | 1.5        | 1.5        | 2.5        | 3          |
| Max. swing of jaws                       | mm                 |           | 242        | 295        | 380        | 480        |
| Max draw bar pull 2-jaws                 | kN                 |           | 16         | 22.5       | 29         | 35         |
| Max draw bar pull 3-jaws                 | kN                 |           | 24         | 33.9       | 43         | 52         |
| Max. total clamping force approx. 2-jaws | kN                 |           | 14         | 20         | 28         | 44         |
| Max. total clamping force approx. 3-jaws | kN                 |           | 21         | 30         | 42         | 66         |
| Max. admissible speed                    | min. <sup>-1</sup> |           | 3400       | 2700       | 1950       | 1800       |
| Moment of inertia J 3-jaws               | kgm <sup>2</sup>   |           | 0.031      | 0.11       | 0.425      | 1.22       |
| Weight without jaws approx. 3-Jaws       | kg                 |           | 9.3        | 17         | 41         | 75         |

## SP Stationary Power Chucks

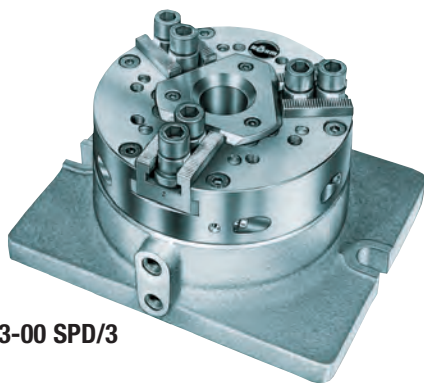
### SPD - Through Hole

### SPO - Without Through Hole

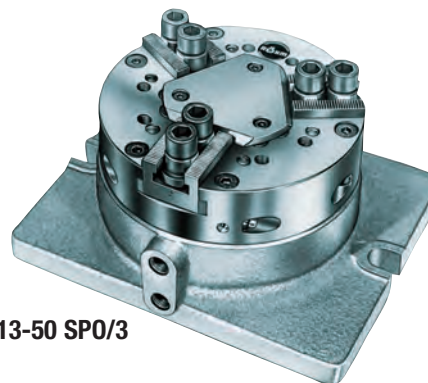
Rohm Power Chucking Fixtures, used as stationary chucks on drilling, milling and special purpose machines, offer many advantages.

#### Features:

- Quick and efficient chucking
- Concentric gripping of round as well as angular parts
- Universal through use of different jaws
- Ideal for series production
- Suitable for use in automated work cycles
- Gripping force adjustable by changing the pressure
- Oil or air operated



Type 513-00 SPD/3



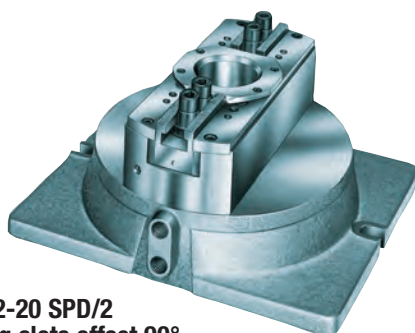
Type 513-50 SPO/3

### 3-Jaw Stationary Power Chuck With Through Hole

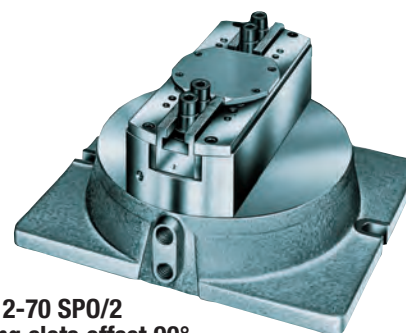
| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020926      | 389828   | 7,285.48  |
| 215        | 020927      | 389829   | 8,414.66  |
| 300        | 020928      | 389830   | 15,187.32 |

### 3-Jaw Stationary Power Chuck Without Through Hole

| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020929      | 389831   | 7,285.48  |
| 215        | 020930      | 389832   | 8,414.66  |
| 300        | 020931      | 389833   | 15,187.32 |



Type 512-20 SPD/2  
Mounting slots offset 90°



Type 512-70 SPO/2  
Mounting slots offset 90°

### 2-Jaw Stationary Power Chuck With Through Hole

| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020935      | 389834   | 6,505.42  |
| 215        | 020936      | 389835   | 7,682.73  |
| 300        | 020937      | 389836   | 13,632.00 |

### 2-Jaw Stationary Power Chuck Without Through Hole

| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020941      | 389837   | 6,505.42  |
| 215        | 020942      | 389838   | 7,682.73  |
| 300        | 020943      | 389839   | 13,632.00 |

Type 512-00 SPD/2  
Mounting slots same direction as jaw guides

Type 512-50 SPO/2  
Mounting slots same direction as jaw guides

### 2-Jaw Stationary Power Chuck With Through Hole

| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020932      | 389840   | 6,505.42  |
| 215        | 020933      | 389841   | 7,682.73  |
| 300        | 020934      | 389842   | 13,632.00 |

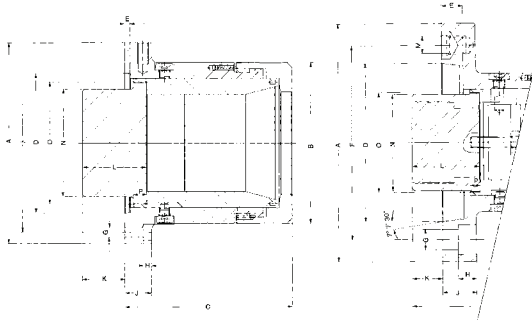
### 2-Jaw Stationary Power Chuck Without Through Hole

| Chuck Size | Rohm Id No. | Code No. | Price \$  |
|------------|-------------|----------|-----------|
| 160        | 020938      | 389843   | 6,505.42  |
| 215        | 020939      | 389844   | 7,682.73  |
| 300        | 020940      | 389845   | 13,632.00 |

## KZF Power Operated Collet Chucks



**Type 508-31-** Power operated collet chucks with bayonet catch are mainly used for chucking bar work on NC/CNC lathes. The bar stock can be fed in through the chuck. Profiles can also be chucked with the appropriate collets.



| Size                  |                    | 40/5            | 40/6            | 60/6            | 60/8            | 80/8            |
|-----------------------|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Rohm ID No.           |                    | 417252          | 417253          | 417256          | 417257          | 417259          |
| Code No.              |                    | 389850          | 389851          | 389852          | 389853          | 389854          |
| Price \$              |                    | <b>2,453.38</b> | <b>2,453.38</b> | <b>3,048.07</b> | <b>3,247.88</b> | <b>6,676.34</b> |
| Short Taper           |                    | 5               | 6               | 6               | 8               | 8               |
|                       | A                  | 135             | 170             | 170             | 210             | 210             |
|                       | B                  | 100             | 100             | 122             | 122             | 150             |
|                       | C                  | 127             | 128             | 144             | 146             | 170             |
|                       | D                  | 82.563          | 106.375         | 106.375         | 139.719         | 139.719         |
|                       | E                  | 16              | 18              | 18              | 22              | 22              |
|                       | F                  | 104.8           | 133.4           | 133.4           | 171.4           | 171.4           |
|                       | G                  | 4 x 11.5        | 4 x 14          | 4 x 14          | 4 x 18          | 4 x 18          |
|                       | H                  | 18              | 12              | 12              | 16              | 16              |
|                       | J                  | 25              | 25              | 25              | 30              | 30              |
|                       | K min.             | 35.5            | 34.5            | 34.5            | 32.5            | 28.35           |
|                       | K max.             | 28              | 27              | 27              | 25              | 25.5            |
|                       | L                  | 60              | 60              | 60              | 60              | 60              |
|                       | M                  | 4 x M10         | 4 x M12         | 4 x M12         | 4 x M16         | 4 x M16         |
|                       | N                  | 62              | 62              | 85              | 85              | 100             |
|                       | O                  | M66 x 1.5       | M66 x 1.5       | M88 x 1.5       | M88 x 1.5       | M114 x 1.5      |
|                       | P                  | 8.5             | 8.5             | 8.5             | 8.5             | 12.5            |
| Total stroke          | mm                 | 7.5             | 7.5             | 7.5             | 7.5             | 3.5             |
| Max. draw bar pull    | kN                 | 25              | 25              | 30              | 30              | 35              |
| Max. admissible speed | min. <sup>-1</sup> | 8000            | 8000            | 5000            | 5000            | 4000            |
| Moment of inertia J   | kgm <sup>2</sup>   | 0.029           | 0.029           | 0.049           | 0.092           | 0.119           |
| Weight without collet | kg                 | 7.5             | 7.5             | 10.2            | 14              | 18              |

Call for Collet Inquiries

Also available  
from RÖHM  
Air operated  
self-contained chucks.



Contact us for more information and to order.

## BH-M High Precision Power Chucks

### BH-M: Master Jaws with Metric Serration (1.5mm x 60°)

- Suitable for Kitagawa top jaws
- Large through hole
- 3-Jaws

### Standard Equipment:

- 3-Jaw chuck
- 1 Set T-nuts w/ bolts
- 1 Set soft top jaws
- Mounting bolts
- Grease gun

### Technical Features:

- Gripping force transmission via wedge hook
- Case hardened body to assure greatest precision and long chuck life
- 2 and 3-Jaw version available in all diameters
- 4-Jaw available starting from 165mm diameters



| SMW-AutoBlok Model No | BH-M 130                 | BH-M 165                   | BH-M 210                     | BH-M 250                     | BH-M 315                     |
|-----------------------|--------------------------|----------------------------|------------------------------|------------------------------|------------------------------|
| Code No.              | 485350                   | 485355                     | 485360                       | 485365                       | 485370                       |
| Price \$              | 3,933.38                 | 4,520.81                   | 5,341.01                     | 5,932.38                     | 11,082.47                    |
| Size                  | 130mm                    | 165mm                      | 210mm                        | 250mm                        | 315mm                        |
| Number of Jaws        | 3                        | 3                          | 3                            | 3                            | 3                            |
| Through hole          | mm 32                    | 43                         | 52                           | 66                           | 95                           |
| Radial jaw stroke     | mm 3.2                   | 3.2                        | 4                            | 5                            | 5                            |
| Wedge stroke          | mm 15                    | 15                         | 19                           | 26                           | 24                           |
| Max. draw-pull        | kN 15                    | 17                         | 25                           | 34                           | 40                           |
| Max. gripping force   | kN 60                    | 70                         | 110                          | 145                          | 175                          |
| Max. speed            | rpm 7000                 | 6000                       | 5000                         | 4000                         | 3200                         |
| Mass (w/out top jaws) | kg 5                     | 9.5                        | 19                           | 30                           | 46                           |
| Moment of inertia     | kgm <sup>2</sup> 0.012   | 0.036                      | 0.12                         | 0.27                         | 0.62                         |
| Recommended Cylinders | SIN-S 100<br>VSNC 101-39 | SIN-S 85/100<br>VSNC 80-32 | SIN-S 100/125<br>VSNC 140-52 | SIN-S 125/150<br>VSNC 180-67 | SIN-S 125/150<br>VSNC 240-95 |

## BB-D & BB-M High Precision Power Chucks

### BB-D: Inch Serration (1/16" x 90°)

### BB-M: Metric Serration (1.5mm x 60°)

- Suitable for Kitagawa top jaws, metric serration
- For open centre or partial open centre clamping
- For machines with very large spindle bore

### Standard Equipment:

- 3-Jaw chuck
- 1 Set T-nuts w/ bolts
- 1 Set soft top jaws
- Mounting bolts
- Grease gun

### Technical Features:

- Extra large through hole
- Gripping force transmission via wedge hook
- Case hardened body to assure greatest precision and long chuck life



The diagrams refer to 3-Jaw chucks. The maximum gripping force is the total, acting on the 3-Jaws, obtained by applying to the chuck the maximum allowed traction to the draw bar. The data refers to a chuck in good conditions, using SMW-AutoBlok K05 grease.

The dynamic gripping forces have been measured using the standard soft top jaws placed in the most external position, but not exceeding the outer diameter of the chuck. Using larger and heavier jaws and/or in a more external position, it is necessary to reduce the rotation speed.

| SMW-AutoBlok Model No. | BB-D 140                 | BB-M 140                 | BB-D 175                     | BB-M 175                     | BB-D 210                      | BB-M 210                      | BB-D 250                      | BB-M 250                      | BB-D 315                      | BB-M 315                      |
|------------------------|--------------------------|--------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Code No.               | 485300                   | 485302                   | 485305                       | 485307                       | 485310                        | 485312                        | 485315                        | 485317                        | 485320                        | 485322                        |
| Price \$               | 4,483.20                 | 4,483.20                 | 5,352.60                     | 5,352.60                     | 5,827.19                      | 6,919.70                      | 6,137.21                      | 7,575.24                      | 12,852.40                     | 14,168.24                     |
| Size                   | 140                      | 140                      | 175                          | 175                          | 210                           | 210                           | 250                           | 250                           | 315                           | 315                           |
| Number of Jaws         | 3                        | 3                        | 3                            | 3                            | 3                             | 3                             | 3                             | 3                             | 3                             | 3                             |
| Through hole           | mm 39                    | 56                       | 66                           | 77                           | 122                           | 122                           | 122                           | 122                           | 122                           | 122                           |
| Radial jaw stroke      | mm 3.2                   | 3.2                      | 4                            | 5                            | 5                             | 5                             | 5                             | 5                             | 5                             | 5                             |
| Wedge stroke           | mm 15                    | 15                       | 19                           | 24                           | 24                            | 24                            | 24                            | 24                            | 24                            | 24                            |
| Max. draw-pull         | kN 22                    | 25                       | 38                           | 50                           | 50                            | 50                            | 50                            | 50                            | 50                            | 50                            |
| Max. gripping force    | kN 58                    | 70                       | 108                          | 145                          | 145                           | 145                           | 145                           | 145                           | 145                           | 145                           |
| Max. speed             | rpm 7000                 | 6000                     | 5000                         | 4000                         | 3200                          | 3200                          | 3200                          | 3200                          | 3200                          | 3200                          |
| Mass (w/out top jaws)  | kg 6                     | 11.5                     | 19.5                         | 30                           | 44                            | 44                            | 44                            | 44                            | 44                            | 44                            |
| Moment of inertia      | kgm <sup>2</sup> 0.016   | 0.06                     | 0.12                         | 0.27                         | 0.62                          | 0.62                          | 0.62                          | 0.62                          | 0.62                          | 0.62                          |
| Recommended Cylinders  | SIN-S 100<br>VSNC 101-39 | SIN-S 100<br>VSNC 140-52 | SIN-S 100/125<br>VSNC 180-67 | SIN-S 125/150<br>VSNC 200-76 | SIN-S 125/150<br>VSNC 320-127 | SIN-S 125/150<br>VSNC 320-127 | SIN-S 125/150<br>VSNC 320-127 | SIN-S 125/150<br>VSNC 320-127 | SIN-S 125/150<br>VSNC 320-127 | SIN-S 125/150<br>VSNC 320-127 |

## High Precision Pull-Down Chucks

**TSF-C:** Floating jaws to clamp rough components and easily deformed parts

**TSR-C:** Rigid jaws to clamp on pre-machined diameters with highest precision

From middle size to very big production batches of parts requiring close squareness and parallelism tolerances. Used in first and second operation to clamp easily deformed parts. Long life with minimal maintenance, reducing the machine down time.

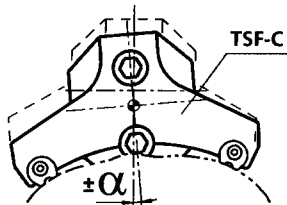


### Features

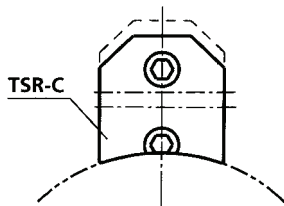
- Case hardened body and internal parts constantly grease-lubricated to assure greatest precision and long chuck life
- Swarf and coolant-proof, prevents contamination of the internal mechanism
- Unique clamping mechanism design
- Tongue and groove master jaws equipped with specially designed top jaws
- Minimum maintenance, very low wear, constant accuracy over a long period of time, constant clamping force
- Constant grease-lubrication of the clamping mechanism
- Compensation of centrifugal force
- Suitable for High-Low clamping

### Standard Equipment:

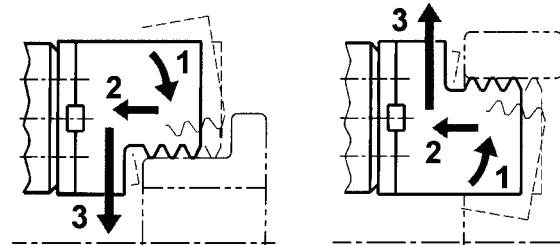
- 3-Jaw chuck
- 1 set fine adjustment keys
- Mounting bolts



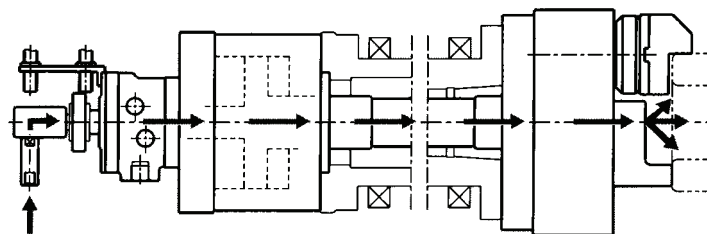
Floating jaws to clamp on rough dia. and easily deformed components on 6 points of contact. Used in both 1st and 2nd operation.



Rigid jaws to clamp pre-machined diameter of not easily deformed parts, with highest centering repeatability.



- Active pull down effect = the jaws slide on the part
- Clamping movement:  
1 centering - 2 pull-down - 3 gripping
- Internal and external clamping on the same chuck



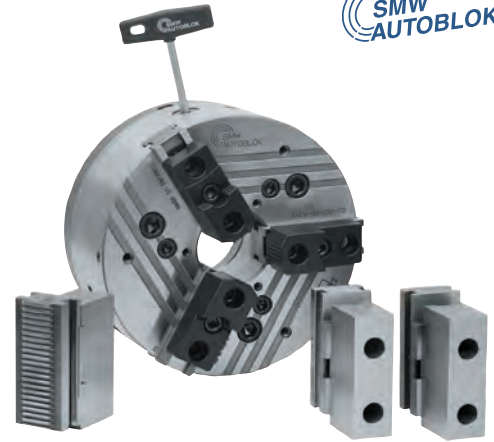
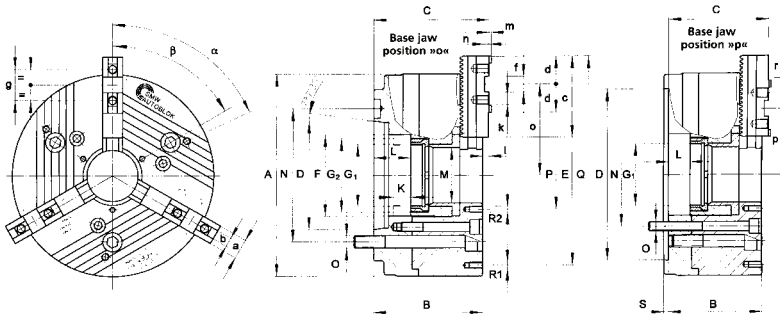
TSF-C and TSR-C chucks actuated by SIN-S cylinder with central bore for coolant or air to flush away chips or to automatically control the correct position of the workpiece on the axial supports (PEL system).

| SMW-AutoBlok – Model No.              |                  | TSF-C170  | TSR-C170  | TSF-C210  | TSR-C210  | TSF-C250  | TSR-C250  | TSF-C315  | TSR-C315  | TSF-C400  | TSR-C400  |
|---------------------------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Angular jaw stroke                    | deg.             |           | 5.2°      |           | 5.2°      |           | 4.9°      |           | 4.9°      | 4.7°      |           |
| Radial jaw stroke (at distance h)     | mm               | 5.3       | 6.3       | 7         | 7         | 6.7       |           |           |           |           |           |
| Pull down movement (standard)         | mm               | 0.6       | 0.6       | 0.6       | 0.6       | 0.8       |           |           |           |           |           |
| Wedge Stroke                          | mm               | 21        | 25        | 25        | 25        | 30        |           |           |           |           |           |
| Max. draw-pull                        | kN               | 18        | 25        | 40        | 40        | 50        |           |           |           |           |           |
| Max. gripping force (at distance h)   | kN               | 44        | 60        | 96        | 96        | 120       |           |           |           |           |           |
| Max. speed                            | rpm              | 5000      | 4500      | 3800      | 3000      | 2200      |           |           |           |           |           |
| Mass (plain black w/out top jaw)      | kg               | 15        | 27        | 41        | 66        | 115       |           |           |           |           |           |
| Moment of inertia (m r <sup>2</sup> ) | kgm <sup>2</sup> | 0.06      | 0.16      | 0.34      | 0.83      | 2.3       |           |           |           |           |           |
| Recommended cylinders                 |                  | SIN-S 85  | SIN-S 100 | SIN-S 125 | SIN-S 125 | SIN-S 150 |           |           |           |           |           |
| ORDERING INFORMATION                  |                  |           |           |           |           |           |           |           |           |           |           |
| Code No.                              |                  | 485005    | 485007    | 485010    | 485012    | 485015    | 485017    | 485020    | 485022    | 485025    | 485027    |
| Price \$                              |                  | 14,967.08 | 14,967.08 | 16,238.20 | 16,238.20 | 18,559.64 | 18,559.64 | 22,664.28 | 22,664.28 | 31,729.07 | 31,729.07 |

# KNCS-N Quick Jaw Change



Jaw position: open position for O.D. clamping



## Main Dimensions and Technical Data Quick Jaw Change

Subject to technical changes

| Type KNCS-N                        | 325-104          |               |           |           | 400-128   |             |           |           | 500-155   |             |           | 630-165     |     |
|------------------------------------|------------------|---------------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|-------------|-----------|-------------|-----|
| Code No.                           | 485200           | 485205        | 485210    | 485215    | 485220    | 485225      | 485230    | 485235    | 485240    | 485245      | 485250    | 485255      |     |
| Price \$                           | 20,589.65        | 20,589.65     | 19,508.83 | 19,508.83 | 27,426.91 | 27,426.91   | 32,053.33 | 32,053.33 | 35,587.03 | 40,145.33   | 40,145.33 | 66,759.16   |     |
| Mounting                           | Dim. Z220        | Z300          | A8        | A11       | Z300      | Z380        | A11       | A15       | Z380      | A11         | A15       | Z380        |     |
| A                                  | 324              |               |           |           | 400       |             |           |           | 500       |             |           | 630         |     |
| B                                  | 130              | 130           | 149       | 151       | 140       | 140         | 161       | 163       | 174       | 195         | 197       | 174         |     |
| C                                  | 139.2            | 139.2         | 158.2     | 160.2     | 149.2     | 149.2       | 170.2     | 172.2     | 184       | 205         | 207       | 184         |     |
| H6 D                               | 220              | 300           | 139.73    | 196.88    | 300       | 380         | 196.88    | 285.77    | 380       | 196.88      | 285.77    | 380         |     |
| E                                  |                  | 268           |           |           |           | 330         |           |           |           | 420         |           | 585         |     |
| F                                  |                  | 144           |           |           |           | 180         |           |           |           | 207         |           | 217         |     |
| Rotating ring nut/depth G1         |                  | M115 x 2/22   |           |           |           | M138 x 2/22 |           |           |           | M165 x 2/25 |           | M175 x 2/25 |     |
| Piston thread/depth G2             |                  | M132 x 2/25   |           |           |           | M160 x 2/25 |           |           |           | M185 x 2/28 |           | M195 x 2/28 |     |
| Piston stroke max. K               |                  | 25/28         |           |           |           | 32          |           |           |           | 42          |           | 42          |     |
| L                                  | 28               | 28            | 47        | 49        | 32        | 32          | 53        | 55        | 42        | 63          | 65        | 42          |     |
| M                                  |                  | 104           |           |           |           | 128         |           |           |           | 155         |           | 165         |     |
| Fixing bolt circle N               | 171.4            | 235           | 171.4     | 235       | 235       | 330.2       | 235       | 330.2     | 330.2     | 235         | 330.2     | 330.2       |     |
| Fixing bolt O                      | M16              | M20           | M16       | M20       | M20       | M24         | M20       | M24       | M24       | M20         | M24       | M24         |     |
| P                                  |                  | 130           |           |           |           | 152         |           |           |           | 180         |           | 195         |     |
| Q                                  |                  | 385           |           |           |           | 452         |           |           |           | 552         |           | 643         |     |
| Thread/thread depth R1             |                  | M10/16        |           |           |           | M12/18      |           |           |           | M16/25      |           | M16/25      |     |
| Thread/thread depth R2             |                  | M10/16        |           |           |           | M12/18      |           |           |           | M12/18      |           | M12/18      |     |
| S                                  |                  | 6             |           |           |           | 8           |           |           |           | 8           |           | 8           |     |
| a                                  |                  | 32            |           |           |           | 32          |           |           |           | 45          |           | 45          |     |
| f7 b                               |                  | 12            |           |           |           | 12          |           |           |           | 18          |           | 18          |     |
| c                                  |                  | 115           |           |           |           | 125         |           |           |           | 160         |           | 200         |     |
| d                                  |                  | 36            |           |           |           | 43          |           |           |           | 50          |           | 50          |     |
| H7 f                               |                  | 20            |           |           |           | 26          |           |           |           | 30          |           | 30          |     |
| g                                  |                  | 40            |           |           |           | 54          |           |           |           | 60          |           | 60          |     |
| Thread/thread depth k              |                  | M12/17        |           |           |           | M12/17      |           |           |           | M16/34      |           | M16/34      |     |
| l                                  |                  | 9.3           |           |           |           | 9.3         |           |           |           | 10          |           | 10          |     |
| m                                  |                  | 3             |           |           |           | 3           |           |           |           | 4           |           | 4           |     |
| n                                  |                  | 6             |           |           |           | 7           |           |           |           | 9           |           | 9           |     |
| max./min. o                        |                  | 155.7/106.2   |           |           |           | 182.3/121.8 |           |           |           | 225/141     |           | 270.5/179.5 |     |
| max./min. p                        |                  | 111.7/62.2    |           |           |           | 143.3/82.2  |           |           |           | 164/80      |           | 170.5/79.5  |     |
| Base jaw tooth pitch               |                  | 5.5           |           |           |           | 5.5         |           |           |           | 7           |           | 7           |     |
| Base jaw offset r                  |                  | 49.5          |           |           |           | 60.5        |           |           |           | 70          |           | 91          |     |
| Base jaw offset teeth              |                  | 9             |           |           |           | 11          |           |           |           | 12          |           | 13          |     |
| $\alpha^\circ$                     |                  | 60            |           |           |           | 60          |           |           |           | 60          |           | 60          |     |
| $\beta^\circ$                      |                  | 60            |           |           |           | 60          |           |           |           | 60          |           | 60          |     |
| Stroke/jaw at piston stroke K      | mm               | 7.0           |           | 25        |           |             |           |           |           |             |           |             |     |
| Stroke/jaw at piston stroke K max. | mm               | 8.0           |           | 28        | 8.0       |             |           | 32        | 10.0      | 42          |           | 10.0        |     |
| Max. actuating force 3-Jaw chuck   | KN               | 95            |           |           |           | 115         |           |           |           | 120         |           | 120         |     |
| Max. total grip force 3-Jaw chuck  | KN               | 180           |           |           |           | 240         |           |           |           | 250         |           | 250         |     |
| Max. speed 3-Jaw chuck             | rpm              | 4000          |           |           |           | 3500        |           |           |           | 2200        |           | 1700        |     |
| Mass without top jaws              | kg               | 65            | 65        | 68        | 68        | 111         | 111       | 116       | 116       | 225         | 231       | 231         | 390 |
| Moment of Inertia                  | kgm <sup>2</sup> | 1.2           |           |           |           | 2.5         |           |           |           | 6.5         |           | 18          |     |
| Recommended closed centre cylinder | Type             | SIN-S 150/200 |           |           |           | SIN-S 200   |           |           |           | SIN-S 200   |           | SIN-S 200   |     |
| Recommended open centre cylinder   | Type             | VNK 250-110   |           |           |           | VNK 320-127 |           |           |           | VSG 450-165 |           | VSG 450-165 |     |

Workholding, Clamping & Fixturing



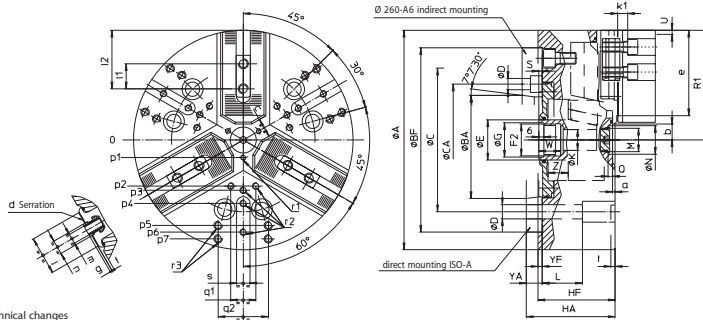
## AP-D & AP-M High Precision Power Chucks



- AP-D - inch serration
- AP-M - metric serration
- Closed centre
- For mid to large batch production
- Fully sealed, ideal for dry machining of castings and forgings or if high pressure coolant is used
- Constant gripping force with permanent grease lubrication
- Central bore for coolant and/or air
- Chuck body and internal parts are case hardened
- Proofline® chucks = fully sealed - low maintenance

### Standard Equipment

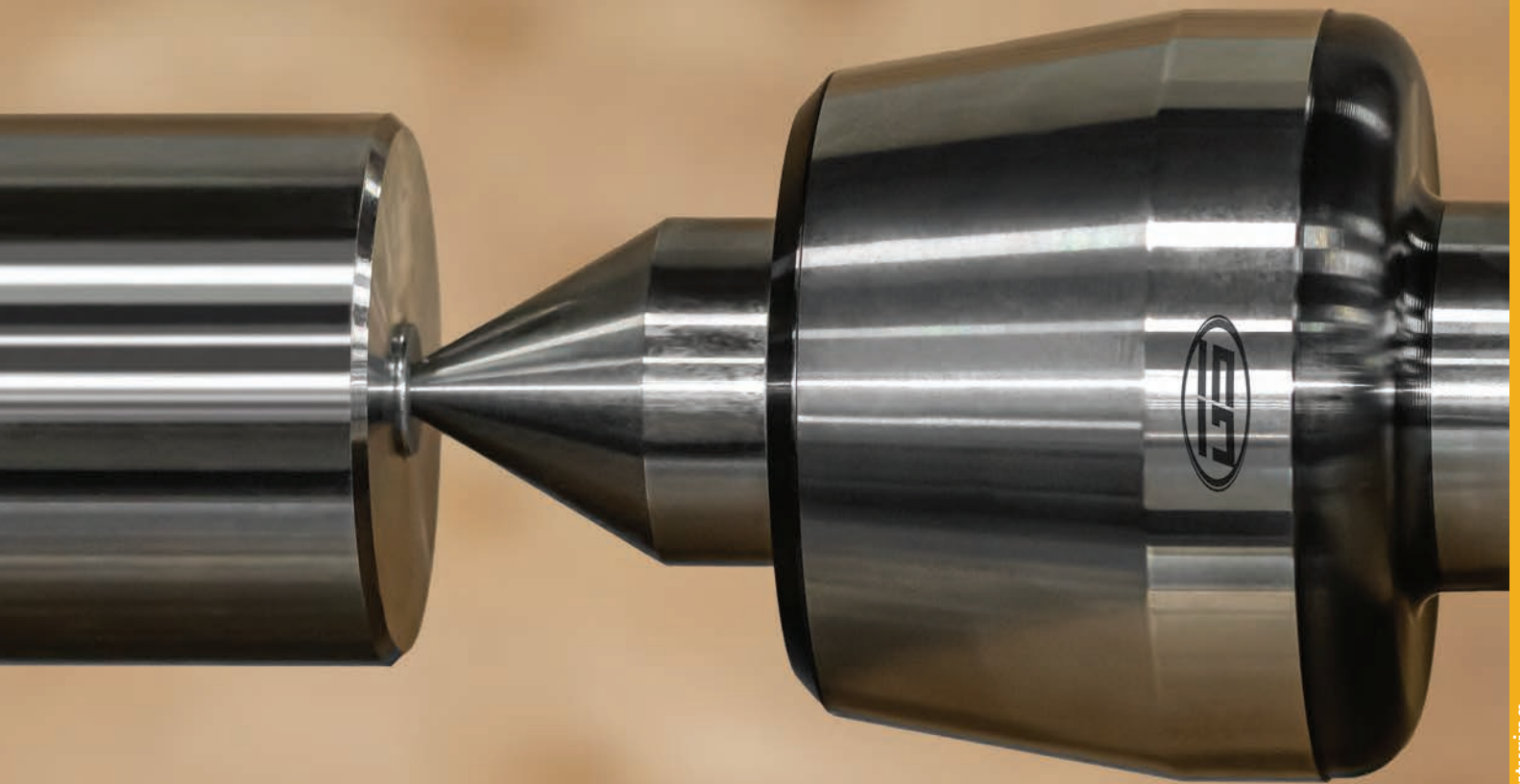
- 3-Jaw chuck
- 1 set T-nuts and bolts
- 1 set soft top jaws
- Mounting bolts



Subject to technical changes  
For more detailed information please ask for customer drawing

| Type                 | AP-D 170<br>AP-M 170 |        | AP-D 215<br>AP-M 215 |         | AP-D 260<br>AP-M 260 |         | AP-D 315<br>AP-M 315 |      | AP-D 400<br>AP-M 400 |      |         |
|----------------------|----------------------|--------|----------------------|---------|----------------------|---------|----------------------|------|----------------------|------|---------|
| AP-D Code No.        | 485920               |        | 485924               |         | 485928               |         | 485932               |      | 485936               |      |         |
| Price \$             | 7,640.99             |        | 8,033.36             |         | 9,572.42             |         | 13,244.76            |      | 19,912.88            |      |         |
| AP-M Code No.        | 485922               |        | 485926               |         | 485930               |         | 485934               |      | 485938               |      |         |
| Price \$             | 8,103.80             |        | 8,388.22             |         | 10,143.38            |         | 14,036.71            |      | 20,920.93            |      |         |
| Mount's Available    | Z140                 | A5     | Z170                 | A6      | Z220                 | A6      | A8                   | Z220 | A8                   | Z300 | A11     |
| Dimensions (mm)      | <b>A</b>             |        | <b>216</b>           |         | <b>262</b>           |         | <b>315</b>           |      | <b>390</b>           |      |         |
| BF/BA (H6)           | 140                  | 82.563 | 170                  | 106.375 | 220                  | 106.375 | 139.719              | 220  | 139.719              | 300  | 196.869 |
| C                    | 104.8                |        | 133.4                |         | 171.4                |         | 171.4                |      | 235                  |      |         |
| Ca                   |                      |        |                      |         | 133.4                |         |                      |      |                      |      |         |
| D                    | 11.5                 |        | 13.5                 |         | 17                   | 13.5    | 17                   | 17   |                      | 21   |         |
| E                    | 32                   |        | 42                   |         | 48                   |         | 48                   |      | 75                   |      |         |
| F2                   | M24 x 2              |        | M32 x 1.5            |         | M38 x 1.5            |         | M38 x 1.5            |      | M60 x 1.5            |      |         |
| G                    | 25                   |        | 33                   |         | 39                   |         | 39                   |      | 61                   |      |         |
| HF/HA                | 68                   | 78     | 81                   | 93      | 92                   | 111     | 106                  | 101  | 115                  | 112  | 127     |
| K                    | 18.5                 |        | 20                   |         | 25                   |         | 25                   |      | 48                   |      |         |
| L                    | 23                   |        | 32                   |         | 38                   |         | 38                   |      | 54                   |      |         |
| M                    | M22 x 1.5            |        | M22 x 1.5            |         | M28 x 1.5            |         | M28 x 1.5            |      | M52 x 1.5            |      |         |
| N (H9)               | 24                   |        | 24                   |         | 34                   |         | 34                   |      | 60                   |      |         |
| Q                    | 5.5                  |        | 5.5                  |         | 5.5                  |         | 5.5                  |      | 9                    |      |         |
| Chuck open max./min. | R1                   | 86.5   | 108                  | 131     | 157.5                | 195     | 157.5                |      | 195                  |      |         |
| Jaw stroke           | S                    | 21/4   | 26/4                 | 28/4    | 34/4                 | 37/4    | 34/4                 |      | 37/4                 |      |         |
| U                    | 3.6                  |        | 4.6                  |         | 5                    |         | 6.3                  |      | 7                    |      |         |
| W                    | 22                   |        | 26                   |         | 26                   |         | 26                   |      | 38                   |      |         |
| YF/YA                | 5                    | 15     | 5                    | 17      | 5                    | 24      | 19                   | 5    | 19                   | 6    | 21      |
| max./min.            | Z                    | 17/0   | 22/0                 | 24/0    | 30/0                 |         | 33/0                 |      | 33/0                 |      |         |
| a                    | 3                    |        | 3                    |         | 3                    |         | 3                    |      | 3                    |      |         |
| min. b               | 8.5                  |        | 12                   |         | 14                   |         | 16.5                 |      | 31                   |      |         |
| min. c               | 9                    |        | 13                   |         | 14                   |         | 16                   |      | 38                   |      |         |
| AP-D d               | 1/16" x 90°          |        | 1/16" x 90°          |         | 1/16" x 90°          |         | 1/16" x 90°          |      | 3/32" x 90°          |      |         |
| AP-M d               | 1.5 x 60°            |        | 1.5 x 60°            |         | 1.5 x 60°            |         | 1.5 x 60°            |      | 1.5 x 60°            |      |         |
| e                    | 67                   |        | 82                   |         | 102                  |         | 123                  |      | 144                  |      |         |
| f                    | 3                    |        | 3                    |         | 3                    |         | 3                    |      | 6                    |      |         |
| g                    | 2.5                  |        | 2.5                  |         | 2.5                  |         | 3.5                  |      | 3.5                  |      |         |
| j                    | 34                   |        | 46                   |         | 48                   |         | 58                   |      | 63                   |      |         |
| k1                   | 10                   |        | 11                   |         | 12                   |         | 12                   |      | 14                   |      |         |
| AP-D l1              | 16.5                 |        | 23                   |         | 30                   |         | 30                   |      | 38                   |      |         |
| AP-M l1              | 20                   |        | 25                   |         | 30                   |         | 30                   |      | 38                   |      |         |
| max./min. l2         | 43/24                |        | 53/33                |         | 70/41                |         | 84/43                |      | 98/54                |      |         |
| AP-D m               | M10                  |        | M12                  |         | M12                  |         | M16                  |      | M20                  |      |         |
| AP-M m               | M10                  |        | M12                  |         | M12                  |         | M16                  |      | M20                  |      |         |
| AP-D n (h8)          | 14                   |        | 17                   |         | 17                   |         | 21                   |      | 25.5                 |      |         |
| AP-M n (h8)          | 12                   |        | 14                   |         | 16                   |         | 21                   |      | 22                   |      |         |
| p1                   | 16                   |        | 16                   |         | 21                   |         | 21                   |      | 37.5                 |      |         |
| p2                   | -                    |        | -                    |         | -                    |         | 60                   |      | 80                   |      |         |
| p3                   | 38                   |        | 49                   |         | 55                   |         | 62.5                 |      | 83                   |      |         |
| p4                   | -                    |        | 80                   |         | 70                   |         | 80                   |      | 110                  |      |         |
| p5                   | 65                   |        | 80                   |         | 102                  |         | 102                  |      | 140                  |      |         |
| p6                   | 70                   |        | -                    |         | 102                  |         | 120                  |      | 155                  |      |         |
| p7                   | -                    |        | -                    |         | -                    |         | 135                  |      | 170                  |      |         |
| q1                   | -                    |        | -                    |         | -                    |         | 30                   |      | 36                   |      |         |
| q2                   | 36                   |        | 45                   |         | 60                   |         | 60                   |      | 80                   |      |         |
| r1                   | M5/7                 |        | M5/8                 |         | M6/10                |         | M6/10                |      | M6/12                |      |         |
| r2                   | M6/14                |        | M8/17                |         | M8/17                |         | M8/17                |      | M10/19               |      |         |
| r3                   | M8/17                |        | M8/17                |         | M10/19               |         | M10/19               |      | M12/22               |      |         |
| s                    | 16                   |        | 16                   |         | 16                   |         | 16                   |      | 20                   |      |         |

\* Actuated Cylinders available, please call today



## Lathe Accessories

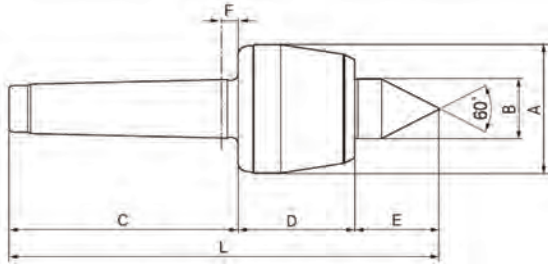
|   |          |
|---|----------|
| GS Live Centres . . . . .                       | H114-118 |
| STM Live Centres . . . . .                      | H119     |
| Skoda Live Centres . . . . .                    | H119-122 |
| Skoda Live Centre Sets . . . . .                | H123     |
| STM Carbide Tipped Dead Lathe Centres . . . . . | H123     |
| Rohm Live Centres . . . . .                     | H124-127 |
| Rohm Live Centre Sets . . . . .                 | H126     |
| Rohm Dead Centres . . . . .                     | H128     |
| Rohm Face Drivers . . . . .                     | H129-131 |
| Quick Change Tool Posts & Holders . . . . .     | H132-135 |

## CNC High Speed Live Centres — Standard Point

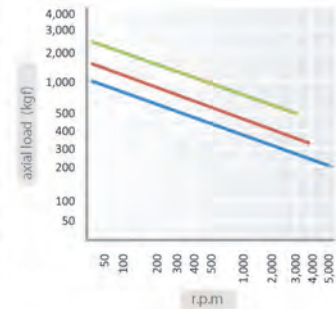
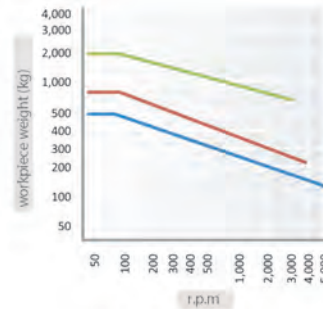


### Features

- Accuracy guaranteed to 0.003mm TIR (0.0001")
- Excellent for CNC and conventional machines
- Heat treated point to 60±2HRC
- High performance lip seal and deflected shaft design protects bearing space from ingress by dust and coolant
- 4-Bearing System: a double row angular contact bearing, a radial ball bearing, and a rear needle roller bearing combine to provide excellent rigidity and high precision point concentricity
- Heat treated drop-forged body (50±2HRC) for extra strength, rigidity, and long life
- Shaft borehole for easy dismounting



- MT2-3
- MT4
- MT5



### Dimensions

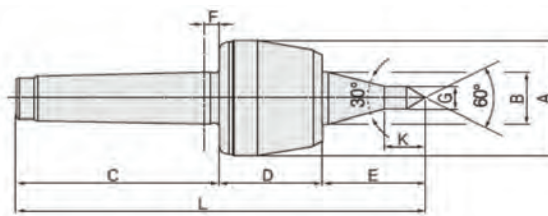
| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | L (mm) | Workpiece Weight | Max RPM | Weight  | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|------------------|---------|---------|------------|----------|----------|
| 2  | 50     | 25     | 68     | 43.5   | 29.5   | 6      | 141    | 500 kg           | 5,000   | 0.7 kg  | 0.003mm    | 311011   | 380.81   |
| 3  | 50     | 25     | 85     | 43.5   | 29.5   | 6      | 158    | 500 kg           | 5,000   | 0.8 kg  | 0.003mm    | 311012   | 463.30   |
| 4  | 69     | 32     | 108    | 55     | 40     | 8      | 203    | 800 kg           | 3,800   | 1.85 kg | 0.003mm    | 311013   | 529.97   |
| 5  | 88     | 40     | 136    | 70     | 50.5   | 8      | 256.3  | 2,000 kg         | 3,000   | 4.2 kg  | 0.003mm    | 311014   | 768.64   |
| 6  | 105    | 50     | 189    | 81.5   | 57.5   | 10     | 328    | 3,500 kg         | 2,800   | 8.7 kg  | 0.005mm    | 311015   | 1,535.54 |

## CNC High Speed Live Centres — Extended A Type Point

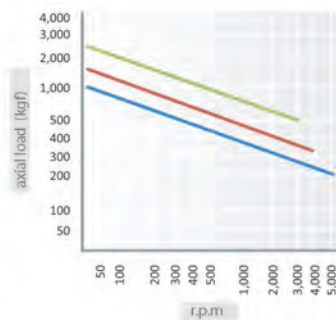
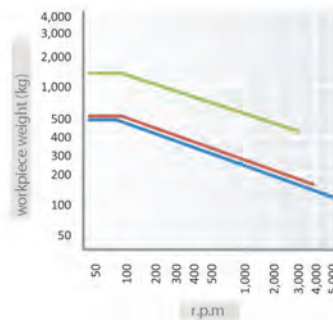


### Features

- Accuracy guaranteed to 0.003mm TIR (0.0001")
- Excellent for CNC and conventional machines
- Specially shaped elongated centre point improves tool clearance and machining flexibility for cramped area work
- Heat treated point to 60±2HRC
- High performance lip seal and deflected shaft design protects bearing space from ingress by dust and coolant
- 4-Bearing System: a double row angular contact bearing, a radial ball bearing, and a rear needle roller bearing combine to provide excellent rigidity and high precision point concentricity
- Heat treated body for extra strength, rigidity, and long life



- MT2-3
- MT4
- MT5



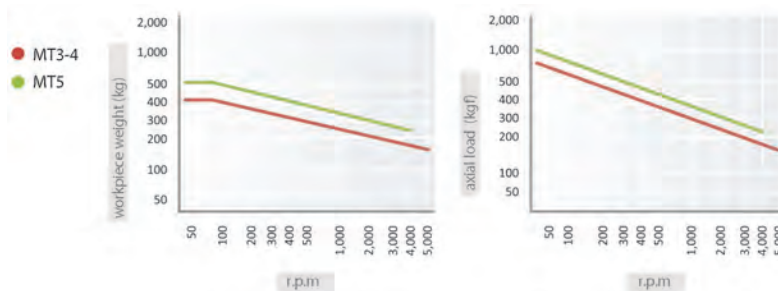
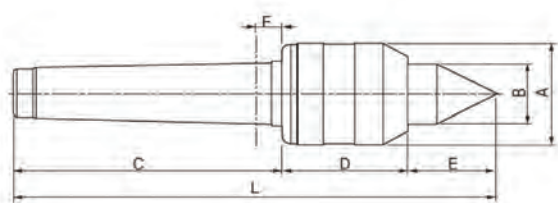
### Dimensions

| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | K (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 2  | 50     | 25     | 68     | 43.5   | 50     | 6      | 10     | 19     | 161.5  | 500 kg           | 5,000   | 0.7 kg | 0.003mm    | 311016   | 458.03   |
| 3  | 50     | 25     | 85     | 43.5   | 50     | 6      | 10     | 19     | 178.5  | 500 kg           | 5,000   | 0.8 kg | 0.003mm    | 311017   | 558.06   |
| 4  | 69     | 32     | 108    | 55     | 63.5   | 8      | 12.5   | 23.5   | 226.5  | 550 kg           | 3,800   | 1.9 kg | 0.003mm    | 311018   | 640.54   |
| 5  | 88     | 40     | 136    | 70     | 80     | 8      | 12.5   | 23.5   | 286    | 1,500 kg         | 3,000   | 4.4 kg | 0.003mm    | 311019   | 921.34   |

## High Performance Live Centres

### Features

- Accuracy guaranteed to 0.003mm TIR (0.0001")
- Excellent for light/medium duty work on conventional lathe machines
- Heat treated point to 60±2HRC
- Slim diameter improves tool clearance
- Triple Bearing System: 2 radial ball bearings and a thrust bearing provide good overall load ratings and improved performance
- Rear bearing is sealed, protecting the assembly from coolant and chips
- Live centre made of wear-resistant, drop-forged tool steel



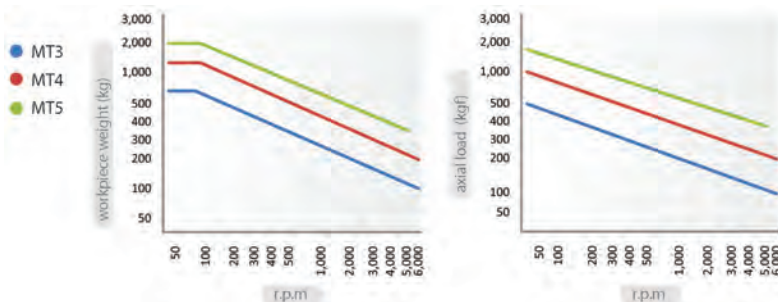
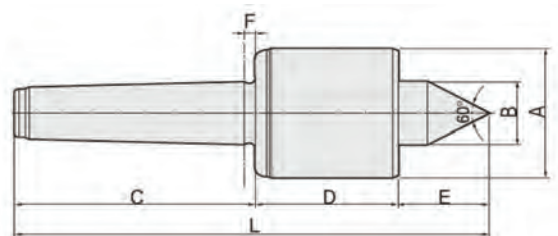
### Dimensions

| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | L (mm) | Workpiece Weight | Max Axial Load | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|------------------|----------------|---------|--------|------------|----------|----------|
| 3  | 44.5   | 25     | 85     | 44     | 32.5   | 5.3    | 161.5  | 400 kg           | 600 kg         | 5,000   | 1 kg   | 0.003mm    | 311024   | 319.39   |
| 4  | 44.5   | 25     | 108    | 44     | 32.5   | 5.3    | 184.5  | 400 kg           | 600 kg         | 5,000   | 1.2 kg | 0.003mm    | 311025   | 424.69   |
| 5  | 63     | 28     | 136    | 58     | 35     | 6.3    | 229    | 500 kg           | 750 kg         | 4,000   | 2.8 kg | 0.003mm    | 311031   | 614.22   |

## High Speed Live Centres

### Features

- Accuracy guaranteed to 0.002mm TIR (0.0001")
- Excellent for grinders, CNC machines, and high speed light duty machining
- Heat treated point to 60±2HRC
- High RPM (up to 6,000)
- Five Bearing System: A double row angular contact bearing, two single row angular contact bearings, and a rear needle roller bearing combine to provide improved runout, greater stability, longer tool life, and superior performance
- Anti-friction seal for coolant deflection and high speed
- Heat treated body for extra strength, rigidity, and long life
- Shaft borehole for easy, efficient dismounting
- Drop forged body (50±2HRC) for long life



### Dimensions

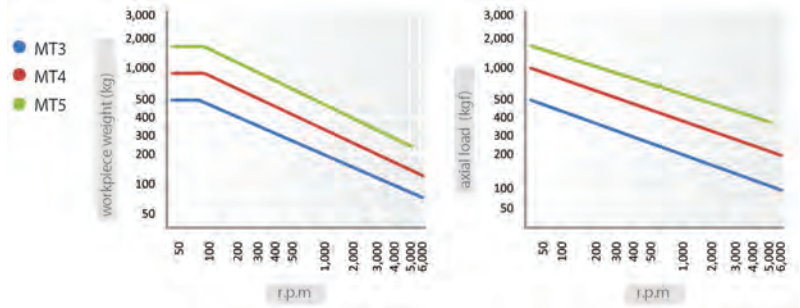
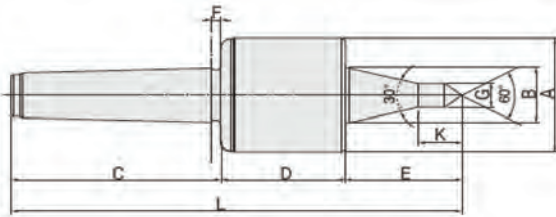
| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 3  | 50     | 20     | 85     | 58     | 23     | 4.5    | 166    | 750 kg           | 6,000   | 1.9 kg | 0.002mm    | 311034   | 958.08   |
| 4  | 66     | 30     | 108    | 71     | 35     | 5.3    | 214    | 1,300 kg         | 6,000   | 2.4 kg | 0.002mm    | 311026   | 772.81   |
| 5  | 80     | 35     | 136    | 76     | 38     | 6.3    | 250    | 2,000 kg         | 5,000   | 5.3 kg | 0.002mm    | 311027   | 995.04   |

## High Speed Live Centres — Extended A Type Point



### Features

- Accuracy guaranteed to 0.002mm TIR (0.0001")
- Excellent for grinders, CNC machines, and high speed light duty machining
- Heat treated point to 60±2HRC
- High RPM (up to 6,000)
- Five Bearing System: A double row angular contact bearing, two single row angular contact bearings, and a rear needle roller bearing combine to provide improved runout, greater stability, longer tool life, and superior performance
- Anti-friction seal for coolant deflection and high speed
- Heat treated body for extra strength, rigidity, and long life
- Shaft borehole for easy, efficient dismounting
- Drop forged body (50±2HRC) for long life



### Dimensions

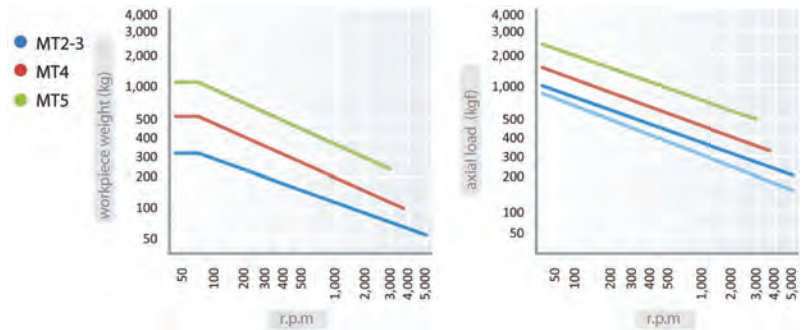
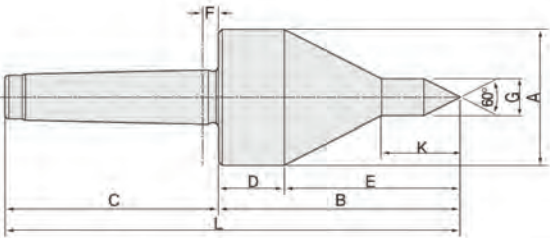
| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | K (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 3  | 50     | 20     | 85     | 58     | 37     | 4.5    | 10     | 15     | 180    | 500 kg           | 6,000   | 1.9 kg | 0.002mm    | 311028   | 741.07   |
| 4  | 66     | 31     | 107    | 71     | 63.5   | 5.3    | 12.5   | 23     | 241.5  | 900 kg           | 6,000   | 2.4 kg | 0.002mm    | 311029   | 846.89   |
| 5  | 80     | 35     | 136    | 78     | 70     | 6.3    | 12.5   | 23.5   | 284    | 1,700 kg         | 5,000   | 5.3 kg | 0.002mm    | 311030   | 931.61   |

## 60° Bull Head Live Centres — Extended A Type Point



### Features

- Accuracy guaranteed to 0.003mm TIR (0.0001")
- Heat treated point to 60±2HRC
- For pipe work, tube work, and parts with extra-large centre holes
- 4-Bearing System: double row angular contact bearing, thrust ball bearing, and a radial ball bearing combine to provide excellent rigidity and high precision point concentricity
- Used both as a centering taper for hollow bodies and as a centre for machining standard workpieces
- Elongated centre point is specially shaped for improved tool clearance



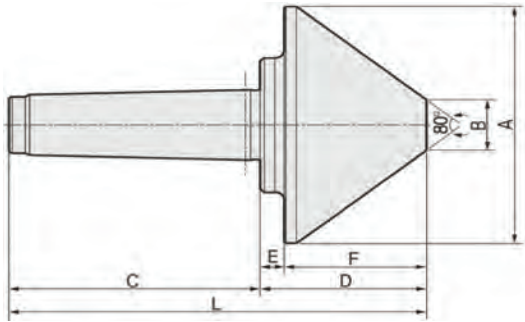
### Dimensions

| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | K (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 3  | 56     | 86     | 85     | 28.9   | 57.1   | 6      | 12     | 19     | 171    | 320 kg           | 5,000   | 1.0 kg | 0.003mm    | 311032   | 624.74   |
| 4  | 78     | 103.5  | 108    | 26.3   | 77.2   | 8      | 16     | 23.5   | 211.5  | 560 kg           | 3,800   | 2.3 kg | 0.003mm    | 311023   | 658.10   |
| 5  | 96     | 140    | 136    | 41.6   | 98.4   | 8      | 19     | 30     | 276    | 1,200 kg         | 3,000   | 5.0 kg | 0.003mm    | 311033   | 986.27   |

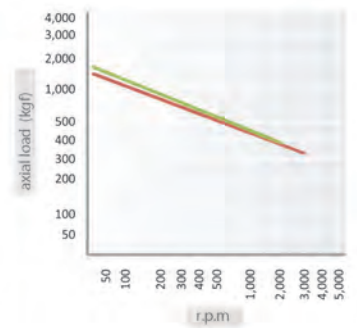
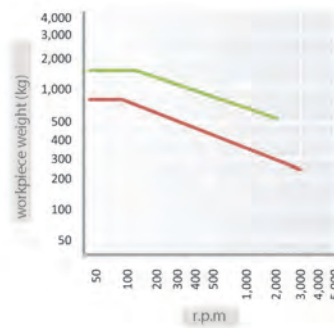
## 80° Bull Nose Live Centres — Standard Point

### Features

- Accuracy guaranteed to 0.003mm TIR (0.0001")
- Excellent for heavy duty lathe applications
- Heat treated point to 60±2HRC
- For pipe work, tube work, and part with extra-large centre holes
- Triple Bearing System: a taper roller bearing, thrust bearing, and a high-precision radial ball bearing combine to provide excellent rigidity and superior performance
- The design prevents ingress of coolant and chips
- Shaft borehole for easy, efficient dismounting
- Drop forged shaft (50±2HRC)



- MT4
- MT5



### Dimensions

| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 4  | 125    | 29     | 108    | 77     | 13     | 64     | 185    | 800 kg           | 3,000   | 3.9 kg | 0.003mm    | 311036   | 947.49   |
| 5  | 150    | 32     | 136    | 90     | 13     | 77     | 226    | 1,600 kg         | 2,000   | 6.9 kg | 0.003mm    | 311035   | 1,085.12 |



## Indexable External Turning Toolholders

Requires fewer tool changes than solid tools in high level metalworking.

See Pages E44-E59



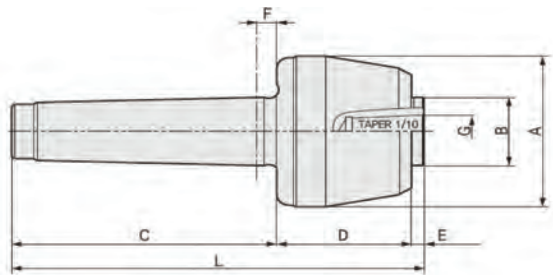
## Interchangeable Points Live Centres



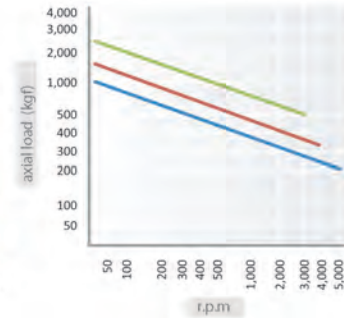
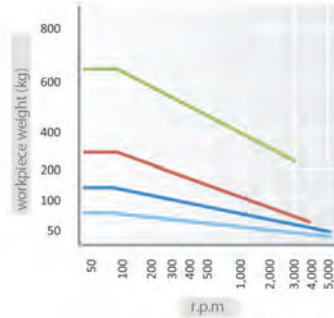
### Features

Each holder comes with the 60° H insert. Other inserts available individually (see below)

- Accuracy for centre inner diameter guaranteed to 0.003mm
- Accuracy after point locking guaranteed to 0.005mm
- Excellent for individual production of various workpieces through different insert shafts
- Heat treated point to 60±2HRC
- 4 types of standard point are available
- 4-Bearing System: a double row angular contact bearing, a radial ball bearing, and a rear needle roller bearing combine to provide excellent rigidity and superior performance
- Because of the insert shafts the allowed workpiece weight is limited
- Mounting taper of point is 1/10
- Drop forged (50±2HRC) body
- Shaft borehole for easy, efficient dismounting



- MT3
- MT4
- MT5



### Dimensions

| MT | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) | G (mm) | L (mm) | Workpiece Weight | Max RPM | Weight | Max Runout | Code No. | Price \$ |
|----|--------|--------|--------|--------|--------|--------|--------|--------|------------------|---------|--------|------------|----------|----------|
| 3  | 50     | 25     | 85     | 43.5   | 5      | 6      | 12     | 133.5  | 150 kg           | 5,000   | 0.8 kg | 0.005mm    | 311020   | 696.65   |
| 4  | 69     | 32     | 108    | 55     | 5      | 8      | 15     | 168    | 250 kg           | 3,800   | 1.7 kg | 0.005mm    | 311021   | 800.44   |
| 5  | 88     | 40     | 136    | 70     | 6      | 8      | 22     | 212    | 650 kg           | 3,000   | 3.9 kg | 0.005mm    | 311022   | 867.27   |

## Interchangeable Points



### Features

Each holder comes with the 60° H insert and a point lever.

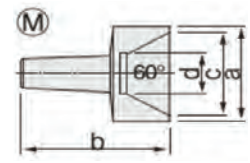
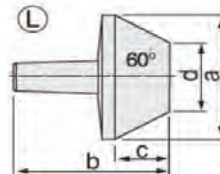
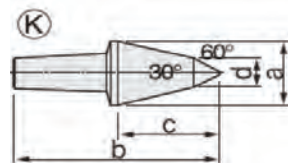
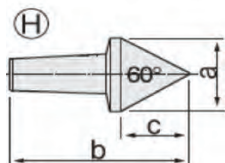
Other inserts available individually (see below)

- Accuracy for centre inner diameter guaranteed to 0.003mm
- Accuracy after point locking guaranteed to 0.005mm
- Mounting taper of point is 1/10



Disassembling Tool

| MT | Inserts            | a (mm) | b (mm) | c (mm) | d (mm) | Code No. | Price \$ |
|----|--------------------|--------|--------|--------|--------|----------|----------|
| 3  | H                  | 24     | 51.5   | 20     | -      | 311037   | 58.97    |
|    | K                  | 18     | 54     | 25     | 8      | 311038   | 58.97    |
|    | L                  | 45     | 51     | 17.5   | 25     | 311039   | 68.98    |
|    | M                  | 22     | 60     | 18     | 6.5    | 311040   | 148.46   |
|    | Disassembling Tool |        |        |        |        | 311068   | 28.79    |
| 4  | H                  | 28     | 61.5   | 23.5   | -      | 311041   | 78.79    |
|    | K                  | 26     | 73     | 36     | 12     | 311042   | 94.77    |
|    | L                  | 55     | 61.5   | 21.5   | 30.2   | 311043   | 110.74   |
|    | M                  | 40     | 55     | 35     | 16.5   | 311044   | 198.31   |
|    | Disassembling Tool |        |        |        |        | 311069   | 28.79    |
| 5  | H                  | 38     | 78     | 32     | -      | 311045   | 98.62    |
|    | K                  | 32     | 90     | 46     | 13     | 311046   | 118.63   |
|    | L                  | 70     | 74     | 20     | 40     | 311047   | 138.63   |
|    | M                  | 52     | 65     | 45     | 25.4   | 311048   | 249.20   |
|    | Disassembling Tool |        |        |        |        | 311070   | 28.79    |



# Skoda Heavy Duty Silver Line Live Centres — CSN 243324M



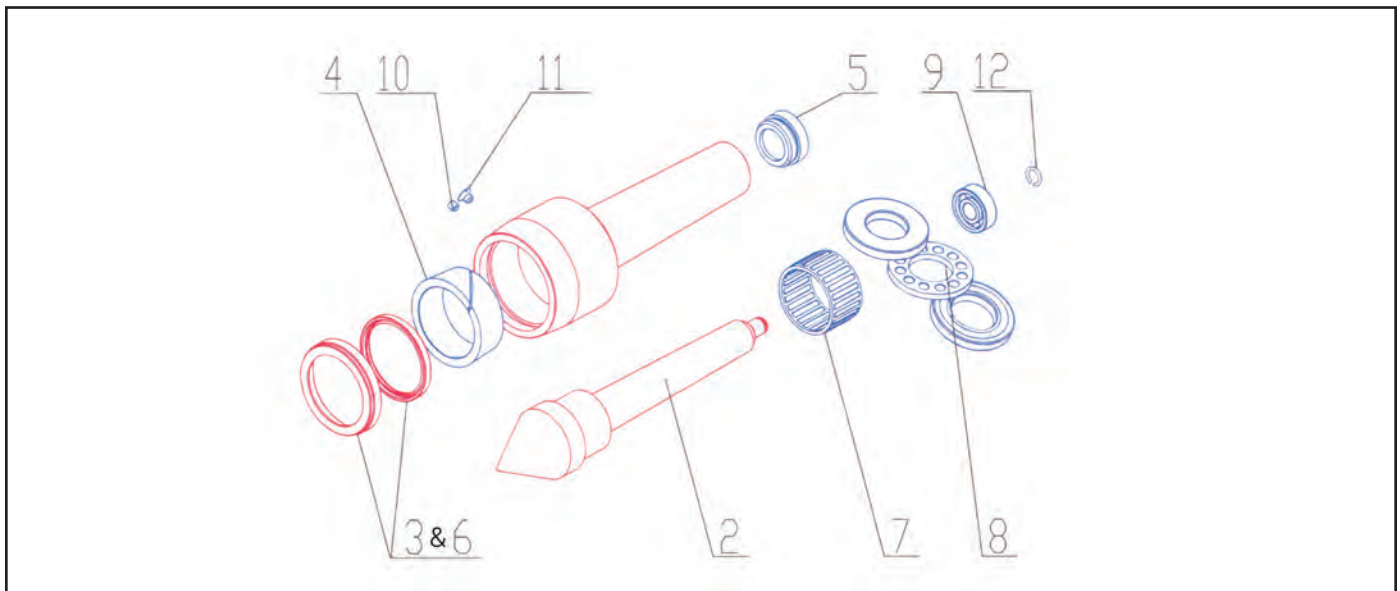
### Features

- The rotating spindle is extended right through the tapered shank
- Two specially designed adjustable needle-roller bearings carry all radial loads
- A heavy duty ball thrust bearing takes all axial thrust
- Complete protection of bearings form the ingress of coolant, dirt or swarf is provided by the built-in oil-seal, which also prevents loss of lubricant



| Centre      |             |                |                |                  |             |                              |                |          |              |          |
|-------------|-------------|----------------|----------------|------------------|-------------|------------------------------|----------------|----------|--------------|----------|
| Morse Taper | Point Angle | Body Dia. (in) | Body Dia. (in) | Body Length (in) | Maximum RPM | Maximum Weight of Work Piece | SKODA Code No. | Price \$ | STM Code No. | Price \$ |
| 1           | 60°         | 5/8            | 1-3/8          | 4-3/8            | 6,000       | 200 lb                       | 310105         | 258.51   | -            | -        |
| 2           | 60°         | 7/8            | 1-1/2          | 5                | 6,000       | 750 lb                       | 310110         | 323.41   | 320110       | 250.07   |
| 3           | 60°         | 1-1/8          | 1-7/8          | 6-1/4            | 5,000       | 880 lb                       | 310115         | 385.30   | 320115       | 297.93   |
| 4           | 60°         | 1-1/2          | 2-3/16         | 7-1/2            | 4,000       | 2860 lb                      | 310120         | 489.98   | 320120       | 378.81   |
| 5           | 60°         | 1-3/4          | 2-3/4          | 9-1/2            | 3,500       | 4400 lb                      | 310125         | 706.86   | 320125       | 546.55   |
| 6           | 60°         | 2-3/8          | 3-1/2          | 12-3/4           | 2,500       | 8800 lb                      | 310130         | 1,423.61 | -            | -        |

## PARTS FOR HEAVY DUTY LIVE CENTRES



## Parts For Heavy Duty Live Centres



| Morse Taper | 2-Point  |          | 3 & 6-Ring & Seal |          | 4-Sleeve |          | 5-End Plug |          | 7-Roller Bearing |          |
|-------------|----------|----------|-------------------|----------|----------|----------|------------|----------|------------------|----------|
|             | Code No. | Price \$ | Code No.          | Price \$ | Code No. | Price \$ | Code No.   | Price \$ | Code No.         | Price \$ |
| 2           | 310205M  | 192.31   | 310211            | 57.20    | 310215   | 136.05   | 310220     | 19.57    | 310230           | 90.22    |
| 3           | 310305M  | 198.59   | 310311            | 81.87    | 310315   | 152.29   | 310320     | 24.50    | 310330           | 136.99   |
| 4           | 310405M  | 260.35   | 310411            | 88.82    | 310415   | 168.98   | 310420     | 23.34    | 310430           | 148.05   |
| 5           | 310505M  | 388.82   | 310511            | 105.34   | 310515   | 235.97   | 310520     | 27.05    | 310530           | 186.81   |
| 6           | 310605M  | 720.15   | 310611            | 230.01   | 310615   | 310.26   | 310620     | 60.78    | 310630           | 324.44   |

| Morse Taper | 8-Thrust Bearing |          | 9-Ball Bearing |          | 10-Set Screw |          | 11-Slot Screw |          | 12-Ring  |          |
|-------------|------------------|----------|----------------|----------|--------------|----------|---------------|----------|----------|----------|
|             | Code No.         | Price \$ | Code No.       | Price \$ | Code No.     | Price \$ | Code No.      | Price \$ | Code No. | Price \$ |
| 2           | 310235           | 91.65    | 310240         | 50.91    | 310245       | 2.71     | 310250        | 3.03     | 310255   | 2.13     |
| 3           | 310335           | 105.49   | 310340         | 60.78    | 310345       | 2.71     | 310350        | 3.03     | 310355   | 2.71     |
| 4           | 310435           | 119.33   | 310440         | 63.01    | 310445       | 2.71     | 310450        | 2.50     | 310455   | 5.25     |
| 5           | 310535           | 148.45   | 310540         | 73.83    | 310545       | 2.71     | 310550        | 2.50     | 310555   | 5.25     |
| 6           | 310635           | 227.30   | 310640         | 87.83    | 310645       | 3.95     | 310650        | 3.95     | 310655   | 5.25     |

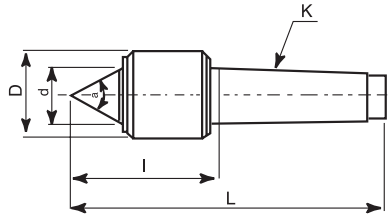


## Skoda Extra Heavy Duty Live Centres — CSN 243325



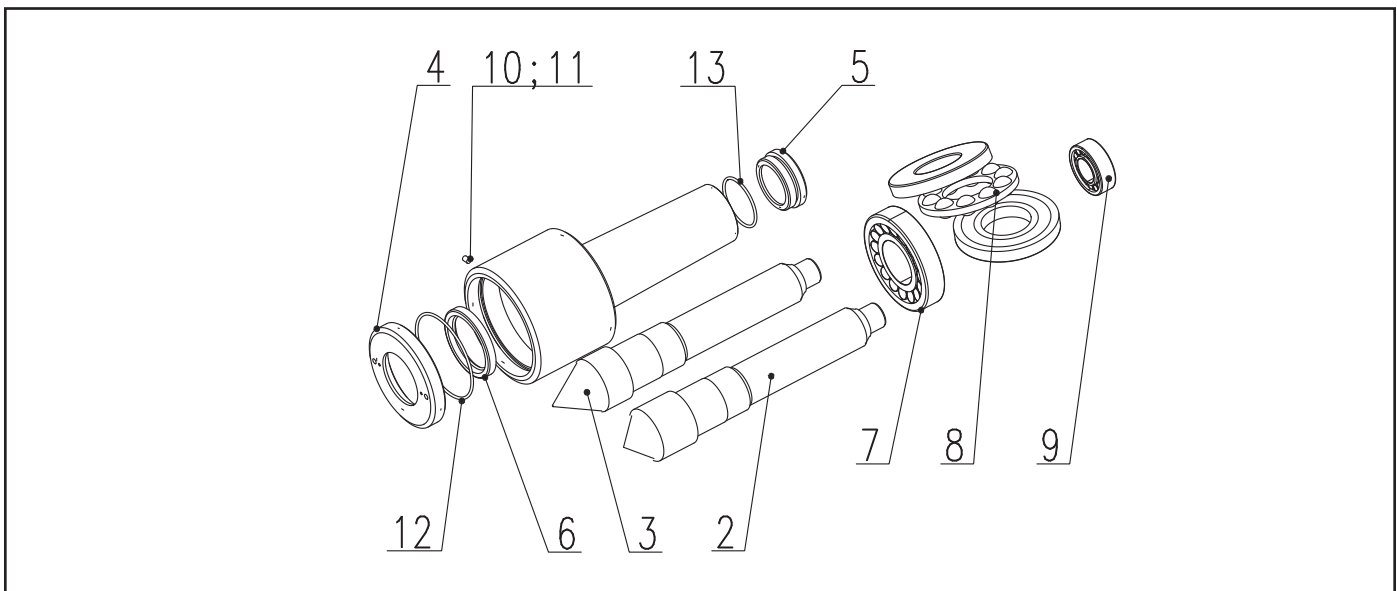
For clamping of heavy workpieces at lathes.

- The rigid structure and seating of the turning part is characterized by long service life
- The model EXTRA is commonly used for work at grinding machines
- Centres with the apex angle of 60° for reduction of deformations of the machine (tailstock, bed, headstock) from axial clamping forces
- The live centres are provided with shanks according to DIN 228 and ISO 296 (without clamping thread)



| Morse Taper | D (in.) | d (in.) | a   | l (in.) | L (in.) | Maximum RPM | Load (lb) | Weight (lb) | Code No. | Price \$ |
|-------------|---------|---------|-----|---------|---------|-------------|-----------|-------------|----------|----------|
| 4           | 3.14    | 1.58    | 60° | 4.10    | 7.85    | 3,200       | 3300      | 5           | 310920   | 2,013.00 |
| 5           | 3.54    | 1.65    | 60° | 5.60    | 9.48    | 2,700       | 5500      | 9           | 310925   | 2,483.32 |
| 6           | 4.92    | 2.16    | 60° | 6.42    | 13.38   | 1,900       | 11000     | 27          | 310930   | 4,695.09 |
| 7           | 5.70    | 2.56    | 60° | 7.80    | 15.25   | 1,600       | 17600     | 45          | 310935   | 8,164.31 |

## SPARE PARTS FOR EXTRA HEAVY DUTY LIVE CENTRES



### Spare Parts For Extra Heavy Duty Live Centres



| Parts No. | Description    | Code No. | Price \$ |
|-----------|----------------|----------|----------|
| MT 4-02   | 90° Point      | 310802   | 651.45   |
| 4-03      | 60° Point      | 310803   | 670.51   |
| 4-04      | Ring           | 310804   | 266.03   |
| 4-05      | End Plug       | 310805   | 9.35     |
| 4-06      | Sealing        | 310806   | 13.55    |
| 4-07      | Roller Bearing | 310807   | 192.41   |
| 4-08      | Thrust Bearing | 310808   | 271.18   |
| 4-09      | Radial Bearing | 310809   | 307.49   |
| 4-10      | Lock Screw     | 310810   | 2.39     |
| 4-11      | Packing Piece  | 310811   | 87.75    |
| 4-12      | Packing Ring   | 310812   | 3.48     |
| 4-13      | Packing Ring   | 310813   | 2.76     |
| MT 5-02   | 90° Point      | 310816   | 810.66   |
| 5-03      | 60° Point      | 310817   | 776.97   |
| 5-04      | Ring           | 310818   | 354.86   |
| 5-05      | End Plug       | 310819   | 24.21    |
| 5-06      | Sealing        | 310820   | 19.06    |
| 5-07      | Roller Bearing | 310821   | 287.48   |
| 5-08      | Thrust Bearing | 310822   | 322.25   |
| 5-09      | Radial Bearing | 310823   | 323.33   |
| 5-10      | Lock Screw     | 310824   | 2.39     |
| 5-11      | Packing Piece  | 310825   | 188.82   |
| 5-12      | Packing Ring   | 310826   | 4.33     |
| 5-13      | Packing Ring   | 310827   | 2.76     |

### Spare Parts For Extra Heavy Duty Live Centres



| Parts No. | Description    | Code No. | Price \$ |
|-----------|----------------|----------|----------|
| MT 6-02   | 90° Point      | 310830   | 1,896.80 |
| 6-03      | 60° Point      | 310831   | 1,966.70 |
| 6-04      | Ring           | 310832   | 220.95   |
| 6-05      | End Plug       | 310833   | 185.46   |
| 6-06      | Sealing        | 310834   | 24.21    |
| 6-07      | Roller Bearing | 310835   | 418.40   |
| 6-08      | Thrust Bearing | 310836   | 670.04   |
| 6-09      | Radial Bearing | 310837   | 501.35   |
| 6-10      | Lock Screw     | 310838   | 3.83     |
| 6-11      | Packing Piece  | 310839   | 385.68   |
| 6-12      | Packing Ring   | 310840   | 9.00     |
| 6-13      | Packing Ring   | 310841   | 2.39     |

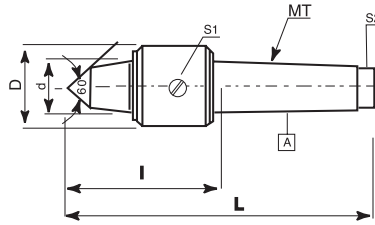
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## Skoda Precision CNC Silver Line Live Centres — CSN 243327-II

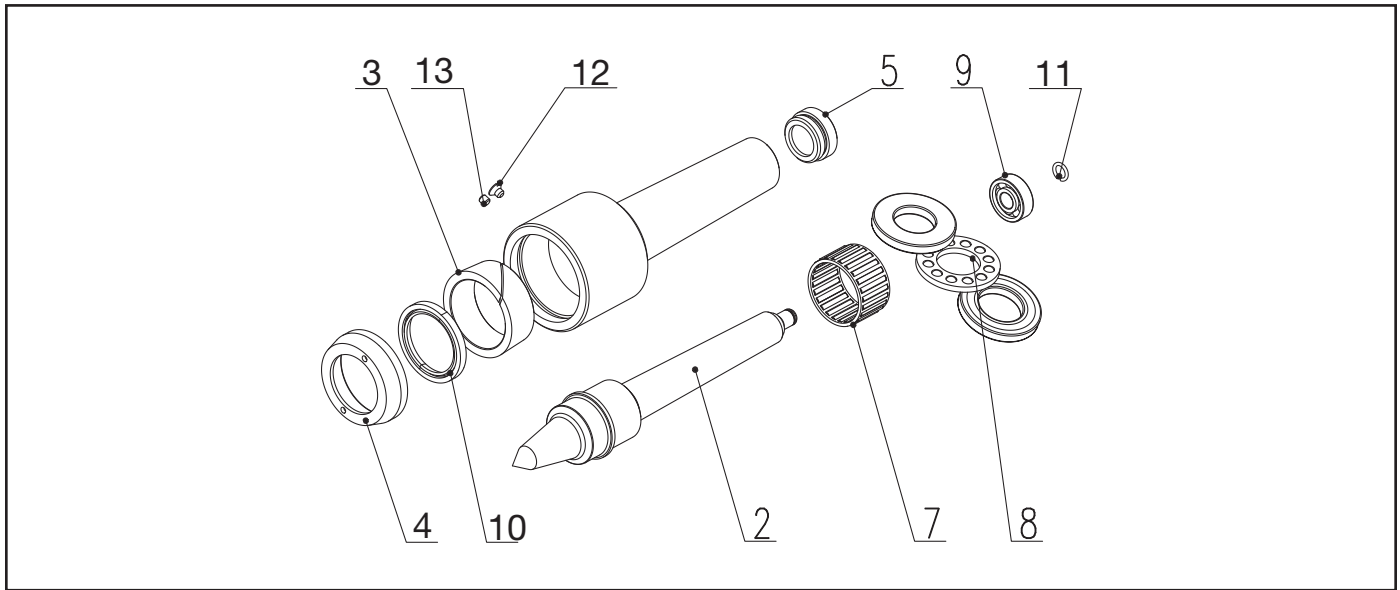


- The centres are intended for NC lathes. Their face parts are formed to allow easy access of the tool to the workpiece, which is an advantage with workpieces of complex shapes
- A special ring is used to set the radial clearance of the centre. It also prevents cutting lubricant from leaking into the centre bearing space, and so extends the centre's operational life
- Spindle-like point extends into shank where it is supported by a needle bearing, increasing rigidity, reducing point deflection and dampening vibration



| Morse Taper | D (in.) | d (in.) | L (in.) | l (in.) | Maximum RPM | Load (lb) | Code No. | Price \$ |
|-------------|---------|---------|---------|---------|-------------|-----------|----------|----------|
| 2           | 1.5     | 0.695   | 5.25    | 2.65    | 6,000       | 594       | 310010   | 613.96   |
| 3           | 1.85    | 0.750   | 6.75    | 3.50    | 5,000       | 704       | 310015   | 648.38   |
| 4           | 2.20    | 1.125   | 8.15    | 3.95    | 4,000       | 2200      | 310020   | 753.36   |
| 5           | 3.10    | 1.375   | 10.50   | 4.85    | 3,500       | 3520      | 310025   | 948.58   |

## SPARE PARTS FOR CNC LIVE CENTRES



### Spare Parts For CNC Live Centres



| Parts No. | Description       | Code No. | Price \$ |
|-----------|-------------------|----------|----------|
| MT 2-02   | Point             | 310855   | 540.55   |
| 2-03      | Ring              | 310857   | 134.78   |
| 2-05      | End Plug          | 310858   | 22.60    |
| 2-07      | Needle Bearing    | 310860   | 90.22    |
| 2-08      | Thrust Bearing    | 310861   | 105.49   |
| 2-09      | Radial Bearing    | 310862   | 180.44   |
| 2-11      | Snap Ring         | 310865   | 22.13    |
| 2-12      | Countersink Screw | 310863   | 2.87     |
| 2-13      | Lock Screw        | 310864   | 2.54     |
| MT 3-02   | Point             | 310869   | 928.91   |
| 3-03      | Ring              | 310871   | 140.83   |
| 3-05      | End Plug          | 310872   | 23.34    |
| 3-07      | Needle Bearing    | 310874   | 136.99   |
| 3-08      | Thrust Bearing    | 310875   | 121.72   |
| 3-09      | Radial Bearing    | 310876   | 180.90   |
| 3-11      | Snap Ring         | 310879   | 18.29    |
| 3-12      | Countersink Screw | 310877   | 3.99     |
| 3-13      | Lock Screw        | 310878   | 3.00     |

### Spare Parts For CNC Live Centres

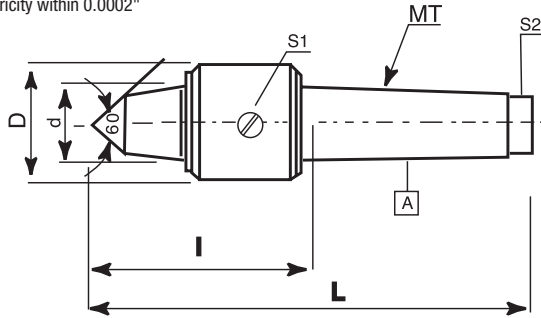


| Parts No. | Description       | Code No. | Price \$ |
|-----------|-------------------|----------|----------|
| MT 4-02   | Point             | 310882   | 1,021.11 |
| 4-03      | Ring              | 310884   | 168.36   |
| 4-05      | End Plug          | 310885   | 24.50    |
| 4-07      | Needle Bearing    | 310887   | 155.45   |
| 4-08      | Thrust Bearing    | 310888   | 136.99   |
| 4-09      | Radial Bearing    | 310889   | 199.84   |
| 4-11      | Snap Ring         | 310892   | 28.36    |
| 4-12      | Countersink Screw | 310890   | 4.03     |
| 4-13      | Lock Screw        | 310891   | 3.00     |
| MT 5-02   | Point             | 310895   | 1,304.32 |
| 5-03      | Ring              | 310897   | 157.76   |
| 5-05      | End Plug          | 310898   | 25.68    |
| 5-07      | Needle Bearing    | 310900   | 189.66   |
| 5-08      | Thrust Bearing    | 310901   | 164.54   |
| 5-09      | Radial Bearing    | 310902   | 291.65   |
| 5-11      | Snap Ring         | 310905   | 36.11    |
| 5-12      | Countersink Screw | 310903   | 3.99     |
| 5-13      | Lock Screw        | 310904   | 3.00     |

## Skoda Extended Point Silver Line Live Centres — CSN 243328



- Designed to keep dust, chips and coolant from coming inside the bearings
- Hardened and ground to 61-65 Rockwell
- Concentricity within 0.0002"



| Morse Taper | D (in.) | d (in.) | L (in.) | I (in.) | Maximum RPM | Load (lb) | Weight (lb) | Point Angle | Code No. | Price \$ |
|-------------|---------|---------|---------|---------|-------------|-----------|-------------|-------------|----------|----------|
| 2           | 1.417   | 0.866   | 5.059   | 2.560   | 6,000       | 594       | 0.79        | 60°         | 310160   | 355.17   |
| 3           | 1.850   | 1.181   | 6.575   | 3.386   | 5,000       | 704       | 1.85        | 60°         | 310165   | 421.90   |
| 4           | 2.165   | 1.378   | 8.169   | 4.094   | 4,000       | 2200      | 3.19        | 60°         | 310170   | 530.66   |
| 5           | 2.736   | 1.772   | 10.197  | 5.078   | 3,500       | 3960      | 7.04        | 60°         | 310175   | 694.52   |
| 6           | 3.504   | 2.362   | 13.425  | 6.319   | 2,500       | 7040      | 17.05       | 60°         | 310180   | 1,553.87 |

## Extended Points



| Morse Taper | Code No. | Price \$ |
|-------------|----------|----------|
| 2           | 310200   | 271.54   |
| 3           | 310300   | 300.58   |
| 4           | 310400   | 396.54   |
| 5           | 310500   | 540.17   |
| 6           | 310600   | 904.01   |

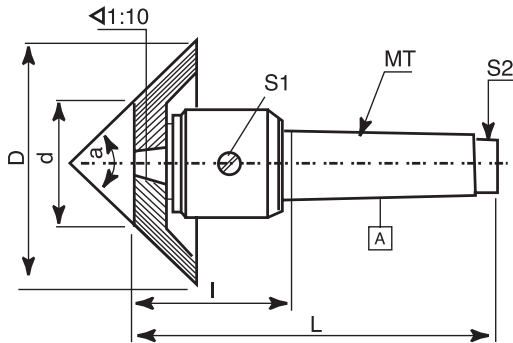


## Skoda Heavy Duty Bull Nose Silver Line Live Centres — CSN 243319



Designed to hold pipe and hollow work. Pipe head can be used as an all-round centre for light work. Two matched angular contact bearings preloaded at the factory. This achieves good thrust and radial capacities. Bearings are protected by a combination steel shield and neoprene seal.

- Accuracy:  $\pm 0.0001$ "



| Morse Taper | a   | D (in.) | d (in.) | L (in.) | I (in.) | Maximum RPM | Load (lb) | Weight (lb) | Code No. | Price \$ |
|-------------|-----|---------|---------|---------|---------|-------------|-----------|-------------|----------|----------|
| 3           | 60° | 3.150   | 1.378   | 6.380   | 3.189   | 5,000       | 880       | 4.62        | 310140   | 1,275.80 |
| 4           | 60° | 4.527   | 1.732   | 7.637   | 3.622   | 4,000       | 2860      | 9.68        | 310145   | 2,054.96 |
| 5           | 60° | 5.314   | 1.811   | 9.449   | 4.331   | 3,500       | 4400      | 17.60       | 310150   | 2,908.41 |
| 6           | 60° | 6.693   | 2.520   | 12.125  | 4.961   | 2,500       | 8800      | 51.70       | 310155   | 7,888.66 |

## Skoda Silver Line Live Centre Sets — CSN 243326



### Features

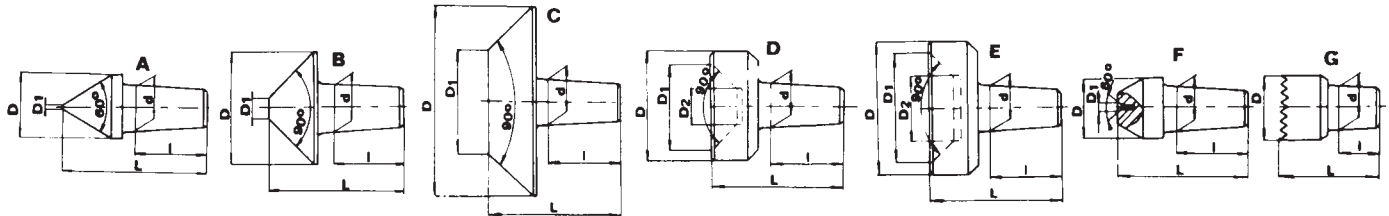
- The rotating spindle is extended right through the tapered shank
- Two specially designed adjustable needle-roller bearings carry all radial loads
- A heavy duty ball thrust bearing takes all axial thrust
- Complete protection of bearings from the ingress of coolant, dirt or swarf is provided by the built-in oil-seal, which also prevents loss of lubricant



| Morse Taper | All   |       | A     | B-G   | A     |       | B     |       | C     |       | D     |       |       | E     |       |       | F     |       | G     | Code No. | Price \$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|----------|
|             | d     | l     | L     | L     | D     | D1    | D     | D1    | D     | D1    | D     | D1    | D2    | D     | D1    | D2    | D     | D1    | D     |          |          |
| 3           | 0.590 | 0.984 | 1.968 | 1.771 | 0.787 | 0.019 | 1.417 | 0.236 | 2.480 | 1.299 | 1.417 | 1.102 | 0.472 | 1.771 | 1.496 | 0.866 | 0.787 | 0.098 | 0.984 | 310705   | 1,616.69 |
| 4           | 0.784 | 1.181 | 2.362 | 2.086 | 0.984 | 0.019 | 1.771 | 0.393 | 2.755 | 1.378 | 1.771 | 1.456 | 0.669 | 2.480 | 2.086 | 1.181 | 0.984 | 0.196 | 1.259 | 310710   | 1,984.95 |
| 5           | 0.984 | 1.496 | 2.874 | 2.559 | 1.259 | 0.039 | 2.204 | 0.551 | 3.149 | 1.496 | 2.204 | 1.732 | 0.787 | 2.775 | 2.362 | 1.417 | 1.259 | 0.196 | 1.771 | 310715   | 2,393.22 |
| 6           | 1.181 | 1.811 | 3.543 | 3.149 | 1.417 | 0.039 | 2.755 | 0.708 | 3.937 | 1.968 | 2.755 | 2.283 | 0.950 | 3.937 | 3.464 | 2.126 | 1.417 | 0.315 | 2.204 | 310720   | 3,911.30 |

| Morse Taper | Max Load (lb) |
|-------------|---------------|
| 3           | 880           |
| 4           | 2860          |
| 5           | 4400          |
| 6           | 8800          |

Maximum weight of workpiece is independent of the individual point being used.



## Parts For Skoda Live Centre Sets



| Morse Taper | Part A Code No. | Price \$ | Part B Code No. | Price \$ | Part C Code No. | Price \$ | Part D Code No. | Price \$ | Part E Code No. | Price \$ | Part F Code No. | Price \$ | Part G Code No. | Price \$ |
|-------------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|
| 3           | 310724          | 234.83   | 310726          | 339.22   | 310728          | 594.33   | 310730          | 355.93   | 310732          | 505.31   | 310734          | 368.89   | 310736          | 383.96   |
| 4           | 310744          | 261.68   | 310746          | 309.15   | 310748          | 594.83   | 310750          | 359.28   | 310752          | 547.84   | 310754          | 410.66   | 310756          | 416.93   |
| 5           | 310764          | 282.53   | 310766          | 399.47   | 310768          | 899.35   | 310770          | 412.68   | 310772          | 879.13   | 310774          | 475.85   | 310776          | 470.93   |
| 6           | 310784          | 457.26   | 310786          | 752.42   | 310788          | 1,192.77 | 310790          | 781.98   | 310792          | 1,135.91 | 310794          | 537.64   | 310796          | 631.24   |

## Additional Items For Skoda Live Centre Sets



| Morse Taper | Live Centre Only Code No. | Price \$ | Internal Point Code No. | Price \$ | Wooden Case Code No. | Price \$ | Drift Key Code No. | Price \$ |
|-------------|---------------------------|----------|-------------------------|----------|----------------------|----------|--------------------|----------|
| 3           | 310722                    | 641.35   | 310723                  | 166.05   | 310738               | 353.72   | 310740             | 346.91   |
| 4           | 310742                    | 733.59   | 310743                  | 189.05   | 310758               | 405.15   | 310760             | 366.98   |
| 5           | 310762                    | 1,063.91 | 310763                  | 229.94   | 310778               | 460.70   | 310780             | 393.57   |
| 6           | 310782                    | 1,993.13 | 310783                  | 333.88   | 310798               | 520.40   | 310800             | 477.95   |

## STM Carbide Tipped Dead Lathe Centre



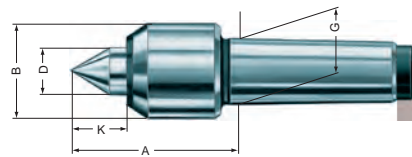
With Morse Taper. Included angle is 60°. They are precision made, hardened and ground to closest tolerances.



| Morse Taper | Length  | Code No. | Price \$ |
|-------------|---------|----------|----------|
| 1           | 3-3/16  | 420905   | 122.60   |
| 2           | 3-15/16 | 420910   | 125.48   |
| 3           | 4-15/16 | 420915   | 183.84   |
| 4           | 6-5/16  | 420920   | 263.54   |
| 5           | 7-7/8   | 420925   | 355.40   |
| 6           | 11      | 420930   | 605.16   |

## Standard Live Centres 60° Type 600

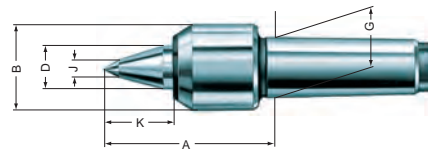
- With small casing diameter



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | D (mm) | G (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|----------|----------|
| 2           | 005336      | 200                        | 0.005                         | 7000     | 62     | 32     | 15     | 17.780 | 18     | 392410   | 369.73   |
| 3           | 005429      | 400                        | 0.005                         | 7000     | 62     | 34     | 15     | 23.825 | 18     | 392415   | 381.71   |
| 4           | 005469      | 800                        | 0.005                         | 6300     | 75.5   | 42     | 20     | 31.267 | 25     | 392425   | 509.40   |
| 5           | 005490      | 1600                       | 0.01                          | 4300     | 104    | 58     | 30     | 44.399 | 34     | 392430   | 734.16   |
| 6           | 005547      | 3500                       | 0.02                          | 3000     | 143    | 80     | 42     | 63.348 | 49     | 392435   | 1,472.32 |

## Extended Live Centres 60° Type 600-20

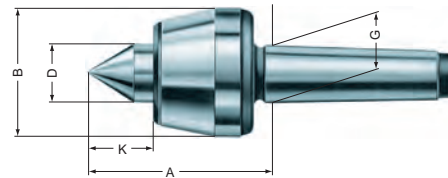
- With extended live centre



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | D (mm) | G (mm) | J (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|--------|----------|----------|
| 2           | 362080      | 170                        | 0.008                         | 7000     | 73     | 32     | 15     | 17.780 | 10     | 29     | 392440   | 444.22   |
| 3           | 362081      | 340                        | 0.008                         | 7000     | 74     | 34     | 15     | 23.825 | 11     | 30     | 392445   | 460.17   |
| 4           | 362082      | 700                        | 0.008                         | 6300     | 88.5   | 42     | 20     | 31.237 | 13     | 38     | 392450   | 610.47   |
| 5           | 362083      | 1400                       | 0.01                          | 4300     | 119    | 58     | 30     | 44.399 | 14     | 49     | 392455   | 881.78   |
| 6           | 362084      | 3000                       | 0.02                          | 3000     | 164    | 80     | 42     | 63.348 | 18     | 70     | 392460   | 1,768.90 |

## Hardened And Ground Live Centres 60° Type 604 H

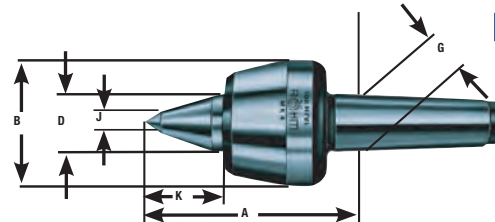
- Body hardened and ground



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | D (mm) | G (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|----------|----------|
| 1           | 043400      | 100                        | 0.005                         | 7000     | 60.5   | 36     | 15     | 12.065 | 17     | 392465   | 456.19   |
| 2           | 043115      | 200                        | 0.005                         | 7000     | 65     | 45     | 20     | 17.780 | 24     | 392470   | 456.19   |
| 3           | 042315      | 400                        | 0.005                         | 6300     | 70.05  | 50     | 22     | 23.825 | 27.5   | 392475   | 473.48   |
| 3           | 042776      | 500                        | 0.005                         | 5000     | 79.5   | 60     | 25     | 23.825 | 31     | 392485   | 555.94   |
| 4           | 042175      | 800                        | 0.005                         | 3800     | 102.5  | 70     | 32     | 31.267 | 41     | 392490   | 635.73   |
| 5           | 042843      | 2000                       | 0.005                         | 3000     | 129    | 90     | 40     | 44.399 | 50.5   | 392500   | 921.69   |
| 6           | 043532      | 3500                       | 0.01                          | 2600     | 152    | 105    | 50     | 63.348 | 57.5   | 392515   | 1,847.38 |
| 6           | 093439      | 4500                       | 0.01                          | 1500     | 196    | 140    | 60     | 63.348 | 67     | 392520   | 3,571.05 |
| m80         | 093440      | 7500                       | 0.015                         | 1500     | 196    | 140    | 60     | 80.000 | 68     | 392525   | 4,635.05 |

## Extended Live Centres 60° Type 604 HVL

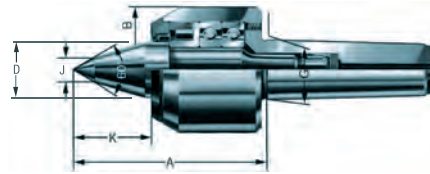
- With extended live centre



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | D (mm) | G (mm) | J (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|--------|----------|----------|
| 1           | 058668      | 80                         | 0.01                          | 7000     | 70.5   | 36     | 15     | 12.065 | 9      | 27     | 392565   | 547.96   |
| 2           | 058669      | 140                        | 0.005                         | 7000     | 75     | 45     | 20     | 17.780 | 10     | 34     | 392570   | 547.96   |
| 3           | 058670      | 400                        | 0.005                         | 5000     | 95.5   | 60     | 25     | 23.825 | 12     | 47     | 392575   | 670.32   |
| 4           | 058671      | 500                        | 0.005                         | 3800     | 114.5  | 70     | 32     | 31.267 | 14     | 53     | 392580   | 768.75   |
| 5           | 058672      | 1200                       | 0.005                         | 3000     | 143.5  | 90     | 40     | 44.399 | 16     | 65     | 392585   | 1,105.23 |
| 6           | 058673      | 2500                       | 0.01                          | 2600     | 172.5  | 105    | 50     | 63.348 | 18     | 78     | 392590   | 2,217.10 |

## High Load High Speed Live Centres 60° Type 640-20

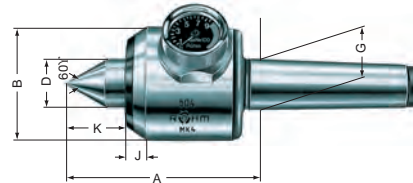
- For high load and high speeds



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | D (mm) | G (mm) | J (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|--------|----------|----------|
| 4           | 303598      | 1000                       | 0.005                         | 7000     | 122    | 70     | 32     | 31.267 | 16     | 44     | 392900   | 1,592.01 |
| 5           | 303599      | 2000                       | 0.005                         | 6000     | 150    | 95     | 42     | 44.399 | 20     | 59     | 392930   | 2,295.58 |
| 6           | 301696      | 3000                       | 0.005                         | 4800     | 180    | 120    | 58     | 63.348 | 26     | 77     | 392935   | 4,608.44 |

## Revolving Tailstock Centres 60° Type 652-AC

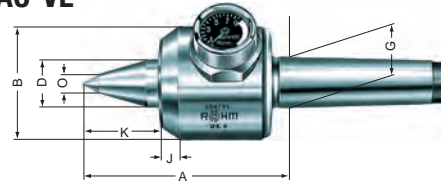
- With pressure display and length compensation, as counter centre for constant face drivers



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. Axial Load (kg) | Spring Way (mm) | A (mm) | B (mm) | D (mm) | G (mm) | J (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------------------|-----------------|--------|--------|--------|--------|--------|--------|----------|----------|
| 3           | 060798      | 400                        | 0.01                          | 550                  | 1.6             | 105    | 64     | 25     | 23.825 | 12     | 31.5   | 392945   | 1,550.78 |
| 4           | 060874      | 800                        | 0.01                          | 900                  | 2               | 123.5  | 72     | 32     | 31.267 | 15     | 39     | 392965   | 1,873.97 |
| 5           | 060906      | 1600                       | 0.01                          | 1500                 | 1.8             | 160.5  | 95     | 40     | 44.399 | 16     | 49     | 392985   | 2,453.85 |
| 6           | 060915      | 3200                       | 0.015                         | 2000                 | 2.7             | 202    | 120    | 52     | 63.348 | 23     | 59     | 393005   | 4,264.53 |

## Revolving Tailstock Extended Point Centres 60° Type 652-AC-VL

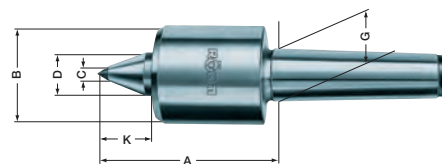
- Extended point with pressure display and length compensation, as counter centre for constant face drivers



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. Axial Load (kg) | Spring Way (mm) | A (mm) | B (mm) | D (mm) | G (mm) | J (mm) | K (mm) | O (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|----------|----------|
| 3           | 079920      | 260                        | 0.01                          | 550                  | 1.6             | 120    | 64     | 25     | 23.825 | 12     | 46.5   | 11     | 393025   | 1,856.68 |
| 4           | 079921      | 550                        | 0.01                          | 900                  | 2               | 137.5  | 72     | 32     | 31.267 | 15     | 53     | 14     | 393030   | 1,683.70 |
| 5           | 079922      | 1100                       | 0.01                          | 1500                 | 1.8             | 177.5  | 95     | 40     | 44.399 | 16     | 66     | 15     | 393035   | 2,947.27 |
| 6           | 079923      | 2500                       | 0.015                         | 2000                 | 2.7             | 223    | 120    | 52     | 63.348 | 23     | 80     | 24     | 393040   | 5,145.77 |

## Revolving Tailstock Extended NC Centres 60° Type 664

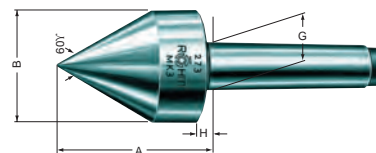
- Extended NC-centre with carbide insert, for high speed, powerful, for small and medium components



| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | Max. RPM | A (mm) | B (mm) | C (mm) | D (mm) | G (mm) | K (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|----------|--------|--------|--------|--------|--------|--------|----------|----------|
| 2           | 772389      | 100                        | 0.01                          | 12000    | 99     | 45     | 7      | 20     | 17.780 | 40     | 393048   | 1,099.90 |
| 3           | 772390      | 100                        | 0.01                          | 12000    | 99     | 45     | 7      | 20     | 23.825 | 40     | 393049   | 1,143.81 |
| 4           | 772391      | 250                        | 0.01                          | 9000     | 141    | 66     | 11     | 32     | 31.267 | 63     | 393051   | 1,526.84 |
| 5           | 772392      | 250                        | 0.01                          | 9000     | 141    | 66     | 11     | 32     | 44.399 | 63     | 393052   | 2,217.10 |

## Revolving Centre Tapers 60° Type 627

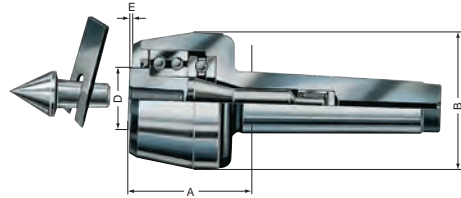
- Revolving centering taper, pointed. As centering taper for tubular workpieces and as a revolving tailstock centre to machine normal workpieces



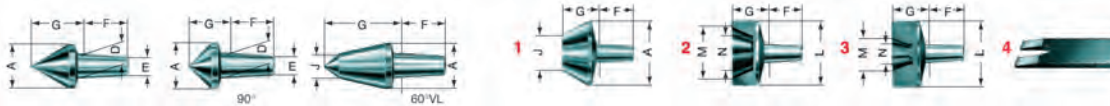
| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | Max. Concentricity Error (mm) | A (mm) | B (mm) | G (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|-------------------------------|--------|--------|--------|----------|----------|
| 2           | 010613      | 200                        | 0.01                          | 61     | 42     | 17.780 | 393335   | 718.19   |
| 3           | 010635      | 400                        | 0.008                         | 79     | 46     | 23.825 | 393340   | 751.44   |
| 4           | 010638      | 800                        | 0.008                         | 100    | 64     | 31.267 | 393345   | 790.03   |
| 5           | 010642      | 1600                       | 0.008                         | 115.5  | 78     | 44.399 | 393355   | 1,181.05 |

## Live Centres Sets Type 614

- Revolving tailstock centres for interchangeable inserts



| Morse Taper | Max Workpiece Weight (kg) | Max Concentricity Error (mm) | A (mm) | B (mm) | D (mm) | E (mm) | Centre Without Inserts |          |          | Complete Set In Wooden Case |          |          |
|-------------|---------------------------|------------------------------|--------|--------|--------|--------|------------------------|----------|----------|-----------------------------|----------|----------|
|             |                           |                              |        |        |        |        | Rohm Id No.            | Code No. | Price \$ | Rohm Id No.                 | Code No. | Price \$ |
| 2 -Size 102 | 40                        | 0.01                         | 45     | 45     | 20     | 4      | 061030                 | 392610   | 456.19   | 061702                      | 392640   | 1,142.48 |
| 3 -Size 104 | 130                       | 0.01                         | 48     | 50     | 22     | 4.5    | 061031                 | 392615   | 473.48   | 061703                      | 392645   | 1,296.76 |
| 3 -Size 106 | 150                       | 0.01                         | 55     | 60     | 25     | 5      | 061032                 | 392620   | 555.94   | 061704                      | 392650   | 1,464.34 |
| 4 -Size 108 | 250                       | 0.01                         | 67     | 70     | 32     | 5      | 061038                 | 392625   | 635.73   | 061705                      | 392655   | 1,710.37 |
| 5 -Size 110 | 650                       | 0.01                         | 85     | 90     | 40     | 6      | 061039                 | 392630   | 921.69   | 061706                      | 392660   | 2,261.00 |
| 6 -Size 114 | 900                       | 0.015                        | 101    | 105    | 50     | 6      | 061040                 | 392635   | 1,847.38 | -                           | -        | -        |



## Interchangeable Inserts 60°



| Size | Rohm Id No. | A (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 070725      | 16     | 7      | 5.2    | 18     | 20     | 392665   | 59.85    |
| 104  | 070728      | 20     | 12     | 9.6    | 24     | 24     | 392670   | 71.82    |
| 106  | 070731      | 24     | 12     | 9.6    | 24     | 27.5   | 392675   | 82.23    |
| 108  | 070734      | 28     | 15     | 12     | 30     | 31.5   | 392680   | 95.77    |
| 110  | 070737      | 38     | 22     | 18.5   | 35     | 43     | 392685   | 118.37   |
| 114  | 070740      | 50     | 28     | 24     | 40     | 54     | 392690   | 167.58   |

## Interchangeable Inserts #1



| Size | Rohm Id No. | A (mm) | D (mm) | E (mm) | F (mm) | G (mm) | J (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 070700      | 25     | 7      | 5.2    | 18     | 21     | 10     | 392785   | 83.80    |
| 104  | 070701      | 35     | 12     | 9.6    | 24     | 26     | 15     | 392790   | 99.76    |
| 106  | 070702      | 45     | 12     | 9.6    | 24     | 27     | 25     | 392795   | 117.03   |
| 108  | 070703      | 55     | 15     | 12     | 30     | 31.5   | 30     | 392800   | 133.00   |
| 110  | 070704      | 70     | 22     | 18.5   | 35     | 39     | 40     | 392805   | 167.58   |
| 114  | 070705      | 100    | 28     | 24     | 40     | 52     | 55     | 392810   | 234.09   |

## Interchangeable Inserts 90°



| Size | Rohm Id No. | A (mm) | D (mm) | E (mm) | F (mm) | G (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 070727      | 16     | 7      | 5.2    | 18     | 14.5   | 392725   | 59.85    |
| 104  | 070730      | 20     | 12     | 9.6    | 24     | 16.5   | 392730   | 71.82    |
| 106  | 070733      | 24     | 12     | 9.6    | 24     | 19     | 392735   | 83.80    |
| 108  | 070736      | 28     | 15     | 12     | 30     | 21.5   | 392740   | 95.77    |
| 110  | 070739      | 38     | 22     | 18.5   | 35     | 29     | 392745   | 118.37   |
| 114  | 070742      | 50     | 28     | 24     | 40     | 36     | 392750   | 167.58   |

## Interchangeable Inserts #2



| Size | Rohm Id No. | D (mm) | E (mm) | F (mm) | G (mm) | L (mm) | M (mm) | N (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 070707      | 7      | 5.2    | 18     | 18     | 25     | 20     | 10     | 392815   | 176.89   |
| 104  | 070708      | 12     | 9.6    | 24     | 24     | 35     | 30     | 15     | 392825   | 214.13   |
| 106  | 070709      | 12     | 9.6    | 24     | 25     | 45     | 40     | 25     | 392835   | 250.04   |
| 108  | 070710      | 15     | 12     | 30     | 30     | 55     | 48     | 30     | 392845   | 285.94   |
| 110  | 070711      | 22     | 18.5   | 35     | 39     | 70     | 63     | 40     | 392855   | 353.77   |
| 114  | 070712      | 28     | 24     | 40     | 42     | 100    | 90     | 55     | 392865   | 500.07   |

## Interchangeable Inserts 60° VL



| Size | Rohm Id No. | A (mm) | D (mm) | E (mm) | F (mm) | G (mm) | J (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 070719      | 14     | 7      | 5.2    | 18     | 25     | 6      | 392755   | 71.82    |
| 104  | 070720      | 18     | 12     | 9.6    | 24     | 30     | 8      | 392765   | 91.77    |
| 106  | 070720      | 18     | 12     | 9.6    | 24     | 30     | 8      | 392765   | 91.77    |
| 108  | 070721      | 26     | 15     | 12     | 30     | 43     | 12     | 392770   | 113.00   |
| 110  | 070722      | 32     | 22     | 18.5   | 35     | 55     | 13     | 392775   | 142.30   |
| 114  | 070723      | 42     | 28     | 24     | 40     | 70     | 18.5   | 392780   | 199.50   |

## Interchangeable Inserts #3



| Size | Rohm Id No. | D (mm) | E (mm) | F (mm) | G (mm) | L (mm) | M (mm) | N (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|--------|--------|----------|----------|
| 102  | 228620      | 7      | 5.2    | 18     | 12     | 16     | 12     | 6      | 392820   | 147.64   |
| 104  | 228621      | 12     | 9.6    | 24     | 16     | 22     | 18     | 10     | 392830   | 178.23   |
| 106  | 228621      | 12     | 9.6    | 24     | 16     | 22     | 18     | 10     | 392830   | 178.23   |
| 108  | 228622      | 15     | 12     | 30     | 25     | 40     | 35     | 20     | 392850   | 239.40   |
| 110  | 308632      | 22     | 18.5   | 35     | 30     | 52     | 45     | 30     | 392860   | 299.25   |

## Extractor #4



| Size | Rohm Id No. | Code No. | Price \$ |
|------|-------------|----------|----------|
| 102  | 061707      | 392870   | 34.59    |
| 104  | 061708      | 392875   | 34.59    |
| 106  | 061708      | 392875   | 34.59    |
| 108  | 061708      | 392875   | 34.59    |
| 110  | 061709      | 392880   | 34.59    |
| 114  | 061709      | 392880   | 34.59    |

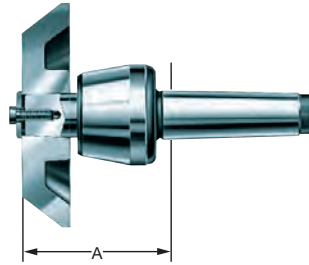
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## Revolving Centering Tapers Type 608-00



- Revolving tailstock centre
- See adjacent chart for insert attachments (AZ-75° & AZR-75°)

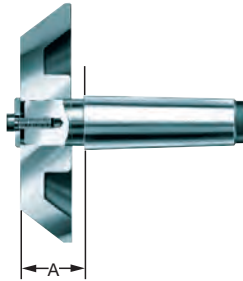


| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | A (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|--------|----------|----------|
| 4           | 304562      | 800                        | 103    | 393045   | 956.26   |
| 5           | 304563      | 1600                       | 128    | 393050   | 1,381.87 |
| 6           | 304564      | 3000                       | 159    | 393055   | 2,753.10 |

## Fixed Shaft Centering Tapers Type 698-00



- Fixed shaft
- See adjacent for insert attachments (AZ-75° & AZR-75°)



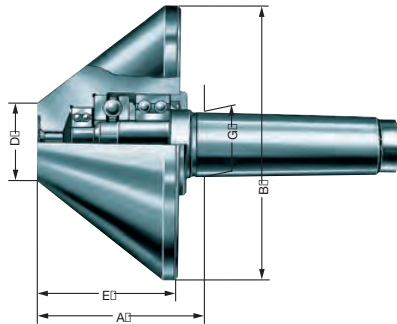
| Morse Taper | Rohm Id No. | Max. Workpiece Weight (kg) | A (mm) | Code No. | Price \$ |
|-------------|-------------|----------------------------|--------|----------|----------|
| 4           | 304580*     | 2000                       | 45     | 393060   | 319.20   |
| 5           | 304581*     | 4800                       | 60     | 393070   | 461.50   |
| 6           | 304582*     | 12000                      | 70     | 393080   | 924.34   |

\* Including fixing screw and washer, without insert

## Revolving Tailstock Centres 60° Type 617

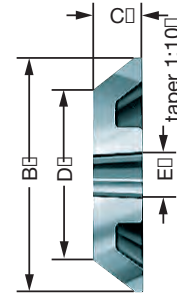
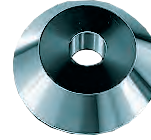


- Revolving tailstock centre



| Morse Tape | Rohm Id No. | Max Workpiece Weight kg | Max Concentricity Error (mm) | A (mm) | B (mm) | D (mm) | E (mm) | Code No. | Price \$ |
|------------|-------------|-------------------------|------------------------------|--------|--------|--------|--------|----------|----------|
| 1          | 301615      | 100                     | 0.008                        | 64     | 50     | 20     | 52     | 393235   | 404.63   |
| 2          | 301616      | 200                     | 0.008                        | 65     | 50     | 20     | 52     | 393240   | 651.70   |
| 2          | 301556      | 300                     | 0.008                        | 77     | 80     | 30     | 64     | 393245   | 718.19   |
| 3          | 301557      | 400                     | 0.008                        | 77     | 80     | 30     | 64     | 393250   | 751.44   |
| 4          | 301558      | 400                     | 0.008                        | 78.5   | 80     | 30     | 64     | 393255   | 790.03   |
| 3          | 221605      | 600                     | 0.008                        | 96.5   | 120    | 30     | 83     | 393260   | 941.64   |
| 4          | 044023      | 800                     | 0.008                        | 98     | 120    | 30     | 83     | 393265   | 985.52   |
| 5          | 090483      | 800                     | 0.008                        | 99     | 120    | 30     | 83     | 393270   | 1,175.00 |

## Insert Attachments Type AZ-75°



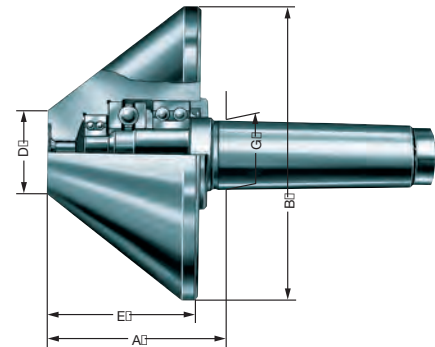
| Size of Insert | For M.T. | Rohm Id No. | B (mm) | C (mm) | D (mm) | E (mm) | Code No. | Price \$ |
|----------------|----------|-------------|--------|--------|--------|--------|----------|----------|
| 1              | 4        | *304565     | 60     | 68     | 5      | 32     | 393090   | 359.10   |
| 2              | 4        | 304566      | 100    | 45     | 45     | 32     | 393095   | 538.66   |
| 3              | 4        | 304567      | 150    | 45     | 95     | 32     | 393100   | 804.64   |
| 4              | 4        | 304568      | 200    | 45     | 145    | 32     | 393105   | 1,214.29 |
| 5              | 4        | 304569      | 250    | 45     | 195    | 32     | 393110   | 1,830.07 |
| 1              | 5        | 304570      | 100    | 43     | 45     | 40     | 393135   | 646.39   |
| 2              | 5        | 304571      | 150    | 43     | 95     | 40     | 393140   | 969.57   |
| 3              | 5        | 304572      | 200    | 43     | 145    | 40     | 393145   | 1,455.03 |
| 4              | 5        | 304573      | 250    | 43     | 195    | 40     | 393150   | 2,199.82 |
| 5              | 5        | 304574      | 300    | 43     | 245    | 40     | 393155   | 3,263.82 |
| 1              | 6        | 304575      | 150    | 54     | 95     | 50     | 393185   | 1,165.09 |
| 2              | 6        | 304576      | 200    | 54     | 145    | 50     | 393190   | 1,747.62 |
| 3              | 6        | 304577      | 250    | 54     | 195    | 50     | 393195   | 2,621.43 |
| 4              | 6        | 304578      | 300    | 54     | 245    | 50     | 393200   | 3,923.50 |
| 5              | 6        | 304579      | 350    | 54     | 295    | 50     | 393205   | 5,883.93 |

\* Without fixing screw and washer

## Revolving Tailstock Centres 75° Type 618



- Revolving tailstock centre



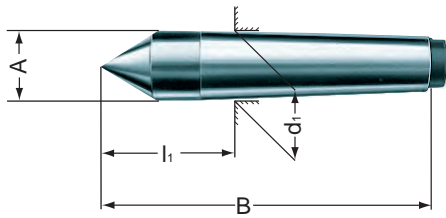
| Morse Taper | Rohm Id No. | Max Workpiece Weight kg | Max Concentricity Error (mm) | A (mm) | B (mm) | D (mm) | E (mm) | Code No. | Price \$ |
|-------------|-------------|-------------------------|------------------------------|--------|--------|--------|--------|----------|----------|
| 2           | 301559      | 300                     | 0.008                        | 80     | 80     | 20     | 67     | 393275   | 718.19   |
| 3           | 301560      | 400                     | 0.008                        | 80     | 80     | 20     | 67     | 393280   | 751.44   |
| 4           | 301561      | 400                     | 0.008                        | 81.5   | 80     | 20     | 67     | 393285   | 790.03   |
| 3           | 062211      | 600                     | 0.008                        | 85.5   | 120    | 30     | 72     | 393290   | 941.64   |
| 4           | 062224      | 800                     | 0.008                        | 87     | 120    | 30     | 72     | 393295   | 985.52   |
| 5           | 062232      | 800                     | 0.008                        | 88     | 120    | 30     | 72     | 393300   | 1,181.05 |
| 4           | 062299      | 1200                    | 0.01                         | 107    | 170    | 50     | 90     | 393305   | 1,979.05 |
| 5           | 063614      | 1600                    | 0.01                         | 106    | 170    | 50     | 90     | 393310   | 2,358.08 |
| 6           | 063633      | 1600                    | 0.01                         | 107.5  | 170    | 50     | 90     | 393315   | 2,358.08 |
| 5           | 063662      | 2000                    | 0.01                         | 146.5  | 250    | 75     | 130    | 393320   | 4,732.14 |
| 6           | 063656      | 2000                    | 0.01                         | 148    | 250    | 75     | 130    | 393325   | 4,732.14 |
| 6           | 063680      | 4000                    | 0.015                        | 184    | 350    | 120    | 168    | 393330   | 9,481.57 |



## Dead Centres Type 665



- Full point
- Completely hardened and ground
- Material: tool steel

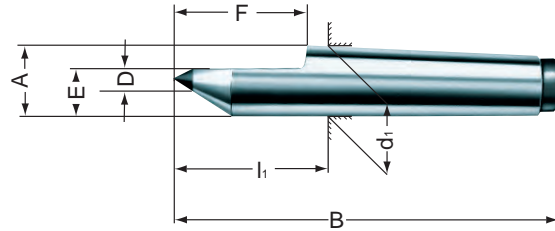


| Morse Taper | Rohm Id No. | A (mm) | B (mm) | d1 (mm) | l1 (mm) | Code No. | Price \$ |
|-------------|-------------|--------|--------|---------|---------|----------|----------|
| 0           | 013706      | 9.2    | 70     | 9.045   | 20      | 394045   | 71.82    |
| 1           | 013707      | 12.2   | 80     | 12.065  | 26.5    | 394050   | 50.89    |
| 2           | 013709      | 18     | 100    | 17.780  | 36      | 394055   | 71.82    |
| 3           | 013711      | 24.1   | 125    | 23.825  | 44      | 394060   | 95.77    |
| 4           | 013712      | 31.6   | 160    | 31.267  | 57.5    | 394065   | 130.34   |
| 5           | 013715      | 44.7   | 200    | 44.399  | 70.5    | 394070   | 239.40   |
| 6           | 013718      | 63.8   | 270    | 63.348  | 88      | 394075   | 597.17   |

## Dead Centres Type 670



- Half point, carbide tipped
- Completely hardened and ground

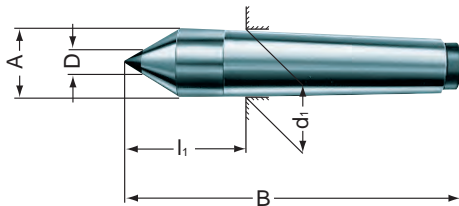


| M.T. | Rohm Id No. | A (mm) | B (mm) | D (mm) | E (mm) | F (mm) | d1 (mm) | l1 (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|--------|--------|--------|---------|---------|----------|----------|
| 2    | 027439      | 18     | 100    | 7      | 11     | 30     | 17.780  | 36      | 394210   | 266.00   |
| 3    | 027440      | 24.1   | 125    | 11     | 15     | 38     | 23.825  | 44      | 394215   | 353.77   |
| 4    | 026571      | 31.6   | 160    | 14     | 21     | 50     | 31.267  | 57.5    | 394220   | 500.07   |
| 5    | 027441      | 44.7   | 200    | 18     | 29.4   | 63     | 44.399  | 70.5    | 394225   | 899.08   |

## Dead Centres Type 667



- Full point, carbide tipped
- Completely hardened and ground

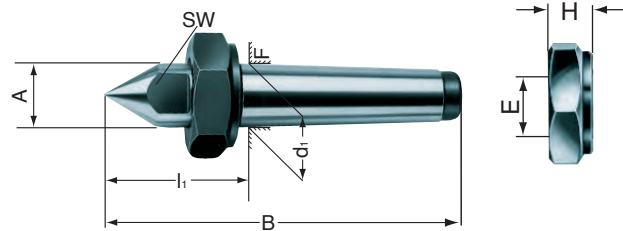


| Morse Taper | Rohm Id No. | A (mm) | B (mm) | D (mm) | d1 (mm) | L1 (mm) | Code No. | Price \$ |
|-------------|-------------|--------|--------|--------|---------|---------|----------|----------|
| 3           | 017172      | 24.1   | 125    | 11     | 23.825  | 44      | 394130   | 239.40   |
| 4           | 017173      | 31.6   | 160    | 14     | 31.267  | 57.5    | 394135   | 331.17   |
| 5           | 017174      | 44.7   | 200    | 18     | 44.399  | 70.5    | 394140   | 597.17   |

## Dead Centres Type 671



- Full point with draw-off nut
- Completely hardened and ground

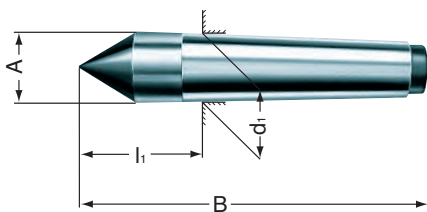


| M.T. | Rohm Id No. | A (mm) | B (mm) | SW (mm) | E (mm)    | F (mm) | d1 (mm) | l1 (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|---------|-----------|--------|---------|---------|----------|----------|
| 3    | 005654      | 24.1   | 138    | 19      | M27 x 1.5 | 41     | 23.825  | 57      | 394240   | 146.31   |
| 4    | 005357      | 31.6   | 175    | 27      | M36 x 1.5 | 55     | 31.267  | 72.5    | 394245   | 198.17   |
| 5    | 005381      | 44.7   | 217    | 36      | M48 x 1.5 | 75     | 44.399  | 87.5    | 394250   | 372.40   |
| 6    | 005426      | 63.8   | 290    | 55      | M68 x 1.5 | 100    | 63.348  | 108     | 394255   | 989.53   |

## Dead Centres Type 677



- Full point, carbide tipped
- Completely hardened and ground

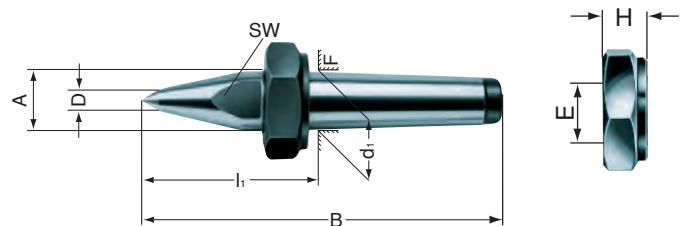


| Morse Taper | Rohm Id No. | A (mm) | B (mm) | d1 (mm) | l1 (mm) | Code No. | Price \$ |
|-------------|-------------|--------|--------|---------|---------|----------|----------|
| 2           | 326786      | 18     | 100    | 17.780  | 36      | 394150   | 353.77   |
| 3           | 306402      | 24.1   | 125    | 23.825  | 44      | 394155   | 473.48   |
| 4           | 221398      | 31.6   | 160    | 31.267  | 57.5    | 394160   | 668.99   |
| 5           | 326816      | 44.7   | 200    | 44.399  | 70.5    | 394165   | 1,193.00 |

## Dead Centres Type 672



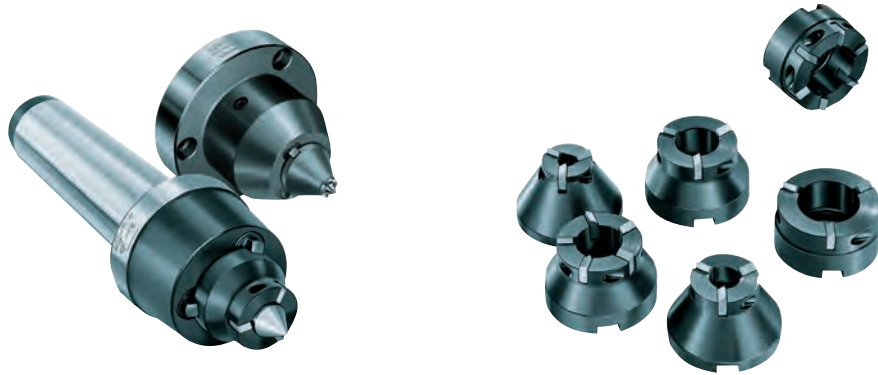
- Extended full point with draw-off nut
- Completely hardened and ground



| M.T. | Rohm Id No. | A (mm) | B (mm) | SW (mm) | D (mm) | E (mm)    | Nut Dia. (mm) | d1 (mm) | l1 (mm) | Code No. | Price \$ |
|------|-------------|--------|--------|---------|--------|-----------|---------------|---------|---------|----------|----------|
| 3    | 249576      | 24.1   | 148    | 19      | 10     | M27 x 1.5 | 41            | 23.825  | 67      | 394265   | 156.95   |
| 4    | 249577      | 31.6   | 186.5  | 27      | 14     | M36 x 1.5 | 55            | 31.267  | 84      | 394270   | 206.15   |
| 5    | 249578      | 44.7   | 242    | 36      | 16     | M48 x 1.5 | 75            | 44.399  | 112     | 394275   | 391.02   |
| 6    | 249579      | 63.8   | 330    | 55      | 20     | M68 x 1.5 | 100           | 63.348  | 148     | 394280   | 1,050.71 |



# CONSTANT FACE DRIVERS

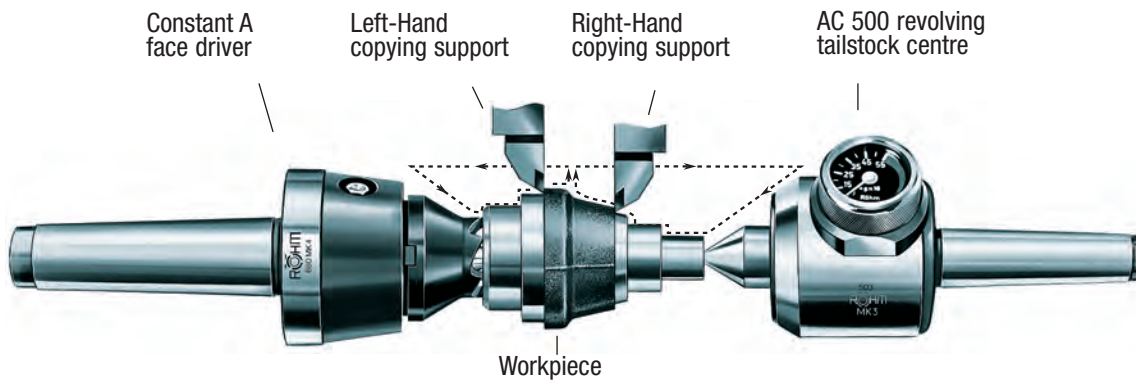


## CONSTANT FACE DRIVERS

For rational turning of workpieces on their entire length without reclamping with high precision.

Developed according to the modular-design principle, therefore a universal exchange of driving discs and centres.

Hydraulic respectively mechanic pressure compensation provides a uniform clamping force also on uneven faces of workpieces. The spring loaded centre provides a longitudinal workpiece stop on the front side.



## CONSTANT FACE DRIVERS CoA

One set consists of a basic body, one driving disc and suitable centre

### Basic Body CoA — Type 680-50

- Basic body with morse taper (all basic bodies without centre)



| Morse Taper | Rohm Id No. | Code No. | Price \$ |
|-------------|-------------|----------|----------|
| 3           | 088173      | 394390   | 923.46   |
| 4           | 088174      | 394395   | 962.65   |
| 5           | 088175      | 394400   | 1,796.05 |
| 6           | 088176      | 394405   | 1,334.06 |

### Basic Body CoA — Type 681-85

- Basic body with short taper DIN 55026 mechanical compensation, with spring set



| Short Taper | Rohm Id No. | Code No. | Price \$ |
|-------------|-------------|----------|----------|
| 6           | 313906      | 394425   | 3,194.62 |
| 8           | 313907      | 394420   | 3,773.90 |

### Basic Body CoA — Type 680-65

- Basic body for clamping in lathe chuck, with spring set



| Shank | Rohm Id No. | Code No. | Price \$ |
|-------|-------------|----------|----------|
| 25mm  | 088074      | 394410   | 1,451.63 |

### Basic Body CoA — Type 680-60

- Basic body flange type with cylindrical centre mount diameter 100mm with spring set



| Flange Mount | Rohm Id No. | Code No. | Price \$ |
|--------------|-------------|----------|----------|
| ZD 100       | 088046      | 394415   | 2,044.56 |

## Adapter Plates For CoA — Type 688-87

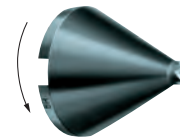
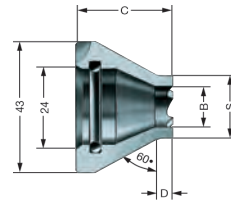
- Adapter plates without spring set (for CoA, type 680-60 and CoK)



| Short Taper | Rohm Id No. | DIN 55026 |          |          | Rohm Id No. | DIN 55027 |  |
|-------------|-------------|-----------|----------|----------|-------------|-----------|--|
|             |             | Code No.  | Price \$ | Code No. |             | Price \$  |  |
| 6           | 088486      | 394430    | 1,432.90 | -        | -           | -         |  |
| 8           | 088487      | 394435    | 1,587.94 | 088482   | 394450      | 1,916.77  |  |
| 11          | 088488      | 394440    | 1,916.77 | -        | -           | -         |  |

## Slip On Driving Discs Toothed

- Slip on driving discs and centres suitable for all basic bodies, clamping diameter 8-80mm



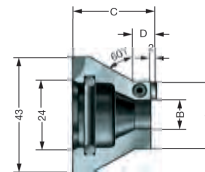
Right hand rotation



| Clamping Diameter S (mm) | Approx Turning Range (mm) | B (mm) | C (mm) | D (mm) | Matching Centre | Type 680-10 Right Hand Rotation |          |          | Type 680-20 Left Hand Rotation |          |          | Type 680-30 Right and Left Hand |          |          |
|--------------------------|---------------------------|--------|--------|--------|-----------------|---------------------------------|----------|----------|--------------------------------|----------|----------|---------------------------------|----------|----------|
|                          |                           |        |        |        |                 | Rohm Id No.                     | Code No. | Price \$ | Rohm Id No.                    | Code No. | Price \$ | Rohm Id No.                     | Code No. | Price \$ |
| 8                        | 9-16                      | 4.5    | 38     | 4      | 4               | 088061                          | 394535   | 131.70   | 088081                         | 394610   | 131.70   | 088541                          | 394710   | 146.36   |
| 10                       | 11-20                     | 4.5    | 38     | 4      | 4               | 088062                          | 394540   | 131.70   | 088082                         | 394615   | 131.70   | 088542                          | 394715   | 136.84   |
| 12                       | 13-24                     | 7      | 36     | 4      | 6               | 088063                          | 394545   | 131.70   | 088083                         | 394620   | 131.70   | 088543                          | 394720   | 146.36   |
| 16                       | 17-32                     | 11     | 33     | 4      | 10              | 088064                          | 394550   | 131.70   | 088084                         | 394625   | 131.70   | 088544                          | 394725   | 146.36   |
| 20                       | 21-40                     | 13     | 30     | 4      | 12              | 088065                          | 394555   | 131.70   | 088085                         | 394630   | 131.70   | -                               | -        | -        |
| 25                       | 26-50                     | 17     | 30     | 8      | 16              | 088066                          | 394560   | 131.70   | 088086                         | 394635   | 131.70   | -                               | -        | -        |
| 32                       | 33-64                     | 22     | 30     | 10     | 16              | 088067                          | 394565   | 131.70   | 088087                         | 394640   | 131.70   | -                               | -        | -        |

## Slip On Driving Discs Toothed

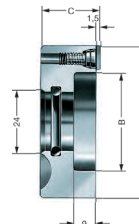
- Slip on driving discs and centres suitable for all basic bodies, clamping diameter 8-80mm
- With interchangeable hard metal driving plates 6mm x 3.2mm



| Clamping Diameter S (mm) | Approx Turning Range (mm) | B (mm) | C (mm) | D (mm) | Matching Centre | Type 680-11 Right Hand Rotation |          |          | Type 680-21 Left Hand Rotation |          |          | Type 680-31 Right and Left Hand |          |          |
|--------------------------|---------------------------|--------|--------|--------|-----------------|---------------------------------|----------|----------|--------------------------------|----------|----------|---------------------------------|----------|----------|
|                          |                           |        |        |        |                 | Rohm Id No.                     | Code No. | Price \$ | Rohm Id No.                    | Code No. | Price \$ | Rohm Id No.                     | Code No. | Price \$ |
| 20                       | 21-40                     | 7      | 30     | 5      | 6               | 089065                          | 394570   | 209.57   | 089085                         | -        | -        | 088545                          | 394730   | 219.79   |
| 25                       | 26-50                     | 11     | 30     | 8      | 10              | 089066                          | 394575   | 209.57   | 089086                         | 394650   | 196.15   | 088546                          | 394735   | 219.79   |
| 32                       | 33-64                     | 17.5   | 30     | 10     | 16              | 089067                          | 394580   | 351.34   | 089087                         | 394655   | 196.15   | 088547                          | 394740   | 219.79   |

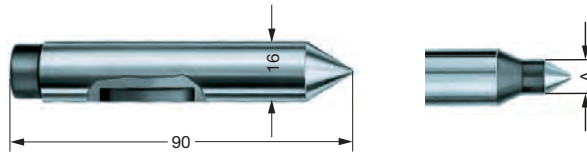
## Slip On Driving Discs Toothed

- Slip on driving discs and centres suitable for all basic bodies, clamping diameter 8-80mm
- With interchangeable hard metal driving plates 9.5mm x 3.2mm which can be used on 4 sides



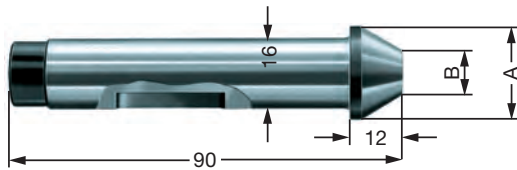
| Clamping Diameter S (mm) | Approx Turning Range (mm) | B (mm) | C (mm) | D (mm) | Matching Centre | Type 680-12 Right Hand Rotation |          |          | Type 680-22 Left Hand Rotation |          |          | Type 680-32 Right and Left Hand |          |          |
|--------------------------|---------------------------|--------|--------|--------|-----------------|---------------------------------|----------|----------|--------------------------------|----------|----------|---------------------------------|----------|----------|
|                          |                           |        |        |        |                 | Rohm Id No.                     | Code No. | Price \$ | Rohm Id No.                    | Code No. | Price \$ | Rohm Id No.                     | Code No. | Price \$ |
| 40                       | 41-80                     | 20     | 24     | 10     | 16              | 088068                          | 394585   | 222.31   | 088088                         | 394660   | 238.54   | 088548                          | 394685   | 250.46   |
| 50                       | 51-100                    | 28     | 24     | -      | 16              | 088069                          | 394590   | 238.54   | 088089                         | 394665   | 222.31   | 088549                          | 394695   | 250.46   |
| 63                       | 64-126                    | 41     | 24     | -      | 16              | 088070                          | 394595   | 238.54   | 088090                         | 394675   | 238.54   | 088550                          | 394700   | 250.46   |
| 80                       | 81-160                    | 58     | 24     | -      | 16              | 088071                          | 394600   | 533.98   | 088091                         | 394680   | 238.54   | 088551                          | 394705   | 250.46   |

## Centre Points For CoA Face Driver — Type 680-40



| Centre Dia. A (mm) | For Clamping Dia. (mm) | Rohm Id No. | Code No. | Price \$ |
|--------------------|------------------------|-------------|----------|----------|
| 4                  | 8-10                   | 088351      | 394755   | 64.74    |
| 6                  | 12                     | 088352      | 394760   | 64.74    |
| 10                 | 16                     | 088353      | 394765   | 64.74    |
| 12                 | 20                     | 088354      | 394770   | 64.74    |
| 16                 | 25-80                  | 088355      | 394775   | 64.74    |

## Centre Points With Head For CoA Face Driver — Type 680-45



| B (mm) | A (mm) | Rohm Id No. | Code No. | Price \$ |
|--------|--------|-------------|----------|----------|
| 10     | 21     | 086619      | 394790   | 128.81   |
| 16     | 27     | 086620      | 394795   | 204.51   |
| 23     | 34     | 688878      | 394815   | 167.66   |
| 29     | 40     | 086621      | 394800   | 187.42   |
| 45     | 56     | 086622      | 394810   | 226.61   |

## Hard Metal Driving Plates For CoA



Carbide driving plates, right-hand or left-hand rotation



| Size (mm) | Rohm Id No. | Code No. | Price \$ |
|-----------|-------------|----------|----------|
| 6 x 3.2   | 088810      | 394825   | 21.29    |
| 9.5 x 3.2 | 088209      | 394830   | 31.92    |

## Face Driving Kits CoA Type 680



- In wooden box, clamping range: 10-80mm turning range: 11-160mm

### Contents

- 1 basic body
- 10 driving discs, clamping diameter: 10-12-16-20-25-32-40-50-63-80 mm
- 5 centres diameter: 4-6-10-12-16 mm
- 1 extractor
- Slide rule to calculate axial tailstock loading
- O-ring, 3 hard metal driving plates
- 3 locking bolts



| Morse Taper | Rohm Id No. | Right Hand Code No. | Price \$ | Rohm Id No. | Left Hand Code No. | Price \$ |
|-------------|-------------|---------------------|----------|-------------|--------------------|----------|
| 3           | 088218      | 394485              | 3,339.43 | 088223      | 394515             | 3,339.43 |
| 4           | 088219      | 394495              | 3,382.03 | 088224      | 394520             | 3,382.03 |
| 5           | 088220      | 394500              | 3,475.74 | 088225      | 394525             | 3,475.74 |
| 6           | 088221      | 394510              | 3,739.83 | 088226      | 394530             | 3,739.83 |

## Accessories for Tooling Your World



Check Out Chapter I

Contact us for more information and to order.

## 40 Position Quick Change Tool Posts & Holders



### Outstanding Features:

Toolpost and toolholder profile-ground. Easy to operate. Any number of different toolholders can be used. 40 tool-bit positions. Adjustment for height of the tool bit is controlled by a knurled head screw without using packing plates or shims. Loosening and locking of any toolholder is performed by simple eccentric clamping. Save time by changing the toolholder from the top without moving longitudinal or traverse slides. Bore with longitudinal feed by using toolholder with inner taper. Eliminates complicated boring with the tailstock.

- Repeatability Accuracy:  $\leq 0.01\text{mm}$

### Mounting on Lathe:

Profile-ground serrated toolpost to be mounted with support clamping bolt. The centering disk should be bored to the dimension of the clamping bolt (snug fit not necessary).

It is recommended that the toolpost with clamped toolholder and boring bar be aligned at a right angle to the face plate. The toolpost is locked on the support by means of two set pins. The marking point should then be set on "0" and the nut of the clamping bolt tightened.



Toolpost



Toolholder 'S'



Toolholder 'B'



Toolholder 'D'

### Technical Data

Min. dimension "S" required for height of tool "h":

| "h" (in) | Size A0<br>"S" (in) | Size A1<br>"S" (in) | Size E5<br>"S" (in) |         | Size B2<br>"S" (in) |         | Size C 3<br>"S" (in) |         |         | Size D 4<br>"S" (in) |         |         |
|----------|---------------------|---------------------|---------------------|---------|---------------------|---------|----------------------|---------|---------|----------------------|---------|---------|
|          | D 12                | D 20                | D 20                | D 25    | D 25                | D 32    | D32                  | D 40    | D 45    | D 40                 | D 50    | D 63    |
| 16/64    | 15/32               |                     |                     |         |                     |         |                      |         |         |                      |         |         |
| 5/16     | 9/16                | 43/64               |                     |         |                     |         |                      |         |         |                      |         |         |
| 25/64    | 5/8                 | 3/4                 | 51/64               | 7/8     | 57/64               |         |                      |         |         |                      |         |         |
| 15/32    | 23/32               | 53/64               | 7/8                 | 59/64   | 31/32               | 1-1/32  |                      |         |         |                      |         |         |
| 9/16     |                     | 29/32               | 61/64               | 1       | 1-3/64              | 1-7/64  | 1-9/64               |         |         |                      |         |         |
| 5/8      |                     | 63/64               | 1-1/32              | 1-5/64  | 1-1/8               | 1-3/16  | 1-7/32               | 1-17/64 |         |                      |         |         |
| 25/32    |                     | 1-9/64              | 1-13/64             | 1-15/64 | 1-9/32              | 1-11/32 | 1-3/8                | 1-27/64 | 1-29/64 |                      |         |         |
| 63/64    |                     |                     |                     | 1-7/64  | 1-31/64             | 1-35/64 | 1-17/32              | 1-3/64  | 1-41/64 | 1-49/64              |         |         |
| 1-3/16   |                     |                     |                     |         | 1-47/64             | 1-49/64 | 1-13/16              | 1-27/32 | 1-31/32 | 2-1/64               |         |         |
| 1-17/64  |                     |                     |                     |         | 1-13/16             | 1-7/8   | 1-57/64              | 1-59/64 | 2-3/64  | 2-3/32               | 2-1/8   |         |
| 1-37/64  |                     |                     |                     |         |                     |         |                      | 2-13/64 | 2-1/4   | 2-23/64              | 2-13/32 | 2-7/16  |
| 1-31/32  |                     |                     |                     |         |                     |         |                      |         |         |                      | 2-51/64 | 2-53/64 |
| 2-31/64  |                     |                     |                     |         |                     |         |                      |         |         |                      |         | 3-11/32 |

| SIZE                            | A 0         | A 1      | E 5      |          | B 2      |          | C 3      |          |          | D 4      |          |          |          |
|---------------------------------|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Size of Exchangeable Toolholder | D 12        | D 20     | D 20     | D 25     | D 25     | D 32     | D 32     | D 40     | D 45     | D 40     | D 50     | D 63     |          |
| Weight                          | lbs.        | 0.77     | 2.86     | 6.18     | 6.18     | 9.04     | 9.04     | 22.93    | 22.93    | 22.93    | 37.48    | 37.48    | 37.48    |
| Max. driving power              | HP          | 1.5      | 3        | 6        | 6        | 9        | 9        | 18       | 18       | 18       | 30       | 30       | 30       |
| Max. width of slide             | in.         | 3-5/32   | 4        | 5        | 5        | 6        | 6        | 7-1/8    | 7-1/8    | 7-1/8    | 7-7/8    | 7-7/8    | 7-7/8    |
| Total height                    | "g" in.     | 1-17/64  | 2-3/32   | 2-11/16  | 2-11/16  | 2-61/64  | 2-61/64  | 4-1/8    | 4-1/8    | 4-1/8    | 4-51/64  | 4-51/64  | 4-51/64  |
| Total width                     | "b" in.     | 2-3/4    | 4        | 5        | 5        | 5-29/32  | 5-29/32  | 7-9/16   | 7-61/64  | 7-61/64  | 9-3/64   | 9-15/64  | 9-17/32  |
| Max. throat                     | "m" in.     | 1-3/16   | 1-57/64  | 2-3/8    | 2-3/8    | 2-51/64  | 2-51/64  | 3-10/16  | 4        | 4        | 4-13/32  | 4-39/64  | 4-7/8    |
| Standard bore                   | "t" in.     | 31/64    | 25/32    | 25/32    | 25/32    | 1-1/4    | 1-1/4    | 1-37/64  | 1-37/64  | 1-37/64  | 1-37/64  | 1-37/64  | 1-37/64  |
| Max. bore                       | "tmax." in. | —        | 1-7/32   | 1-7/32   | 1-7/32   | 2        | 2        | 2-3/4    | 2-3/4    | 2-3/4    | 3-5/32   | 3-5/32   | 3-5/32   |
| Max. depth of bore              | "a" in.     | —        | 1-3/8    | 1-3/8    | 1-3/8    | 1-49/64  | 1-49/64  | 2-61/64  | 2-61/64  | 2-61/64  | 2-61/64  | 2-61/64  | 2-61/64  |
| Max. height of tool             | "h" in.     | 15/32    | 25/32    | 25/32    | 63/64    | 63/64    | 1-17/64  | 1-17/64  | 1-37/64  | 1-49/64  | 1-37/64  | 1-31/32  | 2-31/64  |
| Tool rest                       | "st" in.    | 15/64    | 23/64    | 25/64    | 7/16     | 1/2      | 35/64    | 19/32    | 5/8      | 43/64    | 25/32    | 53/64    | 55/64    |
| Vertical adjustability          | "hv" in.    | 5/16     | 7/16     | 43/64    | 19/32    | 25/32    | 7/16     | 1-37/64  | 1-3/8    | 1-3/16   | 1-3/8    | 1-3/16   | 25/32    |
| Min. height of cutting edge     | "s"         | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" | "h"+"st" |
| Max. height of cutting edge     |             | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" | "s"+"hv" |

## 40 Position Quick Change Tool Posts & Holders

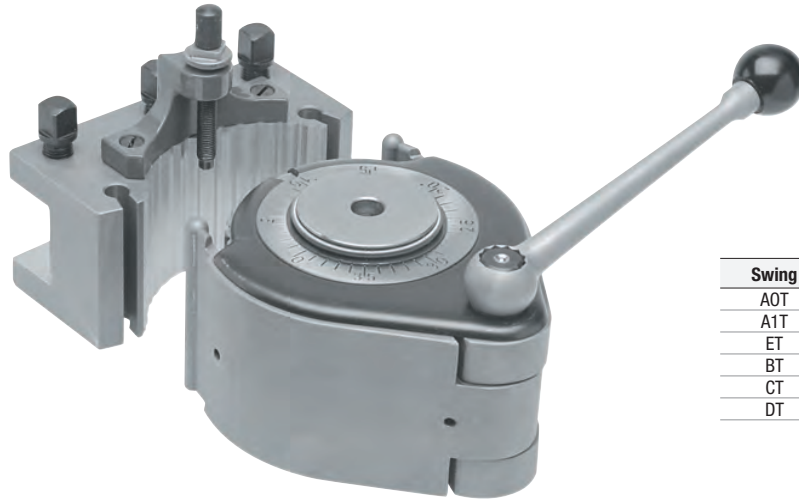
### Sets Include:

- 1 piece toolpost
- 3 piece "D" holder
- 1 piece "B" holder

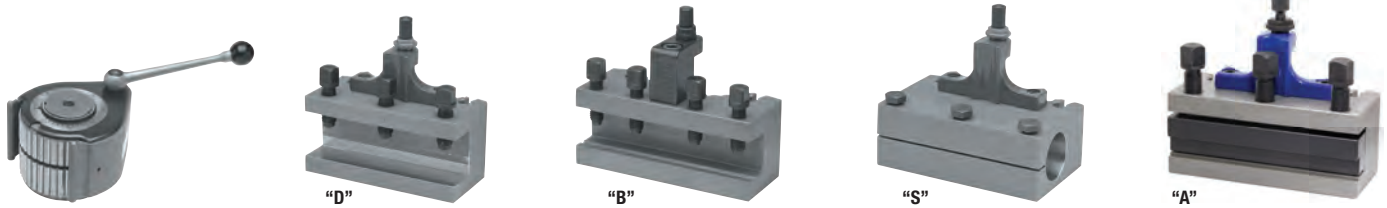
### Tool Post Sets



| Sets (5 piece) | Code No. | Price \$ |
|----------------|----------|----------|
| A1T            | 388405   | 1,316.92 |
| E5T            | 388410   | 1,939.47 |
| B2T            | 388415   | 2,008.19 |
| C3T            | 388420   | 3,561.70 |
| D4T            | 388425   | 6,237.26 |



| Swing |           |
|-------|-----------|
| AOT   | Up to 9"  |
| A1T   | 6" - 13"  |
| ET    | 10" - 18" |
| BT    | 13" - 20" |
| CT    | 18" - 30" |
| DT    | 22" - 35" |



## Quick Change Tool Posts & Holders



| Toolpost   |          |          | Toolholder "D"<br>Flat |     |          |          | Toolholder "B"<br>V-Groove |     |          |          | Toolholder "S"<br>Boring Bar Holder |     |          |          | Toolholder "A"<br>Part Off |          |
|------------|----------|----------|------------------------|-----|----------|----------|----------------------------|-----|----------|----------|-------------------------------------|-----|----------|----------|----------------------------|----------|
| Toolholder | Code No. | Price \$ | *NH                    | L   | Code No. | Price \$ | *NH                        | L   | Code No. | Price \$ | *D                                  | L   | Code No. | Price \$ | Code No.                   | Price \$ |
| AOT        | 388005   | 524.87   | 12                     | 50  | 388010   | 158.82   | 12                         | 50  | 388015   | 169.24   | 15                                  | 50  | 388020   | 240.84   |                            |          |
| A1T        | 388035 ‡ | 658.99   | 20                     | 80  | 388040 ‡ | 174.52   | 18                         | 80  | 388045 ‡ | 185.21   | 30                                  | 80  | 388050   | 279.99   | 388055                     | 396.75   |
| E5T        | 388100 ‡ | 838.53   | 20                     | 100 | 388105   | 234.54   | 30                         | 100 | 388115 ‡ | 272.28   | 30                                  | 100 | 388120   | 345.04   | 388130                     | 451.29   |
|            |          |          | 25                     | 100 | 388110 ‡ | 301.17   |                            |     |          |          | 40                                  | 100 | 388125   | 362.23   |                            |          |
|            |          |          | 25                     | 120 | 388185 ‡ | 272.28   |                            |     |          |          |                                     |     |          |          |                            |          |
|            |          |          | 25                     | 140 | 388190   | 324.12   |                            |     |          |          |                                     |     |          |          |                            |          |
| B2T        | 388180 ‡ | 958.06   | 32                     | 120 | 388195   | 277.92   | 32                         | 130 | 388205 ‡ | 310.81   | 40                                  | 120 | 388210   | 427.37   | 388215                     | 507.30   |
|            |          |          | 32                     | 140 | 388200   | 356.03   |                            |     |          |          |                                     |     |          |          |                            |          |
|            |          |          | 32                     | 150 | 388270   | 424.84   |                            |     |          |          |                                     |     |          |          |                            |          |
|            |          |          | 32                     | 170 | 388275   | 483.30   |                            |     |          |          |                                     |     |          |          |                            |          |
| C3T        | 388265 ‡ | 1,796.48 | 40                     | 150 | 388280 ‡ | 462.88   | 32                         | 160 | 388295   | 495.80   | 40                                  | 150 | 388305   | 707.35   | 388315                     | 599.46   |
|            |          |          | 40                     | 170 | 388285   | 525.64   | 40                         | 170 | 388300 ‡ | 514.06   | 50                                  | 150 | 388310   | 742.77   |                            |          |
|            |          |          | 45                     | 170 | 388290   | 551.55   |                            |     |          |          |                                     |     |          |          |                            |          |
| D4T        | 388375 ‡ | 2,980.87 | 40                     | 180 | 388380 ‡ | 786.20   | 50                         | 180 | 388395 ‡ | 1,138.55 | 63                                  | 180 | 388400   | 1,204.66 |                            |          |
|            |          |          | 50                     | 180 | 388385   | 838.80   |                            |     |          |          |                                     |     |          |          |                            |          |
|            |          |          | 63                     | 180 | 388390   | 914.68   |                            |     |          |          |                                     |     |          |          |                            |          |

\* Notch Height

\* Notch Height

\* Diameter

‡ Denotes items found in the sets listed above

## Quick Change Tool Posts Parts

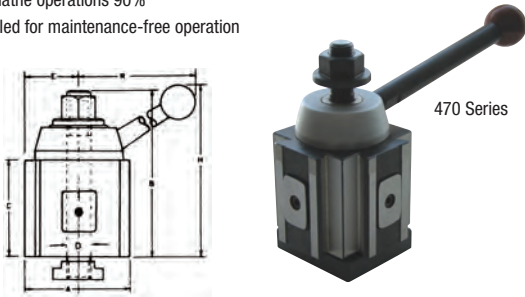


| Toolholder Size | Square Head Screw | Cheese Head Screw | Adjusting Top | Height Adj. Nut | Height Adj. Screw |
|-----------------|-------------------|-------------------|---------------|-----------------|-------------------|
| AOT             | 388501 5.76       | 388502 2.42       | 388503 10.77  | 388504 10.51    | 388505 5.85       |
| A1T             | 388506 5.76       | 388507 2.42       | 388508 11.05  | 388509 10.51    | 388510 5.85       |
| B2T             | 388516 10.54      | 388517 3.18       | 388518 17.56  | 388519 12.47    | 388520 8.19       |
| C3T             | 388521 11.96      | 388522 6.38       | 388523 19.36  | 388524 13.98    | 388525 8.65       |
| D4T             | 388526 16.72      | 388527 8.75       | 388528 27.12  | 388529 19.62    | 388530 12.97      |
| E5T             | 388511 5.76       | 388512 3.18       | 388513 16.75  | 388514 10.51    | 388515 7.24       |

## Piston Type Tool Post



- All working parts hardened and ground
- Maximum rigidity for chatter-free performance
- No time wasted with shims
- Speed up your lathe operations 90%
- Completely sealed for maintenance-free operation

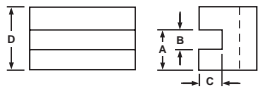


| A     | B     | C     | D    | E     | H       | R      | Swing     | Code No. | Price \$ |
|-------|-------|-------|------|-------|---------|--------|-----------|----------|----------|
| 2 1/2 | 3 7/8 | 2 1/4 | 9/16 | 1 3/8 | 4 11/16 | 5 3/4  | Up To 12" | 470100   | 245.66   |
| 3     | 4 5/8 | 2 3/4 | 5/8  | 1 5/8 | 5 9/16  | 7 5/16 | 10-15"    | 470200   | 296.21   |
| 3 1/2 | 5 1/8 | 3     | 3/4  | 1 7/8 | 6 1/8   | 7 7/8  | 13-18"    | 470300   | 426.01   |
| 4     | 6 1/4 | 3 5/8 | 7/8  | 2 1/8 | 7       | 9      | 14-20"    | 470400   | 811.59   |

## Turning & Facing Holder (#1)



Takes various sizes of bits. Turning and facing tools can be locked in together. Saves time and labor when changing operations.

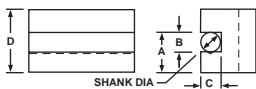


| A       | B   | C    | D     | Tool Bit   | Code No. | Price \$ |
|---------|-----|------|-------|------------|----------|----------|
| 15/16   | 1/2 | 7/16 | 1 1/2 | 3/16 - 1/2 | 470101   | 60.30    |
| 1 1/8   | 5/8 | 1/2  | 1 3/4 | 1/4 - 5/8  | 470201   | 65.44    |
| 1 7/16  | 3/4 | 5/8  | 2 1/8 | 1/2 - 3/4  | 470301   | 107.13   |
| 1 11/16 | 1"  | 3/4  | 2 1/2 | 1/2 - 1"   | 470401   | 134.43   |

## Boring, Turning & Facing Holder (#2)



"V" groove holds round shank boring bars and tools as well as square tool bits.

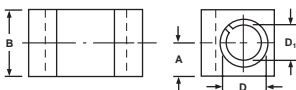


| A       | B   | C    | D     | Tool Bit   | Shank | Code No. | Price \$ |
|---------|-----|------|-------|------------|-------|----------|----------|
| 15/16   | 1/2 | 7/16 | 1 1/2 | 3/16 - 1/2 | 7/16  | 470102   | 63.16    |
| 1 1/8   | 5/8 | 1/2  | 1 3/4 | 1/4 - 5/8  | 1/2   | 470202   | 71.69    |
| 1 7/16  | 3/4 | 5/8  | 2 1/8 | 1/2 - 3/4  | 3/4   | 470302   | 111.50   |
| 1 11/16 | 1"  | 3/4  | 2 1/2 | 1/2 - 1"   | 13/16 | 470402   | 140.72   |

## Heavy Duty Boring Bar Holder (#4)



Equipped with a split bushing to accommodate a boring bar of smaller diameter. It grips bar with extreme rigidity, cuts smoothly without chatter.



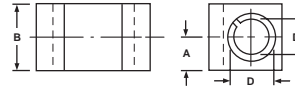
| A     | B     | D     | D1  | Code No. | Price \$ |
|-------|-------|-------|-----|----------|----------|
| 3/4   | 1 1/2 | 3/4   | 5/8 | 470104   | 87.91    |
| 1"    | 2     | 1"    | 3/4 | 470204   | 105.35   |
| 1"    | 2     | 1"    | 3/4 | 470304   | 156.37   |
| 1 3/8 | 2 3/4 | 1 1/4 | 1"  | 470404   | 184.67   |

Tool holders do not include tool bits, boring bars, drills or carbide inserts.

## Heavy Duty Boring Bar Holder (#41)



Equipped with a split bushing to accommodate a boring bar of smaller diameter. It grips bar with extreme rigidity, cuts smoothly without chatter.



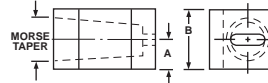
| A     | B     | D     | D1    | Code No. | Price \$ |
|-------|-------|-------|-------|----------|----------|
| 7/8   | 1 3/4 | 1"    | 3/4   | 470141   | 89.31    |
| 1"    | 2     | 1 1/4 | 1"    | 470241   | 125.37   |
| 1 1/8 | 2 1/4 | 1 1/4 | 1"    | 470341   | 146.39   |
| 1 3/8 | 2 3/4 | 1 1/2 | 1 1/4 | 470441   | 183.43   |

## Morse Taper Holder For Drilling (#5)



Drills with carriage by using power feed instead of tail stock. Easily centered.

For No. 2, 3 and 4 Morse Taper Drills.



| A     | B     | Taper Hole Size | Code No. | Price \$ |
|-------|-------|-----------------|----------|----------|
| 3/4   | 1 1/2 | #2 M.T.         | 470105   | 106.79   |
| 7/8   | 1 3/4 | #2 M.T.         | 470205   | 113.09   |
| 1"    | 1 1/2 | #3 M.T.         | 470305   | 126.10   |
| 1 1/4 | 2 1/2 | #3 M.T.         | 470405   | 155.68   |

## Morse Taper Holder For Drilling (#53)



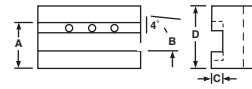
- Refer to diagram above (#5)

| A      | B     | Taper Hole Size | Code No. | Price \$ |
|--------|-------|-----------------|----------|----------|
| 3/4    | 1 1/2 | #3 M.T.         | 470153   | 133.23   |
| 7/8    | 1 3/4 | #3 M.T.         | 470253   | 139.30   |
| 1 1/16 | 2 1/8 | #4 M.T.         | 470354   | 148.78   |
| 1 1/4  | 2 1/2 | #4 M.T.         | 470454   | 175.94   |

## Universal Parting Blade Holder (#7)



For bevel as well as T-cut blades. Enables you to cut-off close to chuck. Absence of vibration prevents breaking blades.

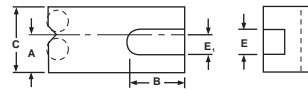


| A      | B     | C    | D     | Blade Height | Code No. | Price \$ |
|--------|-------|------|-------|--------------|----------|----------|
| 13/16  | 1/2   | 3/16 | 1 1/2 | 1/2          | 470107   | 93.09    |
| 1"     | 11/16 | 3/16 | 1 3/4 | 11/16        | 470207   | 100.27   |
| 1 7/16 | 3/4   | 3/16 | 2     | 3/4          | 470307   | 150.60   |
| 1 7/16 | 7/8   | 1/4  | 2 1/2 | 7/8          | 470407   | 174.27   |

## Knurling, Turning & Facing Holder (#10)



"V" groove holds round shank boring bars and tools as well as square tool bits. For turning and facing as well as knurling. Supplied with a set of high speed precision ground and lapped medium diameter knurls. Easily replaceable.



| A      | B     | C      | E   | E1  | Tool Bit   | Code No. | Price \$ |
|--------|-------|--------|-----|-----|------------|----------|----------|
| 7/8    | 2 1/2 | 1 9/16 | 1/2 | 3/8 | 3/16 - 1/2 | 470110   | 99.36    |
| 1"     | 2 5/8 | 1 3/4  | 5/8 | 1/2 | 1/4 - 5/8  | 470210   | 121.74   |
| 1 3/16 | 3 1/8 | 2      | 3/4 | 5/8 | 1/2 - 3/4  | 470310   | 185.49   |
| 1 7/16 | 3 3/4 | 2 1/2  | 1"  | 3/4 | 1/2 - 1    | 470410   | 197.14   |



## Turret Type Quick Change Tool Post

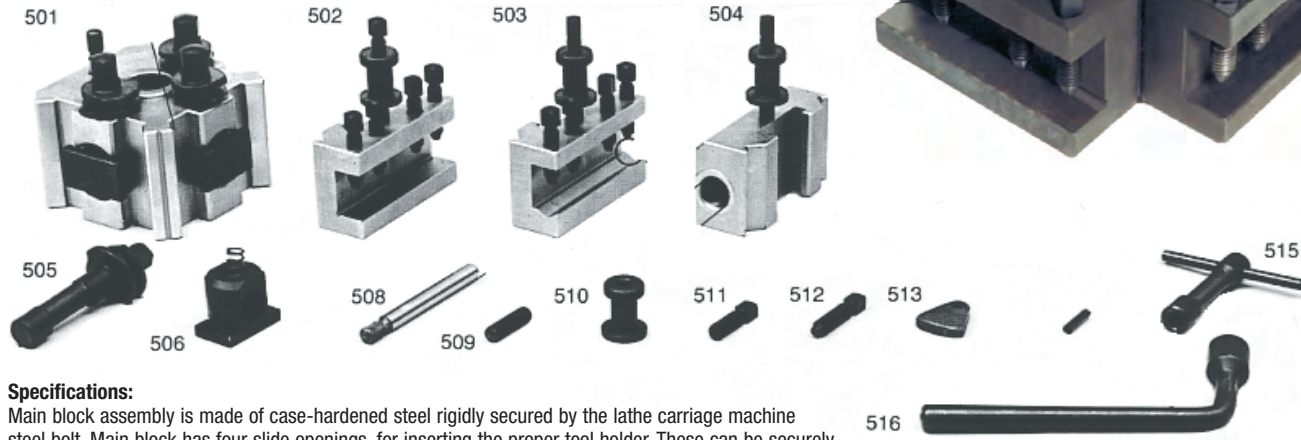
Production of a lathe machine, even of high capacity, is conditioned to the speed and time required for changing tools. Fast tool changing and simplicity increase machine production. Our turrets are designed and constructed to achieve these essential requirements.

### Our Turrets offer these advantages:

- 1 - No chatter or vibrations
- 2 - Save long set-up work for centering tool to centre of rotation axle
- 3 - No tool breakages, caused by poor or irregular setting of the tool on the shims

### Price of Set Includes:

- 3 Tool-holders of flat section
- 1 Tool-holder with V-seat for round tools
- 2 Standard spanners



### Specifications:

Main block assembly is made of case-hardened steel rigidly secured by the lathe carriage machine steel bolt. Main block has four side openings, for inserting the proper tool holder. These can be securely fastened by a simple and safe eccentric device, which also adjusts individual tool holder height. Tool shank is held securely by four hardened screws.

## Quick Change Tool Posts & Holders



| Size | Dimensions For Lathes with Swing (in.) | Max Height of Turret Body (in.) | Max. Square and Rect. Tools (in.) | Diameter Round Tool (in.) | Taper Shank | Max Adjust. Tool Holder (in.) | Sets Code No. | Price \$ |
|------|--|---------------------------------|-----------------------------------|---------------------------|-------------|-------------------------------|---------------|----------|
| M    | 7 - 10                                 | 2-3/4 x 2-3/4 x 1-3/4           | 5/8                               | 1/2                       | 1           | 1/2                           | 385105        | 1,181.25 |
| A    | 10 - 14                                | 3-7/8 x 3-7/8 x 2-3/8           | 3/4                               | 5/8                       | 2           | 9/16                          | 385110        | 1,268.92 |
| B    | 14 - 18                                | 4-5 x 5 x 3-3/8                 | 1-1/8                             | 13/16                     | 3           | 15/16                         | 385115        | 1,631.37 |
| C    | 18 - 24                                | 5-5/8 x 5-5/8 x 3-3/4           | 1-1/4                             | 15/16                     | 4           | 1                             | 385120        | 2,084.86 |
| D    | over                                   | 6-7/8 x 6-7/8 x 4-3/4           | 1-1/2                             | 1-1/4                     | 4           | 1-1/2                         | 385125        | 5,267.54 |

| Fig.                    | Size Description | M Code No. | Price \$ | A Code No. | Price \$ | B Code No. | Price \$ | C Code No. | Price \$ | D Code No. | Price \$ |
|-------------------------|------------------|------------|----------|------------|----------|------------|----------|------------|----------|------------|----------|
| <b>STANDARD HOLDERS</b> |                  |            |          |            |          |            |          |            |          |            |          |
| 502                     | Flat tool holder | 385205     | 116.34   | 385210     | 129.41   | 385215     | 169.67   | 385220     | 219.17   | 385225     | 790.53   |
| 503                     | V tool holder    |            |          | 385310     | 138.43   | 385315     | 192.57   | 385320     | 230.60   |            |          |

| Fig. | Size Description                         | M Code No. | Price \$ | A Code No. | Price \$ | B Code No. | Price \$ | C Code No. | Price \$ | D Code No. | Price \$ |
|------|--|------------|----------|------------|----------|------------|----------|------------|----------|------------|----------|
| 501  | Master blocks                            |            |          |            |          | 386103     | 1,111.01 | 386104     | 1,407.08 | 386105     | 2,853.28 |
| 505  | Eccentric clamp pivot                    | 386111     | 70.86    | 386112     | 85.80    | 386113     | 116.42   | 386114     | 123.29   |            |          |
| 506  | Clamping block                           |            |          | 386122     | 68.79    | 386123     | 87.68    | 386124     | 101.25   |            |          |
| 508  | Dowel pin                                |            |          |            |          |            |          | 386144     | 63.85    | 386145     | 111.24   |
| 509  | Tool holder height adjusting screw       |            |          | 386152     | 3.27     | 386153     | 7.26     | 386154     | 7.26     | 386155     | 12.52    |
| 510  | Bobbin for height adjusting screw        | 386161     | 20.79    | 386162     | 23.63    | 386163     | 28.46    | 386164     | 34.69    | 386165     | 60.21    |
| 511  | Set screw for tool holder height adjust. |            |          | 386172     | 3.93     | 386173     | 6.15     | 386174     | 6.15     | 386175     | 8.17     |
| 512  | Set screw/tool holder                    | 386181     | 4.61     | 386182     | 3.82     | 386183     | 6.75     | 386184     | 6.75     | 386185     | 10.08    |
| 513  | Drift for drill holder                   |            |          | 386192     | 34.69    | 386193     | 42.72    | 386194     | 42.72    | 386195     | 75.18    |
| 515  | T-key for set screws                     |            |          | 386212     | 50.17    | 386213     | 59.12    | 386214     | 73.68    | 386215     | 128.51   |
| 516  | Hex. wrench for tool                     |            |          | 386222     | 47.31    | 386223     | 50.17    | 386224     | 82.61    | 386225     | 143.85   |



## Te-Co & STM Super Clamp Kits



### Super Clamp Kits with Steel Blocks

Each set contains:

- 24 studs with flats, 4 each 3, 4, 5, 6, 7, 8" lengths ‡
- 4 coupling nuts
- 4 flange nuts
- 4 T-slot nuts
- 6 serrated end clamps
- 6 step blocks
- 1 T-slot cleaner
- 1 holder
- Sets shipped in all wood holders



### Inch Kits

| Model No.                                  | Table T-Slot Size | Stud Size | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|--|-------------------|-----------|----------------|----------|--------------|----------|
| <b>With 1" Thick Steel Step Blocks</b>     |                   |           |                |          |              |          |
| S-375-SS                                   | 3/8               | 5/16-18   | 607000         | 494.11   | -            | -        |
| S-437-SS                                   | 7/16              | 3/8-16    | 607002         | 479.34   | 333546       | 353.36   |
| S-500-SS                                   | 1/2               | 3/8-16    | 607004         | 479.34   | 333548       | 353.36   |
| S-560-SS                                   | 9/16              | 3/8-16    | 607006         | 497.15   | 333549       | 366.52   |
| S-562-SS                                   | 9/16              | 1/2-13    | 607008         | 533.09   | 333551       | 393.08   |
| S-625-SS                                   | 5/8               | 1/2-13    | 607010         | 533.09   | 333552       | 393.08   |
| S-686-SS                                   | 11/16             | 1/2-13    | 607012         | 538.75   | 333553       | 175.35   |
| S-687-SS                                   | 11/16             | 5/8-11    | 607014         | 610.17   | 333555       | 449.91   |
| S-750-SS                                   | 3/4               | 5/8-11    | 607016         | 618.59   | 333554       | 456.09   |
| S-8125-SS                                  | 13/16             | 5/8-11    | 607018         | 642.80   | 333557       | 473.90   |
| <b>With 1-1/2" Thick Steel Step Blocks</b> |                   |           |                |          |              |          |
| H-562-SS                                   | 9/16              | 1/2-13    | 607020         | 746.58   | -            | -        |
| H-625-SS                                   | 5/8               | 1/2-13    | 607022         | 746.58   | -            | -        |
| H-686-SS                                   | 11/16             | 1/2-13    | 607024         | 746.58   | -            | -        |
| H-687-SS                                   | 11/16             | 5/8-11    | 607026         | 829.38   | -            | -        |
| H-750-SS                                   | 3/4               | 5/8-11    | 607028         | 832.14   | -            | -        |
| H-8125-SS                                  | 13/16             | 5/8-11    | 607030         | 879.75   | -            | -        |
| H-812-SS                                   | 13/16             | 3/4-10    | 607032         | 1,057.08 | -            | -        |
| H-875-SS                                   | 7/8               | 3/4-10    | 607034         | 1,066.05 | -            | -        |
| H134-SS                                    | 1                 | 3/4-10    | 607036         | 1,089.86 | -            | -        |
| 20222                                      | 1-1/16            | 3/4-10    | 607037         | 1,115.04 | -            | -        |
| <b>With 2" Thick Steel Step Blocks</b>     |                   |           |                |          |              |          |
| H-100-SS                                   | 1                 | 7/8-9     | 607038         | 1,747.08 | -            | -        |
| H-1062-SS                                  | 1-1/16            | 1-8       | 607040         | 1,824.36 | -            | -        |

### Metric Kits ‡ Metric studs do not have flats

| Model No.                                 | Table T-Slot Size | Stud Size  | Te-Co Code No. | Price \$ |
|---|-------------------|------------|----------------|----------|
| <b>With 25 mm Thick Steel Step Blocks</b> |                   |            |                |          |
| 68101                                     | 10                | M8 x 1.25  | 608700         | 430.84   |
| 68102                                     | 12                | M10 x 1.5  | 608702         | 478.52   |
| 68103                                     | 14                | M10 x 1.5  | 608704         | 483.97   |
| 68104                                     | 14                | M12 x 1.75 | 608706         | 535.37   |
| 68105                                     | 16                | M12 x 1.75 | 608708         | 537.79   |
| 68106                                     | 17                | M12 x 1.75 | 608710         | 543.38   |
| 68107                                     | 18                | M16 x 2.0  | 608712         | 651.36   |
| 68108                                     | 20                | M16 x 2.0  | 608714         | 654.05   |
| <b>With 38 mm Thick Steel Step Blocks</b> |                   |            |                |          |
| 68110                                     | 14                | M12 x 1.75 | 608716         | 743.13   |
| 68111                                     | 16                | M12 x 1.75 | 608718         | 746.17   |
| 68112                                     | 17                | M12 x 1.75 | 608720         | 748.58   |
| 68113                                     | 18                | M16 x 2.0  | 608722         | 843.18   |
| 68114                                     | 20                | M16 x 2.0  | 608724         | 848.70   |
| 68115                                     | 22                | M20 x 2.5  | 608726         | 1,083.65 |

## T-Slot Cleaner



- 1" wide cleaner allows for easy removal of chips
- Made of steel for durability



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| 50101     | 607163   | 2.39     |

## Te-Co & STM Machinist Clamping Kits — Inch



Each set contains:

- 24 Studs 4 each 3, 4, 5, 6, 7, 8" lengths
- 6 T-slot nuts
- 6 Flange nuts
- 4 Coupling nuts
- 6 Step blocks
- 6 Serrated end clamps
- 1 T-slot cleaner
- 1 Metal holder



| Table T-Slot Size                      | Stud Size | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|--|-----------|----------------|----------|--------------|----------|
| <b>With 1" Thick Steel Step Blocks</b> |           |                |          |              |          |
| 7/16                                   | 3/8-16    | 607042         | 513.77   | 333530       | 298.02   |
| 1/2                                    | 3/8-16    | 607044         | 502.80   | 333532       | 372.55   |
| 9/16                                   | 3/8-16    | 607046         | 513.77   | 333534       | 380.76   |
| 9/16                                   | 1/2-13    | 607048         | 528.75   | 333536       | 391.72   |
| 5/8 *                                  | 1/2-13    | 607050         | 465.75   | 333550       | 155.81   |
| 5/8 **                                 | 1/2-13    | 607053         | 522.74   | -            | -        |
| 11/16                                  | 1/2-13    | 607052         | 508.39   | 333538       | 376.65   |
| 11/16                                  | 5/8-11    | 607054         | 656.05   | 333540       | 337.27   |
| 3/4                                    | 5/8-11    | 607056         | 657.92   | 333542       | 487.59   |
| 13/16                                  | 5/8-11    | 607058         | 685.72   | 333544       | 508.14   |

- \* Comes with 5/8" height t-nuts
- \*\* Comes with 3/4" height t-nuts

## Te-Co Machinist Clamping Kits — Metric



Each set contains:

- 24 Studs 4 each 80, 110, 125, 150, 175, and 200mm lengths
- 6 T-slot nuts
- 6 Flange nuts
- 4 Coupling nuts
- 6 Step blocks
- 6 Serrated end clamps
- 1 T-slot cleaner
- 1 Metal holder



| Table T-Slot Size (mm)                   | Stud Size  | Weight (lb) | Code No. | Price \$ |
|--|------------|-------------|----------|----------|
| <b>With 25mm Thick Steel Step Blocks</b> |            |             |          |          |
| 12                                       | M10 x 1.5  | 18.5        | 608650   | 521.64   |
| 14                                       | M10 x 1.5  | 18.5        | 608652   | 529.78   |
| 14                                       | M12 x 1.75 | 24          | 608654   | 586.64   |
| 16                                       | M12 x 1.75 | 24          | 608656   | 589.61   |
| 17                                       | M12 x 1.75 | 24          | 608658   | 597.33   |
| 18                                       | M16 x 2.0  | 29          | 608660   | 725.05   |
| 20                                       | M16 x 2.0  | 29          | 608662   | 756.72   |

## Te-Co Economy Machinist Clamping Kit



Means Great Savings!

TE-CO Tooling Components and Sowa Tool are offering an economy line of Machinist Clamp Kits at substantial savings. Of course, the same quality and high standards of the TE-CO Premium Kits are also found in these kits. The only difference between the two is that the economy line has no TE-CO logo, no flats on studs, no t-slot cleaner and stud threads are rolled, not cut. What you will find though, is a nice price tag.

- Each set includes:
- 6 T-slot nuts
  - 6 flange nuts
  - 4 coupling nuts
  - 1/2-13 thread on nuts and studs
  - Meant to fit 5/8" table slot
  - 6 step blocks
  - 6 serrated end clamps
  - 24 studs, 4 each of 3", 4", 5", 6", 7", 8"
  - 1 Plastic holder

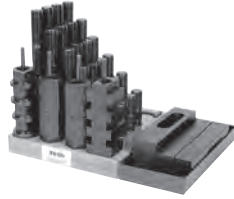


| Description                 | Code No. | Price \$ |
|-----------------------------|----------|----------|
| Economy Machinist Clamp Kit | 608000   | 194.95   |

## Te-Co Milling Machine Clamping Kits



- Bridgeport type milling machines use part no. 20506
- Versatility expanded when used with step block kits
- For material information see individual components
- 24 studs with flats of 4 each of: 3", 4", 5", 6", 7" and 8" long
- 1 holder (wooden base and metal tray)



Each Set Contains:

- 4 soft clamps – 6" long
- 1 T-nut and stud kit with includes: 4 coupling nuts, 4 flange nuts, 4 T-slot nuts, 1 T-slot cleaner

| Table T-Slot Size | Stud Size | Te-Co Part No. | Code No. | Price \$ |
|-------------------|-----------|----------------|----------|----------|
| 3/8               | 5/16-18   | 20501          | 608730   | 354.87   |
| 7/16              | 3/8-16    | 20502          | 608731   | 322.44   |
| 1/2               | 3/8-16    | 20503          | 608732   | 326.30   |
| 9/16              | 3/8-16    | 20504          | 608733   | 331.96   |
| 9/16              | 1/2-13    | 20505          | 608734   | 362.53   |
| 5/8               | 1/2-13    | 20506          | 608735   | 372.12   |
| 11/16             | 1/2-13    | 20507          | 608736   | 375.84   |
| 11/16             | 5/8-11    | 20508          | 608737   | 444.57   |
| 3/4               | 5/8-11    | 20509          | 608738   | 448.29   |
| 13/16             | 5/8-11    | 20510          | 608739   | 463.54   |
| 13/16             | 3/4-10    | 20511          | 608740   | 555.11   |
| 7/8               | 3/4-10    | 20512          | 608741   | 564.70   |
| 1                 | 3/4-10    | 20513          | 608742   | 570.49   |

## Te-Co T-Nut And Stud Sets



Each set includes:

- 24 studs 4 each 3, 4, 5, 6, 7, 8" lengths
- 4 coupling nuts
- 1 T-slot cleaner
- 4 flange nuts
- 1 holder
- 4 T-slot nuts

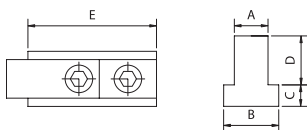


| Model No. | Table T-Slot Size | Stud Size | Code No. | Price \$ |
|-----------|-------------------|-----------|----------|----------|
| 375-TS    | 3/8               | 5/16-18   | 607066   | 157.73   |
| 437-TS    | 7/16              | 3/8-16    | 607068   | 160.84   |
| 500-TS    | 1/2               | 3/8-16    | 607070   | 166.98   |
| 560-TS    | 9/16              | 3/8-16    | 607072   | 170.43   |
| 562-TS    | 9/16              | 1/2-13    | 607074   | 182.44   |
| 625-TS    | 5/8               | 1/2-13    | 607076   | 188.44   |
| 686-TS    | 11/16             | 1/2-13    | 607078   | 191.68   |
| 687-TS    | 11/16             | 5/8-11    | 607080   | 220.73   |
| 750-TS    | 3/4               | 5/8-11    | 607082   | 245.99   |
| 8125-TS   | 13/16             | 5/8-11    | 607084   | 266.96   |
| 812-TS    | 13/16             | 3/4-10    | 607086   | 354.66   |
| 875-TS    | 7/8               | 3/4-10    | 607088   | 361.08   |
| 134-TS    | 1                 | 3/4-10    | 607090   | 369.84   |
| 1000-TS   | 1                 | 7/8-9     | 607092   | 594.64   |
| 1062-TS   | 1-1/16            | 7/8-9     | 607094   | 599.89   |
| 1125-TS   | 1-1/8             | 7/8-9     | 607096   | 624.17   |
| 10621-TS  | 1-1/16            | 1-8       | 607098   | 659.64   |

## T-Slot Clamp Sets



- 1 set consists of 4 vises
- For thin or small workpieces
- Good clamping force
- Quick setting
- Suitable for light duty cutting on milling, drilling, or EDM machines



| Model   | A    | B  | C  | D  | E  | Code No. | Price \$ |
|---------|------|----|----|----|----|----------|----------|
| CK-3712 | 11.5 | 18 | 7  | 16 | 42 | 333920   | 280.75   |
| CK-3714 | 13.5 | 22 | 8  | 18 | 42 | 333922   | 301.41   |
| CK-3716 | 15.5 | 25 | 10 | 20 | 45 | 333924   | 334.23   |
| CK-3718 | 17.5 | 28 | 11 | 24 | 45 | 333926   | 344.37   |
| CK-3720 | 19.5 | 32 | 12 | 26 | 53 | 333928   | 478.57   |

## Parallel Clamps



- Designed for maximum strength and rigidity
- Ideal for various toolmaking and machine set-ups
- Made of alloy steel, black oxide finish
- Hardened and tempered jaws
- Screw heads drilled allowing use of pin for tightening
- All sizes equipped with spring clip and retaining groove



BLACK OXIDE

| Capacity | Jaw Length | Model | Code No. | Price \$ |
|----------|------------|-------|----------|----------|
| 3-1/2"   | 5"         | PC/5  | 231294   | 56.50    |
| 6"       | 8"         | PC/8  | 231298   | 142.48   |

## Pivot Clamp (Pair)



- Adjustable clamping height
- Brass plate under the clamp arm to protect the workpiece
- Spherical flange nut assures material will be tightly clamped
- Clamping arm is forged



| Table T-Slot Size (in.) | Stud Size (in.) | Code No. | Price \$ |
|-------------------------|-----------------|----------|----------|
| <b>Inch</b>             |                 |          |          |
| 5/8                     | 1/2 - 13 x 5    | 326750   | 147.90   |
| 3/4                     | 5/8 - 11 x 6    | 326755   | 178.82   |
| <b>Metric</b>           |                 |          |          |
| 16mm                    | M12 x 5         | 326745   | 278.47   |
| 20mm                    | M16 x 6         | 326746   | 302.91   |
| 22mm                    | M20 x 7         | 326747   | 403.02   |
| 28mm                    | M24 x 8         | 326748   | 621.68   |

## U-Clamps (Pair)



- Material: S45C
- Adjustable clamping height

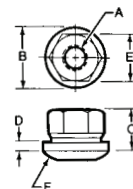


| Model   | Dimensions (LxWxH) | Stud Size | Weight 2pcs (kg) | Code No. | Price \$ |
|---------|--------------------|-----------|------------------|----------|----------|
| VCA-404 | 105x45x35mm        | M12x5"    | 1.5              | 326740   | 236.05   |
| VCA-405 | 126x54x40mm        | M16x6"    | 2.6              | 326741   | 281.15   |
| VCA-406 | 155x58x55mm        | M20x7"    | 4.2              | 326742   | 359.98   |
| VCA-408 | 190x70x65mm        | M24x8"    | 8.2              | 326743   | 578.51   |

## Spherical Flange (Collar) Nuts



- Case hardened
- Black oxide finish



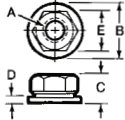
BLACK OXIDE

| Model No. | Thread A | B     | C     | D    | E       | F     | Code No. | Price \$ |
|-----------|----------|-------|-------|------|---------|-------|----------|----------|
| SFN-14    | 1/4-20   | 5/8   | 5/16  | 3/32 | 1/2     | 3/4   | 607186   | 5.31     |
| SFN-56    | 5/16-18  | 3/4   | 3/8   | 1/8  | 9/16    | 1-1/4 | 607188   | 5.60     |
| SFN-38    | 3/8-16   | 7/8   | 1/2   | 1/8  | 11/16   | 1-1/4 | 607190   | 5.74     |
| SFN-76    | 7/16-14  | 1     | 9/16  | 5/32 | 3/4     | 1-1/2 | 607192   | 6.17     |
| SFN-12    | 1/2-13   | 1-1/8 | 11/16 | 3/16 | 7/8     | 1-1/2 | 607194   | 6.46     |
| SFN-58    | 5/8-11   | 1-3/8 | 13/16 | 3/16 | 1-1/16  | 1-3/4 | 607196   | 8.35     |
| SFN-34    | 3/4-10   | 1-5/8 | 1     | 1/4  | 1-1/4   | 2-1/4 | 607198   | 11.69    |
| SFN-78    | 7/8-9    | 1-3/4 | 1-1/8 | 1/4  | 1-7/16  | 2-1/2 | 607200   | 15.80    |
| SFN-10    | 1-8      | 2     | 1-1/4 | 1/4  | 1-5/8   | 2-3/4 | 607202   | 20.04    |
| SFN-114   | 1-1/4-7  | 2-1/2 | 1-1/4 | 1/4  | 1-13/16 | 3     | 607206   | 73.55    |

# Workholding, Clamping & Fixturing

## Flange (Collar) Nuts

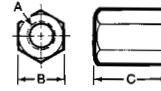
- UNC**
- Case hardened
  - Black oxide finish



| Model No.     | Thread A   | B     | C     | D    | E       | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|---------------|------------|-------|-------|------|---------|----------------|----------|--------------|----------|
| <b>Inch</b>   |            |       |       |      |         |                |          |              |          |
| FN-14         | 1/4-20     | 5/8   | 5/16  | 3/32 | 1/2     | 607164         | 3.92     | -            | -        |
| FN-56         | 5/16-18    | 3/4   | 3/8   | 1/8  | 9/16    | 607166         | 4.35     | -            | -        |
| FN-38         | 3/8-16     | 7/8   | 1/2   | 1/8  | 11/16   | 607168         | 4.64     | 333652       | 3.41     |
| FN-76         | 7/16-14    | 1     | 9/16  | 5/32 | 3/4     | 607170         | 5.22     | -            | -        |
| FN-12         | 1/2-13     | 1-1/8 | 11/16 | 3/16 | 7/8     | 607172         | 5.22     | 333654       | 4.40     |
| FN-58         | 5/8-11     | 1-3/8 | 13/16 | 3/16 | 1-1/16  | 607174         | 6.71     | 333656       | 5.21     |
| FN-34         | 3/4-10     | 1-5/8 | 1     | 1/4  | 1-1/4   | 607176         | 11.29    | 333658       | 8.41     |
| FN-78         | 7/8-9      | 1-3/4 | 1-1/8 | 1/4  | 1-7/16  | 607178         | 17.47    | -            | -        |
| FN-10         | 1-8        | 2     | 1-1/4 | 1/4  | 1-5/8   | 607180         | 21.40    | 333662       | 17.82    |
| FN-114        | 1-1/4-7    | 2-1/2 | 1-1/4 | 1/4  | 1-13/16 | 607184         | 45.61    | -            | -        |
| <b>Metric</b> |            |       |       |      |         |                |          |              |          |
| 61601         | M6 x 1.0   | 16    | 8     | 2    | 10      | 608765         | 5.16     | -            | -        |
| 61602         | M8 x 1.25  | 19    | 10    | 2.5  | 13      | 608766         | 5.31     | -            | -        |
| 61603         | M10 x 1.5  | 22    | 13    | 3    | 17      | 608767         | 6.60     | -            | -        |
| 61604         | M12 x 1.75 | 27    | 17    | 4    | 19      | 608768         | 7.18     | -            | -        |
| 61605         | M16 x 2.0  | 33    | 21    | 5    | 24      | 608769         | 8.65     | -            | -        |
| 61606         | M20 x 2.5  | 40    | 25    | 6    | 30      | 608770         | 12.14    | -            | -        |
| 61607         | M24 x 3.0  | 49    | 32    | 7    | 36      | 608771         | 20.01    | -            | -        |

## Coupling (Extension) Nuts

- Case hardened
- Black oxide finish

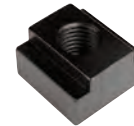
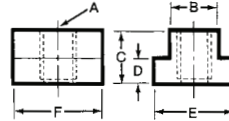


| Model No.     | Thread A (in/mm) | B (in/mm) | C (in/mm) | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|---------------|------------------|-----------|-----------|----------------|----------|--------------|----------|
| <b>Inch</b>   |                  |           |           |                |          |              |          |
| CN-14         | 1/4-20           | 1/2       | 5/8       | 607208         | 5.06     | -            | -        |
| CN-56         | 5/16-18          | 9/16      | 7/8       | 607210         | 5.52     | -            | -        |
| CN-38         | 3/8-16           | 11/16     | 1         | 607212         | 5.96     | 333672       | 4.25     |
| CN-76         | 7/16-14          | 3/4       | 1-1/4     | 607214         | 6.86     | -            | -        |
| CN-12         | 1/2-13           | 7/8       | 1-1/4     | 607216         | 7.30     | 333674       | 5.14     |
| CN-58         | 5/8-11           | 1-1/16    | 1-5/8     | 607218         | 10.58    | 333676       | 7.49     |
| CN-34         | 3/4-10           | 1-1/4     | 1-7/8     | 607220         | 14.49    | 333678       | 10.37    |
| CN-78         | 7/8-9            | 1-7/16    | 2-1/4     | 607222         | 21.94    | -            | -        |
| CN-10         | 1-8              | 1-5/8     | 2-1/2     | 607224         | 22.63    | -            | -        |
| <b>Metric</b> |                  |           |           |                |          |              |          |
| 61501         | M6 x 1.00        | 13        | 16        | 608772         | 8.20     | -            | -        |
| 61502         | M8 x 1.25        | 14        | 19        | 608773         | 8.20     | -            | -        |
| 61503         | M10 x 1.5        | 16        | 24        | 608774         | 8.79     | -            | -        |
| 61504         | M12 x 1.75       | 22        | 32        | 608775         | 11.33    | -            | -        |
| 61505         | M16 x 2.0        | 27        | 40        | 608776         | 14.63    | -            | -        |
| 61506         | M20 x 2.5        | 32        | 51        | 608777         | 20.15    | -            | -        |
| 61507         | M24 x 3.0        | 38        | 64        | 608778         | 27.74    | -            | -        |

## T-Slot Nuts — Inch

Last thread incomplete to prevent stud from turning through bottom of nut into machine table.

- Case hardened
- Black oxide finish
- Tapped through T-nuts available upon request



| Model No.     | Table Slot | Thread A         | B             | C      | D      | E      | F      | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|---------------|------------|------------------|---------------|--------|--------|--------|--------|----------------|----------|--------------|----------|
| <b>Inch</b>   |            |                  |               |        |        |        |        |                |          |              |          |
| 373           | 5/16       | 1/4-20           | 0.304         | 1/4    | 0.177  | 9/16   | 9/16   | 607100         | 6.17     | -            | -        |
| 374           | 3/8        | 1/4-20           | 0.367         | 3/8    | 0.224  | 9/16   | 9/16   | 607102         | 6.32     | -            | -        |
| 375           | 3/8        | 5/16-18          | 0.367         | 3/8    | 0.240  | 5/8    | 7/8    | 607104         | 5.31     | -            | -        |
| 437           | 7/16       | 3/8-16           | 0.427         | 1/2    | 0.208  | 11/16  | 7/8    | 607106         | 5.31     | 333604       | 3.90     |
| 500           | 1/2        | 3/8-16           | 0.490         | 1/2    | 0.271  | 7/8    | 7/8    | 607108         | 5.31     | 333606       | 3.90     |
| 562           | 9/16       | 3/8-16           | 0.552         | 5/8    | 0.333  | 7/8    | 1-1/8  | 607110         | 6.03     | 333608       | 4.49     |
| 501           | 1/2        | 7/16-14          | 0.490         | 1/2    | 0.271  | 7/8    | 7/8    | 607112         | 7.31     | -            | -        |
| 502           | 1/2        | 7/16-14          | 0.490         | 3/8    | 0.208  | 3/4    | 7/8    | 607114         | 7.04     | -            | -        |
| 563           | 9/16       | 1/2-13           | 0.552         | 5/8    | 0.333  | 7/8    | 1-1/8  | 607116         | 5.88     | 333614       | 4.37     |
| 625           | 5/8        | 1/2-13           | 0.615         | 5/8    | 0.333  | 1      | 1-1/8  | 607118         | 6.60     | 333616       | 4.96     |
| 626           | 5/8        | 1/2-13           | 0.615         | 3/4    | 0.365  | 1-1/8  | 1-1/8  | 607120         | 8.75     | -            | -        |
| 687           | 11/16      | 1/2-13           | 0.677         | 3/4    | 0.427  | 1-1/8  | 1-1/4  | 607122         | 7.18     | 333618       | 5.33     |
| 750           | 3/4        | 1/2-13           | 0.740         | 3/4    | 0.458  | 1-1/4  | 1-1/4  | 607124         | 9.76     | -            | -        |
| 688           | 11/16      | 5/8-11           | 0.677         | 3/4    | 0.427  | 1-1/8  | 1-1/4  | 607128         | 7.60     | 333620       | 5.62     |
| 751           | 3/4        | 5/8-11           | 0.740         | 3/4    | 0.458  | 1-1/4  | 1-1/4  | 607130         | 7.89     | 333622       | 5.91     |
| 812           | 13/16      | 5/8-11           | 0.802         | 1      | 0.552  | 1-1/4  | 1-1/2  | 607132         | 11.48    | 333624       | 8.53     |
| 813           | 13/16      | 3/4-10           | 0.802         | 1      | 0.552  | 1-1/4  | 1-1/2  | 607134         | 12.63    | 333626       | 9.41     |
| 875           | 7/8        | 3/4-10           | 0.865         | 1      | 0.552  | 1-1/2  | 1-1/2  | 607136         | 13.63    | 333628       | 10.18    |
| 1000          | 1          | 3/4-10           | 0.990         | 1      | 0.615  | 1-5/8  | 1-3/4  | 607138         | 15.53    | 333630       | 14.62    |
| 1000-34       | 1          | 3/4-10           | 0.990         | 1-1/2  | 0.750  | 1-3/4  | 1-3/4  | 607140         | 23.12    | -            | -        |
| 1010          | 1-1/16     | 3/4-10           | 1.052         | 1-1/8  | 0.677  | 1-5/8  | 2      | 607142         | 18.08    | 333632       | 17.82    |
| 1001          | 1          | 7/8-9            | 0.990         | 1      | 0.615  | 1-5/8  | 1-3/4  | 607144         | 16.35    | -            | -        |
| 1062          | 1-1/16     | 7/8-9            | 1.052         | 1-1/8  | 0.677  | 1-5/8  | 2      | 607146         | 21.53    | -            | -        |
| 1125          | 1-1/8      | 7/8-9            | 1.115         | 1-1/2  | 0.740  | 1-3/4  | 2      | 607148         | 27.67    | -            | -        |
| 1063          | 1-1/16     | 1-8              | 1.052         | 1-1/8  | 0.677  | 1-5/8  | 2      | 607150         | 39.88    | 333636       | 29.70    |
| 1126          | 1-1/8      | 1-8              | 1.115         | 1-1/2  | 0.740  | 1-3/4  | 2      | 607152         | 39.88    | -            | -        |
| 1250          | 1-1/4      | 1-8              | 1.237         | 1-1/4  | 0.865  | 2      | 2      | 607154         | 40.50    | -            | -        |
| 1310          | 1-5/16     | 7/8-9            | 1.302         | 1-1/4  | 0.927  | 2      | 2      | 607156         | 40.92    | -            | -        |
| 1311          | 1-5/16     | 1-8              | 1.302         | 1-1/4  | 0.927  | 2      | 2      | 607158         | 35.88    | -            | -        |
| 1375          | 1-3/8      | 1-1/4-7          | 1.362         | 1-3/4  | 1.115  | 2-1/2  | 2-1/2  | 607162         | 76.52    | -            | -        |
| <b>Metric</b> |            |                  |               |        |        |        |        |                |          |              |          |
| Model No.     | Table Slot | Table Slot (in.) | Thread A (mm) | C (mm) | D (mm) | E (mm) | F (mm) | Te-Co Code No. | Price \$ |              |          |
| 61401         | 8          | 5/16             | M6 x 1.0      | 10     | 6      | 14     | 19     | 608750         | 7.60     | -            | -        |
| 61402         | 10         | 7/16             | M6 x 1.0      | 11     | 6      | 16     | 22     | 608751         | 8.75     | -            | -        |
| 61403         | 10         | 7/16             | M8 x 1.25     | 11     | 6      | 16     | 22     | 608752         | 8.75     | -            | -        |
| 61404         | 12         | 1/2              | M10 x 1.5     | 13     | 7      | 19     | 22     | 608753         | 8.75     | -            | -        |
| 61405         | 14         | 9/16             | M10 x 1.5     | 16     | 9      | 22     | 29     | 608754         | 10.34    | -            | -        |
| 61406         | 14         | 9/16             | M12 x 1.75    | 16     | 9      | 22     | 29     | 608755         | 10.34    | -            | -        |
| 61407         | 16         | 5/8              | M12 x 1.75    | 16     | 9      | 25     | 29     | 608756         | 10.34    | -            | -        |
| 61408         | 17         | 11/16            | M12 x 1.75    | 19     | 11     | 29     | 32     | 608757         | 12.34    | -            | -        |
| 61409         | 18         | 3/4              | M16 x 2.0     | 19     | 11     | 29     | 32     | 608758         | 12.34    | -            | -        |
| 61410         | 21         | 13/16            | M16 x 2.0     | 25     | 14     | 32     | 38     | 608759         | 13.50    | -            | -        |
| 61411         | 22         | 7/8              | M20 x 2.5     | 25     | 14     | 35     | 38     | 608760         | 14.90    | -            | -        |
| 61412         | 27         | 1-1/16           | M24 x 3.0     | 29     | 18     | 41     | 51     | 608761         | 21.80    | -            | -        |
| 61413         | 33         | 1-5/16           | M24 x 3.0     | 32     | 24     | 51     | 51     | 608762         | 27.12    | -            | -        |



## Te-Co Tugger™ T-Slot Bolts

- Medium Carbon Steel
- Heat treat quoted on request
- Threads Class 2A UNC
- Black oxide finish



| Length | 3/8-16 Code No. | Price \$ | 1/2-13 Code No. | Price \$ | 5/8-11 Code No. | Price \$ | 3/4-10 Code No. | Price \$ | 7/8-9 Code No. | Price \$ | 1-8 Code No. | Price \$ |
|--------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|----------------|----------|--------------|----------|
| 1-1/2  | 607244          | 15.66    | 607314          | 16.08    | -               | -        | -               | -        | -              | -        | -            | -        |
| 2      | 607248          | 16.22    | 607318          | 16.56    | 607388          | 16.70    | 607456          | 22.36    | -              | -        | -            | -        |
| 2-1/2  | 607252          | 16.56    | 607322          | 16.97    | 607392          | 17.39    | 607458          | 23.25    | -              | -        | -            | -        |
| 3      | 607256          | 16.97    | 607326          | 17.87    | 607396          | 18.42    | 607460          | 24.15    | 607484         | 38.30    | 607508       | 42.99    |
| 3-1/2  | 607258          | 17.53    | 607328          | 18.29    | 607398          | 19.18    | 607462          | 24.56    | -              | -        | -            | -        |
| 4      | 607260          | 17.87    | 607330          | 18.70    | 607400          | 19.73    | 607464          | 25.88    | 607486         | 41.12    | 607510       | 46.09    |
| 4-1/2  | 607278          | 18.42    | 607332          | 19.46    | 607402          | 20.36    | 607466          | 28.50    | -              | -        | -            | -        |
| 5      | 607280          | 18.70    | 607334          | 19.87    | 607404          | 21.18    | 607468          | 29.12    | 607488         | 43.61    | 607512       | 49.27    |
| 5-1/2  | 607282          | 19.60    | 607336          | 20.36    | 607408          | 21.94    | 607470          | 30.43    | -              | -        | -            | -        |
| 6      | 607284          | 20.01    | 607338          | 21.05    | 607410          | 22.70    | 607472          | 31.60    | 607490         | 47.40    | 607514       | 53.27    |
| 7      | 607286          | 20.36    | 607340          | 21.67    | 607412          | 23.87    | 607474          | 32.15    | 607492         | 53.41    | 607516       | 55.89    |
| 8      | -               | -        | 607342          | 22.36    | 607414          | 25.74    | 607476          | 33.47    | 607494         | 54.10    | 607518       | 59.27    |
| 9      | -               | -        | 607344          | 24.01    | 607416          | 27.67    | 607478          | 35.26    | 607496         | 59.82    | 607520       | 65.41    |
| 10     | -               | -        | 607346          | 27.53    | 607418          | 29.39    | 607480          | 37.47    | 607498         | 61.13    | 607522       | 71.97    |
| 12     | -               | -        | 607348          | 29.12    | 607420          | 32.64    | 607482          | 41.12    | 607500         | 62.58    | 607524       | 80.87    |
| 14     | -               | -        | -               | -        | -               | -        | -               | -        | 607502         | 64.38    | 607526       | 82.94    |
| 16     | -               | -        | -               | -        | -               | -        | -               | -        | 607504         | 67.28    | 607528       | 85.84    |
| 18     | -               | -        | -               | -        | -               | -        | -               | -        | 607506         | 69.07    | 607530       | 87.22    |

## Driver Studs — Inch

- Black oxide finish
- Medium carbon steel
- Most studs have wrench flats
- Special lengths and sizes will be quoted on request



| Length | Te-Co 1/4-20 Code No. | Price \$ | Te-Co 5/16-18 Code No. | Price \$ | Te-Co 3/8-16 Code No. | Price \$ | STM 3/8-16 Code No. | Price \$ | Te-Co 7/16-14 Code No. | Price \$ | Te-Co 1/2-13 Code No. | Price \$ | STM 1/2-13 Code No. | Price \$ |
|--------|-----------------------|----------|------------------------|----------|-----------------------|----------|---------------------|----------|------------------------|----------|-----------------------|----------|---------------------|----------|
| 1-1/2  | 607532                | 3.34     | 607560                 | 3.63     | 607586                | 3.19     | -                   | -        | 607614                 | 5.66     | 607642                | 3.30     | -                   | -        |
| 2      | 607534                | 3.34     | 607562                 | 3.77     | 607588                | 3.19     | -                   | -        | 607616                 | 5.37     | 607644                | 3.45     | -                   | -        |
| 2-1/2  | 607536                | 3.34     | 607564                 | 3.77     | 607590                | 3.19     | -                   | -        | 607618                 | 5.66     | 607646                | 3.30     | -                   | -        |
| 3      | 607538                | 3.34     | 607566                 | 3.92     | 607592                | 3.19     | 333718              | 2.42     | 607620                 | 5.96     | 607648                | 3.45     | 333734              | 2.99     |
| 3-1/2  | 607540                | 3.48     | 607568                 | 4.06     | 607594                | 3.19     | -                   | -        | 607622                 | 5.96     | 607650                | 3.59     | -                   | -        |
| 4      | 607542                | 3.48     | 607570                 | 4.06     | 607596                | 3.34     | 333720              | 2.60     | 607624                 | 6.11     | 607652                | 3.73     | 333736              | 3.20     |
| 4-1/2  | 607544                | 3.63     | 607572                 | 4.06     | 607598                | 3.34     | -                   | -        | 607626                 | 6.27     | 607654                | 3.73     | -                   | -        |
| 5      | 607546                | 3.63     | 607574                 | 4.21     | 607600                | 3.34     | 333722              | 2.81     | 607628                 | 6.27     | 607656                | 3.88     | 333738              | 3.41     |
| 5-1/2  | 607548                | 3.63     | 607575                 | 4.21     | 607602                | 3.48     | -                   | -        | 607630                 | 6.40     | 607658                | 3.88     | -                   | -        |
| 6      | 607550                | 3.63     | 607576                 | 4.35     | 607604                | 3.48     | 333724              | 2.99     | 607632                 | 6.56     | 607660                | 4.02     | 333740              | 3.81     |
| 6-1/2  | 607552                | 3.63     | 607578                 | 4.50     | 607606                | 3.63     | -                   | -        | 607634                 | 6.71     | 607662                | 4.31     | -                   | -        |
| 7      | 607554                | 3.63     | 607580                 | 4.50     | 607608                | 3.63     | 333726              | 3.41     | 607636                 | 6.71     | 607664                | 4.44     | 333742              | 4.21     |
| 7-1/2  | 607556                | 3.63     | 607582                 | 4.64     | 607610                | 3.63     | -                   | -        | 607638                 | 6.86     | 607666                | 4.60     | -                   | -        |
| 8      | 607558                | 3.77     | 607584                 | 4.64     | 607612                | 3.63     | 333728              | 3.61     | 607640                 | 6.86     | 607668                | 4.73     | 333744              | 4.61     |
| 9      | -                     | -        | -                      | -        | -                     | -        | -                   | -        | -                      | -        | 607670                | 8.90     | -                   | -        |
| 10     | -                     | -        | -                      | -        | -                     | -        | -                   | -        | -                      | -        | 607672                | 10.05    | -                   | -        |
| 12     | -                     | -        | -                      | -        | -                     | -        | -                   | -        | -                      | -        | 607674                | 12.20    | -                   | -        |
| 14     | -                     | -        | -                      | -        | -                     | -        | -                   | -        | -                      | -        | 607676                | 13.50    | 333748              | 10.18    |
| 16     | -                     | -        | -                      | -        | -                     | -        | -                   | -        | -                      | -        | 607678                | 17.25    | 333749              | 13.00    |

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Images are representational only and may not reflect actual product.

# Workholding, Clamping & Fixturing

## Driver Studs — Inch — Cont'd



- Black oxide finish
- Medium carbon steel
- Most studs have wrench flats
- Special lengths and sizes will be quoted on request



| Length | Te-Co<br>5/8-11<br>Code No. | Price \$ | STM<br>5/8-11<br>Code No. | Price \$ | Te-Co<br>3/4-10<br>Code No. | Price \$ | STM<br>3/4-10<br>Code No. | Price \$ | Te-Co<br>7/8-9<br>Code No. | Price \$ | STM<br>7/8-9<br>Code No. | Price \$ | Te-Co<br>1-8<br>Code No. | Price \$ | STM<br>1-8<br>Code No. | Price \$ |
|--------|-----------------------------|----------|---------------------------|----------|-----------------------------|----------|---------------------------|----------|----------------------------|----------|--------------------------|----------|--------------------------|----------|------------------------|----------|
| 1-1/2  | 607688                      | 4.64     | -                         | -        | -                           | -        | -                         | -        | -                          | -        | -                        | -        | -                        | -        | -                      | -        |
| 2      | 607690                      | 4.35     | -                         | -        | -                           | -        | -                         | -        | -                          | -        | -                        | -        | -                        | -        | -                      | -        |
| 2-1/2  | 607692                      | 4.21     | -                         | -        | -                           | -        | -                         | -        | -                          | -        | -                        | -        | -                        | -        | -                      | -        |
| 3      | 607694                      | 4.35     | 333757                    | 3.52     | 607734                      | 5.12     | 333780                    | 4.00     | 607774                     | 11.45    | 333804                   | 8.67     | 607814                   | 14.63    | 333827                 | 10.77    |
| 3-1/2  | 607696                      | 4.64     | -                         | -        | 607736                      | 5.55     | -                         | -        | 607776                     | 12.03    | -                        | -        | 607816                   | 15.25    | -                      | -        |
| 4      | 607698                      | 4.64     | 333759                    | 4.05     | 607738                      | 5.82     | 333782                    | 4.80     | 607778                     | 12.90    | 333806                   | 9.85     | 607818                   | 15.66    | 333829                 | 11.49    |
| 4-1/2  | 607700                      | 4.93     | -                         | -        | 607740                      | 6.40     | -                         | -        | 607780                     | 13.94    | -                        | -        | 607820                   | 16.70    | -                      | -        |
| 5      | 607702                      | 5.22     | 333761                    | 4.21     | 607742                      | 6.54     | 333784                    | 5.41     | 607782                     | 14.63    | 333808                   | 11.16    | 607822                   | 17.66    | 333831                 | 13.02    |
| 5-1/2  | 607704                      | 5.37     | -                         | -        | 607744                      | 6.97     | -                         | -        | 607784                     | 15.66    | -                        | -        | 607824                   | 18.56    | -                      | -        |
| 6      | 607706                      | 5.66     | 333763                    | 4.80     | 607746                      | 7.25     | 333786                    | 6.21     | 607786                     | 16.08    | 333810                   | 12.25    | 607826                   | 19.25    | -                      | -        |
| 6-1/2  | 607708                      | 5.95     | -                         | -        | 607748                      | 7.67     | -                         | -        | 607788                     | 16.84    | -                        | -        | 607828                   | 20.01    | -                      | -        |
| 7      | 607710                      | 6.09     | 333765                    | 5.21     | 607750                      | 7.82     | 333788                    | 7.01     | 607790                     | 17.94    | 333812                   | 13.67    | 607830                   | 20.42    | -                      | -        |
| 7-1/2  | 607712                      | 6.67     | -                         | -        | 607752                      | 8.39     | -                         | -        | 607792                     | 18.56    | -                        | -        | 607832                   | 21.74    | -                      | -        |
| 8      | 607714                      | 6.67     | 333767                    | 6.01     | 607754                      | 8.39     | 333790                    | 7.81     | 607794                     | 20.01    | 333814                   | 15.28    | 607834                   | 22.77    | -                      | -        |
| 9      | 607716                      | 11.45    | 333768                    | 8.82     | 607756                      | 15.32    | -                         | -        | 607796                     | 22.91    | -                        | -        | 607836                   | 28.57    | -                      | -        |
| 10     | 607718                      | 12.61    | 333769                    | 9.61     | 607758                      | 16.77    | 333792                    | 12.78    | 607798                     | 24.91    | 333816                   | 19.02    | 607838                   | 30.15    | 333839                 | 22.21    |
| 12     | 607720                      | 13.94    | 333770                    | 11.42    | 607760                      | 18.91    | 333793                    | 14.39    | 607800                     | 26.84    | 333817                   | 20.47    | 607840                   | 33.74    | 333840                 | 24.87    |
| 14     | 607722                      | 16.22    | 333771                    | 13.01    | 607762                      | 20.49    | 333794                    | 15.64    | 607802                     | 29.12    | 333818                   | 22.25    | 607842                   | 37.26    | 333841                 | 27.41    |
| 16     | 607724                      | 18.56    | 333772                    | 14.62    | 607764                      | 22.43    | 333795                    | 17.41    | 607804                     | 31.74    | 333819                   | 24.20    | 607844                   | 40.30    | 333842                 | 29.69    |
| 18     | 607726                      | 20.42    | 333773                    | 16.62    | 607766                      | 24.01    | 333796                    | 18.40    | 607806                     | 34.22    | 333820                   | 26.17    | 607846                   | 44.78    | 333843                 | 32.97    |
| 20     | 607728                      | 22.91    | 333774                    | 18.22    | 607768                      | 26.01    | 333798                    | 19.93    | 607808                     | 36.64    | 333821                   | 28.06    | 607848                   | 48.71    | 333844                 | 35.81    |
| 22     | 607730                      | 26.22    | -                         | -        | 607770                      | 28.98    | -                         | -        | 607810                     | 41.12    | -                        | -        | 607850                   | 56.51    | -                      | -        |
| 24     | 607732                      | 28.29    | -                         | -        | 607772                      | 31.40    | -                         | -        | 607812                     | 47.54    | -                        | -        | 607852                   | 61.13    | -                      | -        |

## Driver Studs — Metric



- Black oxide finish
- Medium carbon steel
- Special lengths and sizes will be quoted on request
- Metric studs do not have flats



| Length<br>(mm) | M6 x 1<br>Code No. | Price \$ | M8 x 1.25<br>Code No. | Price \$ | M10 x 1.5<br>Code No. | Price \$ | M12 x 1.75<br>Code No. | Price \$ | M16 x 2.0<br>Code No. | Price \$ | M20 x 2.5<br>Code No. | Price \$ | M24 x 3.0<br>Code No. | Price \$ |
|----------------|--------------------|----------|-----------------------|----------|-----------------------|----------|------------------------|----------|-----------------------|----------|-----------------------|----------|-----------------------|----------|
| 50             | 608848             | 5.55     | 608857                | 4.40     | 608866                | 4.40     | 608876                 | 5.26     | -                     | -        | -                     | -        | -                     | -        |
| 65             | 608849             | 5.82     | 608858                | 4.55     | 608867                | 4.40     | 608877                 | 5.40     | -                     | -        | -                     | -        | -                     | -        |
| 80             | 608850             | 6.68     | 608859                | 4.69     | 608868                | 4.40     | 608878                 | 5.69     | 608886                | 6.54     | 608895                | 8.24     | -                     | -        |
| 95             | 608851             | 6.97     | 608860                | 5.12     | 608869                | 4.55     | 608879                 | 5.82     | 608887                | 6.97     | 608896                | 8.96     | -                     | -        |
| 100            | -                  | -        | -                     | -        | -                     | -        | -                      | -        | -                     | -        | -                     | -        | 608904                | 13.94    |
| 110            | 608852             | 6.97     | 608861                | 5.12     | 608870                | 4.55     | 608880                 | 6.11     | 608888                | 7.25     | 608897                | 9.81     | -                     | -        |
| 125            | -                  | -        | -                     | -        | -                     | -        | 608881                 | 6.25     | 608889                | 7.96     | 608898                | 10.94    | 608905                | 16.08    |
| 140            | 608853             | 7.67     | 608862                | 5.82     | 608872                | 5.12     | 608882                 | 6.40     | -                     | -        | -                     | -        | -                     | -        |
| 150            | 608854             | 7.82     | 608863                | 5.98     | 608873                | 5.26     | 608883                 | 7.11     | 608890                | 8.24     | 608899                | 11.94    | 608906                | 17.94    |
| 175            | 608855             | 8.24     | 608864                | 6.25     | 608874                | 5.40     | 608884                 | 7.67     | 608891                | 8.67     | 608900                | 12.65    | 608907                | 19.04    |
| 200            | 608856             | 8.53     | 608865                | 6.68     | 608875                | 5.55     | 608885                 | 7.96     | 608892                | 9.38     | 608901                | 13.65    | 608908                | 20.01    |
| 250            | -                  | -        | -                     | -        | -                     | -        | -                      | -        | 608893                | 13.08    | 608902                | 18.49    | -                     | -        |
| 300            | -                  | -        | -                     | -        | -                     | -        | -                      | -        | 608894                | 13.08    | 608903                | 18.91    | 608910                | 28.98    |

## Driver Studs Various Lengths — Metric



- Black oxide finish
- Medium carbon steel

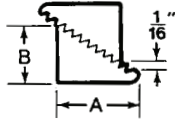


| Model No. | Thread (mm) | Overall Length (mm) | Long Thread Length (mm) | Short Thread Length (mm) | Code No. | Price \$ |
|-----------|-------------|---------------------|-------------------------|--------------------------|----------|----------|
| 60251     | M6 x 1.0    | 50                  | 20                      | 12                       | 608810   | 5.69     |
| 60252     | M6 x 1.0    | 65                  | 20                      | 12                       | 608811   | 6.11     |
| 60253     | M6 x 1.0    | 80                  | 27                      | 12                       | 608812   | 6.82     |
| 60254     | M6 x 1.0    | 95                  | 27                      | 12                       | 608813   | 7.11     |
| 60255     | M6 x 1.0    | 110                 | 31                      | 12                       | 608814   | 7.11     |
| 60351     | M8 x 1.25   | 50                  | 20                      | 12                       | 608815   | 4.55     |
| 60352     | M8 x 1.25   | 65                  | 20                      | 12                       | 608816   | 4.69     |
| 60353     | M8 x 1.25   | 80                  | 27                      | 12                       | 608817   | 4.98     |
| 60354     | M8 x 1.25   | 95                  | 31                      | 12                       | 608818   | 5.12     |
| 60355     | M8 x 1.25   | 110                 | 31                      | 12                       | 608819   | 5.26     |
| 60356     | M8 x 1.25   | 140                 | 35                      | 12                       | 608820   | 5.98     |
| 60451     | M10 x 1.5   | 50                  | 20                      | 16                       | 608821   | 4.55     |
| 60452     | M10 x 1.5   | 65                  | 20                      | 16                       | 608822   | 4.55     |
| 60453     | M10 x 1.5   | 80                  | 27                      | 16                       | 608823   | 4.55     |
| 60454     | M10 x 1.5   | 95                  | 31                      | 16                       | 608824   | 4.69     |
| 60455     | M10 x 1.5   | 110                 | 35                      | 16                       | 608825   | 4.69     |
| 60456     | M10 x 1.5   | 140                 | 35                      | 16                       | 608826   | 5.26     |
| 60551     | M12 x 1.75  | 50                  | 20                      | 16                       | 608827   | 5.40     |
| 60552     | M12 x 1.75  | 65                  | 20                      | 16                       | 608828   | 5.55     |
| 60553     | M12 x 1.75  | 80                  | 27                      | 16                       | 608829   | 5.82     |
| 60554     | M12 x 1.75  | 95                  | 31                      | 16                       | 608830   | 6.11     |
| 60555     | M12 x 1.75  | 110                 | 39                      | 16                       | 608831   | 6.40     |
| 60556     | M12 x 1.75  | 140                 | 39                      | 16                       | 608832   | 6.68     |
| 60557     | M12 x 1.75  | 175                 | 39                      | 16                       | 608833   | 7.96     |
| 60558     | M12 x 1.75  | 200                 | 39                      | 16                       | 608834   | 8.39     |
| 60651     | M16 x 2.0   | 80                  | 21                      | 18                       | 608835   | 6.82     |
| 60652     | M16 x 2.0   | 110                 | 47                      | 18                       | 608836   | 7.53     |
| 60653     | M16 x 2.0   | 150                 | 47                      | 18                       | 608837   | 8.82     |
| 60654     | M16 x 2.0   | 175                 | 47                      | 18                       | 608838   | 8.96     |
| 60655     | M16 x 2.0   | 200                 | 47                      | 18                       | 608839   | 9.66     |
| 60656     | M16 x 2.0   | 250                 | 47                      | 18                       | 608840   | 13.51    |
| 60751     | M20 x 2.5   | 80                  | 27                      | 20                       | 608841   | 8.53     |
| 60752     | M20 x 2.5   | 110                 | 47                      | 20                       | 608842   | 10.24    |
| 60753     | M20 x 2.5   | 150                 | 55                      | 20                       | 608843   | 12.50    |
| 60754     | M20 x 2.5   | 175                 | 55                      | 20                       | 608844   | 13.22    |
| 60755     | M20 x 2.5   | 200                 | 55                      | 20                       | 608845   | 14.21    |
| 60851     | M24 x 3.0   | 160                 | 35                      | 100                      | 608846   | 18.22    |
| 60852     | M24 x 3.0   | 300                 | 35                      | 100                      | 608847   | 29.26    |

## Steel Step Blocks



- Case hardened
- Black oxide finish
- Teeth match all serrated end clamps



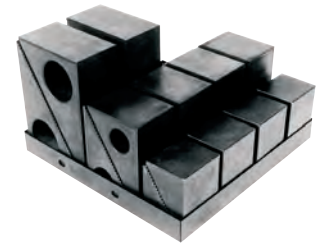
**NOTE:**  
2 pieces = 1 block

| Width (in.) | A (in.) | B (in.) | Height Adj. Range (in.) | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|-------------|---------|---------|-------------------------|----------------|----------|--------------|----------|
| 1           | 1-1/16  | 11/16   | 3/4-1-5/8               | 608005         | 11.39    | 333875       | 11.81    |
| 1           | 1-39/64 | 1-1/16  | 1-1/8-2-1/2             | 608010         | 16.22    | 333876       | 16.01    |
| 1           | 3-3/4   | 2-15/32 | 2-1/2-6                 | 608015         | 39.19    | 333877       | 46.05    |
| 1-1/2       | 2-17/32 | 1-43/64 | 1-3/4-4                 | 608020         | 28.08    | 333878       | 20.48    |
| 1-1/2       | 3-3/4   | 2-15/32 | 2-1/2-6                 | 608025         | 55.55    | 333879       | 40.58    |
| 1-1/2       | 5-21/64 | 3-7/16  | 3-1/2-9                 | 608030         | 100.05   | 333880       | 73.12    |
| 2           | 2-17/32 | 1-43/64 | 1-3/4-4                 | 608035         | 46.58    | -            | -        |
| 2           | 3-3/4   | 2-15/32 | 2-1/2-6                 | 608040         | 70.73    | -            | -        |
| 2           | 5-21/64 | 3-7/16  | 3-1/2-9                 | 608045         | 129.79   | -            | -        |
| 2           | 7-3/8   | 4-3/4   | 4-7/8-10-1/2            | 608050         | 393.30   | -            | -        |

## Te-Co Steel Step Block Clamp Kits



- Kit contains 10 blocks and one holder
- Versatility is expanded when a T-Nut and Stud Kit is used
- Two halves = one block
- Aluminum step blocks also available

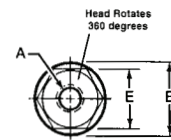


| Model No. | Contains 4 ea. | Contains 4 ea. | Contains 2 ea. | Kit Code No. | Price \$ |
|-----------|----------------|----------------|----------------|--------------|----------|
| 20801     | 608005         | 608010         | 608015         | 607898       | 194.03   |
| 20805     | 608020         | 608025         | 608030         | 607900       | 582.15   |
| 20807     | 608035         | 608040         | 608045         | 607902       | 747.96   |

## Swivel Flange Nuts



- Black oxide finish
- Case hardened
- 12L14 material

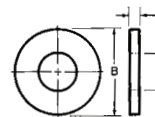


| Thread A | B     | Overall Height | Flange Height | E      | Weight (lb/100) | Model No. | Code No. | Price \$ |
|----------|-------|----------------|---------------|--------|-----------------|-----------|----------|----------|
| 1/4-20   | 5/8   | 3/8            | 1/8           | 1/2    | 2               | 42001     | 608290   | 8.35     |
| 5/16-18  | 3/4   | 7/16           | 9/64          | 9/16   | 3               | 42002     | 608291   | 8.80     |
| 3/8-16   | 7/8   | 17/32          | 5/32          | 11/16  | 4               | 42003     | 608292   | 9.72     |
| 1/2-13   | 1-1/8 | 23/32          | 7/32          | 7/8    | 11              | 42004     | 608293   | 11.08    |
| 5/8-11   | 1-3/8 | 29/32          | 1/4           | 1-1/16 | 18              | 42005     | 608294   | 14.15    |
| 3/4-10   | 1-5/8 | 1-1/64         | 9/32          | 1-1/4  | 28              | 42006     | 608295   | 17.46    |
| 7/8-9    | 1-3/4 | 1-1/8          | 7/16          | 1-7/16 | 41              | 42007     | 608296   | 26.15    |
| 1-8      | 2     | 1-16/64        | 15/32         | 1-5/8  | 57              | 42008     | 608297   | 34.36    |

## Flat Washers



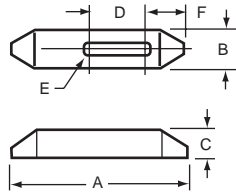
- Black oxide finish
- Case hardened
- C1010 material



| Stud Size | A      | B     | C    | Code No. | Price \$ |
|-----------|--------|-------|------|----------|----------|
| 3/16      | 13/64  | 1/2   | 3/32 | 608100   | 0.81     |
| 1/4       | 9/32   | 5/8   | 1/8  | 608105   | 0.87     |
| 5/16      | 11/32  | 3/4   | 1/8  | 608110   | 0.92     |
| 3/8       | 13/32  | 7/8   | 1/8  | 608115   | 0.95     |
| 7/16      | 15/32  | 1     | 1/8  | 608120   | 1.16     |
| 1/2       | 17/32  | 1-1/8 | 1/8  | 608125   | 1.16     |
| 5/8       | 21/32  | 1-3/8 | 1/8  | 608130   | 1.42     |
| 3/4       | 25/32  | 1-5/8 | 5/32 | 608135   | 2.00     |
| 7/8       | 29/32  | 1-3/4 | 5/32 | 608140   | 2.77     |
| 1         | 1-1/32 | 2     | 3/16 | 608145   | 3.71     |
| 1-1/8     | 1-5/32 | 2-1/4 | 7/32 | 608150   | 7.89     |
| 1-1/4     | 1-9/32 | 2-1/2 | 9/32 | 608155   | 7.89     |

## Plain Clamps

- Case hardened
- Black oxide finish

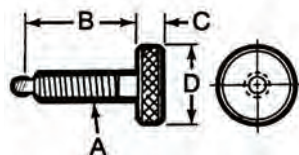


BLACK OXIDE

| Model No.     | A     | B     | C     | D       | Stud Size E  | F       | Weight (lb/100) | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|---------------|-------|-------|-------|---------|--------------|---------|-----------------|----------------|----------|--------------|----------|
| <b>Inch</b>   |       |       |       |         |              |         |                 |                |          |              |          |
| P-3825        | 2-1/2 | 1     | 1/2   | 13/16   | 5/16 and 3/8 | 27/32   | 24              | 607948         | 19.60    | -            | -        |
| P-384         | 4     | 1     | 5/8   | 1-7/16  | 5/16 and 3/8 | 1-1/32  | 48              | 607950         | 26.15    | -            | -        |
| P-386         | 6     | 1-1/8 | 3/4   | 2-3/16  | 5/16 and 3/8 | 1-5/32  | 105             | 607952         | 33.95    | -            | -        |
| P-1225        | 2-1/2 | 1-1/8 | 1/2   | 11/16   | 1/2          | 29/32   | 24              | 607954         | 22.77    | 333862       | 17.61    |
| P-124         | 4     | 1-1/4 | 3/4   | 1-5/16  | 1/2          | 1-5/32  | 67              | 607956         | 30.57    | 333864       | 36.84    |
| P-126         | 6     | 1-1/4 | 7/8   | 2-1/16  | 1/2          | 1-9/32  | 37              | 607958         | 37.67    | 333866       | 47.33    |
| P-5825        | 2-1/2 | 1-1/4 | 5/8   | 9/16    | 5/8          | 31/32   | 31              | 607960         | 26.57    | 333868       | 20.11    |
| P-584         | 4     | 1-1/2 | 3/4   | 1-3/16  | 5/8          | 1-9/32  | 83              | 607962         | 33.40    | 333870       | 37.77    |
| P-586         | 6     | 1-1/2 | 7/8   | 1-15/16 | 5/8          | 1-13/32 | 150             | 607964         | 42.92    | 333872       | 46.05    |
| P-344         | 4     | 1-1/2 | 3/4   | 1-1/16  | 3/4          | 1-11/32 | 75              | 607966         | 35.67    | -            | -        |
| P-346         | 6     | 1-1/2 | 1     | 1-15/16 | 3/4          | 1-15/32 | 164             | 607968         | 53.75    | -            | -        |
| P-348         | 8     | 1-3/4 | 1-1/8 | 2-3/16  | 3/4          | 1-29/32 | 321             | 607970         | 72.04    | -            | -        |
| P-16          | 6     | 2     | 1-1/4 | 1-11/16 | 7/8 and 1    | 1-27/32 | 274             | 607972         | 87.01    | -            | -        |
| P-18          | 8     | 2     | 1-3/8 | 1-15/16 | 7/8 and 1    | 2-1/32  | 425             | 607974         | 111.85   | -            | -        |
| P-110         | 10    | 2     | 1-1/2 | 2-15/16 | 7/8 and 1    | 2-1/32  | 618             | 607976         | 141.17   | -            | -        |
| <b>Metric</b> |       |       |       |         |              |         |                 |                |          |              |          |
| 30401M        | 64    | 25    | 13    | 21      | M6-M8-M10    | 21      | 24              | 608780         | 19.60    | -            | -        |
| 30402M        | 102   | 25    | 16    | 37      | M6-M8-M10    | 26      | 48              | 608781         | 26.29    | -            | -        |
| 30403M        | 152   | 29    | 19    | 56      | M6-M8-M10    | 29      | 105             | 608782         | 33.95    | -            | -        |
| 30404M        | 64    | 29    | 13    | 18      | M12          | 23      | 24              | 608783         | 22.77    | -            | -        |
| 30405M        | 102   | 32    | 16    | 33      | M12          | 29      | 67              | 608784         | 30.57    | -            | -        |
| 30406M        | 152   | 32    | 19    | 52      | M12          | 29      | 37              | 608785         | 37.67    | -            | -        |
| 30407M        | 64    | 32    | 16    | 14      | M16          | 25      | 31              | 608786         | 26.57    | -            | -        |
| 30408M        | 102   | 38    | 19    | 30      | M16          | 31      | 83              | 608787         | 33.40    | -            | -        |
| 30409M        | 152   | 38    | 22    | 49      | M16          | 34      | 150             | 608788         | 42.92    | -            | -        |
| 30410M        | 102   | 38    | 19    | 27      | M20          | 33      | 75              | 608789         | 35.67    | -            | -        |
| 30411M        | 152   | 38    | 25    | 49      | M20          | 37      | 164             | 608790         | 53.75    | -            | -        |
| 30412M        | 203   | 45    | 29    | 56      | M20          | 48      | 321             | 608791         | 72.04    | -            | -        |
| 30413M        | 152   | 51    | 32    | 43      | M24          | 44      | 274             | 608792         | 87.01    | -            | -        |
| 30414M        | 203   | 51    | 35    | 49      | M24          | 52      | 425             | 608793         | 111.85   | -            | -        |
| 30415M        | 254   | 51    | 38    | 75      | M24          | 52      | 618             | 608794         | 141.17   | -            | -        |

## Knurled Head Swivel Screw Clamps

- 12L14 steel
- Black oxide finish
- Use when finger tightening provides adequate pressure



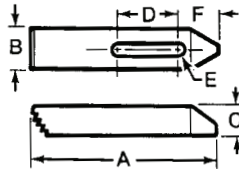
BLACK OXIDE

\* see page H145 for pads

| Thread A | B       | C    | D     | Use w/ Small Pad | Use w/ Large Pad | Use w/ Ball Pad | Use w/ "V" Pad | Weight (lb/100) | Model No. | Code No. | Price \$ |
|----------|---------|------|-------|------------------|------------------|-----------------|----------------|-----------------|-----------|----------|----------|
| 1/4-20   | 1-15/32 | 5/16 | 1     | 31501            | 31601            | 31701           | 31801          | 8               | 31321     | 608250   | 10.34    |
| 1/4-20   | 1-31/32 | 5/16 | 1     | 31501            | 31601            | 31701           | 31801          | 12              | 31322     | 608251   | 10.63    |
| 5/16-18  | 1-5/16  | 3/8  | 1-1/8 | 31502            | 31602            | 31702           | 31802          | 9               | 31331     | 608252   | 10.63    |
| 5/16-18  | 1-31/32 | 3/8  | 1-1/8 | 31502            | 31602            | 31702           | 31802          | 13              | 31332     | 608253   | 11.19    |
| 5/16-18  | 2-15/32 | 3/8  | 1-1/8 | 31502            | 31602            | 30102           | 31802          | 14              | 31333     | 608254   | 11.77    |
| 3/8-16   | 1-7/16  | 7/16 | 1-1/4 | 31503            | 31603            | 31703           | 31803          | 18              | 31341     | 608255   | 11.77    |
| 3/8-16   | 1-15/16 | 7/16 | 1-1/4 | 31503            | 31603            | 31703           | 31803          | 19              | 31342     | 608256   | 11.91    |
| 3/8-16   | 2-7/16  | 7/16 | 1-1/4 | 31503            | 31603            | 31703           | 31803          | 20              | 31343     | 608257   | 12.34    |
| 3/8-16   | 2-15/16 | 7/16 | 1-1/4 | 34503            | 31603            | 31703           | 31803          | 21              | 31344     | 608258   | 12.63    |
| 1/2-13   | 2-15/16 | 7/16 | 1-1/4 | 31504            | 31604            | 31704           | 31804          | 26              | 31354     | 608259   | 13.63    |

## Serrated Clamps

- Case hardened
- Black oxide finish
- Teeth match all step blocks

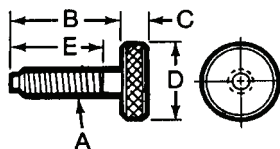


BLACK OXIDE

| Model No.     | A     | B     | C     | D       | Stud Size E | F       | Weight (lb/100) | Te-Co Code No. | Price \$ | STM Code No. | Price \$ |
|---------------|-------|-------|-------|---------|-------------|---------|-----------------|----------------|----------|--------------|----------|
| <b>Inch</b>   |       |       |       |         |             |         |                 |                |          |              |          |
| S-3825        | 2-1/2 | 1     | 1/2   | 13/16   | 5/16 or 3/8 | 27/32   | 23              | 607918         | 20.63    | -            | -        |
| S-384         | 4     | 1     | 5/8   | 1-7/16  | 5/16 or 3/8 | 1-1/32  | 49              | 607920         | 28.57    | -            | -        |
| S-386         | 6     | 1-1/8 | 3/4   | 2-3/16  | 5/16 or 3/8 | 1-5/32  | 106             | 607922         | 35.81    | -            | -        |
| S-1225        | 2-1/2 | 1-1/8 | 1/2   | 11/16   | 1/2         | 29/32   | 27              | 607924         | 24.01    | 333850       | 18.32    |
| S-124         | 4     | 1-1/4 | 3/4   | 1-5/16  | 1/2         | 1-5/32  | 72              | 607926         | 33.67    | 333852       | 34.75    |
| S-126         | 6     | 1-1/4 | 7/8   | 2-1/16  | 1/2         | 1-5/32  | 134             | 607928         | 41.06    | 333854       | 48.09    |
| S-5825        | 2-1/2 | 1-1/4 | 5/8   | 9/16    | 5/8         | 31/32   | 33              | 607930         | 30.02    | 333856       | 22.88    |
| S-584         | 4     | 1-1/2 | 3/4   | 1-3/16  | 5/8         | 1-7/32  | 87              | 607932         | 41.33    | 333858       | 40.04    |
| S-586         | 6     | 1-1/2 | 7/8   | 1-15/16 | 5/8         | 1-11/32 | 160             | 607934         | 49.61    | 333860       | 58.07    |
| S-344         | 4     | 1-1/2 | 3/4   | 1-1/16  | 3/4         | 1-9/32  | 81              | 607936         | 45.33    | -            | -        |
| S-346         | 6     | 1-1/2 | 1     | 1-15/16 | 3/4         | 1-15/32 | 170             | 607938         | 63.27    | -            | -        |
| S-348         | 8     | 1-3/4 | 1-1/8 | 2-3/16  | 3/4         | 1-29/32 | 330             | 607940         | 85.56    | -            | -        |
| S-16          | 6     | 2     | 1-1/4 | 1-11/16 | 7/8 or 1    | 1-23/32 | 275             | 607942         | 95.50    | -            | -        |
| S-18          | 8     | 2     | 1-3/8 | 1-15/16 | 7/8 or 1    | 1-1/32  | 440             | 607944         | 117.99   | -            | -        |
| S-110         | 10    | 2     | 1-1/2 | 2-15/16 | 7/8 or 1    | 2-1/32  | 601             | 607946         | 139.59   | -            | -        |
| <b>Metric</b> |       |       |       |         |             |         |                 |                |          |              |          |
|               | (mm)  | (mm)  | (mm)  | (mm)    | (mm)        | (mm)    |                 |                |          |              |          |
| 30501M        | 64    | 25    | 13    | 21      | M6-M8-M10   | 21      | 23              | 608795         | 20.63    | -            | -        |
| 30502M        | 102   | 25    | 16    | 37      | M6-M8-M10   | 26      | 29              | 608796         | 28.57    | -            | -        |
| 30503M        | 152   | 29    | 19    | 56      | M6-M8-M10   | 29      | 106             | 608797         | 35.81    | -            | -        |
| 30504M        | 64    | 29    | 13    | 18      | M12         | 23      | 27              | 608798         | 24.01    | -            | -        |
| 30505M        | 102   | 32    | 16    | 33      | M12         | 29      | 72              | 608799         | 33.67    | -            | -        |
| 30506M        | 152   | 32    | 19    | 52      | M12         | 29      | 134             | 608800         | 41.06    | -            | -        |
| 30507M        | 64    | 32    | 16    | 14      | M16         | 25      | 33              | 608801         | 30.02    | -            | -        |
| 30508M        | 102   | 38    | 19    | 30      | M16         | 31      | 87              | 608802         | 41.33    | -            | -        |
| 30509M        | 152   | 38    | 22    | 49      | M16         | 34      | 160             | 608803         | 49.61    | -            | -        |
| 30510M        | 102   | 38    | 19    | 27      | M20         | 33      | 81              | 608804         | 45.33    | -            | -        |
| 30511M        | 152   | 38    | 25    | 49      | M20         | 37      | 170             | 608805         | 63.41    | -            | -        |
| 30512M        | 203   | 45    | 29    | 56      | M20         | 48      | 330             | 608806         | 85.56    | -            | -        |
| 30513M        | 152   | 51    | 32    | 43      | M24         | 44      | 275             | 608807         | 95.50    | -            | -        |
| 30514M        | 203   | 51    | 35    | 49      | M24         | 52      | 440             | 608808         | 117.99   | -            | -        |
| 30515M        | 254   | 51    | 38    | 75      | M24         | 52      | 601             | 608809         | 139.59   | -            | -        |

## Dog Point Knurled Head Screws

- 12L14 steel
- Black oxide finish
- Case hardened
- Knurled head allows better grip
- Use for light clamping or holding
- Dog point prevents damage to end threads



BLACK OXIDE

\* see page H145 for pads

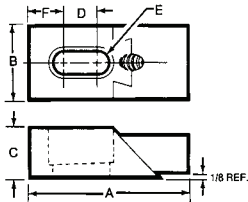
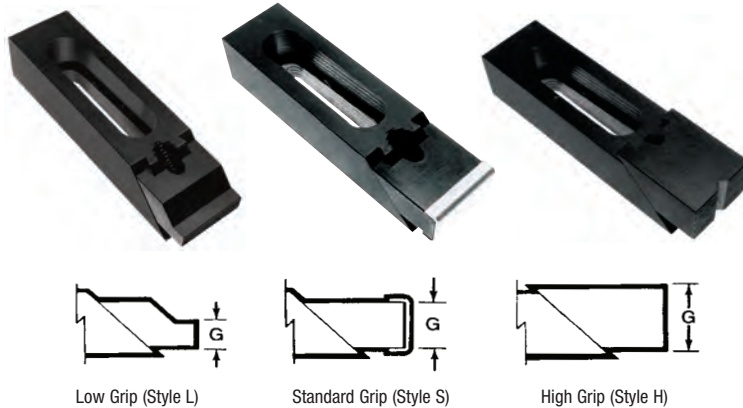
| Thread A | B     | C    | D     | E     | Weight (lb/100) | Model No. | Code No. | Price \$ |
|----------|-------|------|-------|-------|-----------------|-----------|----------|----------|
| 10-24    | 1     | 1/4  | 3/4   | 3/4   | 3               | 43801     | 608260   | 7.18     |
| 10-24    | 1-1/2 | 1/4  | 3/4   | 1-1/4 | 3               | 43802     | 608261   | 7.18     |
| 10-24    | 2     | 1/4  | 3/4   | 1-3/4 | 3               | 43803     | 608262   | 7.47     |
| 10-32    | 1-1/2 | 1/4  | 3/4   | 1-3/8 | 3               | 43804     | 608263   | 7.47     |
| 1/4-20   | 2     | 5/16 | 1     | 1-3/4 | 5               | 43805     | 608264   | 8.32     |
| 1/4-20   | 2-1/2 | 5/16 | 1     | 2-1/4 | 9               | 43806     | 608265   | 8.18     |
| 1/4-20   | 1-1/2 | 5/16 | 1     | 1-1/4 | 9               | 43807     | 608266   | 8.18     |
| 5/16-18  | 1-1/2 | 3/8  | 1-1/8 | 1-1/4 | 6               | 43808     | 608267   | 9.47     |
| 5/16-18  | 2     | 3/8  | 1-1/8 | 1-3/4 | 11              | 43809     | 608268   | 9.76     |
| 5/16-18  | 2-1/2 | 3/8  | 1-1/8 | 2-1/4 | 13              | 43810     | 608269   | 10.05    |
| 3/8-16   | 2     | 7/16 | 1-1/4 | 1-3/4 | 13              | 43813     | 608270   | 10.18    |
| 3/8-16   | 2-1/2 | 7/16 | 1-1/4 | 2-1/4 | 24              | 43811     | 608271   | 10.90    |
| 3/8-16   | 3     | 7/16 | 1-1/4 | 2-3/4 | 27              | 43812     | 608272   | 11.77    |
| 1/2-13   | 3     | 7/16 | 1-1/4 | 2-3/4 | 28              | 43814     | 608273   | 13.21    |
| 1/2-13   | 3-1/2 | 7/16 | 1-1/4 | 3-1/4 | 30              | 43815     | 608274   | 13.34    |



## Nuzzler® Edge Clamps



- Black oxide finish
- Noses have serrations for better gripping of non-finished or semi-finished workpieces
- Edge clamps feature a double action, adjustable nose which exerts clamping pressures both downward and inward through a 45° angle



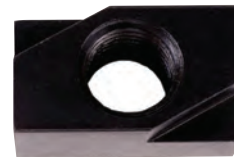
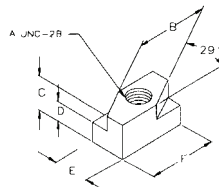
BLACK OXIDE

| A       | B     | C     | D      | E    | F      | Nose Style | G     | Wrench Size | Weight (lb/100) | Model No. | Code No. | Price \$ |
|---------|-------|-------|--------|------|--------|------------|-------|-------------|-----------------|-----------|----------|----------|
| 1-7/8   | 1     | 5/8   | 1/4    | 5/16 | 13/32  | L          | 1/8   | 5/32        | 25              | 33817     | 608200   | 102.53   |
| 2-3/8   | 1     | 5/8   | 3/4    | 5/16 | 5/16   | L          | 1/8   | 5/32        | 29              | 33819     | 608201   | 106.26   |
| 2-7/8   | 1     | 5/8   | 1-1/4  | 5/16 | 5/16   | L          | 1/8   | 5/32        | 35              | 33821     | 608202   | 112.95   |
| 2-5/16  | 1-1/4 | 5/8   | 3/8    | 3/8  | 7/16   | L          | 1/8   | 5/32        | 38              | 33801     | 608203   | 104.95   |
| 2-3/4   | 1-1/4 | 5/8   | 13/16  | 3/8  | 1/2    | L          | 1/4   | 3/16        | 44              | 33890     | 608204   | 112.95   |
| 4-1/8   | 1-1/4 | 5/8   | 2      | 3/8  | 11/16  | L          | 1/4   | 3/16        | 63              | 33803     | 608205   | 116.40   |
| 4-11/16 | 1-1/4 | 5/8   | 2-3/16 | 3/8  | 15/16  | L          | 1/4   | 3/16        | 73              | 33892     | 608206   | 119.65   |
| 3-5/16  | 1-1/2 | 3/4   | 3/4    | 1/2  | 11/16  | L          | 3/8   | 1/4         | 81              | 33805     | 608207   | 119.23   |
| 5-3/16  | 1-1/2 | 3/4   | 2-1/2  | 1/2  | 5/8    | L          | 3/8   | 1/4         | 117             | 33807     | 608208   | 125.51   |
| 3-7/8   | 1-1/2 | 7/8   | 1-1/4  | 1/2  | 1/2    | L          | 1/4   | 1/4         | 100             | 33823     | 608209   | 112.95   |
| 5-5/16  | 1-1/2 | 7/8   | 2      | 1/2  | 7/8    | L          | 1/4   | 1/4         | 141             | 33825     | 608210   | 122.20   |
| 7-1/4   | 1-1/2 | 7/8   | 3      | 1/2  | 1-3/8  | L          | 1/4   | 1/4         | 189             | 33827     | 608211   | 131.93   |
| 5-13/16 | 1-1/2 | 1-1/4 | 2-1/4  | 1/2  | 1-1/16 | L          | 3/8   | 1/4         | 207             | 33809     | 608212   | 196.44   |
| 7-1/8   | 1-1/2 | 1-1/4 | 3-5/16 | 1/2  | 1-3/16 | L          | 3/8   | 1/4         | 252             | 33812     | 608213   | 202.38   |
| 5-1/4   | 2     | 1-1/4 | 1-3/8  | 3/4  | 27/32  | L          | 3/8   | 5/16        | 235             | 33829     | 608214   | 315.95   |
| 1-7/8   | 1     | 5/8   | 1/4    | 5/16 | 13/32  | S          | 5/8   | 5/32        | 30              | 33818     | 608215   | 106.26   |
| 2-3/8   | 1     | 5/8   | 3/4    | 5/16 | 5/16   | S          | 5/8   | 5/32        | 35              | 33820     | 608216   | 116.40   |
| 2-7/8   | 1     | 5/8   | 1-1/4  | 5/16 | 5/16   | S          | 5/8   | 5/32        | 40              | 33822     | 608217   | 119.65   |
| 2-5/16  | 1-1/4 | 5/8   | 3/8    | 3/8  | 7/16   | S          | 5/8   | 3/16        | 43              | 33802     | 608218   | 112.95   |
| 2-3/4   | 1-1/4 | 5/8   | 13/16  | 3/8  | 1/2    | S          | 5/8   | 3/16        | 49              | 33891     | 608219   | 119.65   |
| 4-1/8   | 1-1/4 | 5/8   | 2      | 3/8  | 11/16  | S          | 5/8   | 3/16        | 73              | 33804     | 608220   | 123.37   |
| 4-11/16 | 1-1/4 | 5/8   | 2-3/16 | 3/8  | 15/16  | S          | 5/8   | 3/16        | 76              | 33893     | 608221   | 126.27   |
| 3-5/16  | 1-1/2 | 3/4   | 3/4    | 1/2  | 11/16  | S          | 3/4   | 1/4         | 88              | 33806     | 608222   | 128.00   |
| 5-3/16  | 1-1/2 | 3/4   | 2-1/2  | 1/2  | 5/8    | S          | 3/4   | 1/4         | 123             | 33808     | 608223   | 131.93   |
| 3-7/8   | 1-1/2 | 7/8   | 1-1/4  | 1/2  | 1/2    | S          | 7/8   | 1/4         | 112             | 33824     | 608224   | 122.20   |
| 5-5/16  | 1-1/2 | 7/8   | 2      | 1/2  | 7/8    | S          | 7/8   | 1/4         | 155             | 33826     | 608225   | 128.75   |
| 7-1/4   | 1-1/2 | 7/8   | 3      | 1/2  | 1-3/8  | S          | 7/8   | 1/4         | 205             | 33828     | 608226   | 140.55   |
| 5-13/16 | 1-1/2 | 1-1/4 | 2-1/4  | 1/2  | 1-1/16 | S          | 3/4   | 1/4         | 216             | 33810     | 608227   | 212.24   |
| 7-1/8   | 1-1/2 | 1-1/4 | 3-5/16 | 1/2  | 1-3/16 | S          | 3/4   | 1/4         | 255             | 33813     | 608228   | 218.04   |
| 6-1/8   | 1-1/2 | 1-1/4 | 2-1/4  | 1/2  | 1-1/16 | H          | 1     | 1/4         | 240             | 33811     | 608229   | 227.91   |
| 7-3/8   | 1-1/2 | 1-1/4 | 3-5/16 | 1/2  | 1-3/16 | H          | 1     | 1/4         | 286             | 33814     | 608230   | 235.15   |
| 5-1/4   | 2     | 1-1/4 | 1-3/8  | 3/4  | 27/32  | H          | 1-1/4 | 5/16        | 296             | 33815     | 608231   | 304.22   |
| 6-7/16  | 2-1/2 | 1-1/2 | 2      | 7/8  | 15/16  | H          | 1-1/2 | 1/2         | 541             | 33816     | 608232   | 465.34   |

## Quarter Turn T-Slot Nuts



- Black oxide finish
- The last thread is incomplete to prevent the stud from turning through the bottom of the nut



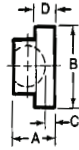
BLACK OXIDE

| Thread A | Table Slot B (in.) | Table Slot (mm) | C   | D     | E     | F    | Model No. | Code No. | Price \$ |
|----------|--------------------|-----------------|-----|-------|-------|------|-----------|----------|----------|
| 3/8-16   | 7/16               | 12              | 1/2 | 0.208 | 0.438 | 0.75 | 41450     | 608275   | 6.46     |
| 3/8-16   | 1/2                | 12              | 1/2 | 0.271 | 0.5   | 1    | 41451     | 608276   | 6.46     |
| 1/2-13   | 9/16               | 15              | 5/8 | 0.333 | 0.563 | 0.94 | 41452     | 608277   | 7.31     |
| 1/2-13   | 5/8                | 16              | 5/8 | 0.333 | 0.625 | 1.25 | 41453     | 608278   | 8.03     |
| 5/8-11   | 11/16              | 18              | 3/4 | 0.427 | 0.688 | 1.38 | 41454     | 608279   | 8.90     |
| 5/8-11   | 3/4                | 20              | 3/4 | 0.458 | 0.75  | 1.5  | 41455     | 608280   | 9.47     |

\* English T-Slot Nut will fit this size metric machine T-Slot

## Large Pads For Swivel Screw Clamps

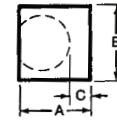
- Used to secure clamping of soft metal or angular surface without damaging workpiece
- Black oxide finish
- Left hand internal threads



| Fits Body Thread | A     | B    | C    | D    | Internal Thread (L.H.) | Weight (lbs/100) | Model No. | Code No. | Price \$ |
|------------------|-------|------|------|------|------------------------|------------------|-----------|----------|----------|
| 1/4-20           | 5/16  | 3/8  | 1/8  | 1/8  | 8-36                   | 1                | 31601     | 608285   | 2.61     |
| 5/16-18          | 23/64 | 1/2  | 5/32 | 5/32 | 12-28                  | 1                | 31602     | 608286   | 2.90     |
| 3/8-16           | 7/16  | 9/16 | 3/16 | 3/16 | 1/4-28                 | 1                | 31603     | 608287   | 3.34     |
| 1/2-13           | 27/64 | 3/4  | 1/8  | 3/16 | 5/16-24                | 2                | 31604     | 608288   | 3.77     |

## Small Pads For Swivel Screw Clamps

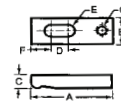
- Used to secure clamping of soft metal or angular surface without damaging workpiece
- Black oxide finish
- Left hand internal threads



| Fits Body Thread | A     | B     | C    | Internal Thread (L.H.) | Weight (lb/100) | Model No. | Code No. | Price \$ |
|------------------|-------|-------|------|------------------------|-----------------|-----------|----------|----------|
| 1/4-20           | 0.193 | 3/16  | 1/16 | 8-36                   | 1               | 31501     | 608281   | 2.61     |
| 5/16-18          | 19/64 | 1/4   | 3/64 | 12/28                  | 1               | 31502     | 608282   | 2.90     |
| 3/8-16           | 21/64 | 19/64 | 1/16 | 1/4-28                 | 1               | 31503     | 608283   | 3.05     |
| 1/2-13           | 25/64 | 13/32 | 1/16 | 5/16-24                | 2               | 31504     | 608284   | 3.19     |

## Tapped End Clamps

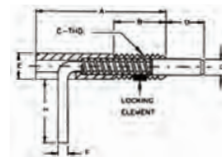
- Black oxide finish
- Case hardened



| A     | B     | C   | D     | Stud Size E | F      | G       | Model No. | Code No. | Price \$ |
|-------|-------|-----|-------|-------------|--------|---------|-----------|----------|----------|
| 2     | 5/8   | 3/8 | 1/2   | 1/4         | 7/16   | 1/4-20  | 30902     | 608300   | 21.80    |
| 2-1/2 | 5/8   | 3/8 | 1/2   | 1/4         | 9/16   | 1/4-20  | 30903     | 608301   | 23.46    |
| 2-3/4 | 1     | 1/2 | 7/16  | 5/16        | 13/16  | 5/16-18 | 30905     | 608302   | 26.57    |
| 3-1/4 | 1     | 1/2 | 13/16 | 5/16        | 7/8    | 5/16-18 | 30906     | 608303   | 27.19    |
| 4     | 1     | 1/2 | 7/8   | 5/16        | 15/16  | 5/16-18 | 30907     | 608304   | 28.77    |
| 3     | 1-1/4 | 5/8 | 3/4   | 3/8         | 9/16   | 3/8-16  | 30908     | 608305   | 29.67    |
| 4     | 1-1/4 | 5/8 | 1     | 3/8         | 3/4    | 3/8-16  | 30909     | 608306   | 30.02    |
| 5     | 1-1/4 | 5/8 | 1-1/2 | 3/8         | 3/4    | 3/8-16  | 30910     | 608307   | 33.53    |
| 4     | 1-1/4 | 5/8 | 1     | 1/2         | 3/4    | 1/2-13  | 30912     | 608308   | 34.16    |
| 4-1/2 | 1-1/4 | 5/8 | 1-1/2 | 1/2         | 13/16  | 1/2-13  | 30913     | 608309   | 34.29    |
| 5     | 1-1/4 | 5/8 | 1-1/2 | 1/2         | 1-1/4  | 1/2-13  | 30914     | 608310   | 34.91    |
| 6     | 1-1/4 | 5/8 | 1-1/2 | 1/2         | 2-1/4  | 1/2-13  | 30916     | 608311   | 38.78    |
| 4-1/2 | 1-1/2 | 3/4 | 1     | 5/8         | 7/8    | 5/8-11  | 30917     | 608312   | 38.78    |
| 5     | 1-1/2 | 3/4 | 1-1/2 | 5/8         | 15/16  | 5/8-11  | 30918     | 608313   | 44.51    |
| 5-1/2 | 1-1/2 | 3/4 | 1-1/2 | 5/8         | 1-7/16 | 5/8-11  | 30919     | 608314   | 47.13    |
| 6     | 1-1/2 | 3/4 | 1-1/2 | 5/8         | 2      | 5/8-11  | 30920     | 608315   | 48.51    |

## Hand Retractable Spring Plungers Quick Release "L" Handle

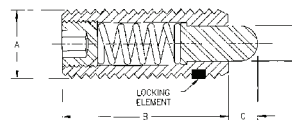
- Plunger has a slight taper for easy alignment
- Built in drive wrench for rapid installation and alignment
- Plunger can be completely withdrawn into the body and locked into a retracted position
- Nylon locking element is standard on all sizes



| End Force Initial | End Force Final | A    | B    | Thread C | D    | Hex E | Dia. F | +0.000 -0.001 G | H    | Model No. | Code No. | Price \$ |
|-------------------|-----------------|------|------|----------|------|-------|--------|-----------------|------|-----------|----------|----------|
| 0.50              | 2.50            | 1.25 | 0.50 | 1/4-20   | 0.38 | 1/4   | 0.101  | 0.155           | 0.50 | 54301     | 608320   | 39.74    |
| 0.75              | 3.75            | 2.00 | 1.00 | 3/8-16   | 0.56 | 3/8   | 0.134  | 0.234           | 0.74 | 54302     | 608321   | 46.99    |
| 1.00              | 5.00            | 2.11 | 1.11 | 1/2-13   | 0.75 | 1/2   | 0.108  | 0.313           | 1.00 | 54303     | 608322   | 54.37    |

## Standard Spring Plungers Heavy End

- Carbon and Stainless Steel Bodies
- Heavy End Forces
- Carbon and Stainless Steel Nose
- Stainless Steel Body Plungers:
  - 303 Stainless Steel Body and Nose
- Excellent Wear Resistance
- Steel Body Plungers:
  - 12L14 Steel Body
  - Black Oxide Finish
  - Case Hardened 12L14 Steel Nose, Black Oxide Finish

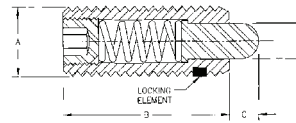


| Thread A | B (in.) | C (in.) | Ball Dia. D (in.) | End Force Initial (lb) | End Force Final (lb) | Carbon Steel Code No. | Price \$ | Stainless Steel Code No. | Price \$ |
|----------|---------|---------|-------------------|------------------------|----------------------|-----------------------|----------|--------------------------|----------|
| 6-32     | 17/32   | 0.062   | 0.046             | 1.50                   | 4.50                 | 609062                | 13.14    | 609075                   | 22.84    |
| 6-32     | 3/8     | 0.062   | 0.046             | 1.00                   | 1.60                 | 609063                | 13.14    | 609076                   | 22.84    |
| 8-32     | 5/8     | 0.093   | 0.070             | 2.70                   | 7.30                 | 609064                | 13.14    | 609077                   | 22.43    |
| 10-32    | 3/4     | 0.125   | 0.093             | 2.90                   | 11.10                | 609065                | 12.70    | 609078                   | 22.43    |
| 1/4-20   | 1       | 0.187   | 0.119             | 3.00                   | 13.00                | 609066                | 12.70    | 609079                   | 21.39    |
| 1/4-28   | 1       | 0.187   | 0.119             | 3.00                   | 13.00                | 609067                | 12.70    | 609080                   | 21.39    |
| 1/4-20   | 3/4     | 0.125   | 0.119             | 2.00                   | 9.00                 | 609068                | 12.70    | 609081                   | 20.01    |
| 5/16-18  | 1       | 0.187   | 0.135             | 3.00                   | 15.00                | 609069                | 12.70    | 609082                   | 22.43    |
| 3/8-16   | 1-1/8   | 0.187   | 0.186             | 5.50                   | 14.50                | 609070                | 12.70    | 609083                   | 24.98    |
| 1/2-13   | 1-1/4   | 0.250   | 0.248             | 6.60                   | 17.40                | 609071                | 13.14    | 609084                   | 23.60    |
| 5/8-11   | 1-1/2   | 0.312   | 0.310             | 10.50                  | 25.50                | 609072                | 16.97    | 609085                   | 43.95    |
| 3/4-10   | 1-3/4   | 0.312   | 0.374             | 6.70                   | 37.30                | 609073                | 24.50    | 609086                   | 55.96    |
| 1-8      | 2-13/32 | 0.500   | 0.499             | 16.00                  | 68.00                | 609074                | 34.71    | 609087                   | 117.92   |

## Standard Spring Plungers Light End



- Carbon and Stainless Steel Bodies
- Light End Forces
- Carbon and Stainless Steel Nose
  - Stainless Steel Body Plungers:
    - 303 Stainless Steel Body and Nose
  - Excellent Wear Resistance
- Steel Body Plungers:
  - 12L14 Steel Body
  - Black Oxide Finish
  - Case Hardened 12L14 Steel Nose, Zinc Plated

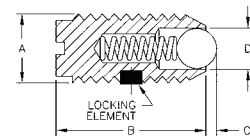


| Thread A | B (in.) | C (in.) | Ball Dia. D (in.) | End Force Initial (lb) | End Force Final (lb) | Carbon Steel Code No. | Price \$ | Stainless Steel Code No. | Price \$ |
|----------|---------|---------|-------------------|------------------------|----------------------|-----------------------|----------|--------------------------|----------|
| 6-32     | 17/32   | 0.062   | 0.046             | 0.50                   | 1.50                 | 609088                | 13.14    | 609100                   | 22.84    |
| 8-32     | 5/8     | 0.093   | 0.070             | 0.70                   | 2.30                 | 609089                | 13.14    | 609101                   | 21.53    |
| 10-32    | 3/4     | 0.125   | 0.093             | 1.30                   | 2.70                 | 609090                | 12.70    | 609102                   | 20.15    |
| 1/4-20   | 3/4     | 0.125   | 0.119             | 0.25                   | 2.00                 | 609091                | 11.52    | 609103                   | 19.25    |
| 1/4-20   | 1       | 0.187   | 0.119             | 1.00                   | 4.00                 | 609092                | 12.70    | 609104                   | 18.22    |
| 1/4-28   | 1       | 0.187   | 0.119             | 1.00                   | 4.00                 | 609093                | 12.70    | 609105                   | 20.91    |
| 5/16-18  | 1       | 0.187   | 0.135             | 1.50                   | 4.50                 | 609094                | 12.70    | 609106                   | 18.22    |
| 3/8-16   | 1-1/8   | 0.187   | 0.186             | 2.80                   | 7.20                 | 609095                | 12.70    | 609107                   | 22.43    |
| 1/2-13   | 1-1/4   | 0.250   | 0.248             | 2.70                   | 9.30                 | 609096                | 12.70    | 609108                   | 23.60    |
| 5/8-11   | 1-1/2   | 0.312   | 0.310             | 3.50                   | 10.50                | 609097                | 16.97    | 609109                   | 43.95    |
| 3/4-10   | 1-3/4   | 0.312   | 0.374             | 4.00                   | 16.00                | 609098                | 23.32    | 609110                   | 77.49    |
| 1-8      | 2-13/32 | 0.500   | 0.499             | 4.00                   | 31.00                | 609099                | 34.71    | 609111                   | 117.92   |

## Te-Co Ball Plungers



- Material:
  - Steel Body: 12L14 Steel
  - Stainless Steel Body: 303 Stainless Steel
  - Ball: 440 Stainless Steel or Nylon
- Smallest and lightest spring loaded device
- Side-load tolerant
- Controlled end forces
- Many sizes conform to TCMAI standards
- Screwdriver installation
- Bodies are color coded to indicate end forces:
  - Plain or Zinc = Light Force
  - Black = Standard Force
  - Gold = Heavy Force



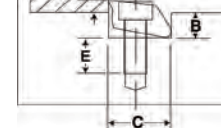
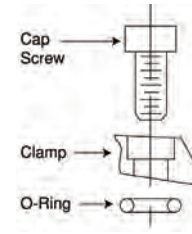
| Thread A      | B     | C     | Ball Dia. D | End Force Initial (lb) | End Force Final (lb) | Steel Body                    |          |                     |          | Stainless Steel Body          |          |                     |          |
|---------------|-------|-------|-------------|------------------------|----------------------|-------------------------------|----------|---------------------|----------|-------------------------------|----------|---------------------|----------|
|               |       |       |             |                        |                      | Stainless Steel Ball Code No. | Price \$ | Nylon Ball Code No. | Price \$ | Stainless Steel Ball Code No. | Price \$ | Nylon Ball Code No. | Price \$ |
| <b>Inch</b>   |       |       |             |                        |                      |                               |          |                     |          |                               |          |                     |          |
| 4-48          | 3/16  | 0.020 | 0.062       | 0.12                   | 0.50                 | 608915                        | 13.29    | 608938              | 13.58    | 608961                        | 13.69    | 608984              | 14.28    |
| 5-40          | 1/4   | 0.020 | 0.062       | 0.25                   | 0.75                 | 608916                        | 12.41    | 608939              | 12.70    | 608962                        | 12.93    | 608985              | 13.54    |
| 6-40          | 5/16  | 0.023 | 0.078       | 0.50                   | 1.00                 | 608917                        | 11.96    | 608940              | 12.25    | 608963                        | 12.34    | 608986              | 12.79    |
| 8-36          | 11/32 | 0.025 | 0.093       | 0.50                   | 1.25                 | 608918                        | 11.08    | 608941              | 11.37    | 608964                        | 11.14    | 608987              | 11.58    |
| 8-32          | 11/32 | 0.025 | 0.093       | 0.50                   | 1.25                 | 608919                        | 11.08    | 608942              | 11.37    | 608965                        | 11.14    | 608988              | 11.58    |
| 10-32         | 33/64 | 0.025 | 0.093       | 0.50                   | 1.50                 | 608920                        | 10.49    | 608943              | 10.78    | 608966                        | 12.34    | 608989              | 12.79    |
| 10-32         | 33/64 | 0.025 | 0.093       | 1.50                   | 3.00                 | 608921                        | 10.49    | 608944              | 10.78    | 608967                        | 12.49    | 608990              | 12.93    |
| 10-32         | 33/64 | 0.025 | 0.093       | 2.00                   | 5.00                 | 608922                        | 10.49    | 608945              | 10.78    | 608968                        | 12.49    | 608991              | 12.93    |
| 1/4-20        | 17/32 | 0.035 | 0.125       | 2.00                   | 4.00                 | 608923                        | 10.49    | 608946              | 10.78    | 608969                        | 13.39    | 608992              | 14.01    |
| 1/4-20        | 17/32 | 0.035 | 0.125       | 3.00                   | 7.00                 | 608924                        | 10.49    | 608947              | 10.78    | 608970                        | 13.39    | 608993              | 14.01    |
| 1/4-20        | 17/32 | 0.035 | 0.125       | 4.00                   | 12.00                | 608925                        | 10.49    | 608948              | 10.78    | 608971                        | 13.39    | 608994              | 14.01    |
| 5/16-18       | 37/64 | 0.040 | 0.156       | 2.00                   | 4.50                 | 608926                        | 10.49    | 608949              | 10.78    | 608972                        | 15.32    | 608995              | 16.08    |
| 5/16-18       | 37/64 | 0.040 | 0.156       | 4.00                   | 9.00                 | 608927                        | 10.49    | 608950              | 10.78    | 608973                        | 15.32    | 608996              | 16.08    |
| 5/16-18       | 37/64 | 0.040 | 0.156       | 6.00                   | 17.00                | 608928                        | 10.78    | 608951              | 11.08    | 608974                        | 15.32    | 608997              | 16.08    |
| 3/8-16        | 5/8   | 0.048 | 0.187       | 2.50                   | 5.00                 | 608929                        | 10.78    | 608952              | 11.08    | 608975                        | 16.84    | 608998              | 17.60    |
| 3/8-16        | 5/8   | 0.048 | 0.187       | 5.00                   | 10.00                | 608930                        | 10.78    | 608953              | 11.08    | 608976                        | 16.84    | 608999              | 17.60    |
| 3/8-16        | 5/8   | 0.048 | 0.187       | 6.00                   | 21.00                | 608931                        | 10.78    | 608954              | 11.08    | 608977                        | 16.84    | 609000              | 17.60    |
| 1/2-13        | 3/4   | 0.072 | 0.281       | 3.00                   | 6.00                 | 608932                        | 11.52    | 608955              | 11.81    | 608978                        | 16.84    | 609001              | 17.60    |
| 1/2-13        | 3/4   | 0.072 | 0.281       | 6.00                   | 12.00                | 608933                        | 11.52    | 608956              | 11.81    | 608979                        | 16.84    | 609002              | 17.60    |
| 1/2-13        | 3/4   | 0.072 | 0.281       | 6.00                   | 30.00                | 608934                        | 11.52    | 608957              | 13.00    | 608980                        | 16.84    | 609003              | 17.60    |
| 5/8-11        | 63/64 | 0.096 | 0.375       | 4.50                   | 9.00                 | 608935                        | 13.73    | 608958              | 14.15    | 608981                        | 21.39    | 609004              | 23.32    |
| 5/8-11        | 63/64 | 0.096 | 0.375       | 9.00                   | 18.00                | 608936                        | 13.73    | 608959              | 14.15    | 608982                        | 22.43    | 609005              | 23.32    |
| 5/8-11        | 63/64 | 0.096 | 0.375       | 7.00                   | 50.00                | 608937                        | 13.73    | 608960              | 14.15    | 608983                        | 22.43    | 609006              | 23.32    |
| <b>Metric</b> |       |       |             |                        |                      |                               |          |                     |          |                               |          |                     |          |
| M4 x 0.7      | 9     | 0.8   | 2.5         | 0.90                   | 2.25                 | 609007                        | 12.70    | 609023              | 12.70    | 609036                        | 18.49    | 609049              | 20.29    |
| M5 x 0.8      | 13    | 0.6   | 2.38        | 0.50                   | 1.50                 | 609008                        | 12.85    | -                   | -        | -                             | -        | -                   | -        |
| M5 x 0.8      | 13    | 0.6   | 2.38        | 1.50                   | 3.00                 | 609009                        | 12.85    | -                   | -        | -                             | -        | -                   | -        |
| M5 x 0.8      | 13    | 0.6   | 2.38        | 2.00                   | 4.90                 | 609010                        | 12.85    | -                   | -        | -                             | -        | -                   | -        |
| M6 x 1.0      | 14    | 1     | 3.5         | 2.00                   | 2.90                 | 609011                        | 13.44    | 609024              | 13.44    | 609037                        | 18.84    | 609050              | 20.77    |
| M6 x 1.0      | 14    | 1     | 3.5         | .45                    | 1.35                 | 609012                        | 13.44    | 609025              | 13.44    | 609038                        | 18.84    | 609051              | 20.77    |
| M6 x 1.0      | 14    | 1     | 3.5         | 6.25                   | 8.95                 | 609013                        | 13.44    | 609026              | 13.44    | 609039                        | 18.84    | 609052              | 20.77    |
| M8 x 1.25     | 16    | 1.5   | 5           | 3.35                   | 6.70                 | 609014                        | 14.15    | 609027              | 14.35    | 609040                        | 19.25    | 609053              | 21.18    |
| M8 x 1.25     | 16    | 1.5   | 5           | 1.11                   | 2.25                 | 609015                        | 14.15    | 609028              | 14.35    | 609041                        | 19.25    | 609054              | 21.18    |
| M8 x 1.25     | 16    | 1.5   | 5           | 8.95                   | 13.40                | 609016                        | 14.15    | 609029              | 14.35    | 609042                        | 19.25    | 609055              | 21.18    |
| M10 x 1.5     | 19    | 2     | 6           | 4.45                   | 7.80                 | 609017                        | 15.04    | 609030              | 15.18    | 609043                        | 24.36    | 609056              | 21.53    |
| M10 x 1.5     | 19    | 2     | 6           | 1.80                   | 3.35                 | 609018                        | 15.04    | 609031              | 15.18    | 609044                        | 19.53    | 609057              | 21.53    |
| M10 x 1.5     | 19    | 2     | 6           | 13.40                  | 20.00                | 609019                        | 15.04    | 609032              | 15.18    | 609045                        | 20.01    | 609058              | 22.08    |
| M12 x 1.75    | 22    | 2.5   | 8           | 6.70                   | 12.25                | 609020                        | 18.49    | 609033              | 18.63    | 609046                        | 20.01    | 609059              | 22.08    |
| M12 x 1.75    | 22    | 2.5   | 8           | 2.25                   | 4.50                 | 609021                        | 18.63    | 609034              | 18.77    | 609047                        | 20.01    | 609060              | 22.08    |
| M12 x 1.75    | 22    | 2.5   | 8           | 16.75                  | 25.65                | 609022                        | 18.77    | 609035              | 6.75     | 609048                        | 20.01    | 609061              | 22.08    |



# Workholding Specialists

## Pitbull® Clamps

The Revolutionary Pitbull® Clamp remains the lowest, highest holding force clamp in the industry today. High vertical and horizontal clamping forces are generated, considering the size of the Pitbull® Clamps. It uses a standard cap screw and an oil resistant O-ring. The Pitbull® Clamp is available in 5 sizes and several styles, a tool steel knife edge for aggressive stock removal, a tool steel blunt edge for general purpose and a brass version to help prevent marring the workpiece.



| Part No.    | Description            | A     | B     | Clamping Width C | D     | E     | Screw Size | Max Torque (ft/lbs) | Holding Force (lbs) | Total Throw | Clamps Per Pack | Code No. | Price \$ Per Pack |
|-------------|------------------------|-------|-------|------------------|-------|-------|------------|---------------------|---------------------|-------------|-----------------|----------|-------------------|
| <b>Inch</b> |                        |       |       |                  |       |       |            |                     |                     |             |                 |          |                   |
| 26000       | Tool Steel, Knife Edge | 0.150 | 0.140 | 0.375            | 0.075 | 0.260 | 4-40       | 1.30                | 650                 | 0.0075      | 8               | 604079   | 129.31            |
| 26010       | Tool Steel, Blunt Edge | 0.150 | 0.140 | 0.375            | 0.075 | 0.260 | 4-40       | 1.30                | 650                 | 0.0075      | 8               | 604080   | 129.31            |
| 26015       | Brass, Blunt Edge      | 0.150 | 0.140 | 0.375            | 0.075 | 0.220 | 4-40       | 0.41                | 200                 | 0.0075      | 8               | 604081   | 129.31            |
| 26020       | Tool Steel, Knife Edge | 0.200 | 0.187 | 0.500            | 0.100 | 0.390 | 8-32       | 3.70                | 1,500               | 0.0160      | 8               | 604082   | 137.31            |
| 26030       | Tool Steel, Blunt Edge | 0.200 | 0.187 | 0.500            | 0.100 | 0.390 | 8-32       | 3.70                | 1,500               | 0.0160      | 8               | 604083   | 137.31            |
| 26040       | Brass, Blunt Edge      | 0.200 | 0.187 | 0.500            | 0.100 | 0.340 | 8-32       | 2.00                | 400                 | 0.0160      | 8               | 604084   | 137.31            |
| 26050       | Tool Steel, Knife Edge | 0.300 | 0.280 | 0.750            | 0.150 | 0.570 | 1/4-20     | 14.50               | 3,600               | 0.0240      | 6               | 604085   | 133.10            |
| 26060       | Tool Steel, Blunt Edge | 0.300 | 0.280 | 0.750            | 0.150 | 0.570 | 1/4-20     | 14.50               | 3,600               | 0.0240      | 6               | 604086   | 133.10            |
| 26065       | Brass, Blunt Edge      | 0.300 | 0.280 | 0.750            | 0.150 | 0.440 | 1/4-20     | 4.10                | 950                 | 0.0240      | 6               | 604087   | 133.10            |
| 26070       | Tool Steel, Knife Edge | 0.400 | 0.450 | 1.000            | 0.250 | 0.710 | 3/8-16     | 30.00               | 6,000               | 0.0500      | 4               | 604088   | 144.00            |
| 26075       | Tool Steel, Blunt Edge | 0.400 | 0.450 | 1.000            | 0.250 | 0.710 | 3/8-16     | 30.00               | 6,000               | 0.0500      | 4               | 604089   | 144.00            |
| 26080       | Tool Steel, Knife Edge | 0.600 | 0.640 | 1.500            | 0.375 | 0.770 | 1/2-13     | 108.30              | 12,000              | 0.0750      | 2               | 604090   | 125.93            |
| 26085       | Tool Steel, Blunt Edge | 0.600 | 0.640 | 1.500            | 0.375 | 0.770 | 1/2-13     | 108.30              | 12,000              | 0.0750      | 2               | 604091   | 125.93            |

Metric also available, call for more information

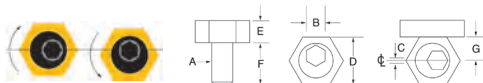
## Original Fixture Clamps

The Cam Action MITEE-BITE Fixture Clamp is made up of two simple components: a hardened steel socket cap screw with an offset head and a hexagonal washer.

- Low profile makes computer programming easier
- Cam action provides fast, strong clamping
- Small size allows more parts per load
- Simple design keeps cost low

NOTE: Clockwise rotation is recommended.

Workpiece stop should be on the right of clamp.



| Part No.                                  | A       | B    | C      | D       | E       | F      | *G      | Torque (ft/lbs) | Holding Force | Clamps Per Pack | Code No. | Price \$ Per Pack |
|---|---------|------|--------|---------|---------|--------|---------|-----------------|---------------|-----------------|----------|-------------------|
| <b>Inch</b>                               |         |      |        |         |         |        |         |                 |               |                 |          |                   |
| 10202                                     | 8-32    | 5/64 | 0.030  | 0.312   | 0.110   | 0.350  | 0.150   | 1.5             | 205 lbs       | 10              | 604000   | 87.88             |
| 10207                                     | 10-32   | 3/32 | 0.040  | 0.500   | 0.160   | 0.340  | 0.250   | 2.5             | 350 lbs       | 10              | 604001   | 92.50             |
| 10204                                     | 1/4-20  | 1/8  | 0.040  | 0.625   | 0.190   | 0.470  | 0.308   | 6.2             | 800 lbs       | 10              | 604002   | 92.50             |
| 10205                                     | 5/16-24 | 3/16 | 0.040  | 0.812   | 0.190   | 0.460  | 0.400   | 8.3             | 800 lbs       | 12              | 604003   | 115.86            |
| 10201                                     | 5/16-18 | 3/16 | 0.040  | 0.812   | 0.190   | 0.460  | 0.400   | 8.3             | 800 lbs       | 12              | 604004   | 115.86            |
| 10206                                     | 3/8-16  | 3/16 | 0.050  | 0.812   | 0.250   | 0.710  | 0.400   | 20.8            | 2,000 lbs     | 10              | 604005   | 106.62            |
| 10208                                     | 1/2-13  | 5/16 | 0.100  | 1.000   | 0.375   | 0.900  | 0.500   | 65.0            | 4,000 lbs     | 8               | 604006   | 115.86            |
| 10210                                     | 5/8-11  | 3/8  | 0.100  | 1.187   | 0.500   | 1.125  | 0.590   | 100.0           | 6,000 lbs     | 4               | 604007   | 87.88             |
| <b>Metric</b>                             |         |      |        |         |         |        |         |                 |               |                 |          |                   |
| 50204                                     | M4      | 3mm  | 0.76mm | 7.93mm  | 2.80mm  | 9.6mm  | 3.80mm  | 2.0 N.m.        | 910 N         | 10              | 604008   | 87.88             |
| 50206                                     | M6      | 4mm  | 1.01mm | 15.86mm | 4.75mm  | 11.2mm | 7.80mm  | 8.5 N.m.        | 3,558 N       | 10              | 604009   | 92.50             |
| 50208                                     | M8      | 5mm  | 1.01mm | 20.61mm | 4.75mm  | 15.0mm | 10.15mm | 11.3 N.m.       | 3,558 N       | 12              | 604010   | 115.86            |
| 50210                                     | M10     | 7mm  | 1.27mm | 20.61mm | 6.35mm  | 19.0mm | 10.15mm | 28.0 N.m.       | 8,895 N       | 10              | 604011   | 106.62            |
| 50212                                     | M12     | 8mm  | 2.03mm | 25.38mm | 9.52mm  | 22.8mm | 12.70mm | 88.0 N.m.       | 17,790 N      | 8               | 604012   | 115.86            |
| 50216                                     | M16     | 12mm | 2.54mm | 30.13mm | 12.70mm | 28.5mm | 15.00mm | 125.0 N.m.      | 26,680 N      | 4               | 604013   | 87.88             |
| <b>Stainless Steel Washer &amp; Screw</b> |         |      |        |         |         |        |         |                 |               |                 |          |                   |
| 10214                                     | 8 - 32  | 5/64 | 0.030  | 0.312   | 0.110   | 0.350  | 0.150   | 1.5 (ft/lbs)    | 205 lbs       | 10              | 604476   | 66.35             |
| 10203                                     | 1/4-20  | 1/8  | 0.040  | 0.625   | 0.190   | 0.470  | 0.308   | 6.2 (ft/lbs)    | 800 lbs       | 4               | 604014   | 99.60             |
| 10213                                     | 5/16-18 | 3/16 | 0.040  | 0.812   | 0.250   | 0.460  | 0.400   | 8.3 (ft/lbs)    | 800 lbs       | 4               | 604015   | 84.67             |
| 50214                                     | M4      | 3mm  | 0.76mm | 7.93mm  | 2.80mm  | 9.6mm  | 3.80mm  | 2.0(N.m.)       | 910N          | 10              | 604477   | 66.35             |
| 50205                                     | M6      | 4mm  | 1.01mm | 15.86mm | 4.75mm  | 11.2mm | 7.80mm  | 8.5 (N.m.)      | 3,558 N       | 4               | 604016   | 103.56            |
| 50207                                     | M8      | 5mm  | 1.01mm | 20.60mm | 6.35mm  | 15.0mm | 10.15mm | 11.30 (N.m.)    | 3,558 N       | 4               | 604017   | 133.35            |

\*G - Location to drill and tap from edge of workpiece

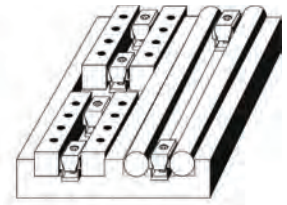
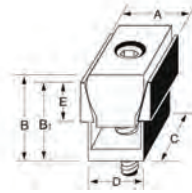
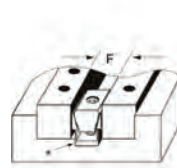
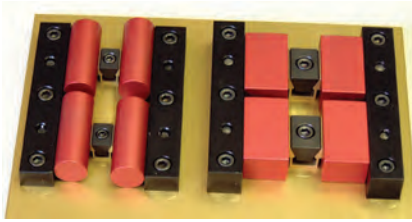
# Workholding, Clamping & Fixturing

## Uniforce Clamps

The Mitee-Bite Uniforce Clamp, a compact, economical workholding device enables you to fixture more parts on the machine table. This simple efficient wedge design provides equilateral clamping force on both sides of the aluminum channel to hold two parts with one clamping action.



Visit [www.miteebite.com](http://www.miteebite.com) for the "Mitee-Bite Challenge" and more product detail.



| Part No.    | Model | A     | B     | B1    | C     | *D    | E     | *F    | Thread Size | Maximum Spread | Max Torque (ft/lbs) | Holding Force (lbs) | Clamps Per Pack | Key Size | Code No. | Price \$ Per Pack |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|----------------|---------------------|---------------------|-----------------|----------|----------|-------------------|
| <b>Inch</b> |       |       |       |       |       |       |       |       |             |                |                     |                     |                 |          |          |                   |
| 60250       | 250   | 0.240 | 0.270 | 0.250 | 0.320 | 0.210 | 0.140 | 0.250 | 2-56        | 0.260          | 0.5                 | 200                 | 6               | 5/64     | 604037   | 108.76            |
| 60375       | 375   | 0.360 | 0.380 | 0.375 | 0.470 | 0.310 | 0.185 | 0.375 | 4-40        | 0.390          | 1.1                 | 310                 | 6               | 3/32     | 604038   | 108.76            |
| 60500       | 500   | 0.485 | 0.580 | 0.500 | 0.625 | 0.410 | 0.220 | 0.500 | 8-32        | 0.530          | 2.5                 | 500                 | 8               | 9/64     | 604039   | 108.76            |
| 60750       | 750   | 0.735 | 0.770 | 0.750 | 0.940 | 0.635 | 0.375 | 0.750 | 1/4-20      | 0.785          | 10.8                | 1,500               | 6               | 3/16     | 604040   | 110.74            |
| 61000       | 1000  | 0.980 | 1.020 | 1.000 | 1.250 | 0.820 | 0.500 | 1.000 | 5/16-18     | 1.050          | 10.4                | 2,000               | 4               | 1/4      | 604041   | 108.76            |
| 61500       | 1500  | 1.470 | 1.520 | 1.500 | 1.875 | 1.215 | 0.750 | 1.500 | 1/2-13      | 1.560          | 28.3                | 3,500               | 2               | 3/8      | 604042   | 181.13            |
| 62000       | 2000  | 1.960 | 2.030 | 2.000 | 2.500 | 1.625 | 1.000 | 2.000 | 5/8-11      | 2.080          | 55.0                | 6,000               | 2               | 1/2      | 604043   | 274.63            |

\*D - A milled slot wider than D dimension will insure the clamp remains in line with workpiece. Clamp sides should not come in contact with slot walls during expansion.

\*F - The distance needed between workpieces for clamp clearance. Drill and tap mounting hole on the center of F dimension.

Metric also available, call for more information.

## Machinable Uniforce Clamps

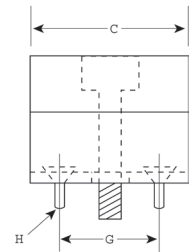
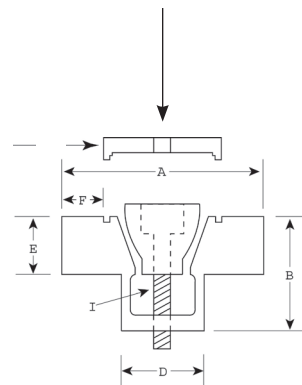


Now you can hold those round and unusual shape parts with ease. This compact method of workholding will allow more parts per load at a lower price than vise soft jaws. The compact Mitee-Bite Uniforce Clamp is available with extra material on the clamping jaws so it can be machined to conform to the shape of your workpiece. The specially designed steel wedge spreads the clamping force uniformly on both sides of the 7075-T6 aluminum channel. A unique locking plate is provided to make the clamp rigid while machining the jaws to your specifications, without vibration.

Locking plate is used only to machine jaws, remove to clamp workpiece



When clamp is used to hold flat stock, use locking plate to machine faces parallel



| Model       | Part No. | Description        | *A    | B    | C    | D     | E    | *F   | G     | *H     | I       | Max Torque (ft/lbs) | Holding Force (lbs) | Code No. | Price \$ |
|-------------|----------|--------------------|-------|------|------|-------|------|------|-------|--------|---------|---------------------|---------------------|----------|----------|
| <b>Inch</b> |          |                    |       |      |      |       |      |      |       |        |         |                     |                     |          |          |
| 500         | 60050    | With Locking Plate | 1.125 | 0.50 | 0.62 | 0.420 | 0.25 | 0.18 | 0.400 | 2-56   | 8-32    | 2.5                 | 500                 | 604058   | 36.89    |
| 750         | 60075    | With Locking Plate | 1.500 | 0.75 | 0.94 | 0.632 | 0.37 | 0.26 | 0.625 | 6-32   | 1/4-20  | 10.8                | 1,500               | 604060   | 39.03    |
| 1000        | 60100    | With Locking Plate | 2.000 | 1.00 | 1.25 | 0.820 | 0.50 | 0.39 | 0.812 | 6-32   | 5/16-18 | 10.4                | 2,000               | 604062   | 53.89    |
| 1500        | 60150    | With Locking Plate | 3.000 | 1.50 | 1.87 | 1.215 | 0.75 | 0.62 | 1.200 | 10-32  | 1/2-13  | 28.3                | 3,500               | 604064   | 149.36   |
| 2000        | 60200    | With Locking Plate | 4.000 | 2.00 | 2.50 | 1.625 | 1.00 | 0.80 | 1.625 | 1/4-20 | 5/8-11  | 55.0                | 6,000               | 604066   | 244.75   |

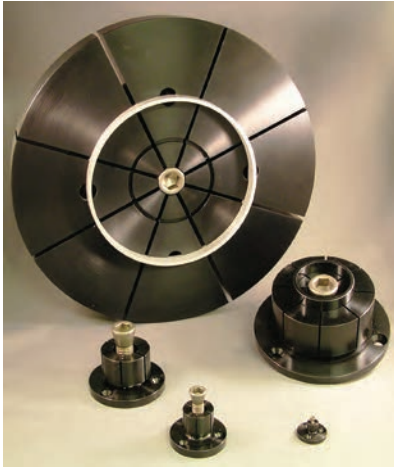
\*A - The distance needed between workpieces for clamp clearance, drill and tap mounting holes on the center of "A" dimension.

\*F - The amount of machinable stock on the jaws.

\*H - Mounting screws included.

Metric also available, call for more information.

# ID Xpansion™ Clamp



The ID Xpansion™ Clamp is the ideal way to hold multiple parts on an inside diameter for machining on your VMC or HMC. These machinable clamps are produced in 12 sizes and can hold internal diameters from 0.160 to 9.85.

- Low profile
- Ideal for secondary operations on lathe parts
- Easily machined to size on lathe or mill
- Excellent for palletized setups
- Allows more parts per workcube or fixture plates
- Clamp body made of mild steel for machinability
- Tighten with hex key or hydraulic pull cylinders
- Longer screws are available for hydraulic applications (pull cylinders)

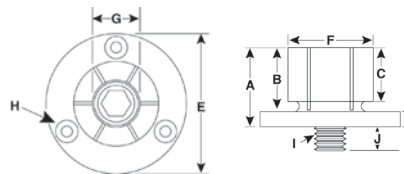
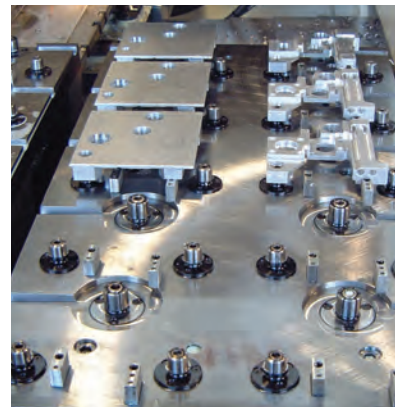


## Model #00 - #6 ID Xpansion® Clamps

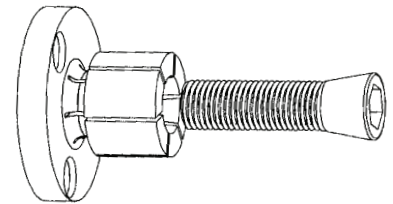
- Expand clamp approximately 0.002" to 0.003" (0.1mm) over relaxed diameter and machine to fit workpiece bore, either on lathe or mill.
- If machining the clamp on lathe use the nut provided on the back of the clamp to tighten the tapered screw. This nut is used only while machining the clamp.
- Machine a pocket in the fixture, for the close tolerance "E" dimension and drill and tap mounting holes per "H" column. Drill and tap a hole from the "I" column in the center of the pocket for the tapered screw.
- A recessed dowel pin may be installed into the flange for additional rigidity if required.
- Range of expansion 0.005" to 0.025" (0.2 to 0.5mm) depending upon size.

## Model #7 - #10 ID Xpansion® Clamps

- Locking ring provided to ensure segments remain rigid while machining clamps to size.
- Insert ring and tighten drive screw, machine clamp to bore size. Remove ring to clamp workpiece.
- Aggressive material removal is not recommended when machining clamps to size.



Machining/Locking ring included on models #7-#10 to ensure the segments remain rigid while machining the clamp



| Part No.    | Model | A    | B    | C    | D    | E<br>(+0.000/-0.002) | F    | *G   | *H                  | I       | J    | Max Torque<br>(ft/lbs) | Holding Force<br>(Lbs) | Code No. | Price \$ |
|-------------|-------|------|------|------|------|----------------------|------|------|---------------------|---------|------|------------------------|------------------------|----------|----------|
| <b>Inch</b> |       |      |      |      |      |                      |      |      |                     |         |      |                        |                        |          |          |
| 31000       | #00   | 0.42 | 0.30 | 0.24 | 0.12 | 0.787                | 0.29 | 0.16 | 2-56 on 0.540 BHC   | 2-56    | 0.16 | 0.5                    | 250                    | 604123   | 63.62    |
| 31050       | #0    | 0.86 | 0.63 | 0.59 | 0.23 | 1.170                | 0.49 | 0.28 | 6-32 on 0.82 BHC    | 8-32    | 0.30 | 3.6                    | 950                    | 604124   | 63.62    |
| 31100       | #1    | 0.98 | 0.75 | 0.59 | 0.23 | 1.240                | 0.56 | 0.48 | 6-32 on 0.910 BHC   | 1/4-20  | 0.50 | 13.3                   | 1,900                  | 604125   | 63.62    |
| 31150       | #2    | 0.98 | 0.75 | 0.59 | 0.23 | 1.476                | 0.79 | 0.53 | 6-32 on 1.140 BHC   | 5/16-18 | 0.56 | 27.6                   | 2,500                  | 604126   | 67.75    |
| 31200       | #3    | 1.13 | 0.88 | 0.69 | 0.25 | 1.969                | 1.06 | 0.71 | 8-32 on 1.550 BHC   | 3/8-16  | 0.71 | 49.3                   | 4,500                  | 604127   | 88.05    |
| 31250       | #4    | 1.25 | 1.00 | 0.81 | 0.25 | 2.205                | 1.39 | 0.90 | 8-32 on 1.790 BHC   | 1/2-13  | 0.71 | 120.0                  | 5,900                  | 604128   | 108.60   |
| 31300       | #5    | 1.56 | 1.25 | 1.06 | 0.31 | 2.736                | 1.65 | 1.15 | 10-32 on 2.200 BHC  | 5/8-11  | 0.79 | 224.0                  | 10,000                 | 604129   | 139.21   |
| 31350       | #6    | 1.56 | 1.25 | 1.06 | 0.31 | 2.972                | 2.03 | 1.15 | 10-32 on 2.515 BHC  | 5/8-11  | 0.79 | 224.0                  | 10,000                 | 604130   | 152.74   |
| 31400       | #7    | 1.79 | 1.48 | 1.27 | 0.31 | 4.232                | 3.06 | 1.15 | 1/4-20 on 3.646 BHC | 5/8-11  | 0.79 | 224.0                  | 10,000                 | 604131   | 242.86   |
| 31450       | #8    | 1.79 | 1.48 | 1.27 | 0.31 | 5.232                | 4.06 | 1.15 | 1/4-20 on 4.648 BHC | 5/8-11  | 0.79 | 224.0                  | 10,000                 | 604132   | 297.98   |
| 31500       | #9    | 1.79 | 1.48 | 1.27 | 0.31 | 5.232                | 6.89 | 1.15 | 1/4-20 on 4.648 BHC | 5/8-11  | 0.79 | 224.0                  | 10,000                 | 604438   | 838.98   |
| 31550       | #10*  | 1.79 | 1.48 | 1.27 | 0.31 | 6.000                | 9.85 | 1.15 | 1/4-20 on 5.250 BHC | 5/8-11  | 0.79 | 125.0                  | 6,000                  | 604440   | 1,472.98 |

\*G - Minimum diameter the "F" dimension can be machined or turned down

\*H - (3) Mounting screws included - (4) for model numbers #9 and #10

\*Model #10 Made from 7075-T6 Aluminum

Metric also available, call for more information

## OK-VISE® Clamps

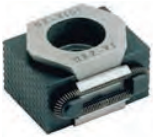


### The OK-Vise Clamp

With clamping capabilities up to 33,000 lbs, the OK-Vise is one of the strongest workholding products available in the Machine Tool Industry today.

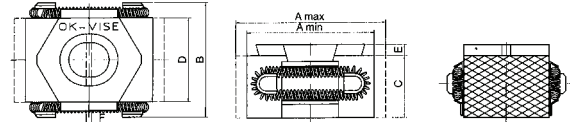
### Three Dimensional Machining

Due to the low-profile design of the OK-Vise Clamps, it is possible to execute flexible three-directional machining of workpieces with one fastening. This feature creates improved accuracy. The single wedge clamp locks the workpiece to prevent any movement.



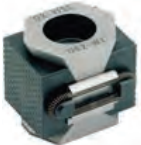
### Single-Wedge OK-Vise Clamps

Strong lateral clamping with a single wedge design



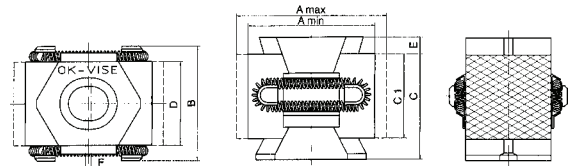
| Part No. | Model     | Min. (in.) | A Optimum | Max. (in.) | B    | C    | D    | E    | F     | Mounting Screw (Included) | Max Torque (ft/lbs) | Pressing Force of Jaws (lbs) | Hardness of Jaws HRC | Code No. | Price \$ |
|----------|-----------|------------|-----------|------------|------|------|------|------|-------|---------------------------|---------------------|------------------------------|----------------------|----------|----------|
| *47100   | AK2-VT-SO | 0.79       | 0.90      | 0.98       | 0.86 | 0.43 | 0.59 | 0.16 | 0.060 | 10-32 x 3/4               | 7                   | 2,000                        | 48-52                | 604442   | 97.74    |
| *47110   | BK2-VT-S  | 1.06       | 1.14      | 1.22       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,500                        | 48-52                | 604068   | 196.85   |
| 47105    | BK2-VT-O  | 1.06       | 1.14      | 1.22       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,500                        | 48-52                | 604468   | 154.03   |
| *47103   | BK2-VT-SO | 1.06       | 1.14      | 1.22       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,500                        | 48-52                | 604469   | 154.03   |
| 47115    | BK2-VT    | 1.06       | 1.14      | 1.22       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,500                        | 48-52                | 604069   | 196.85   |
| 47113    | BK2-VT-SS | 1.06       | 1.14      | 1.22       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,500                        | 48-52                | 604470   | 196.85   |
| 47130    | DK2-VTI   | 1.65       | 1.77      | 1.93       | 1.61 | 0.87 | 1.18 | 0.16 | 0.080 | 1/2-13 x 1-1/4            | 110                 | 14,500                       | 48-52                | 604070   | 291.84   |
| 47160    | FK2-VT    | 2.24       | 2.40      | 2.60       | 2.20 | 1.14 | 1.65 | 0.20 | 0.145 | 5/8-11 x 1-1/2            | 250                 | 24,900                       | 48-52                | 604071   | 462.11   |

\*47100, 47110 and 47103 have smooth jaws

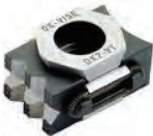


### Double-Wedge OK-Vise Clamps

The double-wedge clamps generate a pull-down action pressing the workpiece down towards the fixture base

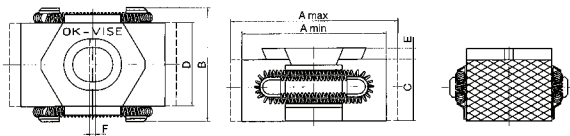


| Part No. | Model   | Min. (in.) | A Optimum | Max. (in.) | B    | C    | C1   | D    | E    | F     | Mounting Screw (Included) | Max Torque (ft/lbs) | Pressing Force of Jaws (lbs) | Hardness of Jaws HRC | Code No. | Price \$ |
|----------|---------|------------|-----------|------------|------|------|------|------|------|-------|---------------------------|---------------------|------------------------------|----------------------|----------|----------|
| 47150    | DK2-WTI | 1.65       | 1.77      | 1.93       | 1.61 | 1.42 | 1.18 | 1.18 | 0.20 | 0.080 | 1/2-13 x 1-1/2            | 110                 | 20,000                       | 48-52                | 604072   | 412.05   |
| 47180    | FK2-WT  | 2.24       | 2.40      | 2.65       | 2.20 | 1.97 | 1.65 | 1.65 | 0.20 | 0.145 | 5/8-11 x 2-1/4            | 250                 | 33,000                       | 48-52                | 604073   | 577.64   |



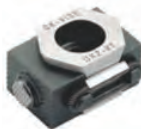
### Machinable Single-Wedge OK-Vise Clamps

Additional material is added to these machinable jaws



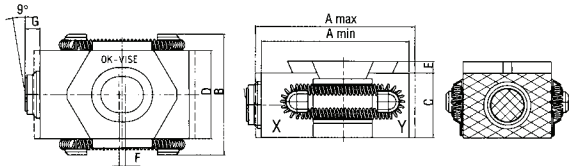
| Part No. | Model      | Min. (in.) | A Optimum | Max. (in.) | B    | C    | D    | E    | F     | Mounting Screw (Included) | Max Torque (ft/lbs) | Pressing Force of Jaws (lbs) | Hardness of Jaws HRC | Code No. | Price \$ |
|----------|------------|------------|-----------|------------|------|------|------|------|-------|---------------------------|---------------------|------------------------------|----------------------|----------|----------|
| *47120   | BK2-VT-S+3 | 1.30       | 1.38      | 1.46       | 1.14 | 0.59 | 0.83 | 0.10 | 0.060 | 5/16-18 x 3/4             | 30                  | 5,000                        | 30-34                | 604074   | 254.16   |
| 47140    | DK2-VTI+5  | 2.05       | 2.17      | 2.32       | 1.61 | 0.87 | 1.18 | 0.16 | 0.080 | 1/2-13 x 1-1/4            | 110                 | 12,000                       | 30-34                | 604075   | 365.84   |
| 47170    | FK2-VT+5   | 2.64       | 2.80      | 2.99       | 2.20 | 1.14 | 1.65 | 0.20 | 0.145 | 5/8-11 x 1-1/2            | 250                 | 22,000                       | 30-34                | 604076   | 500.62   |

\*47120 has smooth jaw



### Special Model OK-Vise Clamps

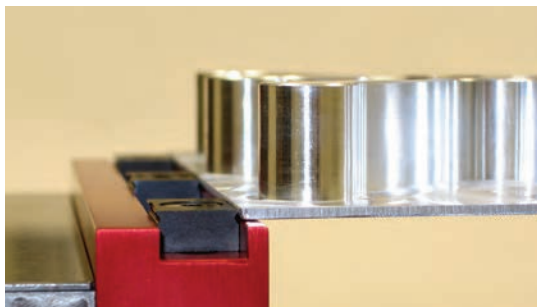
OK-Vise low-profile clamp with a self adjusting steel ball used when clamping castings and workpieces with irregular shapes



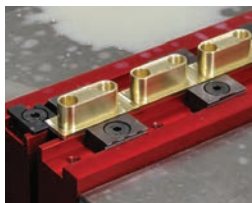
| Part No. | Model     | Min. (in.) | A Optimum | Max. (in.) | B    | C    | D    | E    | F     | G    | H    | K    | L  | Mounting Screw (Included) | Max Torque (ft/lbs) | Pressing Force of Jaws (lbs) | Code No. | Price \$ |
|----------|-----------|------------|-----------|------------|------|------|------|------|-------|------|------|------|----|---------------------------|---------------------|------------------------------|----------|----------|
| 47112    | BK2-VT-T  | 1.18       | 1.26      | 1.34       | 1.14 | 0.59 | 0.83 | 0.10 | -     | 0.30 | 0.47 | 0.83 | M5 | 5/16-18 x 3/4 SHCS        | 30                  | 5,000                        | 604471   | 336.96   |
| 47145    | DK2-VTI-T | 1.81       | 1.93      | 2.09       | 1.61 | 0.87 | 1.18 | 0.16 | -     | 0.43 | 0.71 | 1.10 | M5 | 1/2-13 x 1-1/4 SHCS       | 110                 | 12,000                       | 604472   | 475.59   |
| 47175    | FK2-VT-T  | 2.40       | 2.56      | 2.76       | 2.20 | 1.14 | 1.65 | 0.19 | -     | 0.57 | 1.02 | 1.57 | M5 | 5/8-11 x 1-1/2 SHCS       | 250                 | 22,000                       | 604473   | 612.30   |
| 47185    | BK2-VT-B  | 1.18       | 1.26      | 1.34       | 1.14 | 0.59 | .83  | 0.10 | 0.060 | 0.12 | -    | -    | -  | 5/16-18 x 3/4             | 30                  | 5,500                        | 604077   | 348.42   |
| 47190    | DK2-VTI-B | 1.85       | 1.97      | 2.12       | 1.61 | .87  | 1.18 | 0.16 | 0.080 | 0.20 | -    | -    | -  | 1/2-13 x 1-1/4            | 110                 | 12,000                       | 604078   | 503.46   |
| 47187    | BK2-VT-E  | 1.54       | 1.61      | 1.69       | 1.14 | 0.59 | 0.83 | 0.10 | -     | -    | -    | -    | -  | 5/16-18 x 3/4 SHCS        | 30                  | 5,000                        | 604474   | 423.61   |
| 47186    | DK2-VTI-E | 2.44       | 2.56      | 2.72       | 1.61 | 0.86 | 1.18 | 0.15 | -     | -    | -    | -    | -  | 1/2-13 x 1-1/4 SHCS       | 110                 | 12,000                       | 604475   | 542.98   |



## TalonGrip™ Vise Jaws



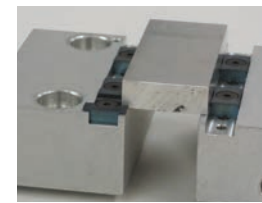
MITEE-BITE Products introduces a new and innovative product that will increase the functionality of your standard 4 and 6 inch (100mm and 150mm) vises. **TalonGrip™** is a simple bolt system that will allow you to perform aggressive machining operations while clamping on as little as 0.060 (1.5mm) of an inch. Ideal for small lot sizes, difficult applications or proto-type work when building a fixture would not be beneficial. TalonGrips are also available individually for fixturing with Pitbull and Dyna-Force clamps or for soft jaw applications.



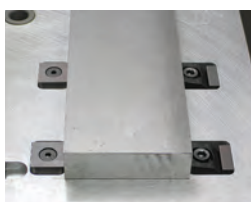
Multiple Parts



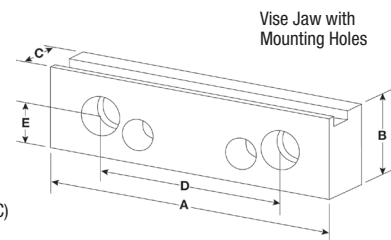
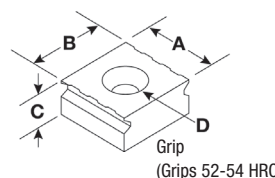
Aggressive stock removal



Soft Jaws



Fixture Application with Pitbull Clamps



### Steel Vise Jaw Set (Set Includes 4 TalonGrips, 1 stop with M5 Screws)

| Part No.                      | Vise                | A Inch (Metric) | B Inch (Metric) | C Inch (Metric) | D Inch (Metric)           | E Inch (Metric)            | Code No. | Price \$ |
|-------------------------------|---------------------|-----------------|-----------------|-----------------|---------------------------|----------------------------|----------|----------|
| <b>With Mounting Holes</b>    |                     |                 |                 |                 |                           |                            |          |          |
| 32044                         | 4" (100mm)          | 4.0" (100)      | 1.48" (37.59)   | 1.0" (25.4)     | 2.5" (63.5)               | 0.688" (17.47)             | 604410   | 259.94   |
| 32066                         | 4"/6" (100mm/150mm) | 6.0" (150)      | 1.73" (43.94)   | 1.0" (25.4)     | 2.5"/3.88" (63.5/98.55)   | 0.688"/0.94" (17.47/23.87) | 604412   | 294.60   |
| 32068                         | 6" (150mm)          | 8.0" (200)      | 1.73" (43.94)   | 1.0" (25.4)     | 3.88" (98.55)             | 0.94" (23.87)              | 604414   | 329.25   |
| 32088                         | 6"/8" (150mm/200mm) | 8.0" (200)      | 2.45" (62.23)   | 1.25" (31.75)   | 3.87"/4.75" (98.3/120.65) | 0.94"/1.218" (23.87/30.94) | 604466   | 433.23   |
| <b>Without Mounting Holes</b> |                     |                 |                 |                 |                           |                            |          |          |
| 33044                         | 4" (100mm)          | 4.0" (100)      | 1.48" (37.59)   | 1.0" (25.4)     | -                         | -                          | 604411   | 259.94   |
| 33066                         | 4"/6" (100mm/150mm) | 6.0" (150)      | 1.73" (43.94)   | 1.0" (25.4)     | -                         | -                          | 604413   | 294.60   |
| 33068                         | 6" (150mm)          | 8.0" (200)      | 1.73" (43.94)   | 1.0" (25.4)     | -                         | -                          | 604415   | 329.25   |

### Vise Jaw Grips & Stops

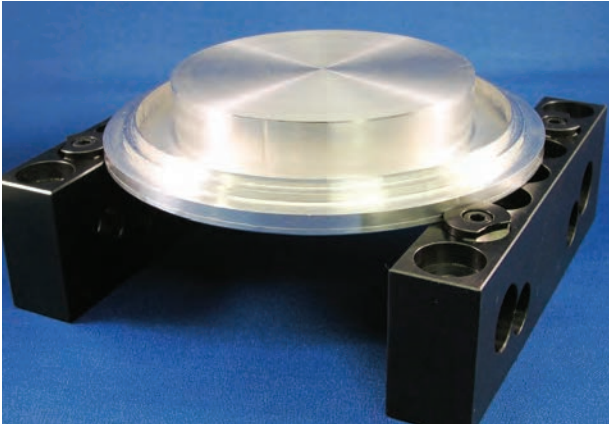
| Part No.      | Description | A Inch (Metric) | B Inch (Metric) | C Inch (Metric) | D Inch (Metric) | Recommended Gripping Height | No. of Grips Per Pack | Code No. | Price \$ Per Pack |
|---------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------------------|-----------------------|----------|-------------------|
| <b>Inch</b>   |             |                 |                 |                 |                 |                             |                       |          |                   |
| 32050         | Extra Grips | 0.75"           | 0.500"          | 0.250"          | 10-32           | 0.060-0.075                 | 2                     | 604416   | 42.50             |
| 32020         | Extra Stop  | 0.75"           | 0.500"          | 0.250"          | 10-32           | -                           | 1                     | 604421   | 25.99             |
| <b>Metric</b> |             |                 |                 |                 |                 |                             |                       |          |                   |
| 33050         | Extra Grips | 19.05mm         | 12.7mm          | 6.35mm          | M5              | 1.5mm-1.9mm                 | 2                     | 604418   | 42.50             |
| 33020         | Extra Stop  | 19.05mm         | 12.7mm          | 6.35mm          | M5              | -                           | 1                     | 604423   | 25.99             |
| 33030         | Extra Stop  | 19.05mm         | 19.05mm         | 7.92mm          | M5              | -                           | 1                     | 604467   | 25.99             |

### Fixture Grips

| Part No.      | A Inch (Metric) | B Inch (Metric) | C Inch (Metric) | D Inch (Metric) | Recommended Gripping Height | No. of Grips Per Pack | Code No. | Price \$ Per Pack |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------------------|-----------------------|----------|-------------------|
| <b>Inch</b>   |                 |                 |                 |                 |                             |                       |          |                   |
| 32075         | 0.75"           | 0.750"          | 0.312"          | 10-32           | 0.060"-0.120"               | 2                     | 604424   | 47.70             |
| 32100         | 0.75"           | 1.000"          | 0.312"          | 10-32           | 0.060"-0.120"               | 2                     | 604428   | 52.48             |
| 32150         | 1.00"           | 1.000"          | 0.500"          | 5/16-18         | 0.060"-0.120"               | 1                     | 604429   | 45.06             |
| <b>Metric</b> |                 |                 |                 |                 |                             |                       |          |                   |
| 33075         | 19.05mm         | 19.05mm         | 7.92mm          | M5              | 1.5mm-3.0mm                 | 2                     | 604426   | 47.70             |
| 33100         | 19.05mm         | 25.4mm          | 7.92mm          | M5              | 1.5mm-3.0mm                 | 2                     | 604430   | 52.48             |
| 33150         | 25.4mm          | 25.4mm          | 12.7mm          | M8              | 1.5mm-3.0mm                 | 1                     | 604431   | 45.06             |

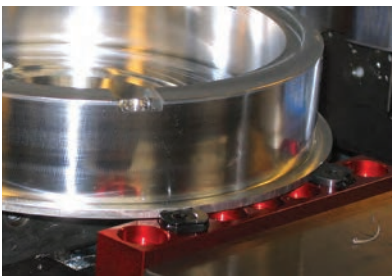


## VersaGrip™ Vise Jaws

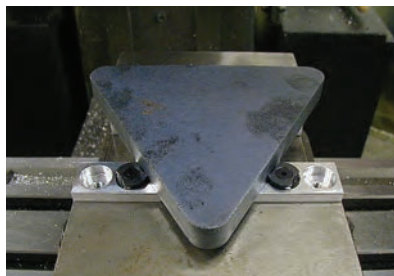


**VersaGrip™**, as the name implies, offers the versatility of clamping standard vise work as well as providing a solution for difficult applications that would normally require fixturing or machining soft-jaws. By simply replacing your current jaws with the VersaGrip™ system you can securely hold odd shaped parts while machining at speeds and feeds you never thought possible.

This system can accommodate a wide range of part sizes as well as holding multiple parts in a single cycle. The hardened (52-54 HRC) VersaGrip™ has penetrating teeth designed to bite into your workpiece preventing lateral and horizontal movement. These grips will hold flame cut parts, castings, even parts with a negative draft!



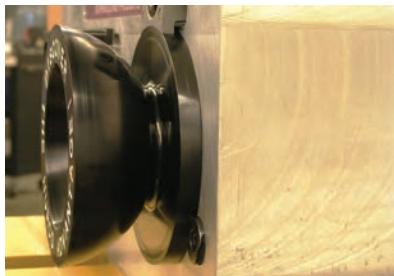
Large Dimensions



Odd Shaped Parts



Multiple Parts



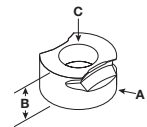
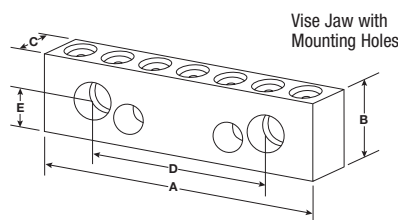
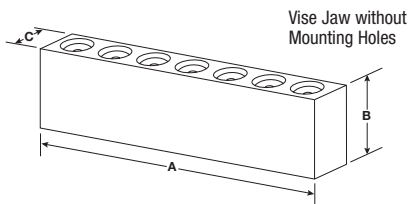
Tombstone Application



### TalonGrip™ & VersaGrip™ 6" Combo Kit

| Part No. | Contents of Kit  | Code No. | Price \$ |
|----------|--|----------|----------|
| 33006    | 32066 TalonGrip Vise Jaw Set<br>32166 VersaGrip Vise Jaw Set | 604464   | 615.19   |

**NOTE:** All Jaws designed to fit on a 4" or 6" Vise



### Steel Vise Jaw Set (Set Includes 4 VersaGrips)

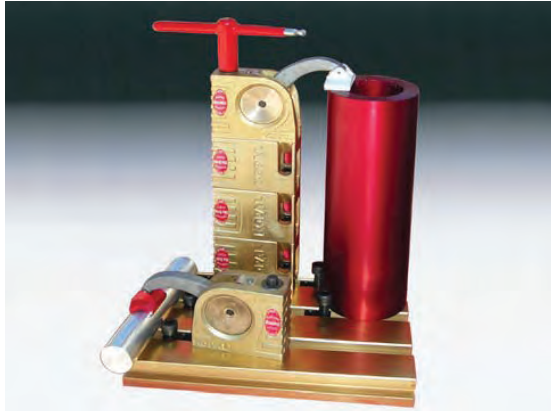
| Part No.                      | Vise                | A Inch (Metric) | B Inch (Metric) | C Inch (Metric) | D Inch (Metric)         | E Inch (Metric)            | Code No. | Price \$ |
|-------------------------------|---------------------|-----------------|-----------------|-----------------|-------------------------|----------------------------|----------|----------|
| <b>With Mounting Holes</b>    |                     |                 |                 |                 |                         |                            |          |          |
| 32166                         | 4"/6" (100mm/150mm) | 6.0" (150)      | 1.88" (47.75)   | 1.0" (25.4)     | 2.5"/3.88" (63.5/98.55) | 0.688"/0.94" (17.47/23.87) | 604432   | 320.59   |
| 32168                         | 6" (150mm)          | 8.0" (200)      | 1.88" (47.75)   | 1.0" (25.4)     | 3.88" (98.55)           | 0.94" (23.87)              | 604434   | 346.58   |
| <b>Without Mounting Holes</b> |                     |                 |                 |                 |                         |                            |          |          |
| 33166                         | 6" (150mm)          | 8" (200mm)      | 1.88" (47.75)   | 1.0" (25.4)     | -                       | -                          | 604433   | 320.59   |
| 33168                         | 8" (200mm)          | 8" (200mm)      | 1.88" (47.75)   | 1.0" (25.4)     | -                       | -                          | 604435   | 346.58   |

### VersaGrip™

| Part No. | A Inch (Metric) | B Inch (Metric) | C Inch (Metric) | Recommended Gripping Height | No. of Grips Per Pack | Code No. | Price \$ |
|----------|-----------------|-----------------|-----------------|-----------------------------|-----------------------|----------|----------|
| 33175    | 0.750"          | 0.375"          | 10-32           | 0.060-0.140                 | 2                     | 604465   | 60.65    |
| 32175    | 19.05           | 9.52            | M5              | 1.55mm-3.5mm                | 2                     | 604436   | 60.65    |



## Kopal® Clamps



Need a quick and easy way to clamp parts with top pressure? Check out this versatile line-up of clamps! From the strong but compact Piccolo to the heavy-duty Big Block.

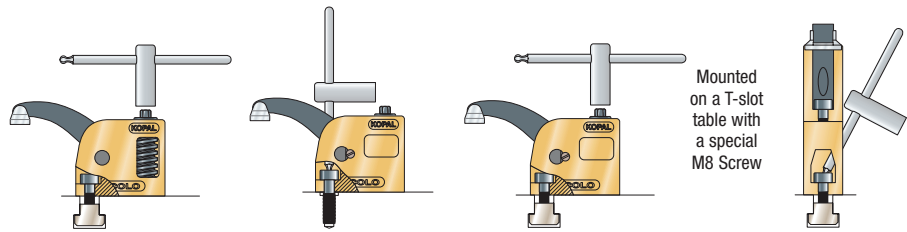
The worm and gear design ensures the clamps will not loosen with use yet the clamps are easy to set up and break down. This is ideal for short cycle times and odd shaped parts.

The modular design also allows adjusting clamping height by stacking the riser blocks, and the use of an extension arm increases reach!

### PICCOLO

Up to 1460 lbs. (6500N) Holding Force

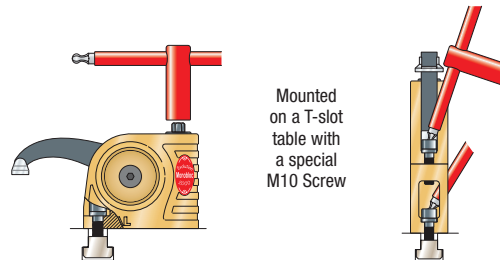
When the arm is released, the Piccolo remains in position in the slot.



### MONO BLOC

Up to 3600 lbs. (16000N) Holding Force

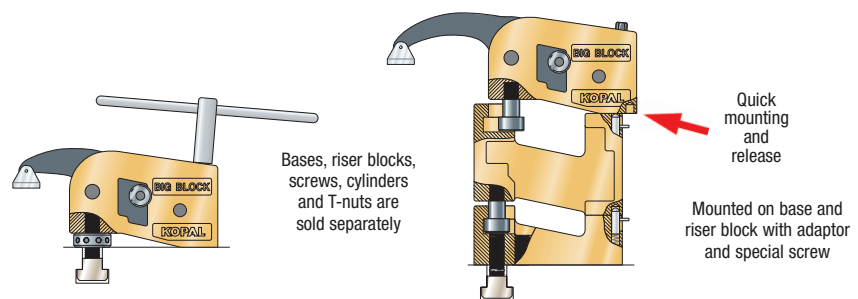
1. Slide the T-nut and the screw into the slot
2. Position and tighten the clamp onto the table using the clamping key provided
3. Clamp the workpiece using the same key
4. Proceed with machining



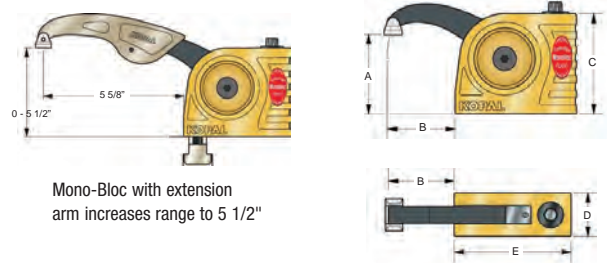
### BIG BLOCK

Up to 9000 lbs. (40000N) Holding Force

When the workpiece is released, the Big Block can either remain fixed in the slot, or slide in the slot.

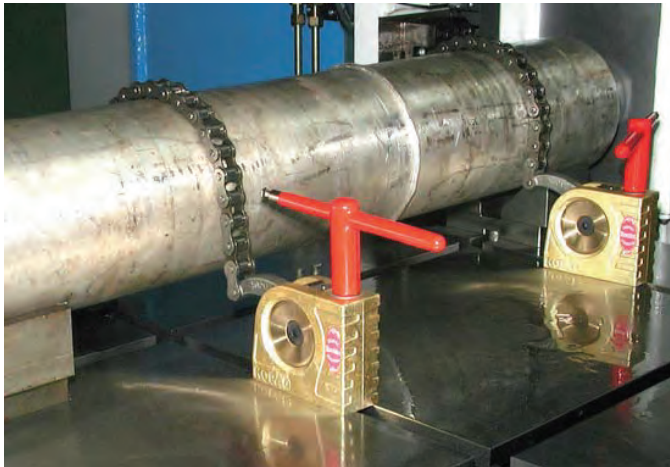


| Part No. | Description | A            | B      | C    | D      | E     | Code No. | Price \$ |
|----------|-------------|--------------|--------|------|--------|-------|----------|----------|
| 25500    | Piccolo     | -0.60"-2.28" | 2.125" | 2.5" | 1.250" | 2.87" | 604486   | 709.03   |
| 25705    | Mono Bloc   | 0"-4"        | 2.375" | 3.5" | 1.563" | 4.25" | 604184   | 824.83   |
| 08035    | Big Block   | -70"-5.32"   | 5.700" | 4.1" | 2.350" | 6.38" | 604485   | 1,918.40 |



Workholding, Clamping & Fixturing

## Mono-Bloc Chain Clamp



The Mono-Bloc Chain Clamp is a simple and rapid workholding solution for a wide array of applications.

The Chain Clamp offers fast and powerful clamping with forces up to 3600 lbs. (16000N).

Additional lengths of chain can be added for large applications.

### Mono-Bloc

| Part No. | Description     | A     | B      | C    | D      | E     | Code No. | Price \$ |
|----------|-----------------|-------|--------|------|--------|-------|----------|----------|
| 25040    | Mono-Bloc Chain | 0"-4" | 2.375" | 3.5" | 1.563" | 4.25" | 604478   | 1,179.40 |

### Parts for the Mono-Bloc

| Part No. | Description             | Code No. | Price \$ |
|----------|-------------------------|----------|----------|
| 25041    | Master Link             | 604479   | 11.55    |
| 25042    | Extra Chain (1 meter)   | 604480   | 116.81   |
| 25043    | Anchor                  | 604481   | 288.82   |
| 25045    | Protective Clips (5/pk) | 604482   | 48.14    |
| 25720    | Wrench                  | 604187   | 71.06    |



To prevent marring or scratching on delicate pieces use the protective chain clips. (25045) Minimum radius 6".

## Deluxe Mono-Bloc Start-up Kit

High-impact plastic storage/carrying case with room to store tools listed below and space to store additional T-nuts for other size mills.

### Kit includes:

- (2) Mono-Bloc Clamps with 2 5/8" arm
- (2) Standard-Duty Riser Blocks
- (1) Extension Arm
- (1) Standard-duty T-Wrench
- (2) M10x35mm screws
- (2) M10x40mm screws
- (2) T-nuts (choose from chart below)



### Mono-Bloc Start-up Kit

| Part No. | T-Slot Size | Code No. | Price \$ |
|----------|-------------|----------|----------|
| 25725    | 1/2"        | 604338   | 2,205.39 |
| 25727    | 9/16"       | 604197   | 2,205.39 |
| 25729    | 5/8         | 604198   | 2,205.39 |
| 25731    | 3/4"        | 604199   | 2,205.39 |

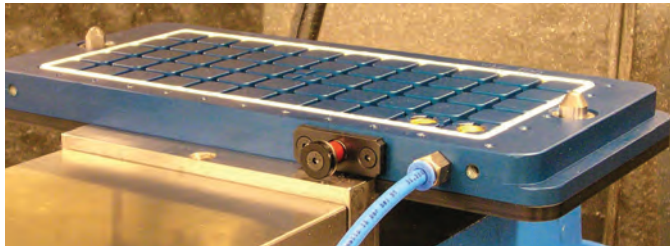


### Individual Mono-Bloc Items

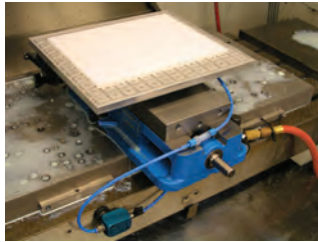
| Part No. | Description   | Code No. | Price \$ |
|----------|---|----------|----------|
| 25705    | Mono-Bloc Clamp with 2 5/8" Arm (Includes T-wrench) | 604184   | 824.83   |
| 25710    | Standard-Duty Riser Block                           | 604185   | 237.11   |
| 25515    | Replacement Swivel Shoe                             | 604186   | 28.88    |
| 25720    | T-Wrench for Mono-Bloc                              | 604187   | 71.06    |
| 25540    | Extension Arm                                       | 604188   | 206.21   |
| 25310    | Worm Gear   | 604483   | 214.46   |

### Special Screws And T-Nuts For Mono-Bloc

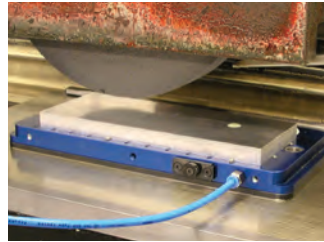
| Part No. | Part Description                         | Code No. | Price \$ |
|----------|--|----------|----------|
| 25730    | M10 x 35mm Screw for 9/16" T-Nut         | 604189   | 27.23    |
| 25733    | M10 x 40mm Screw for 5/8" & 3/4" T-Nut   | 604190   | 28.34    |
| 25736    | M10 x 45mm Screw for 13/16" & 7/8" T-Nut | 604191   | 34.47    |
| 25747    | 1/2" x M10 T-Nut (12mm)                  | 604484   | 22.36    |
| 25748    | 9/16" x M10 T-Nut (14mm)                 | 604192   | 44.28    |
| 25751    | 5/8" x M10 T-Nut (16mm)                  | 604193   | 46.49    |
| 25754    | 3/4" x M10 T-Nut (18mm)                  | 604194   | 54.37    |
| 25757    | 13/16" x M10 T-Nut (20mm)                | 604195   | 37.77    |
| 25760    | 7/8" x M10 T-Nut (22mm)                  | 604196   | 39.70    |



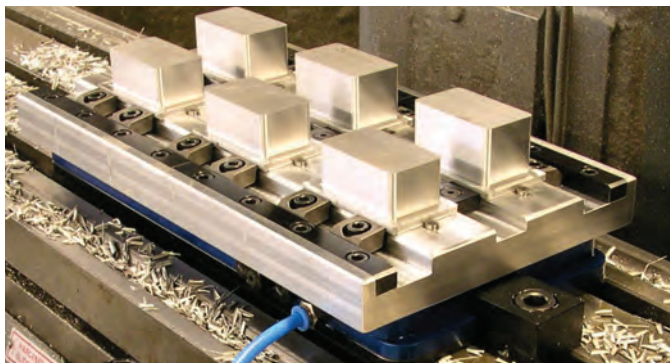
VM100 Base Unit (45375) in Vise



VM100 Base Unit (45375) with VM300 Vacuum Pallet (45150)



VM100 Base Unit (45375) on a Magnetic Chuck

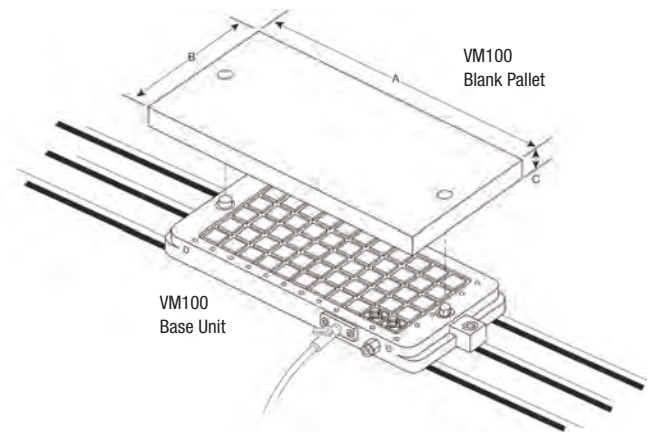


VM100 Base Unit (45375) with a Production Pallet (VM100 Blank Pallet - 45325)

### The Simplest and Most Versatile Vacuum System on the Market

The VM100 was primarily designed for grinding non-ferrous material on a magnetic chuck. During the early stages of R & D it was discovered the VM100 could be much more. Clamp the VM100 in vise to reduce set-up time, use as a pallet changer or mount to a grid plate or T-slot table. The VM100 uses the same patented method as the VM300 to produce a vacuum strong enough for industrial applications but still operates on shop air! No need for vacuum pumps and coolant traps. We include everything necessary to get your VM100 running within minutes of opening the box.

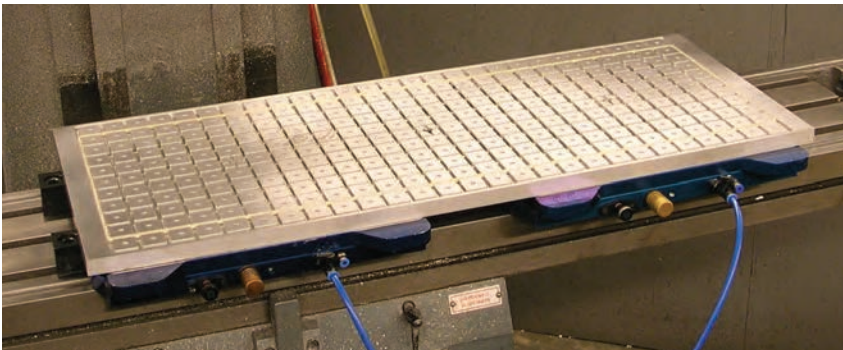
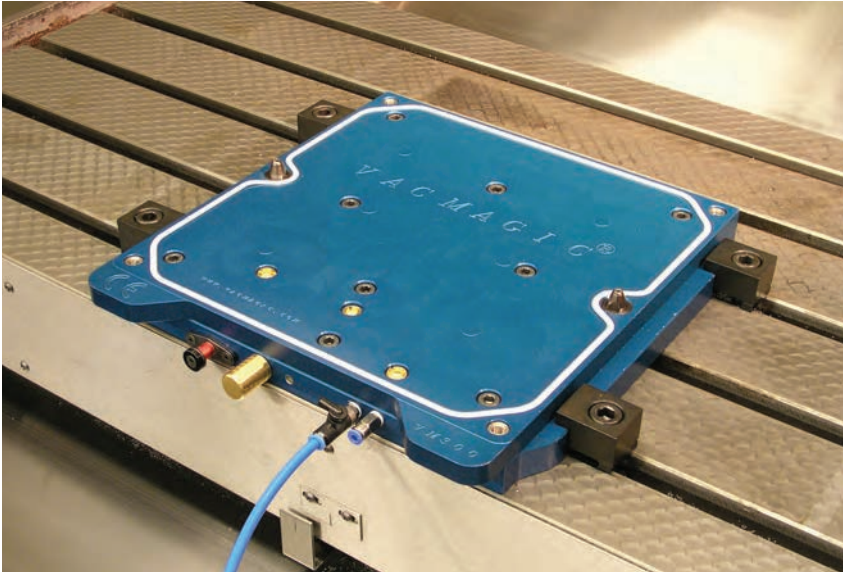
- Operates on 70-100 psi shop air, eliminating vacuum pumps and coolant traps
- Will accept the standard VM300 vacuum pallet, increasing your vacuum platform to over 14" x 12" (360mm x 315mm)
- Make your own vacuum fixtures - we can help with the design and produce the fixture for your custom application
- Remove 12mm pins when grinding/machining thin material, use set screws to locate and aid in holding force



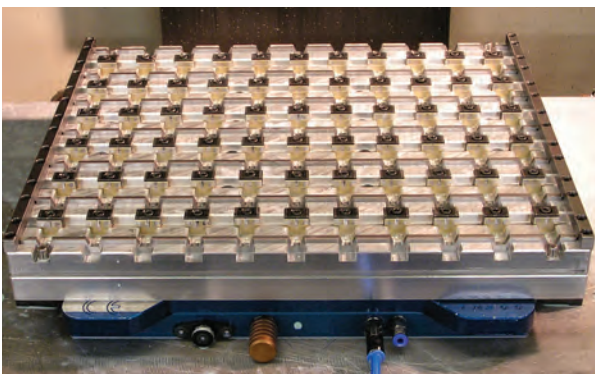
| Part No.                                       | Description  | A - Length<br>Inch (Metric) | B -Width<br>Inch (Metric) | C -Height<br>Inch (Metric) | Code No. | Price \$        |
|--|--|-----------------------------|---------------------------|----------------------------|----------|-----------------|
| <b>VM100</b>                                   |  |                             |                           |                            |          |                 |
| 45300  | <b>Complete System:</b> Base Unit, 2 blank pallets, VM100 vacuum pallet            |                             |                           |                            | 604444   | <b>2,945.96</b> |
| 45325  | Blank Pallet   | 12.5" (318mm)               | 5.875" (150mm)            | 1.0" (25mm)                | 604446   | <b>173.29</b>   |
| 45375  | Base Unit with Mounting Clamps   | 12.375" (315mm)             | 5.5" (140mm)              | 1.0" (25mm)                | 604450   | <b>2,703.36</b> |
| 45150  | VM300 Vacuum Pallet (optional, not included in VM100 system)                       | 14.2" (360mm)               | 12.4" (315mm)             | 0.63" (16mm)               | 604402   | <b>589.19</b>   |
| <b>VM300</b>                                   |  |                             |                           |                            |          |                 |
| 45101  | <b>Complete System:</b> Base Unit, 2 Blank Pallets, 1 Vacuum Pallet, Vacuum Gasket |                             |                           |                            | 604336   | <b>6,047.89</b> |
| 45130  | Blank Pallet: 19mm thick   | 14.2" (360mm)               | 12.4" (315mm)             | 0.75" (19mm)               | 604404   | <b>476.55</b>   |
| 45135  | 1" Thick Blank Pallet  | 14.93" (379mm)              | 14.93" (379mm)            | 1.0" (25mm)                | 604459   | <b>519.88</b>   |
| 45150  | VM300 Vacuum Pallet  | 14.2" (360mm)               | 12.4" (315mm)             | 0.63" (16mm)               | 604402   | <b>589.19</b>   |
| 45160  | VM300 Large Vacuum Pallet  | 33.625" (859mm)             | 14.5" (368mm)             | 0.625" (16mm)              | 604452   | <b>1,689.60</b> |
| 45175  | Base Unit (Receiver) Includes: safety switch, required hoses                       | 12.75" (323mm)              | 13.0" (330mm)             | 1.375" (35mm)              | 604400   | <b>4,505.59</b> |
| <b>Gasket Material (for VM300 &amp; VM100)</b> |  | <b>Diameter</b>             |                           |                            |          |                 |
| 45110  | Black Vacuum Gasket - per 5 ft. length   | 0.170                       |                           |                            | 604337   | <b>12.38</b>    |
| 45111  | Black Vacuum Gasket - by the foot  | 0.170                       |                           |                            | 604454   | <b>2.64</b>     |
| 45115  | Black Vacuum Gasket - by the foot  | 0.070                       |                           |                            | 604460   | <b>2.64</b>     |
| 45118  | Black Vacuum Gasket - per 5 ft. length   | 0.125                       |                           |                            | 604456   | <b>12.38</b>    |
| 45119  | Black Vacuum Gasket - by the foot  | 0.188                       |                           |                            | 604461   | <b>2.64</b>     |
| 45114  | White Vacuum Gasket - by the foot  | 0.170                       |                           |                            | 604458   | <b>2.64</b>     |
| 45116  | White Vacuum Gasket - by the foot  | 0.070                       |                           |                            | 604462   | <b>2.64</b>     |
| 45117  | White Vacuum Gasket - by the foot  | 0.125                       |                           |                            | 604463   | <b>2.64</b>     |

**Black Gasket** - Excellent for long cycles and aggressive coolants  
**White Gasket** - Excellent for small parts, water based coolant or running dry

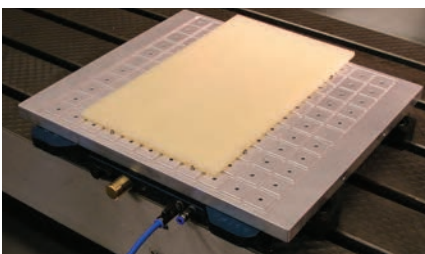
## Vacmagic® VM300



Two VM300 Base Units (45175) and large Vacuum Pallet (45160)



VM300 Base Unit (45175)  
with a Production Pallet (VM300 Blank Pallet - 45130)

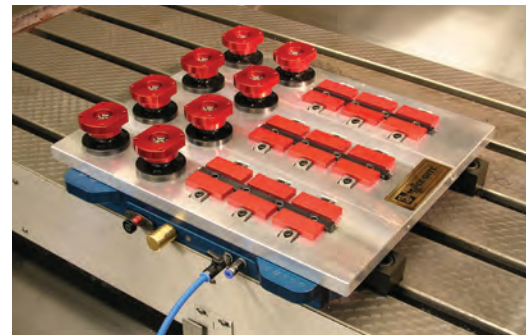


Workpiece placed over gasket  
and pushed down to create vacuum.  
Now ready for machining.  
(VM300 Vacuum Pallet - 45150)

### The All-in-One Pallet Changer and Vacuum System

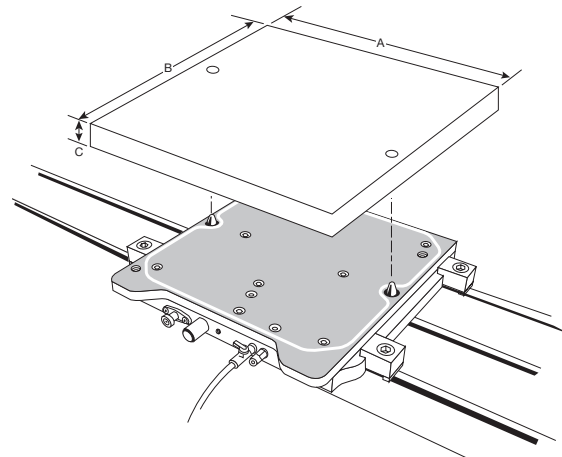
In a relatively short amount of time the VM300 has established itself as the vacuum system to which all others are measured. Capabilities include traditional vacuum applications using our standard vacuum pallet and custom vacuum applications (ie. machining blank pallet to suit specific part geometry) and the ability to perform as a rock solid pallet changer.

- Simple design keeps cost low
- Quick-change - swap pallets in 30 seconds or less
- Productivity maximized - load pallets while machining
- Easy to install and set-up
- Precise repeatability
- Reliable and easy to use - virtually maintenance free
- Flexible pallet design - limited only by your imagination!
- No pumps - uses standard shop air



### Tech Data

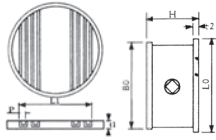
|                            |                  |
|----------------------------|------------------|
| Air Supply Requirements    | - 70 psi (5 bar) |
|                            | - 2 CFM (55 LPM) |
| Low Pressure Safety Switch | - included       |
| Vacuum Indicator           | - included       |
| Hardened Locator Pins      | - included       |



## Magnetic Plate



- 7mm poles, 2mm separators
- Magnetic field intensity: > 650 gauss
- Suitable for light cutting and grinding on lathe, grinder, EDM, and rotary tables



| Model  | Diameter (B0) | Height (H) | Plate Diameter (L0) | L1    | Code No. | Price \$ |
|--------|---------------|------------|---------------------|-------|----------|----------|
| VGD-08 | 200mm         | 78mm       | 200mm               | 137mm | 230626   | 3,030.39 |

## Magnetic Adjustable Link



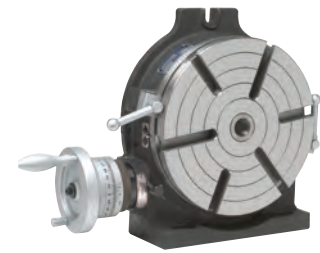
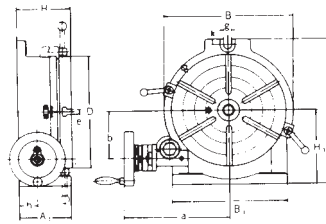
- Overall length 4-1/8"
- Overall width 2-1/8"
- For holding and welding
- Magnetic blocks can be set at any angle by adjustment and locking of the wing nut. When used in multiples, a number of sheets can be held in complicated arrangement
- Compact size for holding work in confined spaces



| Model | Block Dimensions (mm) | Code No. | Price \$ |
|-------|-----------------------|----------|----------|
| VCP-5 | 2" x 1" x 1"          | 230638   | 117.88   |

## Horizontal & Vertical Rotary And Dividing Tables (HV)

- This HV Type Rotary Table is so designed as to permit machining operations at a higher dimension than that of RT Type Rotary tables
- The base can be used in a vertical position to enable to carry out centre work



| Model      | A1          | Table OD     | Height H    | H1           | Base Dim. A  | B            | T-Slot Width | Bolt Slots | Centre Sleeve | Weight (kg/lb) | Worm Gear | Table Code No. | Price \$ | Tailstock Code No. | Price \$ | Indexing Plates Code No. | Price \$ |
|------------|-------------|--------------|-------------|--------------|--------------|--------------|--------------|------------|---------------|----------------|-----------|----------------|----------|--------------------|----------|--------------------------|----------|
| HV-4 (mm)  | 70<br>2.76  | 110<br>4.33  | 80<br>3.15  | 85<br>3.35   | 145<br>5.71  | 115<br>4.53  | 11<br>0.43   | 12<br>0.47 | MT-2          | 7.5<br>16.50   | 90:1      | 326498         | 1,250.00 | 326552             | 531.73   | 326549                   | 409.26   |
| HV-6 (mm)  | 78<br>3.07  | 150<br>5.91  | 80<br>3.11  | 100<br>3.94  | 200<br>7.87  | 160<br>6.30  | 11<br>0.43   | 15<br>0.59 | MT-2          | 12<br>26.4     | 90:1      | 326500         | 1,250.00 | 326552             | 531.73   | 326549                   | 409.26   |
| HV-8 (mm)  | 100<br>3.94 | 200<br>7.87  | 105<br>4.13 | 135<br>5.31  | 265<br>10.43 | 220<br>8.66  | 14<br>0.55   | 17<br>0.67 | MT-3          | 30.0<br>66.1   | 90:1      | 326505         | 1,934.29 | 326553             | 531.73   | 326550                   | 556.38   |
| HV-10 (mm) | 110<br>4.33 | 250<br>9.84  | 115<br>4.53 | 165<br>6.50  | 325<br>12.80 | 280<br>11.02 | 14<br>0.55   | 17<br>0.67 | MT-3          | 45.0<br>99.0   | 90:1      | 326510         | 2,404.28 | 326554             | 539.52   | 326551                   | 558.31   |
| HV-12 (mm) | 130<br>5.12 | 300<br>11.81 | 135<br>5.32 | 195<br>7.68  | 388<br>15.27 | 330<br>12.99 | 16<br>0.63   | 18<br>0.71 | MT-4          | 85<br>187.0    | 90:1      | 326515         | 2,993.59 | 326554             | 539.52   | 326551                   | 558.31   |
| HV-14 (mm) | 130<br>5.12 | 350<br>13.78 | 140<br>5.51 | 230<br>9.06  | 450<br>17.72 | 380<br>14.95 | 16<br>0.63   | 18<br>0.71 | MT-4          | 100<br>220.0   | 90:1      | 326520         | 3,816.33 | 326555             | 732.13   | 326551                   | 558.31   |
| HV-16 (mm) | 150<br>5.90 | 406<br>15.98 | 155<br>6.10 | 255<br>10.03 | 500<br>19.69 | 430<br>16.93 | 16<br>0.63   | 18<br>0.71 | MT-4          | 135<br>297     | 90:1      | 326525         | 5,652.18 | 326555             | 732.13   | 326551                   | 558.31   |

## Tailstocks for Rotary Tables

Cast iron offers good vibration, resistance, good wear resistance and machinability. It is heavier and more economical than steel.



| Model No. | Adjustable   |             | For Models                     | Net Weight (kg) | Code No. | Price \$ |
|-----------|--------------|-------------|--------------------------------|-----------------|----------|----------|
|           | Highest (mm) | Lowest (mm) |                                |                 |          |          |
| TS-1      | 108          | 80          | HV-4, HV-6, BS-0               | 3.9             | 326552   | 531.73   |
| TS-2      | 145          | 115         | HV-8, CC-6, SX-6, BS-1, BS-2   | 5.5             | 326553   | 531.73   |
| TS-3      | 200          | 130         | HV-10, HV-12, CC-8, SX-8, BS-2 | 8.1             | 326554   | 539.52   |
| TS-4      | 260          | 190         | HV-14, HV-16                   | 11.9            | 326555   | 732.13   |

## Universal Tilting Rotary Table



### Model VU-100, VU-150, VU-300

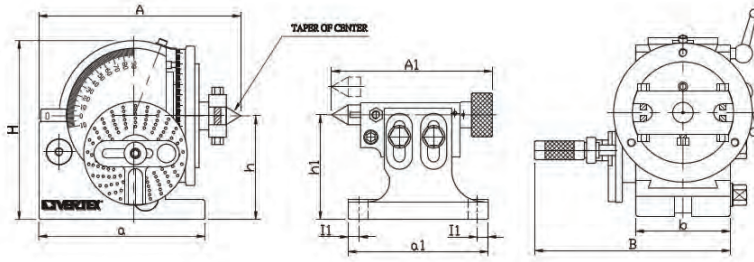
- Tilting range 90° from horizontal to vertical position
- 1 rotation of handle equals 3 degrees, 5 minutes tilting reading
- 10 Second vernier scale
- Table Dial 1 minute graduations
- Fast degrees: Dividing notch pin and 24 holes in 15° around, insures rapid accurate spacing
- Minimum set-up time
- Rugged construction



| VU-100   |          | VU-150   |          | VU-300   |           |
|----------|----------|----------|----------|----------|-----------|
| Code No. | Price \$ | Code No. | Price \$ | Code No. | Price \$  |
| 326560   | 2,368.05 | 326562   | 2,719.85 | 326175   | 11,255.34 |

| Specifications              | 4"      | 6"      | 12"     |
|-----------------------------|---------|---------|---------|
| Size                        | 100mm   | 150mm   | 300mm   |
| Table Height                | 117mm   | 140mm   | 185mm   |
| Table O/A Height (Vertical) | 177mm   | 216mm   | 370mm   |
| Centre Hole                 |         |         | MT 5    |
| Centre Height (Vertical)    | 80mm    | 90mm    | 208mm   |
| Direct Indexing             | 24-div. | 24-div. | 24-div. |
| Gear Ratio                  | 90:1    | 90:1    | 90:1    |
| Weight (approx)             | 13.5 kg | 21 kg   | 125 kg  |

## Universal Dividing Head



This Universal Index Centre has been designed to carry out all types of gear-cutting, precision dividing and spiral work (except Type BS-0, and BS-1) with greater precision and efficiency than has been possible before. The centre face can be tilted from a horizontal position of 90° down to -10° from vertical, and inclinations can be read off a scale graduated in degrees. The centre is built to highest engineering standards and is factory-inspected and tested to assure complete satisfaction. The ratio of worm to gear is 1:40.

Applicable Chuck: 6", 7" or 8"

| Model | Height H    | Machine Body Length A | Width B      | Centre h      | Base Length a | Base Width b | Bolt Slots g | Centre Taper | Weight Screw | Ship Weight (kg/lb) | cu.ft. | Code No. | Price \$ | Flange Only Code No. | Price \$ |
|-------|-------------|-----------------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|---------------------|--------|----------|----------|----------------------|----------|
| BS-2  | 236<br>9.29 | 365<br>14.37          | 272<br>10.71 | 132.7<br>5.22 | 213<br>8.39   | 134<br>5.28  | 16<br>0.63   | MT4          | M55 x P3     | 65<br>143           | 3.4    | 326054   | 4,842.20 | 326055               | 718.66   |

## Semi-Universal Index Centre BS-0 & BS-1



Standards of Accuracy (Tolerances):

Testing Objective

1. True running of centre:
2. True running of inside taper of dividing spindle:
  - Measured at spindle nose
  - Measured at arbor 8" long
3. Axial movement of dividing spindle
4. Dividing accuracy of worm drive, maximum cumulative spacing error

Tolerances Unit (max. in. permit)

- 0.0006  
0.0004  
0.0012  
0.0004  
1'30"

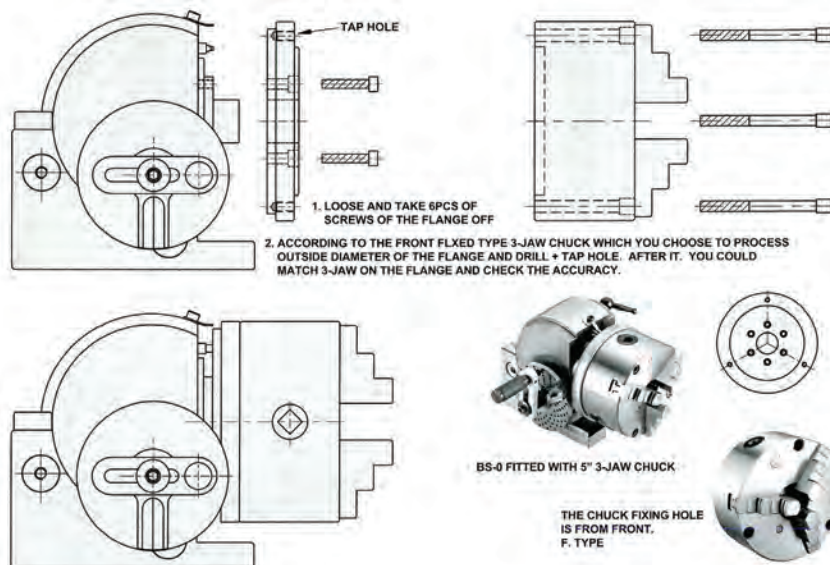
Note:

- BS 0 applicable chuck: 4" or 5"  
BS 1 applicable chuck: 5" or 6"



| Model | Height H    | Machine Body Length A | Width B     | Centre h    | Base Length a | Base Width b | Bolt Slots g | Centre Taper | Weight Screw | Ship Weight (kg/lb) | cu.ft. | Code No. | Price \$ | Flange Only Code No. | Price \$ |
|-------|-------------|-----------------------|-------------|-------------|---------------|--------------|--------------|--------------|--------------|---------------------|--------|----------|----------|----------------------|----------|
| BS-0  | 173<br>6.81 | 177<br>6.97           | 188<br>7.40 | 100<br>3.94 | 160<br>6.30   | 91<br>3.58   | 16<br>0.63   | MT2          | M30 x P3     | 20<br>44            | 0.8    | 326050   | 2,158.22 | 326051               | 507.49   |
| BS-1  | 220<br>8.66 | 245<br>9.65           | 230<br>9.06 | 128<br>5.04 | 205<br>8.07   | 114<br>4.49  | 16<br>0.63   | MT3          | M40 x P3     | 33<br>72.6          | 1.3    | 326052   | 2,800.78 | 326053               | 628.71   |

## How To Install A 3-Jaw Chuck





## Simple Index

The Simple Index is a heavy-duty base on which is mounted a hardened and ground precision turntable. It can be used in either a horizontal and vertical position. Using one of the masking plates provided, the index can carry out many dividing functions. Indexing of 2, 3, 4, 6, 8, 12 and 24 divisions can be rapidly and simply carried out. The specially-made 3-jaw scroll chuck also simplifies the indexing of long workpieces.

**Optional Equipment:** Master indexing plate with 20 or 30 notches can be supplied to special order. When used with the suitable masking plates dividing into 2, 4, 5, 10, and 2, 3, 5, 6, 10, 15 are possible.

### Special Accessories

- 3-jaw scroll chuck dia. 8" 1 piece
- Adjustable tailstock
- Face plate 10" (maximum)
- Masking plates 2, 3, 4, 6, 8, 12 one piece of each

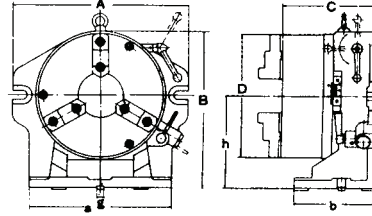
### Standards of Accuracy (Tolerances):

#### Testing Objective

1. Parallelism of table surface to base 0.00 (0.0004)
2. True running of axial movement of table surface 0.0008
3. True running of centre boss 0.0006
4. Squareness of base to angle face 0.0008
5. True running of chuck centre 0.0016
6. Dividing accuracy individual spacing error  $\pm 35''$

#### Tolerances Unit (max. in. permit)

- per 12"  
0.0008  
0.0006  
per 12"  
0.0016  
 $\pm 35''$



### Options

| Description                 | Code No. | Price \$ |
|-----------------------------|----------|----------|
| Optional Tailstock for CC-6 | 326553   | 531.73   |
| Optional Tailstock for CC-8 | 326554   | 539.52   |

| No. of Dividing  | Outer Dia. | Chuck Inner Jaw | Outer Jaw | Inner Hold | A     | B      | C     | D    | a     | b    | h     | g    | Weight kg/lb | Shipping Meas. cu.ft. | Code No. | Price \$ |
|------------------|------------|-----------------|-----------|------------|-------|--------|-------|------|-------|------|-------|------|--------------|-----------------------|----------|----------|
| 2,3,4,6, 8,12,24 | 165        | 3-62            | 60-120    | 34         | 260   | 218    | 138   | 166  | 220   | 130  | 130   | 16   | 35           | 0.64                  | CC-6     |          |
|                  | 6.5        | 0.12-2.44       | 2.36-4.72 | 1.34       | 10.24 | 8.58   | 5.43  | 6.54 | 8.66  | 5.12 | 5.12  | 0.63 | 77.1         |                       | 326136   | 2,835.12 |
| 2,3,4,6, 8,12,24 | 210        | 3-100           | 10-220    | 63         | 312   | 257.25 | 169.3 | 210  | 258   | 48   | 149.2 | 16   | 54           | 1.8                   | CC-8     |          |
|                  | 8.27       | 0.12-3.94       | 0.39-8.66 | 2.48       | 12.28 | 10.13  | 6.67  | 8.27 | 10.16 | 5.83 | 5.87  | 0.63 | 119.0        |                       | 326138   | 3,666.02 |

## Super Dex

This index combines the advantages of the Simple Index with those of a worm-gear index. When mounted on a milling, boring or other machine tool it can carry out single-purpose indexing and indirect indexing using the worm-drive mechanism. Disengaging the worm drive the 24-notch master plate permits 2, 3, 4, 6, 8, 12 and 24 dividing. When the chuck is removed the unit can be used as a horizontal and vertical type rotary table. The operating handle to rotary table worm gear reduction ratio is 1:90. The operating handle collar is graduated in minutes, and readings down to ten seconds can be set on the vernier.



### Ordering Specs. and Dimensions

(Dividing Plates not included)

| Model No. | Chuck Outer Diameter | Code No. | Price \$ |
|-----------|----------------------|----------|----------|
| SX-6      | 6"                   | 326140   | 3,611.40 |
| SX-8      | 8"                   | 326142   | 4,752.51 |

### Options

| Description                 | Code No. | Price \$ |
|-----------------------------|----------|----------|
| Optional Tailstock for SX-6 | 326553   | 531.73   |
| Optional Tailstock for SX-8 | 326554   | 539.52   |
| Optional Dividing Plates    | 326152   | 558.31   |



| Number of holes | Plate A | 26, 30, 34, 38, 41, 44, 47, 51, 57, 28, 32, 37, 39, 43, 46, 49, 53, 59 |
|-----------------|---------|--|
|                 | Plate B | 61, 67, 71, 77, 81, 87, 91, 97, 63, 69, 73, 79, 83, 89, 92, 99         |

## Tailstocks for Indexes

Cast iron offers good vibration, resistance, good wear resistance and machinability. It is heavier and more economical than steel.



| Model No. | Adjustable   |             | For Models                     | Net Weight (kg) | Code No. | Price \$ |
|-----------|--------------|-------------|--------------------------------|-----------------|----------|----------|
|           | Highest (mm) | Lowest (mm) |                                |                 |          |          |
| TS-1      | 108          | 80          | HV-4, HV-6, BS-0               | 3.9             | 326552   | 531.73   |
| TS-2      | 145          | 115         | HV-8, CC-6, SX-6, BS-1, BS-2   | 5.5             | 326553   | 531.73   |
| TS-3      | 200          | 130         | HV-10, HV-12, CC-8, SX-8, BS-2 | 8.1             | 326554   | 539.52   |
| TS-4      | 260          | 190         | HV-14, HV-16                   | 11.9            | 326555   | 732.13   |

## Rapidex

### Complete with chuck

- Simple and rapid operation
- Dividual number 24 notch (15° each)
- Table scale 1°, for angular indexing
- Table bore 30mm
- Horizontal / Vertical and 2 direction
- Suitable for milling and drilling machine using



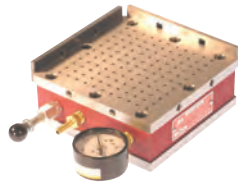
| Model No. | Chuck Outer Diameter | Code No. | Price \$ |
|-----------|----------------------|----------|----------|
| VSI-4     | 4"                   | 326564   | 1,669.02 |
| VSI-5     | 5"                   | 326566   | 1,832.53 |



## Vacuum Chucks



- Vacuum gauge and relief valve included
- All chucks have back and end rail for positive location of workpieces
- Provide an excellent means to hold non-magnetic workpieces for machining or grinding
- Designed to be bolted directly with little or no indicating to a SineSet® sine plate or compound sine plate of the same size and series



| Chuck Model No. | Size           | Recommended Pump Size | Weight (lb) | Code No. | Price \$ |
|-----------------|----------------|-----------------------|-------------|----------|----------|
| VC-66-S1        | 6 x 6 x 2-1/4  | 1/4 HP or larger      | 15          | 251420   | 1,512.35 |
| VC-612-S2       | 6 x 12 x 2-1/4 | 1/2 HP or larger      | 28          | 251422   | 2,067.70 |
| VC-618-S2       | 6 x 18 x 2-1/4 | 1/2 HP or larger      | 41          | 251424   | 2,743.40 |

## Vacuum Pumps



- Oilless, motor-mount, rotary vane design for maximum performance with minimum upkeep
- Has internal mufflers and filters. The filters were specifically designed to be easily removed and replaced
- Built-in thermal overload protection
- Includes a support base, the proper fittings and six feet of reinforced hose



| Pump Model No. | Description               | Weight (lb) | Code No. | Price \$ |
|----------------|---------------------------|-------------|----------|----------|
| VCP-14-MM*     | 1/4 HP, hose and fittings | 31          | 251426   | 2,765.15 |
| VCP-34-MM*     | 3/4 HP, hose and fittings | 56          | 251430   | 3,045.00 |

## Electromagnetic Chucks & Controls



- Top plate has 1/8" steel poles and 1/16" Stainless Steel separators
- Chucks are completely sealed against dirt and liquids
- Can be used on EDM machines
- Longitudinal (lengthwise) or transverse (crosswise) pole models available
- 2 clamps, back rail and side rail included
- Chuck controls must be used.



| Model No.                 | Size            | Watts | Weight (lb) | Code No. | Price \$  |
|---------------------------|-----------------|-------|-------------|----------|-----------|
| <b>Transverse Poles</b>   |                 |       |             |          |           |
| EMCB-612-T                | 6 x 12 x 3-3/4  | 72    | 75          | 251450   | 4,303.60  |
| EMCB-618-T                | 6 x 18 x 3-3/4  | 130   | 117         | 251452   | 6,047.95  |
| EMCB-815-T                | 8 x 15 x 3-3/4  | 125   | 132         | 251454   | 5,733.30  |
| EMCB-818-T                | 8 x 18 x 3-3/4  | 150   | 160         | 251456   | 8,175.10  |
| EMCB-824-T                | 8 x 24 x 4      | 220   | 210         | 251458   | 9,690.35  |
| EMCB-1015-T               | 10 x 15 x 3-3/4 | 160   | 165         | 251460   | 8,243.25  |
| EMCB-1024-T               | 10 x 24 x 3-3/4 | 240   | 255         | 251462   | 12,232.20 |
| EMCB-1036-T               | 10 x 36 x 4     | 350   | 370         | 251464   | 16,482.15 |
| EMCB-1216-T               | 12 x 16 x 4     | 200   | 200         | 251466   | 9,807.80  |
| EMCB-1218-T               | 12 x 18 x 4     | 225   | 225         | 251468   | 10,764.80 |
| EMCB-1224-T               | 12 x 24 x 4     | 280   | 310         | 251470   | 13,522.70 |
| EMCB-1230-T               | 12 x 30 x 4     | 390   | 371         | 251472   | 16,367.60 |
| EMCB-1236-T               | 12 x 36 x 4     | 430   | 442         | 251474   | 20,405.85 |
| <b>Longitudinal Poles</b> |                 |       |             |          |           |
| EMCB-612-L                | 6 x 12 x 3-3/4  | 72    | 75          | 251476   | 2,434.55  |
| EMCB-618-L                | 6 x 18 x 3-3/4  | 130   | 117         | 251478   | 3,722.15  |
| EMCB-815-L                | 8 x 15 x 3-3/4  | 125   | 132         | 251480   | 4,280.40  |
| EMCB-818-L                | 8 x 18 x 3-3/4  | 150   | 160         | 251482   | 4,831.40  |
| EMCB-824-L                | 8 x 24 x 4      | 220   | 210         | 251484   | 6,168.30  |
| EMCB-1015-L               | 10 x 15 x 3-3/4 | 160   | 165         | 251486   | 4,880.70  |
| EMCB-1024-L               | 10 x 24 x 3-3/4 | 240   | 255         | 251488   | 9,506.20  |
| EMCB-1036-L               | 10 x 36 x 4     | 350   | 370         | 251490   | 13,821.40 |
| EMCB-1216-L               | 12 x 16 x 4     | 200   | 200         | 251492   | 7,664.70  |
| EMCB-1218-L               | 12 x 18 x 4     | 225   | 225         | 251494   | 7,828.55  |
| EMCB-1224-L               | 12 x 24 x 4     | 280   | 310         | 251496   | 11,215.75 |
| EMCB-1230-L               | 12 x 30 x 4     | 390   | 371         | 251498   | 13,302.30 |
| EMCB-1236-L               | 12 x 36 x 4     | 430   | 442         | 251500   | 15,364.20 |

- Specifically matched to the input requirements of Suburban's electromagnetic chucks
- 115 volts AC input
- 0-110 volts DC output
- Controls with automatic release cycle free the operator from manual demagnetizing
- Automatic release models also have touchpad controls for easy operation

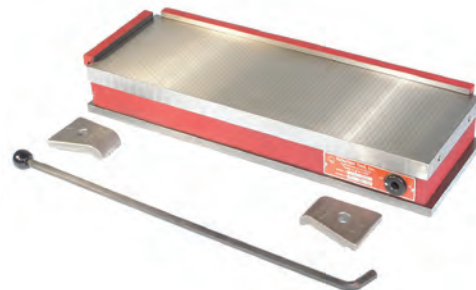


| Model No. | Features   | Code No. | Price \$ |
|-----------|--|----------|----------|
| CC-150-MV | 0-150W variable power control c/w manual release             | 251513   | 2,008.78 |
| CC-150-AV | Same as CC-150-MV plus automatic release control             | 251515   | 4,232.91 |
| CC-300-AV | 0-300W variable power control with automatic release control | 251517   | 5,831.93 |
| CC-500-AV | 0-500W variable power control with automatic release control | 251519   | 6,211.20 |

## Magnetic Surface Grinder Chucks



For use on surface grinders, chucks have laminated one piece top plates. Two tie down clamps, two rails and removable on/off handle included. Ceramic magnet cannot lose magnetism.

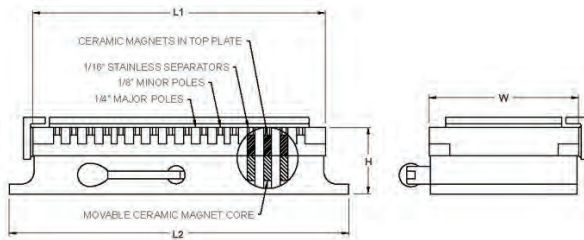
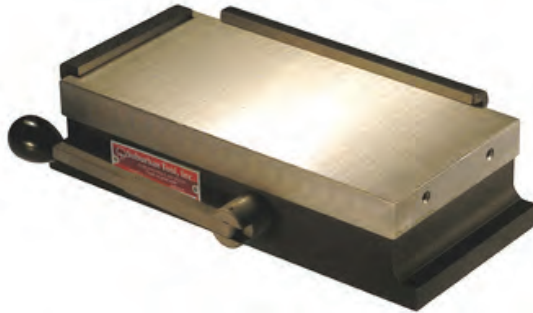


| Model No.   | Width (in.) | Length (in.) | Code No. | Price \$  |
|---|-------------|--------------|----------|-----------|
| <b>Standard (1/4" Poles &amp; 1/8" Separators)</b>  |             |              |          |           |
| MCB-47  | 4           | 7            | 251022   | 1,406.50  |
| MCB-510   | 5           | 10           | 251026   | 1,870.50  |
| MCB-612   | 6           | 12           | 251030   | 2,501.25  |
| MCB-614   | 6           | 14           | 251034   | 2,802.85  |
| MCB-618   | 6           | 18           | 251038   | 3,320.50  |
| MCB-812   | 8           | 12           | 251039   | 3,137.80  |
| MCB-815   | 8           | 15           | 251046   | 3,790.30  |
| MCB-818   | 8           | 18           | 251050   | 4,584.90  |
| MCB-824   | 8           | 24           | 251054   | 6,121.90  |
| MCB-1015  | 10          | 15           | 251055   | 5,940.65  |
| MCB-1018  | 10          | 18           | 251057   | 7,128.20  |
| MCB-1024  | 10          | 24           | 251059   | 10,019.50 |
| MCB-1212  | 12          | 12           | 251061   | 4,819.80  |
| MCB-1218  | 12          | 18           | 251063   | 9,106.00  |
| MCB-1224  | 12          | 24           | 251065   | 11,270.85 |
| <b>Fine Pole (1/8" Poles &amp; 1/8" Separators)</b> |             |              |          |           |
| MC-36-FP  | 3           | 6            | 251020   | 1,365.90  |
| MCB-47-FP   | 4           | 7            | 251024   | 1,503.65  |
| MCB-510-FP  | 5           | 10           | 251028   | 2,159.05  |
| MCB-612-FP  | 6           | 12           | 251032   | 2,862.30  |
| MCB-614-FP  | 6           | 14           | 251036   | 3,158.10  |
| MCB-618-FP  | 6           | 18           | 251040   | 3,812.05  |
| MCB-812-FP  | 8           | 12           | 251041   | 3,584.40  |
| MCB-815-FP  | 8           | 15           | 251048   | 4,303.60  |
| MCB-818-FP  | 8           | 18           | 251052   | 5,092.40  |
| MCB-824-FP  | 8           | 24           | 251056   | 6,887.50  |
| MCB-1015-FP   | 10          | 15           | 251067   | 6,488.75  |
| MCB-1018-FP   | 10          | 18           | 251069   | 7,635.70  |
| MCB-1024-FP   | 10          | 24           | 251071   | 10,537.15 |
| MCB-1212-FP   | 12          | 12           | 251073   | 5,370.80  |
| MCB-1218-FP   | 12          | 18           | 251075   | 9,672.95  |
| MCB-1224-FP   | 12          | 24           | 251077   | 12,475.80 |

## Magnum Force™ Surface Grinding Chucks



- Made with ceramic magnets for superior holding power
- Stationary magnets in the top plate and a movable magnet core provide an average holding power of 90-100 pounds per square inch. This is twice the power of a standard chuck
- Chucks are lubricated and sealed against dirt and liquids
- A rigid work surface is provided by laminated and brazed top plate
- These chucks provide maximum holding power of both small and large parts, due to combination fine / standard pole spacing
- Low height for more work clearance
- Two hold-down clamps, one side rail and one end rail are included



| Model No. | L1  | L2      | W      | H      | Code No. | Price \$  |
|-----------|-----|---------|--------|--------|----------|-----------|
| DBM-44    | 4"  | 4-3/4"  | 4"     | 2-3/8" | 251322   | 2,610.00  |
| DBM-48    | 8"  | 9-1/8"  | 4"     | 2-3/8" | 251324   | 2,756.45  |
| DBM-510   | 10" | 11-1/8" | 5"     | 2-3/4" | 251326   | 3,190.00  |
| DBM-512   | 12" | 13-1/8" | 5"     | 2-3/4" | 251328   | 3,671.40  |
| DBM-66    | 6"  | 7-1/8"  | 6-1/2" | 2-3/4" | 251330   | 3,068.20  |
| DBM-610   | 10" | 11-1/8" | 6"     | 2-3/4" | 251332   | 3,281.35  |
| DBM-612   | 12" | 13-1/8" | 6"     | 2-3/4" | 251334   | 3,601.80  |
| DBM-614   | 14" | 15-1/2" | 6"     | 2-3/4" | 251336   | 4,238.35  |
| DBM-618   | 18" | 20"     | 6"     | 2-3/4" | 251338   | 4,741.50  |
| DBM-815   | 15" | 15-3/4" | 8"     | 2-3/4" | 251340   | 5,744.90  |
| DBM-818   | 18" | 18-3/4" | 8"     | 2-3/4" | 251342   | 6,922.30  |
| DBM-820   | 20" | 20-3/4" | 8"     | 2-3/4" | 251344   | 7,859.00  |
| DBM-824   | 24" | 24-3/4" | 8"     | 2-3/4" | 251346   | 8,077.95  |
| DBM-1015  | 15" | 15-3/4" | 10"    | 2-3/4" | 251348   | 7,970.65  |
| DBM-1018  | 18" | 18-3/4" | 10"    | 2-3/4" | 251350   | 9,432.25  |
| DBM-1020  | 20" | 20-3/4" | 10"    | 2-3/4" | 251352   | 11,154.85 |
| DBM-1218  | 18" | 18-3/4" | 12"    | 3-1/2" | 251356   | 11,811.70 |
| DBM-1224  | 24" | 24-3/4" | 12"    | 3-1/2" | 251358   | 15,825.30 |

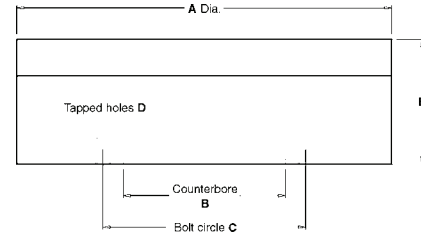
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.

## Round Permanent Magnetic Chucks



- Permanent ceramic magnets for superior holding power, never lose their strength
- Back surface of the aluminum chuck body has tapped holes and turned counterbore for convenient mounting on machines
- All models are watertight except 5-1/4" dia. which uses the swing-type on-off method
- Standard pole models have 1/4" poles and 1/8" separators, fine pole models have 1/8" poles and 1/8" separators

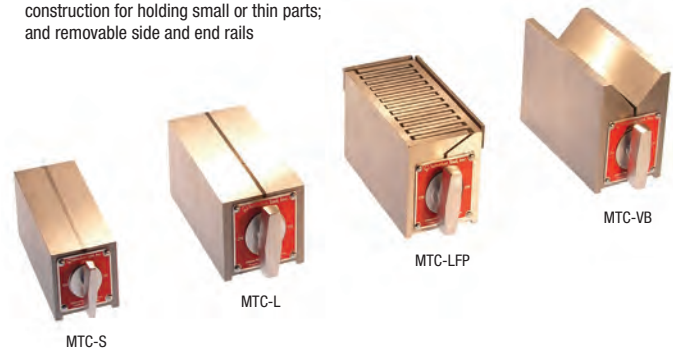


| Model No.        | A       | B         | C         | D             | E        | Weight (lb) | Code No. | Price \$  |
|------------------|---------|-----------|-----------|---------------|----------|-------------|----------|-----------|
| <b>Standard</b>  |         |           |           |               |          |             |          |           |
| RMC-5            | 5-1/4"  | 3 x 1/8"  | 4"        | (4)1/4-20     | 2-13/16" | 15          | 251876   | 1,428.25  |
| RMC-6            | 6-1/4"  | 3 x 1/8"  | 4"        | (4)1/4-20     | 2-15/16" | 17          | 251877   | 2,204.00  |
| RMC-9            | 9-1/4"  | 4 x 3/16" | 5"        | (4)3/8-16     | 2-15/16" | 36          | 251878   | 3,890.35  |
| RMC-12           | 12-1/4" | 4 x 3/16" | 5"        | (4)3/8-16     | 2-15/16" | 60          | 251879   | 5,627.45  |
| RMC-15           | 15-1/4" | 6 x 1/4"  | 7-3/8"    | (6)5/16-18    | 3-3/4"   | 120         | 251880   | 10,976.50 |
| RMC-16           | 16"     | 8 x 3/16" | 9"        | (6)3/8-16     | 2-15/16" | 96          | 251881   | 11,259.25 |
| RMC-20           | 20"     | 11 x 1/4" | 12-13/32" | (6)3/8-16     | 4-1/8"   | 205         | 251882   | 18,435.30 |
| <b>Fine Pole</b> |         |           |           |               |          |             |          |           |
| RMC-6-FP         | 6-1/4"  | 3 x 1/8"  | 4"        | (4)1/4-20x1/2 | 2-15/16" | 18          | 251883   | 2,762.25  |
| RMC-8-FP         | 7-3/4"  | 4 x 3/16" | 4"        | (4)3/8-16x1/2 | 2-15/16" | 26          | 251884   | 3,584.40  |
| RMC-10-FP        | 10"     | 4 x 3/16" | 5"        | (4)3/8-16x1/2 | 2-15/16" | 43          | 251885   | 4,819.80  |
| RMC-12-FP        | 12-1/4" | 4 x 3/16" | 5"        | (4)3/8-16x1/2 | 2-15/16" | 62          | 251886   | 6,746.85  |

## Magnetic Toolmakers' Chucks



- All models precision ground flat, square and parallel to an overall accuracy of 0.0005"
- Top, bottom and end magnetize simultaneously
- Model MTC-VB has "V" capacity of 2-3/4" diameter
- Model MTC-LFP has 3/16" x 1/16" fine pole construction for holding small or thin parts; and removable side and end rails



| Model No.  | Length | Width  | Height | Weight (lb) | Code No. | Price \$ |
|------------|--------|--------|--------|-------------|----------|----------|
| MTC-S      | 5"     | 2"     | 2"     | 6           | 251868   | 1,036.75 |
| MTC-L      | 5-1/2" | 2-3/4" | 2-1/2" | 11          | 251869   | 1,238.30 |
| MTC-LFP    | 5-1/2" | 2-3/4" | 3"     | 12          | 251870   | 1,347.05 |
| MTC-VB     | 5-1/2" | 2-3/4" | 3-5/8" | 13          | 251871   | 1,347.05 |
| MTC-VB-M** | 5-1/2" | 2-3/4" | 3-5/8" | 26          | 251872   | 3,094.30 |

\*\* Matched pair of MTC-VB

Accessories





# Accessories

|  |          |
|--|----------|
| Index Fixtures . . . . .                       | I 2      |
| 5C Spin Index . . . . .                        | I 2      |
| 5C Collet Index . . . . .                      | I 2      |
| 5C Collets . . . . .                           | I 2      |
| Radius And Angle Dressers . . . . .            | I 3      |
| Screw Jack Sets . . . . .                      | I 3      |
| Permanent Magnetic Lifters . . . . .           | I 4      |
| Punch Formers . . . . .                        | I 4      |
| Suburban Master-Grind™ & Accessories . . . . . | I 4      |
| Drill Sharpeners . . . . .                     | I 5      |
| Halogen Lamps . . . . .                        | I 6      |
| Eye Shield . . . . .                           | I 6      |
| Deluxe Shock Absorbers . . . . .               | I 6      |
| Chip Collectors, Chip Hooks . . . . .          | I 7      |
| Coolants, Fluids & Tapping Compounds . . . . . | I 7      |
| Adjustable Coolant Hose System . . . . .       | I 8-I 13 |
| Noga Minicool . . . . .                        | I 13     |

## Collet Master™ Index Fixture



- 48 index positions, +/- 45 arc seconds every 7-1/2 degrees
- Uses all standard 5C collets
- Two sealed, pre-loaded ball bearings in spindle
- Hardened and Ground base held square and parallel to spindle within 0.0002"
- Maximum spindle runout is 0.0001"
- Drawbar and fitted wooden case included
- Optional faceplate and V-block available for eccentric forms



| Model No. | Centre Height | Overall Length | Indexing Accuracy | Weight (lb) | Code No. | Price \$ |
|-----------|---------------|----------------|-------------------|-------------|----------|----------|
| CM-5C     | 3-5/8"        | 6-1/2"         | +/-45 Sec.        | 9 lb        | 251550   | 2,739.05 |

## Optional Faceplate & V-Block For Collet Master Index Fixture



- Optional faceplate and V-block available for eccentric forms



| Model No. | Faceplate Diameter | V-Block Capacity | Weight | Code No. | Price \$ |
|-----------|--------------------|------------------|--------|----------|----------|
| CM-5C-FVB | 6-1/2"             | 1-3/8"           | 15 lbs | 251552   | 1,294.85 |

## Mini-Master™ Index Fixture



- 72 position index plate allows an index every 5 degrees +/-15 arc seconds.
- Spindle rides in sealed, preloaded ball bearings
- Light weight for easy handling
- Uses standard ER-25 spring collets
- Spindle runout 0.0002" T.I.R.
- 3" height is ideal for small machine set-ups
- Hardened steel base is ground square and parallel with spindle axis within 0.0002"
- Fitted wooden case included



| Model No. | Centre Height | Collet Capacity | Through Hole | Weight (lb) | Code No. | Price \$ |
|-----------|---------------|-----------------|--------------|-------------|----------|----------|
| MM-25R    | 1-7/8"        | All ER-25       | 5/8"         | 4 lbs       | 251566   | 2,050.30 |

## Spin-Master™ Index Fixture



- Uses standard 5C collets
- 2-5/16" spindle travel for flute grinding
- Runout on hardened and ground spindle is 0.0005" T.I.R.
- 3-7/8" x 4-5/32" base ground parallel to spindle
- Sides of base ground parallel to spindle axis
- Index plate with 36 holes for direct indexing in 10° steps and is graduated in 5° increments. 10 vernier holes provide 1° indexing



| Model No. | Centre Height | Collet Capacity | Through Hole | Weight (lb) | Code No. | Price \$ |
|-----------|---------------|-----------------|--------------|-------------|----------|----------|
| SM-5C     | 2-3/4"        | All 5C          | 1-1/4"       | 15 lbs      | 251564   | 1,840.05 |

## 5C Spin Index

### Accepts 5C Collets to 1-1/8" Capacity

- A multi-purpose accessory
- Vernier setting to 1 degree
- 2-1/16" spindle travel for flute grinding
- Index plate has precise (10°) 36 hole circle



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| C1-310    | 326110   | 160.48   |

| Specifications                                  | Max. Variation Inches |
|---|-----------------------|
| True running of dividing spindle flange surface | 0.0004"               |
| True running of cylindrical centre bore per 1"  | 0.0012"               |
| Parallelism of spindle centre line to base      | 0.0008"               |

## Horizontal/Vertical 5C Collet Index



The Spindle has a taper seat in the body frame. Rapid opening and closing of the collet on a production basis is done with the lever collet closer having a leverage ratio of 100 to 1. A ratchet device on the front of the spindle permits rapid rotation of the spindle nose. The index plate has a screw in each of the 24 index holes so that holes not required for a particular job can be masked. Threaded spindle 2-1/4" - 8TPI.



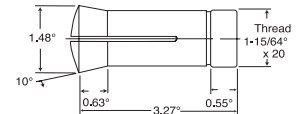
| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| C1-108    | 326108   | 899.79   |

| Specifications                                    | Max. Variation Inches |
|---|-----------------------|
| True running of axis for dividing spindle         | 0.0004"               |
| True running of cylindrical centre bore per 1"    | 0.0012"               |
| Parallelism of spindle centre line to base        | 0.0008"               |
| Squareness of base angle face                     | 0.0008"               |
| Parallelism of centre slot to dividing spindle    | 0.0008"               |
| Lateral offset of centre slot to dividing spindle | 0.0008"               |

## 5C Collets

- Made of tool steel, hardened and ground to maintain original accuracy

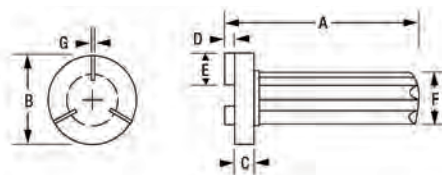


| Size (in.)                  | GS Code No. | Price \$ | STM Code No. | Price \$      |
|-----------------------------|-------------|----------|--------------|---------------|
| 1/8                         | 325317      | 31.89    | 325315       | 16.64         |
| 3/16                        | 325322      | 31.89    | 325320       | 16.64         |
| 1/4                         | 325327      | 31.89    | 325325       | 16.64         |
| 5/16                        | 325332      | 31.89    | 325330       | 16.64         |
| 3/8                         | 325337      | 31.89    | 325335       | 16.64         |
| 7/16                        | 325342      | 31.89    | 325340       | 16.64         |
| 1/2                         | 325347      | 31.89    | 325345       | 16.64         |
| 9/16                        | 325354      | 31.89    | 325350       | 16.64         |
| 5/8                         | 325357      | 31.89    | 325355       | 16.64         |
| 11/16                       | 325362      | 31.89    | 325360       | 16.64         |
| 3/4                         | 325367      | 31.89    | 325365       | 16.64         |
| 13/16                       | 325372      | 31.89    | 325370       | 16.64         |
| 7/8                         | 325377      | 31.89    | 325375       | 16.64         |
| 15/16                       | 325382      | 31.89    | 325380       | 16.64         |
| 1                           | 325387      | 31.89    | 325385       | 16.64         |
| <b>5C Collet Set 1/8-1"</b> |             |          | 325310       | <b>239.70</b> |

## 5C Collet Wrench



- Simplifies insertion and removal of collets in the spindle nose on CNC lathes
- Steel head and fins for greater strength and durability



| Model No. | A    | B    | C    | D    | E    | F    | G     | Code No. | Price \$ |
|-----------|------|------|------|------|------|------|-------|----------|----------|
| 1005C     | 4.25 | 1.25 | 0.50 | 0.25 | 0.28 | 1.13 | 0.052 | 604327   | 72.00    |

## Low Profile Radius & Angle Dresser

**QUALITY  
IMPORT**

An extremely accurate and versatile unit which may be used on all OD, ID and surface grinding operations. Knob "A" controls radius dressing and Knob "B" controls angle dressing. At no time are the hands near the point of contact. All moving parts are lapped and the unit has adjustable gibs for take of future wear.

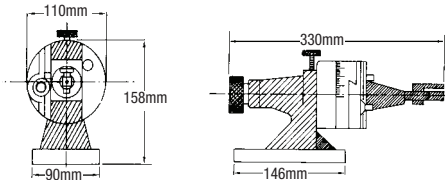


|                       | Model No. | Code No.   | Price \$ |
|-----------------------|-----------|------------|----------|
|                       | C1-330    | 326106     | 1,047.64 |
| <b>Specifications</b> |           |            |          |
| Max. Dia. of Wheel    |           | 10"        |          |
| Convex Radii          |           | 0 - 1-5/8" |          |
| Concave Radii         |           | 0 - 4"     |          |
| Tangent Travel        |           | 1.20"      |          |
| Either side of Centre |           |            |          |
| Centre line of tool   |           | 3.4"       |          |
| Overall length        |           | 16.61"     |          |
| Weight                |           | 27 lbs.    |          |

## V-TDB Radius & Angle Dresser

**STM**

- Positive setting of the diamond to absolute centre with the special gauge included with the dresser
- One push-pull type knob for radius and angle control and for safer and faster operations
- 4 x 90° graduation in full 360° circle. 6 minute vernier reading
- Net weight: 10.5 kg
- Chrome plated

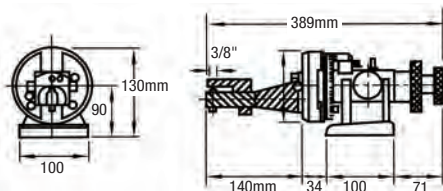


|                               | Model No. | Code No. | Price \$ |
|-------------------------------|-----------|----------|----------|
|                               | V-TDB     | 326570   | 2,610.82 |
| <b>Specifications</b>         |           |          |          |
| Convex dressing range         |           | 0.8R-40R |          |
| Concave dressing range        |           | 0-40R    |          |
| Max. wheel dressing diameter  |           | 250mm    |          |
| Max. wheel extending diameter |           | 375mm    |          |

## V-TDG Radius & Angle Dresser

**STM**

- 6 minute vernier reading
- Dual purpose knob for drum and angle movement
- Stop for concave and convex radii
- Comes with setting gauge for diamond tool



|                                       | Model No. | Code No. | Price \$ |
|---------------------------------------|-----------|----------|----------|
|                                       | V-TDG     | 326572   | 2,886.00 |
| <b>Specifications</b>                 |           |          |          |
| Max. wheel diameter, standard         |           | 11"      |          |
| Concave radius with standard diamonds |           | 0-2 1/4" |          |
| Concave radius with rat-tail diamonds |           | 0-2 1/4" |          |
| Convex radius                         |           | 0-4"     |          |
| Tangent travel in either direction    |           | 1.950"   |          |
| Centre line                           |           | 3.4"     |          |

## Yuasa Radius & Angle Dressers

**YUASA**

- Extremely accurate and versatile
- Useable on all OD / ID surface grinding operations
- Independent or simultaneous radii and angular operation
- Adjustable gibs
- All moving parts are lapped
- Gauge block setting for precise radii
- Knob A controls radii and Knob B controls angular movements



|  | Model No. | Code No. | Price \$ |
|--|-----------|----------|----------|
|  | 550-000   | 325600   | 3,775.51 |
|  | 550-001N  | 325605   | 5,337.19 |
|  | **553-308 | 325607   | 1,381.50 |

| Specifications                       | Model 550000  | Model 55001N          |
|--------------------------------------|---------------|-----------------------|
| Weight lbs/(kg)                      | 16 (7.2)      | 23 (10.4)             |
| Maximum diameter of wheel            | 8"            | 12"                   |
| Convex radii                         | 0-1 3/16"     | 0-1 5/8" (6"*)        |
| Concave radii                        | 1/32"-1 3/16" | 1/32"-1 5/8"****(6"*) |
| Tangent travel either side of centre | 1.20"         | 2"                    |
| Centre line of tool                  | 3"            | 3.4"                  |
| Overall length                       | 13.66"        | 16.61"                |

| Specifications                                   | Maximum Variation |
|--|-------------------|
| Face plate to dresser arm squareness (per 2")    | 0.0005 (0.012)    |
| Face plate to base squareness                    | 0.0006 (0.015)    |
| Centre runout of dovetail groove to wheel centre | 0.0006 (0.015)    |

\*\* Optional extension adapter for 1-5/8" to 6" concave radii and convex radii

## Screw Jack Sets

**STM**

### Features:

- Material: S45C
- Max Capacity: 700kg
- Suitable for irregular workpieces
- Rapid setting and fixed



### Sets

| Model No. | Set Includes   | Code No. | Price \$ |
|-----------|--|----------|----------|
| VSJ-A     | VSJ-70 70-85mm Adj. Capacity Screw Jack - 2pcs<br>VSJ-150 100-150mm Adj. Capacity Screw Jack - 2pcs<br>Pads included: 1A, 2A, 3A, 4A, 5A, 6A - 1 each    | 333400   | 510.62   |
| VSJ-B     | VSJ-150 100-150mm Adj. Capacity Screw Jack - 2pcs<br>VSJ-250 140-230mm Adj. Capacity Screw Jack - 2pcs<br>Pads included: 1A, 2A, 3A, 4A, 5A, 6A - 1 each | 333410   | 845.33   |



### Pads

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| 1A        | 333415   | 77.90    |
| 2A        | 333420   | 65.16    |
| 3A        | 333425   | 56.35    |
| 4A        | 333430   | 73.82    |
| 5A        | 333435   | 56.65    |
| 6A        | 333440   | 50.80    |

## Lift Master™ — Permanent Magnetic Lifts



- Allows one person to do the material loading and handling that once required two or more
- Uses max-C-mag ceramic magnets to ensure powerful holding force, with no chance for demagnetization
- Quick-release handle disengages the lift with a simple cam action
- Grips and holds any ferrous material instantly
- Designed for efficient, trouble free, low maintenance service



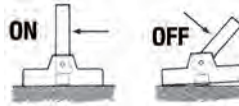
| Model No. | Length | Width | Height | Max Lift Cap. (lb) | Weight (lb) | Code No. | Price \$ |
|-----------|--------|-------|--------|--------------------|-------------|----------|----------|
| LM-800    | 6-5/8  | 3-3/8 | 2-1/2  | 800*               | 20          | 251873   | 1,924.69 |
| LM-1600   | 8-1/2  | 4-7/8 | 2-1/2  | 1600*              | 30          | 251874   | 2,663.72 |
| LM-3000   | 11-1/4 | 6-3/8 | 2-1/2  | 3000*              | 45          | 251875   | 3,539.07 |

\* Capacity based on clean, flat rigid CRS. Derate for other conditions.

## Magnetic Lifter



- Work is held and released very smoothly
- Most suitable to move materials or semi-finished products such as black steel plate, flat iron and other materials



VML-140



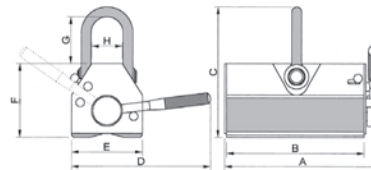
VML-150

| Model   | Capacity (kgf) | Length (mm) | Width (mm) | Height (mm) | Code No. | Price \$ |
|---------|----------------|-------------|------------|-------------|----------|----------|
| VML-140 | 140            | 120         | 50         | 55          | 230602   | 179.27   |
| VML-150 | 150            | 140         | 100        | 140         | 230604   | 461.23   |

## Permanent Magnetic Lifters

### Features:

- Faster and safer than using straps and slings
- Beveled surface for lift round objects
- Magnets are maintenance free and never wear out
- Magnets have built-in safety factor of 3.5 times the rated load. Do not lift more than the maximum rated load



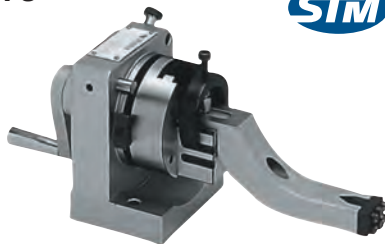
| Model No. | Capacity (lbs) | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | F (in.) | G (in.) | H (in.) | Weight (lbs) | Code No. | Price \$  |
|-----------|----------------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|----------|-----------|
| VML-100   | 220            | 4.2     | 3.3     | 4.7     | 4.9     | 2.4     | 2.8     | 1.6     | 1.2     | 5.5          | 230600   | 1,303.14  |
| VML-300   | 660            | 7.1     | 6.1     | 6.1     | 7.3     | 3.6     | 3.7     | 2.0     | 1.6     | 18.9         | 230605   | 3,083.01  |
| VML-600   | 1320           | 10      | 8.8     | 8.3     | 10.2    | 4.5     | 4.7     | 3.0     | 2.0     | 46           | 230610   | 4,950.18  |
| VML-1000  | 2200           | 11      | 9.6     | 11.3    | 14.6    | 6.5     | 6.7     | 3.8     | 3.4     | 101          | 230615   | 8,222.40  |
| VML-2000  | 4400           | 16.6    | 15      | 13.7    | 20.2    | 8.5     | 8.5     | 4.1     | 4.8     | 259          | 230620   | 16,142.07 |

## Punch Former — YCT-PS



### Features:

- YCT-PS can pass through from itself to the centre of grip, in case of facing a longer punch ejector pin, it can go deep into the grip position
- To assemble an arm with the main body, any combination of radii of the grinding wheel may be dressed accurately by easy operation
- The longer punch can also be ground



| Style        | Code No. | Price \$ |
|--------------|----------|----------|
| Through hole | 230735   | 3,619.89 |

## Punch Former — YCT-PB



### Punch former is the great dressing instrument.

Precision forming of grinding wheels can be done by assembling an arm with the main body. Any combination of tangents or radii form of the grinding wheel may be dressed accurately by easy operation. Maximum grinding wheel diameter of 200mm can be dressed accurately and safely. The height from the base to roller's centre is 80mm. Movement of each side can reach 12.5mm while aiming at the centre of V-block. The main body is one-piece steel construction.

### Features:

- Punch former is the fixture to grind the point of standard punches and E.D.M. electrodes for precise and fast operation
- Besides the round, radius and multi-angle punches, any special forms can be ground precisely
- By using this attachment, it can be ground either concave or convex radius shape
- Capacity from 4mm to 30mm



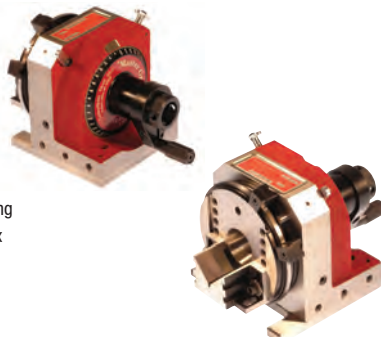
| Style   | Code No. | Price \$ |
|---------|----------|----------|
| Off set | 230730   | 4,543.82 |

## Suburban Master-Grind™



### 5C Collet and V-Block Combination

- Built-in sine bar for setting angles between hard index locations
- 2 heavy duty 4" diameter tapered roller bearings in spindle
- Spindle runout 0.00005"
- Square and parallel within 0.0002"
- Extra large 1-5/8" V-block capacity
- Horizontal or vertical V-block mounting
- 72 position index plate for hard index every 5° +/- 15 arc seconds
- Fitted wooden case included



| Model No. | V-Block Capacity | Collet Capacity | Through Hole | Centre Height | Base Height | Base Length | Base Width | Weight | Code No. | Price \$ |
|-----------|------------------|-----------------|--------------|---------------|-------------|-------------|------------|--------|----------|----------|
| MG-5CV-S1 | 1-5/8            | all 5c          | 1-1/4        | 3             | 6           | 4           | 5          | 22     | 251400   | 7,242.75 |

## Suburban Master-Grind™ Accessories



### Motor Drive Kit:

- 1/15 HP, reversible, variable speed, 60 to 300 rpm
- Can be mounted on either side of the index fixture
- Includes mounting bracket, motor pulley, drive belt and screws



### Baseplate and Tailstock

- Tailstock has 1/2" diameter spring loaded centre with lock screw
- 1/2" 5C collet and steel 60° headstock centre included
- Base plate and edge guide are hardened and ground

| Model No. | Description         | Weight | Code No. | Price \$ |
|-----------|---------------------|--------|----------|----------|
| MG5-BTS   | Baseplate/tailstock | 22     | 251405   | 2,241.63 |
| MG5-MD    | Motor drive kit     | 5      | 251410   | 2,022.75 |

## DM213 Fast Drill Sharpener 13mm Capacity



### Patented Features

- Double-bearing grinding unit (reduces wear)
- Drill tightening design with bearing device
- Adjustable trimming angle

### Standard Accessories

- ER20 Collets, ranged from 2.0mm-13mm (12pcs)
- CBN wheel #200x1pc (for High Speed drill)
- 4mm and 5mm Hexagon (Hex.) wrench x 1pc each

|                        |                     |
|------------------------|---------------------|
| <b>Drill Diameter:</b> | Ø2mm - Ø13mm        |
| <b>Point Angle:</b>    | 85° ~ 140°          |
| <b>Power Supply:</b>   | AC110/AC220 50/60HZ |
| <b>Motor:</b>          | 90W                 |
| <b>RPM:</b>            | 6000rpm             |
| <b>Weight:</b>         | 10 kg               |

### Model DM213

| Code No. | Price \$ |
|----------|----------|
| 326130   | 1,828.26 |

### Replacement Wheels for Model DM213

| Description                    | Code No. | Price \$ |
|--------------------------------|----------|----------|
| CBN Wheel for HSS              | 326141   | 154.09   |
| Diamond Wheel for Carbide      | 326143   | 154.09   |
| CBN Wheel for Drills under 4mm | 326145   | 154.09   |

### ER20 Collets for Model DM213

| Size (mm) | ER20 Code No. | Price \$ | Size (mm) | ER20 Code No. | Price \$ |
|-----------|---------------|----------|-----------|---------------|----------|
| 2.0-2.5*  | 326151        | 46.33    | 7-8       | 337479        | 36.65    |
| 2.5-3*    | 326153        | 46.33    | 8-9       | 337480        | 36.65    |
| 3-4*      | 326155        | 45.24    | 9-10      | 337481        | 36.65    |
| 4-5*      | 326157        | 46.33    | 10-11     | 337482        | 36.65    |
| 5-6       | 337477        | 36.65    | 11-12     | 337483        | 36.65    |
| 6-7       | 337478        | 36.65    | 12-13     | 337484        | 36.65    |

\* 2.5-5mm sizes are specially designed pull-back collets, standard ER20 collets cannot be substituted. 6-13mm sizes are standard ER20.

## DM1226 Fast Drill Sharpener 30mm Capacity



### Patented Features

- Double-bearing grinding unit (reduces wear)
- Drill tightening design with bearing device
- Adjustable trimming angle

### Standard Accessories

- ER40 Collets, ranged from 12mm-26mm (15pcs)  
Optional Collets 8~11mm, 27~30mm
- CBN wheel #200x1pcs (for High Speed drill)
- 4mm and 6mm Hexagon (Hex.) wrench x 1pc each

|                        |                       |
|------------------------|-----------------------|
| <b>Drill Diameter:</b> | Ø8mm - Ø30mm          |
| <b>Point Angle:</b>    | 85° ~ 140°            |
| <b>Power Supply:</b>   | AC110 / AC220 50/60HZ |
| <b>Motor:</b>          | 450W                  |
| <b>RPM:</b>            | 4000rpm               |
| <b>Weight:</b>         | 25 kg                 |

### Model DM1226

| Code No. | Price \$ |
|----------|----------|
| 326134   | 4,185.47 |

### Replacement Wheels for Model DM1226

| Description               | Code No. | Price \$ |
|---------------------------|----------|----------|
| CBN Wheel for HSS         | 326154   | 385.04   |
| Diamond Wheel for Carbide | 326156   | 385.04   |

### ER40 Collets for Model DM1226

| Size (mm) | ER40 Code No. | Price \$ | Size (mm) | ER40 Code No. | Price \$ |
|-----------|---------------|----------|-----------|---------------|----------|
| 7-8*      | 326165        | 52.22    | 19-20     | 337522        | 43.12    |
| 8-9*      | 326166        | 52.22    | 20-21     | 337523        | 43.12    |
| 9-10*     | 326167        | 52.22    | 21-22     | 337524        | 43.12    |
| 10-11*    | 326168        | 52.22    | 22-23     | 337525        | 43.12    |
| 11-12     | 337511        | 43.12    | 23-24     | 337526        | 43.12    |
| 12-13     | 337513        | 43.12    | 24-25     | 337527        | 43.12    |
| 13-14     | 337514        | 43.12    | 25-26     | 337528        | 43.12    |
| 14-15     | 337515        | 43.12    | 26-27*    | 326158        | 52.22    |
| 15-16     | 337517        | 43.12    | 27-28*    | 326159        | 52.22    |
| 16-17     | 337518        | 43.12    | 28-29*    | 326160        | 52.22    |
| 17-18     | 337519        | 43.12    | 29-30*    | 326161        | 52.22    |
| 18-19     | 337521        | 43.12    |           |               |          |

\* Optional 8-11mm & 27-30mm sizes are specially designed for the DM1226, standard ER40 collets cannot be substituted. 12-26mm sizes are standard ER40.



## Dust-Proof Halogen Lamps c/w Magnetic Base



### Features:

- Dust Proof with Magnetic Base
- 110 voltage

600FT Series - Segment Adjustable Arm  
700FT Series - Flexible Arm



VHL-600FT

VHL-700FT

| Model No. | Arm Length (mm) | Base Width (mm) | Weight (kgs.) | Code No. | Price \$ |
|-----------|-----------------|-----------------|---------------|----------|----------|
| VHL-600FT | 380             | 88              | 1.7           | 326365   | 249.99   |
| VHL-700FT | 400             | 88              | 1.7           | 326370   | 249.99   |

## Replacement Parts For VHL-600/700-FT Lamps



| Description          | Code No. | Price \$ |
|----------------------|----------|----------|
| 12V/20W Halogen Bulb | 326371   | 71.94    |
| Replacement Glass    | 326372   | 8.21     |

## Magnetic Base With Working Beam



- 110 voltage



| Model     | Base Size LxWxH (mm) | Holding Power (kg) | Arm OD x L (mm) | Weight (kg) | Code No. | Price \$ |
|-----------|----------------------|--------------------|-----------------|-------------|----------|----------|
| VML-A-110 | 62x50x55.5           | 75                 | 20x200          | 1.5         | 326884   | 164.03   |

## Eye Shield



- The clamping height is adjustable
- Brass plate under the clamp arm to protect the working material from damage



| Model | Shield Size (mm) | Weight (kg) | Code No. | Price \$ |
|-------|------------------|-------------|----------|----------|
| VH-56 | 300x180x2        | 1.0         | 230660   | 123.68   |

## Water-Proof Halogen Lamps



### Features:

- Water-proof lighting head with reinforced glass resists large temperature fluctuations of cutting oil
- 110 voltage



| Model No. | Arm Length (mm) | Base Width (mm) | Weight (kgs.) | Code No. | Price \$ |
|-----------|-----------------|-----------------|---------------|----------|----------|
| VHL-400L  | 400 x 400       | 79              | 3.8           | 326335   | 409.24   |
| VHL-400M  | 220 x 220       | 79              | 3.5           | 326340   | 409.24   |
| VHL-400S  | -               | 60              | 2.8           | 326345   | 272.97   |
| VHL-500L  | 400 x 400       | 79              | 4             | 326350   | 409.24   |
| VHL-500M  | 220 x 220       | 79              | 3.8           | 326355   | 409.24   |
| VHL-500S  | -               | 79              | 2.7           | 326360   | 319.27   |

## Replacement Parts For VHL-400/500 Lamps



| Description          | Code No. | Price \$ |
|----------------------|----------|----------|
| 12V/50W Halogen Bulb | 326361   | 46.50    |
| Replacement Glass    | 326362   | 12.08    |

## Magnetic Base With Magnifying Glass



- 2X magnification
- M8x1.25 threaded mount



| Model | Base Size LxWxH (mm) | Holding Power (kg) | Arm OD x L (mm) | Weight (kg) | Code No. | Price \$ |
|-------|----------------------|--------------------|-----------------|-------------|----------|----------|
| VML-M | 60x50x55             | 80                 | 15x325          | 1.7         | 326880   | 198.74   |

## Deluxe Shock Absorbers



Suitable for machine tools, CNC lathe, molding, printing, grinding, drilling, and milling machines.

- Prevents shock and reduces noise



| Model | Height (H)(mm) | Bolt Size (Ød)(mm) | Load (kg) | Adjustment Height | Code No. | Price \$ |
|-------|----------------|--------------------|-----------|-------------------|----------|----------|
| SB-4  | 60             | 12x50L             | 500       | 25mm              | 231450   | 228.75   |
| SB-6  | 95             | 16x110L            | 1000      | 40mm              | 231452   | 343.14   |
| SB-8  | 100            | 20x120L            | 2500      | 40mm              | 231454   | 403.05   |
| SB-10 | 125            | 24x180L            | 4000      | 40mm              | 231456   | 777.22   |

## Chip Collector with Flexible Arm

### Flexible Magnetic Pick-Up Tool

- 21" in length
- 12 lb capacity

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| VCC-20    | 230640   | 70.54    |

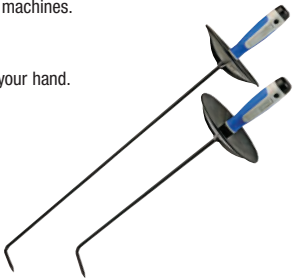


## Chip Hooks — SP2500 & SP2550

For removing chips and clean the chip trays on your machines. Black finished steel hooks.

The Chip Hooks include a plastic protective guard.

NogaGrip Handle designed for maximum comfort in your hand.



| Model  | Length | Code No. | Price \$ |
|--------|--------|----------|----------|
| SP2500 | 400mm  | 165488   | 42.70    |
| SP2550 | 600mm  | 165490   | 48.32    |

## Magnetic Chip Collector

- Wide variety of applications
- Most suitable for collecting iron pieces scattered on the floor or mixed in a medium
- Magnetic force is turned ON/OFF by operating the hand lever
- Powerful magnet with a wide attractive surface
- Material of outer cover: Aluminum



| Model  | Dimensions   | Magnetic Force | Weight (kg) | Code No. | Price \$ |
|--------|--------------|----------------|-------------|----------|----------|
| VCP-15 | Ø112mmx178mm | 0.9kg          | 1.9         | 230650   | 641.87   |

## Mini Handy Magnetic Chip Collector

- Permanent magnet
- Pull handle for easy release
- Made of impact-proof plastic
- Easy to pick up hand tools, small iron or steel parts in the office, house or factory
- Material of outer cover: Plastic



| Model  | Dimensions   | Magnetic Force | Weight (kg) | Code No. | Price \$ |
|--------|--------------|----------------|-------------|----------|----------|
| VCC-16 | Ø110mmx190mm | 4.9kg          | 0.7         | 230655   | 118.87   |

## Chip Collector with LED Light & Flexible Arm

### Flexible Magnetic Pick-Up Tool

- LED light
- 21" in length
- 0.7 lb capacity
- 2pcs 1.5V batteries

| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| VCC-21    | 230645   | 72.88    |



All products below are F.O.B. Sowa Tool Kitchener.

## Oak Green-LPH

Oak Green LPH Floor Cleaner is a water based floor cleaner developed for use in automatic floor scrubbers, mop buckets and spray bottles. It offers enhanced detergency to remove oils, greases, soot and shop dirt from floors, steps and walkways.



| Description            | Code No. | Price \$ |
|------------------------|----------|----------|
| Oak Green-LPH 19L Pail | 659715   | 105.07   |

## Cimclean 30

Recommended for cleaning individual machine tanks and central system reservoirs, metalworking fluid lines, machines and parts.



| Description          | Code No. | Price \$ |
|----------------------|----------|----------|
| Cimclean 30 20L Pink | 659720   | 205.62   |

## Cimtap II Tapping Fluid

General purpose tapping fluid for both ferrous and non-ferrous metals.



| Description                | Code No. | Price \$ |
|----------------------------|----------|----------|
| 16oz Bottle Cimtap II Pink | 659730   | 15.54    |
| 4L Jug Cimtap II Pink      | 659735   | 54.31    |
| 20L Cimtap II Pink         | 659620   | 225.26   |

## Cimtap H.D. Tapping Fluid

Cimtap H.D. is the most heavy duty tapping oil recommended for both ferrous and non-ferrous metals.



| Description      | Code No. | Price \$ |
|------------------|----------|----------|
| Cimtap H.D. 16oz | 659750   | 29.44    |

## Cimtap Paste Tapping Compound

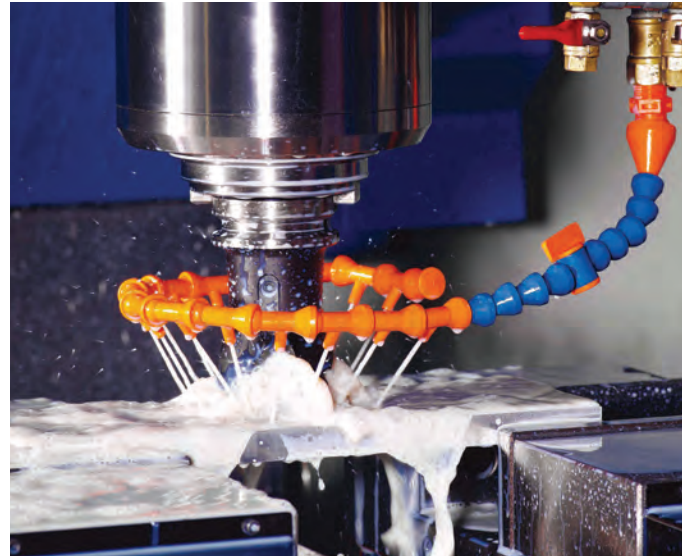
Cimtap Paste is a general purpose tapping paste recommended for both ferrous and non-ferrous metals.



| Description               | Code No. | Price \$ |
|---------------------------|----------|----------|
| Cimtap Paste - 1 Pint     | 659740   | 12.28    |
| Cimtap Paste (Case of 24) | 659745   | 286.03   |



# Adjustable Coolant Hose System



Length and angle can be freely adjusted, suitable for most fluids (liquids and gases), hose orifice can be changed as needed. Can be used for air or for water/oil supply to metal processing machinery.

- Made of Dupont 100P material; this highly rigid yet resilient acetal (POM) is strongly resistant to oils and chemicals
- Adjustable Coolant Hose is highly pliable; it holds its shape well and will not spring back
- Bending hose will not reduce inner diameter; hose will not pinch or fatigue
- Adjustable Coolant Hose will not damage cutting blades if there is accidental contact
- Adjustable Coolant Hose does not conduct electricity and is suitable for use on electrical discharge (EDM) machines
- Four kinds of inner diameter are available: 1/4", 3/8", 1/2", 3/4"
- Adjustable Coolant Hose is designed for the transport of low-pressure fluids

### Installation of Adjustable Coolant Hoses

It's simple and easy to install Adjustable Coolant Hoses using the special pliers. The pliers can also be used to take apart the hose.



## Total Control Units

The **Total Flow Control Unit** can be installed on all types of mechanical equipment to control water flow. It is easy to install and makes the machine more aesthetically attractive. Ensure convenient flow control.



### Standard Control Unit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <b>#1 Control Unit</b>                                 |          |          |
| • Total Flow Control Unit - 1 set                      |          |          |
| • 1/4" Adjustable Coolant Hoses & Valves Unit - 1 set  | 665002   | 254.38   |
| • 3/8" Adjustable Coolant Hoses & Valves Unit - 3 sets |          |          |



### High Pressure Control Unit

| Description   | Code No. | Price \$ |
|---|----------|----------|
| <b>#2 Control Unit</b>                                |          |          |
| • Total Flow Control Unit - 1 set                     |          |          |
| • 1/4" Adjustable Coolant Hoses & Valves Unit - 1 set | 665004   | 418.15   |
| • High Pressure Adjustable Nozzles - 3 sets           |          |          |





## 1/4" Coolant Hose System

|  | Description   | Code No.                   | Price \$                    |
|--|---|----------------------------|-----------------------------|
|  | <b>1/4" Hose Kit</b><br>Includes: 10pcs of 1/4" segments - 2 sets<br>1/16", 1/8", 1/4" Nozzles<br>1/4" & 1/8" Male NPT Connectors | 665008                     | 28.29                       |
|  | <b>1/4" Extended Element Kit with Element Kit</b> Includes: 4 each of:<br>1/4" Extended Elements, 1/4" Element Clamps             | 665010                     | 37.68                       |
|  | <b>1/4" Segment Pack</b> 2 x 5-1/2" pcs<br>1/4" x 50 ft coil<br>1/4" x 82 ft coil   | 665012<br>665014<br>665016 | 15.25<br>784.47<br>1,311.92 |
|  | <b>1/4 Circle Flow Nozzles</b><br>Nozzle Kit Assembled with 15 Side Flow Nozzles 1/4", 1pc End Cap - 1/4"                         | 665018                     | 62.10                       |
|  | <b>1/4" Extended Element, Pack of 4</b><br><b>1/4" Extended Element, Pack of 20</b>   | 665020<br>665022           | 21.87<br>107.85             |
|  | <b>1/4" Element Clamp, Pack of 4</b><br><b>1/4" Element Clamp, Pack of 20</b>   | 665024<br>665026           | 16.24<br>79.44              |
|  | <b>1/4" - 90° Nozzle Kit</b><br>1 ea. 1/16", 1/8", 1/4" & Spray Bar Nozzle  | 665028                     | 17.57                       |
|  | <b>1/16" Round Nozzle, Pack of 4</b><br><b>1/16" Round Nozzle, Pack of 50</b>   | 665030<br>665032           | 9.39<br>113.37              |
|  | <b>1/8" Round Nozzle, Pack of 4</b><br><b>1/8" Round Nozzle, Pack of 50</b>   | 665034<br>665036           | 9.39<br>113.37              |
|  | <b>1/4" Round Nozzle, Pack of 4</b><br><b>1/4" Round Nozzle, Pack of 50</b>   | 665038<br>665040           | 9.39<br>113.37              |
|  | <b>1/16" - 90° Round Nozzle, Pack of 4</b><br><b>1/16" - 90° Round Nozzle, Pack of 20</b>   | 665042<br>665044           | 13.81<br>67.08              |
|  | <b>1/8" - 90° Round Nozzle, Pack of 4</b><br><b>1/8" - 90° Round Nozzle, Pack of 20</b>   | 665046<br>665048           | 13.81<br>67.08              |
|  | <b>1/4" - 90° Round Nozzle, Pack of 4</b><br><b>1/4" - 90° Round Nozzle, Pack of 20</b>   | 665050<br>665052           | 13.81<br>67.08              |
|  | <b>1/4" - 90° Spray Bar Nozzle, Pack of 2</b><br><b>1/4" - 90° Spray Bar Nozzle, Pack of 20</b>                                   | 665054<br>665056           | 14.93<br>144.31             |
|  | <b>3/8" Flat Nozzle, Pack of 2</b><br><b>3/8" Flat Nozzle, Pack of 20</b>   | 665058<br>665060           | 12.04<br>116.14             |
|  | <b>1" Flare Nozzle, Pack of 2</b><br><b>1" Flare Nozzle, Pack of 20</b>   | 665062<br>665064           | 7.18<br>68.29               |
|  | <b>1/8" NPT Connector, Pack of 4</b><br><b>1/8" NPT Connector, Pack of 50</b>   | 665070<br>665072           | 9.39<br>113.37              |
|  | <b>1/4" NPT Connector, Pack of 4</b><br><b>1/4" NPT Connector, Pack of 50</b>   | 665078<br>665080           | 9.39<br>113.37              |
|  | <b>1/4" Y Fitting Pack, of 2</b><br><b>1/4" Y Fitting Pack, of 20</b>   | 665086<br>665088           | 14.93<br>144.31             |
|  | <b>1/4" Double Socket, Pack of 4</b><br><b>1/4" Double Socket, Pack of 20</b>   | 665090<br>665092           | 10.83<br>52.27              |

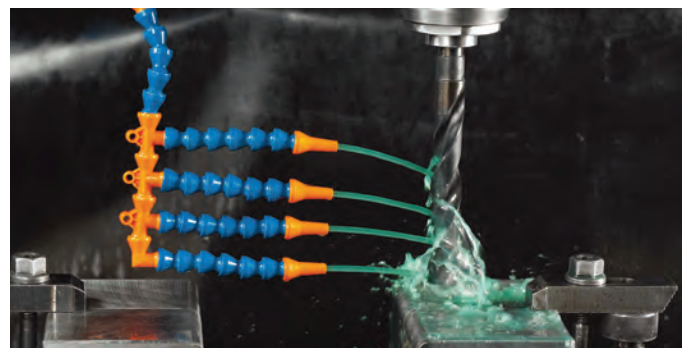
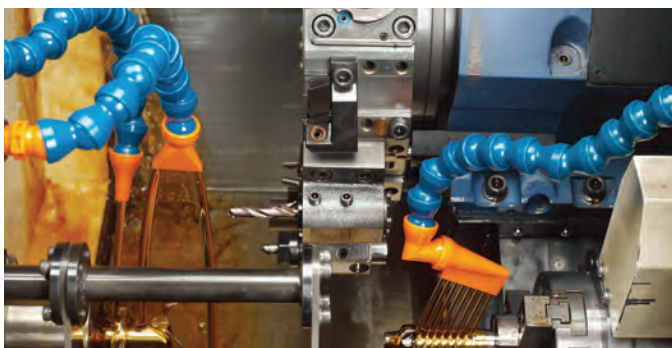
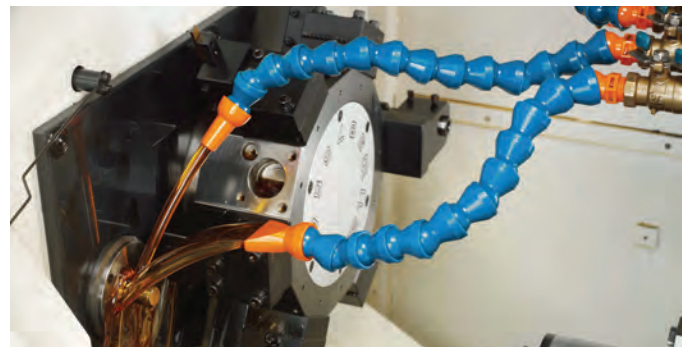
|  | Description  | Code No.         | Price \$        |
|--|--|------------------|-----------------|
|  | <b>1/4" Socket to 1/8" NPTF, Pack of 4</b><br><b>1/4" Socket to 1/8" NPTF, Pack of 20</b>  | 665094<br>665096 | 15.13<br>54.48  |
|  | <b>1/4" Female NPTF Connector, Pack of 4</b><br><b>1/4" Female NPTF Connector, Pack of 50</b>  | 665102<br>665104 | 18.46<br>226.32 |
|  | <b>5/8" Female UNF Connector, Pack of 4</b><br><b>5/8" Female UNF Connector, Pack of 50</b>  | 665106<br>665108 | 18.46<br>90.83  |
|  | <b>7/16" Female UNF Connector, Pack of 4</b><br><b>7/16" Female UNF Connector, Pack of 50</b>  | 665110<br>665112 | 18.46<br>90.83  |
|  | <b>1/4" Elbow Fitting, Pack of 2</b><br><b>1/4" Elbow Fitting, Pack of 20</b>  | 665114<br>665116 | 13.93<br>135.92 |
|  | <b>1/4" T Fitting, Pack 2</b><br><b>1/4" T Fitting, Pack 20</b>  | 665118<br>665120 | 16.24<br>73.82  |
|  | <b>1/4" Side Flow Nozzle, Pack of 4</b><br><b>1/4" Side Flow Nozzle, Pack of 20</b>  | 665122<br>665124 | 16.24<br>79.44  |
|  | <b>1/4" End Cap, Pack of 4</b><br><b>1/4" End Cap, Pack of 20</b>  | 665126<br>665128 | 9.94<br>48.62   |
|  | <b>1/4" Swivel Nozzle 40, Pack of 2</b><br><b>1/4" Swivel Nozzle 40, Pack of 20</b>  | 665130<br>665132 | 21.33<br>209.30 |
|  | <b>1/4" Swivel Nozzle 60, Pack of 2</b><br><b>1/4" Swivel Nozzle 60, Pack of 20</b>  | 665134<br>665136 | 21.33<br>209.30 |
|  | <b>1/4" NPT Male Hose Nipple Valve, Pk. of 2</b><br><b>1/4" NPT Male Hose Nipple Valve, Pk. of 10</b>  | 665138<br>665140 | 23.10<br>113.37 |
|  | <b>1/4" Connection Valve, Pack of 2</b><br><b>1/4" Connection Valve, Pack of 10</b>  | 665142<br>665144 | 23.10<br>113.37 |
|  | <b>1/4" Male NPT Valve, Pack of 2</b><br><b>1/4" Male NPT Valve, Pack of 10</b>  | 665150<br>665152 | 23.10<br>113.37 |
|  | <b>1/4" Female NPT Valve, Pack of 2</b><br><b>1/4" Female NPT Valve, Pack of 10</b>  | 665158<br>665160 | 23.10<br>113.37 |
|  | <b>1/4" Connection Check Valve, Pack of 2</b><br><b>1/4" Connection Check Valve, Pack of 10</b>  | 665162<br>665164 | 23.10<br>113.37 |
|  | <b>1/4" Modular Manifold System</b><br>Includes: 1/4" Elbow Fitting - 1pc<br>1/4" Manifold Bracket - 1pc<br>1/4" T Fitting - 3pcs<br>1/4" Mounting Screws - 3pcs | 665166           | 36.57           |
|  | <b>1/4" Main Flow Control Manifold System</b><br>Includes: 1/4" Modular Manifold - 1 set<br>1/4" Connection Valve - 5pcs   | 665168           | 96.80           |
|  | <b>1/4" Manifold Bracket, Pack of 2</b>  | 665170           | 11.06           |
|  | <b>1/4" Hose Assembly Pliers</b>   | 665172           | 71.93           |



## 3/8" Coolant Hose System

|  | Description   | Code No. | Price \$ |
|--|---|----------|----------|
|  | <b>3/8" Hose Kit</b><br>Includes: 8pcs of 3/8" segments - 2 sets<br>3/8" Nozzle<br>3/8" Male NPT Connector                      | 665176   | 22.54    |
|  | <b>3/8" Hose Kit</b><br>Includes: 8pcs of 3/8" segments - 2 sets<br>1/4", 3/8", 1/2" Nozzles<br>3/8" & 1/2" Male NPT Connectors | 665180   | 32.05    |
|  | <b>3/8" Segment Pack</b> 2 x 5-1/2" pcs   | 665182   | 16.69    |
|  | <b>3/8" x 25 ft coil</b>  | 665184   | 456.49   |
|  | <b>3/8" x 50 ft coil</b>  | 665186   | 896.41   |
|  | <b>1/4" Round Nozzle, Pack of 4</b>   | 665188   | 11.71    |
|  | <b>1/4" Round Nozzle, Pack of 50</b>  | 665190   | 141.67   |
|  | <b>3/8" Round Nozzle, Pack of 4</b>   | 665192   | 11.71    |
|  | <b>3/8" Round Nozzle, Pack of 50</b>  | 665194   | 141.67   |
|  | <b>1/2" Round Nozzle, Pack of 4</b>   | 665196   | 11.71    |
|  | <b>1/2" Round Nozzle, Pack of 50</b>  | 665198   | 141.67   |

|  | Description                              | Code No. | Price \$ |
|--|--|----------|----------|
|  | <b>3/8" NPT Connector, Pack of 4</b>     | 665208   | 11.71    |
|  | <b>3/8" NPT Connector, Pack of 50</b>    | 665210   | 141.67   |
|  | <b>1/2" NPT Connector, Pack of 4</b>     | 665216   | 11.71    |
|  | <b>1/2" NPT Connector, Pack of 50</b>    | 665218   | 141.67   |
|  | <b>1-1/4" Flare Nozzle, Pack of 2</b>    | 665220   | 8.62     |
|  | <b>1-1/4" Flare Nozzle, Pack of 20</b>   | 665222   | 82.21    |
|  | <b>3/8" Male NPT Valve, Pack of 2</b>    | 665228   | 28.73    |
|  | <b>3/8" Male NPT Valve, Pack of 10</b>   | 665230   | 141.67   |
|  | <b>3/8" Female NPT Valve, Pack of 2</b>  | 665236   | 28.73    |
|  | <b>3/8" Female NPT Valve, Pack of 10</b> | 665238   | 141.67   |
|  | <b>3/8" Hose Assembly Pliers</b>         | 665240   | 71.93    |





## 1/2" Coolant Hose System

|  | Description   | Code No.                   | Price \$                      |
|--|---|----------------------------|-------------------------------|
|  | <b>1/2" Hose Kit</b><br>Includes: 6pcs of 1/2" segments - 2 sets<br>1/4", 3/8", 1/2" Nozzles<br>3/8" & 1/2" Male NPT Connectors | 665244                     | 36.36                         |
|  | <b>1/2" Extended Element Kit with Element Kit</b> Includes: 4 each of:<br>1/2" Extended Elements, 1/2" Element Clamps           | 665246                     | 47.29                         |
|  | <b>1/2" Segment Pack</b> 2 x 5-1/2" pcs<br><b>1/2" x 50 ft coil</b><br><b>1/2" x 82 ft coil</b>                                 | 665248<br>665250<br>665252 | 18.34<br>1,045.27<br>1,576.80 |
|  | <b>1/2 Circle Flow Nozzles</b><br>Nozzle Kit Assembled with 15 Side Flow Nozzles 1/2", 1pc End Cap - 1/2"                       | 665254                     | 79.44                         |
|  | <b>1/2" Extended Element, Pack of 4</b><br><b>1/2" Extended Element, Pack of 20</b>   | 665256<br>665258           | 26.86<br>133.05               |
|  | <b>1/2" Element Clamp, Pack of 4</b><br><b>1/2" Element Clamp, Pack of 20</b>   | 665260<br>665262           | 20.67<br>102.00               |
|  | <b>1/4" - 90° Nozzle Kit</b><br>1 ea. 1/4", 3/8", 1/2" & Spray Bar Nozzle   | 665264                     | 20.56                         |
|  | <b>1/4" Round Nozzle, Pack of 4</b><br><b>1/4" Round Nozzle, Pack of 50</b>   | 665266<br>665268           | 13.93<br>169.95               |
|  | <b>3/8" Round Nozzle, Pack of 4</b><br><b>3/8" Round Nozzle, Pack of 50</b>   | 665270<br>665272           | 13.93<br>169.95               |
|  | <b>1/2" Round Nozzle, Pack of 4</b><br><b>1/2" Round Nozzle, Pack of 50</b>   | 665274<br>665276           | 13.93<br>169.95               |
|  | <b>1/4" - 90° Round Nozzle, Pack of 4</b><br><b>1/4" - 90° Round Nozzle, Pack of 20</b>   | 665278<br>665280           | 15.13<br>73.82                |
|  | <b>3/8" - 90° Round Nozzle, Pack of 4</b><br><b>3/8" - 90° Round Nozzle, Pack of 20</b>   | 665282<br>665284           | 15.13<br>73.82                |
|  | <b>1/2" - 90° Round Nozzle, Pack of 4</b><br><b>1/2" - 90° Round Nozzle, Pack of 20</b>   | 665286<br>665288           | 15.13<br>73.82                |
|  | <b>1/2" - 90° Spray Bar Nozzle, Pack of 2</b><br><b>1/2" - 90° Spray Bar Nozzle, Pack of 20</b>                                 | 665290<br>665292           | 16.57<br>161.34               |
|  | <b>1-1/4" Flare Nozzle, Pack of 2</b><br><b>1-1/4" Flare Nozzle, Pack of 20</b>   | 665294<br>665296           | 9.94<br>96.57                 |
|  | <b>1-3/4" Flare Nozzle, Pack of 2</b><br><b>1-3/4" Flare Nozzle, Pack of 20</b>   | 665298<br>665300           | 10.49<br>102.00               |
|  | <b>2-1/2" Flare Nozzle, Pack of 2</b><br><b>2-1/2" Flare Nozzle, Pack of 20</b>   | 665302<br>665304           | 11.71<br>113.37               |
|  | <b>3/8" NPT Connector, Pack of 4</b><br><b>3/8" NPT Connector, Pack of 50</b>   | 665310<br>665312           | 13.93<br>169.95               |
|  | <b>1/2" NPT Connector, Pack of 4</b><br><b>1/2" NPT Connector, Pack of 50</b>   | 665318<br>665320           | 13.93<br>169.95               |
|  | <b>1/2" Y Fitting Pack, of 2</b><br><b>1/2" Y Fitting Pack, of 20</b>   | 665322<br>665324           | 16.57<br>161.34               |

|  | Description  | Code No.         | Price \$        |
|--|--|------------------|-----------------|
|  | <b>1/2" to 1/4" Y Reducer, Pack of 2</b><br><b>1/2" to 1/4" Y Reducer, Pack of 20</b>  | 665326<br>665328 | 16.57<br>161.34 |
|  | <b>1/2" to 1/4" Adapter, Pack of 2</b><br><b>1/2" to 1/4" Adapter, Pack of 20</b>  | 665330<br>665332 | 12.38<br>119.13 |
|  | <b>1/2" Double Socket, Pack of 4</b><br><b>1/2" Double Socket, Pack of 20</b>  | 665334<br>665336 | 12.38<br>59.77  |
|  | <b>1/2" Elbow Fitting, Pack of 2</b><br><b>1/2" Elbow Fitting, Pack of 20</b>  | 665338<br>665340 | 15.58<br>152.83 |
|  | <b>1/2" T Fitting, Pack 2</b><br><b>1/2" T Fitting, Pack 20</b>  | 665342<br>665344 | 18.23<br>178.35 |
|  | <b>1/2" Side Flow Nozzle, Pack of 4</b><br><b>1/2" Side Flow Nozzle, Pack of 20</b>  | 665346<br>665348 | 20.67<br>102.00 |
|  | <b>1/2" End Cap, Pack of 4</b><br><b>1/2" End Cap, Pack of 20</b>  | 665350<br>665352 | 11.06<br>54.03  |
|  | <b>1/2" Connection Valve, Pack of 2</b><br><b>1/2" Connection Valve, Pack of 10</b>  | 665354<br>665356 | 37.24<br>183.88 |
|  | <b>1/2" Male NPT Valve, Pack of 2</b><br><b>1/2" Male NPT Valve, Pack of 10</b>  | 665362<br>665364 | 37.24<br>183.88 |
|  | <b>1/2" Female NPT Valve, Pack of 2</b><br><b>1/2" Female NPT Valve, Pack of 10</b>  | 665370<br>665372 | 37.24<br>183.88 |
|  | <b>1/2" Connection Check Valve, Pack of 2</b><br><b>1/2" Connection Check Valve, Pack of 10</b>  | 665374<br>665376 | 30.72<br>151.40 |
|  | <b>3/8" SAE Flare Nut Adapter, Pack of 4</b><br><b>3/8" SAE Flare Nut Adapter, Pack of 20</b>  | 665378<br>665380 | 15.58<br>76.57  |
|  | <b>1/2" Modular Manifold System</b><br>Includes: 1/2" Elbow Fitting - 1pc<br>1/2" Manifold Bracket - 1pc<br>1/2" T Fitting - 3pcs<br>1/2" Mounting Screws - 3pcs | 665382           | 40.90           |
|  | <b>1/2" Main Flow Control Manifold System</b><br>Includes: 1/2" Modular Manifold - 1 set<br>1/2" Connection Valve - 5pcs   | 665384           | 132.50          |
|  | <b>1/2" Manifold Bracket, Pack of 2</b>  | 665386           | 12.60           |
|  | <b>1/2" Hose Assembly Pliers</b>   | 665388           | 71.93           |



## 3/4" Coolant Hose System

|  | Description   | Code No. | Price \$ |
|--|---|----------|----------|
|  | <b>3/4" Hose Kit</b><br>Includes: 6pcs of 3/4" segments - 2 sets<br>5/8" & 3/4" Nozzles<br>3/4" Male NPT Connectors | 665392   | 47.96    |
|  | <b>3/4" Segment Pack</b> 2 x 5-1/2" pcs   | 665394   | 32.60    |
|  | <b>3/4" x 50 ft coil</b>  | 665396   | 1,757.69 |
|  | <b>3/4" x 82 ft coil</b>  | 665398   | 2,785.16 |
|  | <b>5/8" Round Nozzle, Pack of 4</b>   | 665400   | 19.56    |
|  | <b>3/4" Round Nozzle, Pack of 50</b>  | 665402   | 240.45   |
|  | <b>3/4" Round Nozzle, Pack of 4</b>   | 665404   | 19.56    |
|  | <b>3/4" Round Nozzle, Pack of 50</b>  | 665406   | 240.45   |
|  | <b>3/4" NPT Connector, Pack of 4</b>  | 665412   | 19.56    |
|  | <b>3/4" NPT Connector, Pack of 50</b>   | 665414   | 240.45   |

|  | Description                               | Code No. | Price \$ |
|--|---|----------|----------|
|  | <b>3" Flare Nozzle, Pack of 2</b>         | 665416   | 13.93    |
|  | <b>3" Flare Nozzle, Pack of 20</b>        | 665418   | 135.92   |
|  | <b>3/4" Y Fitting, Pack of 2</b>          | 665420   | 36.13    |
|  | <b>3/4" Y Fitting, Pack of 20</b>         | 665422   | 356.05   |
|  | <b>3/4" to 1/2" Adapter, Pack of 2</b>    | 665424   | 13.93    |
|  | <b>3/4" to 1/2" Adapter, Pack of 20</b>   | 665426   | 135.92   |
|  | <b>3/4" to 1/2" Y Reducer, Pack of 2</b>  | 665428   | 48.73    |
|  | <b>3/4" to 1/2" Y Reducer, Pack of 20</b> | 665430   | 483.13   |
|  | <b>3/4" Double Socket, Pack of 4</b>      | 665432   | 15.13    |
|  | <b>3/4" Double Socket, Pack of 20</b>     | 665434   | 73.82    |
|  | <b>3/4" Hose Assembly Pliers</b>          | 665436   | 71.93    |

## Magnetic Base & Shield Systems



### 3 Valve Magnetic Set (With On-Off)

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base (W 2" x L 2-1/2" x H 2")</li> <li>20 pcs of 1/4" Segment - 3pcs</li> <li>1" Flare Nozzle - 3pcs</li> <li>1/4" NPT Connector - 3pcs</li> <li>1/4" Copper Valve - 3pcs</li> </ul> | 665438   | 349.31   |



### 2 Valve Magnetic Set (With On-Off)

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base (W 2" x L 2-1/2" x H 2")</li> <li>20 pcs of 1/4" Segment - 2pcs</li> <li>1" Flare Nozzle - 2pcs</li> <li>1/4" NPT Connector - 2pcs</li> <li>1/4" Copper Valve - 2pcs</li> </ul> | 665440   | 328.20   |



### Single Hose Magnetic Set

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base - 1pc</li> <li>10 pcs of 1/4" Segment - 1pc</li> <li>1" Flare Nozzle - 1pc</li> <li>1/4" NPT Connector - 1pc</li> </ul> | 665442   | 44.97    |



### Single Hose Magnetic Set (Shut Off Valve)

| Description   | Code No. | Price \$ |
|---|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base - 1pc</li> <li>10 pcs of 1/4" Segment - 1pc</li> <li>1" Flare Nozzle - 1pc</li> <li>1/4" Male NPT Valve - 1pc</li> </ul> | 665446   | 60.11    |



### Long Single Hose Magnetic Set

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base - 1pc</li> <li>20 pcs of 1/4" Segment - 1pc</li> <li>1" Flare Nozzle - 1pc</li> <li>1/4" NPT Connector - 1pc</li> </ul> | 665444   | 51.28    |



### Long Single Hose Magnetic Set (Shut Off Valve)

| Description   | Code No. | Price \$ |
|---|----------|----------|
| <ul style="list-style-type: none"> <li>Magnetic Base - 1pc</li> <li>20 pcs of 1/4" Segment - 1pc</li> <li>1" Flare Nozzle - 1pc</li> <li>1/4" Male NPT Valve - 1pc</li> </ul> | 665448   | 67.41    |



### Magnetic Shield Kits

| Description                      | Dimensions   | Code No. | Price \$ |
|----------------------------------|--------------|----------|----------|
| Magnetic Base - 1pc              | 6" x 8"      | 665450   | 95.92    |
| 12 pcs of 3/4" Segment - 1pc     | 7-1/2" x 10" | 665452   | 100.34   |
| 3/4" Shield Mounting Elbow - 1pc | 8-1/2" x 12" | 665454   | 107.96   |
| Nut - 2pcs                       |              |          |          |
| Acrylic Board - 1pc              |              |          |          |





## Adjustable Coolant Hoses & Valves



### 1/4" Male 13" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 1/4" Male NPT Valve - 1pc</li> <li>• 20 pcs of 1/4" Segment - 1pc</li> <li>• 1/4" Round Nozzle - 1pc</li> </ul> | 665456   | 29.61    |



### 1/4" Female 13" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 1/4" Female NPT Valve - 1pc</li> <li>• 20 pcs of 1/4" Segment - 1pc</li> <li>• 1/4" Round Nozzle - 1pc</li> </ul> | 665458   | 29.61    |



### 3/8" Male 14" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 3/8" Male NPT Valve - 1pc</li> <li>• 16 pcs of 3/8" Segment - 1pc</li> <li>• 3/8" Round Nozzle - 1pc</li> </ul> | 665460   | 36.13    |



### 3/8" Female 14" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 3/8" Female NPT Valve - 1pc</li> <li>• 16 pcs of 3/8" Segment - 1pc</li> <li>• 3/8" Round Nozzle - 1pc</li> </ul> | 665462   | 36.13    |



### 1/2" Male 13" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 1/2" Male NPT Valve - 1pc</li> <li>• 12 pcs of 1/2" Segment - 1pc</li> <li>• 1/2" Round Nozzle - 1pc</li> </ul> | 665464   | 44.31    |



### 1/2" Female 13" Length Hose Kit

| Description  | Code No. | Price \$ |
|--|----------|----------|
| <ul style="list-style-type: none"> <li>• 1/2" Female NPT Valve - 1pc</li> <li>• 12 pcs of 1/2" Segment - 1pc</li> <li>• 1/2" Round Nozzle - 1pc</li> </ul> | 665466   | 44.31    |

# COOLING SYSTEM



**NOGA MINICOOL** is using the VENTURI principle to spray an air + liquid mixture. It consists of the following basic elements: A control valve, spray unit, air line, syphon line and a powerful on/off Popeye magnet, which has a "V" form base, making it possible to mount on non-flat surfaces. The MINICOOL enables the user to easily control both the air flow rate and liquid rate. Stainless steel armoured syphon hose and air hose are made in standard lengths: 1m, 2m, 3m (special lengths available upon request). The spray unit comes in three standard lengths: 264, 334, 479 mm (special lengths available upon request).

### NogaCool — MC1601

NOGACOO consists of a manifold & Loc-Line® flexible hose with a nozzle on top and a valve at the bottom. Assembled on the powerful ON/OFF POPEYE magnet. The plug attached can be replaced by a second Loc-Line® hose. NOGACOO is supplied with a set of three nozzles: 1/16", 1/8", 1/4".

Working conditions are as follows: Pressure: 2-3.4 Bar (30-50 psi), Flow rate: 940 l/hour (250 gal/hour) Max. Working Temp. 170°C.



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| MC1601 | 165462   | 47.99    |

### Noga Minicool — MC1700

NOGA Minicool is using the VENTURI principle to spray an air + liquid mixture. The Minicool enables the user to easily control both the air flow rate and liquid rate.

- Strong magnetic base
- Separate on/off air and fluid control
- Stainless steel armoured syphon hose and air hose
- Simple, inexpensive, rugged
- Nozzle connected via Loc-Line® flexible hose
- Single spray unit

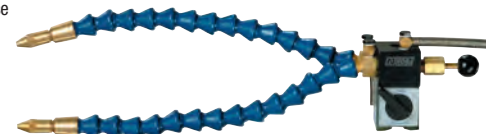


| Model  | Code No. | Price \$ |
|--------|----------|----------|
| MC1700 | 165461   | 125.99   |

### Noga Minicool — MC3000

NOGA Minicool is using the VENTURI principle to spray an air + liquid mixture. The Minicool enables the user to easily control both the air flow rate and liquid rate.

- Strong magnetic base
- Separate on/off air and fluid control
- Stainless steel armoured syphon hose and air hose
- Simple, inexpensive, rugged
- Nozzle connected via Loc-Line® flexible hose
- Two spray units



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| MC3000 | 165463   | 336.40   |



# Abrasives & Finishing





# Abrasives & Finishing

## GRINDING WHEELS

|  |      |
|--|------|
| General Information On Grinding Wheels . . . . . | J2   |
| Ceramic . . . . .                                | J3   |
| Surface Grinding . . . . .                       | J4   |
| General Purpose . . . . .                        | J5   |
| Nested Wheel Bushings . . . . .                  | J5   |
| Straight Cup, Saucer & Flaring Cup . . . . .     | J6   |
| Coated Abrasives - Shop Rolls & Discs . . . . .  | J7-8 |
| Cloth & Paper Sheets & Belts . . . . .           | J8   |

## DISCS

|                                    |        |
|------------------------------------|--------|
| Flap Discs, Mop Discs . . . . .    | J8-9   |
| Cut-Off Wheels . . . . .           | J9     |
| Depressed Centre . . . . .         | J9     |
| Grinding Discs . . . . .           | J9-10  |
| Hand Block . . . . .               | J10    |
| Abrasive Mops . . . . .            | J10    |
| Quick Change Discs . . . . .       | J10-11 |
| Die Grinders . . . . .             | J12-14 |
| Die Grinder Kits . . . . .         | J14    |
| Air Belt Sanders & Belts . . . . . | J14    |
| Needle Files . . . . .             | J15    |
| Diamond Files . . . . .            | J15    |
| Air Blow Gun . . . . .             | J15    |

## DEBURRING

|                                     |        |
|-------------------------------------|--------|
| Carbide Burrs & Sets . . . . .      | J16-18 |
| Carbide Burr Sets . . . . .         | J18    |
| Noga Deburring System . . . . .     | J19-28 |
| Countersinks & Rotodrives . . . . . | J21    |
| Scrapers . . . . .                  | J22    |
| Specialty Tools . . . . .           | J22    |
| Chip Hooks . . . . .                | J23    |
| Ceramics . . . . .                  | J23    |
| Sets & Kits . . . . .               | J24    |
| Blades . . . . .                    | J25-28 |

## How to Order

When ordering Kinik standard grinding wheels, specify your selection in this order:



### Wheel Shape and Face

- Dimensions**
- (1) Diameter (D)
  - (2) Thickness (T)
  - (3) Hole size (H)

- Wheel Specifications**
- (1) Abrasive
  - (2) Grit Size
  - (3) Grade
  - (4) Bond
  - (5) Quantity

### Abrasives

| Symbols        | Characteristics   |
|----------------|---|
| <b>A</b>       | Regular aluminum oxide, hard and tough. Suitable for mild steel, case-iron etc in rough grinding  |
| <b>10A</b>     | The prime regular aluminum oxide, hard and tough. It is suited for cylindrical grinding of unhardened steels.                               |
| <b>WA, 38A</b> | White aluminum oxide, hard and brittle. Suitable for all kinds of steel grinding.   |
| <b>32A</b>     | Strong sharp monocrystalline aluminum oxide. Suitable for all kinds of tool precision grinding.   |
| <b>FA, 57A</b> | Semi-friable, with a grinding action intermediate A and WA. Suitable for cylindrical grinding of steel parts.                               |
| <b>PA</b>      | Pink aluminum oxide is suitable for tool grinding and surface grinding.   |
| <b>RA</b>      | Ruby aluminum oxide, hard and less brittle than PA. Suitable for high alloy steel etc. in precision grinding.                               |
| <b>PSA</b>     | Special pink abrasive similar to 32A. Suitable for all kinds of hard steels in precision grinding.  |
| <b>AZ</b>      | A modified high zirconia aluminum oxide. Used in foundries snagging cast iron and steels for heavy duty work.                               |
| <b>C</b>       | Black silicone carbide. Used for grinding gray iron, non-ferrous metals, and non-metallic materials such as glass, rubber, stones etc.      |
| <b>CSKG</b>    | Blue Ceramic. Fast stock removal excellent cutting. 5X more life than aluminum oxide wheels.  |
| <b>GC</b>      | Green silicone carbide is well suited for special alloy grinding such as tungsten carbide, cold rolled steels, sapphire, glass and granite. |

# GENERAL INFORMATION ON GRINDING WHEELS

### Note:

Wheels are available in both metric and imperial dimensions.

### Standard Wheel Markings

For clarity as well as to avoid mistakes in wheel selection, a standard designation of wheel specifications was developed and was inscribed by ISO in 1995. Standards such as CNS of the R.O.C., JIS of Japan, ANSI of U.S.A. and DIN of Germany all employ this uniform standard.

Wheel marking includes the following information:

| WA       | 46   | K     | 8         | V         | 7N           |
|----------|------|-------|-----------|-----------|--------------|
| Abrasive | Grit | Grade | Structure | Bond Type | KINIK Symbol |

### Bond Type

| Symbols                              | Characteristics  |
|--------------------------------------|--|
| <b>V</b><br>(Vitrified)              | Most common bond for precision grinding porosity and strength. Wheels made with this bond give high stock removal and their rigidity helps attain high precision. Not affected by water, acid oils or ordinary temperature.  |
| <b>B</b><br>(Resinoid)               | Used for wheels in fabrication shops, foundries, billet shops, sharpening and gumming saws, and in many precision applications. These wheels excel in rapid stock removal as well as in applications requiring better finishes. This bond is also restricted to reinforced resinoid products, cut-off wheels or specialty formulated products. |
| <b>R</b><br>(Rubber)                 | Used for most centreless feed wheels, precision ball race grinding wheels and for snagging with portable grinders. Used where finish is important and for cut-off wheels where burr and burn must be kept to a minimum.  |
| <b>Mg</b><br>(Magnesium Oxychloride) | A notable bond used for cutlery or particularly thin workpieces, marble surface grinding and superfinishing.   |

**Grades:** Grades indicate the relative strength of the bond which holds the abrasive grains in place

| Very Soft  | Soft       | Medium     | Hard       | Very Hard           |
|------------|------------|------------|------------|---------------------|
| D, E, F, G | H, I, J, K | L, M, N, O | P, Q, R, S | T, U, V, W, X, Y, Z |

### Grit (CNS and JIS STANDARD)

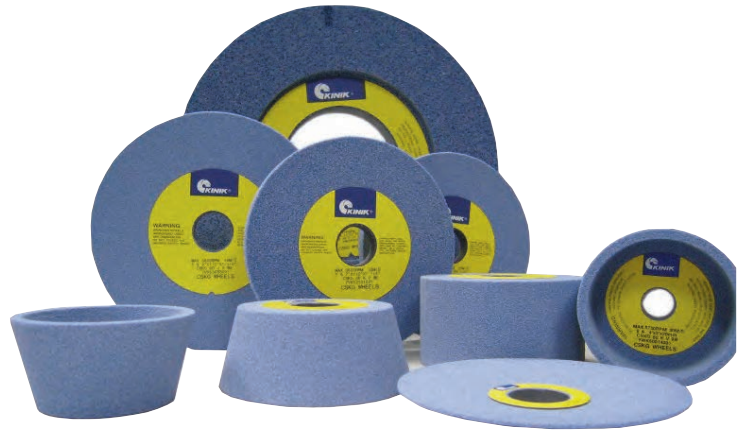
| Coarse |    |    | Medium |    |    | Fine |     |     |     | Very Fine |     |     |     | Ultra Fine |      |      |      |
|--------|----|----|--------|----|----|------|-----|-----|-----|-----------|-----|-----|-----|------------|------|------|------|
| 10     | 12 | 14 | 30     | 36 | 46 | 70   | 80  | 90  | 100 | 240       | 280 | 320 | 400 | 1000       | 1200 | 1500 | 2000 |
| 16     | 20 | 24 | 54     | 60 |    | 120  | 150 | 180 | 220 | 500       | 600 | 700 | 800 | 2500       | 3000 | 4000 |      |

### Structures:

| Symbol No.       | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 |
|------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Abrasive Ratio % | 62 | 60 | 58 | 56 | 54 | 52 | 50 | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 |

# CERAMIC GRINDING WHEELS

- HIGH PERFORMANCE CERAMIC ALUMINUM OXIDE
- UP TO 5X LONGER LIFE THAN WHITE ALUMINUM OXIDE WHEELS
- SUPERIOR STOCK REMOVAL RATES, LONG WHEEL LIFE REDUCING GRINDING COSTS
- MAXIMUM RESULTS FOR:
  - TOOL SHARPENING  
HSS & TOOL STEEL <68HRC
  - SURFACE GRINDING  
HSS & TOOL STEEL <68HRC, 300 & 400 SERIES  
STAINLESS STEEL, CAST IRON: DUCTILE & GRAY,  
NON-FERROUS ALLOYS



## Kinik Ceramic Surface Grinding Wheels

### Peripheral Surface Grinding

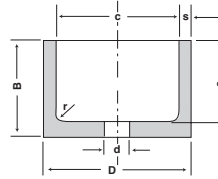
Surface grinding with straight or recessed wheels on machines with a rotating or reciprocating table results in a larger contact area than in cylindrical grinding. Therefore it is necessary to use softer grade wheels, particularly when large diameter and/or wide wheels are used. When grinding a large number of components, the grinding is not continuous. In this case the components tend to dress the wheel, so a harder grade wheel should be used.



| Dimensions                    | Structure<br>CSKG 46H | Price \$ | Structure<br>CSKG 46K | Price \$ | Structure<br>CSKG 60K | Price \$ | Structure<br>CSKG 80K | Price \$ | Structure<br>CSKG 100K | Price \$ |
|-------------------------------|-----------------------|----------|-----------------------|----------|-----------------------|----------|-----------------------|----------|------------------------|----------|
| 6x1/4x11/4                    | -                     | -        | 635040                | 33.69    | 635041                | 30.54    | 635042                | 33.69    | -                      | -        |
| 6x1/2x11/4                    | -                     | -        | 635044                | 36.75    | 635046                | 36.75    | 635052                | 36.75    | -                      | -        |
| 6x5/8x11/4                    | -                     | -        | 635112                | 99.41    | -                     | -        | -                     | -        | -                      | -        |
| 7x1/4x11/4                    | -                     | -        | 635047                | 42.22    | 635048                | 45.45    | 635049                | 45.45    | -                      | -        |
| 7x1/2x11/4                    | -                     | -        | 635055                | 49.40    | 635050                | 49.40    | 635053                | 49.40    | 635056                 | 49.40    |
| 8x1/4x11/4                    | -                     | -        | 635057                | 53.23    | 635061                | 53.23    | 635062                | 53.23    | -                      | -        |
| 8x1/2x11/4                    | -                     | -        | 635064                | 66.39    | 635065                | 63.19    | 635066                | 63.19    | -                      | -        |
| 8x3/4x11/4                    | -                     | -        | 635067                | 81.75    | 635068                | 81.79    | 635091                | 81.79    | -                      | -        |
| 8x3/4x2                       | -                     | -        | 635093                | 81.79    | 635094                | 81.79    | 635096                | 81.79    | -                      | -        |
| 8x1x11/4                      | -                     | -        | 635069                | 95.09    | 635071                | 95.09    | -                     | -        | -                      | -        |
| 8x1x2                         | -                     | -        | 635097                | 95.09    | 635098                | 95.09    | -                     | -        | -                      | -        |
| 10x3/4x3                      | -                     | -        | 635101                | 119.80   | 635102                | 119.80   | 635103                | 119.80   | -                      | -        |
| 10x1x3                        | -                     | -        | 635072                | 136.49   | 635073                | 136.49   | 635104                | 135.37   | -                      | -        |
| 12x3/4x3                      | -                     | -        | -                     | -        | 635074                | 182.96   | -                     | -        | -                      | -        |
| 12x1x3                        | -                     | -        | 635076                | 196.26   | 635077                | 199.42   | 635078                | 169.25   | -                      | -        |
| 12x1x5                        | -                     | -        | 635079                | 196.35   | 635081                | 173.64   | -                     | -        | -                      | -        |
| 12x11/2x5                     | -                     | -        | 635082                | 249.36   | 635105                | 249.36   | -                     | -        | -                      | -        |
| 14x1x5                        | -                     | -        | 635083                | 249.36   | 635084                | 249.36   | 635109                | 249.36   | -                      | -        |
| 14x11/2x5                     | -                     | -        | 635086                | 315.83   | 635087                | 322.30   | -                     | -        | -                      | -        |
| 14x2x5                        | -                     | -        | 635110                | 415.54   | 635111                | 415.54   | -                     | -        | -                      | -        |
| <b>RECESSED 2A BOTH SIDES</b> |                       |          |                       |          |                       |          |                       |          |                        |          |
| 12x2x3 2A 6x3/8               | -                     | -        | 635106                | 332.64   | 635107                | 332.64   | -                     | -        | -                      | -        |
| 12x2x5 2A 71/4x1/2            | -                     | -        | 635108                | 319.23   | -                     | -        | -                     | -        | -                      | -        |
| 14x2x5 2A 8x3/8               | -                     | -        | 635088                | 432.24   | 635089                | 432.24   | -                     | -        | -                      | -        |
| 14x2x5 2A 8x3/8 H             | 635070                | 440.12   | -                     | -        | -                     | -        | -                     | -        | -                      | -        |

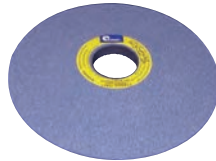
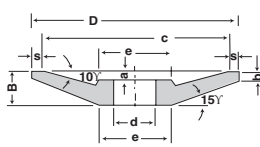
## Kinik Ceramic Straight Cup Wheels

### Shape D Straight Cup



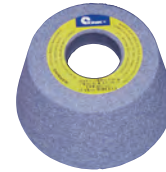
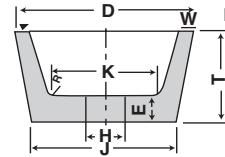
| D | B | d    | a      | c     | r    | s   | CSKG60J Code No. | Price \$ |
|---|---|------|--------|-------|------|-----|------------------|----------|
| 4 | 2 | 20mm | 1-9/16 | 3-1/2 | 3/16 | 1/4 | 635075           | 66.69    |

## Kinik Ceramic Shape B Saucer Type Grinding Wheels



| D | B   | d     | a   | b   | c     | e | s    | CSKG60K Code No. | Price \$ |
|---|-----|-------|-----|-----|-------|---|------|------------------|----------|
| 6 | 5/8 | 1-1/4 | 1/4 | 1/8 | 5-3/8 | 2 | 5/16 | 635095           | 91.90    |

## Kinik Ceramic Shape E Flaring Cup Grinding Wheels



| D | T | H     | W    | E   | J | K     | CSKG60K Code No. | Price \$ |
|---|---|-------|------|-----|---|-------|------------------|----------|
| 4 | 2 | 1-1/4 | 6 mm | 1/2 | 3 | 2-1/2 | 635085           | 66.69    |
| 5 | 2 | 1-1/4 | 8 mm | 1/2 | 4 | 3     | 635090           | 91.96    |

## Kinik Aluminum Oxide Surface Grinding Wheels

### Peripheral Surface Grinding

Surface grinding with straight or recessed wheels on machines with a rotating or reciprocating table results in a larger contact area than in cylindrical grinding. Therefore it is necessary to use softer grade wheels, particularly when large diameter and/or wide wheels are used.

When grinding a large number of components, the grinding is not continuous. In this case the components tend to dress the wheel, so a harder grade wheel should be used.



WA  
White Aluminum Oxide



PA  
Pink Aluminum Oxide



| Dimensions                    | Structure WA46J | Price \$ | WA60J  | Price \$ | WA80J  | Price \$ | PA46J  | Price \$ | PA60J  | Price \$ |
|-------------------------------|-----------------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| 6x1/4x1-1/4                   | 635280          | 31.95    | 635282 | 31.95    | 635284 | 31.95    | -      | -        | -      | -        |
| 6x1/2x1-1/4                   | 635288          | 36.79    | 635290 | 36.79    | 635292 | 36.79    | -      | -        | -      | -        |
| 7x1/4x1-1/4                   | 635296          | 44.47    | 635298 | 44.47    | 635300 | 44.47    | -      | -        | -      | -        |
| 7x1/2x1-1/4                   | 635306          | 45.09    | 635308 | 47.81    | 635310 | 47.81    | 635812 | 50.90    | -      | -        |
| 8x1/4x1-1/4                   | 635314          | 54.01    | 635316 | 54.01    | 635318 | 54.01    | -      | -        | -      | -        |
| 8x1/2x1-1/4                   | 635324          | 56.62    | 635326 | 56.62    | 635328 | 56.64    | 635820 | 63.20    | 635822 | 63.20    |
| 8x3/4x1-1/4                   | 635334          | 73.30    | 635336 | 69.61    | 635338 | 73.27    | 635824 | 80.01    | -      | -        |
| 8x1x1-1/4                     | 635344          | 83.48    | 635346 | 83.48    | 635348 | 83.48    | -      | -        | -      | -        |
| 8x3/4x2                       | 635352          | 73.27    | 635354 | 73.27    | 635356 | 73.27    | -      | -        | -      | -        |
| 8x1x2                         | 635360          | 83.48    | 635362 | 83.48    | -      | -        | 635836 | 89.80    | 635838 | 89.80    |
| 10x1/2x3                      | 635364          | 104.46   | 635366 | 104.46   | -      | -        | -      | -        | -      | -        |
| 10x3/4x3                      | 635368          | 113.06   | 635370 | 113.06   | 635372 | 114.11   | -      | -        | -      | -        |
| 10x1x3                        | 635376          | 119.80   | 635378 | 119.80   | 635379 | 119.80   | 635848 | 133.03   | -      | -        |
| 12x3/4x3                      | 635380          | 168.11   | 635382 | 164.71   | 635384 | 164.71   | -      | -        | 635854 | 180.05   |
| 12x1x3                        | 635386          | 193.88   | 635388 | 193.88   | -      | -        | -      | -        | -      | -        |
| 12x1x5                        | 635390          | 193.88   | 635392 | 193.88   | -      | -        | -      | -        | -      | -        |
| 12x1-1/2x5                    | 635394          | 227.96   | 635396 | 227.97   | -      | -        | -      | -        | -      | -        |
| 14x1x5                        | 635402          | 227.97   | 635404 | 227.97   | 635406 | 227.97   | -      | -        | -      | -        |
| 14x1-1/2x5                    | 635408          | 292.99   | 635410 | 294.40   | -      | -        | -      | -        | -      | -        |
| 14x2x5                        | 635411          | 385.77   | 635414 | 385.77   | -      | -        | -      | -        | -      | -        |
| <b>RECESSED 2A BOTH SIDES</b> |                 |          |        |          |        |          |        |          |        |          |
| 12x2x3                        |                 |          |        |          |        |          |        |          |        |          |
| 2A 6x3/8                      | 635398          | 294.40   | 635399 | 284.98   | -      | -        | 635872 | 322.58   | -      | -        |
| 12x2x5                        |                 |          |        |          |        |          |        |          |        |          |
| 2A 7-1/4x1/2                  | 635400          | 294.40   | 635401 | 284.98   | -      | -        | -      | -        | -      | -        |
| 14x2x5                        |                 |          |        |          |        |          |        |          |        |          |
| 2A 8x3/8                      | 635412          | 405.47   | 635418 | 386.12   | -      | -        | 635880 | 433.67   | -      | -        |

## Kinik General Purpose Grinding Wheels

Used on bench, pedestal, wagon and swing frame grinders

- Diameter: 125 ~ 760 mm
- Diameter: 5" ~ 30"



| A: Dark Regular Aluminum Oxide |         |          |        |          |        | GC: Green Silicone Carbide |        |          |        |          |        |          |         |          |
|--------------------------------|---------|----------|--------|----------|--------|----------------------------|--------|----------|--------|----------|--------|----------|---------|----------|
| Dimensions                     | A30P    | Price \$ | A54N   | Price \$ | A80N   | Price \$                   | GC60KV | Price \$ | GC80JV | Price \$ | GC100J | Price \$ | GC120JV | Price \$ |
| 6x3/4x1                        | 635202* | 27.62    | 635204 | 27.62    | 635206 | 27.62                      | 635450 | 42.21    | 635452 | 42.21    | 635454 | 42.21    | -       | -        |
| 6x1x1                          | 635208  | 29.40    | 635210 | 29.40    | 635212 | 29.40                      | 635458 | 46.77    | 635460 | 46.77    | 635462 | 46.77    | -       | -        |
| 7x3/4x1                        | -       | -        | -      | -        | -      | -                          | 635474 | 62.17    | 635476 | 60.85    | -      | -        | -       | -        |
| 7x1x1                          | 635220  | 45.24    | 635222 | 45.21    | -      | -                          | 635480 | 73.42    | 635482 | 73.42    | -      | -        | -       | -        |
| 7x1/2x1-1/4                    | -       | -        | -      | -        | -      | -                          | 635466 | 50.70    | 635468 | 50.70    | -      | -        | 635472  | 50.70    |
| 8x3/4x1                        | 635226  | 43.96    | 635228 | 44.47    | -      | -                          | -      | -        | 635490 | 71.49    | -      | -        | 635492  | 70.41    |
| 8x1x1                          | 635232  | 50.64    | 635234 | 50.90    | -      | -                          | 635494 | 86.09    | 635496 | 86.09    | 635498 | 86.09    | 635500  | 85.98    |
| 10x1x1                         | 635238  | 78.53    | 635240 | 78.53    | -      | -                          | 635502 | 144.97   | -      | -        | -      | -        | -       | -        |
| 10x1-1/2x1-1/4                 | 635250  | 113.06   | 635252 | 113.06   | -      | -                          | -      | -        | 635510 | 209.53   | -      | -        | -       | -        |
| 10x2x1-1/4                     | 635256  | 133.07   | 635258 | 133.07   | -      | -                          | -      | -        | 635516 | 274.78   | -      | -        | -       | -        |
| 12x1-1/2x1-1/4                 | 635262* | 152.95   | 635264 | 152.95   | -      | -                          | 635518 | 321.11   | -      | -        | -      | -        | -       | -        |
| 12x2x1-1/4                     | 635268  | 208.21   | 635270 | 208.21   | -      | -                          | -      | -        | -      | -        | -      | -        | -       | -        |
| 14x2x1-1/4                     | 635274* | 276.03   | -      | -        | -      | -                          | -      | -        | -      | -        | -      | -        | -       | -        |

\* A36P

## Kinik 32A Open Bond White Aluminum Oxide Grinding Wheels



| Dimensions                    | Specifications |          |        |          |
|-------------------------------|----------------|----------|--------|----------|
|                               | 32A46J         | Price \$ | 32A60J | Price \$ |
| 7x1/2x1-1/4                   | 635420         | 55.05    | 635422 | 55.05    |
| 8x1/2x1-1/4                   | 635424         | 68.33    | -      | -        |
| 8x3/4x1-1/4                   | 635428         | 86.45    | 635430 | 86.45    |
| 8x1x1-1/4                     | 635432         | 104.46   | 635434 | 99.76    |
| 10x1x3                        | 635436         | 153.02   | 635438 | 153.02   |
| 12x1x3                        | 635440         | 227.97   | 635442 | 223.51   |
| 14x1x5                        | 635443         | 309.33   | 635444 | 299.38   |
| 14x1-1/2x5                    | 635445         | 392.21   | 635446 | 392.21   |
| <b>RECESSED 2A BOTH SIDES</b> |                |          |        |          |
| 12x2x3                        | -              | -        | -      | -        |
| 2A 6x3/8                      | 635447         | 316.75   | 635448 | 316.75   |
| 12x2x5                        | -              | -        | -      | -        |
| 2A 7-1/4x1/2                  | 635449         | 316.75   | 635439 | 322.50   |
| 14x2x5                        | -              | -        | -      | -        |
| 2A 8x3/8                      | 635441         | 529.43   | 635437 | 491.88   |

## Nested Wheel Bushings



- Used to reduce the size of grinding wheel bores
- Can reduce 1-1/4" down to 1/2"
- 4 bushings with 10 possible combinations



|           | O.D.   | I.D. | Code No. | Price \$ |
|-----------|--------|------|----------|----------|
| Contains: | 1-1/4" | 1"   | 635999   | 2.68     |
|           | 1"     | 3/4" |          |          |
|           | 3/4"   | 5/8" |          |          |
|           | 5/8"   | 1/2" |          |          |

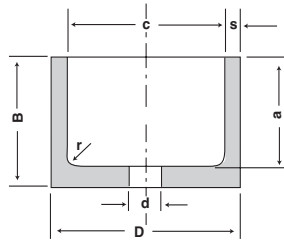
Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

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## Kinik Aluminum Oxide Straight Cup Grinding Wheels



Shape D Straight Cup



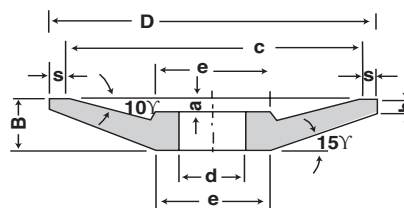
### WA White Aluminum Oxide

| D | B     | d     | a      | c      | r    | s    | WA46J  | Price \$ | WA60J  | Price \$ | WA80J  | Price \$ | WA100J | Price \$ |
|---|-------|-------|--------|--------|------|------|--------|----------|--------|----------|--------|----------|--------|----------|
| 4 | 2     | 1-1/4 | 1-9/16 | 3-1/2  | 3/16 | 1/4  | 635530 | 54.01    | 635532 | 53.23    | 635534 | 53.23    | -      | -        |
| 4 | 2     | 20mm  | 1-9/16 | 3-1/2  | 3/16 | 1/4  | 635538 | 53.23    | 635540 | 53.23    | 635542 | 53.23    | 635544 | 53.23    |
| 5 | 2-1/2 | 1-1/4 | 2      | 4-5/16 | 1/4  | 5/16 | 635546 | 76.06    | 635548 | 76.58    | 635550 | 76.06    | -      | -        |
| 6 | 3-1/8 | 1-1/4 | 2-1/2  | 5-1/8  | 1/4  | 3/8  | 635554 | 136.50   | 635556 | 136.50   | 635558 | 136.50   | -      | -        |

### PA Pink Aluminum Oxide

| D | B     | d     | a      | c      | r    | s    | PA46J  | Price \$ | PA60J  | Price \$ | PA80J  | Price \$ | PA100J | Price \$ |
|---|-------|-------|--------|--------|------|------|--------|----------|--------|----------|--------|----------|--------|----------|
| 4 | 2     | 1-1/4 | 1-9/16 | 3-1/2  | 3/16 | 1/4  | 635900 | 57.76    | 635902 | 57.76    | 635904 | 57.76    | 635906 | 57.76    |
| 4 | 2     | 20mm  | 1-9/16 | 3-1/2  | 3/16 | 1/4  | 635908 | 57.76    | 635910 | 55.13    | 635912 | 55.13    | -      | -        |
| 5 | 2-1/2 | 1-1/4 | 2      | 4-5/16 | 1/4  | 5/16 | 635916 | 79.90    | -      | -        | -      | -        | -      | -        |
| 6 | 3-1/8 | 1-1/4 | 2-1/2  | 5-1/8  | 1/4  | 3/8  | -      | -        | 635926 | 145.86   | -      | -        | -      | -        |

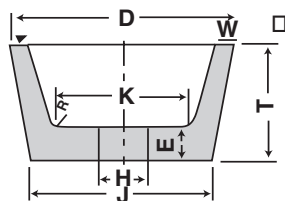
## Kinik Aluminum Oxide Shape B Saucer Type Grinding Wheels



### WA WHITE ALUMINUM OXIDE

| D | B     | d     | a    | b   | c     | e     | s    | WA46J  | Price \$ | WA60J  | Price \$ |
|---|-------|-------|------|-----|-------|-------|------|--------|----------|--------|----------|
| 6 | 5/8   | 1-1/4 | 1/4  | 1/8 | 5-3/8 | 2     | 5/16 | 635970 | 76.68    | 635972 | 76.68    |
| 7 | 11/16 | 1-1/4 | 5/16 | 1/8 | 6-1/4 | 2-3/8 | 5/16 | 635978 | 78.62    | 635980 | 91.93    |

## Kinik Aluminum Oxide Shape E Flaring Cup Grinding Wheels



### WA White Aluminum Oxide

| D | T | H     | W     | E   | J     | K     | WA46J  | Price \$ | WA60J  | Price \$ | WA80J  | Price \$ | WA100J | Price \$ |
|---|---|-------|-------|-----|-------|-------|--------|----------|--------|----------|--------|----------|--------|----------|
| 4 | 2 | 1-1/4 | 6 mm  | 1/2 | 3     | 2-1/2 | 635562 | 63.55    | 635564 | 60.03    | 635566 | 63.55    | 635568 | 63.55    |
| 5 | 2 | 1-1/4 | 8 mm  | 1/2 | 4     | 3     | 635570 | 79.90    | 635572 | 79.90    | 635574 | 79.90    | -      | -        |
| 6 | 2 | 1-1/4 | 10 mm | 1/2 | 4-1/2 | 4     | 635578 | 89.83    | 635580 | 89.83    | -      | -        | -      | -        |

### PA Pink Aluminum Oxide

| D | T | H     | W    | E   | J | K     | PA46J  | Price \$ | PA60J  | Price \$ |
|---|---|-------|------|-----|---|-------|--------|----------|--------|----------|
| 4 | 2 | 1-1/4 | 6 mm | 1/2 | 3 | 2-1/2 | 635940 | 63.19    | -      | -        |
| 5 | 2 | 1-1/4 | 8 mm | 1/2 | 4 | 3     | 635948 | 86.53    | 635950 | 86.53    |

## Shop Rolls



| Size       | Grit | Code No. | Price \$ |
|------------|------|----------|----------|
| 1 x 50     | 40   | 520002   | 62.14    |
| 1 x 50     | 50   | 520004   | 58.52    |
| 1 x 50     | 60   | 520006   | 56.40    |
| 1 x 50     | 80   | 520008   | 46.63    |
| 1 x 50     | 100  | 520010   | 45.30    |
| 1 x 50     | 120  | 520012   | 45.30    |
| 1 x 50     | 180  | 520014   | 45.30    |
| 1 x 50     | 220  | 520016   | 45.30    |
| 1 x 50     | 320  | 520018   | 45.30    |
| 1-1/2 x 50 | 40   | 520020   | 87.51    |
| 1-1/2 x 50 | 50   | 520022   | 82.41    |
| 1-1/2 x 50 | 60   | 520024   | 77.56    |
| 1-1/2 x 50 | 80   | 520026   | 65.66    |
| 1-1/2 x 50 | 100  | 520028   | 62.81    |
| 1-1/2 x 50 | 120  | 520030   | 62.81    |
| 1-1/2 x 50 | 180  | 520040   | 62.81    |
| 1-1/2 x 50 | 220  | 520042   | 62.81    |
| 1-1/2 x 50 | 320  | 520044   | 62.81    |
| 2 x 50     | 40   | 520046   | 112.28   |
| 2 x 50     | 50   | 520048   | 105.95   |
| 2 x 50     | 60   | 520050   | 99.98    |
| 2 x 50     | 80   | 520052   | 84.07    |
| 2 x 50     | 100  | 520054   | 79.72    |
| 2 x 50     | 120  | 520056   | 79.72    |
| 2 x 50     | 180  | 520058   | 79.72    |
| 2 x 50     | 220  | 520060   | 79.72    |
| 2 x 50     | 320  | 520062   | 79.72    |

## Abrasive Cloths, Antistatic CS 311 Y ACT

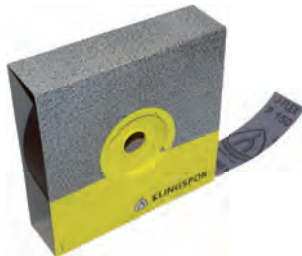
- Bonding agent: Resin
- Aluminium Oxide
- Coating: Open
- Backing: "Y" - Polyester
- Applications: Drum Sander, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 3" x 50m       | 80   | 920016   | 277.76   |
| 3" x 50m       | 100  | 920017   | 264.45   |

## Abrasive Cloths, Brown KL 361 JF

- Bonding agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "JF" - cotton cloth, light, highly flexible
- Applications: Stainless Steel, Steel, Metal, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 1" x 50m       | 80   | 920030   | 66.40    |
| 1" x 50m       | 320  | 920037   | 64.00    |
| 2" x 50m       | 120  | 920058   | 133.76   |
| 2" x 50m       | 400  | 920065   | 122.72   |

## Abrasive Cloths, Brown KL 385 JF

- Bonding agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "JF" - cotton cloth, light, highly flexible
- Applications: Metal, Non-Ferrous Metals, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 1" x 50m       | 60   | 920067   | 52.64    |
| 1" x 50m       | 80   | 920068   | 49.44    |
| 2" x 50m       | 60   | 920089   | 109.92   |
| 2" x 50m       | 240  | 920096   | 90.08    |
| 2" x 50m       | 320  | 920097   | 90.08    |

## Abrasive Fiber Discs CS 565

- Bonding agent: Resin
- Alumina Zirconia
- Coating: Close
- Applications: Metal, Stainless Steel
- Hole Pattern: 30 = Star shaped hole



| Diameter Hole | Grit | Code No. | Price \$ |
|---------------|------|----------|----------|
| 5" x 7/8"     | 36   | 921103   | 2.22     |
| 5" x 7/8"     | 50   | 921104   | 1.94     |
| 5" x 7/8"     | 60   | 921105   | 1.76     |
| 5" x 7/8"     | 80   | 921106   | 1.71     |

## Abrasive Fiber Discs CS 561

- Bonding agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal
- Hole Pattern: 30 = Star shaped hole



| Diameter Hole | Grit | Code No. | Price \$ |
|---------------|------|----------|----------|
| 5" x 7/8"     | 36   | 921080   | 1.68     |
| 5" x 7/8"     | 40   | 921081   | 1.49     |
| 5" x 7/8"     | 60   | 921083   | 1.30     |
| 5" x 7/8"     | 120  | 921086   | 1.25     |
| 7" x 7/8"     | 24   | 921089   | 3.28     |
| 7" x 7/8"     | 80   | 921093   | 2.27     |

## Abrasive Fiber Discs, Multibond CS 570

- Bonding agent: Resin
- Alumina Zirconia
- Coating: Close
- Applications: Stainless Steel
- Hole Pattern: 30 = Star shaped hole



| Diameter Hole | Grit | Code No. | Price \$ |
|---------------|------|----------|----------|
| 5" x 7/8"     | 36   | 921120   | 2.40     |
| 5" x 7/8"     | 50   | 921121   | 2.03     |
| 5" x 7/8"     | 60   | 921122   | 1.84     |
| 5" x 7/8"     | 80   | 921123   | 1.79     |
| 5" x 7/8"     | 120  | 921125   | 1.79     |

## Back-Up Pad ST 358 C

Back-up pads for fibre abrasive discs and paper abrasive discs.



| Dimensions   | Density | Max. Operating Speed | Maximum RPM | Code No. | Price \$ |
|--------------|---------|----------------------|-------------|----------|----------|
| 5" x 5/8"-11 | Med.    | 80 m/s               | 12,000      | 921145   | 24.08    |



## Pressure Sensitive Adhesive Discs

- No holes
- Fast, convenient mounting
- Used for grinding, dry sanding and finishing



| Size | Grit | Code No. | Price \$ |
|------|------|----------|----------|
| 6    | 120  | 520362   | 2.42     |
| 9    | 180  | 520402   | 5.47     |
| 12   | 60   | 520428   | 10.34    |
| 12   | 80   | 520430   | 10.08    |

## 9 X 11 Paper & Cloth Sheets

For surface preparation or finishing on wet or dry surfaces.



|                                | Grit  | Code No. | Price \$ |
|--------------------------------|-------|----------|----------|
| <b>Emery Cloth</b>             |       |          |          |
|                                | J050  | 520604   | 2.72     |
|                                | J120  | 520608   | 2.35     |
| <b>SIC Latex Wet/Dry Paper</b> |       |          |          |
|                                | A600  | 520568   | 1.33     |
|                                | B1200 | 520570   | 1.49     |

## Abrasive Paper, Waterproof PS 11 A

- Bonding Agent: Resin
- SiC
- Coating: Close
- Backing: "A" - 95 g/m<sup>2</sup>
- Applications: Paint / Varnish / Filler



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 9" x 11"       | 240  | 920417   | 1.65     |
| 9" x 11"       | 320  | 920419   | 1.65     |
| 9" x 11"       | 400  | 920421   | 1.65     |
| 9" x 11"       | 1000 | 920425   | 1.74     |

## Abrasive Cloths, Brown KL 361 JF

- Bonding Agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "JF"- Cotton Cloth, Light, Highly Flexible
- Applications: Steel, Metal, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 9" x 11"       | 120  | 920488   | 3.49     |
| 9" x 11"       | 600  | 920497   | 3.52     |

## Abrasive Cloths, Brown KL 385 JF

- Bonding Agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "JF"- Cotton Cloth, Light, Highly Flexible
- Applications: Metal, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 9" x 11"       | 80   | 920502   | 2.69     |
| 9" x 11"       | 150  | 920505   | 2.58     |
| 9" x 11"       | 180  | 920506   | 2.58     |
| 9" x 11"       | 240  | 920508   | 2.59     |

## Non-Woven Web Hand Pads NPA 400

- Bonding Agent: Resin
- Applications Al Oxide: Stainless Steel, Metal/Wood
- Application SiC: Paint/Varnish, Plastic, Metal/Wood



| Width Length | Grade           | Colour   | Grain           | Code No. | Price \$ |
|--------------|-----------------|----------|-----------------|----------|----------|
| 6" x 9"      | General Purpose | Green    | Aluminium Oxide | 920519   | 1.86     |
| 6" x 9"      | Very Fine       | Maroon   | Aluminium Oxide | 920520   | 1.95     |
| 6" x 9"      | Ultra Fine      | Gray     | Silicon Carbide | 920521   | 2.46     |
| 6" x 9"      | Coarse          | Brown    | Aluminium Oxide | 920522   | 4.49     |
| 6" x 9"      | Medium          | Green HD | Aluminium Oxide | 920523   | 1.92     |

## Aluminum Oxide Resin Cloth Belts

- Grind and finish surfaces
- Applications: Wood and Metal



| Size   | Grit | Code No. | Price \$ |
|--------|------|----------|----------|
| 4 x 36 | 36   | 520298   | 7.84     |

## Abrasive Cloths LS 309 XH

- Bonding Agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "X" - Cotton Cloth, Heavy
- Applications: Metal, Non-Ferrous Metals, Wood



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 3" x 24        | 80   | 920133   | 3.38     |
| 3" x 24        | 120  | 920135   | 3.31     |

## Abrasive Cloths CS 310 X

- Bonding Agent: Resin
- Aluminium Oxide
- Coating: Close
- Backing: "X" - Cotton Cloth, Heavy
- Applications: Metal



| Width x Length | Grit | Code No. | Price \$ |
|----------------|------|----------|----------|
| 2" x 48        | 220  | 920186   | 6.26     |
| 6" x 48        | 40   | 920216   | 18.90    |
| 6" X 48        | 220  | 920223   | 15.47    |

## Flap Discs — Type 27

- Excellent for curved surfaces
- No backing pad required
- Offers full advantage of the flexible grinding wheel and sanding disc paper



| Dimensions (in.) | Grit | Code No. | Price \$ |
|------------------|------|----------|----------|
| 4-1/2 x 7/8      | 60   | 635656   | 19.10    |
| 4-1/2 x 7/8      | 80   | 635657   | 19.10    |
| 5 x 7/8          | 60   | 635658   | 22.86    |
| 5 x 7/8          | 80   | 635659   | 22.86    |
| 7 x 7/8          | 60   | 635661   | 38.66    |
| 7 x 7/8          | 80   | 635663   | 38.66    |

## Abrasive Mop Discs SMT 624

- Design: Convex 12°
- Quality Class: Supra
- Alumina Zirconia
- Backing plate: Glass Fibre
- Application: Stainless Steel, Steel



| Diameter Bore | Grit | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|---------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 7/8" | 80   | 80 m/s               | 13,300   | 921161   | 11.81    |
| 4-1/2" x 7/8" | 120  | 80 m/s               | 13,300   | 921162   | 11.81    |
| 5" x 7/8"     | 60   | 80 m/s               | 12,200   | 921166   | 13.94    |

## Grinding Disc & Cut-Off Wheel TS 30 AP Special

- Bond: Hard
- Quality Class: Special
- Application: Steel, Stainless Steel



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921275   | 6.43     |

## Cut-Off Wheels For Steel

# TAILIN



| Dimensions      | Specification | RPM  | Code No. | Price \$ |
|-----------------|---------------|------|----------|----------|
| 12 x 1/8 x 1    | A30RBF2G      | 5000 | 635694   | 17.81    |
| 12 x 1/8 x 1    | A30RBF1G      | 4500 | 635696   | 15.05    |
| 12 x 1/8 x 1    | A30RBF2G      | 6300 | 635697   | 17.81    |
| 12 x 1/8 x 20mm | A30RBF2.5G    | 6300 | 635700   | 17.81    |
| 14 x 1/8 x 1    | A30RBF2G      | 4300 | 635702   | 23.85    |
| 14 x 1/8 x 1    | A30RBF1G      | 3900 | 635704   | 17.81    |
| 14 x 7/64 x 1   | A30RBF2G      | 5400 | 635705   | 23.85    |
| 16 x 1/8 x 1    | A24SBF2G      | 3800 | 635708   | 30.75    |

## Reinforced Depressed Centre Discs For Steel

# TAILIN

- A. (Type 27)
- Approved by CNS standard No. 2551
- German DSA standard No. 2335



| Dimensions        | Specification | RPM   | Code No. | Price \$ |
|-------------------|---------------|-------|----------|----------|
| 4 x 1/8 x 5/8     | A24R2G        | 15300 | 635600   | 3.37     |
| 4 x 1/8 x 5/8     | A24S2G        | 15300 | 635602   | 3.37     |
| 4 x 1/4 x 5/8     | A24R2G        | 15300 | 635604   | 3.80     |
| 4 x 1/4 x 5/8     | A24S2G        | 15300 | 635606   | 3.80     |
| 4-1/2 x 1/8 x 7/8 | A24R2G        | 13300 | 635608   | 4.95     |
| 4-1/2 x 1/8 x 7/8 | A24S2G        | 13300 | 635610   | 4.95     |
| 4-1/2 x 1/4 x 7/8 | A24R2G        | 13300 | 635616   | 5.30     |
| 4-1/2 x 1/4 x 7/8 | A24S2G        | 13300 | 635612   | 5.30     |
| 5 x 1/8 x 7/8     | A24R2G        | 12200 | 635618   | 5.59     |
| 5 x 1/4 x 7/8     | A24R2G        | 12200 | 635620   | 6.58     |
| 5 x 1/4 x 7/8     | A24S2G        | 12200 | 635621   | 6.58     |
| 7 x 1/8 x 7/8     | A24R2G        | 8500  | 635622   | 7.75     |
| 7 x 1/8 x 7/8     | A24S2G        | 8500  | 635624   | 7.75     |
| 7 x 1/4 x 7/8     | A24R2.5G      | 8500  | 635628   | 10.47    |
| 7 x 1/4 x 7/8     | A24S2.5G      | 8500  | 635629   | 10.47    |
| 9 x 1/8 x 7/8     | A24R2G        | 6500  | 635634   | 10.84    |
| 9 x 1/4 x 7/8     | A24R2.5G      | 6500  | 635640   | 14.87    |
| 9 x 1/4 x 7/8     | A24S2.5G      | 6500  | 635642   | 14.87    |

## Cut-Off Wheels INOX A 46 TZ Special

- Bond: Hard
- Quality Class: Special
- Application: Stainless Steel



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921305   | 4.74     |
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921306   | 4.74     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921307   | 5.65     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921308   | 5.65     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921311   | 8.97     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921312   | 8.97     |

## Grinding Discs A 24 R Supra

- Bond: Medium
- Quality Class: Supra
- Application: Steel



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921247   | 5.92     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921248   | 6.80     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921250   | 10.63    |

## Grinding Discs A 46 N Supra

- Bond: Soft
- Quality Class: Supra
- Application: Aluminum



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921255   | 6.60     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921256   | 7.59     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921257   | 11.91    |

## Grinding Discs A 30 M Special

- Bond: Medium
- Quality Class: Special
- Application: Steel, Stainless Steel



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921271   | 6.60     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921272   | 7.59     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921274   | 11.91    |

## Grinding Discs A 24 N Supra

- Bond: Soft
- Quality Class: Supra
- Application: Stainless Steel



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 4-1/2" x 1/4" x 7/8"  |      | 80 m/s               | 13,300   | 921252   | 6.12     |
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921253   | 7.02     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921254   | 10.79    |

## Grinding Discs A 24 TX Special

- Bond: Hard
- Quality Class: Special
- Application: Castings



| Diameter x Width Bore | Form | Max. Operating Speed | Max. RPM | Code No. | Price \$ |
|-----------------------|------|----------------------|----------|----------|----------|
| 5" x 1/4" x 7/8"      |      | 80 m/s               | 12,200   | 921266   | 8.67     |
| 7" x 1/4" x 7/8"      |      | 80 m/s               | 8,500    | 921268   | 13.59    |

## Hand Block SFK 655

- Bond Agent: Plastic
- SiC
- Application: Paint/Varnish, Glass/Stone, Wood, Plastic, Leather, Metal



| Width x Length Height | Grit | Code No. | Price \$ |
|-----------------------|------|----------|----------|
| 3" x 2" x 3/4"        | 240  | 921345   | 10.91    |

## Small Abrasive Mops KM 613

- Bonding Agent: Resin
- Aluminum Oxide
- Applications: Metal



| Diameter Height x Shaft | Grit | Maximum RPM | Code No. | Price \$ |
|-------------------------|------|-------------|----------|----------|
| 5/8" x 5/8" x 1/8"      | 80   | 37,000      | 920944   | 9.64     |
| 5/8" x 5/8" x 1/8"      | 120  | 37,000      | 920945   | 9.71     |
| 3/4" x 3/4" x 1/4"      | 80   | 35,000      | 920949   | 10.40    |
| 1" x 1" x 1/4"          | 60   | 30,000      | 920961   | 7.49     |
| 1" x 1" x 1/4"          | 80   | 30,000      | 920962   | 7.49     |
| 1" x 1" x 1/4"          | 120  | 30,000      | 920964   | 7.51     |
| 1" x 1" x 1/4"          | 180  | 30,000      | 920965   | 7.51     |
| 1" x 1" x 1/4"          | 240  | 30,000      | 920966   | 7.57     |
| 1" x 1" x 1/4"          | 320  | 30,000      | 920967   | 7.57     |
| 1-1/2" x 1" x 1/4"      | 60   | 25,000      | 920978   | 8.15     |
| 1-1/2" x 1-1/2" x 1/4"  | 80   | 25,000      | 920985   | 9.37     |
| 2" x 1" x 1/4"          | 40   | 25,000      | 921002   | 9.41     |
| 2" x 1" x 1/4"          | 60   | 25,000      | 921003   | 10.36    |
| 2" x 1" x 1/4"          | 80   | 25,000      | 921004   | 9.41     |
| 2" x 1" x 1/4"          | 120  | 25,000      | 921006   | 9.45     |
| 2" x 1" x 1/4"          | 240  | 25,000      | 921008   | 9.94     |
| 2" x 2" x 1/4"          | 40   | 25,000      | 921014   | 12.23    |
| 2" x 2" x 1/4"          | 60   | 25,000      | 921015   | 12.23    |
| 2" x 2" x 1/4"          | 80   | 25,000      | 921016   | 12.23    |
| 2" x 2" x 1/4"          | 120  | 25,000      | 921017   | 13.56    |
| 3" x 1" x 1/4"          | 40   | 9,500       | 921035   | 14.27    |
| 3" x 1" x 1/4"          | 60   | 9,500       | 921036   | 14.27    |
| 3" x 1" x 1/4"          | 80   | 9,500       | 921037   | 14.27    |
| 3" x 1" x 1/4"          | 120  | 9,500       | 921038   | 14.37    |

## Abrasive Mops NCS 600

- Bonding Agent: Resin
- Aluminum Oxide
- Applications: Metal, Stainless Steel



| Diameter Height x Shaft | Grit | Grade  | Maximum RPM | Code No. | Price \$ |
|-------------------------|------|--------|-------------|----------|----------|
| 1-1/2" x 1" x 1/4"      | 100  | Medium | 17,000      | 921047   | 12.75    |
| 2" x 1" x 1/4"          | 150  | Medium | 13,700      | 921050   | 15.93    |

## Small Finishing Mops NFS 600

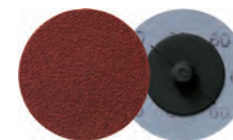
- Bonding Agent: Resin
- Aluminum Oxide
- Applications: Metal, Stainless Steel



| Diameter Height x Shaft | Grade     | Maximum RPM | Code No. | Price \$ |
|-------------------------|-----------|-------------|----------|----------|
| 1-1/2" x 1" x 1/4"      | Fine      | 17,100      | 921054   | 12.62    |
| 1-1/2" x 1" x 1/4"      | Very Fine | 17,100      | 921055   | 12.62    |

## Quick Change Discs QRC 412

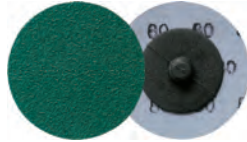
- Bonding Agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal, Non-Ferrous Metals



| Diameter | Grit | Code No. | Price \$ |
|----------|------|----------|----------|
| 2"       | 36   | 920860   | 1.54     |
| 2"       | 50   | 920861   | 1.46     |
| 2"       | 60   | 920862   | 1.44     |
| 2"       | 80   | 920863   | 1.38     |
| 2"       | 120  | 920865   | 1.36     |
| 3"       | 36   | 920866   | 2.30     |
| 3"       | 50   | 920868   | 2.06     |

## Quick Change Disc, Multibond QRC 409

- Bonding Agent: Resin
- Alumina Zirconia
- Coating: Close
- Applications: Metal, Stainless Steel



| Diameter | Grit | Code No. | Price \$ |
|----------|------|----------|----------|
| 2"       | 80   | 920879   | 1.66     |

## Back-Up Pads QRC 555

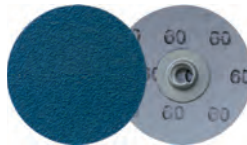
- Shorter set-up times
- More effective abrasive performance
- Wide range of applications
- Uniform sanding results



| Shank Size | Density | Maximum RPM | Code No. | Price \$ |
|------------|---------|-------------|----------|----------|
| 2" x 1/4"  | Medium  | 30,000      | 920886   | 24.40    |
| 3" x 1/4"  | Medium  | 30,000      | 920887   | 30.83    |

## Quick Change Discs QMC 411

- Bonding Agent: Resin
- Alumina Zirconia
- Coating: Close
- Applications: Metal, Stainless Steel



| Diameter | Grit | Code No. | Price \$ |
|----------|------|----------|----------|
| 2"       | 36   | 920903   | 1.63     |
| 2"       | 80   | 920905   | 1.47     |
| 3"       | 36   | 920906   | 2.46     |
| 3"       | 80   | 920908   | 2.22     |

## Back-Up Pads QMC 555

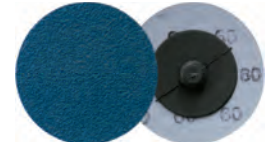
- For use on non-ferrous metal, stainless steel, high-alloy steel
- More effective abrasive performance
- Wide range of applications



| Shank Size | Density | Maximum RPM | Code No. | Price \$ |
|------------|---------|-------------|----------|----------|
| 2" x 1/4"  | Medium  | 30,000      | 920925   | 17.63    |
| 3" x 1/4"  | Medium  | 30,000      | 920926   | 20.84    |

## Quick Change Discs QRC 411

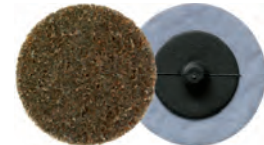
- Bonding Agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal, Non-Ferrous Metals



| Diameter | Grit | Code No. | Price \$ |
|----------|------|----------|----------|
| 2"       | 36   | 920870   | 1.63     |
| 2"       | 60   | 920871   | 1.54     |
| 2"       | 80   | 920872   | 1.47     |
| 3"       | 36   | 920873   | 2.46     |
| 3"       | 60   | 920874   | 2.30     |
| 3"       | 80   | 920875   | 2.22     |

## Quick Change Discs QRC 800

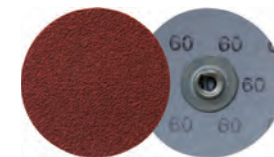
- Bonding Agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal, Stainless Steel



| Diameter | Grade     | Code No. | Price \$ |
|----------|-----------|----------|----------|
| 2"       | Coarse    | 920880   | 2.99     |
| 2"       | Medium    | 920881   | 2.85     |
| 2"       | Very Fine | 920882   | 2.62     |
| 3"       | Coarse    | 920883   | 4.50     |
| 3"       | Medium    | 920884   | 4.27     |
| 3"       | Very Fine | 920885   | 3.94     |

## Quick Change Discs QMC 412

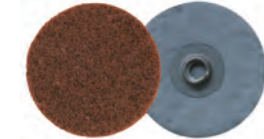
- Bonding Agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal, Non-Ferrous Metals



| Diameter | Grit | Code No. | Price \$ |
|----------|------|----------|----------|
| 2"       | 36   | 920892   | 1.54     |
| 2"       | 60   | 920894   | 1.44     |
| 2"       | 120  | 920897   | 1.50     |
| 3"       | 50   | 920899   | 2.18     |
| 3"       | 80   | 920901   | 2.06     |
| 3"       | 120  | 920902   | 2.05     |

## Quick Change Discs QMC 800

- Bonding Agent: Resin
- Aluminum Oxide
- Coating: Close
- Applications: Metal, Stainless Steel



| Diameter | Grade     | Code No. | Price \$ |
|----------|-----------|----------|----------|
| 2"       | Coarse    | 920918   | 2.99     |
| 2"       | Medium    | 920919   | 3.14     |
| 2"       | Very Fine | 920920   | 2.62     |
| 3"       | Coarse    | 920921   | 4.50     |
| 3"       | Medium    | 920922   | 4.27     |
| 3"       | Very Fine | 920923   | 3.94     |

## STANDARD DUTY PRECISION AIR TOOLS

### 1/4" Mini Die Grinder — TP-1006



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Front
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 4-3/4                | 0.68            | 174012   | 79.97    |

### 1/4" Mini Die Grinder — TP-1008



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 0.79            | 174010   | 79.69    |

### 1/4" Medium Die Grinder — TP-1001



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 14 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 22,000 | 1/4"(6mm)   | 90                 | 6-7/8                | 1.36            | 174008   | 80.71    |

### 1" Extended Die Grinder — TP-1010



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 7-1/2                | 1.25            | 174018   | 192.91   |

## STANDARD DUTY PRECISION AIR TOOLS

### 3" Extended Die Grinder — TP-1011



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 9-1/4                | 1.45            | 174020   | 223.61   |

### 5" Extended Die Grinder — TP-1012



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 11-1/4               | 1.45            | 174022   | 253.59   |

### 1/4" Mini Angle Die Grinder — TP-1007



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Front
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 20,000 | 1/4"(6mm)   | 90                 | 4-7/8                | 0.99            | 174016   | 160.79   |

### 1/4" Right Angle Die Grinder — TP-1014



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 20,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 1.10            | 174014   | 160.86   |

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## HEAVY DUTY PRECISION AIR TOOLS

### 1/4" H.D. Die Grinder — TP-1101



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: TP1101 - Rear
- Exhaust System: TP1101F - Front
- Aluminum Alloy Housing



| Model   | Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|---------|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| TP-1101 | 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 0.81            | 174024   | 137.23   |

### 1" Extended H.D. Die Grinder — TP-1102



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 7-1/2                | 1.07            | 174028   | 240.83   |

### 3" Extended H.D. Die Grinder — TP-1103



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 9-1/4                | 1.21            | 174030   | 271.15   |

### 5" Extended H.D. Die Grinder — TP-1104



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 25,000 | 1/4"(6mm)   | 90                 | 11-1/4               | 1.45            | 174032   | 301.52   |

### 1/4" Right Angle H.D. Die Grinder — TP-1106 / TP-1106F



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: TP1106 - Rear
- Exhaust System: TP1106F - Front
- Aluminum Alloy Housing



| Model   | Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|---------|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| TP-1106 | 0.3         | 20,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 1.07            | 174034   | 225.77   |

## PROFESSIONAL DUTY PRECISION AIR TOOLS

### 1/4" Die Grinder — TP-1101H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 28,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 0.81            | 174038   | 161.86   |

### 1" Extended Die Grinder — TP-1102H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 28,000 | 1/4"(6mm)   | 90                 | 7-1/2                | 1.07            | 174040   | 268.31   |

### 3" Extended Die Grinder — TP-1103H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 28,000 | 1/4"(6mm)   | 90                 | 9-1/4                | 1.21            | 174042   | 298.56   |

### 5" Extended Die Grinder — TP-1104H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 28,000 | 1/4"(6mm)   | 90                 | 11-1/4               | 1.45            | 174044   | 335.01   |

### 1/4" Right Angle Die Grinder — TP-1106H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 15,000 | 1/4"(6mm)   | 90                 | 6-5/16               | 1.07            | 174046   | 255.97   |

## 1/4" Die Grinder — TP-1109H



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Front
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.3         | 20,000 | 1/4"(6mm)   | 90                 | 7-1/2                | 1.32            | 174048   | 220.86   |

## 1/4" Die Grinder — TP-6001



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 15 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.6         | 20,000 | 1/4"(6mm)   | 90                 | 6-11/16              | 1.43            | 174050   | 216.31   |

## 1/4" Die Grinder — TP-9001



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.9         | 18,000 | 1/4"(6mm)   | 90                 | 7-5/16               | 1.56            | 174052   | 259.26   |

## Angle Die Grinder — TP-6059



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 15 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM    | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|--------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.6         | 10,000 | 1/4"(6mm)   | 90                 | 7-1/2                | 2.20            | 174054   | 382.62   |

## 105° Die Grinder — TP-9059



- Air Inlet (N.P.T.): 1/4"
- Air Consumption (Loading): 13 cfm
- Exhaust System: Rear
- Aluminum Alloy Housing



| Horse Power | RPM   | Collet Size | Air Pressure (psi) | Overall Length (in.) | Net Weight (lb) | Code No. | Price \$ |
|-------------|-------|-------------|--------------------|----------------------|-----------------|----------|----------|
| 0.9         | 9,000 | 1/4"(6mm)   | 90                 | 9-1/4                | 2.28            | 174056   | 387.56   |

## 1/4" Die Grinder Kit (with Throttle Lever)



### Contains:

- 1pc TP-1008 Grinder
- 1pc 1/8" (3 mm) collet
- 1pc 1/4" (6 mm) collet
- 2pcs spanners
- 5pcs 1/4" (6 mm) shank grinding
- 5pcs 1/8" (3 mm) shank grinding



| Description                   | Code No. | Price \$ |
|-------------------------------|----------|----------|
| 1/4" straight die grinder kit | 174004   | 117.44   |

## 1/4" 90° Die Grinder Kit (with Throttle Lever)



### Contains:

- 1pc TP-1014 Grinder
- 1pc 1/8" (3 mm) collet
- 1pc 1/4" (6 mm) collet
- 2pcs spanners
- 5pcs 1/4" (6 mm) shank grinding
- 5pcs 1/8" (3 mm) shank grinding



| Description              | Code No. | Price \$ |
|--------------------------|----------|----------|
| 1/4" 90° die grinder kit | 174006   | 197.59   |

## Air Micro Die Grinder



### Contains:

- 1pc TP-501-1 Grinder
- 1pc 3 mm collet
- 10pcs 1/8" (3 mm) grinding stones
- 2pcs spanners
- 1pc blow case



| Description          | Code No. | Price \$ |
|----------------------|----------|----------|
| 1/8" die grinder kit | 174002   | 280.23   |

## Air Belt Sanders



- For sanding both curved and flat surfaces
- For removing spot welding, semi-automatic welds, adhesive, paint, and other coatings



| Model   | Belt Size (mm) | Speed (RPM) | Length (mm) | Weight (kg) | Code No. | Price \$ |
|---------|----------------|-------------|-------------|-------------|----------|----------|
| VAG-310 | 10x330         | 16,000      | 290         | 0.80        | 174160   | 666.43   |
| VAG-320 | 20x520         | 16,000      | 360         | 1.10        | 174162   | 952.12   |

## 10 Piece Needle File Set

- Used for deburring, shaping and finishing
- Used for fine detailing or finishing



| Description              | Code No. | Price \$ |
|--------------------------|----------|----------|
| 10 Piece Needle File Set | 200761   | 11.07    |

## 10 Piece Diamond File Set

- Used for precision filing and shaping
- Electroplated with a diamond abrasive
- Highly durable when used on harder materials
- Excellent for material removal



| Description               | Code No. | Price \$ |
|---------------------------|----------|----------|
| 10 Piece Diamond File Set | 200763   | 17.58    |

## Safety Air Blow Gun

- 4-1/2" stainless steel nozzle
- Conforms to OSHA STD 1-13.1 for safety
- Operating pressure: 50-235 psi
- Vent in tip prevents pressure from exceeding 30 psi if tip becomes blocked
- Impact and weather resistant nylon body
- Operating temperature: -10° to 70° C



| Model        | Noise Level (100psi) | Blowing Force (100psi) | Air Consumption (100psi) | Code No. | Price \$ |
|--------------|----------------------|------------------------|--------------------------|----------|----------|
| ABG/3/1-4F/N | 80db                 | 0.76lb                 | 15.18cfm                 | 231474   | 76.93    |

## Air Blow Gun

- 4" nozzle length
- Recommended air pressure: 75-120 psi
- Max 150 psi
- Air inlet: 1/4"



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| BG2504    | 174068   | 17.43    |

## Air Blow Gun

- 13" bent steel nozzle
- Recommended air pressure: 75-120 psi
- Max 150 psi
- Air inlet: 1/4"



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| BG25013   | 174070   | 24.03    |



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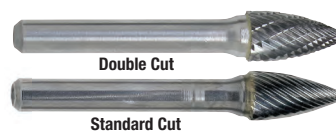


## Cylindrical — Square End — End Not Cut



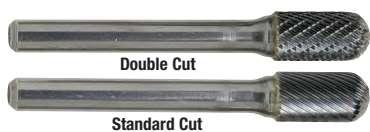
| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SA-41  | 1/16              | 1/4                 | 1/8              | 1-1/2                | 170002              | 10.82    | 170001                | 11.40    |
| SA-42  | 3/32              | 7/16                | 1/8              | 1-1/2                | 170004              | 12.11    | 170003                | 11.40    |
| SA-43  | 1/8               | 9/16                | 1/8              | 1-1/2                | 170006              | 10.82    | 170005                | 10.30    |
| SA-12  | 1/8               | 1/2                 | 1/4              | 2                    | 170008              | 23.05    | 170007                | 21.89    |
| SA-14  | 3/16              | 5/8                 | 1/4              | 2                    | 170010              | 18.53    | 170009                | 21.89    |
| SA-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170014              | 20.46    | 170013                | 19.03    |
| SA-51  | 1/4               | 1/2                 | 1/8              | 2-1/4                | 170016              | 20.72    | 170015                | 19.79    |
| SA-2   | 5/16              | 3/4                 | 1/4              | 2-1/2                | 170020              | 28.43    | 170019                | 27.04    |
| SA-3   | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170022              | 27.39    | 170021                | 29.33    |
| SA-4   | 7/16              | 1                   | 1/4              | 2-3/4                | 170024              | 46.15    | 170023                | 43.79    |
| SA-5   | 1/2               | 1                   | 1/4              | 2-3/4                | 170026              | 43.17    | 170025                | 39.54    |
| SA-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 170028              | 49.44    | 170027                | 57.79    |
| SA-16  | 3/4               | 3/4                 | 1/4              | 2-1/2                | 170030              | 64.70    | 170029                | 69.36    |
| SA-7   | 3/4               | 1                   | 1/4              | 2-3/4                | 170032              | 73.70    | 170031                | 87.08    |
| SA-9   | 1                 | 1                   | 1/4              | 2-3/4                | 170034              | 132.04   | 170033                | 125.75   |

## Tree — Pointed End



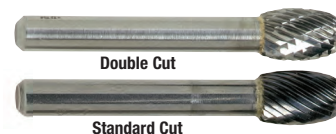
| E.D.P.  | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|---------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SG-41   | 1/8               | 1/4                 | 1/8              | 1-1/2                | 170130              | 11.80    | 170129                | 11.40    |
| SG-53   | 3/16              | 1/2                 | 1/8              | 1-1/2                | 170132              | 99.52    | 170131                | 29.46    |
| SG-44   | 1/8               | 1/2                 | 1/8              | 1-1/2                | 170134              | 12.26    | 170133                | 11.40    |
| SG-1    | 1/4               | 5/8                 | 1/4              | 2                    | 170138              | 24.80    | 170137                | 26.51    |
| SG-51   | 1/4               | 1/2                 | 1/8              | 2                    | 170140              | 20.72    | 170139                | 19.79    |
| SG-2    | 5/16              | 3/4                 | 1/4              | 2-1/2                | 170142              | 37.74    | 170141                | 35.85    |
| SG-3    | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170144              | 31.30    | 170143                | 33.50    |
| SG-13   | 1/2               | 3/4                 | 1/4              | 2-1/2                | 170146              | 39.91    | 170145                | 47.04    |
| SG-5    | 1/2               | 1                   | 1/4              | 2-3/4                | 170148              | 44.22    | 170147                | 47.48    |
| SG-6    | 5/8               | 1                   | 1/4              | 2-3/4                | 170150              | 71.52    | 170149                | 68.00    |
| SG-7    | 3/4               | 1                   | 1/4              | 2-3/4                | 170152              | 94.32    | 170151                | 89.89    |
| SG-15DC | 3/4               | 1-1/2               | 1/4              | 3-1/4                | 170154              | 135.05   | -                     | -        |

## Cylindrical — Radius End



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SC-41  | 3/32              | 7/16                | 1/8              | 1-1/2                | 170050              | 10.82    | 170049                | 11.40    |
| SC-42  | 1/8               | 9/16                | 1/8              | 1-1/2                | 170052              | 10.82    | 170051                | 10.30    |
| SC-12  | 1/8               | 1/2                 | 1/4              | 2                    | 170054              | 22.17    | 170053                | 25.17    |
| SC-14  | 3/16              | 5/8                 | 1/4              | 2                    | 170056              | 27.47    | 170055                | 25.17    |
| SC-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170060              | 22.97    | 170059                | 24.69    |
| SC-51  | 1/4               | 1/2                 | 1/8              | 2-15/16              | 170062              | 20.72    | 170061                | 16.05    |
| SC-2   | 5/16              | 3/4                 | 1/4              | 2-1/2                | 170064              | 31.43    | 170063                | 32.17    |
| SC-3   | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170066              | 30.40    | 170065                | 32.59    |
| SC-4   | 7/16              | 1                   | 1/4              | 2-3/4                | 170068              | 42.57    | 170067                | 47.48    |
| SC-5   | 1/2               | 1                   | 1/4              | 2-3/4                | 170070              | 47.73    | 170069                | 51.21    |
| SC-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 170072              | 60.79    | 170071                | 65.21    |
| SC-7   | 3/4               | 1                   | 1/4              | 2-3/4                | 170074              | 97.81    | 170073                | 93.17    |

## Oval Shape



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SE-41  | 1/8               | 7/32                | 1/8              | 1-1/2                | 170160              | 10.82    | 170159                | 11.40    |
| SE-1   | 1/4               | 3/8                 | 1/4              | 2                    | 170164              | 30.76    | 170163                | 29.33    |
| SE-51  | 1/4               | 3/8                 | 1/8              | 1-3/4                | 170166              | 20.72    | 170165                | 16.05    |
| SE-3   | 3/8               | 5/8                 | 1/4              | 2-3/8                | 170168              | 33.79    | 170167                | 36.11    |
| SE-5   | 1/2               | 7/8                 | 1/4              | 2-5/8                | 170170              | 47.73    | 170169                | 51.21    |
| SE-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 170172              | 67.31    | 170171                | 72.65    |
| SE-7   | 3/4               | 1                   | 1/4              | 2-3/4                | 170174              | 97.81    | 170173                | 93.17    |

## Ball Shape



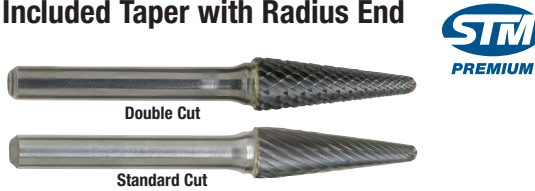
| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SD-41  | 3/32              | -                   | 1/8              | 1-1/2                | 170200              | 10.82    | 170199                | 11.40    |
| SD-42  | 1/8               | -                   | 1/8              | 1-1/2                | 170202              | 10.82    | 170201                | 10.30    |
| SD-12  | 1/8               | -                   | 1/4              | 2                    | 170204              | 26.08    | 170203                | 24.69    |
| SD-14  | 3/16              | -                   | 1/4              | 2                    | 170206              | 26.08    | 170205                | 24.69    |
| SD-53  | 3/16              | -                   | 1/8              | 2                    | 170208              | 19.97    | 170207                | 32.49    |
| SD-1   | 1/4               | -                   | 1/4              | 2                    | 170210              | 22.17    | 170209                | 23.75    |
| SD-51  | 1/4               | -                   | 1/8              | 2                    | 170212              | 18.53    | 170211                | 17.87    |
| SD-2   | 5/16              | -                   | 1/4              | 2-1/16               | 170214              | 27.04    | 170213                | 25.63    |
| SD-3   | 3/8               | -                   | 1/4              | 2-1/8                | 170216              | 24.65    | 170215                | 25.31    |
| SD-5   | 1/2               | -                   | 1/4              | 2-1/4                | 170218              | 34.97    | 170217                | 37.28    |
| SD-6   | 5/8               | -                   | 1/4              | 2-3/8                | 170220              | 43.57    | 170219                | 46.59    |
| SD-7   | 3/4               | -                   | 1/4              | 2-1/2                | 170222              | 53.88    | 170221                | 63.35    |
| SD-9   | 1                 | -                   | 1/4              | 2-3/4                | 170224              | 109.44   | 170223                | 104.33   |

## Tree — Radius End



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SF-42  | 1/8               | 1/2                 | 1/8              | 1-1/2                | 170100              | 10.82    | 170099                | 9.26     |
| SF-41  | 1/8               | 1/4                 | 1/8              | 1-1/2                | 170102              | 12.10    | -                     | -        |
| SF-12  | 1/8               | 1/2                 | 1/4              | 2                    | 170104              | 27.96    | 170103                | 26.51    |
| SF-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170108              | 24.80    | 170107                | 26.51    |
| SF-51  | 1/4               | 1/2                 | 1/8              | 2                    | 170110              | 18.53    | 170109                | 19.79    |
| SF-3   | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170112              | 31.30    | 170111                | 27.13    |
| SF-4   | 7/16              | 1                   | 1/4              | 2-3/4                | 170114              | 45.88    | 170113                | 43.79    |
| SF-5   | 1/2               | 1                   | 1/4              | 2-3/4                | 170116              | 44.22    | 170115                | 49.32    |
| SF-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 170118              | 71.52    | 170117                | 68.00    |
| SF-7   | 3/4               | 1                   | 1/4              | 2-3/4                | 170120              | 94.32    | 170119                | 89.89    |
| SF-14  | 3/4               | 1-1/4               | 1/4              | 3                    | 170122              | 98.27    | 170121                | 93.60    |
| SF-15  | 3/4               | 1-1/2               | 1/4              | 3-1/4                | 170124              | 136.94   | 170123                | 130.39   |

## Taper 14° Included Taper with Radius End



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SL-41  | 1/8               | 3/8                 | 1/8              | 1-1/2                | 170230              | 12.26    | 170229                | 14.82    |
| SL-42  | 1/8               | 1/2                 | 1/8              | 1-1/2                | 170232              | 10.82    | 170231                | 10.30    |
| SL-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170236              | 29.23    | 170235                | 26.80    |
| SL-2   | 5/16              | 7/8                 | 1/4              | 2-5/8                | 170238              | 31.68    | 170237                | 34.01    |
| SL-3   | 3/8               | 1-1/16              | 1/4              | 2-13/16              | 170240              | 37.70    | 170239                | 32.74    |
| SL-4   | 1/2               | 1-1/8               | 1/4              | 2-7/8                | 170242              | 43.70    | 170241                | 51.71    |
| SL-6   | 5/8               | 1-5/16              | 1/4              | 3-1/16               | 170244              | 95.21    | 170243                | 90.83    |
| SL-7   | 3/4               | 1-1/2               | 1/4              | 3-1/4                | 170246              | 136.94   | 170245                | 130.39   |

## Flame



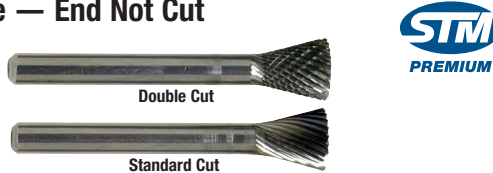
| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SH-41  | 1/8               | 1/4                 | 1/8              | 1-1/2                | 170250              | 10.82    | 170247                | 9.26     |
| SH-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170251              | 30.78    | -                     | -        |
| SH-2   | 5/16              | 3/4                 | 1/4              | 2-3/4                | 170254              | 30.64    | 170255                | 32.59    |
| SH-5   | 1/2               | 1-1/4               | 1/4              | 3-1/4                | 170256              | 62.62    | 170257                | 67.09    |
| SH-6   | 5/8               | 1-7/16              | 1/4              | 3-7/16               | 170258              | 81.66    | 170259                | 96.38    |
| SH-7   | 3/4               | 1-5/8               | 1/4              | 3-5/8                | 170260              | 146.69   | 170261                | 218.49   |

## Cone



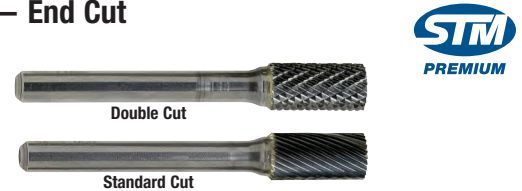
| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Included Angle | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-----------------------|---------------------|----------|-----------------------|----------|
| SM-41  | 1/8               | 11/32               | 1/8              | 1-1/2                | 12°                   | 170270              | 9.78     | 170269                | 11.84    |
| SM-42  | 1/8               | 7/16                | 1/8              | 1-1/2                | 14°                   | 170272              | 10.82    | 170271                | 9.26     |
| SM-43  | 1/8               | 5/8                 | 1/8              | 1-1/2                | 7°                    | 170274              | 10.82    | 170273                | 10.30    |
| SM-1   | 1/4               | 1/2                 | 1/4              | 2                    | 22°                   | 170278              | 24.27    | 170277                | 26.08    |
| SM-2   | 1/4               | 3/4                 | 1/4              | 2                    | 14°                   | 170280              | 29.33    | 170279                | 27.96    |
| SM-3   | 1/4               | 1                   | 1/4              | 2                    | 10°                   | 170282              | 27.79    | 170281                | 29.80    |
| SM-51  | 1/4               | 1/2                 | 1/8              | 2-1/8                | 22°                   | 170284              | 20.72    | 170283                | 17.87    |
| SM-4   | 3/8               | 5/8                 | 1/4              | 2-3/8                | 28°                   | 170286              | 24.65    | 170285                | 40.07    |
| SM-5   | 1/2               | 7/8                 | 1/4              | 2-5/8                | 28°                   | 170288              | 47.73    | 170287                | 51.21    |
| SM-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 31°                   | 170290              | 83.57    | 170289                | 79.63    |

## Inverted Cone — End Not Cut



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Included Angle | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-----------------------|---------------------|----------|-----------------------|----------|
| SN-41  | 3/32              | 1/8                 | 1/8              | 1-1/2                | 10°                   | 170300              | 12.11    | 170299                | 11.40    |
| SN-42  | 1/8               | 3/16                | 1/8              | 1-1/2                | 10°                   | 170302              | 9.78     | 170301                | 11.40    |
| SN-1   | 1/4               | 5/16                | 1/4              | 2                    | 10°                   | 170306              | 25.17    | 170305                | 23.99    |
| SN-51  | 1/4               | 1/4                 | 1/8              | 1-3/4                | 10°                   | 170308              | 20.72    | 170307                | 19.79    |
| SN-4   | 1/2               | 1/2                 | 1/4              | 2-1/4                | 16°                   | 170310              | 49.83    | 170309                | 47.48    |
| SN-6   | 5/8               | 3/4                 | 1/4              | 2-1/2                | 18°                   | 170312              | 71.52    | 170311                | 68.00    |
| SN-7   | 3/4               | 5/8                 | 1/4              | 2-3/4                | 30°                   | 170314              | 84.06    | 170313                | 80.08    |

## Cylindrical — End Cut



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SB-41  | 1/16              | 1/4                 | 1/8              | 1-1/2                | 170038              | 12.11    | 170078                | 11.40    |
| SB-42  | 3/32              | 7/16                | 1/8              | 1-1/2                | 170040              | 12.11    | 170080                | 11.40    |
| SB-43  | 1/8               | 9/16                | 1/8              | 1-1/2                | 170042              | 12.11    | 170082                | 11.40    |
| SB-12  | 1/8               | 5/8                 | 1/4              | 2                    | 170035              | 23.53    | 170075                | 22.40    |
| SB-14  | 3/16              | 5/8                 | 1/4              | 2                    | 170036              | 26.31    | 170076                | 25.17    |
| SB-1   | 1/4               | 5/8                 | 1/4              | 2                    | 170037              | 21.91    | 170077                | 23.25    |
| SB-2   | 5/16              | 3/4                 | 1/4              | 2-1/2                | 170043              | 31.43    | 170083                | 29.80    |
| SB-3   | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170039              | 30.01    | 170079                | 32.17    |
| SB-4   | 7/16              | 1                   | 1/4              | 2-3/4                | 170044              | 49.83    | 170084                | 47.48    |
| SB-5   | 1/2               | 1                   | 1/4              | 2-3/4                | 170041              | 53.88    | 170081                | 51.21    |
| SB-6   | 5/8               | 1                   | 1/4              | 2-3/4                | 170045              | 59.62    | 170085                | 63.79    |
| SB-16  | 3/4               | 3/4                 | 1/4              | 2-1/2                | 170047              | 80.35    | 170087                | 76.35    |
| SB-7   | 3/4               | 1                   | 1/4              | 2-3/4                | 170046              | 97.81    | 170086                | 93.17    |
| SB-9   | 1                 | 1                   | 1/4              | 2-3/4                | 170048              | 146.69   | 170088                | 139.71   |

## 60° Taper



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|
| SJ-42  | 1/8               | 3/32                | 1/8              | 1-1/2                | 170176              | 12.11    |
| SJ-1   | 1/4               | 3/16                | 1/4              | 2                    | 170177              | 25.63    |
| SJ-2   | 5/16              | 5/16                | 1/4              | 2-1/16               | 170178              | 27.96    |
| SJ-3   | 3/8               | 5/16                | 1/4              | 2-1/16               | 170179              | 31.21    |
| SJ-5   | 1/2               | 7/16                | 1/4              | 2-3/16               | 170180              | 38.75    |
| SJ-6   | 5/8               | 9/16                | 1/4              | 2-5/16               | 170181              | 50.75    |
| SJ-7   | 3/4               | 11/16               | 1/4              | 2-7/16               | 170182              | 68.23    |
| SJ-9   | 1                 | 15/16               | 1/4              | 2-9/16               | 170184              | 107.59   |

## 90° Taper



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|
| SK-42  | 1/8               | 1/16                | 1/8              | 1-1/2                | 170185              | 12.11    |
| SK-1   | 1/4               | 1/8                 | 1/4              | 2                    | 170186              | 25.63    |
| SK-2   | 5/16              | 3/16                | 1/4              | 1-15/16              | 170187              | 27.96    |
| SK-3   | 3/8               | 3/16                | 1/4              | 1-15/16              | 170188              | 31.21    |
| SK-5   | 1/2               | 1/4                 | 1/4              | 2                    | 170189              | 38.66    |
| SK-6   | 5/8               | 5/16                | 1/4              | 2-1/16               | 170190              | 45.26    |
| SK-7   | 3/4               | 3/8                 | 1/4              | 2-1/8                | 170191              | 68.34    |
| SK-9   | 1                 | 1/2                 | 1/4              | 2-1/4                | 170193              | 107.59   |

## Alumacut Burrs — Cylindrical



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SA-1FM | 1/4               | 5/8                 | 1/4              | 2                    | 170320                  | 23.60    |
| SA-3FM | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170321                  | 35.35    |
| SA-5FM | 1/2               | 1                   | 1/4              | 2-3/4                | 170322                  | 62.22    |
| SA-6FM | 5/8               | 1                   | 1/4              | 2-3/4                | 170323                  | 78.02    |
| SA-7FM | 3/4               | 1                   | 1/4              | 2-3/4                | 170324                  | 117.58   |

## Alumacut Burrs — Radius End



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SC-1FM | 1/4               | 5/8                 | 1/4              | 2                    | 170325                  | 33.77    |
| SC-3FM | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170326                  | 39.13    |
| SC-5FM | 1/2               | 1                   | 1/4              | 2-3/4                | 170327                  | 61.32    |
| SC-6FM | 5/8               | 1                   | 1/4              | 2-3/4                | 170328                  | 88.01    |
| SC-7FM | 3/4               | 1                   | 1/4              | 2-3/4                | 170329                  | 125.75   |

## Alumacut Burrs — Ball



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SD-1FM | 1/4               | 7/32                | 1/4              | 2                    | 170330                  | 33.05    |
| SD-3FM | 3/8               | 5/16                | 1/4              | 2-1/8                | 170331                  | 34.97    |
| SD-5FM | 1/2               | 7/16                | 1/4              | 2-1/4                | 170332                  | 50.30    |
| SD-6FM | 5/8               | 9/16                | 1/4              | 2-3/8                | 170333                  | 62.87    |
| SD-7FM | 3/4               | 11/16               | 1/4              | 2-1/2                | 170334                  | 85.49    |

## Alumacut Burrs - Egg



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SE-1FM | 1/4               | 3/8                 | 1/4              | 2                    | 170335                  | 39.59    |
| SE-3FM | 3/8               | 5/8                 | 1/4              | 2-3/8                | 170336                  | 48.66    |
| SE-5FM | 1/2               | 7/8                 | 1/4              | 2-5/8                | 170337                  | 69.19    |
| SE-6FM | 5/8               | 1                   | 1/4              | 2-3/4                | 170338                  | 98.07    |
| SE-7FM | 3/4               | 1                   | 1/4              | 2-3/4                | 170339                  | 125.75   |

## Alumacut Burrs - 14° Included Angle



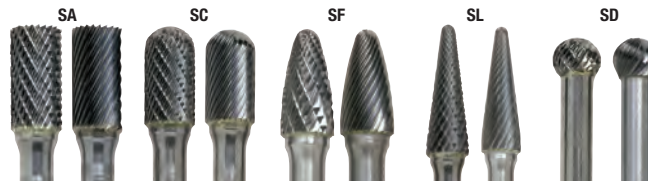
| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SL-3FM | 3/8               | 1-1/16              | 1/4              | 2-13/16              | 170345                  | 54.91    |
| SL-4FM | 1/2               | 1-1/8               | 1/4              | 2-7/8                | 170346                  | 69.93    |
| SL-6FM | 5/8               | 1-5/16              | 1/4              | 3-1/16               | 170347                  | 122.74   |
| SL-7FM | 3/4               | 1-1/2               | 1/4              | 3-1/4                | 170348                  | 176.06   |

## Alumacut Burrs - Tree Radius



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Alumacut Burrs Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|-------------------------|----------|
| SF-1FM | 1/4               | 5/8                 | 1/4              | 2                    | 170340                  | 28.69    |
| SF-3FM | 3/8               | 3/4                 | 1/4              | 2-1/2                | 170341                  | 40.18    |
| SF-5FM | 1/2               | 1                   | 1/4              | 2-3/4                | 170342                  | 64.31    |
| SF-6FM | 5/8               | 1                   | 1/4              | 2-3/4                | 170343                  | 143.49   |
| SF-7FM | 3/4               | 1-1/4               | 1/4              | 3                    | 170344                  | 121.33   |

## 6" O.A.L. Carbide Burrs



| E.D.P. | Cutter Dia. (in.) | Length of Cut (in.) | Shank Dia. (in.) | Overall Length (in.) | Double Cut Code No. | Price \$ | Standard Cut Code No. | Price \$ |
|--------|-------------------|---------------------|------------------|----------------------|---------------------|----------|-----------------------|----------|
| SA-3L6 | 3/8               | 3/4                 | 1/4              | 6                    | 170370              | 49.37    | 170372                | 47.99    |
| SA-5L6 | 1/2               | 1                   | 1/4              | 6                    | 170371              | 70.32    | 170373                | 64.78    |
| SC-3L6 | 3/8               | 3/4                 | 1/4              | 6                    | 170374              | 55.17    | 170376                | 51.21    |
| SC-5L6 | 1/2               | 1                   | 1/4              | 6                    | 170375              | 82.31    | 170377                | 69.84    |
| SF-3L6 | 3/8               | 3/4                 | 1/4              | 6                    | 170378              | 51.40    | 170380                | 52.15    |
| SF-5L6 | 1/2               | 1                   | 1/4              | 6                    | 170379              | 79.83    | 170381                | 66.13    |
| SL-3L6 | 3/8               | 1-1/16              | 1/4              | 6                    | 170382              | 69.00    | 170384                | 59.13    |
| SL-4L6 | 1/2               | 1-1/8               | 1/4              | 6                    | 170383              | 73.05    | -                     | -        |
| SD-3L6 | 3/8               | -                   | 1/4              | 6                    | 170386              | 39.13    | 170388                | 47.04    |
| SD-5L6 | 1/2               | -                   | 1/4              | 6                    | 170387              | 52.83    | 170389                | 87.44    |

## Solid Carbide Burr Sets



| Burs Included   | Single Cut |          | Double Cut |          | Alumacut |          |
|---|------------|----------|------------|----------|----------|----------|
|   | Code No.   | Price \$ | Code No.   | Price \$ | Code No. | Price \$ |
| SA-43, SA-42, SC-42, SC-41, SD-42, SE-41, SF-41, SG-41, SH-41, SJ-41, SL-42, SN-42  | 172950     | 224.70   | 172951     | 234.03   | -        | -        |
| SA-41, SC-42, SF-42, SG-44, SE-41, SD-42, SL-42, SH-41, SM-42, SN-42 (Plastic case) | -          | -        | 172980*    | 104.57   | -        | -        |
| SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51                       | 172952     | 270.11   | 172953     | 279.29   | -        | -        |
| SA-1, SC-1, SF-1, SG-3, SE-3, SD-1, SL-1, SH-1, SM-1, SN-1 (Plastic case)           | -          | -        | 172982*    | 252.55   | -        | -        |
| SA-1, SA-3, SC-1, SC-3, SD-1 SD-3, SF-1, SF-3                                       | 172956     | 302.09   | 172957     | 314.37   | 172958   | 384.97   |
| SB-1, SB-3, SC-1, SC-3, SD-1 SD-3, SF-1, SF-3                                       | 172959     | 398.75   | 172960     | 429.27   | 172961   | 539.22   |
| SA-3, SA-5, SC-3, SC-5, SD-3 SD-5, SF-3, SF-5                                       | 172962     | 539.95   | 172963     | 562.99   | 172964   | 752.01   |
| SB-3, SB-5, SC-3, SC-5, SD-3 SD-5, SF-3, SF-5                                       | 172965     | 520.13   | 172966     | 286.06   | 172967   | 670.78   |
| SA-5, SC-3, SC-5, SD-5, SF-3 SF-5, SG-3, SL-4                                       | 172968     | 579.60   | 172969     | 438.37   | 172970   | 706.71   |
| SB-5, SC-3, SC-5, SD-5, SF-3 SF-5, SG-3, SL-4                                       | 172971     | 553.74   | 172972     | 611.43   | 172973   | 716.24   |
| SC-3L6, SD-3L6, SF-3L6, SF-5L6  | 172974     | 311.61   | 172975     | 247.55   | 172976   | 289.93   |

\* Quality Import

## 8pc Solid Carbide Double Cut Burr Sets

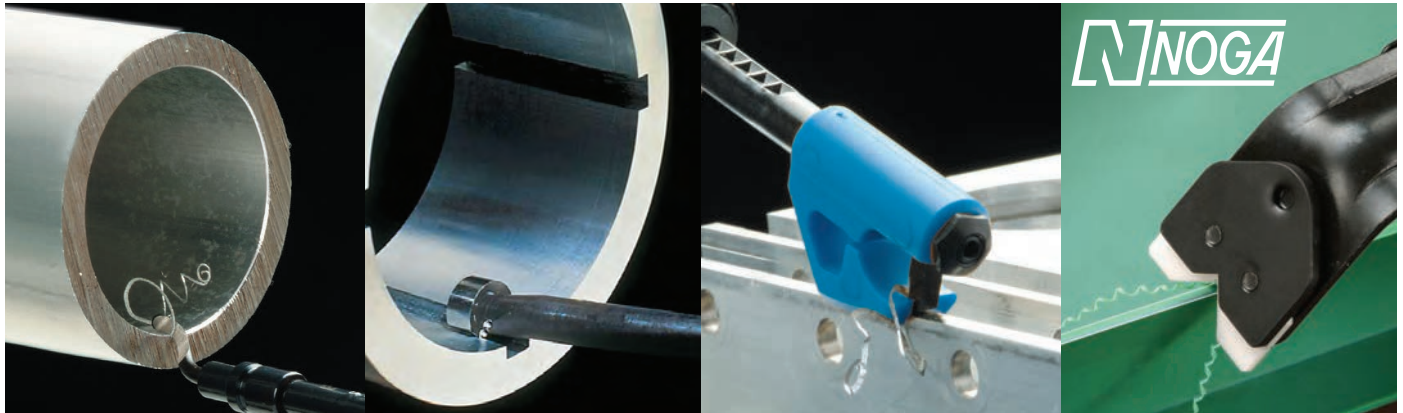


- Solid carbide
- Double cut
- Comes in fitted case



| Contents  | Shank Diameter | Code No. | Price \$ |
|---|----------------|----------|----------|
| SA-51, SB-51, SC-51, SD-1, SD-52, SF-53, SG-51, SL-51 | 1/8"           | 172984   | 105.96   |
| SA-3, SA-5, SC-1, SC-3, SD-3, SD-5, SF-3, SF-5        | 1/4"           | 172986   | 197.37   |

# DEBURRING SYSTEMS



## Promo N Noga Set — NG8000

- For Steel, Aluminum and Plastic
- Noga Grip 2 handle & 10pcs N1 (B10) blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8000 | 165474   | 25.67    |

## N Cobalt Set — NG8100

- For Plastic and Hard Materials
- 1 Noga Grip 2 handle & 20pcs N10 (B10) Cobalt blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8100 | 165466   | 54.59    |

## Promo S Noga Set — NG8150

- For Steel, Aluminum and Plastic
- Noga Grip 1 handle & 10pcs S10 (E100) blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8150 | 165464   | 27.91    |

## S Golden Noga Set — NG8152 TiN Coated

- For Abrasive Materials
- Noga Grip 1 handle & 10pcs S10 TiN Coated blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8152 | 165460   | 44.06    |

## N Economy Set — NG8050

- For Steel, Aluminum and Plastic
- Noga Grip handle & 20pcs N1 (B10) blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8050 | 165478   | 38.90    |

## N Golden Noga Set — NG8002 TiN Coated

- For Steel, Aluminum and Plastic
- Noga Grip Handle 10 N1 TiN Coated blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG8002 | 165465   | 36.21    |

## B10 Noga Set — SG6000

- For Steel, Aluminum, and Plastic
- Noga Grip 2 Handle & 20pcs B10 blades



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| SG6000    | 165300   | 38.90    |

## Deburring Tool — SG1000

### Contains:

- Ergonomic soft grip SG handle
- S100 and N10 blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SG1000 | 165380   | 24.32    |

## Noga Burr 3 — NB3000

- Multi-functional tool deburrs round parts, small holes and straight edges
- Blades are easily changed and stored in handle

### Contains:

- Handle and 3 "S" blades (165024, 165026, 165030)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NB3000 | 165370   | 22.08    |

## Liza Burr — LB1000

- Double sided blade holder
- Accepts all "N" and "S" blades
- Standard tool includes uni-handle
- To lock holder in position turn black ring clockwise



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| LB1000 | 165010   | 24.89    |

## Rapid Burr — RB1000

- Economical version of the Noga Burr
- Utilizes replaceable blades only without spare blade storage



| Model                     | Code No. | Price \$ |
|---------------------------|----------|----------|
| RB1000                    | 165006   | 16.14    |
| RB1005 (RB1000+S20 Blade) | 165130   | 19.62    |

## Edge Off — E02000

### Contains:

- Plastic handle and S10 blade, holds all types of "S" blades. (blades can be replaced)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| E02000 | 165375   | 5.94     |

## Noga Burr 1 — NB1100

- Blue plastic handle and S10 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NB1100 | 165390   | 14.12    |

## Noga Burr 5 — NB5000

- Multi-functional tool deburrs round parts, small holes and straight edges
- Blades are easily changed and stored in handle
- Set includes blades 1pc ea.: 165024, 165026, 165030, 165032, 165034



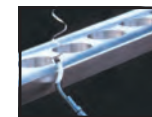
| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NB5000 | 165004   | 26.46    |

## Super Burr — SB1000

- Similar to the Liza-Burr but with heavy duty blades for heavy duty jobs

### Contains:

- Uni-handle, SN-holder, S100, S20, S30 blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SB1000 | 165001   | 32.17    |

## Teddy Burr — TB1000

- Slim-grip design allows deburring in hard to reach locations
- Holds all "N" (2.6mm) blades
- Easy to replace blades with handy pocket clip

### Contains:

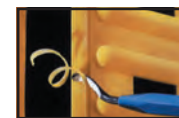
- N1 blade and 8mm hexagonal painted handle



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| TB1000 | 165031   | 13.79    |

## Edge-Off Disposable Deburring Tool — E01000

- Handy tool fits in shirt pocket
- Equipped with a non-removable 165024 blade
- Pocket clip included



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| E01000 | 165008   | 9.30     |

### H.D. Keyway Burr — KW1300



- Most useful for wide, deep or shallow keyways
- Range: 3-15mm

**Contains:**

- Uni-handle, K-holder, N90K blade

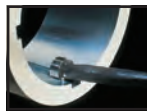


| Model  | Code No. | Price \$ |
|--------|----------|----------|
| KW1300 | 165003   | 27.91    |

### H.D. Keyway Burr — KW1000



- Effectively solves the problem of deburring keyways, internal and external
- Blade can be reversed to extend life



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| KW1000 | 165018   | 26.80    |

### Double Burr (Sheet Metal) — DB1000



- Dual purpose tool for machinists and sheet metal workers
- Deburr both sides of sheet metal simultaneously
- Blades adjustable up to 3/8" thickness
- Can be used with one blade in centre for deburring edges of blocks
- Blades can be rotated to extend life
- Standard tool includes: handle, two 165042 blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| DB1000 | 165016   | 39.91    |

### Noga "V" Cut — NC1000



- Simple and safe for use with hand guard, which is available on request
- Most economical tool for sheet metal range 1-8mm

**Contains:**

- Uni-handle, LD-holder, and L3 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NC1000 | 165011   | 31.05    |

### Countersink — CS1000



- 20mm diameter countersink
- Uses 140mm hex. blade holder which can be locked into any position
- Useful for chamfering deep holes
- Standard tool includes Unihandle and hex. blade holder



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| CS1000 | 165012   | 56.15    |

### Reversible Countersinks — RC2000 & RC2200



- RC2000 Range: 5-9mm
- RC2200 Range: 10-22mm
- Similar to RC1000 only larger
- Patented



**Contains:**

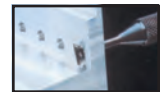
- Handle and R2 (RC2000) or R3 blade (RC2200)

| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RC2000 | 165029   | 51.00    |
| RC2200 | 165182   | 60.64    |

### Reversible Mini Countersink — RC1000



- Unique 2 pair of cutting edges
- For chamfering, hold tool between fingers and thumb and rotate back and forth
- Fine tool for deburring both back side and front side of holes
- Blade has two working positions
- Range: 3-5.5mm
- To insert/withdraw blade into/from hole, push knob and release slowly



**Contains:**

- Handle and small R1 blade

| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RC1000 | 165027   | 51.00    |

### H.D. Rotodrive — RD7000



- Has cranked blade holder with M7 thread
- Accepts C12, C20 and C30
- 56mm displacement allows for heavy duty burrs to be removed
- Continuous rotation of countersink enables very fast chamfering



**Contains:**

- Uni-handle, H.D. rotodrive holder, and C20 countersink

| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RD7000 | 165002   | 60.20    |

### Fixed Rotodrive — RD1040



- The quickest way to chamfer by hand
- Single flute countersink provides a smoother cut
- Patented



**Contains:**

- NB-handle and 10.4 rotodrive countersink

| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RD1040 | 165022   | 47.52    |

## Scraper — SC1000



- Heavy duty scraper
- Triangular double ended blade
- Blade can be locked into the handle at desired length

**Contains:**

- Unihandle, 3/4" scraper blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SC1000 | 165014   | 38.34    |

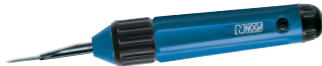
## Mini-Scraper — MS1000



- Ideal for tool and die makers
- Hollow ground

**Contains:**

- Uni-handle, D-holder, triangular mini-scraper D50
- D50 scraper is held in the D-holder by means of wedge action



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| MS1000 | 165005   | 33.07    |

## Internal Scraper — IS1000



- For the deburring of cross-holes
- D66 scraper is held in the D-holder by means of wedge action

**Contains:**

- Uni-handle, D-holder, internal scraper D66



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| IS1000 | 165007   | 30.72    |

## Adjustable Scraper — SC8000



- Protected by plastic cap
- 5mm medium size scraper
- Knurled locking collar to control blade extension

**Contains:**

- 12mm anodized handle, T80 double ended triangular scraper



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SC8000 | 165033   | 34.52    |

## Adjustable Mini Scraper — SC7500



- Protected by plastic cap
- 3.2 x 75mm triangular scraper
- Ideal for tool and mold making

**Contains:**

- 12mm anodized handle, D75 triangular scraper



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SC7500 | 165035   | 32.17    |

## Noga Mini Cut — NG3220



- Used for deburring small ridges in difficult to reach places
- Range of 0-2.5mm makes this tool very unique

**Contains:**

- Uni-handle, LD-holder, L4 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NG3220 | 165479   | 29.92    |

## Leader — LD1000



- Safe and easy to use
- Ensures 45° chamfers
- Chamfers straight or curved edges

**Contains:**

- Uni-handle, L-holder, L1 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| LD1000 | 165013   | 31.62    |

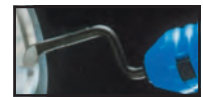
## Noga "O" Ring Burr — KW2000



- Range: 0-3mm (groove width)
- Removes burrs from internal "O" ring grooves
- Patented

**Contains:**

- NB-handle, OR blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| KW2000 | 165019   | 29.71    |

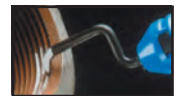
## Thread Cleaner — TC1000



- For repair and cleaning damaged internal threads
- 9mm minimum diameter
- Works well on all threads and pitches
- Patented

**Contains:**

- NB-handle, TC blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| TC1000 | 165017   | 24.77    |

## Deburring Accessories



| Item | Description   | Range                  | Code No. | Price \$ |
|------|---|------------------------|----------|----------|
| D50  | Mini-scraper; most suitable for miniature components                                  | HSS 3mm                | 165100   | 13.56    |
| D66  | Internal scraper; most useful on cross holes  | HSS 3.2mm              | 165105   | 10.99    |
| N70K | Special square blade for small keyways (For shallow Keyways, one corner is truncated) | 1.2-8mm<br>3/64"-5/16" | 165120   | 11.66    |
| N90K | Heavy duty blade for wide keyways (similar to N70K)                                   | 3-15mm<br>1/8"-19/32"  | 165125   | 19.28    |

### MultiBurr — RG1000



Four of Noga's most popular multi-purpose blades in one innovative tool set.

- S10 blade (steel, aluminum, plastic)
- D50 scraper (ideal for tool and die makers)
- N2 blade (brass, cast iron)
- Rotodrive 90° countersink (1-10.4mm)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RG1000 | 165371   | 131.94   |

### Universal Handy Chuck Holder — PV1000



A 3-jaw chuck helps with the quick and secure clamping of a wide variety of tools, blades and blade holders such as scrapers, countersinks, files etc.

Hardness 58HRC  
Range: 0.5-8.0mm



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| PV1000 | 165484   | 98.98    |

### YT Handle — YT1000



The perfect grip on Noga Adjustable Scrapers, Needle Files, Pins & Drills

- Quick Change
- Fits every hand
- Flexible collet

Range: 2.2-4.5mm



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| YT1000 | 165486   | 11.44    |

### Chip Hooks — SP2500 & SP2550



For removing chips and clean the chip trays on your machines. Black finished steel hooks.

The Chip Hooks include a plastic protective guard.

NogaGrip Handle designed for maximum comfort in your hand.



| Model  | Length | Code No. | Price \$ |
|--------|--------|----------|----------|
| SP2500 | 400mm  | 165488   | 42.70    |
| SP2550 | 600mm  | 165490   | 48.32    |

### Soft Cut Ceramic Tool — NC5100



- Ideal for deburring soft abrasive plastics, (blade can be replaced)

**Includes:**

- Noga NC5100 holder & CR6100 blade



| Model            | Code No. | Price \$ |
|------------------|----------|----------|
| NC5100 holder    | 165492   | 51.79    |
| CR6000 65° blade | 165494   | 28.58    |
| CR6100 75° blade | 165496   | 28.58    |

### Cera-Cut — CR1100



- Ideal for deburring plastics and other soft materials
- Extremely long life

**Includes:**

- Ceramic blade mounted in a modified Soft Grip handle, (this blade cannot be replaced)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| CR1100 | 165385   | 60.64    |

### Ceramic Tool — CR2000



- Ideal for all plastic materials and soft metals
- Ideal for cleaning surface and parting line flash

**Includes:**

- Cera-Cut handle and straight Cera-Cut blade, (blades can be replaced)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| CR2000 | 165415   | 59.41    |

### Ceramic Double Burr — DB5000



- Removes burr from both sides of workpiece simultaneously
- Ergonomically designed handle with guard to protect you while you work

**Includes:**

- V-shaped blade mounted in a DB handle, (blades can be replaced)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| DB5000 | 165410   | 82.51    |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.



## The Set — SP7700

The most popular deburring tools you need to carry for any deburring application. Packed in one handy box.

### Contains:

- Countersink NG3100, Mini Scraper NG3700, Noga V Cut NG3200, Adjustable Scraper SC8000, Keyway-Burr NG3300, Internal Scraper NG3710, Super Burr NG3003



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SP7700 | 165482   | 241.79   |

## Noga Box — NX1000

Collected to meet the total requirements of the Tool and Die makers.

### Contains:

- Keyway burr; half round riffler file; round riffler file; flat riffler file; double-burr; D-key; uni-handle plus SN holder; C holder plus C20; C12; D holder plus D50; D holder plus D66; T120 scraper; L holder plus L1; N1 blade; S10 blade; S101 B blade; S20 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NX1000 | 165160   | 320.60   |

## NB Set — NB1900

For Steel, Aluminum and Plastic

### Contains:

- NB Handle
- 10pcs S10 blades



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| NB1900 | 165060   | 27.91    |

## Deburring Kit — SP1007

### Contains:

- RB Handle (12mm Hex. Aluminum Handle)
- OR ("O" Ring Grooves Blade)
- RD 16.5 (RotoDrive Countersink)
- RDE18 (External Rotodrive Countersink)
- TC (Thread Cleaner Blade)
- S100 Blade (for Steel)
- S150 Blade (for Plastic)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| SP1007 | 165190   | 103.03   |

## Micro Deburring Set — FT3000

- Ideal for Tool and Die makers
- For extra fine jobs

### Contains:

- Micro Deburring Tool (FT1000)
- Micro Scraper (FT1100)
- Micro RotoDrive Countersink (FT1200)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| FT3000 | 165135   | 61.88    |

## Magic Set — RB4000

The handle can hold both types of blades (rotating & fixed).

### Contains:

- Rapid Burr (RB1000) and modified D50 Mini Scraper
- Blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RB4000 | 165480   | 29.38    |

## Unikit Special — UK2000

The Standard UNIKIT with the addition of the internal scraper and the 12mm countersink C12

### Contains:

- D holder plus D66; T120 scraper; uni-handle; SN holder; C holder plus C20; C12; N2 blade; N1 blade; S101 blade; S30 blade; S20 blade; S10 blade



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| UK2000 | 165150   | 177.22   |

## Unikit Extra — UK3000

### Contains:

- D holder plus D50, D66; T120 scraper; uni-handle; SN holder;
- C holder plus C20; C12; N1 blade; N2 blade; S101 blade; S30 blade; S20 blade; S10 blade
- L holder; L1; L2



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| UK3000 | 165168   | 233.16   |

## Rotodrive Combi Set — RD2001

Combination of RotoDrive and Universal deburring set.

### Contains:

- NB handle, 3.2 mm RotoDrive Countersink, 10.4 mm RotoDrive countersink, S10, S20, S30 blade, demo plate



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| RD2001 | 165165   | 95.06    |

## Plastic Edge-Off Set — E02100

### Contains:

- E0 handle + S10 blade, green sleeve (for aluminum)
- E0 handle + S20 blade, red sleeve (for brass & cast iron)
- E0 handle + S100 blade, blue sleeve (for steel)
- E0 handle + S150 blade, yellow sleeve (for plastic)



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| E02100 | 165440   | 24.32    |

## Noga Unikit — UK1000

Recommended for machinists and tool makers.

### Contains:

- 1 Liza-burr; 1 C20 countersink, 1 countersink holder; 1 scraper blade; 1 S10 blade; 1 S20 blade; 1 S30 blade; 1 S101 blade



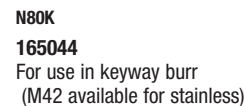
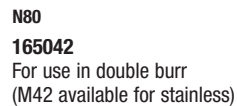
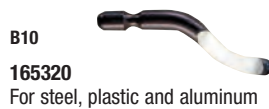
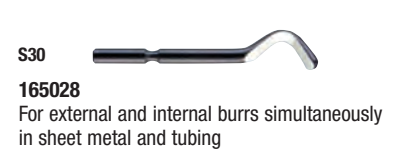
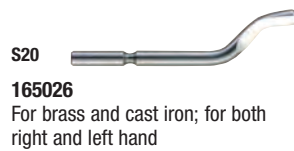
| Model  | Code No. | Price \$ |
|--------|----------|----------|
| UK1000 | 165020   | 128.46   |

## Blade Selection — General



- Ready-to-use blades included

- All blades are made of HSS



| Type     | Length (in.) | Fits Tool No. | Standard Pack | Code No. | Per Blade Price \$ |
|----------|--------------|---------------|---------------|----------|--------------------|
| S10      | 1-7/8        | 165004/165010 | 10            | 165024   | 2.68               |
| S20      | 1-7/8        | 165004/165010 | 10            | 165026   | 2.91               |
| S30      | 1-7/8        | 165004/165010 | 10            | 165028   | 2.91               |
| S35      | 1-7/8        | 165004/165010 | 10            | 165030   | 3.02               |
| S101     | 1-5/8        | 165004/165010 | 10            | 165032   | 3.15               |
| S202     | 1-5/8        | 165004/165010 | 10            | 165034   | 3.02               |
| B10      | 7/8          | 165010/165310 | 10            | 165320   | 2.01               |
| N1       | 7/8          | 165010        | 10            | 165036   | 2.01               |
| N2       | 7/8          | 165010        | 10            | 165038   | 2.01               |
| N3       | 7/8          | 165010        | 10            | 165040   | 4.15               |
| N80      | 7/16         | 165016        | 10            | 165042   | 8.63               |
| N80K     | 7/16         | 165018        | 10            | 165044   | 8.63               |
| C12      | 1-1/8        | 165012        | 1             | 165046   | 30.27              |
| C20      | 1-3/16       | 165012        | 1             | 165048   | 40.80              |
| C30      | 1-7/16       | 165012        | 1             | 165050   | 56.61              |
| T120     | 4-3/4        | 165014        | 1             | 165052   | 26.23              |
| SN       | 5-3/4        | 165010        | 1             | 165054   | 13.22              |
| C-Holder | 5-1/2        | 165012        | 1             | 165056   | 9.41               |

## Blade Selection — Swivel Blades

- Ready-to-use blades included

**N1LH**



**165037**  
For left handed user

**N1 TiN**



**165039**  
TiN coated N1 for long life

**N1 C**



**165041**  
Solid carbide N1 for hardened steel and special plastics

**N2 C**



**165043**  
Solid carbide N2 for ceramic and glass

**N6**



**165045**  
For cross holes in difficult to reach places

**S10 LH**



**165047**  
For left handed users

**S10 TiN**



**165049**  
TiN coated S10 for long life

**S10 C**



**165051**  
Solid carbide tipped S10 for hardened steel and special plastics

**S100**



**165053**  
Cobalt combination blade best for plastics and hard materials

**S101 LH**



**165055**  
S101 for left handed users

**S101 TiN**



**165057**  
TiN coated S101 for long life

**S150**



**165059**  
Heavy duty shank, for holes as small as 1.5mm dia.

**S20 C**



**165061**  
Solid carbide tipped S20 for hardened materials

**S60**



**165062**  
Heavy duty for cross holes in difficult to reach places

**TC**



**165063**  
Patented for internal thread cleaning and deburring from 9mm

| Type           | Standard Pack | Code No. | Per Blade Price \$ |
|----------------|---------------|----------|--------------------|
| N1 Left Hand   | 10            | 165037   | 2.91               |
| N1 TiN         | 10            | 165039   | 4.15               |
| N1 C           | 1             | 165041   | 11.21              |
| N2 C           | 1             | 165043   | 12.78              |
| N6             | 1             | 165045   | 6.16               |
| S10 Left Hand  | 10            | 165047   | 8.73               |
| S10 TiN        | 10            | 165049   | 4.49               |
| S10 C          | 10            | 165051   | 12.55              |
| S100 Cobalt    | 10            | 165053   | 3.48               |
| S101 Left Hand | 10            | 165055   | 3.59               |
| S101 TiN       | 10            | 165057   | 4.49               |
| S150           | 10            | 165059   | 3.02               |
| S20 C          | 10            | 165061   | 12.55              |
| S60            | 1             | 165062   | 6.16               |
| TC             | 1             | 165063   | 11.66              |

## Blade Selection — Diamond Coated Blades, Countersinks, And Reversible Blades



- Ready-to-use blades included

N1D



**165074**  
Diamond coated N1 for ceramic and glass

S10D



**165075**  
Diamond coated S10 for ceramic and glass

RDE 25D



**165080**  
External diamond coated RotoDrive for reinforced plastic, fiberglass and epoxy

D55



**165082**  
Solid carbide D50, fits adjustable scraper handle

D75



**165083**  
Similar to D50 but 75mm long, fits adjustable scraper handle

D77



**165084**  
Similar to D66 but 75mm long, fits adjustable scraper handle

T80



**165085**  
Double medium scraper blade for adjustable scraper

**165086**

Same as N80 but heat-treated to 68HRC, use for stainless steel

N80M42



**165087**

Same as N80K but heat-treated to 68HRC

N80KM42



### Reversible Blades

**165088**

For cross holes 3-5.5mm

R1



**165089**

For cross holes 5-9mm

R2



| Type     | Standard Pack | Code No. | Per Blade Price \$ |
|----------|---------------|----------|--------------------|
| N1D      | 1             | 165074   | 21.41              |
| S10D     | 10            | 165075   | 21.97              |
| D55      | 1             | 165082   | 29.38              |
| D75      | 1             | 165083   | 14.58              |
| D77      | 1             | 165084   | 13.56              |
| T80      | 1             | 165085   | 14.69              |
| N80 M42  | 10            | 165086   | 11.44              |
| N80K M42 | 10            | 165087   | 11.44              |
| R1       | 1             | 165088   | 23.10              |
| R2       | 1             | 165089   | 24.32              |

## Blade Selection — Swivel Blades



• Ready-to-use blades included

• All blades are made of HSS

**OR**



**165064**  
Patented HSS for  
"O" ring grooves up to 3mm

**RD 3.2**



**165065**  
Patented, 3.2mm cranked countersink

**RD 6.3**



**165066**  
Patented, 6.3mm cranked countersink

**RD 8.3**



**165067**  
Patented, 8.3mm  
cranked countersink

**RD 10.4**




**165068**  
Patented, 10.4mm  
cranked countersink

**RD 16.5**



**165069**  
Patented, 16.5mm  
cranked countersink

**RDE 18**



**165073**  
Patented, 4-18mm  
cranked external countersink

| Type    | Standard Pack | Code No. | Per Blade Price \$ |
|---------|---------------|----------|--------------------|
| OR      | 1             | 165064   | 15.36              |
| RD 3.2  | 1             | 165065   | 12.89              |
| RD 6.3  | 1             | 165066   | 29.25              |
| RD 8.3  | 1             | 165067   | 29.92              |
| RD 10.4 | 1             | 165068   | 33.63              |
| RD 16.5 | 1             | 165069   | 36.32              |
| RDE 18  | 1             | 165073   | 28.24              |

## Blade Selection — L-Blades & Handles & Holders



**L3**



**165090**  
Used with Leader  
for steel and aluminum

**L4**



**165091**  
Used for sheet metal  
1-8mm wide

**L5**



**165092**  
Used for ridges  
0-2.5mm wide

**L6**



**165093**  
Used for cleaning corners

**L7**



**165094**  
Double ended slot cleaner

**Uni Handle**




**165095**  
Holds round, hexagonal and triangular holders

**D Holder**



**165096**  
Holds D50 and D66 blades

**K Holder**



**165097**  
Holds N80K and N90 K on one side and N70K on the other

**LD Holder**



**165099**  
Holds L3, L4, L5, L6, L7 blades

**H.D. Cranked Holder**



**165101**  
Heavy duty  
cranked holder for C12, C20, C30

**L Holder**



**165098**  
Holds L1 blade

| Type                | Code No. | Per Blade Price \$ |
|---------------------|----------|--------------------|
| L3                  | 165090   | 6.28               |
| L4                  | 165091   | 4.71               |
| L5                  | 165092   | 7.51               |
| L6                  | 165093   | 5.26               |
| L7                  | 165094   | 10.99              |
| UNI Handle          | 165095   | 12.78              |
| D Holder            | 165096   | 10.54              |
| K Holder            | 165097   | 10.10              |
| L Holder            | 165098   | 20.74              |
| LD Holder           | 165099   | 12.89              |
| H.D. Cranked Holder | 165101   | 14.46              |



## Hand Tools

|   |        |
|---|--------|
| Punches .....                           | K2-4   |
| Stamps .....                            | K4     |
| Chisels .....                           | K4     |
| Hammers .....                           | K4     |
| Hacksaw .....                           | K5     |
| Utility Knives .....                    | K5     |
| Pin Chucks & Pin Vises .....            | K5     |
| Pot Magnets .....                       | K5     |
| Grease Guns & Oil Cans .....            | K6     |
| Barrel Pumps & Wrenches .....           | K6     |
| Ball End, Hex End, Torx® Wrenches ..... | K7-12  |
| ClickSet™ Torque Limiting Device .....  | K13    |
| Screwdrivers & Bits .....               | K14-17 |
| 1/4" Drive Sockets & Attachments .....  | K16    |
| 3/8" Drive Sockets & Attachments .....  | K17-19 |
| 1/2" Drive Sockets & Attachments .....  | K20-24 |
| 3/4" Drive Sockets & Attachments .....  | K25    |
| Combination Wrenches & Sets .....       | K26-27 |
| Adjustable & Pipe Wrenches .....        | K27    |
| Torque Wrench .....                     | K27    |
| Torque Multipliers .....                | K27    |
| Pliers & Wire Strippers .....           | K27-28 |

## Centre Punches

- Made of tool steel
- Black oxide finish for rust prevention
- Knurled body for better grip
- Hardened both ends, 45 to 52 HRC
- Points precision ground
- 4" length, 1/16" diameter, punch 3" long
- Set supplied in fitted case with clear size markings



BLACK OXIDE

| Model No. | Style      | Description                  | Code No. | Price \$ |
|-----------|------------|------------------------------|----------|----------|
| 6200-005  | 5pc set    | 1/16, 5/64, 3/32, 9/64, 5/32 | 606286   | 33.70    |
| 6200-1/16 | Individual | 1/16                         | 606288   | 6.17     |
| 6200-5/64 | Individual | 5/64                         | 606290   | 6.17     |
| 6200-3/32 | Individual | 3/32                         | 606292   | 6.17     |
| 6200-9/64 | Individual | 9/64                         | 606294   | 6.17     |
| 6200-5/32 | Individual | 5/32                         | 606296   | 6.17     |

## Heavy Duty Centre Punch Set

Single piece construction with hexagonal shank, these are one of the strongest and most durable of centre punches. The punches have ground working ends, with the body in premium powder coated finish.



| Description      | Code No. | Price \$ |
|------------------|----------|----------|
| 5pc set 5/64-3/8 | 606640   | 62.59    |

## 8pc Centre Punch Set

One piece construction with round striking head. The knurling is clean and well cut to provide a positive finger grip. This range of punches has a black oxide finish.



BLACK OXIDE

| Description     | Code No. | Price \$ |
|-----------------|----------|----------|
| 8pc 1/16 - 7/32 | 606635   | 77.72    |

## Centre Punches



- Made of premium steel and precision heat treated for maximum durability
- Corrosion resistant black phosphate finish body
- Meets ANSI standards



| Pin Dia. | Body Dia. | Length | Dynamic EDP | Code No. | Price \$ |
|----------|-----------|--------|-------------|----------|----------|
| 5/64"    | 1/4"      | 3-1/2" | D058018     | 866410   | 9.62     |
| 1/8"     | 5/16"     | 4-1/2" | D058019     | 866411   | 10.80    |
| 5/32"    | 5/16"     | 5-1/2" | D058020     | 866412   | 10.80    |
| 1/4"     | 3/8"      | 6"     | D058021     | 866413   | 13.43    |

## Combination Punch Set

- Made of tool steel with black oxide finish for rust prevention
- Knurled body for better grip
- Hardened both ends, 45 to 52 HRC
- 4" length
- Supplied in fitted case
- Set contains: 5/32" drive pin punch, 5/32" centre punch and scriber



BLACK OXIDE

| Model No. | Description | Code No. | Price \$ |
|-----------|-------------|----------|----------|
| 6304-003  | 3pc set     | 606298   | 22.28    |

## Drive Pin Punches & Set

- Made of tool steel
- Punch section centreless ground
- Handles black oxide for rust prevention
- Knurled body for better grip
- Hardened both ends, 45 to 52 HRC
- 4" length
- Set supplied in fitted pouch with clear size markings



BLACK OXIDE

| Model No. | Description             | Code No. | Price \$ |
|-----------|-------------------------|----------|----------|
| 6300-008  | 8pc Drive Pin Punch Set | 606250   | 50.61    |
| 6300-1/16 | 1/16" Drive Pin Punch   | 606252   | 6.11     |
| 6300-3/32 | 3/32" Drive Pin Punch   | 606254   | 6.11     |
| 6300-1/8  | 1/8" Drive Pin Punch    | 606256   | 6.11     |
| 6300-5/32 | 5/32" Drive Pin Punch   | 606258   | 6.11     |
| 6300-3/16 | 3/16" Drive Pin Punch   | 606260   | 6.11     |
| 6300-7/32 | 7/32" Drive Pin Punch   | 606262   | 6.11     |
| 6300-1/4  | 1/4" Drive Pin Punch    | 606264   | 6.11     |
| 6300-5/16 | 5/16" Drive Pin Punch   | 606266   | 7.32     |

## Extra Long Drive Pin Punches & Set

- Made of tool steel
- Punch section centreless ground
- Handles black oxide for rust prevention
- Knurled body for better grip
- Hardened both ends, 45 to 52 HRC
- 8" length, drive pin section 3-1/2" long
- Set supplied in fitted pouch with clear size markings



BLACK OXIDE

| Model No. | Description                    | Code No. | Price \$ |
|-----------|--------------------------------|----------|----------|
| 6301-058  | 5pc X-Long Drive Pin Punch Set | 606238   | 60.05    |
| 6301-1/8  | 1/8" X-Long Drive Pin Punch    | 606240   | 9.69     |
| 6301-3/16 | 3/16" X-Long Drive Pin Punch   | 606242   | 10.56    |
| 6301-1/4  | 1/4" X-Long Drive Pin Punch    | 606244   | 11.27    |
| 6301-5/16 | 5/16" X-Long Drive Pin Punch   | 606246   | 11.85    |
| 6301-3/8  | 3/8" X-Long Drive Pin Punch    | 606248   | 12.17    |

## 5pc X-Long Pin Punch Set — Vinyl Pouch

Single piece construction with hexagonal shank. Single piece construction imparts additional durability to the punch. The pin end is ground with the body in premium powder coated finish.



| Description               | Code No. | Price \$ |
|---------------------------|----------|----------|
| 1/8, 3/16, 1/4, 5/16, 3/8 | 606650   | 85.21    |

## Heavy Duty Pin Punch Set

Single piece construction with hexagonal shank, these are one of the strongest and most durable of pin punches. The pin end is ground with the body in a premium powder coated finish.

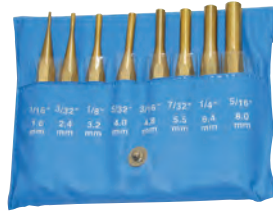


| Description      | Code No. | Price \$ |
|------------------|----------|----------|
| 7pc set 1/16-1/4 | 606645   | 84.48    |

## Brass Drive Pin Punches & Set



- Made of brass
- Punch section centreless ground
- Hexagonal body style
- Used in spark-free environments
- 4" length
- Set supplied in fitted pouch with clear size markings



| Model No.  | Description                   | Code No. | Price \$     |
|------------|-------------------------------|----------|--------------|
| 6300-008B  | 8pc Brass Drive Pin Punch Set | 606268   | <b>72.68</b> |
| 6300-1/16B | 1/16" Brass Drive Pin Punch   | 606270   | <b>9.32</b>  |
| 6300-3/32B | 3/32" Brass Drive Pin Punch   | 606272   | <b>9.32</b>  |
| 6300-1/8B  | 1/8" Brass Drive Pin Punch    | 606274   | <b>10.14</b> |
| 6300-5/32B | 5/32" Brass Drive Pin Punch   | 606276   | <b>9.32</b>  |
| 6300-3/16B | 3/16" Brass Drive Pin Punch   | 606278   | <b>9.32</b>  |
| 6300-7/32B | 7/32" Brass Drive Pin Punch   | 606280   | <b>9.32</b>  |
| 6300-1/4B  | 1/4" Brass Drive Pin Punch    | 606282   | <b>10.14</b> |
| 6300-5/16B | 5/16" Brass Drive Pin Punch   | 606284   | <b>9.32</b>  |

## 8pc Pin Punch Set — Wooden Case

These round shank pin punches have clean and well cut knurling which provides positive, non-slip grip. This range of punches has a black oxide finish.



BLACK OXIDE

| Description                                 | Code No. | Price \$     |
|---|----------|--------------|
| 1/16, 3/32, 1/8, 5/32, 3/16, 1/4, 5/16, 3/8 | 606630   | <b>84.73</b> |

## Pin Punches



- Special heat treatment process delivers a hardened working tip with a softer striking end
- Corrosion resistant black phosphate finish body
- Made of premium steel and precision heat treated for maximum durability
- Meets ANSI standards



| Pin Dia. | Body Dia. | Length | Dynamic EDP | Code No. | Price \$     |
|----------|-----------|--------|-------------|----------|--------------|
| 1/16"    | 1/4"      | 4"     | D058001     | 866393   | <b>8.82</b>  |
| 3/32"    | 1/4"      | 4-1/4" | D058002     | 866394   | <b>9.79</b>  |
| 1/8"     | 5/16"     | 4-3/4" | D058003     | 866395   | <b>10.80</b> |
| 5/32"    | 5/16"     | 5"     | D058004     | 866396   | <b>10.80</b> |
| 3/16"    | 5/16"     | 5-1/4" | D058005     | 866397   | <b>10.80</b> |
| 1/4"     | 3/8"      | 5-3/4" | D058006     | 866398   | <b>11.83</b> |
| 5/16"    | 7/16"     | 6"     | D058007     | 866399   | <b>16.23</b> |

## Drift Punches



- Special heat treatment process delivers a hardened working tip with a softer striking end
- Corrosion resistant black phosphate finish body
- Made of premium steel and precision heat treated for maximum durability
- Meets ANSI standards



| Pin Dia. | Body Dia. | Length | Dynamic EDP | Code No. | Price \$     |
|----------|-----------|--------|-------------|----------|--------------|
| 1/8"     | 5/16"     | 8"     | D058008     | 866400   | <b>14.55</b> |
| 5/32"    | 3/8"      | 9"     | D058009     | 866401   | <b>16.16</b> |
| 3/16"    | 5/16"     | 10"    | D058010     | 866402   | <b>20.63</b> |
| 1/4"     | 3/8"      | 10"    | D058011     | 866403   | <b>29.15</b> |

## Solid Punches



- Special heat treatment process delivers a hardened working tip with a softer striking end
- Corrosion resistant black phosphate finish body
- Made of premium steel and precision heat treated for maximum durability
- Meets ANSI standards



| Pin Dia. | Body Dia. | Length | Dynamic EDP | Code No. | Price \$     |
|----------|-----------|--------|-------------|----------|--------------|
| 1/16"    | 3/8"      | 5"     | D058012     | 866404   | <b>12.79</b> |
| 1/8"     | 5/16"     | 5"     | D058013     | 866405   | <b>13.96</b> |
| 5/32"    | 3/8"      | 5"     | D058014     | 866406   | <b>13.88</b> |
| 3/16"    | 3/8"      | 5"     | D058015     | 866407   | <b>14.55</b> |
| 1/4"     | 1/2"      | 5"     | D058016     | 866408   | <b>15.78</b> |
| 5/16"    | 1/2"      | 6"     | D058017     | 866409   | <b>17.60</b> |

## S565WB Pin Punch Set



- 4" long
- Hardened and tempered
- Well proportioned knurled grip
- Each punch has the size stamped on the head
- Set of 8 in round box



| Diameters  | Starrett No. | Code No. | Price \$      |
|--|--------------|----------|---------------|
| 1/16", 3/32", 1/8", 5/32", 3/16", 7/32", 1/4", 5/16" | S565WB       | 629395   | <b>109.00</b> |

## Automatic Centre Punches



- Automatic, spring operated action
- Adjustable for very light to heavy strokes
- Replaceable point ground and hardened
- Used for marking, punching, staking and riveting



| Model No. | Description       | Code No. | Price \$     |
|-----------|-------------------|----------|--------------|
| P170      | Standard duty     | 606300   | <b>23.07</b> |
| P171      | Heavy duty        | 606302   | <b>56.90</b> |
| P171-P    | Replacement point | 606304   | <b>10.75</b> |

## Automatic Centre Punch



- Automatic, spring operated action
- Used for marking, punching, staking, and riveting
- 120mm length



| Model  | Code No. | Price \$     |
|--------|----------|--------------|
| VACP-1 | 326290   | <b>42.17</b> |

## Automatic Centre Punch



- Corrosion resistant brass body with non-slip knurled grips
- Spring loaded designed delivers a high-impact strike when tip pressed against any work surface
- Can be used on applications involving wood, metal or plastic



| Length | Dynamic EDP | Code No. | Price \$     |
|--------|-------------|----------|--------------|
| 4.90"  | D058030     | 865978   | <b>17.94</b> |



## Letter & Number Stamp Sets

High quality steel punches are through induction hardened, which gives durability and extended life even after repeated use. The hardness at the stamping end is maintained at 58-62 HRC, the striking end is tempered to 38-43 HRC.



| Stamp Size | 27pc A - Z plus "&" stamp |          | 9pc #0-9 |          |
|------------|---------------------------|----------|----------|----------|
|            | Code No.                  | Price \$ | Code No. | Price \$ |
| 1/8        | 606615                    | 64.05    | 606600   | 21.46    |
| 3/16       | 606620                    | 91.32    | 606605   | 30.49    |
| 1/4        | 606625                    | 114.87   | 606610   | 38.29    |

## Cold Chisels



- Meets ANSI standards
- Special heat treatment process delivers a hardened working edge with a softer striking end
- Corrosion resistant black phosphate finish body
- Made of premium steel and precision heat treated for maximum durability



| Width of Cut | Body  | Length | Dynamic EDP | Code No. | Price \$ |
|--------------|-------|--------|-------------|----------|----------|
| 1/4"         | 1/4"  | 5"     | D058101     | 866415   | 9.62     |
| 5/16"        | 1/4"  | 5"     | D058102     | 866416   | 11.74    |
| 3/8"         | 5/16" | 5-1/2" | D058103     | 866417   | 15.85    |
| 1/2"         | 7/16" | 6"     | D058104     | 866418   | 15.78    |
| 5/8"         | 1/2"  | 6-1/2" | D058105     | 866419   | 16.90    |
| 3/4"         | 5/8"  | 7"     | D058106     | 866420   | 28.48    |
| 7/8"         | 5/8"  | 8"     | D058107     | 866421   | 34.95    |
| 1"           | 3/4"  | 8-1/2" | D058108     | 866422   | 36.64    |
| 1"           | 3/4"  | 10"    | D058109     | 866423   | 54.02    |
| 1"           | 3/4"  | 12"    | D058110     | 866424   | 59.47    |

## 14pc Punch & Chisel Set



### Contents:

- 5 Octagonal Cold Chisels, 3/8, 1/2, 5/8, 3/4, 7/8
- 2 H D Centre Punches 5/32, 1/4
- 3 H D Pin Punches 1/16, 1/8, 3/16
- 2 H D Drift Punches 1/8, 5/32
- 2 H D Starting Punches 5/16, 1/8



| Model No. | Code No. | Price \$ |
|-----------|----------|----------|
| KIT/14    | 606655   | 177.37   |

## Transfer Punch Set



### 28 Punches

- Heat treated tempered steel
- Consists of one each of punch sizes 3/32 through 1/2 x 64th plus 17/32



| Description                        | Code No. | Price \$ |
|------------------------------------|----------|----------|
| 3/32 through 1/2 x 64th plus 17/32 | 200750   | 33.24    |

## Polyurethane Hammers

- Steel structure containing steel shot
- Main body made from polyurethane resin, the handle from soft quality TPR



| Model  | Head Diameter (mm) | Head Width (mm) | Overall Length (mm) | Weight (kg) | Code No. | Price \$ |
|--------|--------------------|-----------------|---------------------|-------------|----------|----------|
| VHM-38 | 38                 | 100             | 287                 | 0.49        | 231460   | 54.28    |
| VHM-46 | 46                 | 100             | 306                 | 0.69        | 231462   | 60.76    |
| VHM-50 | 50                 | 110             | 340                 | 0.93        | 231464   | 75.80    |
| VHM-56 | 56                 | 120             | 353                 | 1.16        | 231466   | 86.82    |

## Indestructible Handle Hammers

Made with spring steel bars that run all the way through the handle. Bars are locked with the hammer head using steel locking plates ensuring that the head never gets dislodged

- Ergonomic rubber grip handle
- Hammer head is forged from special steel and is induction case hardened to 52-56 HRC for extended life



| Style     | Head Weight | Handle Length | Model      | Code No. | Price \$ |
|-----------|-------------|---------------|------------|----------|----------|
| Club      | 4 lb        | 12"           | CHID/4/12  | 231468   | 173.40   |
| Sledge    | 8 lb        | 30"           | SHID/8/30  | 231470   | 348.18   |
| Ball Pein | 32 oz       | 14"           | BPID/32/14 | 231472   | 151.38   |

## Dead Blow Hammers



- Features weather resistant fibreglass handle with non-slip rubber handle
- Meets ANSI standards



| Head Weight | Head Dia. | Head Length | Overall Length | Dynamic EDP | Code No. | Price \$ |
|-------------|-----------|-------------|----------------|-------------|----------|----------|
| 1 lb        | 1.50"     | 3.95"       | 11.40"         | D041065     | 865726   | 50.70    |
| 2 lb        | 2.00"     | 4.33"       | 13.40"         | D041067     | 865813   | 66.21    |
| 3 lb        | 2.36"     | 5.11"       | 14.56"         | D041069     | 865727   | 72.60    |

## Claw Hammers



- Meets ANSI standard
- Curved claw generates leverage for pulling stubborn nails



| Head Weight | Head Dia. | Head Length | Overall Length | Handle     | Dynamic EDP | Code No. | Price \$ |
|-------------|-----------|-------------|----------------|------------|-------------|----------|----------|
| 16 oz       | 1.09"     | 5.07"       | 12.83"         | Hickory    | D041010     | 866372   | 32.67    |
| 16 oz       | 1.09"     | 5.07"       | 12.95"         | Fiberglass | D041011     | 861664   | 32.67    |

## Ball Pein Hammers — Hickory Handle



- Meets ANSI standard
- A metal wedge safely secures head to hickory handle, permitting replacement of damage handles
- Face and pein are fully polished, other head surfaces are painted in corrosion resistant black finish



| Head Weight | Head Dia. | Head Length | Overall Length | Dynamic EDP | Code No. | Price \$ |
|-------------|-----------|-------------|----------------|-------------|----------|----------|
| 8 oz        | 0.92"     | 3.22"       | 11.70"         | D041025     | 866373   | 28.62    |
| 16 oz       | 1.19"     | 3.94"       | 13.65"         | D041027     | 866032   | 32.67    |
| 24 oz       | 1.38"     | 4.64"       | 15.44"         | D041028     | 866375   | 40.84    |
| 32 oz       | 1.50"     | 4.91"       | 15.60"         | D041029     | 866376   | 44.96    |

## 12" Hacksaw



A rugged heavy-duty industrial quality hacksaw designed for the professional.

- Strong aluminum die cast handle
- Guarded grip design
- Comes complete with a 12" chrome steel hacksaw blade

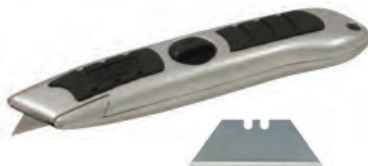


| Model    | Overall Length | Bow Depth | Code No. | Price \$ |
|----------|----------------|-----------|----------|----------|
| HF/12/BC | 17-5/16"       | 4"        | 231370   | 36.32    |

## Screw-Lock Utility Knife



- Heavy duty utility knife
- Handle stores extra blades
- Easy to remove and install blades
- Comfort grip handle
- Includes 3 blades



| Description                 | Gray EDP | Code No. | Price \$ |
|-----------------------------|----------|----------|----------|
| Screw-Lock Utility Knife    | 206      | 865638   | 14.87    |
| Replacement Blades (pkg. 5) | 206-KBL  | 865692   | 11.22    |

## Pin Chuck Sets



- Designed for holding small drills in drilling machine
- Set includes three interchangeable collets and knurled chuck with 1/4" shank
- Range: 0-1/32, 1/32-1/16, 1/16-3/32
- Overall length 2-1/2"



| Model No. | Description       | Code No. | Price \$ |
|-----------|-------------------|----------|----------|
| 6000-003  | 4pc Pin Chuck Set | 606226   | 41.11    |

## Pin Vises & Set



- Made of alloy steel, black oxide finish
- Collets grip firmly when chuck is tightened
- Knurled finger grip
- Range of set 0 - 0.188"
- Supplied in plastic pouch
- Ideal for holding small tools, rods, wires, taps, etc.



| Model No. | Description          | Code No. | Price \$ |
|-----------|----------------------|----------|----------|
| 6000-004  | 4pc Pin Vise Set     | 606228   | 70.25    |
| 6000-004A | 0.000-0.040 Pin Vise | 606230   | 18.27    |
| 6000-004B | 0.032-0.059 Pin Vise | 606232   | 20.18    |
| 6000-004C | 0.052-0.122 Pin Vise | 606234   | 22.04    |
| 6000-004D | 0.118-0.188 Pin Vise | 606236   | 22.82    |

## Pot Magnets



Unique combination of a strong magnet with nickel chrome plated insulating ring gives these magnets the superior holding power of larger ones.

- 1/4"-20 threaded



| Model      | Diameter (in.) | Height (in.) | Magnetic Pull (kg) | Code No. | Price \$ |
|------------|----------------|--------------|--------------------|----------|----------|
| PMG/11-16  | 11/16          | 5/8          | 2.7                | 231420   | 11.81    |
| PMG/13-16  | 13/16          | 3/4          | 4.5                | 231422   | 14.84    |
| PMG/1-1-16 | 1-1/16         | 1            | 6.0                | 231424   | 23.58    |
| PMG/1-3-8  | 1-3/8          | 1-3/16       | 13                 | 231426   | 34.10    |

# ASIMETO



For when you need accuracy, not a hammer.

High-precision measuring instruments, competitively priced!

See Chapter F

## Mini Pistol Grease Gun

One hand pistol grip grease gun with convenient pull type operating mechanism

- Capacity: 3oz cartridge
- 3,500 psi
- Zinc plated finish
- Complete with 4" steel extension



| Model     | Code No. | Price \$ |
|-----------|----------|----------|
| G-16/ZN/N | 231382   | 50.50    |

## Pistol Grease Gun

One hand operated grease gun designed for use in confined spaces.

- Capacity: 14oz cartridge
- 5,000 psi
- Heavy duty aluminum die cast head
- 12" flexible hose



| Model | Code No. | Price \$ |
|-------|----------|----------|
| G5F/N | 231384   | 78.12    |

## Heavy Duty Lever Grease Gun

Top of the line grease gun designed for heavy industrial applications.

- Capacity: 14oz cartridge
- 10,000 psi
- Variable stroke feature
- High tolerance aluminum die cast head
- Complete with 6" steel extension



| Model    | Code No. | Price \$ |
|----------|----------|----------|
| G1R/HD/N | 231380   | 78.12    |

## 80pc SAE Grease Fitting Assortment

Contents:

- 1/8"-27 PTF - 25pcs straight, 10pcs 45°, 10pcs 90°
- 1/4"-28 SAE-LT - 15pcs straight, 10pcs 45°, 10pcs 90°



| Model          | Code No. | Price \$ |
|----------------|----------|----------|
| GFT/KIT/SAE-80 | 231386   | 112.23   |

## Lever Action Barrel Pump

Premium powder coated steel pump body with ribbed section aluminum die cast pump head for maximum strength.

- Built-in 1-1/2" and 2" bung for use on drums
- Plated steel lever handle with rubber grip
- Complete with curved metal spout and telescopic suction tube for use on 15-55 gallon barrels



| Model  | Code No. | Price \$ |
|--------|----------|----------|
| LBP/04 | 231388   | 110.15   |

## Hand Rotary Barrel Pump

- Dual Directional Operation allows the pump to both empty, as well as refill containers
- Extremely heavy duty and rugged
- Pump body is sturdy cast iron with precisely machined cast iron vanes for better draw and smoother delivery
- Fits 15-55 gallon barrels
- Complete with suction tube, 2" cast iron bung nut, and discharge spout



| Model         | Code No. | Price \$ |
|---------------|----------|----------|
| GNB-25/3R/SPL | 231390   | 220.05   |

## Aluminum Drum Wrench

An easy and convenient tool to open all types of drums. Ends of the wrench are designed to fit perfectly onto most 2" and 3/4" drum plugs.

- Hardened and tempered cast aluminum for increased strength
- Compact design for easy storage



| Model     | Code No. | Price \$ |
|-----------|----------|----------|
| DRW/AL-01 | 231398   | 46.01    |

## Lever Type Oil Cans

This series of oil cans have a modern and contemporary design with a dome shaped body. Most popularly used oil can style all over the world. Manufactured with a steel pump, powder coated red body, and a flexible wire braided extension.



| Model | Capacity | Spout Length | Code No. | Price \$ |
|-------|----------|--------------|----------|----------|
| MP21F | 200 ml   | 6"           | 231392   | 18.45    |
| MP22F | 300 ml   | 6"           | 231394   | 19.38    |
| MP23F | 500 ml   | 7"           | 231396   | 21.21    |

## Ball End L-Wrench Sets — Long

- Insert into a screw at 25°
- Ball end saves time by quickly funnelling tool into screw
- ProGuard™ finish delivers superior corrosion protection
- Works in hard to reach places



| Model         | Pcs | Contents  | Bondhus EDP | Code No. | Price \$      |
|---------------|-----|---|-------------|----------|---------------|
| <b>Inch</b>   |     |   |             |          |               |
| BLX12         | 12  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16"  | 10936       | 619005   | <b>34.62</b>  |
| BLX13         | 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8"                                     | 10937       | 619007   | <b>43.67</b>  |
| BLX15         | 15  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8, 7/16, 1/2" (in vinyl roll up pouch) | 10935       | 619584   | <b>87.97</b>  |
| <b>Metric</b> |     |   |             |          |               |
| BLX6M         | 6   | 1.5, 2, 2.5, 3, 4, 5mm  | 10946       | 619020   | <b>16.16</b>  |
| BLX9M         | 9   | 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm  | 10999       | 619015   | <b>35.45</b>  |
| BLX15M        | 15  | 1.27, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 7, 8, 9, 10mm   | 10995       | 619016   | <b>59.55</b>  |
| MBLX13        | 13  | 1.27, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 14, 17mm (in metal box)   | 10989       | 619585   | <b>164.53</b> |

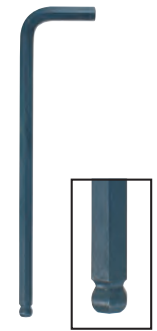
## Ball End L-Wrench Sets — Long & Extra Long



| Pcs | Contents   | Bondhus EDP | Code No. | Price \$     |
|-----|--|-------------|----------|--------------|
| 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8 | 68913       | 865346   | <b>36.67</b> |
| 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8 | 68913XL     | 865257   | <b>45.70</b> |
| 9   | 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm                           | 68909       | 865312   | <b>29.82</b> |
| 9   | 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm                           | 68909XL     | 865258   | <b>38.02</b> |
| 22  | All pieces contained in 68913 & 68909                                      | 68722       | 865013   | <b>67.91</b> |

## Ball End L-Wrenches — Long

- Insert into a screw at 25°
- Ball end saves time by quickly funnelling tool into screw
- ProGuard™ finish delivers superior corrosion protection
- Works in hard to reach places



| Size          | Length | Arm Length | Bondhus EDP | Code No. | Price \$      |
|---------------|--------|------------|-------------|----------|---------------|
| <b>Inch</b>   |        |            |             |          |               |
| 0.050         | 2.8    | 0.53       | 10902       | 619255   | <b>2.51</b>   |
| 1/16          | 3.0    | 0.56       | 10903       | 619260   | <b>2.51</b>   |
| 5/64          | 3.2    | 0.61       | 10904       | 619265   | <b>2.51</b>   |
| 3/32          | 3.4    | 0.65       | 10905       | 619270   | <b>2.67</b>   |
| 7/64          | 3.6    | 0.70       | 10906       | 619275   | <b>2.98</b>   |
| 1/8           | 3.8    | 0.75       | 10907       | 619280   | <b>3.09</b>   |
| 9/64          | 4.0    | 0.80       | 10908       | 619285   | <b>3.09</b>   |
| 5/32          | 4.2    | 0.84       | 10909       | 619290   | <b>3.24</b>   |
| 3/16          | 4.5    | 0.94       | 10910       | 619295   | <b>3.69</b>   |
| 7/32          | 4.9    | 1.03       | 10911       | 619300   | <b>4.41</b>   |
| 1/4           | 5.6    | 1.13       | 10912       | 619305   | <b>5.08</b>   |
| 5/16          | 6.0    | 1.25       | 10913       | 619310   | <b>8.16</b>   |
| 3/8           | 6.8    | 1.38       | 10914       | 619315   | <b>11.51</b>  |
| 7/16          | 7.5    | 1.50       | 10915       | 619320   | <b>23.85</b>  |
| 1/2           | 8.3    | 1.63       | 10916       | 619325   | <b>30.49</b>  |
| 9/16          | 9.0    | 1.75       | 10917       | 619330   | <b>37.35</b>  |
| 5/8           | 9.8    | 1.88       | 10918       | 619335   | <b>41.74</b>  |
| 3/4           | 11.3   | 2.13       | 10919       | 619340   | <b>68.99</b>  |
| 7/8           | 12.8   | 2.37       | 10920       | 619586   | <b>149.86</b> |
| 1             | 14.2   | 2.62       | 10921       | 619587   | <b>199.89</b> |
| <b>Metric</b> |        |            |             |          |               |
| 1.27          | 72     | 13         | 10949       | 619588   | <b>2.51</b>   |
| 1.5           | 77     | 14         | 10950       | 619350   | <b>2.51</b>   |
| 2.0           | 82     | 16         | 10952       | 619355   | <b>2.51</b>   |
| 2.5           | 88     | 17         | 10954       | 619360   | <b>2.62</b>   |
| 3.0           | 98     | 19         | 10956       | 619365   | <b>3.03</b>   |
| 4.0           | 110    | 22         | 10960       | 619375   | <b>3.24</b>   |
| 5.0           | 119    | 27         | 10964       | 619385   | <b>4.00</b>   |
| 6.0           | 139    | 31         | 10968       | 619395   | <b>5.39</b>   |
| 8.0           | 152    | 35         | 10972       | 619405   | <b>8.62</b>   |
| 10.0          | 171    | 39         | 10976       | 619415   | <b>12.57</b>  |
| 12.0          | 220    | 44         | 10980       | 619425   | <b>27.80</b>  |
| 14.0          | 260    | 55         | 10984       | 619430   | <b>34.73</b>  |
| 17.0          | 280    | 61         | 10986       | 619589   | <b>55.09</b>  |
| 19.0          | 295    | 69         | 10988       | 619590   | <b>65.30</b>  |
| 22.0          | 330    | 78         | 10991       | 619591   | <b>157.75</b> |
| 24.0          | 370    | 88         | 10993       | 619592   | <b>199.89</b> |



Corrosion resistant finish. Environmentally safe, provides better tool grip, resists solvents and is 5 times more corrosion resistant than competitor finishes.



Up to 20% stronger, with more torque and twice the wear resistance of standard grades of steel.

## Hex End L-Wrench Sets — Long — Inch

- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Model | Pcs | Contents  | Bondhus EDP | Code No. | Price \$     |
|-------|-----|---|-------------|----------|--------------|
| HLX7  | 7   | 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16"                                    | 12145       | 619030   | <b>9.99</b>  |
| HLX12 | 12  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16"      | 12136       | 619025   | <b>19.94</b> |
| HLX13 | 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 12137       | 619892   | <b>25.08</b> |

## Hex End L-Wrench Sets — Long — Metric

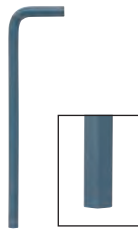
- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Model   | Pcs | Contents  | Bondhus EDP | Code No. | Price \$      |
|---------|-----|---|-------------|----------|---------------|
| HLX6M   | 6   | 1.5, 2, 2.5, 3, 4, 5mm  | 12146       | 619035   | <b>11.53</b>  |
| HLX9M   | 9   | 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm  | 12199       | 619040   | <b>23.77</b>  |
| HLX15M  | 15  | 1.27, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 7, 8, 9, 10mm                   | 12195       | 619597   | <b>40.03</b>  |
| MHLX10M | 10  | 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 12mm (in metal box)                           | 12396       | 619598   | <b>67.31</b>  |
| PHLX15M | 15  | 0.89, 1.27, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 14, 17, 19mm (in vinyl pouch) | 12349       | 619599   | <b>123.12</b> |

## Hex End L-Wrenches — Long — Inch

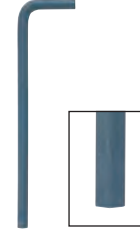
- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Size (in.) | Length (in.) | Arm Length (in.) | Bondhus EDP | Code No. | Price \$      |
|------------|--------------|------------------|-------------|----------|---------------|
| 0.028      | 2.6          | 0.22             | 12100       | 619045   | <b>1.26</b>   |
| 0.035      | 2.7          | 0.34             | 12101       | 619050   | <b>1.26</b>   |
| 0.050      | 2.8          | 0.53             | 12102       | 619055   | <b>0.77</b>   |
| 1/16       | 3.0          | 0.56             | 12103       | 619060   | <b>0.79</b>   |
| 5/64       | 3.2          | 0.61             | 12104       | 619065   | <b>0.79</b>   |
| 3/32       | 3.4          | 0.65             | 12105       | 619070   | <b>0.79</b>   |
| 7/64       | 3.6          | 0.70             | 12106       | 619075   | <b>1.05</b>   |
| 1/8        | 3.8          | 0.75             | 12107       | 619080   | <b>1.08</b>   |
| 9/64       | 4.0          | 0.80             | 12108       | 619085   | <b>1.08</b>   |
| 5/32       | 4.2          | 0.84             | 12109       | 619090   | <b>1.18</b>   |
| 3/16       | 4.5          | 0.94             | 12110       | 619095   | <b>1.28</b>   |
| 7/32       | 4.9          | 1.03             | 12111       | 619100   | <b>1.90</b>   |
| 1/4        | 5.3          | 1.13             | 12112       | 619105   | <b>2.62</b>   |
| 5/16       | 6.0          | 1.25             | 12113       | 619110   | <b>3.95</b>   |
| 3/8        | 6.8          | 1.38             | 12114       | 619115   | <b>5.28</b>   |
| 7/16       | 7.5          | 1.50             | 12115       | 619120   | <b>12.00</b>  |
| 1/2        | 8.3          | 1.63             | 12116       | 619125   | <b>13.59</b>  |
| 9/16       | 9.0          | 1.75             | 12117       | 619130   | <b>17.80</b>  |
| 5/8        | 9.8          | 1.88             | 12118       | 619135   | <b>27.96</b>  |
| 3/4        | 11.3         | 2.13             | 12119       | 619140   | <b>40.63</b>  |
| 7/8        | 12.7         | 2.37             | 12120       | 619593   | <b>63.73</b>  |
| 1          | 14.1         | 2.62             | 12121       | 619594   | <b>87.28</b>  |
| 1-1/4      | 17.0         | 3.00             | 12125       | 619595   | <b>341.22</b> |
| 1-1/2      | 20.3         | 3.50             | 12129       | 619596   | <b>544.94</b> |

## Hex End L-Wrenches — Long — Metric

- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Size (mm) | Length (mm) | Arm Length (mm) | Bondhus EDP | Code No. | Price \$      |
|-----------|-------------|-----------------|-------------|----------|---------------|
| 0.71      | 66          | 6               | 12147       | 619145   | <b>1.19</b>   |
| 0.89      | 68          | 9               | 12148       | 619150   | <b>1.28</b>   |
| 1.27      | 72          | 13              | 12149       | 619155   | <b>0.77</b>   |
| 1.5       | 77          | 14              | 12150       | 619160   | <b>0.79</b>   |
| 2.0       | 82          | 16              | 12152       | 619165   | <b>0.79</b>   |
| 2.5       | 88          | 17              | 12154       | 619170   | <b>1.03</b>   |
| 3.0       | 98          | 19              | 12156       | 619175   | <b>1.03</b>   |
| 3.5       | 100         | 21              | 12158       | 619180   | <b>1.09</b>   |
| 4.0       | 110         | 22              | 12160       | 619185   | <b>77.00</b>  |
| 4.5       | 114         | 25              | 12162       | 619190   | <b>1.80</b>   |
| 5.0       | 119         | 27              | 12164       | 619195   | <b>1.80</b>   |
| 5.5       | 124         | 29              | 12166       | 619200   | <b>2.37</b>   |
| 6         | 139         | 31              | 12168       | 619205   | <b>2.56</b>   |
| 7         | 140         | 33              | 12170       | 619210   | <b>4.16</b>   |
| 8         | 152         | 35              | 12172       | 619215   | <b>4.16</b>   |
| 9         | 159         | 37              | 12174       | 619220   | <b>6.62</b>   |
| 10        | 171         | 39              | 12176       | 619225   | <b>6.62</b>   |
| 11        | 200         | 42              | 12178       | 619230   | <b>14.21</b>  |
| 12        | 220         | 44              | 12180       | 619235   | <b>14.21</b>  |
| 13        | 240         | 48              | 12182       | 619600   | <b>14.76</b>  |
| 14        | 260         | 55              | 12184       | 619240   | <b>18.83</b>  |
| 17        | 280         | 61              | 12186       | 619245   | <b>26.93</b>  |
| 19        | 295         | 69              | 12188       | 619601   | <b>37.45</b>  |
| 22        | 325         | 78              | 12191       | 619602   | <b>61.73</b>  |
| 24        | 364         | 88              | 12193       | 619603   | <b>91.41</b>  |
| 32        | 432         | 122             | 12196       | 619604   | <b>351.12</b> |
| 36        | 516         | 137             | 12198       | 619605   | <b>572.26</b> |



Corrosion resistant finish. Environmentally safe, provides better tool grip, resists solvents and is 5 times more corrosion resistant than competitor finishes.



Up to 20% stronger, with more torque and twice the wear resistance of standard grades of steel.

## Hex End L-Wrench Sets — Short — Inch



- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection

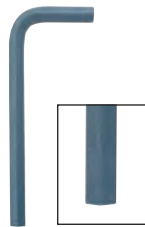


| Model   | Pcs | Contents   | Bondhus EDP | Code No. | Price \$     |
|---------|-----|--|-------------|----------|--------------|
| HLX7S   | 7   | 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16"   | 12245       | 619606   | <b>8.82</b>  |
| HLX12S  | 12  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16"   | 12236       | 619607   | <b>14.34</b> |
| HLX13S  | 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8"  | 12237       | 619608   | <b>17.28</b> |
| MHLX15S | 15  | 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" (in metal box)  | 12344       | 619609   | <b>72.34</b> |
| MHLX18S | 18  | 0.028, 0.035, 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8, 1/2, 9/16, 5/8" (in metal box) | 12339       | 619610   | <b>86.97</b> |
| PHLX7S  | 7   | 5/64, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4"  | 12345       | 619611   | <b>9.14</b>  |

## Hex End L-Wrenches — Short — Inch



- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Size  | Length (in.) | Arm Length (in.) | Bondhus EDP | Code No. | Price \$      |
|-------|--------------|------------------|-------------|----------|---------------|
| 0.028 | 1.2          | 0.22             | 12200       | 619612   | <b>0.90</b>   |
| 0.035 | 1.2          | 0.34             | 12201       | 619613   | <b>0.90</b>   |
| 0.050 | 1.6          | 0.53             | 12202       | 619614   | <b>0.62</b>   |
| 1/16  | 1.8          | 0.56             | 12203       | 619615   | <b>0.67</b>   |
| 5/64  | 1.9          | 0.61             | 12204       | 619616   | <b>0.72</b>   |
| 3/32  | 2.0          | 0.65             | 12205       | 619617   | <b>0.72</b>   |
| 7/64  | 2.1          | 0.70             | 12206       | 619618   | <b>0.77</b>   |
| 1/8   | 2.3          | 0.75             | 12207       | 619619   | <b>0.77</b>   |
| 9/64  | 2.4          | 0.80             | 12208       | 619620   | <b>0.76</b>   |
| 5/32  | 2.5          | 0.84             | 12209       | 619621   | <b>0.76</b>   |
| 3/16  | 2.8          | 0.94             | 12210       | 619622   | <b>1.03</b>   |
| 7/32  | 3.0          | 1.03             | 12211       | 619623   | <b>1.33</b>   |
| 1/4   | 3.3          | 1.13             | 12212       | 619624   | <b>1.61</b>   |
| 5/16  | 3.8          | 1.25             | 12213       | 619625   | <b>2.51</b>   |
| 3/8   | 4.3          | 1.38             | 12214       | 619626   | <b>3.59</b>   |
| 7/16  | 4.8          | 1.50             | 12215       | 619627   | <b>8.46</b>   |
| 1/2   | 5.3          | 1.63             | 12216       | 619628   | <b>9.95</b>   |
| 9/16  | 5.8          | 1.75             | 12217       | 619629   | <b>13.91</b>  |
| 5/8   | 6.3          | 1.88             | 12218       | 619630   | <b>17.75</b>  |
| 3/4   | 7.3          | 2.13             | 12219       | 619631   | <b>28.16</b>  |
| 7/8   | 8.2          | 2.37             | 12220       | 619632   | <b>44.88</b>  |
| 1     | 9.2          | 2.62             | 12221       | 619633   | <b>65.81</b>  |
| 1-1/4 | 11.0         | 3.00             | 12225       | 619634   | <b>171.64</b> |
| 1-1/2 | 13.0         | 3.50             | 12229       | 619635   | <b>214.51</b> |
| 1-3/4 | 13.3         | 4.00             | 12231       | 619636   | <b>409.97</b> |
| 2     | 15.0         | 4.50             | 12233       | 619637   | <b>550.41</b> |

## Hex End L-Wrench Sets — Short — Metric



- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection

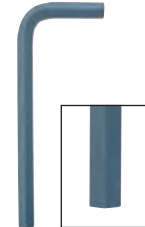


| Model    | Pcs | Contents   | Bondhus EDP | Code No. | Price \$     |
|----------|-----|--|-------------|----------|--------------|
| HLX6MS   | 6   | 1.5, 2, 2.5, 3, 4, 5mm   | 12246       | 619638   | <b>10.56</b> |
| HLX9MS   | 9   | 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm                                   | 12299       | 619639   | <b>16.28</b> |
| MHLX12MS | 12  | 0.71, 0.89, 1.27, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm (in metal box)  | 12393       | 619640   | <b>60.01</b> |
| PHLX11MS | 11  | 2, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 12mm (in vinyl pouch)             | 12391       | 619641   | <b>42.45</b> |
| PHLX14MS | 14  | 2, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 17, 19mm (in vinyl pouch) | 12397       | 619642   | <b>70.45</b> |

## Hex End L-Wrenches — Short — Metric



- Chamfered tool tips eliminate burrs and help tools seat in screw head
- Sharp corners transfer more torque to the screw and reduce stripping
- Precision machined for ease of use and superior fit
- ProGuard™ finish delivers superior corrosion protection



| Size (mm) | Length (mm) | Arm Length (mm) | Bondhus EDP | Code No. | Price \$      |
|-----------|-------------|-----------------|-------------|----------|---------------|
| 0.71      | 31          | 6               | 12247       | 619643   | <b>0.90</b>   |
| 0.89      | 31          | 9               | 12248       | 619644   | <b>0.90</b>   |
| 1.27      | 42          | 13              | 12249       | 619645   | <b>0.62</b>   |
| 1.5       | 44          | 14              | 12250       | 619646   | <b>0.62</b>   |
| 2.0       | 49          | 16              | 12252       | 619647   | <b>0.72</b>   |
| 2.5       | 54          | 17              | 12254       | 619648   | <b>0.72</b>   |
| 3.0       | 61          | 19              | 12256       | 619649   | <b>0.77</b>   |
| 3.5       | 65          | 21              | 12258       | 619650   | <b>0.76</b>   |
| 4.0       | 68          | 22              | 12260       | 619651   | <b>0.76</b>   |
| 4.5       | 73          | 25              | 12262       | 619652   | <b>1.03</b>   |
| 5.0       | 78          | 27              | 12264       | 619653   | <b>1.03</b>   |
| 6.0       | 88          | 31              | 512268      | 619654   | <b>1.61</b>   |
| 7.0       | 93          | 33              | 12270       | 619655   | <b>2.56</b>   |
| 8.0       | 98          | 35              | 12272       | 619656   | <b>2.56</b>   |
| 9.0       | 102         | 37              | 12274       | 619657   | <b>4.24</b>   |
| 10.0      | 109         | 39              | 12276       | 619658   | <b>4.16</b>   |
| 11.0      | 115         | 42              | 12278       | 619659   | <b>10.67</b>  |
| 12.0      | 122         | 44              | 12280       | 619660   | <b>10.67</b>  |
| 13.0      | 129         | 48              | 12282       | 619661   | <b>12.37</b>  |
| 14.0      | 136         | 55              | 12284       | 619662   | <b>14.57</b>  |
| 17.0      | 156         | 61              | 12286       | 619663   | <b>15.90</b>  |
| 19.0      | 175         | 69              | 12288       | 619664   | <b>26.93</b>  |
| 22.0      | 190         | 78              | 12291       | 619665   | <b>61.60</b>  |
| 24.0      | 213         | 88              | 12293       | 619666   | <b>72.80</b>  |
| 27.0      | 238         | 98              | 12295       | 619667   | <b>154.08</b> |
| 32.0      | 300         | 122             | 12296       | 619668   | <b>184.81</b> |
| 36.0      | 338         | 137             | 12298       | 619669   | <b>218.11</b> |

## Hex End L-Wrench Sets — Long & Extra Long



| Pcs | Contents   | Gray EDP | Code No. | Price \$ |
|-----|--|----------|----------|----------|
| 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8 | 68713    | 865117   | 21.09    |
| 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8 | 68713XL  | 865016   | 36.20    |
| 9   | 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm                           | 68709    | 865118   | 20.16    |
| 9   | 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm                           | 68709XL  | 865017   | 34.36    |
| 22  | All pieces contained in 68713 & 68709                                      | 68723    | 865045   | 41.22    |

## TORX® L-Wrench Sets

- Fits all TORX® and Star screws
- Broad contact surface provides deep lobe engagement
- Straight, vertical sidewalls increase tool engagement and virtually eliminates camout
- ProGuard™ finish delivers superior corrosion protection



| Model | Pcs | Contents                              | Bondhus EDP | Code No. | Price \$ |
|-------|-----|---------------------------------------|-------------|----------|----------|
| TLX8S | 8   | T6, T7, T8, T9, T10, T15, T20, T25    | 31832       | 619670   | 38.46    |
| TLX8  | 8   | T9, T10, T15, T20, T25, T27, T30, T40 | 31834       | 619671   | 33.11    |

## TORX® L-Wrenches — Long

- Fits all TORX® and Star screws
- Broad contact surface provides deep lobe engagement
- Straight, vertical sidewalls increase tool engagement and virtually eliminates camout
- ProGuard™ finish delivers superior corrosion protection



| Size | Length (in.) | Arm Length (in.) | Bondhus EDP | Code No. | Price \$ |
|------|--------------|------------------|-------------|----------|----------|
| T6   | 2.1          | 0.65             | 31806       | 619672   | 7.71     |
| T7   | 2.4          | 0.65             | 31807       | 619673   | 6.87     |
| T8   | 2.6          | 0.65             | 31808       | 619674   | 6.87     |
| T9   | 2.9          | 0.65             | 31809       | 619675   | 6.87     |
| T10  | 3.2          | 0.73             | 31810       | 619676   | 3.83     |
| T15  | 3.3          | 0.78             | 31815       | 619677   | 3.97     |
| T20  | 3.6          | 0.78             | 31820       | 619678   | 4.11     |
| T25  | 3.8          | 0.88             | 31825       | 619679   | 4.39     |
| T27  | 4.2          | 0.95             | 31827       | 619680   | 4.32     |
| T30  | 4.6          | 1.03             | 31830       | 619681   | 5.04     |
| T40  | 4.9          | 1.11             | 31840       | 619682   | 5.42     |
| T45  | 5.4          | 1.2              | 31845       | 619683   | 7.38     |
| T50  | 6.2          | 1.25             | 31850       | 619684   | 9.25     |
| T55  | 6.7          | 1.36             | 31855       | 619685   | 13.92    |
| T60  | 7.2          | 1.75             | 31860       | 619686   | 18.26    |

## Tamper Resistant TORX® L-Wrench Sets

- Fits all TORX® and Star screws
- Broad contact surface provides deep lobe engagement
- Straight, vertical sidewalls increase tool engagement and virtually eliminates camout
- ProGuard™ finish delivers superior corrosion protection



| Model   | Pcs | Contents                                   | Bondhus EDP | Code No. | Price \$ |
|---------|-----|--|-------------|----------|----------|
| TR-TL8S | 8   | TR6, TR7, TR8, TR9, TR10, TR15, TR20, TR25 | 32432       | 619689   | 41.08    |
| TR-TL8  | 8   | T9, T10, T15, T20, T25, T27, T30, T40      | 32434       | 619690   | 56.56    |

## Hex End GorillaGrip® Fold Ups

- Chamfered tool tips eliminate burrs and help tools seat in screws
- World's strongest handle
- Speed-Wrench feature
- Tools open from both the top and bottom
- Molded-in 90° stop
- Patented spacers between tools



| Model         | Pcs | Contents  | Bondhus EDP | Code No. | Price \$ |
|---------------|-----|---|-------------|----------|----------|
| <b>Inch</b>   |     |   |             |          |          |
| HF9S          | 9   | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16" | 12591       | 619702   | 13.77    |
| HF9           | 9   | 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4"   | 12589       | 619505   | 16.93    |
| HF5           | 5   | 3/16, 7/32, 1/4, 5/16, 3/8"                           | 12585       | 619703   | 24.37    |
| <b>Metric</b> |     |   |             |          |          |
| HF7MS         | 7   | 1.5, 2, 2.5, 3, 4, 5, 6mm                             | 12592       | 619704   | 13.60    |
| HF7M          | 7   | 2, 2.5, 3, 4, 5, 6, 8mm                               | 12587       | 619515   | 18.82    |
| HF6M          | 6   | 3, 4, 5, 6, 8, 10mm                                   | 12595       | 619705   | 26.34    |

## GorillaGrip® Fold Up Multi Packs

- Assembled from our most popular Fold Up sets
- Multiple Fold Up sets per package
- Tip selections include Hex End and TORX® Tip
- ProGuard™ finish delivers superior corrosion protection



| Model | Pcs | Contents   | Bondhus EDP | Code No. | Price \$ |
|-------|-----|--|-------------|----------|----------|
| HF16  | 16  | 12589 (5/64-1/4") + 12587 (2-8mm)                  | 12522       | 619687   | 34.14    |
| HF24  | 24  | 12589 (5/64-1/4") + 12587 (2-8mm) + 12634 (T9-T40) | 12533       | 619688   | 62.35    |

## TORX® GorillaGrip® Fold Ups

- Fits all TORX® and Star screws
- World's strongest handle
- Speed-Wrench feature
- Tools open from both the top and bottom
- Molded-in 90° stop
- Patented spacers between tools
- ProGuard™ finish delivers superior corrosion protection



| Model | Pcs | Contents                              | Bondhus EDP | Code No. | Price \$ |
|-------|-----|---------------------------------------|-------------|----------|----------|
| TF8S  | 8   | T6, T7, T8, T9, T10, T15, T20, T25    | 12632       | 619520   | 33.95    |
| TF8   | 8   | T9, T10, T15, T20, T25, T27, T30, T40 | 12634       | 619521   | 33.45    |

## Ball End T-Handle Sets



- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- Handle coating extends along blade
- ProGuard™ finish delivers superior corrosion protection
- Graduated blade



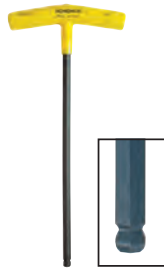
| Model         | Pcs | Contents  | Bondhus EDP | Code No. | Price \$ |
|---------------|-----|---|-------------|----------|----------|
| <b>Inch</b>   |     |   |             |          |          |
| BTX60         | 6   | 5/32, 3/16, 7/32, 1/4, 5/16, 3/8"                                     | 13146       | 619706   | 98.15    |
| BTX10/S*      | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" (with stand) | 13190       | 619785   | 141.24   |
| BTX10*        | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8"              | 13138       | 619043   | 132.42   |
| <b>Metric</b> |     |   |             |          |          |
| BTX50M        | 5   | 4, 5, 6, 8, 10mm  | 13148       | 619707   | 84.38    |
| BTX80M/S*     | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm (with stand)                              | 13189       | 619790   | 117.33   |
| BTX80M*       | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm   | 13187       | 619783   | 108.51   |

\* The 3/32, 7/64, 1/8, 9/64 & 2mm, 2.5mm, 3mm blades are straight hex blades to prevent breakage

## Ball End T-Handles



- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- Handle coating extends along blade
- ProGuard™ finish delivers superior corrosion protection
- Graduated blades



| Size          | Length (in./mm) | Arm Length (in./mm) | Bondhus EDP | Code No. | Price \$ |
|---------------|-----------------|---------------------|-------------|----------|----------|
| <b>Inch</b>   |                 |                     |             |          |          |
| 3/32          | 6.1             | 3.0                 | 13205       | 619708   | 10.21    |
| 7/64          | 6.8             | 3.0                 | 13206       | 619709   | 11.03    |
| 1/8           | 7.6             | 3.0                 | 13207       | 619710   | 11.64    |
| 9/64          | 8.3             | 3.0                 | 13208       | 619791   | 12.36    |
| 5/32          | 9.1             | 3.0                 | 13109       | 619792   | 13.18    |
| 3/16          | 9.8             | 4.0                 | 13110       | 619793   | 12.94    |
| 7/32          | 10.3            | 4.0                 | 13111       | 619794   | 15.43    |
| 1/4           | 10.8            | 4.0                 | 13112       | 619795   | 15.77    |
| 5/16          | 11.4            | 5.0                 | 13113       | 619796   | 24.22    |
| 3/8           | 11.8            | 5.0                 | 13114       | 619797   | 26.69    |
| <b>Metric</b> |                 |                     |             |          |          |
| 2.0           | 150             | 76                  | 13252       | 619798   | 11.64    |
| 2.5           | 172             | 76                  | 13254       | 619799   | 11.64    |
| 3.0           | 196             | 76                  | 13256       | 619800   | 12.36    |
| 4.0           | 220             | 76                  | 13160       | 619801   | 13.88    |
| 5.0           | 246             | 102                 | 13164       | 619802   | 15.94    |
| 6             | 266             | 102                 | 13168       | 619803   | 17.30    |
| 8             | 285             | 127                 | 13172       | 619804   | 24.60    |
| 10            | 307             | 127                 | 13176       | 619805   | 26.97    |

## Hex End T-Handle Sets



- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- Handle coating extends along blade
- ProGuard™ finish delivers superior corrosion protection



| Model         | Pcs | Contents   | Length | Bondhus EDP | Code No. | Price \$ |
|---------------|-----|--|--------|-------------|----------|----------|
| <b>Inch</b>   |     |  |        |             |          |          |
| HTX80-6       | 8   | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4"            | 6"     | 15232       | 619806   | 74.37    |
| HTX80-9       | 8   | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4"            | 9"     | 15332       | 619807   | 105.92   |
| HTX10/S-6*    | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 6"     | 15290       | 619808   | 120.52   |
| HTX10-6       | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 6"     | 15238       | 619809   | 111.55   |
| HTX10/S-9*    | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 9"     | 15390       | 619810   | 167.02   |
| HTX10-9       | 10  | 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 9"     | 15338       | 619811   | 158.18   |
| <b>Metric</b> |     |  |        |             |          |          |
| HTX60M-6      | 6   | 2, 2.5, 3, 4, 5, 6mm                                     | 6"     | 15248       | 619812   | 55.61    |
| HTX60M-9      | 6   | 2, 2.5, 3, 4, 5, 6mm                                     | 9"     | 15348       | 619813   | 83.13    |
| HTX80M/S-6*   | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm                              | 6"     | 15289       | 619814   | 105.92   |
| HTX80M-6      | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm                              | 6"     | 15287       | 619815   | 98.87    |
| HTX80M/S-9*   | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm                              | 9"     | 15389       | 619816   | 144.55   |
| HTX80M-9      | 8   | 2, 2.5, 3, 4, 5, 6, 8, 10mm                              | 9"     | 15387       | 619817   | 135.58   |

\* Comes with stand

## Hex End T-Handles - 6" & 9" — Inch



- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- Handle coating extends along blade
- ProGuard™ finish delivers superior corrosion protection



| Size | Length (in.) | Handle Length (in.) | Bondhus EDP | Code No. | Price \$ |
|------|--------------|---------------------|-------------|----------|----------|
| 3/32 | 6.0          | 3.0                 | 15205       | 619818   | 8.11     |
| 7/64 | 6.0          | 3.0                 | 15206       | 619819   | 8.26     |
| 1/8  | 6.0          | 3.0                 | 15207       | 619820   | 9.15     |
| 9/64 | 6.0          | 3.0                 | 15208       | 619821   | 9.73     |
| 5/32 | 6.0          | 3.0                 | 15209       | 619822   | 10.25    |
| 3/16 | 6.0          | 4.0                 | 15210       | 619823   | 11.40    |
| 7/32 | 6.0          | 4.0                 | 15211       | 619824   | 11.61    |
| 1/4  | 6.0          | 4.0                 | 15212       | 619825   | 13.23    |
| 5/16 | 6.0          | 5.0                 | 15213       | 619826   | 21.50    |
| 3/8  | 6.0          | 5.0                 | 15214       | 619827   | 23.96    |
| 1/2  | 6.0          | 5.0                 | 15216       | 619828   | 40.20    |
| 3/32 | 9.0          | 3.0                 | 15305       | 619829   | 12.24    |
| 7/64 | 9.0          | 3.0                 | 15306       | 619830   | 13.08    |
| 1/8  | 9.0          | 3.0                 | 15307       | 619831   | 13.86    |
| 9/64 | 9.0          | 3.0                 | 15308       | 619832   | 14.17    |
| 5/32 | 9.0          | 3.0                 | 15309       | 619833   | 14.65    |
| 3/16 | 9.0          | 4.0                 | 15310       | 619834   | 14.96    |
| 7/32 | 9.0          | 4.0                 | 15311       | 619835   | 17.68    |
| 1/4  | 9.0          | 4.0                 | 15312       | 619836   | 18.10    |
| 5/16 | 9.0          | 5.0                 | 15313       | 619837   | 26.36    |
| 3/8  | 9.0          | 5.0                 | 15314       | 619838   | 29.13    |
| 1/2  | 9.0          | 5.0                 | 15316       | 619839   | 48.85    |



## Hex End T-Handles - 6" & 9" — Metric



- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- Handle coating extends along blade
- ProGuard™ finish delivers superior corrosion protection



| Size | Length (in.) | Handle Length (in.) | Bondhus EDP | Code No. | Price \$ |
|------|--------------|---------------------|-------------|----------|----------|
| 2.0  | 6.0          | 3.0                 | 15252       | 619526   | 8.26     |
| 2.5  | 6.0          | 3.0                 | 15254       | 619527   | 8.26     |
| 3.0  | 6.0          | 3.0                 | 15256       | 619528   | 9.00     |
| 4.0  | 6.0          | 3.0                 | 15260       | 619529   | 10.25    |
| 5.0  | 6.0          | 4.0                 | 15264       | 619530   | 11.25    |
| 6    | 6.0          | 4.0                 | 15268       | 619531   | 14.33    |
| 8    | 6.0          | 5.0                 | 15272       | 619532   | 22.54    |
| 10   | 6.0          | 5.0                 | 15276       | 619533   | 25.05    |
| 2.0  | 9.0          | 3.0                 | 15352       | 619534   | 13.86    |
| 2.5  | 9.0          | 3.0                 | 15354       | 619535   | 13.86    |
| 3.0  | 9.0          | 3.0                 | 15356       | 619536   | 14.65    |
| 4.0  | 9.0          | 3.0                 | 15360       | 619537   | 14.96    |
| 5.0  | 9.0          | 4.0                 | 15364       | 619538   | 17.16    |
| 6    | 9.0          | 4.0                 | 15368       | 619539   | 18.72    |
| 8    | 9.0          | 5.0                 | 15372       | 619540   | 26.78    |
| 10   | 9.0          | 5.0                 | 15376       | 619541   | 29.34    |

## 8pc SAE Loop Handle Hex Key Set



- Precisely-sized, chamfered edges provide a better fit and grip reducing the likelihood of stripping fastener heads
- Meets ANSI standards
- PVC dipped handle
- Corrosion resistant black phosphate finish



| Pcs | Contents                                    | Blade Length | Dynamic EDP | Code No. | Price \$ |
|-----|---|--------------|-------------|----------|----------|
| 8   | 5/64, 3/32, 1/8, 5/32, 3/16, 1/4, 5/16, 3/8 | 9"           | D043420     | 866569   | 53.58    |

## 8pc Metric Loop Handle Hex Key Set



- Precisely-sized, chamfered edges provide a better fit and grip reducing the likelihood of stripping fastener heads
- Meets ANSI standards
- PVC dipped handle
- Corrosion resistant black phosphate finish

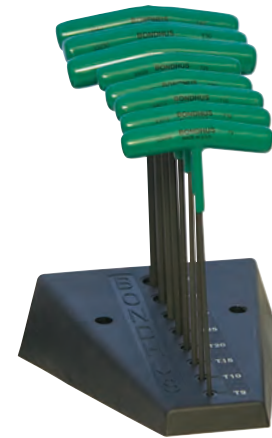


| Pcs | Contents (mm)             | Blade Length | Dynamic EDP | Code No. | Price \$ |
|-----|---------------------------|--------------|-------------|----------|----------|
| 8   | 2, 2.5, 3, 4, 5, 6, 8, 10 | 9"           | D043320     | 866633   | 53.58    |

## TORX® T-Handle Sets



- Fits all TORX® and Star screws
- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- ProGuard™ finish delivers superior corrosion protection



| Model | Pcs | Contents                              | Length    | Bondhus EDP | Code No. | Price \$ |
|-------|-----|---------------------------------------|-----------|-------------|----------|----------|
| TTHX8 | 8   | T9, T10, T15, T20, T25, T27, T30, T40 | Graduated | 33034       | 619542   | 110.89   |

## TORX® T-Handles



- Fits all TORX® and Star screws
- Solid steel handles
- Welded handle/blade connection
- Ergonomic handle design
- Flywheel effect saves time
- Smooth, non-porous handle coating
- ProGuard™ finish delivers superior corrosion protection



| Size | Length (mm) | Handle Length (mm) | Bondhus EDP | Code No. | Price \$ |
|------|-------------|--------------------|-------------|----------|----------|
| T9   | 6.1         | 3.0                | 33009       | 619543   | 11.53    |
| T10  | 6.4         | 3.0                | 33010       | 619544   | 12.07    |
| T15  | 6.6         | 3.0                | 33015       | 619545   | 12.79    |
| T20  | 6.9         | 3.0                | 33020       | 619546   | 13.42    |
| T25  | 7.1         | 3.0                | 33025       | 619547   | 13.96    |
| T27  | 7.4         | 4.0                | 33027       | 619548   | 14.72    |
| T30  | 7.6         | 4.0                | 33030       | 619549   | 15.49    |
| T40  | 7.9         | 4.0                | 33040       | 619550   | 17.42    |
| T45  | 8.1         | 5.0                | 33045       | 619551   | 19.45    |
| T50  | 8.4         | 5.0                | 33050       | 619552   | 22.74    |
| T55  | 8.6         | 5.0                | 33055       | 619553   | 29.49    |



Corrosion resistant finish. Environmentally safe, provides better tool grip, resists solvents and is 5 times more corrosion resistant than competitor finishes.



Up to 20% stronger, with more torque and twice the wear resistance of standard grades of steel.

# BONDHUS® ClickSet™ TLD (Torque Limiting Device)

- Wide range of factory preset torque limiting handles – no adjustment needed
- When the preset torque level is reached, the mechanism slips and makes an audible “click”
- Protects from overtorquing
- Reduces fastener wear and stripping
- Reduces potential damage to carbide inserts
- Universal TORX® for TORX PLUS® and older style TORX® fasteners
- +/- 10% repeatability

## Handles



| Torque            | Bondhus EDP | Code No. | Price \$ |
|-------------------|-------------|----------|----------|
| 4.4 in-lb/0.5 Nm  | 50404       | 619554   | 60.86    |
| 5.3 in-lb/0.6 Nm  | 50405       | 619555   | 60.86    |
| 8.0 in-lb/0.9 Nm  | 50408       | 619556   | 60.86    |
| 9.7 in-lb/1.1 Nm  | 50409       | 619557   | 60.86    |
| 10.6 in-lb/1.2 Nm | 50410       | 619558   | 60.86    |
| 12.4 in-lb/1.4 Nm | 50412       | 619559   | 56.77    |
| 17.7 in-lb/2.0 Nm | 50417       | 619560   | 56.77    |
| 22.1 in-lb/2.5 Nm | 50422       | 619561   | 56.77    |
| 26.6 in-lb/3.0 Nm | 50426       | 619562   | 56.77    |
| 31.0 in-lb/3.5 Nm | 50431       | 619563   | 56.77    |

## Blades



|                   | Size   | Bondhus EDP | Code No. | Price \$ |
|-------------------|--------|-------------|----------|----------|
| <b>Inch Hex</b>   | 0.050" | 50102       | 619564   | 21.06    |
|                   | 1/16"  | 50103       | 619565   | 21.06    |
|                   | 5/64"  | 50104       | 619566   | 21.06    |
|                   | 3/32"  | 50105       | 619567   | 21.06    |
|                   | 7/64"  | 50106       | 619568   | 21.06    |
|                   | 1/8"   | 50107       | 619569   | 21.06    |
| <b>Metric Hex</b> | 1.5mm  | 50150       | 619570   | 21.06    |
|                   | 2.0mm  | 50152       | 619571   | 21.06    |
|                   | 2.5mm  | 50154       | 619572   | 21.06    |
|                   | 3.0mm  | 50156       | 619573   | 21.06    |
| <b>TORX®</b>      | T/IP5  | 50205       | 619574   | 21.06    |
|                   | T/IP6  | 50206       | 619575   | 21.06    |
|                   | T/IP7  | 50207       | 619576   | 21.06    |
|                   | T/IP8  | 50208       | 619577   | 21.06    |
|                   | T/IP9  | 50209       | 619578   | 21.06    |
|                   | T/IP10 | 50210       | 619579   | 21.06    |
|                   | T/IP15 | 50215       | 619580   | 21.06    |

## Sets



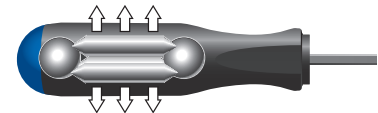
| Handle Torque     | Blade Tip | Bondhus EDP | Code No. | Price \$ |
|-------------------|-----------|-------------|----------|----------|
| 4.4 in-lb/0.5 Nm  | T/IP5     | 50004       | 619581   | 76.46    |
| 5.3 in-lb/0.6 Nm  | T/IP6     | 50005       | 619582   | 76.46    |
| 8.0 in-lb/0.9 Nm  | T/IP7     | 50008       | 619450   | 76.46    |
| 10.6 in-lb/1.2 Nm | T/IP8     | 50010       | 619451   | 76.46    |
| 12.4 in-lb/1.4 Nm | T/IP9     | 50012       | 619583   | 76.46    |
| 22.1 in-lb/2.5 Nm | T/IP10    | 50017       | 619456   | 76.46    |
| 31.0 in-lb/3.5 Nm | T/IP15    | 50026       | 619452   | 76.46    |

Impermeable PTFE finish for extra corrosion protection

TuffKote™ finish



Replaceable blades snap into handle, simplifying blade replacement



ClickSet™ Torque Limiting Devices distribute the torque load along the handle, redistributing force over a larger surface for greater accuracy and longer tool life.



The Bondhus ComfortGrip handle features a durable thermoplastic core wrapped in cushioned rubber for increased comfort and torque

ClickSet™ Blades made with:



Up to 20% stronger, with more torque and twice the wear resistance of standard grades of steel.

## Ball End Screwdriver Sets

- Ball End inserts into screw at a 25° angle
- Ergonomic handle design
- Non-slip grip
- Two component handle with tough inner core and cushioned rubber exterior
- Anti-roll design
- ProGuard™ finish delivers superior corrosion protection



| Model         | Pcs | Contents  | Bondhus EDP | Code No. | Price \$ |
|---------------|-----|---|-------------|----------|----------|
| <b>Inch</b>   |     |   |             |          |          |
| BSX8S         | 8   | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32"                             | 10632       | 619868   | 52.45    |
| BSX13         | 13  | 0.050, 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8" | 10637       | 619013   | 126.34   |
| <b>Metric</b> |     |   |             |          |          |
| BSX6M         | 6   | 1.5, 2, 2.5, 3, 4, 5mm  | 10686       | 619869   | 46.94    |
| BSX9M         | 9   | 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm  | 10699       | 619019   | 103.26   |

## Ball End Screwdrivers

- Ball End inserts into screw at a 25° angle
- Ergonomic handle design
- Non-slip grip
- Two component handle with tough innercore and cushioned rubber exterior
- Anti-roll design
- ProGuard™ finish delivers superior corrosion protection



| Size          | Length (in.) | Handle Length (in.) | Bondhus EDP | Code No. | Price \$ |
|---------------|--------------|---------------------|-------------|----------|----------|
| <b>Inch</b>   |              |                     |             |          |          |
| 0.050         | 2.4          | 4.1                 | 10602       | 619870   | 5.51     |
| 1/16          | 2.5          | 4.7                 | 10603       | 619721   | 5.89     |
| 5/64          | 2.6          | 4.8                 | 10604       | 619871   | 6.74     |
| 3/32          | 2.8          | 5.2                 | 10605       | 619872   | 7.09     |
| 7/64          | 2.9          | 5.3                 | 10606       | 619873   | 7.19     |
| 1/8           | 3.1          | 6.6                 | 10607       | 619874   | 7.24     |
| 9/64          | 3.3          | 6.8                 | 10608       | 619875   | 7.46     |
| 5/32          | 3.6          | 7.9                 | 10609       | 619876   | 8.45     |
| 3/16          | 3.7          | 8.0                 | 10610       | 619877   | 11.21    |
| 7/32          | 4.2          | 9.0                 | 10611       | 619878   | 12.07    |
| 1/4           | 5.0          | 9.8                 | 10612       | 619879   | 15.24    |
| 5/16          | 5.6          | 10.4                | 10613       | 619880   | 18.10    |
| 3/8           | 6.5          | 11.3                | 10614       | 619881   | 20.51    |
| <b>Metric</b> |              |                     |             |          |          |
| 1.5           | 2.6          | 4.7                 | 10650       | 619882   | 6.44     |
| 2.0           | 2.8          | 5.0                 | 10652       | 619883   | 7.19     |
| 2.5           | 2.7          | 5.1                 | 10654       | 619884   | 7.19     |
| 3.0           | 3.3          | 6.7                 | 10656       | 619885   | 7.29     |
| 3.5           | 3.5          | 6.9                 | 10658       | 619886   | 9.86     |
| 4.0           | 3.7          | 8.1                 | 10660       | 619887   | 8.80     |
| 5.0           | 4.3          | 8.6                 | 10664       | 619888   | 11.62    |
| 6             | 5.4          | 10.2                | 10668       | 619889   | 13.28    |
| 8             | 6.4          | 11.2                | 10672       | 619890   | 20.22    |
| 10            | 7.3          | 12.1                | 10676       | 619891   | 22.03    |

## 36pc Screwdriver & Bit Set



### Set contents:

- 4 Phillips®: #0, 1, 2, 3
- 1 Phillips® Stubby: #2
- 1 Offset Phillips®: #1, #2
- 5 Slotted: 5/32, 3/16, 1/4, 5/16, 3/8
- 1 Slotted Stubby: 1/4
- 1 Offset Slotted: 3/16, 1/4
- 4 Square Recess: #0, 1, 2, 3
- 2 Square Recess Stubby: #1, 2
- 1 Offset Square Recess: #1, 2
- Circuit Tester (110V only)
- Magnetic Bit Holder
- Torx Bits: T10, T15, T20, T25, T27, T30, T40
- Hex Bits: 2, 2.5, 3, 4, 5, 6, 8mm
- Blow mold case



| Description                | Dynamic EDP | Code No. | Price \$ |
|----------------------------|-------------|----------|----------|
| 36pc Screwdriver & Bit Set | D062505     | 865764   | 152.37   |

## 9pc Screwdriver Set — Comfort Handle



### Set contents:

- 5 Slotted: 1/8, 5/32, 1/4, 5/16, 3/8
- 2 Phillips®: #1, #2
- 2 Square Recess: #1, #2
- Plastic tray



| Description         | Dynamic EDP | Code No. | Price \$ |
|---------------------|-------------|----------|----------|
| 9pc Screwdriver Set | D062500     | 865729   | 90.91    |

## 13pc Ratcheting Screwdriver Set



### Set contents:

- Ratcheting Screwdriver Handle
- Phillips® bits: #0, 1, 2, 3
- Square bits: #0, 1, 2, 3
- Slotted bits: 3.5, 4.5, 5.5, 6.5mm



| Description                     | Dynamic EDP | Code No. | Price \$ |
|---------------------------------|-------------|----------|----------|
| 13pc Ratcheting Screwdriver Set | D062508     | 866634   | 35.99    |

## 21pc Screwdriver Set — Removable Bits



### Set contents:

- Comfort Grip handle (1/4" hex)
- 3" Screwdriver Bits
  - Torx®: T10, T15, T20, T25, T30
  - Square Recess: #0, 1, 2, 3
  - Slotted: 1/8, 5/32, 3/16
  - Phillips®: #0, 1, 2, 3
- 2" Screwdriver Bits
  - Phillips®: #1, #2 (2), #3



| Description                | Dynamic EDP | Code No. | Price \$ |
|----------------------------|-------------|----------|----------|
| 21pc Screwdriver & Bit Set | D062506     | 866103   | 55.97    |

## Phillips® Screwdrivers — Acetate Handle



- Meets ANSI standards
- High visibility, oil and solvent resistant acetate handle
- Precision-machined tip for an exact fit
- Corrosion resistant black phosphate finish shank



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| #1       | 3.00               | 6.50                 | 0.20             | D062106     | 866635   | 7.90     |
| #2       | 4.00               | 7.75                 | 0.24             | D062107     | 866636   | 10.69    |
| #3       | 6.00               | 10.00                | 0.31             | D062108     | 866637   | 16.48    |

## Phillips® Stubby Screwdrivers — Acetate Handle



- Meets ANSI standards
- High visibility, oil and solvent resistant acetate handle
- Precision-machined tip for an exact fit
- Corrosion resistant black phosphate finish shank



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| #1       | 1.50               | 3.50                 | 0.24             | D062109     | 866638   | 6.19     |
| #2       | 1.50               | 3.50                 | 0.24             | D062110     | 866639   | 6.32     |

## Phillips® Stubby Screwdrivers — Comfort Handle



- Meets ANSI standards
- High visibility, cushion-grip handle for maximum user comfort
- Precision-machined tip for an exact fit



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| #1       | 1.50               | 3.80                 | 0.20             | D062104     | 866428   | 8.96     |
| #2       | 1.50               | 3.80                 | 0.24             | D062105     | 866429   | 9.04     |

## Square Recess Screwdrivers — Comfort Handle



- Meets ANSI standards
- High visibility, cushion-grip handle for maximum user comfort
- Precision-machined tip for an exact fit



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| #0       | 2.95               | 7.40                 | 0.24             | D062201     | 866430   | 8.69     |
| #1       | 3.94               | 8.39                 | 0.24             | D062202     | 866431   | 9.04     |
| #2       | 3.94               | 8.39                 | 0.24             | D062203     | 866432   | 10.82    |
| #3       | 4.92               | 9.37                 | 0.24             | D062204     | 866433   | 18.10    |

## Square Recess Stubby Screwdrivers — Comfort Handle



- Meets ANSI standards
- High visibility, cushion-grip handle for maximum user comfort
- Precision-machined tip for an exact fit



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| #1       | 1.50               | 3.80                 | 0.24             | D062205     | 866434   | 8.69     |
| #2       | 1.50               | 3.80                 | 0.24             | D062206     | 866435   | 9.04     |

## Slotted Screwdrivers — Comfort Handle



- Meets ANSI standards
- High visibility, cushion-grip handle for maximum user comfort
- Precision-machined tip for an exact fit



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| 1/8"     | 2.95               | 6.02                 | 0.12             | D062001     | 866617   | 9.04     |
| 5/32"    | 2.95               | 6.02                 | 0.12             | D062002     | 866618   | 10.43    |
| 3/16"    | 3.94               | 7.87                 | 0.16             | D062003     | 866619   | 12.37    |
| 1/4"     | 4.92               | 9.37                 | 0.24             | D062004     | 866620   | 15.01    |
| 5/16"    | 5.91               | 10.67                | 0.31             | D062005     | 866621   | 19.85    |
| 3/8"     | 7.87               | 12.64                | 0.39             | D062006     | 866640   | 22.80    |

## Slotted Stubby Screwdrivers — Comfort Handle



- Meets ANSI standards
- High visibility, cushion-grip handle for maximum user comfort
- Precision-machined tip for an exact fit



| Tip Size | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|----------|--------------------|----------------------|------------------|-------------|----------|----------|
| 1/4"     | 1.50               | 3.80                 | 0.24             | D062007     | 866641   | 9.04     |

## SAE Nut Drivers — Acetate Handle



- Meets ANSI standards
- High visibility, oil and solvent resistant acetate handle
- Precision-machined tip for an exact fit
- Handles are colour-coded by size making finding the correct size quicker and easier



| Tip Size      | Blade Length (in.) | Overall Length (in.) | Shank Size (in.) | Dynamic EDP | Code No. | Price \$ |
|---------------|--------------------|----------------------|------------------|-------------|----------|----------|
| <b>Inch</b>   |                    |                      |                  |             |          |          |
| 3/16"         | 3"                 | 6.75                 | 0.24             | D062401     | 866436   | 14.50    |
| 1/4"          | 3"                 | 6.75                 | 0.24             | D062402     | 866437   | 14.50    |
| 5/16"         | 3"                 | 6.75                 | 0.31             | D062403     | 866438   | 14.50    |
| 11/32"        | 3"                 | 6.75                 | 0.31             | D062404     | 866439   | 14.50    |
| 3/8"          | 3"                 | 6.75                 | 0.31             | D062405     | 866440   | 15.15    |
| 7/16"         | 3"                 | 6.75                 | 0.43             | D062406     | 866441   | 15.30    |
| 1/2"          | 3"                 | 6.75                 | 0.43             | D062407     | 866442   | 16.63    |
| <b>Metric</b> |                    |                      |                  |             |          |          |
| 5mm           | 3"                 | 6.75                 | 0.24             | D062408     | 866443   | 13.68    |
| 6mm           | 3"                 | 6.75                 | 0.24             | D062409     | 866444   | 13.68    |
| 7mm           | 3"                 | 6.75                 | 0.31             | D062410     | 866445   | 13.20    |
| 8mm           | 3"                 | 6.75                 | 0.31             | D062411     | 866446   | 13.20    |
| 9mm           | 3"                 | 6.75                 | 0.31             | D062412     | 866447   | 13.68    |
| 10mm          | 3"                 | 6.75                 | 0.43             | D062413     | 866448   | 13.68    |
| 11mm          | 3"                 | 6.75                 | 0.43             | D062414     | 866449   | 13.68    |

## Slotted Insulated Screwdrivers



- Meets ANSI standards
- Precision-machined tip for an exact fit
- Ergonomic handle reduces fatigue and improves user comfort



| Tip Size | Blade Length | Overall Length | Shank Size | Dynamic EDP | Code No. | Price \$ |
|----------|--------------|----------------|------------|-------------|----------|----------|
| 1/8"     | 3.93         | 7.50           | 1.00       | D062701     | 866450   | 13.46    |
| 5/32"    | 3.93         | 8.00           | 1.18       | D062702     | 866451   | 14.13    |
| 7/32"    | 4.98         | 9.00           | 1.18       | D062703     | 866452   | 18.84    |
| 1/4"     | 5.93         | 10.50          | 1.37       | D062704     | 866453   | 21.97    |

## Phillips® Insulated Screwdrivers



- Meets ANSI standards
- Precision-machined tip for an exact fit
- Ergonomic handle reduces fatigue and improves user comfort



| Tip Size | Blade Length | Overall Length | Shank Size | Dynamic EDP | Code No. | Price \$ |
|----------|--------------|----------------|------------|-------------|----------|----------|
| #1       | 3.20         | 7.25           | 1.17       | D062705     | 866454   | 18.03    |
| #2       | 4.00         | 8.50           | 1.39       | D062706     | 866455   | 24.74    |

## 6pc Insulated Screwdriver Set



- Meets ANSI standards
- Precision-machined tips for an exact fit



| Description                     | Dynamic EDP | Code No. | Price \$ |
|---------------------------------|-------------|----------|----------|
| 6pc Insulated Screwdriver Set   | D062720     | 866456   | 104.68   |
| <b>Contents</b>                 |             |          |          |
| 2 Phillips®: #1, #2             |             |          |          |
| 4 Slotted: 1/8, 5/32, 7/32, 1/4 |             |          |          |
| Plastic Tray                    |             |          |          |

## Sockets & Attachments 1/4" Drive

### Quick Release Ratchet — Chrome Handle



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Teardrop head design allows for great access in confined spaces



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 5"     | 45           | D001301     | 866642   | 50.83    |

### Stubby Ratchet



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Stubby design allows greater access in confined spaces



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 3.5"   | 48           | D001307     | 866644   | 50.18    |

### Quick Release Ratchet — Chrome Handle



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Teardrop head design allows for great access in confined spaces



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 7.6"   | 45           | D005301     | 866130   | 66.02    |

### Quick Release Ratchet — Comfort Handle — Long



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- 270° swivel head design allows greater access in confined spaces



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 9"     | 72           | D005306     | 866087   | 83.63    |

### Chrome Extensions



- Chrome finish for maximum resistance against corrosion
- Provides the added reach needed to access fasteners in tight spaces
- Knurled surface for easy mounting and removal from sockets and ratchets



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 3.00"  | D005003     | 866124   | 11.75    |
| 6.00"  | D005006     | 866125   | 17.01    |
| 10.00" | D005010     | 866126   | 24.53    |

### Universal Joint



- Chrome finish for maximum resistance against corrosion
- Ball and spring socket retention mechanism
- 360° articulation for access to fasteners in confined spaces



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 1.81"  | D005601     | 866133   | 28.02    |

### Stubby Ratchet



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Stubby design allows greater access in confined spaces



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 4.75"  | 48           | D005307     | 866131   | 56.90    |

### Flex Head Ratchet



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Release button ensures sockets and attachments securely lock on and quickly-release off



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 11.75" | 48           | D005308     | 866003   | 80.31    |

## Sliding T-Handle



- Ball and spring socket retention mechanism
- Chrome finish for maximum resistance against corrosion
- Ideal for loosening stuck and stubborn nuts and bolts
- Sliding handle allows for the application of extra torque in confined space applications



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 6.46"  | D005500     | 866132   | 26.36    |

## Adapters



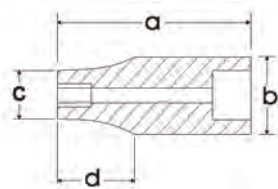
- Versatile tool that expands the capabilities of any existing socket and attachment collection
- Chrome finish for maximum resistance against corrosion
- Ball and spring retention system provides a safe and secure hold



| Length | Female | Male | Dynamic EDP | Code No. | Price \$ |
|--------|--------|------|-------------|----------|----------|
| 1.38"  | 3/8"   | 1/4" | D005701     | 866134   | 7.68     |
| 1.81"  | 3/8"   | 1/2" | D005702     | 866135   | 9.09     |

## SAE Standard Chrome Sockets

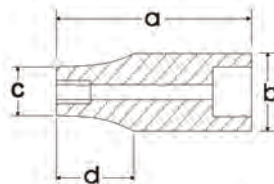
- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments



| Size   | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|--------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 1/4"   | 1.10"              | 0.66"         | 0.39"       | 0.47"            | D008308     | 866174           | 7.68     | D009408     | 866645            | 7.68     |
| 5/16"  | 1.10"              | 0.66"         | 0.47"       | 0.47"            | D008310     | 866175           | 7.68     | D009410     | 866646            | 7.68     |
| 3/8"   | 1.10"              | 0.66"         | 0.54"       | 0.47"            | D008312     | 866176           | 7.68     | D009412     | 866647            | 7.68     |
| 7/16"  | 1.10"              | 0.66"         | 0.63"       | 0.47"            | D008314     | 866177           | 7.68     | D009414     | 866648            | 7.68     |
| 1/2"   | 1.10"              | 0.70"         | 0.70"       | -                | D008316     | 866178           | 7.83     | D009416     | 866649            | 7.83     |
| 9/16"  | 1.10"              | 0.78"         | 0.78"       | -                | D008318     | 866179           | 7.98     | D009418     | 866650            | 7.98     |
| 5/8"   | 1.10"              | 0.86"         | 0.86"       | -                | D008320     | 866180           | 8.16     | D009420     | 866651            | 8.16     |
| 11/16" | 1.18"              | 0.94"         | 0.94"       | -                | D008322     | 866181           | 8.27     | D009422     | 866652            | 8.27     |
| 3/4"   | 1.18"              | 1.02"         | 1.02"       | -                | D008324     | 866182           | 8.43     | D009424     | 866653            | 8.43     |
| 13/16" | 1.18"              | 1.09"         | 1.09"       | -                | D008326     | 866183           | 8.60     | D009426     | 866654            | 8.55     |
| 7/8"   | 1.18"              | 1.17"         | 1.17"       | -                | D008328     | 866184           | 8.74     | D009428     | 866655            | 8.68     |
| 15/16" | 1.18"              | 1.25"         | 1.25"       | -                | D008330     | 866185           | 9.35     | D009430     | 866656            | 8.85     |
| 1"     | 1.18"              | 1.33"         | 1.33"       | -                | D008332     | 866186           | 10.12    | D009432     | 866657            | 9.00     |

## Metric Standard Chrome Sockets

- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments

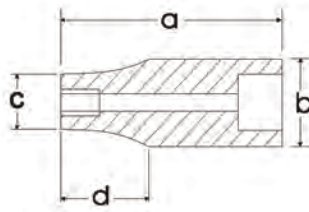


| Size | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 6mm  | 1.10"              | 0.66"         | 0.39"       | 0.47"            | D008006     | 866137           | 7.68     | D009106     | 866658            | 7.15     |
| 7mm  | 1.10"              | 0.66"         | 0.43"       | 0.47"            | D008007     | 866138           | 7.68     | D009107     | 866659            | 7.43     |
| 8mm  | 1.10"              | 0.66"         | 0.47"       | 0.47"            | D008008     | 866139           | 7.68     | D009108     | 866660            | 7.68     |
| 9mm  | 1.10"              | 0.66"         | 0.52"       | 0.47"            | D008009     | 866140           | 7.68     | D009109     | 866661            | 7.68     |
| 10mm | 1.10"              | 0.66"         | 0.58"       | 0.47"            | D008010     | 866141           | 7.68     | D009110     | 866662            | 7.68     |
| 11mm | 1.10"              | 0.66"         | 0.62"       | 0.47"            | D008011     | 866142           | 7.68     | D009111     | 866663            | 7.68     |
| 12mm | 1.10"              | 0.66"         | 0.66"       | -                | D008012     | 866143           | 7.83     | D009112     | 866664            | 7.83     |
| 13mm | 1.10"              | 0.70"         | 0.70"       | -                | D008013     | 866144           | 7.83     | D009113     | 866665            | 7.83     |
| 14mm | 1.10"              | 0.78"         | 0.78"       | -                | D008014     | 866145           | 7.98     | D009114     | 866666            | 7.98     |
| 15mm | 1.10"              | 0.86"         | 0.86"       | -                | D008015     | 866146           | 8.16     | D009115     | 866667            | 8.16     |
| 16mm | 1.10"              | 0.86"         | 0.86"       | -                | D008016     | 866147           | 8.27     | D009116     | 866668            | 8.27     |
| 17mm | 1.18"              | 0.94"         | 0.94"       | -                | D008017     | 866148           | 8.27     | D009117     | 866669            | 8.27     |
| 18mm | 1.18"              | 1.02"         | 1.02"       | -                | D008018     | 866149           | 8.43     | D009118     | 866670            | 8.43     |
| 19mm | 1.18"              | 1.02"         | 1.02"       | -                | D008019     | 866150           | 8.43     | D009119     | 866671            | 8.43     |
| 20mm | 1.18"              | 1.09"         | 1.09"       | -                | D008020     | 866151           | 9.27     | D009120     | 866672            | 8.60     |
| 21mm | 1.18"              | 1.09"         | 1.09"       | -                | D008021     | 866152           | 9.27     | D009121     | 866673            | 8.73     |
| 22mm | 1.18"              | 1.17"         | 1.17"       | -                | D008022     | 866153           | 9.79     | D009122     | 866674            | 8.86     |
| 23mm | 1.18"              | 1.25"         | 1.25"       | -                | D008023     | 866154           | 10.08    | D009123     | 866675            | 9.01     |
| 24mm | 1.18"              | 1.25"         | 1.25"       | -                | D008024     | 866155           | 10.56    | -           | -                 | -        |

## SAE Deep Chrome Sockets



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments

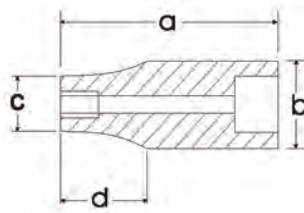


| Size   | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|--------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 1/4"   | 2.48"              | 0.66"         | 0.39"       | 1.5"             | D008508     | 866187           | 11.18    | D009608     | 866676            | 11.43    |
| 5/16"  | 2.48"              | 0.66"         | 0.47"       | 1.5"             | D008510     | 866188           | 11.26    | D009610     | 866677            | 11.43    |
| 3/8"   | 2.48"              | 0.66"         | 0.54"       | 1.5"             | D008512     | 866189           | 11.66    | D009612     | 866678            | 11.66    |
| 7/16"  | 2.48"              | 0.66"         | 0.63"       | 1.5"             | D008514     | 866190           | 11.66    | D009614     | 866679            | 11.66    |
| 1/2"   | 2.48"              | 0.74"         | 0.74"       | -                | D008516     | 866191           | 11.75    | D009616     | 866680            | 11.75    |
| 9/16"  | 2.48"              | 0.78"         | 0.78"       | -                | D008518     | 866192           | 11.75    | D009618     | 866681            | 11.75    |
| 5/8"   | 2.48"              | 0.86"         | 0.86"       | -                | D008520     | 866193           | 12.20    | D009620     | 866682            | 12.20    |
| 11/16" | 2.48"              | 0.94"         | 0.94"       | -                | D008522     | 866194           | 12.95    | D009622     | 866683            | 12.20    |
| 3/4"   | 2.48"              | 1.02"         | 1.02"       | -                | D008524     | 866195           | 13.71    | D009624     | 866684            | 12.95    |
| 13/16" | 2.48"              | 1.09"         | 1.09"       | -                | D008526     | 866196           | 14.17    | D009626     | 866685            | 14.28    |
| 7/8"   | 2.48"              | 1.17"         | 1.17"       | -                | D008528     | 866197           | 14.97    | D009628     | 866686            | 14.62    |
| 15/16" | 2.48"              | 1.25"         | 1.25"       | -                | D008530     | 866198           | 15.30    | D009630     | 866687            | 15.08    |
| 1"     | 2.48"              | 1.33"         | 1.33"       | -                | D008532     | 866199           | 16.06    | D009632     | 866688            | 16.22    |

## Metric Deep Chrome Sockets



- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments



| Size | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 6mm  | 2.48"              | 0.66"         | 0.39"       | 1.5"             | D008206     | 866156           | 11.59    | D009706     | 866689            | 11.62    |
| 7mm  | 2.48"              | 0.66"         | 0.43"       | 1.5"             | D008207     | 866157           | 11.59    | D009707     | 866690            | 11.62    |
| 8mm  | 2.48"              | 0.66"         | 0.47"       | 1.5"             | D008208     | 866158           | 11.66    | D009708     | 866691            | 11.66    |
| 9mm  | 2.48"              | 0.66"         | 0.52"       | 1.5"             | D008209     | 866159           | 11.66    | D009709     | 866692            | 11.66    |
| 10mm | 2.48"              | 0.66"         | 0.58"       | 1.5"             | D008210     | 866160           | 11.66    | D009710     | 866693            | 11.66    |
| 11mm | 2.48"              | 0.66"         | 0.62"       | 1.5"             | D008211     | 866161           | 11.75    | D009711     | 866694            | 11.75    |
| 12mm | 2.48"              | 0.70"         | 0.70"       | -                | D008212     | 866162           | 11.75    | D009712     | 866695            | 11.75    |
| 13mm | 2.48"              | 0.74"         | 0.74"       | -                | D008213     | 866163           | 11.75    | D009713     | 866696            | 11.75    |
| 14mm | 2.48"              | 0.78"         | 0.78"       | -                | D008214     | 866164           | 11.75    | D009714     | 866697            | 11.75    |
| 15mm | 2.48"              | 0.86"         | 0.86"       | -                | D008215     | 866165           | 11.90    | D009715     | 866698            | 11.90    |
| 16mm | 2.48"              | 0.86"         | 0.86"       | -                | D008216     | 866166           | 12.04    | D009716     | 866699            | 12.04    |
| 17mm | 2.48"              | 0.94"         | 0.94"       | -                | D008217     | 866167           | 12.67    | D009717     | 866700            | 12.67    |
| 18mm | 2.48"              | 1.02"         | 1.02"       | -                | D008218     | 866168           | 13.47    | D009718     | 866701            | 13.47    |
| 19mm | 2.48"              | 1.02"         | 1.02"       | -                | D008219     | 866169           | 13.71    | D009719     | 866702            | 13.71    |
| 20mm | 2.48"              | 1.09"         | 1.09"       | -                | D008220     | 866170           | 15.06    | -           | -                 | -        |
| 21mm | 2.48"              | 1.09"         | 1.09"       | -                | D008221     | 866171           | 16.49    | -           | -                 | -        |
| 22mm | 2.48"              | 1.17"         | 1.17"       | -                | D008222     | 866172           | 16.73    | -           | -                 | -        |
| 23mm | 2.48"              | 1.25"         | 1.25"       | -                | D008223     | 866173           | 17.46    | -           | -                 | -        |

## Standard Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size          | Overall Length (in) | Drive End (in) | Hex End (in) | Taper Length (in) | Dynamic EDP | Code No. | Price \$    |
|---------------|---------------------|----------------|--------------|-------------------|-------------|----------|-------------|
| <b>Inch</b>   |                     |                |              |                   |             |          |             |
| 5/16"         | 1.12                | 0.74           | 0.49         | 0.47              | D007310     | 866703   | <b>5.36</b> |
| 3/8"          | 1.12                | 0.74           | 0.54         | 0.47              | D007312     | 866704   | <b>5.36</b> |
| 7/16"         | 1.18                | 0.74           | 0.58         | 0.47              | D007314     | 866705   | <b>6.13</b> |
| 1/2"          | 1.18                | 0.74           | 0.67         | 0.47              | D007316     | 866706   | <b>6.13</b> |
| 9/16"         | 1.18                | 0.78           | 0.78         | -                 | D007318     | 866707   | <b>6.31</b> |
| 5/8"          | 1.18                | 0.94           | 0.94         | -                 | D007320     | 866708   | <b>6.85</b> |
| 11/16"        | 1.24                | 0.94           | 0.94         | -                 | D007322     | 866709   | <b>7.05</b> |
| 3/4"          | 1.24                | 1.02           | 1.02         | -                 | D007324     | 866710   | <b>7.35</b> |
| <b>Metric</b> |                     |                |              |                   |             |          |             |
| 8mm           | 1.12                | 0.74           | 0.49         | 0.47              | D007008     | 866711   | <b>5.68</b> |
| 9mm           | 1.12                | 0.74           | 0.55         | 0.47              | D007009     | 866712   | <b>5.68</b> |
| 10mm          | 1.12                | 0.74           | 0.59         | 0.47              | D007010     | 866713   | <b>5.75</b> |
| 11mm          | 1.12                | 0.74           | 0.67         | 0.47              | D007011     | 866714   | <b>5.75</b> |
| 12mm          | 1.12                | 0.74           | 0.74         | -                 | D007012     | 866715   | <b>5.75</b> |
| 13mm          | 1.12                | 0.74           | 0.74         | -                 | D007013     | 866716   | <b>5.75</b> |
| 14mm          | 1.12                | 0.78           | 0.78         | -                 | D007014     | 866717   | <b>6.31</b> |
| 15mm          | 1.12                | 0.86           | 0.86         | -                 | D007015     | 866718   | <b>6.31</b> |
| 16mm          | 1.12                | 0.94           | 0.94         | -                 | D007016     | 866719   | <b>6.92</b> |
| 17mm          | 1.12                | 0.94           | 0.94         | -                 | D007017     | 866720   | <b>7.05</b> |
| 18mm          | 1.12                | 1.00           | 1.00         | -                 | D007018     | 866721   | <b>7.21</b> |
| 19mm          | 1.12                | 1.02           | 1.02         | -                 | D007019     | 866722   | <b>7.70</b> |

## Deep Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size          | Overall Length (in) | Drive End (in) | Hex End (in) | Taper Length (in) | Dynamic EDP | Code No. | Price \$     |
|---------------|---------------------|----------------|--------------|-------------------|-------------|----------|--------------|
| <b>Inch</b>   |                     |                |              |                   |             |          |              |
| 5/16"         | 2.48                | 0.74           | 0.49         | 0.51              | D007510     | 866723   | <b>8.91</b>  |
| 3/8"          | 2.48                | 0.74           | 0.54         | 0.51              | D007512     | 866724   | <b>9.30</b>  |
| 7/16"         | 2.48                | 0.74           | 0.58         | 0.51              | D007514     | 866725   | <b>9.61</b>  |
| 1/2"          | 2.48                | 0.74           | 0.67         | 0.51              | D007516     | 866726   | <b>9.81</b>  |
| 9/16"         | 2.48                | 0.78           | 0.78         | -                 | D007518     | 866727   | <b>10.07</b> |
| 5/8"          | 2.48                | 0.94           | 0.94         | -                 | D007520     | 866728   | <b>10.20</b> |
| 11/16"        | 2.48                | 0.94           | 0.94         | -                 | D007522     | 866729   | <b>10.78</b> |
| 3/4"          | 2.48                | 1.02           | 1.02         | -                 | D007524     | 861636   | <b>12.98</b> |
| <b>Metric</b> |                     |                |              |                   |             |          |              |
| 8mm           | 2.48                | 0.74           | 0.49         | 0.51              | D007208     | 866731   | <b>9.03</b>  |
| 9mm           | 2.48                | 0.74           | 0.55         | 0.51              | D007209     | 866732   | <b>9.30</b>  |
| 10mm          | 2.48                | 0.74           | 0.59         | 0.51              | D007210     | 866733   | <b>9.30</b>  |
| 11mm          | 2.48                | 0.74           | 0.67         | 0.51              | D007211     | 866734   | <b>9.55</b>  |
| 12mm          | 2.48                | 0.74           | 0.74         | -                 | D007212     | 866735   | <b>9.68</b>  |
| 13mm          | 2.48                | 0.74           | 0.74         | -                 | D007213     | 866736   | <b>9.68</b>  |
| 14mm          | 2.48                | 0.78           | 0.78         | -                 | D007214     | 866737   | <b>10.07</b> |
| 15mm          | 2.48                | 0.86           | 0.86         | -                 | D007215     | 866738   | <b>10.20</b> |
| 16mm          | 2.48                | 0.94           | 0.94         | -                 | D007216     | 866739   | <b>10.20</b> |
| 17mm          | 2.48                | 0.94           | 0.94         | -                 | D007217     | 866740   | <b>10.90</b> |
| 18mm          | 2.48                | 1.00           | 1.00         | -                 | D007218     | 866741   | <b>11.28</b> |
| 19mm          | 2.48                | 1.02           | 1.02         | -                 | D007219     | 866742   | <b>12.46</b> |

Find storage for all your tools, big and small.

See Chapter L





## Quick Release Ratchet — Chrome Handle



- Teardrop head design allows for great access in confined spaces
- Chrome finish for maximum resistance against corrosion
- Meets ANSI standards



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 9.33"  | 45           | D012301     | 866205   | 81.76    |

## Flex Head Ratchet



- Release button ensures sockets and attachments securely lock on and quickly-release off
- 180° folding head allows greater access in confined spaces
- Chrome finish for maximum resistance against corrosion



| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 17.75" | 48           | D012308     | 866207   | 104.31   |

## Flex Handle



- Chrome finish for maximum resistance against corrosion
- Long length handle provides the extra leverage and torque needed to turn stubborn fasteners
- Flex handle bends 100° in either direction



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 14.96" | D012800     | 865846   | 61.90    |

## Sliding T-Handle



- Sliding handle allows for the application of extra torque in confined space applications
- Ball and spring socket retention mechanism
- Chrome finish for maximum resistance against corrosion



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 9.75"  | D012500     | 866208   | 27.18    |

## Chrome Extensions



- Chrome finish for maximum resistance against corrosion
- Notches ensure a safe and secure lock to any ratchet
- Knurled surface for easy mounting and removal from sockets and ratchets



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 5.00"  | D012005     | 866200   | 17.88    |
| 10.00" | D012010     | 866201   | 25.75    |

## Universal Joint



- 360° articulation for access to fasteners in confined spaces
- Chrome finish for maximum resistance against corrosion
- Ball and spring socket retention mechanism



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 2.76"  | D012600     | 866209   | 29.98    |

## Chrome Extension With Quick Release



- Provides the added reach needed to access fasteners in tight spaces
- Chrome finish for maximum resistance against corrosion
- Notches ensure a safe and secure lock to any ratchet, while a spring-loaded ball locks onto any 1/2 drive socket
- Knurled surface for easy mounting and removal from sockets and ratchets



| Length | Dynamic EDP | Code No. | Price \$ |
|--------|-------------|----------|----------|
| 3.00"  | D012023     | 866202   | 25.27    |
| 5.00"  | D012025     | 866203   | 27.76    |
| 10.00" | D012030     | 866204   | 34.21    |

## Adapters



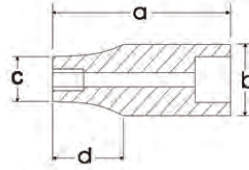
- Versatile tool that expands the capabilities of any existing socket and attachment collection
- Chrome finish for maximum resistance against corrosion
- Ball and spring retention system provides a safe and secure hold



| Length | Female | Male | Dynamic EDP | Code No. | Price \$ |
|--------|--------|------|-------------|----------|----------|
| 1.42"  | 1/2"   | 3/8" | D012701     | 866210   | 9.68     |

## SAE Standard Chrome Sockets

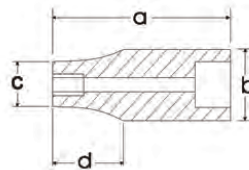
- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments



| Size    | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|---------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 3/8"    | 1.50"              | 0.86"         | 0.57"       | 0.67"            | D016312     | 866338           | 10.63    | D015412     | 866743            | 9.53     |
| 7/16"   | 1.50"              | 0.86"         | 0.67"       | 0.67"            | D016314     | 866339           | 10.63    | D015414     | 866744            | 9.42     |
| 1/2"    | 1.50"              | 0.86"         | 0.73"       | 0.67"            | D016316     | 866340           | 10.99    | D015416     | 866745            | 9.42     |
| 9/16"   | 1.50"              | 0.86"         | 0.81"       | 0.67"            | D016318     | 866341           | 10.99    | D015418     | 866746            | 9.42     |
| 5/8"    | 1.50"              | 0.86"         | 0.86"       | -                | D016320     | 866342           | 11.07    | D015420     | 866747            | 10.34    |
| 11/16"  | 1.50"              | 0.94"         | 0.94"       | -                | D016322     | 866343           | 11.07    | D015422     | 866748            | 11.18    |
| 3/4"    | 1.50"              | 1.02"         | 1.02"       | -                | D016324     | 866344           | 11.75    | D015424     | 866749            | 11.91    |
| 13/16"  | 1.50"              | 1.09"         | 1.09"       | -                | D016326     | 866345           | 12.95    | D015426     | 866750            | 12.33    |
| 7/8"    | 1.50"              | 1.17"         | 1.17"       | -                | D016328     | 866346           | 13.32    | D015428     | 866751            | 13.35    |
| 15/16"  | 1.57"              | 1.25"         | 1.25"       | -                | D016330     | 866347           | 13.63    | D015430     | 866752            | 14.06    |
| 1"      | 1.65"              | 1.33"         | 1.33"       | -                | D016332     | 866348           | 13.86    | D015432     | 866753            | 14.80    |
| 1-1/16" | 1.65"              | 1.41"         | 1.41"       | -                | D016334     | 866349           | 15.54    | D015434     | 866754            | 16.16    |
| 1-1/8"  | 1.69"              | 1.49"         | 1.49"       | -                | D016336     | 866350           | 15.64    | D015436     | 866755            | 17.80    |
| 1-3/16" | 1.73"              | 1.57"         | 1.57"       | -                | D016338     | 866351           | 17.32    | D015438     | 866756            | 19.25    |
| 1-1/4"  | 1.73"              | 1.65"         | 1.65"       | -                | D016340     | 866352           | 17.32    | D015440     | 866757            | 19.88    |
| 1-5/16" | 1.73"              | 1.72"         | 1.72"       | -                | D016342     | 866353           | 17.76    | D015442     | 866758            | 20.21    |

## Metric Standard Chrome Sockets

- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Large laser etched markings improve size identification
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments



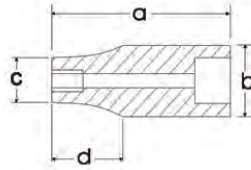
| Size | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 10mm | 1.50"              | 0.86"         | 0.59"       | 0.67"            | D016010     | 866292           | 9.86     | D015110     | 866759            | 9.53     |
| 11mm | 1.50"              | 0.86"         | 0.64"       | 0.67"            | D016011     | 866293           | 9.86     | D015111     | 866760            | 9.42     |
| 12mm | 1.50"              | 0.86"         | 0.69"       | 0.67"            | D016012     | 866294           | 9.86     | D015112     | 866761            | 9.42     |
| 13mm | 1.50"              | 0.86"         | 0.74"       | 0.67"            | D016013     | 866295           | 10.23    | D015113     | 866762            | 9.42     |
| 14mm | 1.50"              | 0.86"         | 0.80"       | 0.67"            | D016014     | 866296           | 10.23    | D015114     | 866763            | 9.42     |
| 15mm | 1.50"              | 0.86"         | 0.83"       | 0.67"            | D016015     | 866297           | 10.23    | D015115     | 866764            | 10.24    |
| 16mm | 1.50"              | 0.86"         | 0.86"       | -                | D016016     | 866298           | 10.23    | D015116     | 866765            | 10.34    |
| 17mm | 1.50"              | 0.94"         | 0.94"       | -                | D016017     | 866299           | 10.23    | D015117     | 866766            | 11.18    |
| 18mm | 1.50"              | 1.02"         | 1.02"       | -                | D016018     | 866300           | 10.91    | D015118     | 866767            | 11.91    |
| 19mm | 1.50"              | 1.02"         | 1.02"       | -                | D016019     | 866301           | 10.91    | D015119     | 866768            | 11.91    |
| 20mm | 1.50"              | 1.09"         | 1.09"       | -                | D016020     | 866302           | 11.66    | D015120     | 866769            | 12.50    |
| 21mm | 1.50"              | 1.09"         | 1.09"       | -                | D016021     | 866303           | 12.72    | D015121     | 866770            | 12.33    |
| 22mm | 1.50"              | 1.17"         | 1.17"       | -                | D016022     | 866304           | 13.24    | D015122     | 866771            | 13.35    |
| 23mm | 1.57"              | 1.25"         | 1.25"       | -                | D016023     | 866305           | 14.45    | D015123     | 866772            | 14.06    |
| 24mm | 1.57"              | 1.25"         | 1.25"       | -                | D016024     | 866306           | 14.45    | D015124     | 866773            | 14.06    |
| 25mm | 1.57"              | 1.33"         | 1.33"       | -                | D016025     | 866307           | 14.77    | D015125     | 866774            | 15.55    |
| 26mm | 1.65"              | 1.33"         | 1.33"       | -                | D016026     | 866308           | 15.37    | D015126     | 866775            | 14.80    |
| 27mm | 1.65"              | 1.41"         | 1.41"       | -                | D016027     | 866309           | 17.70    | D015127     | 866776            | 16.16    |
| 28mm | 1.69"              | 1.49"         | 1.49"       | -                | D016028     | 866310           | 17.91    | D015128     | 866777            | 17.80    |
| 29mm | 1.69"              | 1.49"         | 1.49"       | -                | D016029     | 866311           | 18.53    |             |                   |          |
| 30mm | 1.73"              | 1.57"         | 1.57"       | -                | D016030     | 866312           | 19.42    | D015130     | 866779            | 19.25    |
| 31mm | 1.73"              | 1.57"         | 1.57"       | -                | D016031     | 866313           | 19.58    |             |                   |          |
| 32mm | 1.73"              | 1.65"         | 1.65"       | -                | D016032     | 866314           | 19.73    | D015132     | 866781            | 19.88    |

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## SAE Deep Chrome Sockets

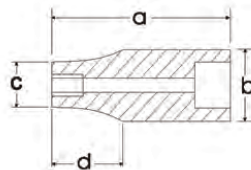
- Meets ANSI standards
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| Size    | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|---------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 3/8"    | 3.03"              | 0.86"         | 0.52"       | 1.81"            | D016512     | 866354           | 13.94    | D015612     | 866782            | 15.32    |
| 7/16"   | 3.03"              | 0.86"         | 0.57"       | 1.81"            | D016514     | 866355           | 17.08    | D015614     | 866783            | 15.32    |
| 1/2"    | 3.03"              | 0.86"         | 0.67"       | 1.81"            | D016516     | 866356           | 17.08    | D015616     | 866784            | 15.21    |
| 9/16"   | 3.03"              | 0.86"         | 0.73"       | 1.81"            | D016518     | 866357           | 17.08    | D015618     | 866785            | 14.92    |
| 5/8"    | 3.03"              | 0.86"         | 0.81"       | 1.81"            | D016520     | 866358           | 17.08    | D015620     | 866786            | 15.21    |
| 11/16"  | 3.03"              | 0.86"         | 0.86"       | -                | D016522     | 866359           | 17.70    | D015622     | 866787            | 16.24    |
| 3/4"    | 3.03"              | 0.94"         | 0.94"       | -                | D016524     | 866360           | 18.82    | D015624     | 866788            | 17.59    |
| 13/16"  | 3.03"              | 1.02"         | 1.02"       | -                | D016526     | 866361           | 20.09    | D015626     | 866789            | 17.59    |
| 7/8"    | 3.03"              | 1.09"         | 1.09"       | -                | D016528     | 866362           | 21.65    | D015628     | 866790            | 19.25    |
| 15/16"  | 3.03"              | 1.17"         | 1.17"       | -                | D016530     | 866363           | 24.04    | D015630     | 866791            | 20.39    |
| 1"      | 3.03"              | 1.25"         | 1.25"       | -                | D016532     | 866364           | 28.08    | D015632     | 866792            | 24.65    |
| 1-1/16" | 3.03"              | 1.33"         | 1.33"       | -                | D016534     | 866365           | 28.59    | D015634     | 866793            | 24.74    |
| 1-1/8"  | 3.03"              | 1.41"         | 1.41"       | -                | D016536     | 866366           | 29.44    | D015636     | 866794            | 29.62    |
| 1-3/16" | 3.03"              | 1.49"         | 1.49"       | -                | D016538     | 866367           | 30.31    | D015638     | 866795            | 30.45    |
| 1-1/4"  | 3.03"              | 1.65"         | 1.65"       | -                | D016540     | 866368           | 32.67    | D015640     | 866796            | 31.59    |
| 1-5/16" | 3.03"              | 1.72"         | 1.72"       | -                | D016542     | 866369           | 33.61    | D015642     | 866797            | 31.88    |

## Metric Deep Chrome Sockets

- Meets ANSI standards
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| Size | Overall Length (a) | Drive End (b) | Hex End (c) | Taper Length (d) | Dynamic EDP | 6-point Code No. | Price \$ | Dynamic EDP | 12-point Code No. | Price \$ |
|------|--------------------|---------------|-------------|------------------|-------------|------------------|----------|-------------|-------------------|----------|
| 10mm | 3.03"              | 0.86"         | 0.59"       | 1.81"            | D016210     | 866315           | 17.08    | D015710     | 866798            | 15.32    |
| 11mm | 3.03"              | 0.86"         | 0.64"       | 1.81"            | D016211     | 866316           | 17.10    | D015711     | 866799            | 15.32    |
| 12mm | 3.03"              | 0.86"         | 0.69"       | 1.81"            | D016212     | 866317           | 17.08    | D015712     | 866800            | 15.21    |
| 13mm | 3.03"              | 0.86"         | 0.74"       | 1.81"            | D016213     | 866318           | 17.08    | D015713     | 866801            | 15.21    |
| 14mm | 3.03"              | 0.86"         | 0.80"       | 1.81"            | D016214     | 866319           | 17.08    | D015714     | 866802            | 14.92    |
| 15mm | 3.03"              | 0.86"         | 0.83"       | 1.81"            | D016215     | 866320           | 17.08    | D015715     | 866803            | 15.21    |
| 16mm | 3.03"              | 0.86"         | 0.86"       | -                | D016216     | 866321           | 17.08    | D015716     | 866804            | 15.21    |
| 17mm | 3.03"              | 0.94"         | 0.94"       | -                | D016217     | 866322           | 17.17    | D015717     | 866805            | 16.24    |
| 18mm | 3.03"              | 1.02"         | 1.02"       | -                | D016218     | 866323           | 18.21    | D015718     | 866806            | 17.59    |
| 19mm | 3.03"              | 1.02"         | 1.02"       | -                | D016219     | 866324           | 18.30    | D015719     | 866807            | 17.59    |
| 20mm | 3.03"              | 1.09"         | 1.09"       | -                | D016220     | 866325           | 19.50    | D015720     | 866808            | 18.21    |
| 21mm | 3.03"              | 1.09"         | 1.09"       | -                | D016221     | 866326           | 20.86    | D015721     | 866809            | 17.59    |
| 22mm | 3.03"              | 1.17"         | 1.17"       | -                | D016222     | 866327           | 23.10    | D015722     | 866810            | 19.25    |
| 23mm | 3.03"              | 1.25"         | 1.25"       | -                | D016223     | 866328           | 24.48    | D015723     | 866811            | 20.39    |
| 24mm | 3.03"              | 1.25"         | 1.25"       | -                | D016224     | 866329           | 24.48    | D015724     | 866812            | 20.39    |
| 25mm | 3.03"              | 1.33"         | 1.33"       | -                | D016225     | 866330           | 29.65    | D015725     | 866813            | 25.67    |
| 26mm | 3.03"              | 1.33"         | 1.33"       | -                | D016226     | 866331           | 30.12    | D015726     | 866814            | 24.65    |
| 27mm | 3.03"              | 1.41"         | 1.41"       | -                | D016227     | 866332           | 30.88    | D015727     | 866815            | 24.74    |
| 28mm | 3.03"              | 1.49"         | 1.49"       | -                | D016228     | 866333           | 33.64    | -           | -                 | -        |
| 29mm | 3.03"              | 1.49"         | 1.49"       | -                | D016229     | 866334           | 33.64    | -           | -                 | -        |
| 30mm | 3.03"              | 1.57"         | 1.57"       | -                | D016230     | 866335           | 34.59    | -           | -                 | -        |
| 31mm | 3.03"              | 1.57"         | 1.57"       | -                | D016231     | 866336           | 35.87    | -           | -                 | -        |
| 32mm | 3.03"              | 1.65"         | 1.65"       | -                | D016232     | 866337           | 35.87    | -           | -                 | -        |

## SAE Standard Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size    | Overall Length (in.) | Drive End (in.) | Hex End (in.) | Taper Length (in.) | Dynamic EDP | Code No. | Price \$ |
|---------|----------------------|-----------------|---------------|--------------------|-------------|----------|----------|
| 3/8"    | 1.50                 | 0.86            | 0.67          | 0.35               | D014312     | 866256   | 9.03     |
| 7/16"   | 1.50                 | 0.86            | 0.71          | 0.35               | D014314     | 866257   | 9.03     |
| 1/2"    | 1.50                 | 0.86            | 0.79          | 0.35               | D014316     | 866258   | 9.30     |
| 9/16"   | 1.50                 | 0.94            | 0.87          | 0.35               | D014318     | 866259   | 9.30     |
| 5/8"    | 1.50                 | 0.94            | 0.94          | -                  | D014320     | 866260   | 9.35     |
| 11/16"  | 1.50                 | 1.02            | 1.02          | -                  | D014322     | 866261   | 10.38    |
| 3/4"    | 1.57                 | 1.09            | 1.09          | -                  | D014324     | 866262   | 10.38    |
| 13/16"  | 1.57                 | 1.17            | 1.17          | -                  | D014326     | 866263   | 11.42    |
| 7/8"    | 1.65                 | 1.25            | 1.25          | -                  | D014328     | 866264   | 12.76    |
| 15/16"  | 1.73                 | 1.33            | 1.33          | -                  | D014330     | 866265   | 14.32    |
| 1"      | 1.73                 | 1.41            | 1.41          | -                  | D014332     | 866266   | 14.78    |
| 1-1/16" | 1.81                 | 1.49            | 1.49          | -                  | D014334     | 866267   | 20.79    |
| 1-1/8"  | 1.81                 | 1.50            | 1.57          | 0.55               | D014336     | 866268   | 21.61    |
| 1-3/16" | 1.81                 | 1.50            | 1.65          | 0.55               | D014338     | 866269   | 21.92    |
| 1-1/4"  | 1.81                 | 1.50            | 1.72          | 0.55               | D014340     | 866270   | 23.16    |
| 1-5/16" | 1.81                 | 1.50            | 1.76          | 0.63               | D014342     | 866271   | 23.35    |
| 1-3/8"  | 1.97                 | 1.50            | 1.88          | 0.63               | D014344     | 866272   | 23.60    |
| 1-7/16" | 1.97                 | 1.50            | 1.96          | 0.63               | D014346     | 865818   | 23.88    |
| 1-1/2"  | 1.97                 | 1.50            | 2.04          | 0.63               | D014348     | 866816   | 24.50    |

## SAE Deep Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size    | Overall Length (in.) | Drive End (in.) | Hex End (in.) | Taper Length (in.) | Dynamic EDP | Code No. | Price \$ |
|---------|----------------------|-----------------|---------------|--------------------|-------------|----------|----------|
| 3/8"    | 3.07                 | 0.86            | 0.67          | 0.63               | D014512     | 866275   | 14.44    |
| 7/16"   | 3.07                 | 0.86            | 0.71          | 0.63               | D014514     | 866276   | 14.78    |
| 1/2"    | 3.07                 | 0.94            | 0.79          | 0.63               | D014516     | 866277   | 15.22    |
| 9/16"   | 3.07                 | 0.94            | 0.88          | 0.63               | D014518     | 866278   | 15.75    |
| 5/8"    | 3.07                 | 0.94            | 0.94          | -                  | D014520     | 866279   | 16.14    |
| 11/16"  | 3.07                 | 1.02            | 1.02          | -                  | D014522     | 866280   | 16.79    |
| 3/4"    | 3.07                 | 1.09            | 1.09          | -                  | D014524     | 866281   | 17.76    |
| 13/16"  | 3.07                 | 1.17            | 1.17          | -                  | D014526     | 866282   | 18.39    |
| 7/8"    | 3.07                 | 1.25            | 1.25          | -                  | D014528     | 866283   | 19.03    |
| 15/16"  | 3.07                 | 1.33            | 1.33          | -                  | D014530     | 866284   | 20.97    |
| 1"      | 3.07                 | 1.41            | 1.41          | -                  | D014532     | 866285   | 22.66    |
| 1-1/16" | 3.07                 | 1.49            | 1.49          | -                  | D014534     | 866286   | 30.26    |
| 1-1/8"  | 3.07                 | 1.50            | 1.57          | 0.55               | D014536     | 866287   | 32.87    |
| 1-3/16" | 3.07                 | 1.50            | 1.65          | 0.55               | D014538     | 866288   | 33.67    |
| 1-1/4"  | 3.07                 | 1.50            | 1.72          | 0.55               | D014540     | 866289   | 34.70    |
| 1-5/16" | 3.07                 | 1.50            | 1.76          | 0.63               | D014542     | 866290   | 35.24    |
| 1-3/8"  | 3.07                 | 1.50            | 1.88          | 0.63               | D014544     | 866291   | 35.48    |

## Metric Standard Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size | Overall Length (in.) | Drive End (in.) | Hex End (in.) | Taper Length (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|-----------------|---------------|--------------------|-------------|----------|----------|
| 8mm  | 1.50                 | 0.86            | 0.55          | 0.35               | D014008     | 866817   | 8.38     |
| 9mm  | 1.50                 | 0.86            | 0.59          | 0.35               | D014009     | 866818   | 8.65     |
| 10mm | 1.50                 | 0.86            | 0.67          | 0.35               | D014010     | 866819   | 9.03     |
| 11mm | 1.50                 | 0.86            | 0.71          | 0.35               | D014011     | 866820   | 9.03     |
| 12mm | 1.50                 | 0.86            | 0.75          | 0.35               | D014012     | 866821   | 9.30     |
| 13mm | 1.50                 | 0.86            | 0.79          | 0.35               | D014013     | 866822   | 9.30     |
| 14mm | 1.50                 | 0.94            | 0.87          | 0.35               | D014014     | 866823   | 9.30     |
| 15mm | 1.50                 | 0.94            | 0.94          | -                  | D014015     | 866824   | 10.00    |
| 16mm | 1.50                 | 0.94            | 0.94          | -                  | D014016     | 866825   | 10.00    |
| 17mm | 1.50                 | 1.02            | 1.02          | -                  | D014017     | 866826   | 10.00    |
| 18mm | 1.50                 | 1.02            | 1.02          | -                  | D014018     | 866827   | 10.32    |
| 19mm | 1.57                 | 1.09            | 1.09          | -                  | D014019     | 866828   | 10.32    |
| 20mm | 1.57                 | 1.17            | 1.17          | -                  | D014020     | 866829   | 11.82    |
| 21mm | 1.57                 | 1.17            | 1.17          | -                  | D014021     | 866830   | 12.46    |
| 22mm | 1.65                 | 1.25            | 1.25          | -                  | D014022     | 866831   | 12.46    |
| 23mm | 1.65                 | 1.25            | 1.25          | -                  | D014023     | 866832   | 14.01    |
| 24mm | 1.73                 | 1.33            | 1.33          | -                  | D014024     | 866833   | 14.19    |
| 25mm | 1.73                 | 1.37            | 1.37          | -                  | D014025     | 866834   | 14.55    |
| 26mm | 1.73                 | 1.41            | 1.41          | -                  | D014026     | 866835   | 15.22    |
| 27mm | 1.81                 | 1.49            | 1.49          | -                  | D014027     | 866836   | 16.34    |
| 28mm | 1.81                 | 1.50            | 1.57          | 0.55               | D014028     | 866837   | 18.72    |
| 29mm | 1.81                 | 1.50            | 1.57          | 0.55               | D014029     | 866838   | 20.32    |
| 30mm | 1.81                 | 1.50            | 1.65          | 0.55               | D014030     | 866839   | 20.32    |
| 31mm | 1.81                 | 1.50            | 1.65          | 0.55               | D014031     | 866840   | 21.92    |
| 32mm | 1.81                 | 1.50            | 1.72          | 0.55               | D014032     | 866841   | 23.16    |
| 36mm | 1.97                 | 1.50            | 1.96          | 0.63               | D014036     | 866845   | 23.48    |

## Metric Deep Impact Sockets



- Meets ANSI standards
- Corrosion resistant black phosphate finish
- Large laser etched markings improve size identification



| Size | Overall Length (in.) | Drive End (in.) | Hex End (in.) | Taper Length (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|-----------------|---------------|--------------------|-------------|----------|----------|
| 8mm  | 3.07                 | 0.86            | 0.55          | 0.63               | D014208     | 866846   | 14.19    |
| 9mm  | 3.07                 | 0.86            | 0.59          | 0.63               | D014209     | 866847   | 14.19    |
| 10mm | 3.07                 | 0.86            | 0.67          | 0.63               | D014210     | 866848   | 14.71    |
| 11mm | 3.07                 | 0.86            | 0.71          | 0.63               | D014211     | 866849   | 14.71    |
| 12mm | 3.07                 | 0.86            | 0.75          | 0.63               | D014212     | 866850   | 15.22    |
| 13mm | 3.07                 | 0.94            | 0.79          | 0.63               | D014213     | 866851   | 15.22    |
| 14mm | 3.07                 | 0.94            | 0.87          | 0.63               | D014214     | 866852   | 15.75    |
| 15mm | 3.07                 | 0.94            | 0.94          | -                  | D014215     | 866853   | 16.14    |
| 16mm | 3.07                 | 0.94            | 0.94          | -                  | D014216     | 866854   | 16.39    |
| 17mm | 3.07                 | 1.02            | 1.02          | -                  | D014217     | 866855   | 16.73    |
| 18mm | 3.07                 | 1.02            | 1.02          | -                  | D014218     | 866856   | 16.85    |
| 19mm | 3.07                 | 1.09            | 1.09          | -                  | D014219     | 866857   | 16.94    |
| 20mm | 3.07                 | 1.17            | 1.17          | -                  | D014220     | 866858   | 18.08    |
| 21mm | 3.07                 | 1.17            | 1.17          | -                  | D014221     | 866859   | 19.54    |
| 22mm | 3.07                 | 1.25            | 1.25          | -                  | D014222     | 866860   | 19.83    |
| 23mm | 3.07                 | 1.25            | 1.25          | -                  | D014223     | 866861   | 19.99    |
| 24mm | 3.07                 | 1.33            | 1.33          | -                  | D014224     | 866862   | 20.32    |
| 27mm | 3.07                 | 1.49            | 1.49          | -                  | D014227     | 866863   | 20.64    |
| 30mm | 3.07                 | 1.50            | 1.65          | 0.55               | D014230     | 866864   | 21.03    |
| 36mm | 3.07                 | 1.50            | 1.96          | 0.63               | D014236     | 866865   | 21.29    |

## SAE Hex Head Sockets — Standard Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size  | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|-------|----------------------|------------------|-----------------------|-------------|----------|----------|
| 1/4"  | 2.44                 | 0.94             | 0.86                  | D013058     | 866219   | 18.61    |
| 5/16" | 2.44                 | 0.94             | 0.86                  | D013060     | 866220   | 18.61    |
| 3/8"  | 2.44                 | 0.94             | 0.86                  | D013062     | 866221   | 18.61    |
| 7/16" | 2.44                 | 0.94             | 0.94                  | D013064     | 866222   | 18.61    |
| 1/2"  | 2.44                 | 0.94             | 0.94                  | D013066     | 866223   | 18.61    |
| 9/16" | 2.44                 | 0.94             | 0.94                  | D013068     | 866224   | 18.61    |
| 5/8"  | 2.44                 | 0.94             | 1.02                  | D013070     | 866225   | 18.61    |
| 3/4"  | 2.44                 | 0.94             | 1.02                  | D013074     | 866226   | 18.61    |

## Metric Hex Head Sockets — Standard Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|------------------|-----------------------|-------------|----------|----------|
| 6mm  | 2.44                 | 0.94             | 0.86                  | D013006     | 866212   | 18.61    |
| 8mm  | 2.44                 | 0.94             | 0.86                  | D013008     | 866213   | 18.61    |
| 10mm | 2.44                 | 0.94             | 0.86                  | D013010     | 866214   | 18.61    |
| 12mm | 2.44                 | 0.94             | 0.94                  | D013012     | 866215   | 18.61    |
| 14mm | 2.44                 | 0.94             | 0.94                  | D013014     | 866216   | 18.61    |
| 17mm | 2.44                 | 0.94             | 1.02                  | D013017     | 866217   | 18.61    |
| 19mm | 2.44                 | 0.94             | 1.02                  | D013019     | 866218   | 18.61    |

## SAE Hex Head Sockets — Long Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size  | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|-------|----------------------|------------------|-----------------------|-------------|----------|----------|
| 1/4"  | 3.94                 | 2.44             | 0.86                  | D013458     | 866241   | 22.28    |
| 5/16" | 3.94                 | 2.44             | 0.86                  | D013460     | 866242   | 22.28    |
| 3/8"  | 3.94                 | 2.44             | 0.86                  | D013462     | 866243   | 22.28    |
| 7/16" | 3.94                 | 2.44             | 0.94                  | D013464     | 866244   | 22.28    |
| 1/2"  | 3.94                 | 2.44             | 0.94                  | D013466     | 866245   | 22.28    |
| 9/16" | 3.94                 | 2.44             | 0.94                  | D013468     | 866246   | 22.28    |
| 5/8"  | 3.94                 | 2.44             | 1.02                  | D013470     | 866247   | 22.28    |
| 3/4"  | 3.94                 | 2.44             | 1.02                  | D013474     | 866248   | 22.28    |

## Metric Hex Head Sockets — Long Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|------------------|-----------------------|-------------|----------|----------|
| 6mm  | 3.94                 | 2.44             | 0.86                  | D013406     | 866234   | 22.28    |
| 8mm  | 3.94                 | 2.44             | 0.86                  | D013408     | 866235   | 22.28    |
| 10mm | 3.94                 | 2.44             | 0.86                  | D013410     | 866236   | 22.28    |
| 12mm | 3.94                 | 2.44             | 0.94                  | D013412     | 866237   | 22.28    |
| 14mm | 3.94                 | 2.44             | 0.94                  | D013414     | 866238   | 22.28    |
| 17mm | 3.94                 | 2.44             | 1.02                  | D013417     | 866239   | 22.28    |
| 19mm | 3.94                 | 2.44             | 1.02                  | D013419     | 866240   | 22.28    |

## Torx® Head Sockets — Standard Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|------------------|-----------------------|-------------|----------|----------|
| T20  | 2.44                 | 0.94             | 0.86                  | D013320     | 866227   | 19.33    |
| T25  | 2.44                 | 0.94             | 0.86                  | D013325     | 866228   | 19.33    |
| T27  | 2.44                 | 0.94             | 0.86                  | D013327     | 866229   | 19.33    |
| T30  | 2.44                 | 0.94             | 0.86                  | D013330     | 866230   | 19.33    |
| T40  | 2.44                 | 0.94             | 0.86                  | D013340     | 866231   | 19.33    |
| T45  | 2.44                 | 0.94             | 0.86                  | D013345     | 866232   | 19.33    |
| T50  | 2.44                 | 0.94             | 0.86                  | D013350     | 866233   | 19.33    |

## Torx® Head Sockets — Long Length



- Meets ANSI standards
- Knurled ring provides superior grip for quicker and easier removal of socket from ratchets and attachments
- Laser etched markings improve size identification



| Size | Overall Length (in.) | Bit Length (in.) | Drive End Width (in.) | Dynamic EDP | Code No. | Price \$ |
|------|----------------------|------------------|-----------------------|-------------|----------|----------|
| T20  | 3.94                 | 2.44             | 0.86                  | D013720     | 866249   | 23.02    |
| T25  | 3.94                 | 2.44             | 0.86                  | D013725     | 866250   | 23.02    |
| T27  | 3.94                 | 2.44             | 0.86                  | D013727     | 866251   | 23.02    |
| T30  | 3.94                 | 2.44             | 0.86                  | D013730     | 866252   | 23.02    |
| T40  | 3.94                 | 2.44             | 0.86                  | D013740     | 866253   | 23.02    |
| T45  | 3.94                 | 2.44             | 0.86                  | D013745     | 866254   | 23.02    |
| T50  | 3.94                 | 2.44             | 0.86                  | D013750     | 866255   | 23.02    |

## 21pc 12 Point Standard SAE Set



### Set contents:

- 16 Regular SAE Sockets: 7/8, 15/16, 1", 1-1/16, 1-1/8, 1-3/16, 1-1/4, 1-5/16, 1-3/8, 1-7/16, 1-5/8, 1-3/4, 1-13/16, 1-7/8, 2"
- 3 Extensions: 4", 8", 16"
- Flex handle
- 24 tooth ratchet
- Blow mold case



| Description                    | Dynamic EDP | Code No. | Price \$ |
|--------------------------------|-------------|----------|----------|
| 21pc 12 Point Standard SAE Set | D023000     | 866866   | 759.83   |

## 20pc 12 Point Standard Metric Set



### Set contents:

- 15 Regular Metric Sockets: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 35, 36mm
- 3 Extensions: 4", 8", 16"
- Flex handle
- 24 tooth ratchet
- Blow mold case



| Description                    | Dynamic EDP | Code No. | Price \$ |
|--------------------------------|-------------|----------|----------|
| 20pc 12 Point Standard SAE Set | D023001     | 866867   | 722.00   |

## Ratchet — Chrome Handle



- Chrome finish for maximum resistance against corrosion
- Knurled handle area provides user a non-slip and secure hole



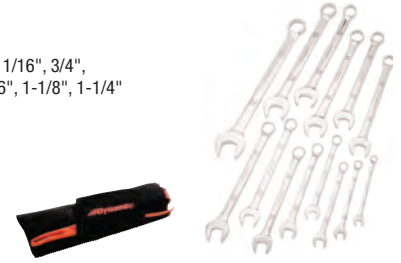
| Length | No. of Teeth | Dynamic EDP | Code No. | Price \$ |
|--------|--------------|-------------|----------|----------|
| 19.69" | 24           | D019301     | 866868   | 236.40   |

## 14pc SAE Combination Wrench Set



### Set contents:

- 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1-1/16", 1-1/8", 1-1/4"
- Canvas roll



| Description                     | Dynamic EDP | Code No. | Price \$ |
|---------------------------------|-------------|----------|----------|
| 14pc SAE Combination Wrench Set | D074201     | 865897   | 339.51   |

## 19pc Metric Combination Wrench Set



### Set contents:

- 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24mm
- Canvas roll



| Description                        | Dynamic EDP | Code No. | Price \$ |
|------------------------------------|-------------|----------|----------|
| 19pc Metric Combination Wrench Set | D074203     | 865898   | 308.06   |

## 12pc SAE Combination Wrench Set — Contractor Series



### Set contents:

- 1/4, 5/16, 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16"
- Satin Finish
- Canvas roll



Contractor Series -  
A superior alternative to raised panel wrenches

| Description                                | Dynamic EDP | Code No. | Price \$ |
|--|-------------|----------|----------|
| 12pc SAE Contractor Combination Wrench Set | D074222     | 866869   | 122.12   |

## 16pc SAE Combination Wrench Set — Contractor Series



### Set contents:

- 1/4, 5/16, 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1-1/16, 1-1/8, 1-1/4"
- Satin Finish
- Canvas roll



Contractor Series -  
A superior alternative to raised panel wrenches

| Description                                | Dynamic EDP | Code No. | Price \$ |
|--|-------------|----------|----------|
| 16pc SAE Contractor Combination Wrench Set | D074221     | 865827   | 221.52   |

## 19pc Metric Contractor Combination Wrench Set



### Set contents:

- 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24mm
- Satin Finish
- Canvas roll



Contractor Series -  
A superior alternative to raised panel wrenches



| Description                                   | Dynamic EDP | Code No. | Price \$ |
|---|-------------|----------|----------|
| 19pc Metric Contractor Combination Wrench Set | D074223     | 865983   | 223.17   |

## Combination Wrenches



- Mirror chrome finish
- Meets ANSI standards



| Size          | O.A.L. (in) | Head Width (in) | Head Thickness (in) | Box Width (in) | Box Thickness (in) | Dynamic EDP | Code No. | Price \$ |
|---------------|-------------|-----------------|---------------------|----------------|--------------------|-------------|----------|----------|
| <b>Inch</b>   |             |                 |                     |                |                    |             |          |          |
| 1/4"          | 5.04        | 0.54            | 0.17                | 0.41           | 0.18               | D074008     | 866870   | 9.70     |
| 5/16"         | 5.83        | 0.74            | 0.19                | 0.5            | 0.22               | D074010     | 866871   | 11.21    |
| 3/8"          | 6.06        | 0.81            | 0.23                | 0.61           | 0.32               | D074012     | 866872   | 12.30    |
| 7/16"         | 6.57        | 0.91            | 0.27                | 0.7            | 0.33               | D074014     | 866026   | 13.83    |
| 1/2"          | 7.01        | 1.04            | 0.28                | 0.8            | 0.35               | D074016     | 866025   | 15.74    |
| 9/16"         | 7.48        | 1.14            | 0.3                 | 0.87           | 0.38               | D074018     | 866022   | 17.63    |
| 5/8"          | 8.07        | 1.28            | 0.33                | 0.96           | 0.42               | D074020     | 866873   | 19.67    |
| 11/16"        | 8.86        | 1.43            | 0.35                | 1.05           | 0.43               | D074022     | 866874   | 22.00    |
| 3/4"          | 9.76        | 1.52            | 0.36                | 1.11           | 0.44               | D074024     | 866024   | 25.94    |
| 13/16"        | 10.63       | 1.67            | 0.39                | 1.2            | 0.49               | D074026     | 866875   | 28.70    |
| 7/8"          | 11.5        | 1.83            | 0.41                | 1.31           | 0.51               | D074028     | 866876   | 32.92    |
| 15/16"        | 12.36       | 1.91            | 0.43                | 1.39           | 0.55               | D074030     | 866877   | 36.99    |
| 1"            | 13.23       | 1.98            | 0.45                | 1.44           | 0.57               | D074032     | 866582   | 40.73    |
| 1-1/16"       | 14.13       | 2.11            | 0.48                | 1.51           | 0.61               | D074034     | 866878   | 48.36    |
| 1-1/8"        | 15.35       | 2.25            | 0.51                | 1.7            | 0.62               | D074036     | 866023   | 59.16    |
| 1-1/4"        | 16.73       | 2.44            | 0.51                | 1.78           | 0.65               | D074040     | 866583   | 65.37    |
| <b>Metric</b> |             |                 |                     |                |                    |             |          |          |
| 6mm           | 5.04        | 0.54            | 0.17                | 0.41           | 0.18               | D074106     | 866879   | 8.88     |
| 7mm           | 5.43        | 0.60            | 0.18                | 0.46           | 0.20               | D074107     | 866880   | 9.17     |
| 8mm           | 5.83        | 0.74            | 0.19                | 0.50           | 0.22               | D074108     | 866881   | 10.13    |
| 9mm           | 6.06        | 0.81            | 0.23                | 0.61           | 0.32               | D074109     | 866882   | 11.21    |
| 10mm          | 6.38        | 0.85            | 0.24                | 0.57           | 0.33               | D074110     | 866033   | 11.61    |
| 11mm          | 6.57        | 0.91            | 0.27                | 0.70           | 0.33               | D074111     | 866883   | 12.47    |
| 12mm          | 6.85        | 1.01            | 0.27                | 0.72           | 0.31               | D074112     | 866884   | 13.03    |
| 13mm          | 7.01        | 1.04            | 0.28                | 0.80           | 0.35               | D074113     | 866885   | 13.64    |
| 14mm          | 7.48        | 1.14            | 0.30                | 0.87           | 0.38               | D074114     | 866886   | 15.23    |
| 15mm          | 8.07        | 1.28            | 0.33                | 0.96           | 0.42               | D074115     | 866887   | 17.55    |
| 16mm          | 8.07        | 1.28            | 0.33                | 0.96           | 0.42               | D074116     | 866888   | 19.76    |
| 17mm          | 8.86        | 1.43            | 0.35                | 1.05           | 0.43               | D074117     | 866584   | 21.88    |
| 18mm          | 9.76        | 1.52            | 0.36                | 1.11           | 0.44               | D074118     | 866889   | 24.97    |
| 19mm          | 9.76        | 1.52            | 0.36                | 1.11           | 0.44               | D074119     | 866585   | 26.97    |
| 20mm          | 10.63       | 1.67            | 0.39                | 1.20           | 0.49               | D074120     | 866890   | 28.70    |
| 21mm          | 10.63       | 1.67            | 0.39                | 1.20           | 0.49               | D074121     | 866891   | 30.75    |
| 22mm          | 11.50       | 1.83            | 0.41                | 1.31           | 0.51               | D074122     | 866892   | 31.92    |
| 23mm          | 12.36       | 1.91            | 0.43                | 1.39           | 0.55               | D074123     | 866893   | 36.14    |
| 24mm          | 12.36       | 1.91            | 0.43                | 1.39           | 0.55               | D074124     | 866894   | 36.36    |
| 25mm          | 13.23       | 1.98            | 0.45                | 1.44           | 0.57               | D074125     | 866586   | 37.15    |
| 26mm          | 13.23       | 1.98            | 0.45                | 1.44           | 0.57               | D074126     | 866895   | 38.05    |
| 27mm          | 14.13       | 2.11            | 0.48                | 1.51           | 0.61               | D074127     | 866896   | 43.69    |
| 28mm          | 15.35       | 2.25            | 0.51                | 1.70           | 0.62               | D074128     | 866897   | 49.82    |
| 29mm          | 15.35       | 2.25            | 0.51                | 1.70           | 0.62               | D074129     | 866898   | 51.17    |
| 30mm          | 15.35       | 2.25            | 0.51                | 1.70           | 0.62               | D074130     | 866587   | 53.18    |
| 32mm          | 16.73       | 2.44            | 0.51                | 1.78           | 0.65               | D074132     | 866900   | 61.35    |

## Combination Wrenches — Contractor Series



- Satin finish
- Meets ANSI standards



Contractor Series -  
A superior alternative  
to raised panel wrenches

| Size          | O.A.L. (in) | Head Width (in) | Head Thickness (in) | Box Width (in) | Box Thickness (in) | Dynamic EDP | Code No. | Price \$ |
|---------------|-------------|-----------------|---------------------|----------------|--------------------|-------------|----------|----------|
| <b>Inch</b>   |             |                 |                     |                |                    |             |          |          |
| 1/4"          | 5.08        | 0.60            | 0.17                | 0.42           | 0.23               | D074308     | 866464   | 7.74     |
| 5/16"         | 5.59        | 0.73            | 0.19                | 0.51           | 0.26               | D074310     | 866465   | 7.74     |
| 3/8"          | 6.34        | 0.82            | 0.20                | 0.61           | 0.29               | D074312     | 866466   | 8.41     |
| 7/16"         | 6.61        | 0.91            | 0.23                | 0.68           | 0.31               | D074314     | 866467   | 8.94     |
| 1/2"          | 7.09        | 1.04            | 0.25                | 0.76           | 0.34               | D074316     | 866468   | 9.91     |
| 9/16"         | 7.60        | 1.06            | 0.25                | 0.79           | 0.34               | D074318     | 866469   | 11.41    |
| 5/8"          | 8.15        | 1.29            | 0.31                | 0.91           | 0.36               | D074320     | 866470   | 13.29    |
| 11/16"        | 8.94        | 1.35            | 0.31                | 0.96           | 0.41               | D074322     | 866471   | 14.86    |
| 3/4"          | 9.84        | 1.54            | 0.37                | 1.09           | 0.45               | D074324     | 866472   | 17.65    |
| 13/16"        | 10.67       | 1.71            | 0.39                | 1.21           | 0.50               | D074326     | 866473   | 19.45    |
| 7/8"          | 11.61       | 1.80            | 0.40                | 1.29           | 0.53               | D074328     | 866474   | 24.80    |
| 15/16"        | 12.48       | 1.95            | 0.41                | 1.36           | 0.56               | D074330     | 866475   | 29.43    |
| 1"            | 13.35       | 2.03            | 0.45                | 1.44           | 0.59               | D074332     | 866476   | 34.16    |
| 1-1/16"       | 14.25       | 2.18            | 0.48                | 1.52           | 0.62               | D074334     | 866477   | 39.34    |
| 1-1/8"        | 15.51       | 2.30            | 0.50                | 1.67           | 0.65               | D074336     | 866478   | 43.98    |
| 1-1/4"        | 16.89       | 2.56            | 0.53                | 1.80           | 0.71               | D074340     | 866479   | 52.24    |
| 1-5/16"       | 18.54       | 2.80            | 0.61                | 1.95           | 0.75               | D074342     | 866480   | 59.25    |
| 1-3/8"        | 18.54       | 2.80            | 0.61                | 1.95           | 0.75               | D074344     | 866481   | 63.04    |
| 1-7/16"       | 20.08       | 2.99            | 0.65                | 2.17           | 0.83               | D074346     | 866482   | 74.31    |
| 1-1/2"        | 20.08       | 2.99            | 0.65                | 2.17           | 0.83               | D074348     | 866483   | 75.54    |
| 1-5/8"        | 21.65       | 3.27            | 0.69                | 2.36           | 0.75               | D074350     | 866901   | 110.59   |
| 1-11/16"      | 21.65       | 3.27            | 0.69                | 2.36           | 0.75               | D074352     | 866902   | 112.82   |
| 1-3/4"        | 24.13       | 3.39            | 0.81                | 2.40           | 0.75               | D074354     | 866903   | 119.90   |
| 1-13/16"      | 24.13       | 3.39            | 0.81                | 2.40           | 0.75               | D074356     | 866904   | 123.21   |
| 1-7/8"        | 25.63       | 3.78            | 0.94                | 2.87           | 0.75               | D074358     | 866905   | 150.91   |
| 2"            | 25.63       | 3.78            | 0.94                | 2.87           | 0.75               | D074360     | 866906   | 168.46   |
| 2-1/8"        | 28.50       | 4.45            | 1.22                | 3.23           | 0.92               | D074362     | 866907   | 318.92   |
| 2-1/4"        | 28.50       | 4.45            | 1.22                | 3.23           | 0.92               | D074364     | 866908   | 354.67   |
| 2-3/8"        | 29.25       | 4.69            | 1.28                | 3.68           | 1.00               | D074366     | 866909   | 381.74   |
| 2-1/2"        | 29.25       | 4.69            | 1.28                | 3.68           | 1.00               | D074368     | 866910   | 394.24   |
| <b>Metric</b> |             |                 |                     |                |                    |             |          |          |
| 6mm           | 5.08        | 0.60            | 0.17                | 0.42           | 0.23               | D074406     | 866484   | 6.53     |
| 7mm           | 5.31        | 0.64            | 0.18                | 0.46           | 0.24               | D074407     | 866485   | 6.59     |
| 8mm           | 5.59        | 0.73            | 0.19                | 0.51           | 0.26               | D074408     | 866486   | 7.60     |
| 9mm           | 6.10        | 0.76            | 0.19                | 0.54           | 0.26               | D074409     | 866487   | 8.50     |
| 10mm          | 6.34        | 0.82            | 0.20                | 0.61           | 0.29               | D074410     | 866488   | 8.81     |
| 11mm          | 6.61        | 0.91            | 0.23                | 0.68           | 0.31               | D074411     | 866489   | 9.32     |
| 12mm          | 6.85        | 0.94            | 0.23                | 0.70           | 0.32               | D074412     | 866490   | 9.74     |
| 13mm          | 7.09        | 1.04            | 0.25                | 0.76           | 0.34               | D074413     | 866491   | 10.75    |
| 14mm          | 7.60        | 1.06            | 0.25                | 0.79           | 0.34               | D074414     | 866492   | 11.41    |
| 15mm          | 7.87        | 1.21            | 0.28                | 0.89           | 0.35               | D074415     | 866493   | 12.38    |
| 16mm          | 8.15        | 1.29            | 0.31                | 0.91           | 0.36               | D074416     | 866494   | 14.65    |
| 17mm          | 8.94        | 1.35            | 0.31                | 0.96           | 0.41               | D074417     | 866495   | 15.68    |
| 18mm          | 9.41        | 1.48            | 0.34                | 1.05           | 0.44               | D074418     | 866496   | 17.51    |
| 19mm          | 9.84        | 1.54            | 0.37                | 1.09           | 0.45               | D074419     | 866497   | 18.47    |
| 20mm          | 10.20       | 1.60            | 0.37                | 1.13           | 0.47               | D074420     | 866498   | 19.30    |
| 21mm          | 10.67       | 1.71            | 0.39                | 1.21           | 0.50               | D074421     | 866499   | 21.11    |
| 22mm          | 11.61       | 1.80            | 0.40                | 1.29           | 0.53               | D074422     | 866500   | 24.55    |
| 23mm          | 12.48       | 1.95            | 0.41                | 1.36           | 0.56               | D074423     | 866501   | 26.57    |
| 24mm          | 12.48       | 1.95            | 0.41                | 1.36           | 0.56               | D074424     | 866502   | 29.22    |
| 25mm          | 13.35       | 2.03            | 0.45                | 1.44           | 0.59               | D074425     | 866503   | 33.69    |
| 26mm          | 13.35       | 2.03            | 0.45                | 1.44           | 0.59               | D074426     | 866504   | 33.70    |
| 27mm          | 14.25       | 2.18            | 0.48                | 1.52           | 0.62               | D074427     | 866505   | 40.54    |
| 28mm          | 15.51       | 2.30            | 0.50                | 1.67           | 0.65               | D074428     | 866506   | 45.02    |
| 29mm          | 15.51       | 2.30            | 0.50                | 1.67           | 0.65               | D074429     | 866507   | 45.02    |
| 30mm          | 15.51       | 2.30            | 0.50                | 1.67           | 0.65               | D074430     | 866508   | 45.02    |
| 32mm          | 16.89       | 2.56            | 0.53                | 1.80           | 0.71               | D074432     | 866509   | 51.88    |

## Adjustable Wrenches

**Dynamic**

- Drop forged
- Meets ANSI standards
- Chrome finish for maximum resistance against corrosion
- Size graduation markings allow for faster adjustment to the correct fastener size



| Size | Maximum Jaw Opening | Dynamic EDP | Code No. | Price \$ |
|------|---------------------|-------------|----------|----------|
| 4"   | 0.6"                | D072004     | 866457   | 19.17    |
| 6"   | 0.8"                | D072006     | 866458   | 20.43    |
| 8"   | 1.0"                | D072008     | 866031   | 27.03    |
| 10"  | 1.2"                | D072010     | 865899   | 35.00    |
| 12"  | 1.4"                | D072012     | 866111   | 48.39    |
| 15"  | 1.7"                | D072015     | 866058   | 77.00    |
| 18"  | 2.1"                | D072018     | 866463   | 132.61   |

## Aluminum Pipe Wrenches

**Dynamic**

- Meets ANSI standards
- Forged and hardened steel hook and heel jaws
- Aluminum construction is up to 30% lighter than traditional cast steel models



| Size | Maximum Jaw Opening | Dynamic EDP | Code No. | Price \$ |
|------|---------------------|-------------|----------|----------|
| 14"  | 2"                  | D080014     | 866034   | 103.55   |
| 18"  | 2.5"                | D080018     | 866911   | 108.83   |
| 24"  | 3"                  | D080024     | 866912   | 172.40   |
| 36"  | 5"                  | D080036     | 866027   | 340.53   |
| 48"  | 6"                  | D080048     | 866913   | 544.32   |

## Torque Wrenches

**Dynamic**

- Each torque wrench is factory calibrated within tolerance limits of  $\pm 4\%$  clockwise
- Factory certificate of calibration included
- Quick release mechanism makes socket removal easy
- Lock ring prevents accidental change of torque setting
- Blow molded plastic case for convenient storage
- Durable aluminum handle features an easy to grip diamond knurl surface
- Dual scale SAE/Metric
- Increments: 1lb / 1.4Nm
- Fixed head style
- 32 teeth



| Square Drive | Capacity |            | Length | Dynamic EDP | Code No. | Price \$ |
|--------------|----------|------------|--------|-------------|----------|----------|
|              | ft.lb    | Nm         |        |             |          |          |
| 3/8"         | 20-100   | 33.9-128.8 | 17"    | D086001     | 866914   | 274.91   |
| 1/2"         | 30-250   | 48-332     | 24"    | D086002     | 866915   | 380.41   |

## Torque Multiplier — 1/2"F - 3/4"M

**Dynamic**

- Maximum Input Torque: 220ft.lb. / 300Nm
- Maximum Output Torque: 1100ft.lb. / 1500Nm
- Accuracy:  $\pm 5\%$
- Includes blow mold case
- No Anti-Backlash



| Input Drive | Output Drive | Torque Ratio | Length | Dynamic EDP | Code No. | Price \$ |
|-------------|--------------|--------------|--------|-------------|----------|----------|
| 1/2"F       | 3/4"M        | 5:1          | 6.37"  | D086101     | 866916   | 1,359.80 |

## Torque Multiplier — 1/2"F - 1"M

**Dynamic**

- Maximum Input Torque: 126ft.lb. / 173Nm
- Maximum Output Torque: 3300ft.lb. / 4500Nm
- Accuracy:  $\pm 5\%$
- Includes blow mold case
- With Anti-Backlash



| Input Drive | Output Drive | Torque Ratio | Length | Dynamic EDP | Code No. | Price \$ |
|-------------|--------------|--------------|--------|-------------|----------|----------|
| 1/2"F       | 1"M          | 26:1         | 9.25"  | D086102     | 866917   | 3,964.24 |

## 5pc Plier Set — Comfort Handle

**Dynamic**

- Set contents:
- 8" Linesman Pliers
  - 7" Diagonal Cutting Pliers
  - 8" Long Nose Pliers
  - 8" Bent Nose Pliers
  - 8" Slip Joint Pliers
  - Plastic Tray



| Description   | Dynamic EDP | Code No. | Price \$ |
|---------------|-------------|----------|----------|
| 5pc Plier Set | D055201     | 865961   | 64.22    |

## Diagonal Cutting Pliers — Comfort Handle

**Dynamic**

- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability



| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 6"             | 1.00"      | 0.43"         | D055038     | 866918   | 18.88    |
| 7"             | 1.00"      | 0.43"         | D055000     | 865886   | 26.80    |

## Long Nose Pliers — Comfort Handle

**Dynamic**

- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability



| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 6"             | 1.93"      | 0.35"         | D055001     | 865979   | 18.88    |
| 8"             | 2.99"      | 0.37"         | D055002     | 866381   | 22.98    |
| 11"            | 3.23"      | 0.39"         | D055003     | 866921   | 30.45    |

## Bent Nose Pliers — Comfort Handle

**Dynamic**

- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability



| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 6"             | 1.73"      | 0.35"         | D055004     | 866547   | 20.76    |
| 8"             | 2.85"      | 0.37"         | D055005     | 866382   | 25.36    |
| 11"            | 2.80"      | 0.39"         | D055006     | 866922   | 29.47    |



## Linesman Pliers — Comfort Handle



- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability

| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 7"             | 1.50"      | 0.39"         | D055013     | 866923   | 22.92    |
| 8"             | 1.61"      | 0.43"         | D055014     | 866386   | 29.66    |

## Slip Joint Pliers — Comfort Handle



- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability

| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 6"             | 1.59"      | 0.39"         | D055007     | 866925   | 18.91    |
| 8"             | 2.05"      | 0.41"         | D055008     | 866383   | 24.13    |
| 10"            | 2.24"      | 0.46"         | D055009     | 866926   | 29.66    |

## Groove Joint Pliers — Comfort Handle



- Meets ANSI standards
- Satin chrome finish with cushion-grip handle
- Drop forged and specially heat treated for maximum durability

| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 7-1/2"         | 1.69"      | 0.39"         | D055010     | 865890   | 23.21    |
| 9-1/2"         | 2.03"      | 0.44"         | D055011     | 865891   | 29.66    |
| 12"            | 2.50"      | 0.47"         | D055012     | 865885   | 36.13    |

## Wire Stripper/Cutter — Comfort Handle



- Meets ANSI standards
- Strips 8-20 AWG solid wire and 10-22 AWG stranded wire
- Serrated jaws to pull, bend, and loop wire

**Warning: Handles are not insulated and not designed to protect the user against electrical shock**

| Overall Length | Jaw Length | Jaw Thickness | Dynamic EDP | Code No. | Price \$ |
|----------------|------------|---------------|-------------|----------|----------|
| 6"             | 0.79"      | 0.43"         | D095001     | 866516   | 34.27    |

## Locking Pliers — Curved Jaws



- The narrow, large opening curved jaws provide firm grip on all round shapes
- Nickel plated finish for corrosion resistance

| Overall Length | Jaw Opening | Dynamic EDP | Code No. | Price \$ |
|----------------|-------------|-------------|----------|----------|
| 7"             | 1.50"       | D055304     | 866579   | 23.63    |
| 10"            | 1.88"       | D055305     | 866388   | 25.17    |

## Locking Pliers — Curved Jaws With Wire Cutter



- The functionality of regular curved jaws with the added convenience of a wire cutter
- Nickel plated finish for corrosion resistance

| Overall Length | Jaw Opening | Dynamic EDP | Code No. | Price \$ |
|----------------|-------------|-------------|----------|----------|
| 7"             | 1.50"       | D055302     | 866105   | 25.25    |
| 10"            | 1.88"       | D055303     | 866387   | 27.02    |

## 3pc Aviation Tin Snips Set



- Chrome Vanadium Blade with polish
- Self opening action
- Left Cut, Straight Cut, Right Cut



| Size  | Code No. | Price \$ |
|-------|----------|----------|
| 245mm | 505003   | 12.99    |

Prices in this catalogue are subject to change without notice. If there is a discrepancy between a product price listed in this catalogue and that listed on [www.sowatool.com](http://www.sowatool.com), the price on our website will take precedence.

Images are representational only and may not reflect actual product.



## Cabinets & Chests

|                                       |      |
|---------------------------------------|------|
| Machinists' & Mechanics' Chests ..... | L2   |
| Chest Bases .....                     | L2   |
| Top Chests .....                      | L3-4 |
| Heavy Duty Workstation .....          | L4   |
| Chest Riser .....                     | L5   |
| Roller Cabinets .....                 | L5-9 |
| Utility Carts .....                   | L9   |
| Tool Boxes .....                      | L10  |
| Parts Cabinets .....                  | L10  |
| End Mill Dispenser Cabinets .....     | L10  |
| Drill Dispenser Cabinets .....        | L10  |

## Machinists' Chest – Model 520



**7 Drawer** – Drawers and top compartment felt lined. Front panel covers drawers, stores in base. Has top carry handle.

- 6 drawer dividers

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 20-1/8      | 8-1/2       | 13-5/8       | 28          | Brown  | 609601   | 1,199.77 |

## Mechanics' Chest – Model 263



**3 Drawer**

- Fits on 27" and 29" wide roller cabinets
- Lift-out tote tray with socket set divider included
- Friction drawer slides

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-1/8      | 12-1/8      | 14-3/4       | 44          | Red    | 609112   | 1,515.96 |

## Machinists' Chest – Model 526



**8 Drawer** – Felt lined drawers and tool compartment. Self storing drop front panel and rugged side handles.

- 6 drawer dividers

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-3/4      | 8-1/2       | 13-5/8       | 36          | Brown  | 609602   | 1,530.55 |

## Mechanics' Chest – Model 266



**6 Drawer**

- Fits on 27" and 29" wide roller cabinets
- Lift-out tote tray with socket set divider included
- Friction drawer slides

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-1/8      | 12-1/8      | 14-3/4       | 52          | Red    | 609113   | 1,765.32 |

## Machinists' Chest – Model 52611



**11 Drawer** – Drawers and top compartment felt lined. Front panel covers drawers.

- 3 drawer dividers
- Side handles

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-3/4      | 8-1/2       | 18           | 47          | Brown  | 609615   | 1,760.34 |

## Mechanics' Chest – Model 360



**10 Drawer**

- Fits on 27" and 29" wide roller cabinets
- Lift-out tote tray with socket set divider included
- Friction drawer slides

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-1/8      | 12-1/8      | 18-7/8       | 68          | Brown  | 609635   | 2,220.21 |

## Machinists' Chest – Model 3611



**11 Drawer** – Drawers and top compartment wool felt lined. Unlined handbook drawer locks separately. Felt covered bottom glides protect drop front panel from scratches.

- Chrome side handles
- 6 adjustable drawer dividers
- Wrinkle finish

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-1/8      | 12          | 18-7/8       | 69          | Brown  | 609830   | 2,452.68 |

## Chest Bases – Models MC-22 & MC-28



**2 Drawer Chest Base MC-22** – Fits under model 520 and 620 machinists' chests.

- Also fits any 27" or 29" roller cabinet
- Has wool felt lined top drawer and side handles



**2 Drawer Chest Base MC-28** – Fits under model 526 and 52611 machinists' chests.

- Also fits any 27" or 29" roller cabinet
- Has wool felt lined top drawer and side handles



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 21-5/8      | 9-5/8       | 7-13/16      | 20          | Brown  | 609604   | 727.78   |
| 28-1/8      | 9-5/8       | 7-13/16      | 23          | Brown  | 609605   | 842.08   |

## Machinists' Chest – Model 620



**3 Drawer** – Drawers and top compartment wool felt lined. Front panel conceals, locks drawers.

- Top carry handle
- Includes 4 adjustable drawer dividers

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 20-1/8      | 8-1/2       | 13-5/8       | 25          | Brown  | 609603   | 985.19   |

## Chest Base – Model 5150



**2 Drawer**

- Fits under models 526, 52611, and 3611 machinists' chests



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-3/4      | 12-1/2      | 9-1/2        | 28          | Brown  | 609114   | 1,020.46 |

## Pro+ Series Toolbox Features

- 100lbs bearing slides on all drawers
- Completely redesigned locking system with tubular key and steel double hook engagement mechanism
- Smooth and quiet rolling premium 5" x 2" casters with precision sealed bearings and 360° top brake
- New see-through design allows quicker visual and physical access to tools in the top lid cavity (42" model top chests only)
- Heavy-duty 18 gauge steel frame for superior durability
- Drawer liners included on all models
- Scratch and corrosion resistant powder coat paint finish
- Pre-installed casters on all 42" wide roller cabinets making it faster to go from unboxing to working
- Redesigned side handle that makes moving rolling cabinets easier and more comfortable

### 26" PRO+ Top Chest – 6 Drawer



PRO+ Series

6 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 16          | 16.3         | 72          | 93106    | 866613   | 894.96   |

### 26" PRO+ Top Chest – 9 Drawer



PRO+ Series

9 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 21           | 106         | 93109    | 866612   | 1,311.40 |

### 26" PRO+ Top Chest – 12 Drawer



PRO+ Series

12 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 21           | 120         | 93120    | 861746   | 1,416.20 |

### 42" PRO+ Top Chest – 9 Drawer



PRO+ Series

9 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 42          | 19          | 23.5         | 168         | 93119    | 861747   | 2,494.15 |

### 26" PRO+ Intermediate Chest – 3 Drawer



PRO+ Series

3 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 13.6         | 55          | 93503    | 861748   | 1,005.99 |



Grab a tool trolley for all your holders!

See Page G90



## Marquis Series Toolbox Features

- Safety latch system prevents drawers from accidentally opening
- Heavy duty roller bearing slides allow heavily loaded drawers to open and close with ease
- Industrial black wrinkle finish offers superior scratch and fade resistance
- Drawer liners included
- Heavy gauge steel construction for greater load ratings and storage capacities

- Premium quality casters with greater load ratings allow easier movement on all surfaces
- Oval handles on roller cabinets allow comfortable gripping and maneuvering
- Heavy duty lifting handles with 90° stop for easy lifting of top chests
- Gas shocks assist in opening and closing lids on top chests (41-1/2" and 53-3/8" models only)

### 26" Top Chest – 6 Drawer



Marquis Series

6 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 16          | 19           | 86          | 99806SB  | 865031   | 1,534.24 |

### 41-1/2" Top Chest – 8 Drawer



Marquis Series

8 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 41-1/2      | 18-1/2      | 20-1/2       | 155         | 99108SB  | 865041   | 2,626.75 |

### 26" Top Chest – 8 Drawer



Marquis Series

8 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 16          | 19-1/4       | 94          | 99808SB  | 865208   | 1,346.44 |

### 53-3/8" Top Chest – 8 Drawer



Marquis Series

8 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 53-3/8      | 24          | 19-3/4       | 264         | 99508SB  | 861745   | 5,385.65 |

### 41-1/2" Top Chest – 7 Drawer



Marquis Series

7 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 41-1/2      | 18-1/2      | 23-3/4       | 182         | 99107SB  | 865488   | 3,555.27 |

### 33-1/2" Top Chest – 5 Drawer



Marquis Series

5 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 33-1/2      | 19-1/8      | 19-1/4       | 127         | 99105SB  | 865043   | 1,850.89 |

### 28" Top Chest – 9 Drawers



9 Drawer

- Includes lock and key, and drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 28          | 18          | 20           | 103         | D069208     | 866626   | 1,053.15 |

### Kennedy Heavy Duty Workstations



- Unassembled
- Adjustable feet
- Tough durable grey wrinkle finish
- 5 drawer models have two shelves on the left hand side

54" Model

- Dimensions: 54"W x 20"D x 34-1/2"H
- Drawers: 16-9/16"W x 16-1/2"D x 3-3/16"H



| Description                               | Weight (lb) | Code No. | Price \$ |
|---|-------------|----------|----------|
| 54" work station with steel top 5 drawer  | 159         | 609840   | 1,259.36 |
| 54" work station with steel top 10 drawer | 216         | 609842   | 2,731.36 |

## Chest Riser – Model 2600

Add storage and work surface to your roller cabinet. Use with 263, 266 and 360 chests, or 2602, 2603 and 2604 chest bases.



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 26-5/8      | 12-1/2      | 11-3/4       | 9           | Brown  | 609645   | 315.48   |

## Roller Cabinet – Model 175C

5 Drawer

- Black wrinkle finish



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 27          | 18          | 35           | 113         | Black  | 609115   | 1,093.25 |

## Roller Cabinet – Model 21040

5 Drawer – Top drawer activates locking mechanism.

- Includes side handle, four 3" swivel casters, cylinder lock, 2 keys
- Ball bearing slides



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 21"         | 13-5/8      | 32-13/16     | 70          | Brown  | 609664   | 2,109.94 |

## Roller Cabinet – Model 273

3 Drawer – Swing down panel conceals, locks bottom compartment

- Includes side handle, four 5" casters, cylinder lock, 2 keys



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 27          | 18          | 35           | 99          | Brown  | 609665   | 1,566.44 |

## Roller Cabinets – Models 275(X) & 295(X)

5 Drawer – Swing down panel conceals, locks bottom compartment.

- Includes side handle, four 5" casters, cylinder lock, 2 keys
- Brown wrinkle finish
- Models 275 and 295 have Friction Drawer Slides
- Models 275X and 295X have Ball Bearing Drawer Slides



| Model | Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Code No. | Price \$ |
|-------|-------------|-------------|--------------|-------------|----------|----------|
| 275   | 27          | 18          | 35           | 110         | 609670   | 1,884.86 |
| 275X  | 27          | 18          | 35           | 115         | 609116   | 2,130.46 |
| 295   | 29          | 20          | 35           | 128         | 609685   | 1,944.59 |
| 295X  | 29          | 20          | 35           | 133         | 609117   | 2,356.21 |

## Roller Cabinets – Models 277(X) & 297(X)

7 Drawer – Swing down panel conceals, locks bottom compartment.

- Includes side handle, four 5" casters, cylinder lock, 2 keys
- Brown wrinkle finish
- Models 277 and 297 have Friction Drawer Slides
- Models 277X and 297X have Ball Bearing Drawer Slides



| Model | Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Code No. | Price \$ |
|-------|-------------|-------------|--------------|-------------|----------|----------|
| 277   | 27          | 18          | 35           | 127         | 609675   | 2,192.42 |
| 277X  | 27          | 18          | 35           | 134         | 609118   | 2,424.19 |
| 297   | 29          | 20          | 35           | 146         | 609690   | 2,287.75 |
| 297X  | 29          | 20          | 35           | 153         | 609119   | 2,628.37 |

## Roller Cabinet – Model 310X

10 Drawer

- 5" x 2" Roller Bearing Casters hold up to 350lbs each
- High security tubular locking system
- Ball bearing drawer slides
- Tubular push handle included



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 39-3/8      | 18          | 34           | 180         | Brown  | 609120   | 3,761.62 |

## Roller Cabinet – Model 315X

15 Drawer

- 5" x 2" Roller Bearing Casters hold up to 350lbs each
- High security tubular locking system
- Ball bearing drawer slides
- Tubular push handle included



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 39-3/8      | 18          | 39           | 230         | Red    | 609121   | 4,928.45 |

## Roller Cabinet – Model 376X

6 Drawer – Just the cabinet to fill the needs of those who want workbench height and plenty of tool storage space.

- Four 5" casters, side handle
- Swing down panel conceals storage compartment
- Ball bearing slides



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 27          | 18          | 39           | 131         | Red    | 609695   | 2,163.09 |

## Roller Cabinet – Model 378XB



**8 Drawer** – Top drawer activates locking mechanism.

- Includes side handle, four 5" swivel casters, cylinder lock, 2 keys
- Ball bearing slides



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 27          | 18          | 39           | 146         | Brown  | 609699   | 2,656.62 |

## Roller Cabinet – Model 2907MP



**7 Drawer**

- Heavy duty, non-slip drawer liners and full width aluminum drawer pulls
- Large 6" x 2" roller bearing heavy duty casters
- Ball bearing drawer slides
- Coated MDF work surface



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 29          | 20          | 40-1/8       | 198         | Red    | 609122   | 3,391.30 |

## Roller Cabinet – Model 4804



**4 Drawer** – Pad-lockable doors protect 4 drawer cabinet and interior shelves.



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 48          | 26          | 35-7/8       | 345         | Brown  | 609702   | 5,316.08 |

## Roller Cabinet – Model 4400MP



**10 Drawer**

- Heavy duty, non-slip drawer liners and full width aluminum drawer pulls
- Large 6" x 2" roller bearing heavy duty casters
- 10" centre wheel axle adds strength and stability
- Ball bearing drawer slides
- Coated MDF work surface



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 43-3/4      | 20          | 37-3/4       | 316         | Red    | 609124   | 6,690.93 |

## Roller Cabinet – Model 6012E



**12 Drawer** – With ball bearing slides on all drawers.



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 60-7/8      | 32          | 35-7/8       | 510         | Brown  | 609703   | 8,615.72 |

## Side Cabinet – Model 205X



**5 Drawer**

- Ball-bearing slides
- Fits models 295(X), 297(X), 4410, and 4400MP
- Hangs on either side of your roller cabinet
- Metal thickness: Body -18 ga., Drawers - 20 ga.



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 13-5/8      | 20          | 29           | 102         | Brown  | 609126   | 2,173.12 |

## Roller Cabinet – Model 6012S



**12 Drawer** – With ball bearing slides on all drawers.



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Colour | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|--------|----------|----------|
| 60-7/8      | 32          | 35-7/8       | 500         | Brown  | 609701   | 8,501.95 |

## Tubular Key High Security Lock Sets



| Lock & Key Set No. | Description  | Code No. | Price \$ |
|--------------------|--|----------|----------|
| 80401              | Machinists' and Mechanics' Chests. Replaces Standard Lock No. 80840  | 609854   | 72.52    |
| 80402              | Chest Base Models MC22 and MC28. Replaces Standard Lock No. 80843  | 609856   | 72.52    |
| 80403              | Chest Base Models 2602, 2603, 2604, 2902, Drill, Tap and End Mill Dispensers 5101, 5103, 5302 and 27", 29" and 34" Roller Cabinets. Replaces Standard Lock No. 80844 | 609858   | 72.52    |

## 5 Drawer Roller Cabinet

- Ball bearing slides with Quick Disconnect
- Heavy duty 4" x 1" casters
- Double wall construction
- Electro-powder coating to resist scratches and solvents
- 10mm top mat



| Model  | Dimensions (mm)    | Weight (kg) | Code No. | Price \$ |
|--------|--------------------|-------------|----------|----------|
| VTC-23 | 570W x 345D x 650H | 34          | 326530   | 1,963.72 |

## 26" PRO+ Roller Cabinet – 4 Drawers

### PRO+ Series

#### 4 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 36           | 116         | 93204    | 861749   | 1,527.42 |

## 26" PRO+ Roller Cabinet – 5 Drawers

### PRO+ Series

#### 5 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 36           | 120         | 93250    | 866615   | 2,031.61 |

## 26" PRO+ Roller Cabinet – 7 Drawers

### PRO+ Series

#### 7 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 42           | 155         | 93270    | 861750   | 2,400.81 |

## 26" PRO+ Roller Cabinet – 11 Drawers

### PRO+ Series

#### 11 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26          | 19          | 42           | 165         | 93211    | 866614   | 2,225.67 |

## 42" PRO+ Roller Cabinet – 12 Drawers

### PRO+ Series

#### 12 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 42          | 19          | 43.5         | 247         | 93212    | 861647   | 2,887.13 |

## 42" PRO+ Roller Cabinet – 15 Drawers

### PRO+ Series

#### 15 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 42          | 19          | 43.5         | 262         | 93215    | 861677   | 3,037.47 |

## 14" PRO+ Right Side Rider – 8 Drawers

### PRO+ Series

#### 8 Drawer

- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 14          | 19          | 36.5         | 100         | 93508    | 861751   | 2,064.24 |

## 19" PRO+ Right Side Rider – 8 Drawers

### PRO+ Series

#### 8 Drawer

- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 19          | 19          | 36.5         | 117         | 93408    | 861672   | 1,469.05 |



## 19" PRO+ Left Side Rider – 8 Drawers

### PRO+ Series

#### 8 Drawer

- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 19          | 19          | 36.5         | 117         | 93418    | 861678   | 1,985.23 |

## 26-1/2" Roller Cabinet – 11 Drawers

### PRO Series

#### 11 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26-1/2      | 18          | 42-1/2       | 155         | 97211    | 865003   | 843.76   |

## 26-1/2" Roller Cabinet – 7 Drawers

### Marquis Series

#### 7 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26-1/2      | 18          | 39-1/8       | 145         | 99507SB  | 865033   | 2,210.00 |

## 26-1/2" Roller Cabinet – 9 Drawers

### Marquis Series

#### 9 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 26-1/2      | 18          | 39-1/8       | 150         | 99509SB  | 865402   | 2,362.37 |

## 34" Roller Cabinet – 6 Drawers

### Marquis Series

#### 6 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 34          | 19-1/2      | 39-1/8       | 220         | 99206SB  | 865248   | 3,394.08 |

## 34" Roller Cabinet – 8 Drawers

### Marquis Series

#### 8 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 34          | 19-1/2      | 39-1/8       | 235         | 99208SB  | 865075   | 3,077.55 |

## 42" Roller Cabinet – 10 Drawers

### Marquis Series

#### 10 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 42          | 19          | 40           | 295         | 99210SB  | 865321   | 4,253.49 |

## 53-3/8" Roller Cabinet – 9 Drawers

### Marquis Series

#### 9 Drawer

- 2 swivel/brake, 2 swivel, 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 53-3/8      | 24          | 39-1/2       | 435         | 99209SB  | 861752   | 6,653.71 |

## 53-3/8" Roller Cabinet – 13 Drawers

### Marquis Series

#### 13 Drawer

- 2 swivel/brake, 2 swivel, 2 fixed casters
- Includes lock and key, drawer liner kit and top mat



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 53-3/8      | 24          | 39-1/2       | 455         | 99113SB  | 861753   | 7,517.03 |

## 40-11/16" Roller Cabinet – 12 Drawers



### XL Series

#### 11 Drawer

- 2 swivel / 2 fixed casters
- Includes lock and key, and drawer liner kit

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Gray EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|----------|----------|----------|
| 40-11/16    | 18          | 42-1/2       | 245         | 92212    | 865799   | 2,116.89 |

## 28" Roller Cabinet – 10 Drawers



### 10 Drawer

- 2 swivel / 2 fixed 5" x 2" casters
- Includes lock and key, drawer liner kit and top mat

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 28          | 18          | 43.25        | 163         | D069206     | 866623   | 1,931.47 |

## 36" Roller Cabinet – 8 Drawers



### 8 Drawer

- 2 swivel / 2 fixed 5" x 2" casters
- Includes lock and key, drawer liner kit and top mat
- Sides open to allow for extra storage

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 36          | 18          | 39.33        | 195         | D069207     | 866627   | 1,283.01 |

## 16" Side Rider – 6 Drawers



### 6 Drawer

- Can be installed on the right or left
- Includes lock and key, drawer liner kit and top mat

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 16          | 18          | 33.75        | 77          | D069205     | 866090   | 579.87   |

## 52" Industrial Cart – 12 Drawers



### 12 Drawer

- 4 swivel / 2 fixed 5" x 2" casters
- Includes lock and key, drawer liner kit and PVC top mat

| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 52.5        | 31.64       | 40.25        | 378         | D069209     | 866628   | 4,622.16 |

## 2 Tray Utility Cart



- 2 swivel / 2 fixed 4" x 1" casters
- Optional middle tray available



| Width (in.)                 | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-----------------------------|-------------|--------------|-------------|-------------|----------|----------|
| 30                          | 16          | 36           | 36          | D069101     | 866629   | 292.59   |
| <b>Optional Middle Tray</b> |             |              |             |             |          |          |
| 30                          | 16          | 3            |             | D069103     | 866630   | 122.71   |

## 3 Drawer Utility Cart



- 2 swivel / 2 fixed 4" x 1" casters
- Includes lock and key, drawer liner kit and work top



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 27          | 18.5        | 36           | 50          | D069102     | 865940   | 790.42   |

## Professional Tool Boxes – Models K20/K24



- Includes lift-out tray with socket set divider
- Brown wrinkle finish



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Model | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------|----------|----------|
| 20-1/8      | 8-5/8       | 9-3/4        | 13          | K20   | 609608   | 494.10   |
| 24-1/8      | 8-5/8       | 9-3/4        | 14.5        | K24   | 609614   | 536.55   |

## Cantilever Tool Boxes – Models 1018/1022



- Create compartments in trays with movable/removable partitions and divider sets
- One tray has socket set divider
- Brown wrinkle finish



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Model | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------|----------|----------|
| 18-1/8      | 10-1/6      | 12-5/8       | 18.3        | 1018  | 609760   | 285.26   |

## 3 Drawer Hand Box with Ball Bearing Slides



- Includes drawer liner kit



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 20"         | 10"         | 12"          | 28          | D069001     | 865919   | 278.44   |

# Cabinets & Chests

## 19" Hip Roof Tool Box



- Powder coated paint finish
- Includes tote tray



| Width (in.) | Depth (in.) | Height (in.) | Weight (lb) | Dynamic EDP | Code No. | Price \$ |
|-------------|-------------|--------------|-------------|-------------|----------|----------|
| 19"         | 7"          | 7.5"         | 9           | D069002     | 866631   | 105.06   |

## Tool Boxes



- ABS plastic
- VTB-102 has two levered trays
- VTB-901 has one removable tray



VTB-102



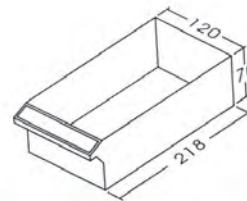
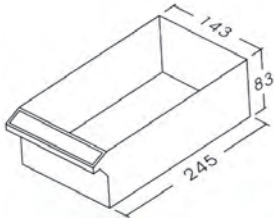
VTB-901

| Model   | Dimensions (mm)    | Code No. | Price \$ |
|---------|--------------------|----------|----------|
| VTB-102 | 420W x 235D x 180H | 326546   | 131.34   |
| VTB-901 | 378W x 182D x 144H | 326547   | 50.95    |

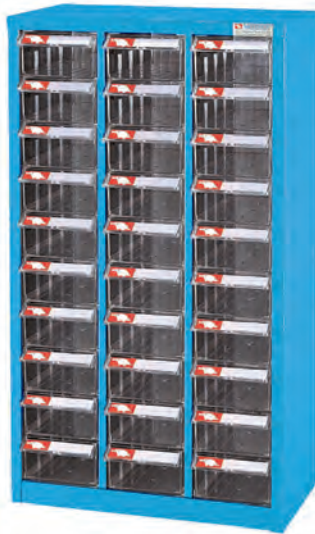
## Parts Cabinets



- Steel plate cover with Zinc
- Drawer material: GPS



VA6-212H



VA6-330H



VA7-324P



VA7-448P

| Model No. | Width (mm) | Depth (mm) | Height (mm) | No. of Drawers | Weight (kgs.) | Code No. | Price \$ |
|-----------|------------|------------|-------------|----------------|---------------|----------|----------|
| VA6-212H  | 362        | 265        | 571         | 12             | 10.8          | 326534   | 606.21   |
| VA6-330H  | 533        | 264        | 937         | 30             | 25.3          | 326536   | 1,103.42 |
| VA7-324P  | 440        | 222        | 642         | 24             | 15.5          | 326538   | 692.55   |
| VA7-448P  | 586        | 222        | 937         | 48             | 27.5          | 326540   | 1,060.38 |
| VA1-525   | 586        | 222        | 350         | 25             | 10.0          | 326542   | 718.40   |
| VA1-575   | 586        | 222        | 937         | 75             | 32.3          | 326544   | 1,481.73 |

## End Mill Dispenser Cabinets



- Three drawer
- All steel



| Description  | Model No. | Code No. | Price \$ |
|--|-----------|----------|----------|
| Two flute single and double end for 1/16 to 1                | CZD10     | 113905   | 1,529.44 |
| Four flute single and double end for 1/16 to 1               | CZD11     | 113906   | 1,529.44 |
| Two and four flute single and double end for 1/8 to 1 x 8ths | CZD12     | 113907   | 372.97   |

## Drill Dispenser Cabinets



- 14.625" x 7.375" x 7.75"
- 10.25lbs
- Stackable for larger inventories
- One piece drawer slide for long useful life



| Description  | Case No. | Code No. | Price \$ |
|--|----------|----------|----------|
| Steel Cabinet holds 1/16-1/2 x 64ths Jobber Drills | 13000    | 113826   | 157.94   |
| Steel Cabinet holds #1-60 Jobber Drills            | 13025    | 113827   | 199.70   |



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L11 The Sowa logo is a small, stylized version of the main logo, featuring the word 'Sowa' in a yellow, italicized font.



# A

**AA ER COLLETS** G22-27, G29

## ABRASIVES

|                             |         |
|-----------------------------|---------|
| Back-up Pads                | J7, J11 |
| Belt Sanders                | J14     |
| Belts                       | J8      |
| Bushings, Nested Wheel      | J5      |
| Cloth Rolls, Aluminum Oxide | J7      |
| Cut-Off Wheels              | J9      |
| Depressed Centre Wheels     | J9      |
| Discs                       | J7-11   |
| Emery Cloth                 | J8      |
| Grinding Wheels             | J3-6    |
| Hand Blocks                 | J10     |
| Hand Pads, Non-Woven        | J8      |
| Mops                        | J10     |
| Quick Change Discs          | J10-11  |
| Rolls                       | J7      |
| Sheets – Aluminum Oxide     | J8      |
| Wet or Dry Finishing Paper  | J8      |
| Wheels                      | J3-6    |

**ABSOLUTE DIGITAL CALIPERS** F10

## ACME

Screw Pitch Gauge F23

**ADAPTER PLATES** H33-34, H51,  
H58-59, H87, H102

## ADAPTERS

|                       |                                |
|-----------------------|--------------------------------|
| Boring Head           | G80, G84, G89                  |
| Collet Chuck          | G18-21, G33-35,<br>G38-40, G42 |
| End Mill              | G4-10                          |
| Jacobs Taper          | G72-73, G78-80                 |
| Milling Machine       | G15-16                         |
| Morse Taper           | G72-73, G78-81                 |
| Shell End Mill        | G13-15                         |
| Tapping Head V Flange | G63-66                         |

## ADJUSTABLE

|                         |        |
|-------------------------|--------|
| Angle Block             | F28    |
| Angle Plates            | F28    |
| Broach Holders, Rotary  | D25    |
| Coolant Hose System     | I 8-13 |
| Die Stocks              | C13    |
| Dies                    | C12-13 |
| Magnetic Link           | H157   |
| Reamers                 | B72    |
| Tap and Reamer Wrenches | C11    |
| Wrenches                | K27    |

**AIR GRINDERS** J12-14

**AIR TAPPING UNITS** G68

**AIRCRAFT EXTENSION DRILL** B26-27

**ALUMINUM END MILLS** A19-21, A27

**ALUMINUM TAPS** C7

## ANGLE

|         |               |
|---------|---------------|
| Blocks  | F28           |
| Cutters | D8, D12-13    |
| Dresser | I 3           |
| Heads   | G49-61        |
| Plates  | F28, H16, H18 |
| Vises   | H9            |

## ANNULAR

|          |     |
|----------|-----|
| Cutters  | D6  |
| Holdings | G81 |

## ARBOR

|                          |                |
|--------------------------|----------------|
| Boring Head              | G84, G89       |
| Drill Chuck              | G72-73, G78-80 |
| Face Mill                | G14-15         |
| Milling Machine          | G15-16         |
| Presses                  | H19            |
| Running Bushings         | G16            |
| Saw                      | G15            |
| Screws – Shell End Mills | G15            |
| Shell End Mill           | G13-15         |

Shell Reamer B71

Spacers G15-16

Stub G15

## ARMS

Tapping G68

**AUTOBLOK-Power Chucks** H109-112

**AUTOMATIC CENTRE PUNCH** K3

# B

**BACK PLATES** H33-34, H51,  
H58-59, H87, H102

**BACK-UP PADS** J7, J11

## BALANCED TOOLING

|                    |        |
|--------------------|--------|
| DA Collet Chucks   | G39-40 |
| End Mill Holders   | G4-10  |
| ER Collet Chucks   | G18-21 |
| SA Collet Chucks   | G33    |
| Shrink Fit Holders | G43-46 |
| TG Collet Chucks   | G34-35 |

## BALL END

|              |         |
|--------------|---------|
| Screwdrivers | K14     |
| Wrenches     | K7, K11 |

## BALL PEIN

Hammers K4

**BALL PLUNGERS** H145-146

## BARS

|           |                          |
|-----------|--------------------------|
| Boring    | D3, D5, E60-73, E170-171 |
| Draw      | G90                      |
| Sine      | H17-18                   |
| Threading | E89                      |

**BASES – MAGNETIC** F16-18, I 6

**BELT SANDERS** J14

**BELTS – ABRASIVE** J8

**BENCH VISES** H12

## BEVEL

|             |     |
|-------------|-----|
| Edge Square | F27 |
| Protractor  | F26 |

## BIG TAPPER

G68

## BISON LATHE CHUCKS

### AND ACCESSORIES

H21-80

## BLACK BOOK

F34

## BLACK/GOLD

|        |     |
|--------|-----|
| Drills | B15 |
|--------|-----|

## BLADE MICROMETER

F5

## BLADES

|                    |        |
|--------------------|--------|
| Cut-Off            | D2     |
| Deburring          | J25-28 |
| Indexable Part Off | E81-82 |

## BLANKS – Drill and Reamer

B45-46

## BLOCKS

|                |            |
|----------------|------------|
| 1-2-3 Blocks   | F34        |
| 2-4-6 Blocks   | F34        |
| Angle          | F28        |
| Gauge          | F29        |
| Hand, Abrasive | J10        |
| Step Blocks    | H136, H141 |
| Tri Blocks     | F34        |
| “V”            | H15-16     |

## BOLTS

|        |      |
|--------|------|
| T-Slot | H139 |
|--------|------|

## BONDHUS

K7-K14

## BOOKS

|                      |     |
|----------------------|-----|
| Machinery Handbook   | F34 |
| Engineers Black Book | F34 |
| Fastener Black Book  | F34 |
| Pocket Reference     | F34 |

## BORE GAUGES

F19

## BORING

|                  |                          |
|------------------|--------------------------|
| Bars             | D3, D5, E60-73, E170-171 |
| and Facing Heads | G84-89                   |
| Heads and Shanks | G84-89                   |

## BOX PARALLELS

H19

## BOXES – TOOL

L9-10

## BRAZED TOOLBITS

D2-3

## BRIDGE REAMER

B69

## BROACHES

D16-27

## BROWN AND SHARPE REAMERS

B72

## BT TAPER TOOLING

G7-8, G14-15, G20,  
G34, G38, G40, G45,  
G50-55, G58-61, G63,  
G66, G70, G79, G84

## BULL NOSE CENTRES

H117-118,  
H122-123, H126-127

## BURRS – Solid Carbide

J16-18

## BUSHINGS

|                |        |
|----------------|--------|
| Arbor          | G16    |
| Broach         | D18-19 |
| CNC Toolholder | G81    |
| Keyway         | D18-19 |
| Running        | G16    |
| Wheel, Nested  | J5     |

# C

## CABINETS

|                    |         |
|--------------------|---------|
| Drill Dispenser    | B5, L10 |
| End Mill Dispenser | A4, L10 |
| Parts Cabinets     | L10     |
| Roller             | L5-L9   |

## CALIPERS

|                             |     |
|-----------------------------|-----|
| Absolute                    | F10 |
| Accessory Kit               | F11 |
| Centreline Gauge Attachment | F11 |
| Coolant Proof               | F9  |
| Depth                       | F18 |
| Dial                        | F10 |
| Divider                     | F27 |

Electronic F9-11, F18

Extender Attachments F11

Hermaphrodite F27

Internal/External F27

Jenny F27

Metric F9-11

Outside F9-11

Vernier F10-11

## CARBIDE

Burrs J16-18

Chamfer Tools E126, E142-143

Combined Drills  
and Countersinks B42-44

Countersinks B56, B60-61

Dovetail Milling Cutter E144

Drills B3, B6-11, B42-43

End Mills Uncoated  
Blue Series A3-12

End Mills TiAlN Coated  
Yellow Series A3-12

End Mills Typhoon  
Red Series A13-17

End Mills QTT Premium Class  
TiAlN Coated A17-18

End Mills for Aluminum  
Green Series A19-20

Reamers B68

Saws D15

Tapered End Mills A28-30

## CARBIDE INSERTS

ADKT 1505 E92

APKT E92

APKT 1003/1035 E92

APKT 1604 E93

APKT-A E92

APKT-X24 E92

APMT E93

|                  |          |                          |          |              |          |
|------------------|----------|--------------------------|----------|--------------|----------|
| APXT 11T3 & 1604 | E94      | ECTR Threading           | E88      | SEK(T)       | E100     |
| CCGT-AM          | E8, E34  | ICTR Threading           | E88      | SEKN Ceramic | E40      |
| CCGT-AP          | E8, E34  | KNUX                     | E17      | SEKR-F3      | E100     |
| CCGT-F1P         | E8       | LNEX-F2/M                | E94      | SEXT-F2      | E100     |
| CCMT-F1P/F2P     | E9       | LNMX-F2/M                | E95      | SEXT-M       | E100     |
| CCMT-F3P         | E9       | MGMN-G Part off/Grooving | E77      | SEXT-R8      | E101     |
| CCMT-FVL         | E9       | MGMN-M Grooving/Turning  | E77      | SNEX-A       | E101     |
| CNGA Ceramic     | E39      | MPMT                     | E95      | SNEX-F2/M    | E101     |
| CNGN Ceramic     | E39      | MRGN-A Part off          | E77      | SNGA Ceramic | E40      |
| CNMA C.B.N.      | E38      | MRMN-M                   | E77      | SNGN Ceramic | E40      |
| CNMA Ceramic     | E39      | N9MT                     | E151-152 | SNMA         | E19      |
| CNMG-A           | E10      | NPET-AD                  | E95      | SNMA C.B.N.  | E38      |
| CNMG-F2          | E10      | NPET-RD                  | E95      | SNMA Ceramic | E40      |
| CNMG-M/M1        | E10      | NPMT-MD                  | E96      | SNMG-A       | E20      |
| CNMG-MM          | E11      | NPMT-SD                  | E96      | SNMG-G       | E20      |
| CNMG-R1          | E11      | OFCW                     | E96      | SNMG-M       | E20      |
| CNMG-R2          | E11      | OFKR-F2, M, A            | E96      | SNMG-R1      | E21      |
| CNMG-SM          | E12      | OFKT-F2, M, A            | E97      | SNMG(M)-R2   | E21      |
| CNMM-R3          | E12      | QCMT                     | E97      | SNMG-SM      | E21      |
| CPMT-M           | E94      | RC                       | E97      | SNMM-R3      | E22      |
| DCGT-AM          | E12, E35 | RCGT-AM                  | E17, E35 | SNMX-M       | E101     |
| DCGT-AP          | E13, E35 | RCGT-AP                  | E17, E36 | SNU          | E101     |
| DCMT-F1P/F2P     | E13      | RCMX                     | E18      | SP Part off  | E81      |
| DCMT-F3P         | E13      | RDKT-F2/M                | E98      | SPC          | E102     |
| DCMT-FVL         | E14      | RNG Ceramic              | E40      | SPG          | E22      |
| DNGA Ceramic     | E39      | RNGA Ceramic             | E40      | SPK          | E102     |
| DNGN Ceramic     | E39      | RNMG-G                   | E18      | SPMT         | E102     |
| DNMA C.B.N.      | E38      | RPMM                     | E98      | SPMT-MD      | E102     |
| DNMA Ceramic     | E40      | SCGT-AM/AP               | E18, E36 | SPU          | E102     |
| DNMG-A           | E14      | SCMT-F2P                 | E19      | TCGT-AM      | E22, E36 |
| DNMG-F2          | E14      | SCMT-F3P                 | E19      | TCGT-AP      | E23, E37 |
| DNMG-G           | E15      | SDXT-A                   | E98      | TCGT-F1P     | E23      |
| DNMG-M/M1        | E15      | SDXT-F2/M                | E98      | TCMT-F1P/F2P | E23      |
| DNMG-MM          | E16      | SECA/SEHT                | E99      | TCMT-F3P     | E24      |
| DNMG-R2          | E16      | SECN                     | E99      | TDGW         | E103     |
| DNMG-SM          | E16      | SEET-A                   | E99      | TECN         | E103     |



|              |           |                            |   |                                |  |
|--------------|-----------|----------------------------|---|--------------------------------|--|
| TEEN         | E103      | WNGA Ceramic               | E41   | Lathe                          | H113-128                                       |
| TEKN         | E103      | WNMG-A                     | E31   | Live                           | H113-127                                       |
| TNG Ceramic  | E41       | WNMG-F2                    | E31   | <b>CERAMIC</b>                 |  |
| TNGA Ceramic | E41       | WNMG-FVL                   | E31   | Grinding Wheels                | J3-4   |
| TNMA C.B.N.  | E38       | WNMG-G                     | E31   | Inserts                        | E39-41   |
| TNMG-A       | E24       | WNMG-M/M1                  | E32   | <b>CHAMFER TOOLS</b>           | E142-143                                       |
| TNMG-G       | E25       | WNMG-MM                    | E32   | <b>CHESTS – TOOL</b>           | L2-4   |
| TNMG-M/M1    | E25       | WNMG-R1                    | E32   | <b>CHIP COLLECTOR MAGNETIC</b> | I 7  |
| TNMG-MM      | E26       | WNMG-R2                    | E33   | <b>CHIP HOOK</b>               | I 7  |
| TNMG-R1      | E26       | WNMG-SM                    | E33   | <b>CHISELS</b>                 |  |
| TNMG-R2      | E26       | WNMX                       | E105  | Cold                           | K4   |
| TNMG-SM      | E27       | XCET                       | E143  | Punch & Chisel Set             | K4   |
| TPG Ceramic  | E41       | XEKT-MA                    | E105  | <b>CHUCK</b>                   |  |
| TPK          | E103      | <b>CARBIDE TIPPED</b>      |   | Adapter Plates                 | H33-34, H51,<br>H58-59, H87, H102              |
| TPKR-F3      | E104      | Boring Bars                | D3, D5  | Arbors                         | G72-73, G78-80                                 |
| TPMR-F       | E27       | Drills                     | B39-42, B44   | Jaw Cutting Attachment         | H94, H103                                      |
| TPMR-M       | E27       | Tool Bits                  | D2-3  | Jaws                           | H35, H60, H68, H74,<br>H87, H90-96, H100, H104 |
| TPU          | E104      | <b>CARTS</b>               |   | Keys                           | G71, G73, G77                                  |
| V045         | E155      | Tooling                    | G90   | Removal Wedge Sets             | G72  |
| V060         | E155      | Utility                    | L9  | <b>CHUCKS</b>                  |  |
| V082         | E153      | <b>CAT TAPER TOOLING</b>   | G4-7, G13-15,<br>G18-19, G33-34, G38-40, G44,<br>G50-61, G63, G66, G70, G79-80, G84 | 5C Collet                      | I 2  |
| V9MT         | E153      | <b>CBN INSERTS</b>         | E38   | Die Grinder                    | G75  |
| VBMT         | E27       | <b>CENTERING INDICATOR</b> | F14   | Drill                          | G69-74, G76-78                                 |
| VCGT-AM      | E28, E37  | <b>CENTRE</b>              |   | HSK                            | G20, G39                                       |
| VCGT-AP      | E28, E37  | Drills                     | B42, B44-45   | Independent                    | H68-79, H83-84, H104                           |
| VCKT-A       | E104      | Finders                    | F25-26  | Keyless – Drill                | G70-71, G74, G77-78                            |
| VCMT-F2P     | E28       | Gauges                     | F22   | Lathe                          | Full Index See Page H20                        |
| VDKT-MA      | E104      | Punches                    | K2-3  | Lathe – Keys                   | H35, H61,<br>H74, H102, H104                   |
| VNMA C.B.N.  | E38       | Reamers                    | B57-58  | Magnetic                       | H157, H160-161                                 |
| VNMG-A       | E29       | Squares                    | F28   | Oil Country                    | H55-57, H68-69                                 |
| VNMG-F2      | E29       | <b>CENTRES</b>             |   | Pin                            | K5   |
| VNMG-M/M1    | E29       | Bull-Nose                  | H117-118,<br>H122-123, H126-127   | Power                          | H86-89, H105-109, H112                         |
| VNMG-SM      | E30       | Dead                       | H123, H128  | Self-Centering Scroll          | H30-66,<br>H81-82, H98-102                     |
| WCMT-C20     | E30, E105 |                            |   |                                |  |
| WCMT-C21     | E30, E105 |                            |   |                                |  |
| WDKT         | E105      |                            |   |                                |  |

|                             |  |
|-----------------------------|--|
| Tap                         | G63-67, G74  |
| Toolmaker's Magnetic        | F87, I 9   |
| Vacuum                      | H160   |
| <b>CLAMPS</b>               |  |
| “C” Clamps                  | H13  |
| Chain Clamp, Locking        | H14  |
| Chain Clamp, Mono-Bloc      | H154   |
| Fixture                     | H147   |
| ID Xpansion                 | H149   |
| Kopal                       | H153   |
| Nuzzler Edge                | H144   |
| OK-Vise                     | H150   |
| Parallel                    | H137   |
| Pitbull                     | H147   |
| Pivot                       | H137   |
| Plain                       | H142   |
| Serrated End                | H143   |
| Tapped End                  | H145   |
| T-Slot Set                  | H137   |
| U/N Work Stoppers           | H13  |
| Uniforce                    | H148   |
| <b>CLAMPING KITS</b>        | H137, H141   |
| <b>CLAW HAMMERS</b>         | K4   |
| <b>CNC</b>                  |  |
| Broach, Single Point Keyway | D24  |
| Rotary Table                | H157   |
| Toolholder Bushings         | G81  |
| Tooling Cart                | G90  |
| <b>COBALT</b>               |  |
| Broaches, Rotary/Punch      | D23  |
| Counterbore                 | D5-6   |
| Countersinks                | B55, B58, B60  |
| Cut-Off Blades              | D4   |
| Drills                      | B2-4, B13, B18-19, B22-24,<br>B26-27, B30, B43, B47-48 |
| End Mills                   | A20-27   |
| Tool Bits                   | D4   |

|   |                                     |
|---|-------------------------------------|
| <b>COLLET</b>                               |                                     |
| 5C  | I 2, G43                            |
| AA ER                                       | G22-27, G29                         |
| Bilz Style                                  | G65                                 |
| Chucks                                      | G18-21, G23,<br>G33-35, G38-40, G42 |
| Double Angle (DA)                           | G39-40                              |
| Emergency Type                              | G43                                 |
| ER  | G22-32                              |
| Extractor SA                                | G33                                 |
| Holder                                      | G18-21, G23,<br>G33-35, G38-40, G42 |
| Indexes                                     | I 2                                 |
| Milling                                     | G39                                 |
| Positive Drive                              | G65                                 |
| R8  | G43                                 |
| Rubberflex                                  | G74-76                              |
| SA  | G33-34                              |
| Sets  | G22, G31-32, G36-37, G40-43         |
| Tapping Head                                | G65                                 |
| TG  | G35-37                              |
| Torque Control                              | G65                                 |
| Type 25 & 32                                | G42                                 |
| Wrenches                                    | G32-33, G38-39, G42                 |
| <b>COMBINATION CHUCKS</b>                   | H103                                |
| <b>COMBINATION SQUARES</b>                  | F24-25                              |
| <b>COMBINATION WRENCHES</b>                 | K25-26                              |
| <b>COMBINED DRILLS<br/>and COUNTERSINKS</b> | B42-44                              |
| <b>COMPOUND</b>                             |                                     |
| Angle and Sine Plates                       | H17                                 |
| <b>CONCAVE CUTTERS</b>                      | D8, D13                             |
| <b>CONTACT POINTS</b>                       | F16                                 |
| <b>CONVEX CUTTERS</b>                       | D8, D13                             |
| <b>COOLANT</b>                              |                                     |
| Fed Drills                                  | B8-10, B37-38                       |
| Hose System                                 | I 8-13                              |

|                                    |                           |
|------------------------------------|---------------------------|
| Inducer Socket                     | B38                       |
| Tubes                              | G10                       |
| <b>COOLANT PROOF</b>               |                           |
| Dial Indicators                    | F12                       |
| Digital Calipers                   | F9                        |
| Digital Indicators                 | F12                       |
| Digital Outside Micrometers        | F3, F5, F7-8              |
| <b>CORE DRILLS</b>                 | B39                       |
| <b>CORNER RADIUS</b>               |                           |
| End Mills                          | A5, A10, A13, A15-17, A20 |
| <b>CORNER ROUNDING</b>             |                           |
| End Mills                          | D7                        |
| <b>COUNTERBORES</b>                |                           |
| Cap Screw                          | D5-6                      |
| Sets                               | D6                        |
| <b>COUNTERSINKS</b>                |                           |
| Carbide                            | B42-43, B56, B60-61       |
| Chatterfree                        | B54, B59                  |
| Cobalt                             | B43, B55, B58, B60        |
| Combined Drills<br>and Countersink | B42-44                    |
| Double End                         | B42-44, B56, B61          |
| Hole Type                          | B54                       |
| Multi-Flute                        | B60                       |
| Sets                               | B5, B55, B58              |
| Single-Flute                       | B54-55                    |
| Titanium Coated                    | B44, B55, B58, B60        |
| <b>COUPLING NUTS</b>               | H138                      |
| <b>CROSS SLIDE TABLE</b>           | H16                       |
| <b>CUT-OFF</b>                     |                           |
| Blades                             | D4                        |
| Carbide Tipped                     | D2                        |
| Inserts                            | E81                       |
| Tool Holders                       | E81-82                    |
| Tooling System                     | E81-82                    |
| Wheels                             | J9                        |

## CUTTERS

|                           |   |
|---------------------------|---|
| Annular                   | D6  |
| Concave                   | D8, D13   |
| Convex                    | D8, D13   |
| Corner Rounding           | D7  |
| Double Angle              | D8, D13   |
| Dovetail                  | D8  |
| Face Milling              | E118, E121, E128-137,<br>E142, E146-148, E162-166 |
| Gear                      | D14   |
| Indexable Milling Cutters | E106-148, E162-167                                |
| Keyseat Cutters           | D7  |
| Plain Milling             | D8-10, D14  |
| Plain Slitting Saws       | D10   |
| Screw Slotting Saws       | D14-15  |
| Shell Mills               | D14   |
| Side Milling              | D8-10   |
| Side Slitting             | D10-11  |
| Single Angle              | D12   |
| Staggered Side Milling    | D8-10   |
| T-Slot                    | D7  |
| Woodruff                  | D7  |

## D

|                         |            |
|-------------------------|------------|
| <b>DA Collet Chucks</b> | G39-40     |
| 100 Collets             | G40        |
| 180 Collets             | G41        |
| 200 Collets             | G41        |
| 300 Collets             | G41        |
| Collet Sets             | G40-41     |
| <b>DEAD BLOW</b>        |            |
| Hammers                 | K4         |
| <b>DEAD CENTRES</b>     | H123, H128 |

## DEBURRING TOOLS

|                                  |          |
|----------------------------------|----------|
| J19-28                           |          |
| <b>DEEP HOLE DRILLING SYSTEM</b> | E156-160 |
| <b>DEPRESSED CENTRE DISCS</b>    | J9       |
| <b>DEPTH CALIPER</b>             | F18      |
| <b>DEPTH MICROMETER</b>          | F8       |
| <b>DIAL</b>                      |          |
| Bore Gauges                      | F19      |
| Calipers                         | F10      |
| Height Gauges                    | F19-20   |
| Indicators                       | F12-13   |
| Test Indicators                  | F13-15   |

## DIAMOND FILES

|            |        |
|------------|--------|
| J15        |        |
| <b>DIE</b> |        |
| Drills     | B41    |
| Grinders   | J12-14 |
| Stocks     | C13    |

## DIES

|                        |        |
|------------------------|--------|
| Adjustable Round Split | C12-13 |
| Hex                    | C14    |
| Metric                 | C13    |

## DIGITAL

|              |            |
|--------------|------------|
| Bore Gauges  | F19        |
| Calipers     | F9-11, F18 |
| Depth Gauges | F18        |
| Indicators   | F12        |
| Micrometers  | F3, F5-8   |

## DIRECT COOLANT

|                  |          |
|------------------|----------|
| End Mill Holders | G5, G7-8 |
|------------------|----------|

## DISCS

|                        |        |
|------------------------|--------|
| Fiber                  | J7     |
| Flap                   | J8     |
| Grinding               | J9-10  |
| Micrometer             | F5     |
| Mop                    | J9     |
| PSA                    | J8     |
| Quick Change, Abrasive | J10-11 |

## DIVIDERS

|                             |          |
|-----------------------------|----------|
| F27                         |          |
| <b>DIVIDING HEADS</b>       | H158     |
| <b>DIVIDING PLATES</b>      | H159     |
| <b>DOUBLE ANGLE CUTTERS</b> | D8, D13  |
| <b>DOUBLE CLAMP VISES</b>   | H5-6     |
| <b>DOUBLE RELOCK SYSTEM</b> | H10      |
| <b>DOVETAIL CUTTERS</b>     | D8, E144 |
| <b>DRAW BAR</b>             | G90      |

## DRESSERS

|                  |     |
|------------------|-----|
| Radius and Angle | I 3 |
|------------------|-----|

## DRIFT KEYS

|          |
|----------|
| B34, G78 |
|----------|

## DRIFT PUNCH

|    |
|----|
| K3 |
|----|

## DRILL

|                     |                |
|---------------------|----------------|
| Chuck Arbors        | G72-73, G78-80 |
| Chuck Keys          | G71, G73, G77  |
| Chucks              | G69-74, G76-78 |
| Containers          | B3-5, L10      |
| Dispenser Cabinet   | B5, L10        |
| Drift Keys          | B34            |
| Gauges              | F22-23         |
| Press Vises         | H13            |
| Sets                | B2-5           |
| Sharpeners          | I 5            |
| Sleeves and Sockets | G80            |

## DRILL MILLS

|    |
|----|
| A5 |
|----|

## DRILLING

|                |     |
|----------------|-----|
| Milling Tables | H16 |
|----------------|-----|

## DRILLS

|                     |  |
|---------------------|--|
| Air Craft Extension | B26-27   |
| Black/Gold          | B15  |
| Blanks              | B45-46   |
| Carbide             | B3, B6-11, B42-43                                      |
| Carbide Tipped      | B39-42, B44  |
| Centre              | B42, B44-45  |
| Cobalt              | B2-4, B13, B18-19, B22-24,<br>B26-27, B30, B43, B47-48 |

Combined Drills and Countersinks

|   |  |
|---|--|
|   | B42-44   |
| Core  | B39  |
| Die   | B41  |
| Extra Length                                    | B4, B28-29, B34-38                             |
| Fast Spiral                                     | B17  |
| Indexable                                       | E149-153, E156-160                             |
| Jobber Length                                   | B2-3, B11-15,<br>B18-20, B39-40                |
| Left Hand                                       | B3, B19-20                                     |
| Masonry   | B42  |
| Metric  | B3, B6-11, B18-19,<br>B24-25, B32, B40, B47-48 |
| Oil Hole  | B37-38   |
| Prentice  | B5, B22-23                                     |
| QTT Premium Carbide<br>TiAlN Coated             | B6-10  |
| QTT Premium Carbide<br>Coolant Fed TiAlN Coated | B8-10  |
| Reduced Shank                                   | B4, B22-23                                     |
| Silver and Deming                               | B5, B22-23                                     |
| Slow Spiral                                     | B16  |
| Spade   | B47-51   |
| Spotting and Centering                          | B44-45   |
| Straight Flute                                  | B41  |
| Stub  | B4, B21-22, B42, B44-45                        |
| Taper Length                                    | B4, B23-25, B40                                |
| Taper Shank                                     | B29-37, B39, B41                               |
| TiAlN Coated                                    | B6-10  |
| Titanium Coated                                 | B2-3, B13, B33,<br>B44, B47-48                 |
| Vent  | B45  |
| <b>DRIVE PIN PUNCHES</b>                        | K2-3   |
| <b>DUAL CONTACT</b>                             |  |
| Collet Chucks                                   | G18-19, G38-39                                 |
| End Mill Holders                                | G5-6   |
| Milling Chucks                                  | G38-39   |
| Shell Mill Holders                              | G13  |

|                      |                                 |
|----------------------|---------------------------------|
| <b>DYNAMIC Tools</b> | K2-4, K12, K14-28,<br>L4, L9-10 |
|----------------------|---------------------------------|

## E

|                     |     |
|---------------------|-----|
| <b>EDGE FINDERS</b> | F25 |
|---------------------|-----|

|                  |     |
|------------------|-----|
| <b>EDM</b>       |     |
| Tool Makers Vise | H12 |

|                               |      |
|-------------------------------|------|
| <b>ELECTROMAGNETIC CHUCKS</b> | H160 |
|-------------------------------|------|

### ELECTRONIC

|               |            |
|---------------|------------|
| Bore Gauges   | F19        |
| Calipers      | F9-11, F18 |
| Depth Gauges  | F18        |
| Height Gauges | F19-20     |
| Micrometers   | F3, F5-8   |

|                    |    |
|--------------------|----|
| <b>EMERY CLOTH</b> | J8 |
|--------------------|----|

### END MILL

|                      |                       |
|----------------------|-----------------------|
| Adapters             | G4-10                 |
| Arbor Screws – Shell | G15                   |
| Arbors Shell         | G13-15                |
| Dispenser Cabinet    | A4, L10               |
| Holdings             | G4-10                 |
| Rack                 | A4                    |
| Sets                 | A3, A8, A16, A20, A24 |

### END MILLS

|                          |                                    |
|--------------------------|------------------------------------|
| Carbide                  | A3-20, A29-30                      |
| Carbide for Aluminum     | A19-20                             |
| Carbide QTT TiAlN Coated | A17-18                             |
| Carbide TiAlN Coated     | A3-12, A17-18,<br>A20, A24, A26-27 |
| Carbide TiCN Coated      | A20                                |
| Carbide Typhoon Coated   | A13-17                             |
| Cobalt HSCO              | A20-27                             |
| Corner Rounding          | D7                                 |
| Drill Mills              | A5                                 |

|           |   |
|-----------|---|
| H.S.S.    | A20-21, A23-24, A28                                       |
| Indexable | E106-120, E122-128, E133,<br>E138-142, E144-145, E147-148 |

|                   |        |
|-------------------|--------|
| QTT Premium Class | A17-18 |
|-------------------|--------|

|          |        |
|----------|--------|
| Roughing | A26-27 |
|----------|--------|

|       |     |
|-------|-----|
| Shell | D14 |
|-------|-----|

|         |        |
|---------|--------|
| Tapered | A28-30 |
|---------|--------|

|                |          |
|----------------|----------|
| Threaded Shank | A20, A24 |
|----------------|----------|

|                |     |
|----------------|-----|
| Variable Helix | A16 |
|----------------|-----|

|                           |     |
|---------------------------|-----|
| <b>ENGINEER'S SQUARES</b> | F28 |
|---------------------------|-----|

|                            |     |
|----------------------------|-----|
| <b>ENGINEER'S TOOL SET</b> | F27 |
|----------------------------|-----|

### ER

|               |        |
|---------------|--------|
| Collet Chucks | G18-21 |
|---------------|--------|

|    |             |
|----|-------------|
| AA | G22-27, G29 |
|----|-------------|

|           |     |
|-----------|-----|
| 8 Collets | G23 |
|-----------|-----|

|            |     |
|------------|-----|
| 11 Collets | G23 |
|------------|-----|

|            |     |
|------------|-----|
| 16 Collets | G24 |
|------------|-----|

|            |     |
|------------|-----|
| 20 Collets | G25 |
|------------|-----|

|            |     |
|------------|-----|
| 25 Collets | G26 |
|------------|-----|

|            |        |
|------------|--------|
| 32 Collets | G27-28 |
|------------|--------|

|            |        |
|------------|--------|
| 40 Collets | G29-30 |
|------------|--------|

|            |     |
|------------|-----|
| 50 Collets | G30 |
|------------|-----|

|             |        |
|-------------|--------|
| Collet Sets | G22-32 |
|-------------|--------|

|                          |     |
|--------------------------|-----|
| <b>EXPANSION REAMERS</b> | B72 |
|--------------------------|-----|

### EXTENDED POINT

|             |                      |
|-------------|----------------------|
| Live Centre | H114, H116, H124-125 |
|-------------|----------------------|

### EXTENSION

|               |        |
|---------------|--------|
| Drill Sockets | G80-81 |
|---------------|--------|

|        |        |
|--------|--------|
| Drills | B26-27 |
|--------|--------|

|                            |                       |
|----------------------------|-----------------------|
| <b>EXTRA LENGTH DRILLS</b> | B4, B28-29,<br>B34-38 |
|----------------------------|-----------------------|

|                            |          |
|----------------------------|----------|
| <b>EXTRACTOR SA COLLET</b> | G27, G33 |
|----------------------------|----------|

|                   |    |
|-------------------|----|
| <b>EYE SHIELD</b> | I6 |
|-------------------|----|

## F

**5 MICRON COLLETS** G22-27, G29

### 5C

Chuck For Mounting H50, I 2

Collet Wrench I 2

Collets I 2, G43

**FACE DRIVERS** H129-131

**FACE MILLS** E106-110, E118, E121,  
E128-137, E142, E146-148

**FAST SPIRAL DRILLS** B17

**FASTENER BLACK BOOK** F34

**FEELER GAUGES** F21

**FIBER DISCS** J7

**FILES** J15

**FINE ADJUSTMENT CHUCKS** H29-35

**FIXTURE CLAMPS** H147

**FIXTURES – Collet** I 2

**FLANGE NUTS** H137-138

**FLAP DISCS** J9

**FLAT WASHERS** H141

### FLEXIBLE

Magnetic Pick Up Tool I 7

Rules F23-24

**FLOW CONTROL UNIT** I 8

### FLUIDS

Cimclean I 7

Floor Cleaner I 7

Tapping I 7

**FORMING RING, SOFT JAW** H94

**FREE STYLE VISE** H13

## G

**GAUGE BLOCKS** F29

### GAUGES

Acme Screw Thread F23

Bore F19, F25

Centre F22

Depth F18, F25

Depth & Angle F25

Drill F22-23

Feeler F21

Fillet F21

Height/Transfer F19-20

Hole F21

Pin F29

Planer & Shaper F30

Radius F20-21

Ring F30

Screw Pitch F23

Surface F18

Taper F25

Telescoping F21-22

Thread Plug F30

Wire F23

**GEAR CUTTERS** D14

**GIANT SLOTTED ANGLE PLATES** H18

**GRANITE PLATES** F20

**GRAY TOOLS** K5, K7, K10, L3-4, L7-9

### GREASE

Fitting Assortment K6

Gun K6

### GRINDERS

Air J12-14

### GRINDING

Discs J9-10

Surface Chuck H160-161

Wheels J3-6

**GROOVE JOINT PLIERS** K28

**GROOVING TOOLS** E74-80

**GS ROTARY TOOLING** see G1

**GS VISES** H2-8

## H

**HACKSAW** K5

**HALOGEN LAMPS** I 6

**HAMMERS** K4

### HAND

Block, Abrasive J10

Books F34

Pads, Abrasive J8

Reamers B71

Taps C8-9

**HAND BLOCKS, Abrasive** J10

**HANDBOOKS** F34

### HANDLES

Pin Gauge F29

Tap C11

**HARDNESS TESTERS** F79

### HASSAY SAVAGE

Broach Sets D16-17

Broaches D16-27

Bushings D16-19

### HEADS

Boring D5, G84-89

Boring and Facing G84-89

Dividing H158

Pivoting Angle G59-61

Right Angle G48-58

Shanks for Boring G84, G89

Tapping G68

**HEIGHT GAUGES** F19-20

**HEIGHT PRESETTER** G90

**HEX DIES** C14

|                                 |   |                               |          |                          |          |
|---------------------------------|---|-------------------------------|----------|--------------------------|----------|
| <b>HEX WRENCH</b>               |   | <b>INDEX SIMPLE</b>           | H159     | Pro Part off Blade PP-B  | E82      |
| Fold Up                         | K10   | <b>INDEXABLE</b>              |          | Pro Part off Block P.O.B | E82      |
| L-Wrench                        | K7-10   | <b>Boring Bars</b>            |          | <b>Kits</b>              |          |
| Loop Handle                     | K12   | MCLNR/L                       | E64      | Boring                   | E170-171 |
| T-Handle                        | K11-12  | MTFNR/L                       | E65      | Milling                  | E162-167 |
| <b>HOLDERS</b>                  |   | MTUNR                         | E65      | Parting & Grooving       | E172     |
| Broach, Rotary                  | D25, D27  | MVUNR/L                       | E66      | Threading                | E171     |
| Collet                          | G18-21, G23, G33-35,<br>G38-40, G42                 | MWLNRL/L                      | E66      | Turning                  | E168-169 |
| Die                             | C13   | PCLNR/L                       | E67      | <b>Milling Cutters</b>   |          |
| End Mill                        | G4-10   | PDSNR                         | E67      | AD 15 90° End Mill       | E125     |
| Face Mill                       | G14   | PDUNR                         | E68      | Alumi-End Mills          | E145     |
| HSK                             | G9, G14, G20, G39, G46,<br>G50-55, G58-61, G64, G66 | PSKNR/L                       | E68      | Alumi-Face Mills         | E146     |
| Indicator                       | F14-17  | PTFNR/L                       | E69      | Alumi-X End Mill         | E147     |
| Knurling Tool                   | D16   | SCLCR/L                       | E69      | Alumi-X Face Mill        | E147     |
| Magnetic                        | F16-18  | SDQCR                         | E70      | AP 06 90° End Mill       | E122     |
| Ring Gauge                      | F30   | SDUCR                         | E70      | AP 10 90° End Mill       | E125     |
| Shell Mill                      | G13-14  | SDZCR/L                       | E71      | AP 11 15° End Mill       | E125     |
| Shrink Fit                      | G43-46  | SSKCR/L                       | E71      | AP 11 90° End Mill       | E122-123 |
| Spade Drill                     | B49-51  | STFCR/L                       | E72      | AP 11M 90° End Mill      | E124     |
| Turning Tool                    | E47-59  | SVQBR                         | E72      | AP 16 90° End Mill       | E122-123 |
| <b>HOLE GAUGES</b>              | F21   | SVUBR/L                       | E73      | AP 16M 90° End Mill      | E124     |
| <b>HOSE</b>                     |   | SWLCR/L                       | E73      | AP 16 Chamfer Mill       | E126     |
| Coolant System                  | I 8-13  | <b>Drills</b>                 |          | AP 18 90° End Mill       | E127     |
| <b>HSK COOLANT TUBES</b>        | G10   | Combo Turning & Drilling Tool | E150     | APCC Centre Cut E/M      | E127     |
| <b>HSK TOOLING</b>              | G9, G14, G20, G39, G46,<br>G50-55, G58-61, G64, G66 | Max Drill System              | E156-160 | APFM 06 90° Face Mill    | E128     |
| <b>HYDRAULIC VISE</b>           | H9, H11   | Pro NP/SP                     | E149     | APFM 10 90° Face Mill    | E131     |
|                                 |   | Spot Drills                   | E151-153 | APFM 11 15° Face Mill    | E132     |
|                                 |   | <b>Engraving</b>              |          | APFM 11 90° Face Mill    | E130     |
|                                 |   | Nine9 Tools                   | E154-155 | APFM 11M 90° Face Mill   | E129     |
|                                 |   | <b>Grooving &amp; Parting</b> |          | APFM 16 15° Face Mill    | E132     |
|                                 |   | MGEHR/L                       | E78      | APFM 16 90° Face Mill    | E130-131 |
|                                 |   | MGEUR/L                       | E79      | APFM 16M 90° Face Mill   | E129     |
|                                 |   | MGEVR/L                       | E79      | APFM 18 90° Face Mill    | E132     |
|                                 |   | MGIUR/L                       | E80      | BMSC Button Face Mill    | E133     |
|                                 |   | MGIVR/L                       | E80      | BMSS Button End Mill     | E133     |
|                                 |   | Pro Part off Integral Shank   | E81      | Chamfer Mill-45          | E142     |
| <b>IMPACT SOCKETS</b>           | K19, K23  |                               |          |                          |          |
| <b>INDEPENDENT LATHE CHUCKS</b> | H67-80, H83-84                                      |                               |          |                          |          |

|                                       |         |
|---------------------------------------|---------|
| Chamfer Tool                          | E143    |
| CTP 45° Multi-functional Chamfer Tool | E143    |
| DS4 End Mill                          | E128    |
| DS4 Face Mill                         | E135    |
| DS8 45° Face Mill                     | E136    |
| HFNA High Feed End Mill               | E120    |
| HFNC High Feed Face Mill              | E121    |
| HFPA High Feed End Mill               | E118    |
| HFPC High Feed FACE Mill              | E118    |
| JMBE Jet Mill                         | E139    |
| Max Drill System                      | E156-60 |
| Max Mill 45° Face Mill                | E137    |
| Max Mill 90° Face Mill                | E135    |
| MMEM Mold Max End Mill                | E141    |
| MMFM Mold Max Face Mill               | E142    |
| Mold Mill                             | E140    |
| OKT-MAX-45° Face Mill                 | E134    |
| Square Shoulder Milling Cutter        | E148    |
| TSC T-Slot Cutter                     | E145    |
| <b>Turning Toolholders</b>            |         |
| CKJNR/L                               | E47     |
| MCKNR/L                               | E48     |
| MCLNR/L                               | E48     |
| MCRNR/L                               | E49     |
| MDJNR/L                               | E49     |
| MSDNN                                 | E50     |
| MSKNR/L                               | E50     |
| MSRNR/L                               | E51     |
| MTCNN                                 | E51     |
| MTENN                                 | E52     |
| MTFNR/L                               | E52     |
| MTGNR/L                               | E53     |
| MTJNR/L                               | E53     |
| MVJNR/L                               | E54     |
| MWLNR/L                               | E54     |

|         |     |
|---------|-----|
| PRDCN   | E55 |
| SCACR/L | E55 |
| SCLCR/L | E56 |
| SDJCR/L | E56 |
| SDNCN   | E57 |
| SSBCR/L | E57 |
| SSSCR   | E58 |
| STFCR/L | E58 |
| STGCR/L | E59 |
| SVJCR/L | E59 |

## Threading

|                     |     |
|---------------------|-----|
| ETH External Holder | E89 |
| ITH Internal Holder | E89 |

## INDEXES

|                 |     |
|-----------------|-----|
| 5C Collet Index | I 2 |
|-----------------|-----|

## INDEXING

|               |      |
|---------------|------|
| Rotary Tables | H157 |
|---------------|------|

|                              |        |
|------------------------------|--------|
| <b>INDICATOR ACCESSORIES</b> | F13-18 |
|------------------------------|--------|

|                         |     |
|-------------------------|-----|
| <b>INDICATOR POINTS</b> | F16 |
|-------------------------|-----|

|                   |        |
|-------------------|--------|
| <b>INDICATORS</b> | F12-15 |
|-------------------|--------|

## INSERTS

|             |                     |
|-------------|---------------------|
| Carbide     | See Carbide Inserts |
| Spade Drill | B47-48              |

|                           |      |
|---------------------------|------|
| <b>INSIDE MICROMETERS</b> | F6-8 |
|---------------------------|------|

|                               |     |
|-------------------------------|-----|
| <b>INSULATED SCREWDRIVERS</b> | K16 |
|-------------------------------|-----|

|                              |     |
|------------------------------|-----|
| <b>INVOLUTE GEAR CUTTERS</b> | D14 |
|------------------------------|-----|

# J

|                      |        |
|----------------------|--------|
| <b>JACOBS CHUCKS</b> | G72-76 |
|----------------------|--------|

|                               |      |
|-------------------------------|------|
| <b>JAW CUTTING ATTACHMENT</b> | H103 |
|-------------------------------|------|

|                         |     |
|-------------------------|-----|
| <b>JAW FORMING RING</b> | H94 |
|-------------------------|-----|

## JAWS

|             |          |
|-------------|----------|
| Drill Chuck | G72, G78 |
|-------------|----------|

|                  |                       |
|------------------|-----------------------|
| Pie              | H95                   |
| TalonGrip Vise   | H151                  |
| Top (Soft Blank) | H35, H60, H74, H90-94 |
| Vise             | H2, H4, H6, H10       |

|                      |                              |
|----------------------|------------------------------|
| <b>JOBBER DRILLS</b> | B2-3, B11-15, B18-20, B39-40 |
|----------------------|------------------------------|

|                       |     |
|-----------------------|-----|
| <b>JOBBER REAMERS</b> | B70 |
|-----------------------|-----|

# K

|                |              |
|----------------|--------------|
| <b>KENNEDY</b> | L2, L4-6, L9 |
|----------------|--------------|

|                      |    |
|----------------------|----|
| <b>KEY LOCK SETS</b> | L6 |
|----------------------|----|

|                             |                     |
|-----------------------------|---------------------|
| <b>KEYLESS DRILL CHUCKS</b> | G70-71, G74, G77-78 |
|-----------------------------|---------------------|

## KEYS

|               |               |
|---------------|---------------|
| Chuck – Drill | G71, G73, G77 |
|---------------|---------------|

|       |          |
|-------|----------|
| Drift | B34, G78 |
|-------|----------|

|             |                           |
|-------------|---------------------------|
| Lathe Chuck | H35, H61, H74, H102, H104 |
|-------------|---------------------------|

|                        |    |
|------------------------|----|
| <b>KEYSEAT CUTTERS</b> | D7 |
|------------------------|----|

|                                     |        |
|-------------------------------------|--------|
| <b>KEYWAY BROACHES AND BUSHINGS</b> | D16-20 |
|-------------------------------------|--------|

|                              |      |
|------------------------------|------|
| <b>KINIK GRINDING WHEELS</b> | J3-6 |
|------------------------------|------|

|                            |       |
|----------------------------|-------|
| <b>KLINGSPOR Abrasives</b> | J7-11 |
|----------------------------|-------|

## KNEE MILL

|         |     |
|---------|-----|
| Package | F31 |
|---------|-----|

## KNIFE

|         |    |
|---------|----|
| Utility | K5 |
|---------|----|

|                              |          |
|------------------------------|----------|
| <b>KNOCKOUT DRILL DRIFTS</b> | B34, G78 |
|------------------------------|----------|

|                       |     |
|-----------------------|-----|
| <b>KNURLING TOOLS</b> | D16 |
|-----------------------|-----|

## KOPAL

|        |      |
|--------|------|
| Clamps | H153 |
|--------|------|

# L

## L-WRENCH

|          |       |
|----------|-------|
| Ball End | K7    |
| Hex      | K8-10 |
| Torx     | K10   |

## LAMPS

|         |     |
|---------|-----|
| Halogen | I 6 |
|---------|-----|

## LATHE

|             |                                   |
|-------------|-----------------------------------|
| Back Plates | H33-34, H51,<br>H58-59, H87, H102 |
| Centres     | H113-128                          |
| Chucks      | See Page H20 For Full Index       |
| Keys        | H35, H61, H74, H102, H104         |
| Mandrels    | G81                               |

## LEFT HAND JOBBER DRILLS

B3, B19-20

## LEVELS

F26, F28

## LIFTER – Magnetic

I 4

## LINESMAN PLIERS

K27-28

## LIVE CENTRES

H113-127

## LOCKING PLIERS

K28

## LOCKS

L6

## LONG DRILLS

B4, B23-29, B34-38, B43

## LONG NOSE PLIERS

K27

# M

## MACHINIST

|               |       |
|---------------|-------|
| Chests        | L2    |
| Clamping Sets | H136  |
| Vises         | H2-11 |

## MACHINISTS MATE

G90

## MAGNETIC

|                 |        |
|-----------------|--------|
| Adjustable Link | H157   |
| Bases           | F16-18 |

|                |     |
|----------------|-----|
| Chip Collector | I 7 |
|----------------|-----|

|        |          |
|--------|----------|
| Chucks | H160-161 |
|--------|----------|

|                 |     |
|-----------------|-----|
| Cylinder Square | F28 |
|-----------------|-----|

|        |     |
|--------|-----|
| Lifter | I 4 |
|--------|-----|

|       |      |
|-------|------|
| Plate | H157 |
|-------|------|

|             |        |
|-------------|--------|
| Sine Plates | H17-18 |
|-------------|--------|

|            |        |
|------------|--------|
| “V” Blocks | H14-15 |
|------------|--------|

|                         |     |
|-------------------------|-----|
| <b>MANDRELS – Lathe</b> | G81 |
|-------------------------|-----|

|                       |     |
|-----------------------|-----|
| <b>MASONRY DRILLS</b> | B42 |
|-----------------------|-----|

|                     |     |
|---------------------|-----|
| <b>MASTER-GRIND</b> | I 4 |
|---------------------|-----|

## MAX DRILL DEEP HOLE

|                        |          |
|------------------------|----------|
| <b>DRILLING SYSTEM</b> | E156-160 |
|------------------------|----------|

## METRIC

|          |                        |
|----------|------------------------|
| Broaches | D16-17, D18-24, D26-27 |
|----------|------------------------|

|          |            |
|----------|------------|
| Calipers | F9-11, F18 |
|----------|------------|

|               |      |
|---------------|------|
| Clamping Kits | H136 |
|---------------|------|

|              |    |
|--------------|----|
| Counterbores | D6 |
|--------------|----|

|      |        |
|------|--------|
| Dies | C13-14 |
|------|--------|

|        |  |
|--------|--|
| Drills | B3, B6-11, B18-19,<br>B24-25, B32, B40, B47-48 |
|--------|--|

|           |                                   |
|-----------|-----------------------------------|
| End Mills | A3-9, A11-15,<br>A17-19, A21, A24 |
|-----------|-----------------------------------|

|                      |     |
|----------------------|-----|
| Gauges Ring and Plug | F30 |
|----------------------|-----|

|            |        |
|------------|--------|
| Indicators | F12-14 |
|------------|--------|

|             |      |
|-------------|------|
| Micrometers | F3-8 |
|-------------|------|

|         |     |
|---------|-----|
| Reamers | B66 |
|---------|-----|

|       |        |
|-------|--------|
| Rules | F23-24 |
|-------|--------|

|                    |     |
|--------------------|-----|
| Screw Pitch Gauges | F23 |
|--------------------|-----|

|      |             |
|------|-------------|
| Taps | See Page C1 |
|------|-------------|

|                          |    |
|--------------------------|----|
| <b>MICROMETER STANDS</b> | F3 |
|--------------------------|----|

## MICROMETERS

|       |    |
|-------|----|
| Anvil | F5 |
|-------|----|

|       |    |
|-------|----|
| Blade | F5 |
|-------|----|

|         |          |
|---------|----------|
| Digital | F3, F5-8 |
|---------|----------|

|      |    |
|------|----|
| Disc | F5 |
|------|----|

|            |          |
|------------|----------|
| Electronic | F3, F5-8 |
|------------|----------|

|        |      |
|--------|------|
| Inside | F6-8 |
|--------|------|

|                       |    |
|-----------------------|----|
| Interchangeable Anvil | F5 |
|-----------------------|----|

|                     |    |
|---------------------|----|
| Interchangeable Rod | F7 |
|---------------------|----|

|        |      |
|--------|------|
| Metric | F3-8 |
|--------|------|

|             |    |
|-------------|----|
| Multi-Anvil | F5 |
|-------------|----|

|         |      |
|---------|------|
| Outside | F3-5 |
|---------|------|

|              |      |
|--------------|------|
| Screw Thread | F5-6 |
|--------------|------|

|      |      |
|------|------|
| Sets | F3-4 |
|------|------|

|                      |    |
|----------------------|----|
| Three Point Internal | F7 |
|----------------------|----|

|      |    |
|------|----|
| Tube | F8 |
|------|----|

|                        |     |
|------------------------|-----|
| <b>MILACRON Fluids</b> | I 7 |
|------------------------|-----|

## MILLING

|            |        |
|------------|--------|
| Attachment | G48-61 |
|------------|--------|

|        |        |
|--------|--------|
| Chucks | G38-39 |
|--------|--------|

|         |       |
|---------|-------|
| Cutters | D6-15 |
|---------|-------|

|                 |     |
|-----------------|-----|
| Drilling Tables | H16 |
|-----------------|-----|

|         |         |
|---------|---------|
| Inserts | E92-105 |
|---------|---------|

|                |        |
|----------------|--------|
| Machine Arbors | G38-39 |
|----------------|--------|

|                |       |
|----------------|-------|
| Machine Visers | H2-11 |
|----------------|-------|

|                                |    |
|--------------------------------|----|
| <b>MINI CARBIDE BORING BAR</b> | D5 |
|--------------------------------|----|

|                            |              |
|----------------------------|--------------|
| <b>MINIATURE END MILLS</b> | A3, A25, A29 |
|----------------------------|--------------|

|                 |      |
|-----------------|------|
| <b>MINICOOL</b> | I 13 |
|-----------------|------|

|                               |          |
|-------------------------------|----------|
| <b>MITEE-BITE WORKHOLDING</b> | H147-156 |
|-------------------------------|----------|

|                                 |                                       |
|---------------------------------|---------------------------------------|
| <b>MITUTOYO Measuring Tools</b> | F3-5, F8-14,<br>F17, F19-25, F27, F31 |
|---------------------------------|---------------------------------------|

|                  |          |
|------------------|----------|
| <b>MONO-BLOC</b> | H153-154 |
|------------------|----------|

|                  |    |
|------------------|----|
| <b>MOP DISCS</b> | J9 |
|------------------|----|

|                        |       |
|------------------------|-------|
| <b>MOPS - Abrasive</b> | J9-10 |
|------------------------|-------|

|                           |     |
|---------------------------|-----|
| <b>MORSE TAPER REAMER</b> | B72 |
|---------------------------|-----|

|                           |        |
|---------------------------|--------|
| <b>MULTI-GROOVE TOOLS</b> | E74-80 |
|---------------------------|--------|



|                       |                |                                    |                                   |                            |                        |
|-----------------------|----------------|------------------------------------|-----------------------------------|----------------------------|------------------------|
| <b>N</b>              |                | Precision – Set                    | F32                               | Magnetic                   | H157                   |
| <b>NAREX</b>          |                | <b>PARALLELS</b>                   |                                   | Precision Angle            | F28                    |
| Boring & Facing Heads | G84-89         | Box                                | H19                               | Sine                       | H17-18                 |
| Knurling Tools        | D16            | Individual                         | F33                               | Surface                    | F20                    |
| <b>NEEDLE FILES</b>   | J15            | Matched Pairs                      | F32-33                            | <b>PLIERS</b>              | K27-28                 |
| <b>NINE9</b>          | E151-155       | Precision – Steel                  | F32-33                            | <b>PLUNGER</b>             |                        |
| <b>NOGA</b>           |                | Thin Style                         | F32                               | Ball                       | H145-146               |
| Cooling System        | I 13           | Wavy                               | F32                               | Spring                     | H145-146               |
| Deburring System      | J19-28         | <b>PASTE</b>                       |                                   | <b>POCKET</b>              |                        |
| Magnetic Bases        | F17-18         | Tapping                            | I 7                               | Feeler Gauge               | F21                    |
| <b>NUT DRIVER</b>     | K15            | <b>PIE JAWS</b>                    | H95                               | Rules                      | F24                    |
| <b>NUTS</b>           |                | <b>PIN</b>                         |                                   | <b>POINTS INDICATOR</b>    | F16                    |
| Collar                | H137-138       | Chucks                             | K5                                | <b>POSTS</b>               |                        |
| Coupling and Flange   | H137-138, H141 | Gauges                             | F29                               | Quick Change               | H132-135               |
| DA Collet             | G39            | Vises                              | K5                                | <b>POT MAGNET</b>          | K5                     |
| ER Collet             | G32            | <b>PIPE</b>                        |                                   | <b>POWER</b>               |                        |
| Milling Machine Arbor | G16            | Reamers (Taper)                    | B70, B72                          | Chuck Jaws                 | H87                    |
| SA Collet             | G33            | Taps (N.P.T.)                      | C7, C9                            | Chucks                     | H86-89, H105-109, H112 |
| TG Collet             | G38            | Vises                              | H12                               | T-Nuts                     | H97                    |
| T-Slot                | H138, H144     | Wrenches                           | K27                               | <b>PRECISION TOOL KITS</b> |                        |
|                       |                | <b>PITBULL CLAMPS</b>              | H147                              | Asimeto                    | F35                    |
|                       |                | <b>PIVOT CLAMP</b>                 | H137                              | STM                        | F35                    |
|                       |                | <b>PIVOTING ANGLE HEADS</b>        | G59-61                            | <b>PRENTICE DRILLS</b>     | B5, B22-23             |
|                       |                | <b>PLAIN CLAMPS</b>                | H142                              | <b>PRESETTER</b>           | G90                    |
|                       |                | <b>PLAIN METAL SLITTING SAWS</b>   | D12                               | <b>PRESS ARBOR</b>         | H19                    |
|                       |                | <b>PLAIN TOOTH MILLING CUTTERS</b> | D8-10                             | <b>PROFILE PROJECTOR</b>   | F31                    |
|                       |                | <b>PLATES</b>                      |                                   | <b>PROTRACTORS</b>         |                        |
|                       |                | Adapter                            | H33-34, H51,<br>H58-59, H87, H102 | Adjustable                 | F26                    |
|                       |                | Angle                              | F28                               | Bevel                      | F26                    |
|                       |                | Back                               | H33-34, H51,<br>H58-59, H87, H102 | Digital - Level Type       | F26                    |
|                       |                | Compound Angle                     | H17                               | <b>PULL STUDS</b>          | G11                    |
|                       |                | Compound Sine                      | H17                               | <b>PULL-DOWN CHUCKS</b>    | H110                   |
|                       |                | Dividing                           | H159                              | <b>PULLER</b>              | H14                    |
|                       |                | Granite                            | F20                               | <b>PUMP</b>                |                        |
|                       |                |                                    |                                   | Barrel                     | K6                     |
|                       |                |                                    |                                   | <b>PUNCH FORMER</b>        | I 4                    |

## O

|                           |                |
|---------------------------|----------------|
| <b>OIL CAN</b>            | K6             |
| <b>OIL COUNTRY CHUCKS</b> | H55-57, H68-69 |
| <b>OIL HOLE DRILLS</b>    | B37-38         |

## P

|                 |      |
|-----------------|------|
| <b>PARALLEL</b> |      |
| Clamps          | H137 |

**PUNCH, TRANSFER SET** K4**PUNCHES**

|                    |      |
|--------------------|------|
| Automatic Centre   | K3   |
| Centre             | K2-3 |
| Drift              | K3   |
| Drive Pin          | K2-3 |
| Pin                | K2-3 |
| Punch & Chisel Set | K4   |
| Solid              | K3   |
| Transfer           | K4   |

**Q****QTT**

|   |        |
|---|--------|
| End Mills Premium Class<br>TiAIN Coated Carbide | A17-18 |
| Drills Premium Class<br>Carbide                 | B6-10  |
| Drills Premium Class<br>Carbide Coolant Fed     | B8-10  |

**QUICK CHANGE**

|                                |          |
|--------------------------------|----------|
| Chuck, Lathe                   | J98      |
| Discs, Abrasive                | J10-11   |
| ER Punch & Index Broach System | D27      |
| Tool Posts                     | H132-135 |

**R****R8 COLLETS** G43**RACK**

|                 |    |
|-----------------|----|
| End Mill Sheath | A4 |
|-----------------|----|

**RADIUS**

|                    |        |
|--------------------|--------|
| and Angle Dressers | I 3    |
| Gauges             | F20-21 |

**RATCHET**

|                 |               |
|-----------------|---------------|
| Socket Wrenches | K16, K20, K25 |
|-----------------|---------------|

**REAMERS**

|                        |             |
|------------------------|-------------|
| Adjustable             | B72         |
| Arbor (Shell)          | B71         |
| Blanks                 | B45-46      |
| Bridge                 | B69         |
| Brown and Sharpe Taper | B72         |
| Carbide                | B68         |
| Centre                 | B57-58      |
| Chucking               | B62-68      |
| Decimal                | B62-65      |
| Dowel Pin              | B65         |
| Expansion              | B72         |
| Hand                   | B71         |
| Jobber                 | B70         |
| Metric                 | B66         |
| Morse Taper            | B72         |
| Shell                  | B71         |
| Taper Pin              | B68-70      |
| Taper Pipe             | B70, B72    |
| Taper Shank            | B67, B69-72 |

**REDUCED SHANK DRILLS** B4-5, B22-23**REFERENCE**

|        |     |
|--------|-----|
| Books  | F34 |
| Tables | F34 |

**RETENTION KNOBS** G11**RIGHT ANGLE**

|                    |        |
|--------------------|--------|
| Heads              | G48-58 |
| Irons              | H18-19 |
| Milling Attachment | G48-58 |

**ROHM**

|              |          |
|--------------|----------|
| Dead Centres | H128     |
| Drill Chucks | G77-78   |
| Face Drivers | H129-131 |
| Lathe Chucks | H98-108  |

|              |          |
|--------------|----------|
| Live Centres | H124-127 |
|--------------|----------|

|              |          |
|--------------|----------|
| Power Chucks | H105-109 |
|--------------|----------|

**ROLL FORM TAPS** C7**ROLLER CABINETS** L5-9**ROTARY TABLES AND INDEX** H157-159**ROTATING CHUCKS** H51**ROUGHING END MILLS** A16, A26-27**ROUGHNESS STANDARDS** F31**ROUND DIES** C12-13**ROUND MAGNETIC CHUCKS** H161**ROUND TOOL BITS** D4**RUBBERFLEX COLLETS** G74-76**RULES** F23-24**S****SA Collet Chucks** G33

|         |        |
|---------|--------|
| Collets | G33-34 |
|---------|--------|

**SANDING BELTS** J8**SAWS**

|                         |        |
|-------------------------|--------|
| Hacksaw                 | K5     |
| Plain Slitting          | D10-12 |
| Screw Slitting          | D14    |
| Solid Carbide           | D15    |
| Staggered Side Slitting | D10-11 |

**SCREW**

|                      |      |
|----------------------|------|
| Clamp Assembly       | H143 |
| Extractors           | C12  |
| Jack Set             | I 3  |
| Pitch Gauges         | F23  |
| Shell End Mill Arbor | G15  |
| Slotting Saws        | D14  |
| Thread Micrometers   | F5-6 |

**SCREWDRIVERS** K14-16**SCRIBERS** F27

## SELF-CENTERING CHUCKS

H30-66, H81-82, H98-102

## SHARPENER FAST DRILL I 5

## SHEETS

Aluminum Oxide J8

Emery Cloth J8

Wet or Dry J8

## SHELL

End Mill Adapters G13-15

End Mill Arbor Screws G15

End Mills D14

Reamers and Arbors B71

## SHIELD

Eye I 6

## SHRINK FIT TOOLING G43-46

## SIDE CHIP CLEARANCE SAWS D10-11

## SILVER AND DEMING DRILLS B4-5,

B22-23

## SIMPLE INDEX H159

## SINE

Bars H16

Plates H17

“V” Blocks H18

Vises H17

## SKODA LIVE CENTRES H119-123

## SLIP JOINT PLIERS K28

## SLITTING SAWS

Arbors G15

Plain Metal D12

Plain Side and Staggered Side D8-10

Screw Slotting D14-15

## SLOTTED ANGLE PLATES H18

## SLOW SPIRAL DRILL B16

## SOCKETS & ACCESSORIES

1/4" Drive K16

3/8" Drive K16-19

1/2" Drive K20-24

3/4" Drive K25

## SOCKETS AND SLEEVES

Drill G80

## SOWA HIGH PERFORMANCE

### CUTTING TOOLS

Drills B2, B12, B21, B43-45,  
B47-51, C10-11

End Mills A20-27

Taps C3-8, C10-11

### SOWA INDEXABLE TOOLING see Section E

### SPACERS – ARBOR G15-16

### SPADE DRILL

Holders B49-51

Inserts B47-48

### SPIN INDEX I 4

### SPINDLE TAPER WIPERS G91

### SPIRAL FLUTE TAPS See Page C1

### SPIRAL POINT TAPS See Page C1

### SPOTTING AND CENTERING DRILLS

B44-45

### SPRING COLLET CHUCK SQUARE

Bevel Edge F27-28

Broaches D20-21

Combination Set F24-25

Die Maker's Set F28

Engineers F28

Magnetic Cylinder F28

Shoulder Cutters E148

Tool Bits B4-5

### STAGGERED TOOTH MILLING CUTTERS

D8-10

### STAMPS

Letter Sets K4

Number Sets K4

### STANDS

Micrometer F3

Surface Plate F20

### STARRETT Precision Tools C11, F5,

F8-14, F21, F25-26, F32

### STEP – Blocks and Clamp Set

H136, H141

### STOCKS - Die C13

### STRAIGHT EDGES F33

### STRAIGHT FLUTE DRILLS B41

### STUB

Drills B21-22, B45

End Mills A3-4, A6, A9-12, A17,  
A22-23, A25-27, A29

Milling Machine Arbors G15

### STUDS

Camlock H35, H61

Clamping H139-141

DIN H35, H61

Pull G11

T-Nut Set H137

### SUBURBAN TOOLING F28, F30, F32-34,

H12, H14-19

### SUPER SPACER H159

### SURFACE

Gauge F18

Grinding Chucks H160-161

Grinding Wheels J4-5

Plates & Stands F20

### SURFACE ROUGHNESS STANDARDS F31

### SWIVEL ANGLE PLATES H16, H18

### SYLVAC System Tools F9

### SYNCHROLIZE TAPPING SYSTEM G66-67

### SYSTEM- ER G18-32

# T

## T-HANDLE

Tap Wrenches C11

## T-NUTS LATHE CHUCK

H97

## T-SLOT

Bolts H139

Clamp Sets H136-137

Cutters D7

Nuts H138

## TABLES

Cross Slide H16

Rotary Index H157-159

## TAILSTOCKS

H157-159

## TALONGRIP VISE JAWS

H151

## TAP

and Die Sets C10

and Drill Sets C10-11

Chucks G63-67, G74

Drill – Combination C10-11

Drill Index C10-11

Wrenches C11

## TAPER

End Mills A28-30

Gauge F25

Length Drills B4, B23-25, B40

Pin Reamers B68-70

Pipe Reamers B70, B72

Pipe Taps C7, C9

Shank Counterbores D6

Shank Drills B29-37, B39, B41

Shank Reamers B67, B69-72

Tool Locks G91

Wipers G91

## TAPPING

Air Unit G68

Arms G68

Fluid I 7

Heads G68

Paste I 7

## TAPS

4" & 6" O.A.L. C5

Aluminum C7

DIN Length ANSI Shank C5

Fluteless C7

Hand C8-9

Pipe – N.P.T. C7, C9

Roll Form C7

Sets C10-11

Spiral Fluted See page C1

Spiral Pointed See page C1

UN 8 Pitch C5

## TE-CO

H137-146

## TELESCOPING GAUGE SET

F21-22

## TEST INDICATORS

F13-15

## TESTERS-HARDNESS

F31

## TG Collet Chucks

G34-35

75 Collets G35

100 Collets G36-37

150 Collets G37

Collet Sets G36-37

## THREAD

Mounted Chucks H40, H46

Plug Gauge F30

Wire Set F23

## THREADING INSERTS

E89

## THROWAWAY END MILLS

A23

## TiAIN COATED

Drills B6-10

End Mills A3-12, A17-18,  
A20, A24, A26-27

## TiCN COATED

End Mills A19-20

## TILTING ROTARY TABLES

H157

## TIRE DEPTH GAUGE

F18

## TITANIUM COATED

Countersinks B55, B58, B60

Drills B2-3, B13, B33, B44, B47-48

## TOOL

Boxes L2-L4, L10

Carts G90

Posts and Holders H132-135

## TOOL BITS

D4-5

## TOOLEX

H10

## TOOLHOLDERS

Indexable Carbide See Indexable

Knurling D16

Turning See Indexable

## TOOL LOCKS

G91

## TOOLPOSTS AND HOLDERS

H132-135

## TOP CHESTS

L2-4

## TOP JAWS

H35, H60, H74, H90-94

## TORQUE

Limiting Device K13

Multiplier K27

Wrench K27

## TORX

Hex Head Sockets K24

Wrenches K10, K12

## TRANSFER PUNCH SET

K4

## TUBE MICROMETERS

F8

## TUBULAR INSIDE MICROMETER

F8

## TUGGER BOLTS

H139

## TURNING INSERTS

See Carbide Inserts

## TURNING TOOLHOLDERS

See Indexable Turning Toolholders

## U

|                                   |             |
|-----------------------------------|-------------|
| <b>U/N WORK STOPPER</b>           | H13         |
| <b>ULTRA PRECISION COLLETS</b>    | G22-27, G29 |
| <b>UNIFORCE CLAMPS</b>            | H148        |
| <b>UNIVERSAL BEVEL PROTRACTOR</b> | F26         |
| <b>UNIVERSAL SURFACE GAUGE</b>    | F18         |
| <b>UTILITY CARTS</b>              | L9          |

## V

|                                     |                 |
|-------------------------------------|-----------------|
| <b>“V” BLOCKS</b>                   | H15-16          |
| <b>VACUUM CHUCK AND ACCESSORIES</b> | H160-161        |
| <b>VARIABLE HELIX END MILLS</b>     | A16-17          |
| <b>VENT DRILLS</b>                  | B45             |
| <b>VERNIER</b>                      |                 |
| Calipers                            | F10-11          |
| Height Gauges                       | F20             |
| <b>VICE</b>                         |                 |
| Angle                               | H9              |
| Bench                               | H12             |
| Double Clamp                        | H5-6            |
| Drill Press                         | H12-13          |
| EDM Tool Maker                      | H12             |
| Free Style                          | H13             |
| GS                                  | H2-8            |
| Hydraulic                           | H9, H11         |
| Jaws                                | H2, H4, H6, H10 |
| Milling Machine                     | H2-11           |
| Modular                             | H3-4, H7-8      |
| Pin                                 | K5              |
| Pipe                                | H12             |
| Piston Grip                         | H13             |

|                        |                  |
|------------------------|------------------|
| Precision              | H2-3, H9, H11-12 |
| Round Work and Shaft   | H12              |
| Sine                   | H17-18           |
| Suburban               | H12, H17         |
| Tilting and Swivelling | H9               |
| Toolmakers Precision   | H12              |
| Universal 3 Way Angle  | H9               |

## W

### WASHERS

|                 |      |
|-----------------|------|
| Finished – Flat | H141 |
|-----------------|------|

### WEBBED ANGLE PLATES

H18

### WEDGES

|                     |     |
|---------------------|-----|
| Drill Chuck Removal | G72 |
|---------------------|-----|

### WET OR DRY FINISHING PAPER

J8

### WHEELS

|                  |        |
|------------------|--------|
| Ceramic          | J3-4   |
| Cup              | J4, J6 |
| Cut-Off          | J9     |
| Depressed        | J9     |
| Grinding         | J3-6   |
| Knurling         | D16    |
| Silicon Carbide  | J5     |
| Surface Grinding | J3-6   |

### WIGGLER OR CENTRE FINDER SET

F26

### WIPERS TOOL SPINDLE

G91

### WIRE GAUGES

F62

### WIRE STRIPPER

M30

### WOODRUFF

|                |     |
|----------------|-----|
| Keyseat Cutter | D11 |
|----------------|-----|

### WORK STOPPER

|     |     |
|-----|-----|
| U/N | H13 |
|-----|-----|

### WORKSTATIONS

N4

### WRENCHES

|                |                         |
|----------------|-------------------------|
| Adjustable     | M29                     |
| Ball End       | M8, M12                 |
| Combination    | M27-28                  |
| Coolant Tube   | G12                     |
| Drum           | M7                      |
| ER             | G34                     |
| Hex            | M9-13                   |
| Lathe Chuck    | J19, J46, J59, J83, J85 |
| Milling Chuck  | G43                     |
| Pipe           | M29                     |
| SA             | G35                     |
| Socket         | M17-18, M22, M27        |
| T-Handle Chuck | J19, J46, J59, J83, J85 |
| Tap            | C19                     |
| TG             | G40                     |
| Torque         | M29                     |
| Torx           | M11-13                  |

## Y

|                      |     |
|----------------------|-----|
| <b>YUASA TOOLING</b> | I 7 |
|----------------------|-----|



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## CAT40 End Mill Holders

- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- Certified Steel
- AT2 Taper Accuracy
- RFID chip hole



**PREMIUM BALANCE**  
**G6.3 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Hole Dia. | Gauge Length | Code No. | Quantity |
|-------|-----------|--------------|----------|----------|
| CT40  | 1/8       | 1.35*        | 531069   |          |
| CT40  | 1/8       | 2.50         | 531070   |          |
| CT40  | 1/8       | 4.00         | 531071   |          |
| CT40  | 3/16      | 1.38*        | 531072   |          |
| CT40  | 3/16      | 2.50         | 531073   |          |
| CT40  | 3/16      | 4.00         | 531074   |          |
| CT40  | 1/4       | 1.38*        | 531000   |          |
| CT40  | 1/4       | 2.50         | 531002   |          |
| CT40  | 1/4       | 4.00         | 531004   |          |
| CT40  | 1/4       | 9.00         | 531005   |          |
| CT40  | 5/16      | 1.38*        | 531006   |          |
| CT40  | 5/16      | 2.50         | 531008   |          |
| CT40  | 5/16      | 4.00         | 531010   |          |
| CT40  | 5/16      | 9.00         | 531011   |          |
| CT40  | 3/8       | 1.38*        | 531012   |          |
| CT40  | 3/8       | 2.50         | 531014   |          |
| CT40  | 3/8       | 4.00         | 531016   |          |
| CT40  | 3/8       | 5.00         | 531018   |          |
| CT40  | 3/8       | 9.00         | 531031   |          |
| CT40  | 7/16      | 2.50         | 531020   |          |
| CT40  | 7/16      | 4.00         | 531022   |          |
| CT40  | 7/16      | 9.00         | 531033   |          |
| CT40  | 1/2       | 1.75*        | 531024   |          |
| CT40  | 1/2       | 2.50         | 531026   |          |
| CT40  | 1/2       | 4.00         | 531028   |          |
| CT40  | 1/2       | 5.00         | 531030   |          |
| CT40  | 1/2       | 9.00         | 531035   |          |
| CT40  | 5/8       | 1.75*        | 531032   |          |
| CT40  | 5/8       | 3.00         | 531034   |          |
| CT40  | 5/8       | 4.00         | 531036   |          |
| CT40  | 5/8       | 5.50         | 531038   |          |
| CT40  | 5/8       | 9.00         | 531037   |          |
| CT40  | 3/4       | 1.75*        | 531040   |          |
| CT40  | 3/4       | 3.00         | 531042   |          |
| CT40  | 3/4       | 4.00         | 531044   |          |
| CT40  | 3/4       | 5.50         | 531046   |          |
| CT40  | 3/4       | 9.00         | 531039   |          |
| CT40  | 7/8       | 1.75*        | 531048   |          |
| CT40  | 7/8       | 3.50         | 531050   |          |
| CT40  | 7/8       | 6.00         | 531052   |          |
| CT40  | 7/8       | 9.00         | 531041   |          |
| CT40  | 1         | 2.00*        | 531054   |          |
| CT40  | 1         | 4.00         | 531056   |          |
| CT40  | 1         | 6.00         | 531058   |          |
| CT40  | 1         | 9.00         | 531043   |          |
| CT40  | 1-1/4     | 2.00*        | 531060†  |          |
| CT40  | 1-1/4     | 4.00         | 531062   |          |
| CT40  | 1-1/4     | 6.00         | 531064   |          |
| CT40  | 1-1/2     | 4.50         | 531066   |          |
| CT40  | 1-1/2     | 6.00         | 531068   |          |

\* Stubby Length

† Not DIN Coolant

## CAT40 Shell Mill Holders

- DIN coolant option - standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



| Taper | Hole Dia. | Gauge Length | Code No. | Quantity |
|-------|-----------|--------------|----------|----------|
| CT40  | 1/2       | 1.75         | 531190   |          |
| CT40  | 3/4       | 1.75         | 531192   |          |
| CT40  | 3/4       | 4.00         | 531194   |          |
| CT40  | 3/4       | 6.00         | 531195   |          |
| CT40  | 1         | 1.75         | 531196   |          |
| CT40  | 1         | 4.00         | 531198   |          |
| CT40  | 1         | 6.00         | 531199   |          |
| CT40  | 1-1/4     | 2.00         | 531200   |          |
| CT40  | 1-1/4     | 4.00         | 531202   |          |
| CT40  | 1-1/4     | 6.00         | 531203   |          |
| CT40  | 1-1/2     | 2.00         | 531204   |          |
| CT40  | 1-1/2     | 4.00         | 531206   |          |

## CAT40 ER Collet Chucks

- DIN coolant option - standard
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0003" at 4xDia.
- Wrench not included
- All ground body
- RFID Chip Hole
- AT2 Taper Accuracy



**PREMIUM BALANCE**  
**G2.5 at 30,000rpm**  
**CERTIFICATE INCLUDED**

| Taper | Collet Series | Collet Range       | Gauge Length | Code No.       | Quantity |
|-------|---------------|--------------------|--------------|----------------|----------|
| CT40  | ER11**        | 0.019-0.275        | 2.50         | 531400         |          |
| CT40  | ER11**        | 0.019-0.275        | 4.00         | 531402         |          |
| CT40  | ER11**        | 0.019-0.275        | 6.00         | 531404         |          |
| CT40  | ER16**        | 0.019-0.406        | 2.50         | 531406         |          |
| CT40  | ER16**        | 0.019-0.406        | 3.50         | 531408         |          |
| CT40  | ER16**        | 0.019-0.406        | 4.00         | 531405         |          |
| CT40  | ER16**        | 0.019-0.406        | 6.00         | 531410         |          |
| CT40  | ER16**        | 0.019-0.406        | 9.00         | 531411         |          |
| CT40  | ER20**        | 0.039-0.511        | 2.50         | 531412         |          |
| CT40  | ER20**        | 0.039-0.511        | 4.00         | 531414         |          |
| CT40  | ER20**        | 0.039-0.511        | 6.00         | 531416         |          |
| CT40  | ER20**        | 0.039-0.511        | 9.00         | 531417         |          |
| CT40  | ER25          | 0.039-0.629        | 2.50         | 531418         |          |
| CT40  | ER25          | 0.039-0.629        | 4.00         | 531420         |          |
| CT40  | ER25          | 0.039-0.629        | 6.00         | 531422         |          |
| CT40  | <b>ER32</b>   | <b>0.078-0.787</b> | <b>0.750</b> | <b>531401*</b> |          |
| CT40  | ER32          | 0.078-0.787        | 2.50         | 531421         |          |
| CT40  | ER32          | 0.078-0.787        | 3.13         | 531424         |          |
| CT40  | ER32          | 0.078-0.787        | 4.00         | 531423         |          |
| CT40  | ER32          | 0.078-0.787        | 5.00         | 531426         |          |
| CT40  | ER32          | 0.078-0.787        | 6.00         | 531425         |          |
| CT40  | ER32          | 0.078-0.787        | 9.00         | 531419         |          |
| CT40  | ER40          | 0.118-1.023        | 2.50         | 531427         |          |
| CT40  | ER40          | 0.118-1.023        | 3.13         | 531428         |          |
| CT40  | ER40          | 0.118-1.023        | 4.00         | 531429         |          |
| CT40  | ER40          | 0.118-1.023        | 5.00         | 531430         |          |
| CT40  | ER40          | 0.118-1.023        | 6.00         | 531431         |          |

\* ER Shorty collet chuck, Not DIN coolant \*\* Hex Nut

Company: \_\_\_\_\_

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Notes: \_\_\_\_\_

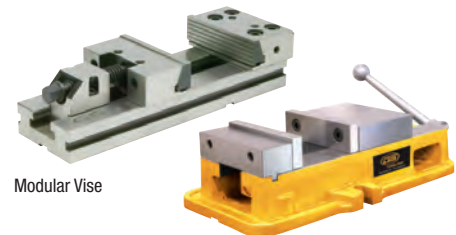
## ER Collet Sets



\* Case may not be as shown

| Collet | Description    | Range            | Code No. | Quantity |
|--------|----------------|------------------|----------|----------|
| ER11   | Inch Size 7pc  | 1/16-1/4 x 32nds | 337401   |          |
| ER11   | Metric 13pc    | 1-7mm            | 337379   |          |
| ER16   | Inch Size 11pc | 1/16-3/8 x 32nds | 337403   |          |
| ER16   | Metric 10pc    | 1-10mm           | 337380   |          |
| ER20   | Inch Size 15pc | 1/16-1/2 x 32nds | 337404   |          |
| ER20   | Metric 12pc    | 2-13mm           | 337382   |          |
| ER25   | Inch Size 17pc | 1/8-5/8 x 32nds  | 337405   |          |
| ER25   | Metric 15pc    | 2-16mm           | 337383   |          |
| ER32   | Inch Size 21pc | 1/8-3/4 x 32nds  | 337407   |          |
| ER32   | Metric 18pc    | 2-20mm           | 337384   |          |
| ER40   | Inch Size 29pc | 1/8-1" x 32nds   | 337409   |          |
| ER40   | Metric 23pc    | 3.5-26mm         | 337386   |          |

## Modular & Milling Machine Vises



Modular Vise

Milling Machine Vise

| Model      | Jaw Width | Jaw Opening | Code No. | Quantity |
|------------|-----------|-------------|----------|----------|
| GS675      | 6         | 7.5         | 327275M  |          |
| GS160G     | 6         | 9.13        | 327320   |          |
| GS810      | 8         | 10.0        | 327300   |          |
| #3 Modular | 6         | 12          | 382017   |          |

## NC/CNC Trolley



Complete Tool Trolley with 4 Tool Trays and Inserts.



- Trays bolt in
- (W)1002mm x (D)650mm x (H)830mm
- Weight: 51kgs

| Desc.   | Taper Type | Inserts Per Tray | Code No. | Quantity |
|---------|------------|------------------|----------|----------|
| Trolley | 40         | 4 x 7            | 326985   |          |
| Trolley | 50         | 4 x 5            | 326995   |          |

## CAT50 End Mill Holders

- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



PREMIUM BALANCE  
G6.3 at 25,000rpm  
CERTIFICATE INCLUDED

| Taper | Hole Dia. | Gauge Length | Code No. | Quantity |
|-------|-----------|--------------|----------|----------|
| CT50  | 1/4       | 1.38*        | 531082   |          |
| CT50  | 1/4       | 2.50         | 531084   |          |
| CT50  | 1/4       | 4.00         | 531086   |          |
| CT50  | 1/4       | 6.00         | 531088   |          |
| CT50  | 1/4       | 8.00         | 531090   |          |
| CT50  | 5/16      | 2.50         | 531092   |          |
| CT50  | 5/16      | 4.00         | 531094   |          |
| CT50  | 5/16      | 6.00         | 531096   |          |
| CT50  | 3/8       | 1.38*        | 531098   |          |
| CT50  | 3/8       | 2.50         | 531100   |          |
| CT50  | 3/8       | 4.00         | 531102   |          |
| CT50  | 3/8       | 6.00         | 531104   |          |
| CT50  | 3/8       | 8.00         | 531106   |          |
| CT50  | 3/8       | 14.00        | 531107   |          |
| CT50  | 7/16      | 2.50         | 531108   |          |
| CT50  | 7/16      | 4.00         | 531110   |          |
| CT50  | 7/16      | 6.00         | 531112   |          |
| CT50  | 7/16      | 14.00        | 531113   |          |
| CT50  | 1/2       | 1.75*        | 531116   |          |
| CT50  | 1/2       | 2.63         | 531118   |          |
| CT50  | 1/2       | 4.00         | 531120   |          |
| CT50  | 1/2       | 6.00         | 531122   |          |
| CT50  | 1/2       | 8.00         | 531124   |          |
| CT50  | 1/2       | 14.00        | 531125   |          |
| CT50  | 9/16      | 6.00         | 531133   |          |
| CT50  | 5/8       | 1.75*        | 531126   |          |
| CT50  | 5/8       | 3.00         | 531128   |          |
| CT50  | 5/8       | 4.00         | 531130   |          |
| CT50  | 5/8       | 6.00         | 531132   |          |
| CT50  | 5/8       | 8.00         | 531134   |          |
| CT50  | 5/8       | 14.00        | 531131   |          |
| CT50  | 3/4       | 1.75*        | 531136   |          |
| CT50  | 3/4       | 3.00         | 531138   |          |
| CT50  | 3/4       | 4.00         | 531140   |          |
| CT50  | 3/4       | 6.00         | 531142   |          |
| CT50  | 3/4       | 8.00         | 531144   |          |
| CT50  | 3/4       | 14.00        | 531145   |          |
| CT50  | 7/8       | 1.75*        | 531146   |          |
| CT50  | 7/8       | 3.75         | 531148   |          |
| CT50  | 1         | 2.00*        | 531152   |          |
| CT50  | 1         | 4.00         | 531154   |          |
| CT50  | 1         | 6.00         | 531156   |          |
| CT50  | 1         | 8.00         | 531158   |          |
| CT50  | 1-1/4     | 2.00*        | 531160   |          |
| CT50  | 1-1/4     | 4.00         | 531162   |          |
| CT50  | 1-1/4     | 6.00         | 531164   |          |
| CT50  | 1-1/4     | 8.00         | 531166   |          |
| CT50  | 1-1/2     | 2.25*        | 531168   |          |
| CT50  | 1-1/2     | 4.50         | 531170   |          |
| CT50  | 1-1/2     | 7.00         | 531172   |          |
| CT50  | 1-1/2     | 9.00         | 531174   |          |
| CT50  | 2         | 3.63*        | 531176   |          |
| CT50  | 2         | 5.37         | 531178   |          |
| CT50  | 2         | 8.00         | 531180   |          |
| CT50  | 2         | 10.00        | 531182   |          |
| CT50  | 2-1/2     | 6.00         | 531184   |          |

\* Stubby Length

## CAT50 Shell Mill Holders

- DIN coolant option - Standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



| Taper | Dia.  | Gauge Length | Code No. | Quantity |
|-------|-------|--------------|----------|----------|
| CT50  | 3/4   | 1.75         | 531208   |          |
| CT50  | 3/4   | 4.00         | 531210   |          |
| CT50  | 3/4   | 6.00         | 531212   |          |
| CT50  | 3/4   | 8.00         | 531214   |          |
| CT50  | 1     | 1.75         | 531216   |          |
| CT50  | 1     | 4.00         | 531218   |          |
| CT50  | 1     | 6.00         | 531220   |          |
| CT50  | 1     | 8.00         | 531222   |          |
| CT50  | 1-1/4 | 1.75         | 531224   |          |
| CT50  | 1-1/4 | 4.00         | 531226   |          |
| CT50  | 1-1/4 | 6.00         | 531228   |          |
| CT50  | 1-1/4 | 8.00         | 531230   |          |
| CT50  | 1-1/2 | 2.00         | 531232   |          |
| CT50  | 1-1/2 | 4.00         | 531234   |          |
| CT50  | 1-1/2 | 6.00         | 531236   |          |
| CT50  | 1-1/2 | 8.00         | 531238   |          |
| CT50  | 2     | 2.00         | 531240   |          |
| CT50  | 2     | 4.00         | 531242   |          |
| CT50  | 2     | 6.00         | 531244   |          |

## CAT50 ER Collet Chucks

- DIN coolant option - standard
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- TIR, 0.0003" at 4xDia.
- Wrench not included
- All ground body
- Increased productivity
- RFID Chip Hole
- AT2 Taper Accuracy



PREMIUM BALANCE  
G2.5 at 25,000rpm  
CERTIFICATE INCLUDED

| Taper | Collet Series | Collet Range | Gauge Length | Code No. | Quantity |
|-------|---------------|--------------|--------------|----------|----------|
| CT50  | ER16**        | 0.019-0.406  | 4.12         | 531432   |          |
| CT50  | ER16**        | 0.019-0.406  | 6.00         | 531434   |          |
| CT50  | ER16**        | 0.019-0.406  | 8.00         | 531436   |          |
| CT50  | ER16**        | 0.019-0.406  | 12.00        | 531437   |          |
| CT50  | ER20**        | 0.039-0.511  | 2.50         | 531438   |          |
| CT50  | ER20**        | 0.039-0.511  | 4.00         | 531440   |          |
| CT50  | ER20**        | 0.039-0.511  | 6.00         | 531442   |          |
| CT50  | ER20**        | 0.039-0.511  | 8.00         | 531444   |          |
| CT50  | ER20**        | 0.039-0.511  | 12.00        | 531445   |          |
| CT50  | ER25          | 0.039-0.629  | 2.50         | 531446   |          |
| CT50  | ER25          | 0.039-0.629  | 4.00         | 531448   |          |
| CT50  | ER25          | 0.039-0.629  | 6.00         | 531450   |          |
| CT50  | ER25          | 0.039-0.629  | 8.00         | 531452   |          |
| CT50  | ER32          | 0.078-0.787  | 0.750        | 531403*  |          |
| CT50  | ER32          | 0.078-0.787  | 4.00         | 531454   |          |
| CT50  | ER32          | 0.078-0.787  | 6.00         | 531456   |          |
| CT50  | ER32          | 0.078-0.787  | 8.00         | 531458   |          |
| CT50  | ER32          | 0.078-0.787  | 12.00        | 531459   |          |
| CT50  | ER40          | 0.118-1.023  | 4.00         | 531460   |          |
| CT50  | ER40          | 0.118-1.023  | 6.00         | 531462   |          |
| CT50  | ER40          | 0.118-1.023  | 8.00         | 531464   |          |

\* ER Shorty collet chuck, Not DIN coolant \*\* Hex Nut

Company:

Contact:

Phone:

Fax:

Email:

Notes:

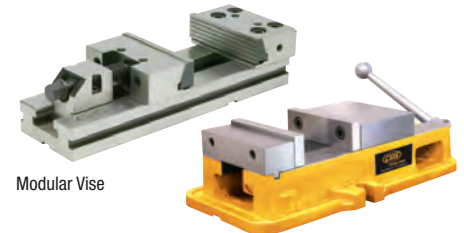
## ER Collet Sets



\* Case may not be as shown

| Collet | Description    | Range            | Code No. | Quantity |
|--------|----------------|------------------|----------|----------|
| ER11   | Inch Size 7pc  | 1/16-1/4 x 32nds | 337401   |          |
| ER11   | Metric 13pc    | 1-7mm            | 337379   |          |
| ER16   | Inch Size 11pc | 1/16-3/8 x 32nds | 337403   |          |
| ER16   | Metric 10pc    | 1-10mm           | 337380   |          |
| ER20   | Inch Size 15pc | 1/16-1/2 x 32nds | 337404   |          |
| ER20   | Metric 12pc    | 2-13mm           | 337382   |          |
| ER25   | Inch Size 17pc | 1/8-5/8 x 32nds  | 337405   |          |
| ER25   | Metric 15pc    | 2-16mm           | 337383   |          |
| ER32   | Inch Size 21pc | 1/8-3/4 x 32nds  | 337407   |          |
| ER32   | Metric 18pc    | 2-20mm           | 337384   |          |
| ER40   | Inch Size 29pc | 1/8-1" x 32nds   | 337409   |          |
| ER40   | Metric 23pc    | 3.5-26mm         | 337386   |          |

## Modular & Milling Machine Vises



Modular Vise

Milling Machine Vise

| Model      | Jaw Width | Jaw Opening | Code No. | Quantity |
|------------|-----------|-------------|----------|----------|
| GS675      | 6         | 7.5         | 327275M  |          |
| GS160G     | 6         | 9.13        | 327320   |          |
| GS810      | 8         | 10.0        | 327300   |          |
| #3 Modular | 6         | 12          | 382017   |          |

## NC/CNC Trolley



Complete Tool Trolley with 4 Tool Trays and Inserts.

- Trays bolt in
- (W)1002mm x (D)650mm x (H)830mm
- Weight: 51kgs



| Desc.   | Taper Type | Inserts Per Tray | Code No. | Quantity |
|---------|------------|------------------|----------|----------|
| Trolley | 40         | 4 x 7            | 326985   |          |
| Trolley | 50         | 4 x 5            | 326995   |          |



# BT40 Tooling Package Quote Request Form



## BT40 End Mill Holders

- DIN coolant option - standard
- All ground body, bore, nose, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



PREMIUM BALANCE  
G6.3 at 30,000rpm  
CERTIFICATE INCLUDED

| Taper | Hole Dia. | Gauge Length | Code No. | Quantity |
|-------|-----------|--------------|----------|----------|
| BT40  | 1/8       | 1.38*        | 531019   |          |
| BT40  | 1/8       | 2.50         | 531021   |          |
| BT40  | 1/8       | 4.00         | 531023   |          |
| BT40  | 3/16      | 1.38*        | 531025   |          |
| BT40  | 3/16      | 2.50         | 531027   |          |
| BT40  | 3/16      | 4.00         | 531029   |          |
| BT40  | 1/4       | 1.38*        | 532018   |          |
| BT40  | 1/4       | 2.50         | 532020   |          |
| BT40  | 1/4       | 4.00         | 532022   |          |
| BT40  | 5/16      | 1.38*        | 532024   |          |
| BT40  | 5/16      | 2.50         | 532026   |          |
| BT40  | 5/16      | 4.00         | 532028   |          |
| BT40  | 3/8       | 1.38*        | 532030   |          |
| BT40  | 3/8       | 2.50         | 532032   |          |
| BT40  | 3/8       | 4.00         | 532034   |          |
| BT40  | 7/16      | 2.50         | 532036   |          |
| BT40  | 1/2       | 1.75*        | 532038   |          |
| BT40  | 1/2       | 2.50         | 532040   |          |
| BT40  | 1/2       | 4.00         | 532042   |          |
| BT40  | 5/8       | 1.75*        | 532044   |          |
| BT40  | 5/8       | 2.50         | 532046   |          |
| BT40  | 5/8       | 4.00         | 532048   |          |
| BT40  | 3/4       | 1.75*        | 532050   |          |
| BT40  | 3/4       | 2.50         | 532052   |          |
| BT40  | 3/4       | 4.00         | 532054   |          |
| BT40  | 7/8       | 3.38         | 532056   |          |
| BT40  | 7/8       | 6.00         | 532058   |          |
| BT40  | 1         | 2.00*        | 532060   |          |
| BT40  | 1         | 3.56         | 532062   |          |
| BT40  | 1         | 6.00         | 532064   |          |
| BT40  | 1-1/4     | 2.00*        | 532066‡  |          |
| BT40  | 1-1/4     | 3.56         | 532068   |          |
| BT40  | 1-1/4     | 6.00         | 532070   |          |
| BT40  | 1-1/2     | 4.50         | 532072   |          |
| BT40  | 1-1/2     | 6.00         | 532074   |          |

\* Stubby Length

‡ Not DIN Coolant



Build your own tooling package and save!

## BT Shell Mill Holders

- DIN coolant option - standard
- All ground body, nose, pilot, flange
- TIR, 0.0001" / 0.003mm OD to ID
- AT2 Taper Accuracy
- Certified Steel
- RFID chip hole



| Taper | Dia.  | Gauge Length | Code No. | Quantity |
|-------|-------|--------------|----------|----------|
| BT40  | 1/2   | 1.75         | 532086   |          |
| BT40  | 3/4   | 1.75         | 532088   |          |
| BT40  | 3/4   | 4.00         | 532111   |          |
| BT40  | 3/4   | 6.00         | 532114   |          |
| BT40  | 1     | 1.75         | 532090   |          |
| BT40  | 1     | 4.00         | 532115   |          |
| BT40  | 1     | 6.00         | 532117   |          |
| BT40  | 1-1/4 | 2.00         | 532092   |          |
| BT40  | 1-1/4 | 4.00         | 532119   |          |
| BT40  | 1-1/4 | 6.00         | 532121   |          |
| BT40  | 1-1/2 | 2.00         | 532094   |          |

## BT Taper ER Collet Chucks

- DIN coolant option - standard
- All ground body
- Factory balanced to save spindle life, tool life and increased productivity
- Threaded through holes for a back-up screw (tool stop) or coolant through when removed
- Wrench not included
- AT2 Taper Accuracy
- RFID Chip Hole



PREMIUM BALANCE  
G2.5 at 30,000rpm  
CERTIFICATE INCLUDED  
BT40

| Taper | Collet Series | Collet Range | Gauge Length | Code No. | Quantity |
|-------|---------------|--------------|--------------|----------|----------|
| BT40  | ER11**        | 0.019-0.275  | 4.00         | 532176   |          |
| BT40  | ER11**        | 0.019-0.275  | 6.00         | 532178   |          |
| BT40  | ER16**        | 0.019-0.406  | 3.50         | 532180   |          |
| BT40  | ER16**        | 0.019-0.406  | 5.00         | 532182   |          |
| BT40  | ER20**        | 0.039-0.511  | 2.50         | 532184   |          |
| BT40  | ER20**        | 0.039-0.511  | 4.00         | 532186   |          |
| BT40  | ER20**        | 0.039-0.511  | 6.00         | 532188   |          |
| BT40  | ER25          | 0.039-0.629  | 2.25         | 532190   |          |
| BT40  | ER25          | 0.039-0.629  | 4.00         | 532192   |          |
| BT40  | ER25          | 0.039-0.629  | 6.00         | 532194   |          |
| BT40  | ER32          | 0.078-0.787  | 1.06         | 532191*  |          |
| BT40  | ER32          | 0.078-0.787  | 3.13         | 532196   |          |
| BT40  | ER32          | 0.078-0.787  | 5.00         | 532198   |          |
| BT40  | ER40          | 0.118-1.023  | 3.13         | 532200   |          |
| BT40  | ER40          | 0.118-1.023  | 5.00         | 532202   |          |

\* Not DIN Coolant

\*\* Hex Nut

‡ ER Shorty Collet Chuck

Company: \_\_\_\_\_

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Notes: \_\_\_\_\_

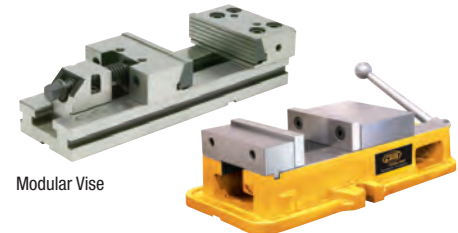
## ER Collet Sets



\* Case may not be as shown

| Collet | Description    | Range            | Code No. | Quantity |
|--------|----------------|------------------|----------|----------|
| ER11   | Inch Size 7pc  | 1/16-1/4 x 32nds | 337401   |          |
| ER11   | Metric 13pc    | 1-7mm            | 337379   |          |
| ER16   | Inch Size 11pc | 1/16-3/8 x 32nds | 337403   |          |
| ER16   | Metric 10pc    | 1-10mm           | 337380   |          |
| ER20   | Inch Size 15pc | 1/16-1/2 x 32nds | 337404   |          |
| ER20   | Metric 12pc    | 2-13mm           | 337382   |          |
| ER25   | Inch Size 17pc | 1/8-5/8 x 32nds  | 337405   |          |
| ER25   | Metric 15pc    | 2-16mm           | 337383   |          |
| ER32   | Inch Size 21pc | 1/8-3/4 x 32nds  | 337407   |          |
| ER32   | Metric 18pc    | 2-20mm           | 337384   |          |
| ER40   | Inch Size 29pc | 1/8-1" x 32nds   | 337409   |          |
| ER40   | Metric 23pc    | 3.5-26mm         | 337386   |          |

## Modular & Milling Machine Vises



Modular Vise

Milling Machine Vise

| Model      | Jaw Width | Jaw Opening | Code No. | Quantity |
|------------|-----------|-------------|----------|----------|
| GS675      | 6         | 7.5         | 327275M  |          |
| GS160G     | 6         | 9.13        | 327320   |          |
| GS810      | 8         | 10.0        | 327300   |          |
| #3 Modular | 6         | 12          | 382017   |          |

## NC/CNC Trolley



Complete Tool Trolley with 4 Tool Trays and Inserts.

- Trays bolt in
- (W)1002mm x (D)650mm x (H)830mm
- Weight: 51kgs



| Desc.   | Taper Type | Inserts Per Tray | Code No. | Quantity |
|---------|------------|------------------|----------|----------|
| Trolley | 40         | 4 x 7            | 326985   |          |
| Trolley | 50         | 4 x 5            | 326995   |          |



**A** Milling

**D** Cutting Tools

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