

**YG** YG-1 CO., LTD.

**HEAD OFFICE** [Http://www.yg1.kr](http://www.yg1.kr)  
68, Cheongcheon-Dong, Bupyeong-Gu, Incheon, Korea  
PHONE : +82-32-526-0909, FAX : +82-32-526-4373

**USA OFFICE** [Http://www.yg1usa.com](http://www.yg1usa.com)  
730 Corporate Woods Parkway, Vernon Hills, IL 60061 U.S.A  
PHONE : 800-765-8665, FAX : 866-941-8665  
Technical Assistance : 888-868-5988

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YU09

**YG-1 Cutting Tools**

**YG** YG-1 CO., LTD.

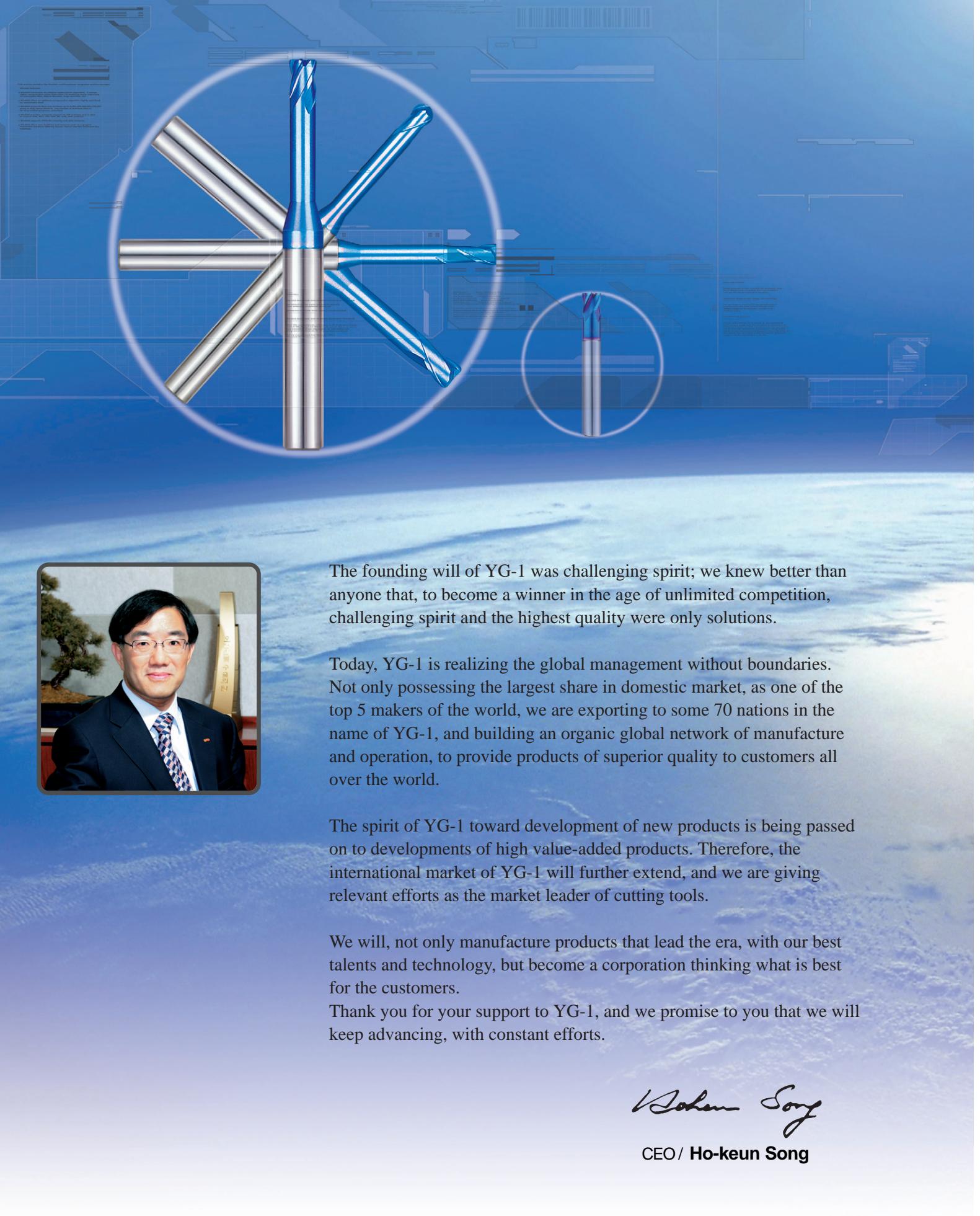
YU09

# YG-1 Cutting Tools

Catalog 2009/2010



**YG** YG-1 CO., LTD.



The founding will of YG-1 was challenging spirit; we knew better than anyone that, to become a winner in the age of unlimited competition, challenging spirit and the highest quality were only solutions.

Today, YG-1 is realizing the global management without boundaries. Not only possessing the largest share in domestic market, as one of the top 5 makers of the world, we are exporting to some 70 nations in the name of YG-1, and building an organic global network of manufacture and operation, to provide products of superior quality to customers all over the world.

The spirit of YG-1 toward development of new products is being passed on to developments of high value-added products. Therefore, the international market of YG-1 will further extend, and we are giving relevant efforts as the market leader of cutting tools.

We will, not only manufacture products that lead the era, with our best talents and technology, but become a corporation thinking what is best for the customers.

Thank you for your support to YG-1, and we promise to you that we will keep advancing, with constant efforts.

CEO / Ho-keun Song

## MEMO



# There are no limits or boundaries, in quality control and technology development

The collage includes several brochures for YG-1 products:

- X-POWER END MILLS**: Features a variety of end mills.
- YG-1 END MILLS SUPER CUTTING END MILLS**: Focuses on super cutting end mills for precision machining.
- YG-1 CARBIDE DRILLS**: Shows carbide drills for high speed drilling and precision work.
- YG-1 DRILLS HIGH SPEED & QUALITY TWIST DRILLS**: Details high speed twist drills.
- YG-1 THROUGH HOLE DRILL INSERTS & HOLDERS**: Shows through hole drill inserts and holders.
- The X5070 Blue**: Features blue-coated tools.

Two certificates from DAS Certification are also shown:

- Quality Management System Certificate of Approval ISO 9001:2000 / KS A 9001:2001**
- Environmental Management System Certificate of Approval ISO 14001:2004 / KS A 14001:2004**

# Another name for our product is No.1

It would be a disgrace to the name of YG-1, if the No.1 doesn't have any significance.

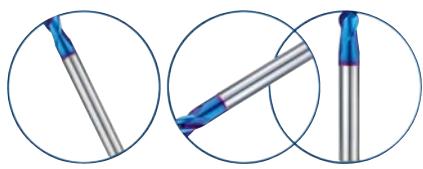
To become the No.1 in technology and quality, the 24 hours of YG-1 does not stop to rest.



Even today, modern products are flowing out from the production line of YG-1, which runs 365 days a year. Know-how of cutting tools are not established in a day; the history of YG-1 was the history of new technology development. As a result, YG-1 today proceeds all one-stop process, from input of raw materials to manufacture of finished product, with latest high-tech production facility and equipments. Therefore the cutting tools of highest quality are manufactured at lowest prices.

Also, to win the battle of technology competition, YG-1 pursues the rigid quality control; through 20 inquisitive inspections, YG-1 is attempting to the 0% inferiority rate.

# GLOBAL NETWORK



WORLDWIDE YG-1  
Being the best through innovation

We are exporting to 75 nations all over the world,  
with the name of **YG-1**

**WORLDWIDE YG-1**

- |              |             |              |               |                |              |              |
|--------------|-------------|--------------|---------------|----------------|--------------|--------------|
| • ALBANIA    | • CHILE     | • HUNGARY    | • KUWAIT      | • NORWAY       | • SLOVAKIA   | • U.K.       |
| • ARGENTINA  | • COLOMBIA  | • INDIA      | • LATVIA      | • PAKISTAN     | • SLOVENIA   | • U.S.A.     |
| • AUSTRALIA  | • CZECH     | • INDONESIA  | • LEBANON     | • PERU         | • SPAIN      | • UKRAINE    |
| • AUSTRIA    | • DENMARK   | • IRAN       | • LITHUANIA   | • PHILIPPINES  | • SRI LANKA  | • UZBEKISTAN |
| • BANGLADESH | • EGYPT     | • IRAQ       | • LUXEMBURG   | • POLAND       | • SWEDEN     | • VIETNAM    |
| • BELARUS    | • ESTONIA   | • ISRAEL     | • MALAYSIA    | • PORTUGAL     | • SWISS      |              |
| • BELGIUM    | • FINLAND   | • ITALY      | • MEXICO      | • RUMANIA      | • TAIWAN     |              |
| • BOLIVIA    | • FRANCE    | • JAMAICA    | • MYANMAR     | • RUSSIA       | • TAJIKISTAN |              |
| • BRAZIL     | • GERMANY   | • JAPAN      | • NEPAL       | • SOUTH AFRICA | • THAILAND   |              |
| • BULGARIA   | • GREECE    | • JORDAN     | • NETHERLANDS | • SAUDI ARABIA | • TURKEY     |              |
| • CANADA     | • HONG KONG | • KAZAKHSTAN | • NEW ZEALAND | • SINGAPORE    | • U.A.E.     |              |

## Global Company

- |  |   |  |  |
|--|---|--|--|
| • <b>New Century Tool Co.,Ltd.(China)</b><br>PHONE : +86 532 8676 9779<br>FAX : +86 532 8676 9105    | • <b>YG-1 Tool(U.S.A.)</b><br>PHONE : +1 847 634 3700<br>FAX : +1 847 634 3755                          | • <b>YG-1 VG mbH(Germany)</b><br>PHONE : +49 711 365 659 37<br>FAX : +49 711 900 382 70      | • <b>YG-1 Co.,Trading Srl(Romania)</b><br>PHONE : +40 21 25 25 501/3<br>FAX : +40 21 25 25 506 |
| • <b>YG-1 Industries India Pvt.Ltd.(India)</b><br>PHONE : +91 22 2580 4059<br>FAX : +91 22 2580 3576 | • <b>Clarkson Osborn International Ltd.(U.K.)</b><br>PHONE : +44 114 276 8622<br>FAX : +44 114 275 4012 | • <b>Europa Tools Co., Ltd.(U.K.)</b><br>PHONE : +44 24 7664 1282<br>FAX : +44 24 7664 1390  | • <b>YG-1 Latin America(Brazil)</b><br>PHONE : +55 11 4586 6780<br>FAX : +55 11 4586 8934      |
| • <b>Regal Cutting Tools Inc.(U.S.A.)</b><br>PHONE : +1 800 435 2948<br>FAX : +1 800 992 1674        | • <b>YG-1 Canada Inc.(Canada)</b><br>PHONE : +1 905 335 2500<br>FAX : +1 905 335 4003                   | • <b>YG-1 Poland Sp. z o.o.(Poland)</b><br>PHONE : +48 22 622 2587<br>FAX : +48 22 622 2586  | • <b>YG-1 Japan Co.,Ltd.(Japan)</b><br>PHONE : +81 6 6305 9897<br>FAX : +81 6 6305 9898        |
| • <b>Premier Cutting Tools Inc.(U.S.A.)</b><br>PHONE : +1 847 793 0053<br>FAX : +1 847 793 0106      | • <b>YG-1 Australia Pty.Ltd(Australia)</b><br>PHONE : +61 3 9558 0177<br>FAX : +61 3 9558 2778          | • <b>YG-1 Tools Asia Pte.Ltd.(Singapore)</b><br>PHONE : +65 6842 0468<br>FAX : +65 6842 0482 | • <b>YG-1 China Holdings Limited</b><br>PHONE : +86 21 6383 1661<br>FAX : +86 21 6383 1771     |
| • <b>YG-1 Europe(France)</b><br>PHONE : +33 172 84 4070<br>FAX : +33 172 84 4086                     | • <b>YG-1 Deutschland GmbH(Germany)</b><br>PHONE : +49 6173 9667 0<br>FAX : +44 6173 9667 29            | • <b>YG-1 (Hong Kong) Limited</b><br>PHONE : +852 2439 9018<br>FAX : +852 2439 9020          |  |

# NEW PRODUCTS

X5070



## Development of New Products always starts from scratch

### X5070

X5070 E/M is made from new top carbide grade that is made of superfine(Nano grain size) tungsten carbide and significantly surpasses our previous grades in hardness without losing in toughness.

Also, newly developed X5070 coating has improved hardness, oxidation resistance and thermal stability. They make the ability of performance stand out, especially high speed cutting and dry cutting.

X5070 E/M is applicable to high hardened materials from 50HRc to 70HRc, such as alloy steels, mold steels and titanium alloys.

### TANK-POWER

The TANK POWER series of end mills are made of "next generation" powdered metal which is tougher than carbide and more wear and heat resistant than cobalt. This combination allows higher edge strength and higher feed rates.

### Gold-P

The Gold-P drill has a full thickness tin coating on its tip. This allows higher production rates and lower costs. The newly designed point, helps reduce thrust and is self centering.

### SM-Point Spade Drill Inserts

This product shows hybrid feature combined an existed notch point of spade drill with standard point. As adding additional thinning shape over existed spade drill(making small thinning for a part of point), it could be able to realize an optimized drilling by ,not only creating a proper speed and a cutting volume according to a distance from drill point to the line drawn by thinning, but also completing a matched thinning shape with a difference which comes from a various cutting object.

TANK-POWER



Gold-P



SM-Point Throw-Away Spade Drill Inserts



[www.yg1.co.kr](http://www.yg1.co.kr)

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| EDP No. INDEX                                   |   | 499-501 |

# GUIDE TO ICONS

|                               |                      |   |
|-------------------------------|----------------------|---|
| <b>TOOL MATERIALS</b>         | <b>MG</b>            | Micro Grain Carbide is used in the tool material. |
|                               | <b>YPM</b>           | YG-1 Premium Material, Powdered HSS               |
|                               | <b>HSS Co8</b>       | Cobalt 8% HSS is used in the tool material.       |
|                               | <b>HSS Co5</b>       | Cobalt 5% HSS is used in the tool material.       |
|                               | <b>HSS</b>           | HSS is used in the tool material.                 |
| <b>HELIX ANGLE</b>            |                      | Helix angle for Ball EndMill.                     |
|                               |                      | Helix angle for Square EndMill.                   |
| <b>THE TYPES OF SHANK</b>     |                      | Plain shank                                       |
|                               |                      | Flat shank.                                       |
| <b>THE TYPES OF PERIPHERY</b> |                      | Coarse pitch type.                                |
|                               |                      | Fine pitch type.                                  |
|                               |                      | Roughing & Finishing type                         |
| <b>THE TYPES OF END TEETH</b> |                      | Corner Radius                                     |
|                               |                      | Ball Nose Radius                                  |
| <b>CUTTING CONDITIONS</b>     |                      | Indicates the pages of cutting conditions         |
| <b>NUMBER OF FLUTES</b>       |                      | 2   |
|                               |                      | 2&4   |
|                               |                      | 3   |
|                               |                      | 3&4   |
|                               |                      | 3-5   |
|                               |                      | 3-5   |
|                               |                      | 3-6   |
|                               |                      | 3-8   |
|                               |                      | 4   |
|                               |                      | 4&6   |
|                               |                      | 4-8   |
|                               |                      | 5   |
|                               |                      | 6   |
|                               |                      | 6&8   |
|                               | The number of flutes |   |

If it's not perfect,  
it's not YG-1

## END MILLS

Cutting tools for high precision making for mold & dies, mold for automobile, electronic appliances manufacturing aircraft fuselage, medical, optical, and aerospace industries. Our representative production series are X5070 carbide endmills, X-POWER carbide endmills, TANK-POWER powdered metal endmills, V7 Mill, K-2 carbide endmills, and etc...

## DRILLS

Cutting tools for making holes in manufactured articles includes metal molds, components for machine tools, automobiles, and electronic appliances. YG-1 produces Carbide Dream Drills, HPD Drills, Gold-P Drills, and Spade Drills. Especially, spade drills are used to produce holes ranging in size from about 9.5mm to 114.3mm diameter, and very deep holes can also be drilled.

## TAPS

Cutting tools for precision processing of threading mainly for automobile parts. The market is being gradually expanded through continuous development of new products including fluteless taps(Formering tap) and Multi-1 taps.

## Special products

Cutting tools for various metalworking. YG-1 offers special products as like carbide rotary burrs, mill cutters, carbide drill mills, shell end mills, counter bores and tool bits.

You can find our unique products that meet your satisfaction.

www.yg1.co.kr

# X5070

## ULTRA MICRO GRAIN CARBIDE END MILLS

- *High Speed Cutting in Dry Conditions*
- *Hardened Mold, Die, Alloy Steels  
and Most Alloys up to HRc70*





# X5070 CARBIDE END MILLS SELECTION GUIDE

**INCH**

| EDP No. | APPEARANCE  | SPECIFICATION   | STOCK | PAGE |
|---------|---|---|-------|------|
| G8A43   |  | 2 FLUTE, STUB CUT LENGTH, BALL NOSE<br>with EXTENDED NECK | ★     | 9    |

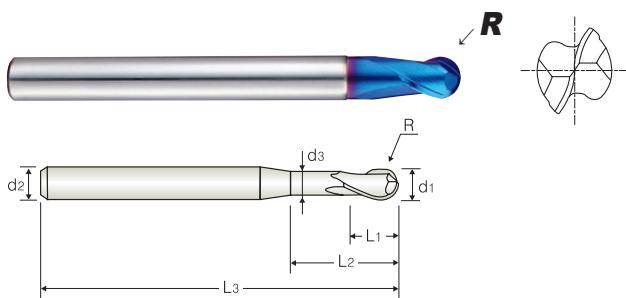
**METRIC**

| EDP No.           | APPEARANCE  | SPECIFICATION   | STOCK | PAGE         |
|-------------------|---|---|-------|--------------|
| G8A36             |   | 2 FLUTE, STUB CUT LENGTH with EXTENDED NECK               | ★     | 10           |
| G8A37             |  | 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK               | ★     | 11           |
| G8A38             |  | 2 FLUTE, STUB CUT LENGTH, BALL NOSE<br>with EXTENDED NECK | ★     | 12           |
| G8A39             |  | 6 FLUTE, 45° HELIX with CORNER RADIUS                     | ★     | 13           |
| SPEED & FEED DATA |   |   |       | <u>14~16</u> |

★:U.S.A Stock

**X5070**

# 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK



R1/64~R1/8 R5/32~R1/4

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Designed for high precision milling operation.
- Higher wear-resistance.

◇ U.S.A Stock

**G8A43 Series**

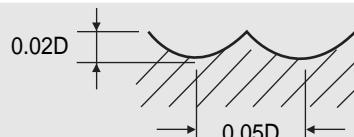
Unit : inch

| EDP No.  | R     | MILL DIAMETER $d_1$ | SHANK DIAMETER $d_2$ | LENGTH OF CUT $L_1$ | LENGTH BELOW SHANK $L_2$ | OVERALL LENGTH $L_3$ | NECK DIAMETER $d_3$ |
|----------|-------|---------------------|----------------------|---------------------|--------------------------|----------------------|---------------------|
| G8A43002 | R1/64 | 1/32                | 1/4                  | 1/32                | 1/16                     | 2                    | .029                |
| G8A43004 | R1/32 | 1/16                | 1/4                  | 1/16                | 1/8                      | 2                    | .059                |
| G8A43006 | R3/64 | 3/32                | 1/4                  | 1/32                | 3/16                     | 2                    | .090                |
| G8A43008 | R1/16 | 1/8                 | 1/4                  | 1/8                 | 1/4                      | 2-1/2                | .121                |
| G8A43012 | R3/32 | 3/16                | 1/4                  | 3/16                | 3/8                      | 3                    | .184                |
| G8A43016 | R1/8  | 1/4                 | 1/4                  | 1/4                 | 1/2                      | 3-1/2                | .246                |
| G8A43020 | R5/32 | 5/16                | 5/16                 | 5/16                | 5/8                      | 4                    | .309                |
| G8A43024 | R3/16 | 3/8                 | 3/8                  | 3/8                 | 3/4                      | 4                    | .371                |
| G8A43032 | R1/4  | 1/2                 | 1/2                  | 1/2                 | 1                        | 4-1/2                | .496                |

| TOLERANCE OF MILL DIA. (inch) |            |                  | TOLERANCE OF SHANK DIA. |
|-------------------------------|------------|------------------|-------------------------|
| DIAMETER                      | TOLERANCE  | RADIUS TOLERANCE |                         |
| up to 1/4                     | 0 ~ -.0005 | $\pm .0002$      |                         |
| over 1/4                      | 0 ~ -.0006 | $\pm .0004$      | h6                      |

**CUTTING CONDITION****G8A43 Series**

| MATERIAL   | HARDENED STEELS<br>HEAT RESISTANT STEELS |                 | HARDENED STEELS |                 | HARDENED STEELS |                 | HARDENED STEELS |        | HARDENED STEELS |        |       |       |
|------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|-----------------|--------|-------|-------|
|            | HARDNESS                                 | HRC 30 ~ HRC 40 | HRC 40 ~ HRC 50 | HRC 50 ~ HRC 55 | HRC 55 ~ HRC 60 | HRC 60 ~ HRC 65 | HRC 65 ~ HRC 70 | RPM    | FEED            | RPM    | FEED  |       |
| R1/64×1/32 | 50000                                    | 188.98          | 50000           | 165.35          | 45000           | 149.61          | 40000           | 118.11 | 35000           | 102.36 | 35000 | 90.55 |
| R1/32×1/16 | 49700                                    | 224.41          | 47800           | 188.98          | 40000           | 157.48          | 35000           | 124.02 | 32000           | 110.24 | 28500 | 90.55 |
| R3/64×3/32 | 49700                                    | 224.41          | 47800           | 188.98          | 40000           | 157.48          | 35000           | 124.02 | 32000           | 110.24 | 28500 | 90.55 |
| R1/16×1/8  | 33100                                    | 236.22          | 31800           | 208.66          | 26500           | 157.48          | 23500           | 124.02 | 21000           | 110.24 | 19000 | 90.55 |
| R3/32×3/16 | 18600                                    | 228.35          | 17800           | 192.91          | 15000           | 147.64          | 13500           | 120.08 | 11500           | 100.39 | 10500 | 82.68 |
| R1/8×1/14  | 13900                                    | 190.94          | 13400           | 161.42          | 11000           | 122.05          | 10000           | 98.43  | 8800            | 84.65  | 8000  | 68.90 |
| R5/32×5/16 | 11100                                    | 165.35          | 10700           | 137.80          | 9000            | 106.30          | 8000            | 84.65  | 7000            | 72.83  | 6500  | 61.02 |
| R3/16×3/8  | 9300                                     | 145.67          | 8900            | 122.05          | 7500            | 94.49           | 6600            | 74.80  | 5800            | 64.96  | 5300  | 54.33 |
| R1/4×1/2   | 6950                                     | 116.14          | 6680            | 98.43           | 5600            | 74.80           | 5000            | 61.02  | 4400            | 49.21  | 4000  | 41.34 |

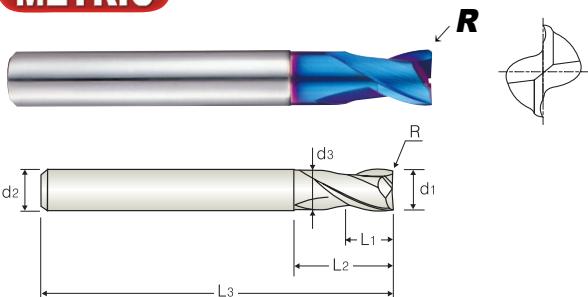


\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.  
FEED = inch/min.

**X5070**

## 2 FLUTE, STUB CUT LENGTH with EXTENDED NECK

**METRIC**

MG

2

30°

R

±0.01

R

±0.015

PLAIN

DATA

Ø0.3~Ø0.6 Ø8~Ø20

P.14,15

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Deep slotting is possible by reduced neck.
- Corner radius against chipping in high speed machining.
- Higher wear-resistance.

◇ U.S.A Stock

**G8A36 Series**

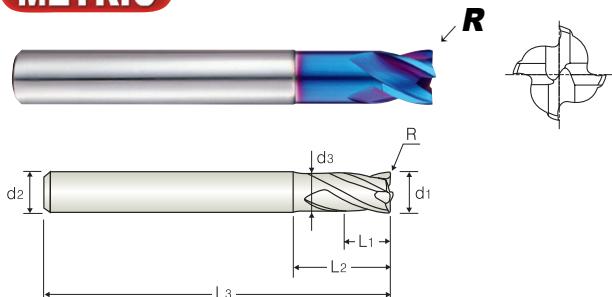
Unit : mm

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|----------|-----------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| G8A36003 | -               | 0.3                          | 3                             | 0.45                         | -                                 | 40                            | -                            |
| G8A36004 | -               | 0.4                          | 3                             | 0.6                          | -                                 | 40                            | -                            |
| G8A36005 | 0.05            | 0.5                          | 3                             | 0.7                          | -                                 | 40                            | -                            |
| G8A36006 | 0.05            | 0.6                          | 3                             | 0.9                          | -                                 | 40                            | -                            |
| G8A36008 | 0.05            | 0.8                          | 3                             | 1.2                          | -                                 | 40                            | -                            |
| G8A36010 | 0.1             | 1                            | 3                             | 1.5                          | -                                 | 40                            | -                            |
| G8A36901 | 0.1             | 1                            | 4                             | 1.5                          | -                                 | 40                            | -                            |
| G8A36015 | 0.1             | 1.5                          | 3                             | 2.2                          | -                                 | 40                            | -                            |
| G8A36020 | 0.1             | 2                            | 3                             | 3                            | 6                                 | 40                            | 1.9                          |
| G8A36902 | 0.1             | 2                            | 4                             | 3                            | 6                                 | 40                            | 1.9                          |
| G8A36025 | 0.1             | 2.5                          | 3                             | 4                            | 6                                 | 40                            | 2.4                          |
| G8A36030 | 0.1             | 3                            | 6                             | 4                            | 7                                 | 45                            | 2.9                          |
| G8A36035 | 0.1             | 3.5                          | 6                             | 5                            | 9                                 | 45                            | 3.3                          |
| G8A36040 | 0.1             | 4                            | 6                             | 5                            | 9                                 | 45                            | 3.8                          |
| G8A36045 | 0.1             | 4.5                          | 6                             | 6                            | 10                                | 45                            | 4.3                          |
| G8A36050 | 0.2             | 5                            | 6                             | 6                            | 11                                | 50                            | 4.8                          |
| G8A36060 | 0.2             | 6                            | 6                             | 7                            | 14                                | 50                            | 5.8                          |
| G8A36080 | 0.2             | 8                            | 8                             | 9                            | 18                                | 60                            | 7.8                          |
| G8A36100 | 0.2             | 10                           | 10                            | 12                           | 25                                | 75                            | 9.7                          |
| G8A36120 | 0.3             | 12                           | 12                            | 15                           | 30                                | 75                            | 11.7                         |
| G8A36160 | 0.3             | 16                           | 16                            | 18                           | 38                                | 90                            | 15.7                         |
| G8A36200 | 0.3             | 20                           | 20                            | 24                           | 45                                | 100                           | 19.7                         |

| TOLERANCE OF MILL DIA.(mm) |            | TOLERANCE OF SHANK DIA. |
|----------------------------|------------|-------------------------|
| DIAMETER                   | TOLERANCE  |                         |
| up to 6                    | 0 ~ -0.012 |                         |
| over 6 ~                   | 0 ~ -0.015 | h6                      |

**X5070**

# 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK

**METRIC**

MG

4

30°

R  
±0.01  
Ø1~Ø6R  
±0.015  
Ø8~Ø20

PLAIN

DATA

P.15

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Deep slotting is possible by reduced neck.
- Corner radius against chipping in high speed machining.
- Higher wear-resistance.

◇ U.S.A Stock

**G8A37 Series**

Unit : mm

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|----------|-----------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| G8A37010 | 0.1             | 1                            | 3                             | 1.5                          | -                                 | 40                            | -                            |
| G8A37015 | 0.1             | 1.5                          | 3                             | 2.2                          | -                                 | 40                            | -                            |
| G8A37020 | 0.1             | 2                            | 3                             | 3                            | 6                                 | 40                            | 1.9                          |
| G8A37025 | 0.1             | 2.5                          | 3                             | 4                            | 6                                 | 40                            | 2.4                          |
| G8A37030 | 0.1             | 3                            | 6                             | 4                            | 7                                 | 45                            | 2.9                          |
| G8A37035 | 0.1             | 3.5                          | 6                             | 5                            | 9                                 | 45                            | 3.3                          |
| G8A37040 | 0.1             | 4                            | 6                             | 5                            | 9                                 | 45                            | 3.8                          |
| G8A37045 | 0.1             | 4.5                          | 6                             | 6                            | 10                                | 45                            | 4.3                          |
| G8A37050 | 0.2             | 5                            | 6                             | 6                            | 11                                | 50                            | 4.8                          |
| G8A37060 | 0.2             | 6                            | 6                             | 7                            | 14                                | 50                            | 5.8                          |
| G8A37080 | 0.2             | 8                            | 8                             | 9                            | 18                                | 60                            | 7.8                          |
| G8A37100 | 0.2             | 10                           | 10                            | 12                           | 25                                | 75                            | 9.7                          |
| G8A37120 | 0.3             | 12                           | 12                            | 15                           | 30                                | 75                            | 11.7                         |
| G8A37160 | 0.3             | 16                           | 16                            | 18                           | 38                                | 90                            | 15.7                         |
| G8A37200 | 0.3             | 20                           | 20                            | 24                           | 45                                | 100                           | 19.7                         |

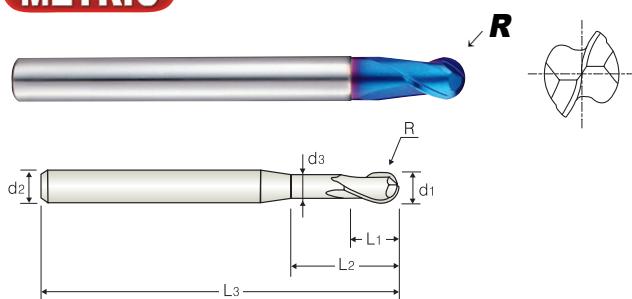
**TOLERANCE OF MILL DIA. (mm)****TOLERANCE OF SHANK DIA.**

| DIAMETER | TOLERANCE  | TOLERANCE OF SHANK DIA.<br>h6 |
|----------|------------|-------------------------------|
| up to 6  | 0 ~ -0.012 |                               |
| over 6 ~ | 0 ~ -0.015 |                               |

**X5070**

# 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

X5070

**METRIC**

P.16

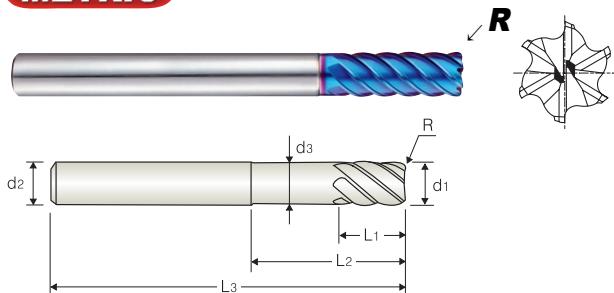
- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Designed for high precision milling operation.
- Higher wear-resistance.

◇ **U.S.A Stock****G8A38 Series**

Unit : mm

| EDP No.  | R    | MILL DIAMETER<br>d <sub>1</sub> | SHANK DIAMETER<br>d <sub>2</sub> | LENGTH OF CUT<br>L <sub>1</sub> | LENGTH BELOW SHANK<br>L <sub>2</sub> | OVERALL LENGTH<br>L <sub>3</sub> | NECK DIAMETER<br>d <sub>3</sub> |
|----------|------|---------------------------------|----------------------------------|---------------------------------|--------------------------------------|----------------------------------|---------------------------------|
| G8A38010 | 0.5  | 1                               | 4                                | 1                               | 2.2                                  | 50                               | 0.95                            |
| G8A38012 | 0.6  | 1.2                             | 4                                | 1.2                             | 2.6                                  | 50                               | 1.1                             |
| G8A38015 | 0.75 | 1.5                             | 4                                | 1.5                             | 3.0                                  | 50                               | 1.4                             |
| G8A38020 | 1.0  | 2                               | 6                                | 2                               | 4.0                                  | 50                               | 1.9                             |
| G8A38030 | 1.5  | 3                               | 6                                | 3                               | 6.0                                  | 60                               | 2.9                             |
| G8A38040 | 2.0  | 4                               | 6                                | 4                               | 8.0                                  | 70                               | 3.9                             |
| G8A38050 | 2.5  | 5                               | 6                                | 5                               | 10.0                                 | 80                               | 4.9                             |
| G8A38060 | 3.0  | 6                               | 6                                | 6                               | 12.0                                 | 90                               | 5.9                             |
| G8A38070 | 3.5  | 7                               | 8                                | 7                               | 14.0                                 | 90                               | 6.9                             |
| G8A38080 | 4.0  | 8                               | 8                                | 8                               | 16.0                                 | 100                              | 7.9                             |
| G8A38090 | 4.5  | 9                               | 10                               | 9                               | 18.0                                 | 100                              | 8.9                             |
| G8A38100 | 5.0  | 10                              | 10                               | 10                              | 20.0                                 | 100                              | 9.9                             |
| G8A38120 | 6.0  | 12                              | 12                               | 12                              | 24.0                                 | 110                              | 11.9                            |
| G8A38140 | 7.0  | 14                              | 14                               | 14                              | 28.0                                 | 110                              | 13.8                            |
| G8A38160 | 8.0  | 16                              | 16                               | 16                              | 32.0                                 | 140                              | 15.8                            |
| G8A38180 | 9.0  | 18                              | 18                               | 18                              | 36.0                                 | 140                              | 17.8                            |
| G8A38200 | 10.0 | 20                              | 20                               | 20                              | 40.0                                 | 160                              | 19.8                            |
| G8A38250 | 12.5 | 25                              | 25                               | 25                              | 50.0                                 | 180                              | 24.8                            |

| TOLERANCE OF MILL DIA. (mm) |            |                  | TOLERANCE<br>OF SHANK DIA. |
|-----------------------------|------------|------------------|----------------------------|
| DIAMETER                    | TOLERANCE  | RADIUS TOLERANCE |                            |
| up to 6                     | 0 ~ -0.012 | $\pm 0.005$      |                            |
| over 6 ~                    | 0 ~ -0.015 | $\pm 0.01$       | h6                         |

**X5070****6 FLUTE, 45° HELIX with CORNER RADIUS****METRIC**

MG

6

45°

R  
±0.01  
Ø6R  
±0.015  
Ø8~Ø20

PLAIN

DATA

P.16

- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Deep slotting is possible by reduced neck.
- Corner radius against chipping in high speed machining.
- Higher wear-resistance.

◇ U.S.A Stock

**G8A39 Series**

Unit : mm

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|----------|-----------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| G8A39060 | 0.5             | 6                            | 6                             | 6                            | 14                                | 50                            | 5.7                          |
| G8A39080 | 0.5             | 8                            | 8                             | 8                            | 24                                | 60                            | 7.65                         |
| G8A39100 | 1.0             | 10                           | 10                            | 10                           | 30                                | 70                            | 9.65                         |
| G8A39120 | 1.0             | 12                           | 12                            | 12                           | 30                                | 75                            | 11.6                         |
| G8A39901 | 0.5             | 6                            | 6                             | 13                           | -                                 | 70                            | -                            |
| G8A39910 | 0.5             | 6                            | 6                             | 26                           | -                                 | 70                            | -                            |
| G8A39902 | 0.5             | 8                            | 8                             | 19                           | -                                 | 90                            | -                            |
| G8A39911 | 0.5             | 8                            | 8                             | 36                           | -                                 | 90                            | -                            |
| G8A39903 | 0.5             | 10                           | 10                            | 22                           | -                                 | 100                           | -                            |
| G8A39904 | 1.0             | 10                           | 10                            | 22                           | -                                 | 100                           | -                            |
| G8A39912 | 1.0             | 10                           | 10                            | 46                           | -                                 | 100                           | -                            |
| G8A39905 | 0.5             | 12                           | 12                            | 26                           | -                                 | 110                           | -                            |
| G8A39906 | 1.0             | 12                           | 12                            | 26                           | -                                 | 110                           | -                            |
| G8A39913 | 1.0             | 12                           | 12                            | 56                           | -                                 | 110                           | -                            |
| G8A39160 | 1.0             | 16                           | 16                            | 32                           | -                                 | 130                           | -                            |
| G8A39907 | 1.5             | 16                           | 16                            | 32                           | -                                 | 130                           | -                            |
| G8A39914 | 1.5             | 16                           | 16                            | 66                           | -                                 | 130                           | -                            |
| G8A39200 | 1.0             | 20                           | 20                            | 38                           | -                                 | 140                           | -                            |
| G8A39908 | 1.5             | 20                           | 20                            | 38                           | -                                 | 140                           | -                            |
| G8A39909 | 2.0             | 20                           | 20                            | 38                           | -                                 | 140                           | -                            |
| G8A39915 | 2.0             | 20                           | 20                            | 76                           | -                                 | 140                           | -                            |

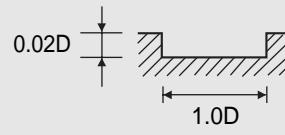
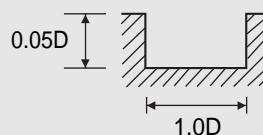
| TOLERANCE OF MILL DIA. (mm) | TOLERANCE OF SHANK DIA. |
|-----------------------------|-------------------------|
| 0<br>- 0.020                | h6                      |

**X5070****2 FLUTE, MINIATURE, SLOTTING**

X5070

**G8A36 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS |       | HARDENED STEELS |       | HARDENED STEELS |       | HARDENED STEELS |      |
|--------------|--|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|------|
| HARDNESS     | HRc 30 ~ HRc 40                          |       | HRc 40 ~ HRc 50 |       | HRc 50 ~ HRc 55 |       | HRc 55 ~ HRc 60 |       | HRc 60 ~ HRc 65 |      |
| DIAMETER(mm) | RPM                                      | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED |
| 0.3          | 50000                                    | 7.48  | 45000           | 5.51  | 40000           | 4.53  | 33000           | 2.76  | 25000           | 1.57 |
| 0.4          | 50000                                    | 9.25  | 45000           | 7.09  | 40000           | 5.51  | 33000           | 3.54  | 25000           | 2.17 |
| 0.5          | 50000                                    | 14.57 | 45000           | 11.02 | 40000           | 8.66  | 33000           | 5.51  | 25000           | 3.35 |
| 0.6          | 50000                                    | 18.50 | 45000           | 14.17 | 40000           | 11.22 | 30000           | 6.30  | 25000           | 4.13 |
| 0.8          | 50000                                    | 23.62 | 40000           | 17.32 | 30000           | 11.61 | 25000           | 7.28  | 19000           | 4.33 |
| 1.0          | 48000                                    | 29.53 | 38000           | 22.44 | 25500           | 14.17 | 20500           | 8.46  | 16000           | 5.31 |
| 1.2          | 42000                                    | 31.10 | 34000           | 25.20 | 22500           | 14.96 | 20000           | 9.84  | 14500           | 5.71 |
| 1.5          | 37000                                    | 31.50 | 30500           | 26.38 | 21000           | 16.14 | 17000           | 9.84  | 13000           | 6.10 |
| 2.0          | 33300                                    | 33.46 | 26000           | 26.77 | 17500           | 16.54 | 14500           | 10.24 | 11000           | 6.30 |



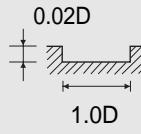
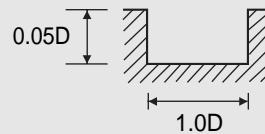
※The FEED, in long &amp; extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

FEED = inch/min.

**X5070****2 FLUTE, STUB CUT LENGTH, SLOTTING****G8A36 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS |       | HARDENED STEELS |       | HARDENED STEELS |       | HARDENED STEELS |      |
|--------------|--|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|------|
| HARDNESS     | HRc 30 ~ HRc 40                          |       | HRc 40 ~ HRc 50 |       | HRc 50 ~ HRc 55 |       | HRc 55 ~ HRc 60 |       | HRc 60 ~ HRc 65 |      |
| DIAMETER(mm) | RPM                                      | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED |
| 1            | 48000                                    | 29.53 | 38000           | 22.44 | 25500           | 14.17 | 20500           | 8.46  | 16000           | 5.31 |
| 2            | 33300                                    | 33.46 | 26000           | 26.77 | 17500           | 16.54 | 14500           | 10.24 | 11000           | 6.30 |
| 3            | 21800                                    | 33.46 | 17300           | 26.77 | 11500           | 16.54 | 9500            | 10.24 | 7500            | 6.30 |
| 4            | 16700                                    | 34.65 | 13200           | 27.56 | 8800            | 17.32 | 7200            | 10.61 | 5600            | 6.69 |
| 5            | 15700                                    | 39.37 | 12500           | 31.69 | 8300            | 19.69 | 6400            | 11.22 | 5100            | 7.09 |
| 6            | 13100                                    | 37.40 | 10350           | 30.31 | 6900            | 18.90 | 5300            | 11.02 | 4200            | 7.09 |
| 8            | 9880                                     | 36.61 | 7800            | 28.35 | 5200            | 17.52 | 4000            | 10.04 | 3200            | 6.50 |
| 10           | 7800                                     | 33.46 | 6150            | 26.77 | 4100            | 16.34 | 3200            | 9.45  | 2550            | 6.10 |
| 12           | 6650                                     | 33.46 | 5250            | 26.77 | 3500            | 16.34 | 2650            | 9.45  | 2100            | 6.10 |
| 16           | 4900                                     | 28.74 | 3900            | 22.83 | 2600            | 14.37 | 2000            | 8.27  | 1600            | 5.31 |
| 20           | 3900                                     | 25.98 | 3100            | 20.67 | 2050            | 13.19 | 1600            | 7.68  | 1300            | 4.92 |



※The FEED, in long &amp; extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

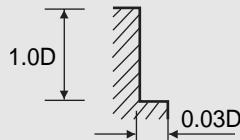
FEED = inch/min.

**X5070****2 FLUTE, STUB CUT LENGTH, SIDE CUTTING**

X5070

**G8A36 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS |      |
|--------------|--|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|------|
| HARDNESS     | HRc 30 ~ HRc 40                          |       | HRc 40 ~ HRc 50 |       | HRc 50 ~ HRc 55 |       | HRc 55 ~ HRc 60 |       | HRc 60 ~ HRc 65 |       | HRc 65 ~ HRc 70 |      |
| DIAMETER(mm) | RPM                                      | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED |
| 1            | 48000                                    | 41.34 | 38000           | 32.28 | 25500           | 20.08 | 20500           | 12.20 | 16000           | 7.48  | 12500           | 4.92 |
| 2            | 33300                                    | 47.24 | 26000           | 38.19 | 17500           | 23.62 | 14500           | 14.57 | 11000           | 9.06  | 9500            | 6.50 |
| 3            | 21800                                    | 47.24 | 17300           | 38.19 | 11500           | 23.62 | 9500            | 14.57 | 7500            | 9.06  | 6400            | 6.50 |
| 4            | 16700                                    | 49.21 | 13200           | 39.37 | 8800            | 24.41 | 7200            | 15.16 | 5600            | 9.45  | 4750            | 6.69 |
| 5            | 15700                                    | 57.09 | 12500           | 45.28 | 8300            | 27.95 | 6400            | 16.14 | 5100            | 10.24 | 4450            | 7.48 |
| 6            | 13100                                    | 53.15 | 10350           | 43.31 | 6900            | 27.17 | 5300            | 15.75 | 4200            | 10.04 | 3700            | 7.28 |
| 8            | 9880                                     | 51.97 | 7800            | 40.55 | 5200            | 25.00 | 4000            | 14.37 | 3200            | 9.25  | 2800            | 6.69 |
| 10           | 7800                                     | 47.24 | 6150            | 38.19 | 4100            | 23.23 | 3200            | 13.39 | 2550            | 8.66  | 2200            | 6.30 |
| 12           | 6650                                     | 47.24 | 5250            | 38.19 | 3500            | 23.23 | 2650            | 13.39 | 2100            | 8.66  | 1860            | 6.30 |
| 16           | 4900                                     | 41.34 | 3900            | 33.07 | 2600            | 20.47 | 2000            | 11.81 | 1600            | 7.48  | 1400            | 5.51 |
| 20           | 3900                                     | 37.40 | 3100            | 29.53 | 2050            | 18.70 | 1600            | 10.83 | 1300            | 6.89  | 1100            | 4.92 |



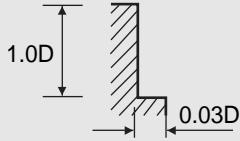
※The FEED, in long &amp; extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

FEED = inch/min.

**X5070****4 FLUTE, STUB CUT LENGTH, SIDE CUTTING****G8A37 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS |       |
|--------------|--|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|
| HARDNESS     | HRc 30 ~ HRc 40                          |       | HRc 40 ~ HRc 50 |       | HRc 50 ~ HRc 55 |       | HRc 55 ~ HRc 60 |       | HRc 60 ~ HRc 65 |       | HRc 65 ~ HRc 70 |       |
| DIAMETER(mm) | RPM                                      | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  | RPM             | FEED  |
| 1            | 48000                                    | 58.27 | 38000           | 41.34 | 25500           | 27.95 | 20500           | 16.93 | 16000           | 10.63 | 12500           | 6.89  |
| 2            | 33300                                    | 68.90 | 26000           | 49.21 | 17500           | 33.07 | 14500           | 20.47 | 11000           | 12.60 | 9500            | 9.06  |
| 3            | 21800                                    | 68.90 | 17300           | 49.21 | 11500           | 33.07 | 9500            | 20.47 | 7500            | 12.60 | 6400            | 9.06  |
| 4            | 16700                                    | 70.87 | 13200           | 51.18 | 8800            | 34.65 | 7200            | 21.26 | 5600            | 13.19 | 4750            | 9.45  |
| 5            | 15700                                    | 78.74 | 12500           | 59.06 | 8300            | 39.37 | 6400            | 22.83 | 5100            | 14.57 | 4450            | 10.63 |
| 6            | 13100                                    | 76.77 | 10350           | 55.12 | 6900            | 37.40 | 5300            | 22.05 | 4200            | 13.78 | 3700            | 10.24 |
| 8            | 9880                                     | 74.02 | 7800            | 53.15 | 5200            | 35.43 | 4000            | 22.47 | 3200            | 12.99 | 2800            | 9.45  |
| 10           | 7800                                     | 68.90 | 6150            | 49.61 | 4100            | 33.07 | 3200            | 18.90 | 2550            | 12.20 | 2200            | 8.66  |
| 12           | 6650                                     | 68.90 | 5250            | 49.61 | 3500            | 33.07 | 2650            | 18.90 | 2100            | 11.81 | 1860            | 8.66  |
| 16           | 4900                                     | 59.06 | 3900            | 43.31 | 2600            | 28.74 | 2000            | 16.54 | 1600            | 10.63 | 1400            | 7.87  |
| 20           | 3900                                     | 51.18 | 3100            | 38.19 | 2050            | 25.59 | 1600            | 14.96 | 1300            | 9.84  | 1100            | 7.09  |



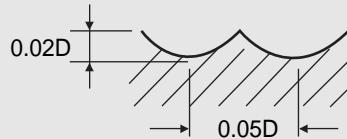
※The FEED, in long &amp; extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

FEED = inch/min.

**X5070****2 FLUTE, STUB CUT, BALL NOSE****G8A38 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |        | HARDENED STEELS |       |
|--------------|--|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|-------|
| HARDNESS     | HRc 30 ~ HRc 40                          |        | HRc 40 ~ HRc 50 |        | HRc 50 ~ HRc 55 |        | HRc 55 ~ HRc 60 |        | HRc 60 ~ HRc 65 |        | HRc 65 ~ HRc 70 |       |
| DIAMETER(mm) | RPM                                      | FEED   | RPM             | FEED   | RPM             | FEED   | RPM             | FEED   | RPM             | FEED   | RPM             | FEED  |
| 1            | 50000                                    | 188.98 | 50000           | 165.35 | 45000           | 149.61 | 40000           | 118.11 | 35000           | 102.36 | 35000           | 90.55 |
| 2            | 49700                                    | 224.41 | 47800           | 188.98 | 40000           | 157.48 | 35000           | 124.02 | 32000           | 110.24 | 28500           | 90.55 |
| 3            | 33100                                    | 236.22 | 31800           | 208.66 | 26500           | 157.48 | 23500           | 124.02 | 21000           | 110.24 | 19000           | 90.55 |
| 4            | 24900                                    | 236.22 | 23900           | 208.66 | 20000           | 157.48 | 17500           | 124.02 | 16000           | 110.24 | 14500           | 90.55 |
| 6            | 18600                                    | 228.35 | 17800           | 192.91 | 15000           | 147.64 | 13500           | 120.08 | 11500           | 100.39 | 10500           | 82.68 |
| 8            | 13900                                    | 190.94 | 13400           | 161.42 | 11000           | 122.05 | 10000           | 98.43  | 8800            | 84.65  | 8000            | 68.90 |
| 10           | 11100                                    | 165.35 | 10700           | 137.80 | 9000            | 106.30 | 8000            | 84.65  | 7000            | 72.83  | 6500            | 61.02 |
| 12           | 9300                                     | 145.67 | 8900            | 122.05 | 7500            | 94.49  | 6600            | 74.80  | 5800            | 64.96  | 5300            | 54.33 |
| 16           | 6950                                     | 116.14 | 6680            | 98.43  | 5600            | 74.80  | 5000            | 61.02  | 4400            | 49.21  | 4000            | 41.34 |
| 20           | 5570                                     | 104.33 | 5350            | 86.61  | 4500            | 66.93  | 4000            | 53.15  | 3500            | 39.37  | 3200            | 33.46 |
| 25           | 4450                                     | 92.52  | 4300            | 76.77  | 3600            | 59.06  | 3200            | 47.24  | 2800            | 31.50  | 2550            | 25.98 |



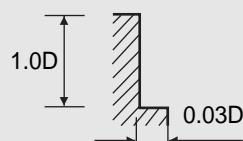
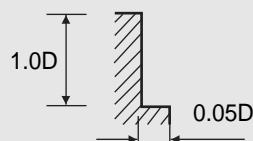
\*The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

FEED = inch/min.

**X5070****6 FLUTE, 45° HELIX with CORNER RADIUS****G8A39 Series**

| MATERIAL     | HARDENED STEELS<br>HEAT RESISTANT STEELS |        | HARDENED STEELS |        | HARDENED STEELS |        | HARDENED STEELS |        | HARDENED STEELS |       | HARDENED STEELS |       |
|--------------|--|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|-------|-----------------|-------|
| HARDNESS     | HRc 30 ~ HRc 40                          |        | HRc 40 ~ HRc 50 |        | HRc 50 ~ HRc 55 |        | HRc 55 ~ HRc 60 |        | HRc 60 ~ HRc 65 |       | HRc 65 ~ HRc 70 |       |
| DIAMETER(mm) | RPM                                      | FEED   | RPM             | FEED   | RPM             | FEED   | RPM             | FEED   | RPM             | FEED  | RPM             | FEED  |
| 6            | 24800                                    | 210.63 | 23500           | 192.91 | 16000           | 192.91 | 13500           | 129.92 | 10500           | 82.68 | 8000            | 57.09 |
| 8            | 20000                                    | 216.54 | 19000           | 196.85 | 12000           | 181.10 | 10000           | 122.05 | 8000            | 78.74 | 6000            | 55.12 |
| 10           | 16000                                    | 192.91 | 15500           | 177.17 | 9500            | 161.42 | 8000            | 114.17 | 6400            | 70.87 | 4800            | 51.18 |
| 12           | 13000                                    | 177.17 | 12500           | 161.42 | 8000            | 149.61 | 6600            | 98.43  | 5300            | 62.99 | 4000            | 45.28 |
| 16           | 10000                                    | 157.48 | 9700            | 145.67 | 6000            | 133.86 | 5000            | 90.55  | 4000            | 49.21 | 3000            | 34.25 |
| 20           | 8000                                     | 131.89 | 7800            | 133.86 | 4800            | 125.98 | 4000            | 82.68  | 3200            | 40.16 | 2400            | 27.17 |



\*The FEED, in long & extra long types, should be reduced by about 50%

RPM = REVOLUTION PER MIN.

FEED = inch/min.

# X-POWER®

## ULTRA MICRO GRAIN CARBIDE END MILLS

- *High Speed Cutting in Dry Conditions*
- *Hardened Mold, Die, Alloy Steels  
and Most Alloys up to HRc70*





# X-POWER CARBIDE END MILLS SELECTION GUIDE

**INCH**

| EDP No.        | APPEARANCE | SPECIFICATION                                   | STOCK | PAGE |
|----------------|------------|---|-------|------|
| EM154<br>EM206 |            | 2 FLUTE, REGULAR & LONG LENGTH                  | ★     | 23   |
| EM959          |            | 2 FLUTE, MINIATURE                              | ★     | 23   |
| EM153<br>EM207 |            | 4 FLUTE, REGULAR & LONG LENGTH                  | ★     | 24   |
| EM636          |            | 2 FLUTE, STUB LENGTH, CORNER RADIUS             | ★     | 25   |
| EM639          |            | 4 FLUTE, STUB LENGTH, CORNER RADIUS             | ★     | 25   |
| EM637          |            | 2 FLUTE, REGULAR LENGTH, CORNER RADIUS          | ★     | 26   |
| EM649          |            | 4 FLUTE, REGULAR LENGTH, CORNER RADIUS          | ★     | 26   |
| EM211          |            | 2 FLUTE, LONG LENGTH, CORNER RADIUS             | ★     | 27   |
| EM212          |            | 4 FLUTE, LONG LENGTH, CORNER RADIUS             | ★     | 27   |
| EM102          |            | 4 FLUTE, 45°HELIX, LONG REACH                   | ★     | 28   |
| EM103          |            | 4 FLUTE, 45°HELIX, LONG REACH, CORNER RADIUS    | ★     | 28   |
| EM965          |            | 4 FLUTE, 55°HELIX, STUB LENGTH, CORNER RADIUS   | ★     | 29   |
| EM208          |            | 6&8 FLUTE, 45°HELIX, LONG LENGTH                | ★     | 30   |
| EM208<br>EM999 |            | 6&8 FLUTE, 45°HELIX, EXTRA LONG LENGTH          | ★     | 30   |
| EM668          |            | 6&8 FLUTE, 45°HELIX, LONG LENGTH, CORNER RADIUS | ★     | 30   |
| EM209          |            | 2 FLUTE, LONG LENGTH, BALL NOSE                 | ★     | 31   |
| EM210          |            | 4 FLUTE, LONG LENGTH, BALL NOSE                 | ★     | 31   |

★:U.S.A Stock ○:Call for Availability



# X-POWER CARBIDE END MILLS SELECTION GUIDE

INCH ➤

| EDP No. | APPEARANCE | SPECIFICATION  | STOCK | PAGE |
|---------|------------|--|-------|------|
| EM961   |            | 2 FLUTE, MEDIUM LENGTH, BALL NOSE                                      | ★     | 32   |
| EM962   |            | 2 FLUTE, LONG REACH, BALL NOSE   | ★     | 32   |
| EM960   |            | 2 FLUTE, MINIATURE, BALL NOSE  | ★     | 33   |
| EM109   |            | 2 FLUTE, 15° HELIX, STUB CUT LENGTH,<br>BALL NOSE for OVER HRc55       | ★     | 33   |
| EM963   |            | 2 FLUTE, BALL NOSE with TAPER NECK                                     | ★     | 34   |
| EM979   |            | 2 FLUTE, BALL NOSE with PENCIL NECK                                    | ★     | 34   |
| EM084   |            | 2 FLUTE, LONG LENGTH, BALL NOSE<br>(MMC-ECONOMY TYPE)                  | ★     | 36   |
| EM093   |            | 4 FLUTE, LONG LENGTH, BALL NOSE<br>(MMC-ECONOMY TYPE)                  | ★     | 36   |
| EM096   |            | 2 FLUTE, LONG LENGTH, BALL NOSE<br>(MMC-SPHERE TYPE)                   | ★     | 37   |
| EM097   |            | 4 FLUTE, LONG LENGTH, BALL NOSE<br>(MMC-SPHERE TYPE)                   | ★     | 37   |
| EM666   |            | MULTI FLUTE, 20° HELIX, STUB LENGTH,<br>FINE PITCH ROUGHING            | ★     | 38   |
| EM156   |            | MULTI FLUTE, 20° HELIX, LONG LENGTH,<br>FINE PITCH ROUGHING            | ★     | 38   |
| EM662   |            | MULTI FLUTE, 20° HELIX, LONG LENGTH,<br>FINE PITCH ROUGHING, BALL NOSE | ★     | 38   |
| EM966   |            | 2 FLUTE for RIB PROCESSING   | ★     | 39   |
| EM967   |            | 2 FLUTE, BALL NOSE for RIB PROCESSING                                  | ★     | 40   |

★:U.S.A Stock ○:Call for Availability



# X-POWER CARBIDE END MILLS SELECTION GUIDE

## METRIC ➤

| EDP No.        | APPEARANCE | SPECIFICATION                                      | STOCK | PAGE |
|----------------|------------|--|-------|------|
| EM810<br>EM816 |            | 2 FLUTE, SHORT & LONG LENGTH                       | ○     | 41   |
| EM811<br>EM817 |            | 4 FLUTE, SHORT & LONG LENGTH                       | ○     | 42   |
| EM895          |            | 3 FLUTE, 38° HELIX, SHORT LENGTH                   | ○     | 43   |
| EM810          |            | 2 FLUTE, MINIATURE                                 | ○     | 43   |
| EM818          |            | 2 FLUTE, LONG LENGTH, CORNER RADIUS                | ○     | 44   |
| EM819          |            | 4 FLUTE, LONG LENGTH, CORNER RADIUS                | ○     | 44   |
| EM905          |            | 4 FLUTE, 45° HELIX, SHORT LENGTH, CORNER RADIUS    | ○     | 45   |
| EM839          |            | 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS            | ○     | 45   |
| EM812          |            | 6&8 FLUTE, 45° HELIX, LONG LENGTH                  | ○     | 46   |
| EM834          |            | 6&8 FLUTE, 45° HELIX, EXTRA LONG LENGTH            | ○     | 46   |
| EM835          |            | 6 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS     | ○     | 47   |
| EM897          |            | 6 FLUTE, 45° HELIX, STUB CUT LENGTH, CORNER RADIUS | ○     | 47   |
| EM876          |            | 2 FLUTE, SHORT LENGTH, BALL NOSE                   | ○     | 48   |
| EM813<br>EM823 |            | 2 FLUTE, LONG LENGTH, BALL NOSE                    | ★     | 49   |
| EM815<br>EM825 |            | 4 FLUTE, LONG LENGTH, BALL NOSE                    | ★     | 49   |
| EM899          |            | 2 FLUTE, MEDIUM LENGTH, BALL NOSE                  | ○     | 50   |
| EM838          |            | 2 FLUTE, LONG REACH, BALL NOSE                     | ○     | 51   |

★:U.S.A Stock ○:Call for Availability



# X-POWER CARBIDE END MILLS SELECTION GUIDE

## METRIC ➤

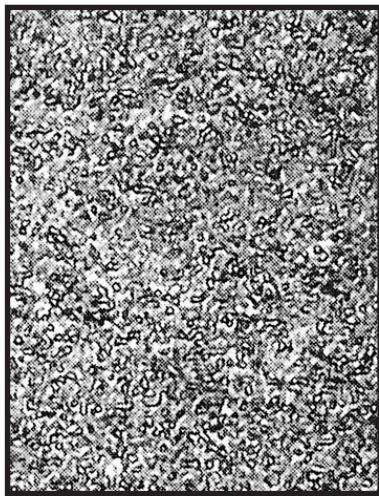
| EDP No. | APPEARANCE | SPECIFICATION   | STOCK | PAGE |
|---------|------------|---|-------|------|
| EM865   |            | 2 FLUTE, MINIATURE, BALL NOSE                                     | ★     | 52   |
| EM868   |            | 2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55     | ○     | 53   |
| EM902   |            | 2 FLUTE, BALL NOSE with TAPER NECK                                | ○     | 54   |
| EM669   |            | 2 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)                | ○     | 56   |
| EM673   |            | 4 FLUTE, LONG LENGTH, BALL NOSE (MMC-ECONOMY TYPE)                | ○     | 56   |
| EM863   |            | 2 FLUTE, LONG LENGTH, BALL NOSE (MMC- SPHERE TYPE)                | ○     | 57   |
| EM864   |            | 4 FLUTE, LONG LENGTH, BALL NOSE (MMC- SPHERE TYPE)                | ○     | 57   |
| EM832   |            | MULTI FLUTE, 20° HELIX, SHORT LENGTH, FINE PITCH ROUGHING         | ○     | 58   |
| EM814   |            | MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING          | ○     | 58   |
| EM833   |            | 3&4 FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE | ○     | 59   |
| EM837   |            | 2 FLUTE, TAPER  | ○     | 59   |
| EM883   |            | 2 FLUTE for RIB PROCESSING  | ○     | 60   |
| EM886   |            | 2 FLUTE, BALL NOSE for RIB PROCESSING                             | ○     | 61   |

SPEED & FEED DATA

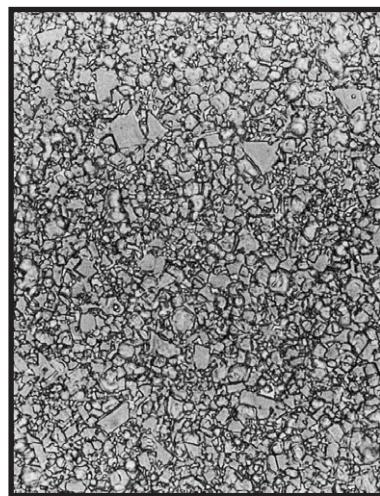
62 ~ 82

★:U.S.A Stock ○:Call for Availability

- YG-1 X-POWER END MILLS ARE MADE FROM THE FINEST MICROGRAIN CARBIDE.  
THE CARBIDE IS SINTERED USING THE HOT ISOSTATIC PROCESS.
- THIS PROCESS ALLOWS PRESSING OF THE CARBIDE AT HIGH TEMPERATURES THEREBY ELIMINATING POROSITY AND INCREASING TOUGHNESS.



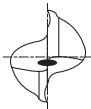
X-POWER Carbide Grain Structure  
Carbide Grain size =  $0 < 0.5 \mu\text{m}$  Consistent



General Carbide Grain Structure

## **X-POWER USES AND ADVANTAGES**

- \* THE HARD PVD COATING ALLOWS EFFECTIVE MACHINING OF HARD MOLD, DIE, AND TOOL STEELS UP TO 70HRc IN DRY OR WET CONDITION.
- \* THE COATING QUALITIES OF HIGH HARDNESS, HIGH THERMAL AND CHEMICAL STABILITY, PROTECTS THE TOOLS FROM PREMATURE WEAR, EVEN UNDER EXTREME CONDITIONS.
- \* SUPERIOR WORKPIECE FINISHES.
- \* GEOMETRIES DESIGNED FOR GOOD CHIP EJECTION ON HARD STEEL.

**X-POWER****2 FLUTE, REGULAR & LONG LENGTH**

P.62

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ U.S.A Stock

**EM154 Series****REGULAR LENGTH**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93074   | 1/16          | 1/8            | 3/16          | 1-1/2          |
| 93075   | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 93076   | 3/16          | 3/16           | 5/8           | 2              |
| 93077   | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 93078   | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 93079   | 3/8           | 3/8            | 1             | 2-1/2          |
| 93080   | 1/2           | 1/2            | 1             | 3              |
| 93081   | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 93082   | 3/4           | 3/4            | 1-1/2         | 4              |
| 93083   | 1             | 1              | 1-1/2         | 4              |

| TOLERANCE OF MILL DIA.(mm) | TOLERANCE OF SHANK DIA. |
|----------------------------|-------------------------|
| 0                          | 0                       |
| -.0012                     | -.0003                  |

**EM206 Series****LONG LENGTH**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93084   | 1/8           | 1/8            | 3/4           | 2-1/4          |
| 93085   | 3/16          | 3/16           | 3/4           | 2-1/2          |
| 93086   | 1/4           | 1/4            | 1-1/8         | 3              |
| 93087   | 5/16          | 5/16           | 1-1/8         | 3              |
| 93088   | 3/8           | 3/8            | 1-1/8         | 3              |
| 93089   | 1/2           | 1/2            | 2             | 4              |
| 93090   | 5/8           | 5/8            | 2-1/4         | 5              |
| 93091   | 3/4           | 3/4            | 2-1/4         | 5              |
| 93092   | 1             | 1              | 2-1/4         | 5              |

**X-POWER****2 FLUTE, MINIATURE**

P.64

- High precision milling in medical, optical, electronics and aero space industries.
- Excellent performance on high hardened steel(HRC70).

◇ U.S.A Stock

**EM959 Series**

Unit : inch

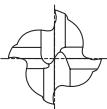
| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93495   | .016          | 1/8            | .031          | 1-1/2          |
| 93496   | .020          | 1/8            | .040          | 1-1/2          |
| 93497   | .024          | 1/8            | .047          | 1-1/2          |
| 93498   | .028          | 1/8            | .055          | 1-1/2          |
| 93499   | .031          | 1/8            | .063          | 1-1/2          |
| 93500   | .035          | 1/8            | .080          | 1-1/2          |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| ±.0005                 | 0<br>-.0003             |

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93501   | .040          | 1/8            | .100          | 1-1/2          |
| 93502   | .043          | 1/8            | .100          | 1-1/2          |
| 93503   | .047          | 1/8            | .157          | 1-1/2          |
| 93504   | .052          | 1/8            | .157          | 1-1/2          |
| 93505   | .055          | 1/8            | .157          | 1-1/2          |
| 93506   | .062          | 1/8            | .157          | 1-1/2          |



# X-POWER 4 FLUTE, REGULAR & LONG LENGTH



P.63

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

◇ U.S.A Stock

X-POWER

## EM153 Series

## ■ REGULAR LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93093   | 1/16          | 1/8            | 3/16          | 1-1/2          |
| 93094   | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 93095   | 3/16          | 3/16           | 5/8           | 2              |
| 93096   | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 93097   | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 93098   | 3/8           | 3/8            | 1             | 2-1/2          |
| 93594   | 7/16          | 7/16           | 1             | 2-3/4          |
| 93099   | 1/2           | 1/2            | 1             | 3              |
| 93100   | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 93101   | 3/4           | 3/4            | 1-1/2         | 4              |
| 93102   | 1             | 1              | 1-1/2         | 4              |

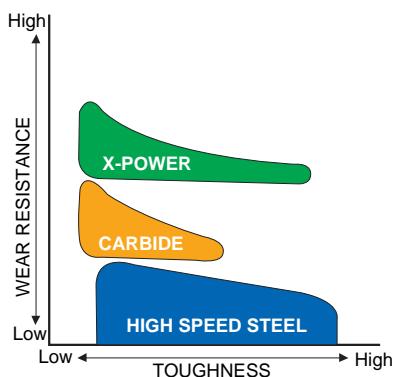
## EM207 Series

## ■ LONG LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93103   | 1/8           | 1/8            | 3/4           | 2-1/4          |
| 93104   | 3/16          | 3/16           | 3/4           | 2-1/2          |
| 93105   | 1/4           | 1/4            | 1-1/8         | 3              |
| 93106   | 5/16          | 5/16           | 1-1/8         | 3              |
| 93107   | 3/8           | 3/8            | 1-1/8         | 3              |
| 93108   | 1/2           | 1/2            | 2             | 4              |
| 93109   | 5/8           | 5/8            | 2-1/4         | 5              |
| 93110   | 3/4           | 3/4            | 2-1/4         | 5              |
| 93111   | 1             | 1              | 2-1/4         | 5              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |



X-POWER

## 2&amp;4 FLUTE, STUB LENGTH, CORNER RADIUS



P.64,65

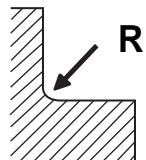
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ U.S.A Stock

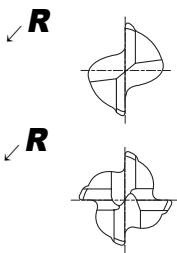
## EM636, EM639 Series

Unit : inch

| EDP No.<br>2 FLUTE<br>EM636 | EDP No.<br>4 FLUTE<br>EM639 | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-----------------------------|-----------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 93172                       | 93216                       | R.008                 | 1/16             | 1/4               | 1/8              | 2-1/4             |
| 93173                       | 93217                       | R.010                 | 1/8              | 1/4               | 1/4              | 2-1/4             |
| 93174                       | 93218                       | R.020                 | 1/8              | 1/4               | 1/4              | 2-1/4             |
| 93175                       | —                           | R.030                 | 1/8              | 1/4               | 1/4              | 2-1/4             |
| 93176                       | 93220                       | R.010                 | 3/16             | 1/4               | 3/8              | 2-1/2             |
| 93177                       | 93221                       | R.020                 | 3/16             | 1/4               | 3/8              | 2-1/2             |
| 93178                       | 93222                       | R.030                 | 3/16             | 1/4               | 3/8              | 2-1/2             |
| 93179                       | 93223                       | R.010                 | 1/4              | 1/4               | 1/2              | 3                 |
| 93180                       | 93224                       | R.020                 | 1/4              | 1/4               | 1/2              | 3                 |
| 93181                       | 93225                       | R.030                 | 1/4              | 1/4               | 1/2              | 3                 |
| 93182                       | 93226                       | R.020                 | 5/16             | 5/16              | 1/2              | 3                 |
| 93183                       | 93227                       | R.030                 | 5/16             | 5/16              | 1/2              | 3                 |
| 93184                       | 93228                       | R.060                 | 5/16             | 5/16              | 1/2              | 3                 |
| 93185                       | 93229                       | R.090                 | 5/16             | 5/16              | 1/2              | 3                 |
| 93186                       | 93230                       | R.020                 | 3/8              | 3/8               | 5/8              | 3                 |
| 93187                       | 93231                       | R.030                 | 3/8              | 3/8               | 5/8              | 3                 |
| 93188                       | 93232                       | R.060                 | 3/8              | 3/8               | 5/8              | 3                 |
| 93189                       | 93233                       | R.090                 | 3/8              | 3/8               | 5/8              | 3                 |
| 93190                       | 93234                       | R.020                 | 1/2              | 1/2               | 5/8              | 4                 |
| 93191                       | 93235                       | R.030                 | 1/2              | 1/2               | 5/8              | 4                 |
| 93192                       | 93236                       | R.060                 | 1/2              | 1/2               | 5/8              | 4                 |
| 93193                       | 93237                       | R.090                 | 1/2              | 1/2               | 5/8              | 4                 |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**X-POWER****2&4 FLUTE, REGULAR LENGTH, CORNER RADIUS**

P.64,65

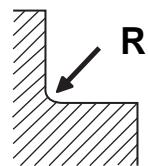
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ U.S.A Stock

**EM637, EM649 Series**

Unit : inch

| EDP No.<br>2 FLUTE<br>EM637 | EDP No.<br>4 FLUTE<br>EM649 | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-----------------------------|-----------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 93194                       | 93238                       | R.008                 | 1/16             | 1/4               | 3/16             | 2-1/4             |
| 93195                       | 93239                       | R.010                 | 1/8              | 1/4               | 1/2              | 2-1/4             |
| 93196                       | 93240                       | R.020                 | 1/8              | 1/4               | 1/2              | 2-1/4             |
| 93197                       | —                           | R.030                 | 1/8              | 1/4               | 1/2              | 2-1/4             |
| 93198                       | 93242                       | R.010                 | 3/16             | 1/4               | 5/8              | 2-1/2             |
| 93199                       | 93243                       | R.020                 | 3/16             | 1/4               | 5/8              | 2-1/2             |
| 93200                       | 93244                       | R.030                 | 3/16             | 1/4               | 5/8              | 2-1/2             |
| 93201                       | 93245                       | R.010                 | 1/4              | 1/4               | 3/4              | 3                 |
| 93202                       | 93246                       | R.020                 | 1/4              | 1/4               | 3/4              | 3                 |
| 93203                       | 93247                       | R.030                 | 1/4              | 1/4               | 3/4              | 3                 |
| 93204                       | 93248                       | R.020                 | 5/16             | 5/16              | 13/16            | 3                 |
| 93205                       | 93249                       | R.030                 | 5/16             | 5/16              | 13/16            | 3                 |
| 93206                       | 93250                       | R.060                 | 5/16             | 5/16              | 13/16            | 3                 |
| 93207                       | 93251                       | R.090                 | 5/16             | 5/16              | 13/16            | 3                 |
| 93208                       | 93252                       | R.020                 | 3/8              | 3/8               | 1                | 3                 |
| 93209                       | 93253                       | R.030                 | 3/8              | 3/8               | 1                | 3                 |
| 93210                       | 93254                       | R.060                 | 3/8              | 3/8               | 1                | 3                 |
| 93211                       | 93255                       | R.090                 | 3/8              | 3/8               | 1                | 3                 |
| 93600                       | 93595                       | R.020                 | 7/16             | 7/16              | 1                | 4                 |
| 93601                       | 93597                       | R.030                 | 7/16             | 7/16              | 1                | 4                 |
| 93602                       | 93598                       | R.060                 | 7/16             | 7/16              | 1                | 4                 |
| 93603                       | 93599                       | R.090                 | 7/16             | 7/16              | 1                | 4                 |
| 93212                       | 93256                       | R.020                 | 1/2              | 1/2               | 1                | 4                 |
| 93213                       | 93257                       | R.030                 | 1/2              | 1/2               | 1                | 4                 |
| 93214                       | 93258                       | R.060                 | 1/2              | 1/2               | 1                | 4                 |
| 93215                       | 93259                       | R.090                 | 1/2              | 1/2               | 1                | 4                 |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



# X-POWER 2&4 FLUTE, LONG LENGTH, CORNER RADIUS



P.64,65

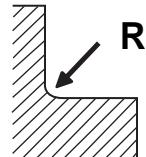
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ U.S.A Stock

## EM211, EM212 Series

Unit : inch

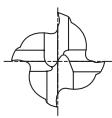
| EDP No.<br>2 FLUTE<br>EM211 | EDP No.<br>4 FLUTE<br>EM212 | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-----------------------------|-----------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 93143                       | 93157                       | R.020                 | 1/4              | 1/4               | 1-1/8            | 3                 |
| 93144                       | 93158                       | R.030                 | 1/4              | 1/4               | 1-1/8            | 3                 |
| 93145                       | 93159                       | R.020                 | 5/16             | 5/16              | 1-1/8            | 3                 |
| 93146                       | 93160                       | R.030                 | 5/16             | 5/16              | 1-1/8            | 3                 |
| 93147                       | 93161                       | R.060                 | 5/16             | 5/16              | 1-1/8            | 3                 |
| 93148                       | 93162                       | R.090                 | 5/16             | 5/16              | 1-1/8            | 3                 |
| 93149                       | 93163                       | R.020                 | 3/8              | 3/8               | 1-1/8            | 3                 |
| 93150                       | 93164                       | R.030                 | 3/8              | 3/8               | 1-1/8            | 3                 |
| 93151                       | 93165                       | R.060                 | 3/8              | 3/8               | 1-1/8            | 3                 |
| 93152                       | 93166                       | R.090                 | 3/8              | 3/8               | 1-1/8            | 3                 |
| 93153                       | 93167                       | R.020                 | 1/2              | 1/2               | 2                | 4                 |
| 93154                       | 93168                       | R.030                 | 1/2              | 1/2               | 2                | 4                 |
| 93155                       | 93169                       | R.060                 | 1/2              | 1/2               | 2                | 4                 |
| 93156                       | 93170                       | R.090                 | 1/2              | 1/2               | 2                | 4                 |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



# 4 FLUTE, 45° HELIX, LONG REACH



P.65

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

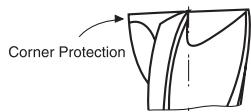
◇ U.S.A Stock

## EM102 Series

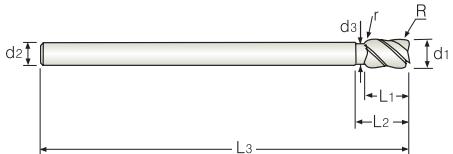
Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 93395   | 3/8           | 5/16           | 5/8           | 5              |
| 93396   | 1/2           | 3/8            | 3/4           | 6              |
| 93397   | 5/8           | 1/2            | 7/8           | 6-1/2          |
| 93398   | 3/4           | 5/8            | 1             | 7              |
| 93399   | 7/8           | 3/4            | 1-1/4         | 8              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |



# 4 FLUTE, 45° HELIX, LONG REACH, CORNER RADIUS



P.66

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ U.S.A Stock

## EM103 Series

Unit : inch

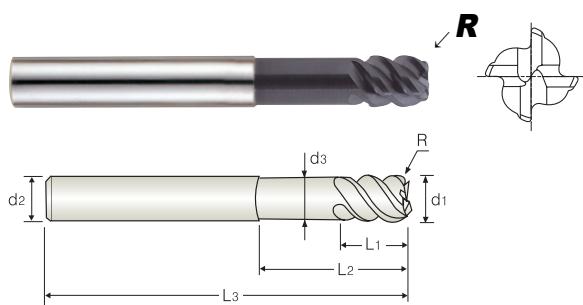
| EDP No. | CORNER RADIUS R | MILL DIAMETER d1 | SHANK DIAMETER d2 | LENGTH OF CUT L1 | LENGTH BELOW SHANK L2 | OVERALL LENGTH L3 | NECK DIAMETER d3 |
|---------|-----------------|------------------|-------------------|------------------|-----------------------|-------------------|------------------|
| 93400   | R.020           | 3/8              | 5/16              | 5/8              | .750                  | 5                 | .293             |
| 93405   | R.040           | 3/8              | 5/16              | 5/8              | .750                  | 5                 | .293             |
| 93401   | R.020           | 1/2              | 3/8               | 3/4              | .875                  | 6                 | .355             |
| 93406   | R.040           | 1/2              | 3/8               | 3/4              | .875                  | 6                 | .355             |
| 93402   | R.020           | 5/8              | 1/2               | 7/8              | 1.000                 | 6-1/2             | .480             |
| 93407   | R.040           | 5/8              | 1/2               | 7/8              | 1.000                 | 6-1/2             | .480             |
| 93403   | R.020           | 3/4              | 5/8               | 1                | 1.125                 | 7                 | .605             |
| 93408   | R.040           | 3/4              | 5/8               | 1                | 1.125                 | 7                 | .605             |
| 93404   | R.020           | 7/8              | 3/4               | 1-1/4            | 1.375                 | 8                 | .730             |
| 93409   | R.040           | 7/8              | 3/4               | 1-1/4            | 1.375                 | 8                 | .730             |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |



**X-POWER**

# 4 FLUTE, 55° HELIX, STUB LENGTH, CORNER RADIUS



P.67,68

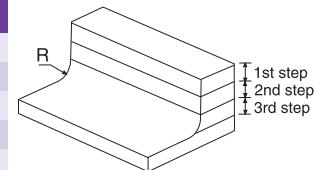
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Corner radius and corner protection against chipping.

◇ **U.S.A Stock**

## EM965 Series

Unit : inch

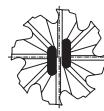
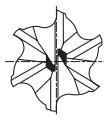
| EDP No. | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|---------|-----------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| 93544   | R.063           | 1/4                          | 1/4                           | 5/16                         | 7/8                               | 2-1/4                         | .230                         |
| 93545   | R.078           | 5/16                         | 5/16                          | 3/8                          | 1                                 | 2-1/2                         | .289                         |
| 93546   | R.094           | 3/8                          | 3/8                           | 7/16                         | 1-1/4                             | 3                             | .344                         |
| 93596   | R.109           | 7/16                         | 7/16                          | 1/2                          | 1-1/2                             | 3-1/4                         | .395                         |
| 93547   | R.125           | 1/2                          | 1/2                           | 1/2                          | 1-1/2                             | 3-1/4                         | .461                         |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |

**X-POWER**

## 6&8 FLUTE, 45°HELIX, LONG & EXTRA LONG LENGTH



P.69,70

- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.
- Corner Protection against chipping.

◇ U.S.A Stock

**EM208 Series**

■ LONG LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 93119   | 1/4           | 1/4            | 1/2           | 2-1/4          | 6            |
| 93120   | 5/16          | 5/16           | 3/4           | 2-1/2          | 6            |
| 93121   | 3/8           | 3/8            | 7/8           | 2-7/8          | 6            |
| 93122   | 1/2           | 1/2            | 1             | 3-1/4          | 6            |
| 93123   | 5/8           | 5/8            | 1-1/4         | 3-5/8          | 6            |
| 93124   | 3/4           | 3/4            | 1-1/2         | 4-1/8          | 8            |
| 93171   | 1             | 1              | 1-3/4         | 4-1/4          | 8            |

TOLERANCE  
OF MILL DIA.

TOLERANCE  
OF SHANK DIA.

0  
-.0012

0  
-.0003

**EM208, EM999 Series**

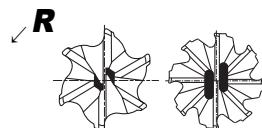
■ EXTRA LONG LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 99666   | 1/4           | 1/4            | 1             | 2-3/4          | 6            |
| 99667   | 5/16          | 5/16           | 1-1/2         | 3-5/8          | 6            |
| 99668   | 3/8           | 3/8            | 1-3/4         | 4              | 6            |
| 99669   | 1/2           | 1/2            | 2-3/16        | 4-3/8          | 6            |
| 99670   | 5/8           | 5/8            | 2-5/8         | 5-1/8          | 6            |
| 99588   | 3/4           | 3/4            | 2-1/4         | 5              | 8            |
| 99589   | 3/4           | 3/4            | 3-1/4         | 6              | 8            |
| 99590   | 3/4           | 3/4            | 4-1/8         | 7              | 8            |
| 99591   | 1             | 1              | 4-1/8         | 7              | 8            |

**X-POWER**

## 6&8 FLUTE 45°HELIX, LONG LENGTH, CORNER RADIUS



P.70

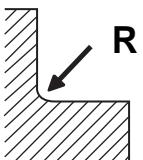
- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.

◇ U.S.A Stock

**EM668 Series**

Unit : inch

| EDP No. | CORNER RADIUS R | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|-----------------|---------------|----------------|---------------|----------------|--------------|
| 93277   | R.020           | 1/4           | 1/4            | 1/2           | 2-1/4          | 6            |
| 93278   | R.020           | 5/16          | 5/16           | 3/4           | 2-1/2          | 6            |
| 93279   | R.020           | 3/8           | 3/8            | 7/8           | 2-7/8          | 6            |
| 93280   | R.030           | 3/8           | 3/8            | 7/8           | 2-7/8          | 6            |
| 93281   | R.020           | 1/2           | 1/2            | 1             | 3-1/4          | 6            |
| 93282   | R.030           | 1/2           | 1/2            | 1             | 3-1/4          | 6            |
| 93283   | R.030           | 5/8           | 5/8            | 1-1/4         | 3-5/8          | 6            |
| 93284   | R.060           | 5/8           | 5/8            | 1-1/4         | 3-5/8          | 6            |
| 93285   | R.030           | 3/4           | 3/4            | 1-1/2         | 4-1/8          | 8            |
| 93286   | R.060           | 3/4           | 3/4            | 1-1/2         | 4-1/8          | 8            |
| 93287   | R.090           | 3/4           | 3/4            | 1-1/2         | 4-1/8          | 8            |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |



# X-POWER 2&4 FLUTE, LONG LENGTH, BALL NOSE



P.71,72

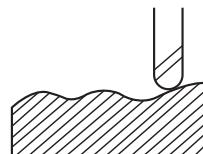
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- For copy-milling machines.

◇ U.S.A Stock

## EM209, EM210 Series

Unit : inch

| EDP No.<br>2 FLUTE<br>EM209 | EDP No.<br>4 FLUTE<br>EM210 | R<br>±.001 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-----------------------------|-----------------------------|------------|------------------|-------------------|------------------|-------------------|
| 93260                       | —                           | R 1/64     | 1/32             | 1/4               | 1/32             | 2-1/2             |
| 93261                       | —                           | R 1/32     | 1/16             | 1/4               | 1/16             | 2-1/2             |
| 93262                       | —                           | R 3/64     | 3/32             | 1/4               | 3/32             | 2-1/2             |
| 93125                       | 93134                       | R 1/16     | 1/8              | 1/8               | 5/16             | 2-3/8             |
| 93126                       | 93135                       | R 3/32     | 3/16             | 3/16              | 3/8              | 3-1/8             |
| 93127                       | 93136                       | R 1/8      | 1/4              | 1/4               | 1/2              | 3-1/2             |
| 93128                       | 93137                       | R 5/32     | 5/16             | 5/16              | 9/16             | 4                 |
| 93129                       | 93138                       | R 3/16     | 3/8              | 3/8               | 3/4              | 4                 |
| 93130                       | 93139                       | R 1/4      | 1/2              | 1/2               | 7/8              | 4-1/4             |
| 93131                       | 93140                       | R 5/16     | 5/8              | 5/8               | 1-1/4            | 5-1/2             |
| 93132                       | 93141                       | R 3/8      | 3/4              | 3/4               | 1-1/2            | 6-1/4             |
| 93133                       | 93142                       | R 1/2      | 1                | 1                 | 2                | 7-1/8             |



TOOL; YG : Ø 5/16, 93128 (2FL. BALL NOSE X-POWER COATING)

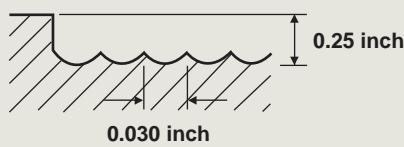
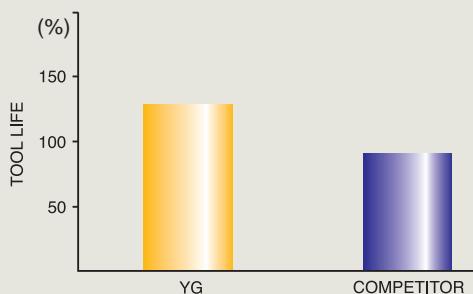
COMPETITOR : Ø 5/16 (2FL. BALL NOSE TiAIN COATING)

MATERIAL : STAINLESS STEEL, SUS304

RPM = 2,000 rev./min

FEED = 12.00 inch/min

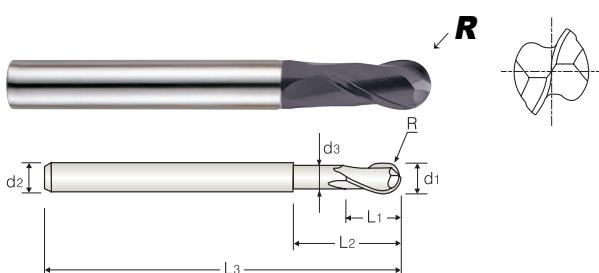
COOLANT : OIL MIST



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**X-POWER**

## 2 FLUTE, MEDIUM LENGTH, BALL NOSE



P.73

- Deep slotting milling is possible by reduced neck.
- High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ U.S.A Stock

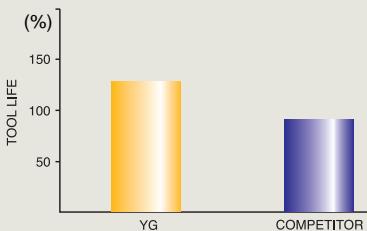
EM961 Series

Unit : inch

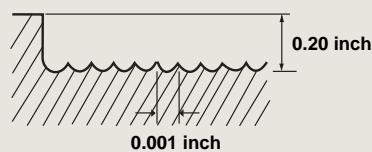
| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|---------|-------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| 93517   | R1/16       | 1/8                    | 1/4                     | 5/16                   | -                           | 2-3/4                   | -                      |
| 93518   | R3/32       | 3/16                   | 1/4                     | 1/2                    | -                           | 3-1/8                   | -                      |
| 93519   | R1/8        | 1/4                    | 1/4                     | 1/2                    | 7/8                         | 3-1/8                   | .242                   |
| 93520   | R5/32       | 5/16                   | 5/16                    | 9/16                   | 1-1/16                      | 3-1/2                   | .305                   |
| 93521   | R3/16       | 3/8                    | 3/8                     | 3/4                    | 1-1/4                       | 4                       | .367                   |
| 93522   | R1/4        | 1/2                    | 1/2                     | 7/8                    | 1-3/8                       | 4-1/4                   | .492                   |
| 93523   | R5/16       | 5/8                    | 5/8                     | 1-1/4                  | 2                           | 5-1/2                   | .617                   |
| 93524   | R3/8        | 3/4                    | 3/4                     | 1-1/2                  | 2-1/4                       | 6-1/4                   | .742                   |
| 93525   | R1/2        | 1                      | 1                       | 2-1/8                  | 3                           | 7                       | .992                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0                         | 0                          |

-.0012      -.0003



TOOL: YG : 93521, Ø 3/8, 2FL. X-POWER BALL NOSE  
COMPETITOR : Ø 3/8, 2FL. BALL NOSE TiAIN COATING  
MATERIAL : SKD61, ALLOYED TOOL STEEL, HRC 50  
RPM = 6050 rev./min  
FEED = 40 inch/min  
COOLANT : OIL MIST



**X-POWER**

## 2 FLUTE, LONG REACH, BALL NOSE



P.74

- Longer overall length than EM209, EM210, type and suitable for machining deeply located area.

◇ U.S.A Stock

EM962 Series

Unit : inch

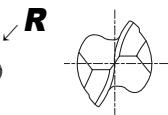
| EDP No. | R<br>±.0005 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|-------------|------------------|-------------------|------------------|-------------------|
| 93578   | R3/64       | 3/32             | 1/8               | 1/4              | 3-1/8             |
| 93579   | R1/16       | 1/8              | 1/8               | 5/16             | 4                 |
| 93580   | R3/32       | 3/16             | 3/16              | 3/8              | 4-3/4             |
| 93581   | R1/8        | 1/4              | 1/4               | 3/8              | 4-3/4             |
| 93582   | R5/32       | 5/16             | 5/16              | 9/16             | 5-1/2             |
| 93583   | R3/16       | 3/8              | 3/8               | 3/4              | 7                 |
| 93584   | R1/4        | 1/2              | 1/2               | 7/8              | 8                 |
| 93585   | R5/16       | 5/8              | 5/8               | 1-1/4            | 10                |
| 93586   | R3/8        | 3/4              | 3/4               | 1-1/2            | 10                |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0                         | 0                          |

-.0012      -.0003

**X-POWER**

## 2 FLUTE, MINIATURE, BALL NOSE



P.80

- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting condition.
- Excellent performance on high hardened steel up to HRc70.

◇ U.S.A Stock

### EM960 Series

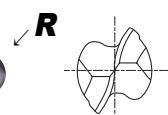
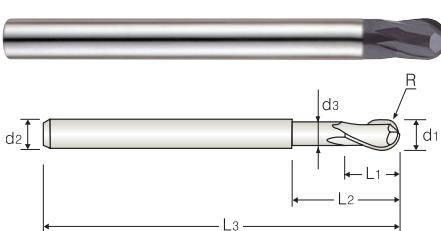
Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|-------------|------------------|-------------------|------------------|-------------------|
| 93507   | R.012       | .024             | 1/8               | .043             | 1-1/2             |
| 93508   | R.014       | .028             | 1/8               | .060             | 1-1/2             |
| 93509   | R.0155      | .031             | 1/8               | .080             | 1-1/2             |
| 93510   | R.0175      | .035             | 1/8               | .087             | 1-1/2             |
| 93511   | R.020       | .040             | 1/8               | .100             | 1-1/2             |
| 93512   | R.0215      | .043             | 1/8               | .118             | 1-1/2             |
| 93513   | R.0235      | .047             | 1/8               | .118             | 1-1/2             |
| 93514   | R.026       | .052             | 1/8               | .138             | 1-1/2             |
| 93515   | R.0275      | .055             | 1/8               | .138             | 1-1/2             |
| 93516   | R.031       | .062             | 1/8               | .157             | 1-1/2             |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |

**X-POWER**

## 2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55



P.75

### HRc55 ~ HRc70

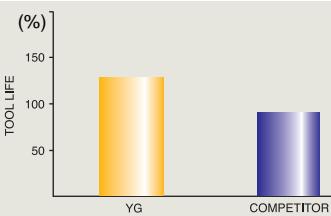
- Suitable for HRc55~HRc70 high hardened materials.
- Strong cutting edges and higher tool rigidity.

◇ U.S.A Stock

### EM109 Series

Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------|-------------|---------------------------|----------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 93485   | R1/64       | 1/32                      | 1/4                        | 1/32                      | 1/16                           | 2                          | .029                      |
| 93486   | R1/32       | 1/16                      | 1/4                        | 1/16                      | 1/8                            | 2                          | .059                      |
| 93487   | R3/64       | 3/32                      | 1/4                        | 3/32                      | 3/16                           | 2                          | .090                      |
| 93488   | R1/16       | 1/8                       | 1/4                        | 1/8                       | 1/4                            | 2-1/2                      | .121                      |
| 93489   | R3/32       | 3/16                      | 1/4                        | 3/16                      | 3/8                            | 3                          | .184                      |
| 93490   | R1/8        | 1/4                       | 1/4                        | 1/4                       | 1/2                            | 3-1/2                      | .246                      |
| 93491   | R5/32       | 5/16                      | 5/16                       | 5/16                      | 5/8                            | 4                          | .309                      |
| 93492   | R3/16       | 3/8                       | 3/8                        | 3/8                       | 3/4                            | 4                          | .371                      |
| 93493   | R1/4        | 1/2                       | 1/2                        | 1/2                       | 1                              | 4-1/2                      | .496                      |



TOOL; YG : 93492, Ø 3/8, 2FL. X-POWER BALL NOSE

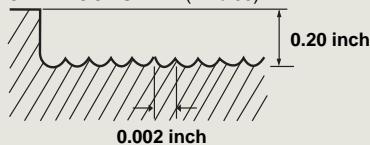
COMPETITOR : Ø 3/8, 2FL. BALL NOSE, TiAIN COATING

MATERIAL : SKD11, ALLOYED TOOL STEEL (HRc 60)

RPM = 3820 rev./min

FEED = 36 inch/min

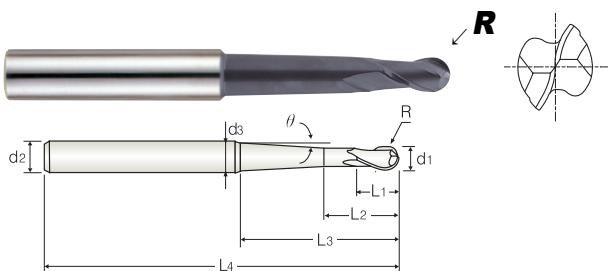
COOLANT : OIL MIST



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



## X-POWER 2 FLUTE, BALL NOSE with TAPER NECK



P.76

► High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ U.S.A Stock

EM963 Series

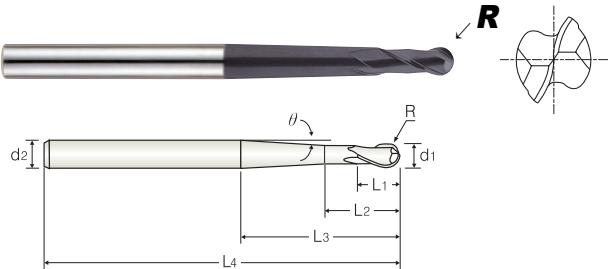
Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | NECK<br>DIAMETER<br>d3 | LENGTH<br>OF CUT<br>L1 | L2    | LENGTH<br>BELOW SHANK<br>L3 | OVERALL<br>LENGTH<br>L4 | NECK<br>TAPER ANGLE<br>θ |
|---------|-------------|------------------------|-------------------------|------------------------|------------------------|-------|-----------------------------|-------------------------|--------------------------|
| 93526   | R1/32       | 1/16                   | 1/4                     | .096                   | 5/32                   | 15/64 | 7/8                         | 2-3/8                   | 1° 30'                   |
| 93527   | R1/32       | 1/16                   | 1/4                     | .208                   | 5/32                   | 15/64 | 1-5/8                       | 3-1/8                   | 3°                       |
| 93528   | R1/16       | 1/8                    | 1/4                     | .216                   | 1/4                    | 21/64 | 2-1/16                      | 3-5/8                   | 1° 30'                   |
| 93529   | R3/32       | 3/16                   | 3/8                     | .288                   | 3/8                    | 29/64 | 2-3/8                       | 4-3/8                   | 1° 30'                   |
| 93530   | R1/8        | 1/4                    | 3/8                     | .325                   | 1/2                    | 5/8   | 2-1/16                      | 4-3/8                   | 1° 30'                   |
| 93531   | R5/32       | 5/16                   | 1/2                     | .385                   | 9/16                   | 11/16 | 2-1/16                      | 4-3/4                   | 1° 30'                   |
| 93532   | R3/16       | 3/8                    | 1/2                     | .458                   | 11/16                  | 13/16 | 2-3/8                       | 5-1/16                  | 1° 30'                   |
| 93533   | R1/4        | 1/2                    | 3/4                     | .618                   | 7/8                    | 1 "   | 3-1/4                       | 6-3/8                   | 1° 30'                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



## X-POWER 2 FLUTE, BALL NOSE with PENCIL NECK



P.77

► High efficiency milling is possible in deep slotting with projection of the end mill being long.

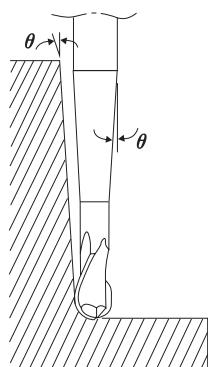
◇ U.S.A Stock

EM979 Series

Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | L2    | LENGTH<br>BELOW SHANK<br>L3 | OVERALL<br>LENGTH<br>L4 | NECK<br>TAPER ANGLE<br>θ |
|---------|-------------|------------------------|-------------------------|------------------------|-------|-----------------------------|-------------------------|--------------------------|
| 93534   | R3/32       | 3/16                   | 3/8                     | 9/16                   | .659  | 3-11/32                     | 7-3/4                   | 2°                       |
| 93535   | R3/32       | 3/16                   | 3/8                     | 9/16                   | .666  | 2-13/16                     | 6                       | 2° 30'                   |
| 93536   | R1/8        | 1/4                    | 1/2                     | 3/4                    | .859  | 4-7/16                      | 7-3/4                   | 2°                       |
| 93537   | R1/8        | 1/4                    | 1/2                     | 3/4                    | .856  | 3-23/32                     | 6                       | 2° 30'                   |
| 93538   | R5/32       | 5/16                   | 1/2                     | 3/4                    | .868  | 4-29/32                     | 7-3/4                   | 1° 20'                   |
| 93539   | R5/32       | 5/16                   | 1/2                     | 3/4                    | .870  | 3-15/16                     | 6                       | 1° 45'                   |
| 93540   | R3/16       | 3/8                    | 5/8                     | 1-3/16                 | 1.326 | 4-29/32                     | 7-3/4                   | 2°                       |
| 93541   | R3/16       | 3/8                    | 5/8                     | 1-3/16                 | 1.325 | 4-3/16                      | 6                       | 2° 30'                   |
| 93542   | R1/4        | 1/2                    | 5/8                     | 1-3/16                 | 1.309 | 4                           | 7-3/4                   | 1° 20'                   |
| 93543   | R1/4        | 1/2                    | 5/8                     | 1-3/16                 | 1.329 | 3-3/8                       | 6                       | 1° 45'                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



MILLING ON TAPERED WALL

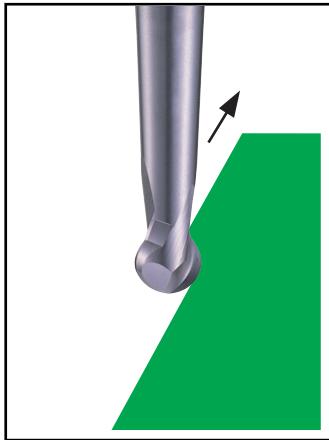
### Useful Field Area

- Die & Mold making, Turbine manufacturing and Aircraft Industry, etc.
- Difficult 3-D Forms.
- Profiling of up to HRc 70 high hardened steels and Alloy steels, Nickel base alloys, Titanium alloys.

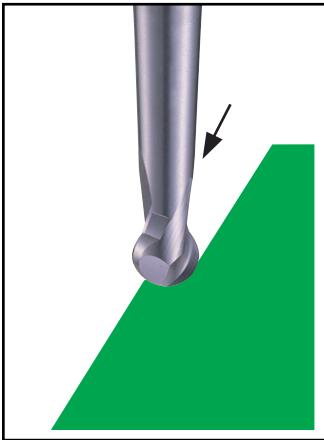
### Characteristic

- Ultra micro grain carbide which increases both toughness and hardness.
- YG-1's unique X-POWER coating suitable for dry cutting and high speed cutting.
- Out standing tool geometry and sphere shape ball enables more increased tool life and higher speed and feed operation.

### Surpassing Milling Operation

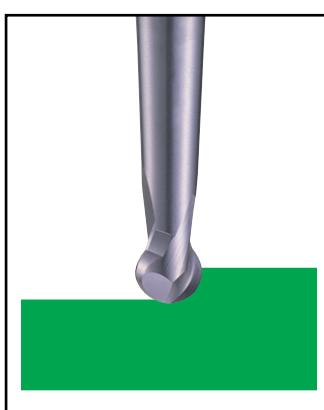


(Favorable Back Milling)

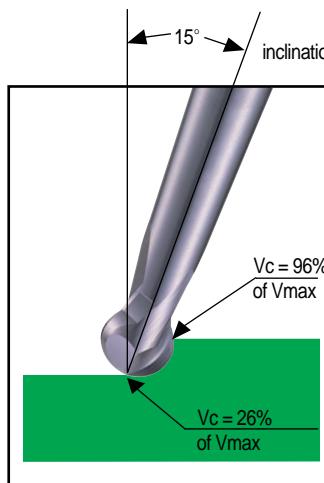


(Unfavorable Drilling)

- Operating angle 14°~16°, higher speed and feed can be achieved by decreased cutting resistance at cutting edges contacting the workpiece.
- Excellent surface roughness and higher milling process.
- Enable to milling with higher speed and feed when Back Milling.



(Unfavorable Profiling)

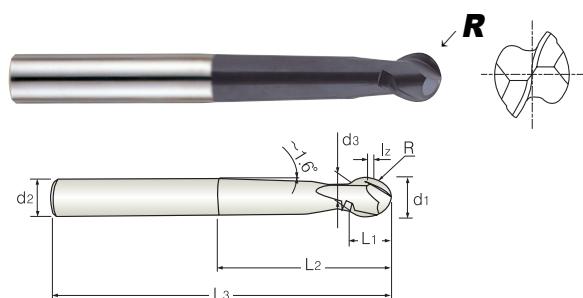


(Favorable Profiling)

- When 15° inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.

**X-POWER**

## 2 FLUTE, LONG LENGTH, BALL NOSE



P.78

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.

◇ U.S.A Stock

### EM084 Series ■ MMC-ECONOMY TYPE

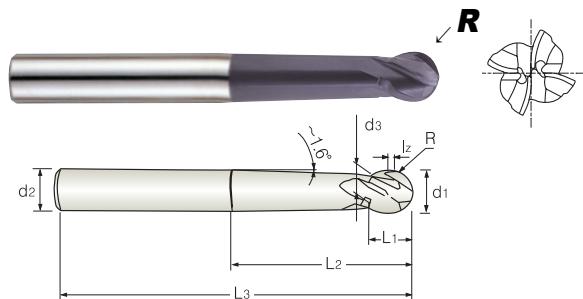
Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 | lz   |
|---------|-------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|------|
| 93288   | R1/16       | 1/8                    | 1/4                     | 5/32                   | 1-1/4                       | 3-1/4                   | .100                   | .060 |
| 93289   | R3/32       | 3/16                   | 1/4                     | 7/32                   | 1-1/4                       | 3-1/4                   | .150                   | .080 |
| 93290   | R1/8        | 1/4                    | 1/4                     | 9/32                   | 1-1/4                       | 4                       | .200                   | .080 |
| 93291   | R5/32       | 5/16                   | 5/16                    | 3/8                    | 1-1/2                       | 4                       | .250                   | .120 |
| 93292   | R3/16       | 3/8                    | 3/8                     | 13/32                  | 1-3/4                       | 4                       | .300                   | .120 |
| 93293   | R1/4        | 1/2                    | 1/2                     | 17/32                  | 2-1/4                       | 4-1/4                   | .400                   | .120 |
| 93294   | R5/16       | 5/8                    | 5/8                     | 5/8                    | 2-3/4                       | 6-1/4                   | .500                   | .120 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |

**X-POWER**

## 4 FLUTE, LONG LENGTH, BALL NOSE



P.79

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.
- Easy to regrind.

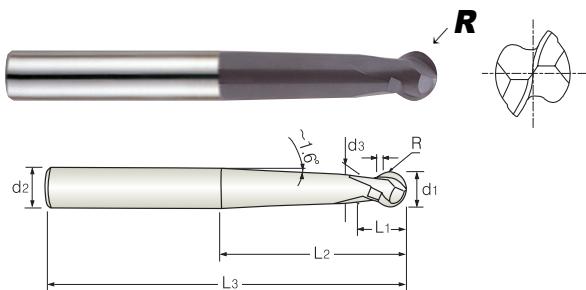
◇ U.S.A Stock

### EM093 Series ■ MMC-ECONOMY TYPE

Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 | lz   |
|---------|-------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|------|
| 93295   | R1/16       | 1/8                    | 1/4                     | 5/32                   | 1-1/4                       | 3-1/4                   | .100                   | .060 |
| 93296   | R3/32       | 3/16                   | 1/4                     | 7/32                   | 1-1/4                       | 3-1/4                   | .150                   | .080 |
| 93297   | R1/8        | 1/4                    | 1/4                     | 9/32                   | 1-1/4                       | 4                       | .200                   | .080 |
| 93298   | R5/32       | 5/16                   | 5/16                    | 3/8                    | 1-1/2                       | 4                       | .250                   | .120 |
| 93299   | R3/16       | 3/8                    | 3/8                     | 13/32                  | 1-3/4                       | 4                       | .300                   | .120 |
| 93300   | R1/4        | 1/2                    | 1/2                     | 17/32                  | 2-1/4                       | 4-1/4                   | .400                   | .120 |
| 93301   | R5/16       | 5/8                    | 5/8                     | 5/8                    | 2-3/4                       | 6-1/4                   | .500                   | .120 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |

**X-POWER****2 FLUTE, LONG LENGTH, BALL NOSE**

P.78

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.

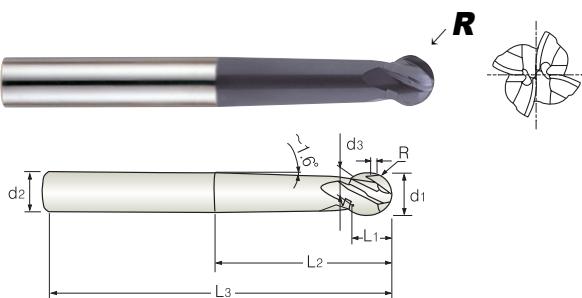
◇ U.S.A Stock

**EM096 Series** ■ MMC-SPHERE TYPE

Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|---------|-------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| 93410   | R1/16       | 1/8                    | 1/4                     | .100                   | 1-1/4                       | 3-1/4                   | .100                   |
| 93411   | R3/32       | 3/16                   | 1/4                     | .150                   | 1-1/4                       | 3-1/4                   | .150                   |
| 93412   | R1/8        | 1/4                    | 1/4                     | .200                   | 1-1/8                       | 4                       | .200                   |
| 93413   | R5/32       | 5/16                   | 5/16                    | .250                   | 1-3/8                       | 4                       | .250                   |
| 93414   | R3/16       | 3/8                    | 3/8                     | .300                   | 1-5/8                       | 4                       | .300                   |
| 93415   | R1/4        | 1/2                    | 1/2                     | .400                   | 2-3/16                      | 4-1/4                   | .400                   |
| 93416   | R5/16       | 5/8                    | 5/8                     | .500                   | 2-3/4                       | 6-1/4                   | .500                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |

**X-POWER****4 FLUTE, LONG LENGTH, BALL NOSE**

P.79

- Designed for copy milling.
- Increased feed rates.
- 15° inclination.

◇ U.S.A Stock

**EM097 Series** ■ MMC-SPHERE TYPE

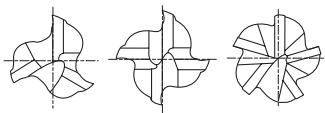
Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|---------|-------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| 93417   | R1/16       | 1/8                    | 1/4                     | .100                   | 1-1/4                       | 3-1/4                   | .100                   |
| 93418   | R3/32       | 3/16                   | 1/4                     | .150                   | 1-1/4                       | 3-1/4                   | .150                   |
| 93419   | R1/8        | 1/4                    | 1/4                     | .200                   | 1-1/8                       | 4                       | .200                   |
| 93420   | R5/32       | 5/16                   | 5/16                    | .250                   | 1-3/8                       | 4                       | .250                   |
| 93421   | R3/16       | 3/8                    | 3/8                     | .300                   | 1-5/8                       | 4                       | .300                   |
| 93422   | R1/4        | 1/2                    | 1/2                     | .400                   | 2-3/16                      | 4-1/4                   | .400                   |
| 93423   | R5/16       | 5/8                    | 5/8                     | .500                   | 2-3/4                       | 6-1/4                   | .500                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |

**X-POWER**

# MULTI FLUTE, 20° HELIX, STUB & LONG LENGTH, FINE PITCH ROUGHING



P.80

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

◇ U.S.A Stock

**EM666 Series**

■ STUB LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 93270   | 1/4           | 1/4            | 5/16          | 2-1/8          | 3            |
| 93271   | 5/16          | 5/16           | 3/8           | 2-1/4          | 3            |
| 93272   | 3/8           | 3/8            | 9/16          | 2-1/2          | 3            |
| 93273   | 1/2           | 1/2            | 5/8           | 3              | 4            |
| 93274   | 5/8           | 5/8            | 7/8           | 3-1/4          | 4            |
| 93275   | 3/4           | 3/4            | 1             | 3-3/4          | 4            |
| 93276   | 1             | 1              | 1             | 4              | 5            |

| MILL DIA.               | 1/4~3/8    | 1/2~5/8     | 3/4~1      |
|-------------------------|------------|-------------|------------|
| TOLERANCE OF MILL DIA.  | 0 ~ -.0022 | 0 ~ -.0027  | 0 ~ -.0033 |
| TOLERANCE OF SHANK DIA. |            | 0<br>-.0003 |            |

**EM156 Series**

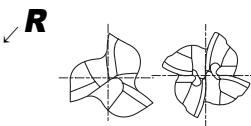
■ LONG LENGTH

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 93112   | 1/4           | 1/4            | 3/4           | 2-1/2          | 3            |
| 93113   | 5/16          | 5/16           | 3/4           | 2-1/2          | 3            |
| 93114   | 3/8           | 3/8            | 7/8           | 2-1/2          | 3            |
| 93115   | 1/2           | 1/2            | 1             | 3              | 4            |
| 93116   | 5/8           | 5/8            | 1-1/4         | 3-1/2          | 4            |
| 93117   | 3/4           | 3/4            | 1-5/8         | 4              | 4            |
| 93118   | 1             | 1              | 1-3/4         | 4              | 5            |

**X-POWER**

# MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING, BALL NOSE



P.81

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

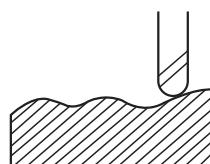
◇ U.S.A Stock

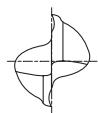
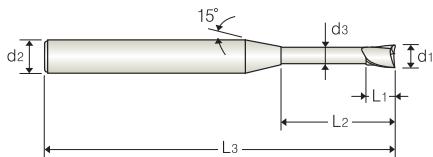
**EM662 Series**

Unit : inch

| EDP No. | R<br>±.001 | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|------------|---------------|----------------|---------------|----------------|--------------|
| 93263   | R1/8       | 1/4           | 1/4            | 3/4           | 2-1/2          | 3            |
| 93264   | R5/32      | 5/16          | 5/16           | 3/4           | 2-1/2          | 3            |
| 93265   | R3/16      | 3/8           | 3/8            | 7/8           | 2-1/2          | 3            |
| 93266   | R1/4       | 1/2           | 1/2            | 1             | 3              | 4            |
| 93267   | R5/16      | 5/8           | 5/8            | 1-1/4         | 3-1/2          | 4            |
| 93268   | R3/8       | 3/4           | 3/4            | 1-5/8         | 4              | 4            |
| 93269   | R1/2       | 1             | 1              | 1-3/4         | 4              | 5            |

| MILL DIA.               | 1/4~3/8    | 1/2~5/8     | 3/4~1      |
|-------------------------|------------|-------------|------------|
| TOLERANCE OF MILL DIA.  | 0 ~ -.0022 | 0 ~ -.0027  | 0 ~ -.0033 |
| TOLERANCE OF SHANK DIA. |            | 0<br>-.0003 |            |





P.81

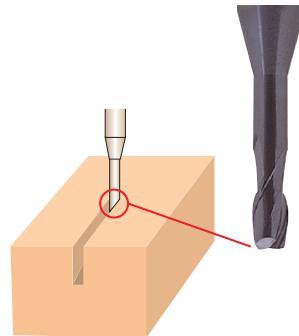
- ▶ For deep slotting & pocketing.
- ▶ For depths of 6 to 10X cutting diameter.
- ▶ Machine carbon steel, alloy steel, tool steel, die and mold steels.
- ▶ Suitable for high speed cutting and high precision machining.
- ▶ Designed with reinforced shank for higher stability and rigidity.
- ▶ Long neck design for deep machining near walls.

◇ **U.S.A Stock**

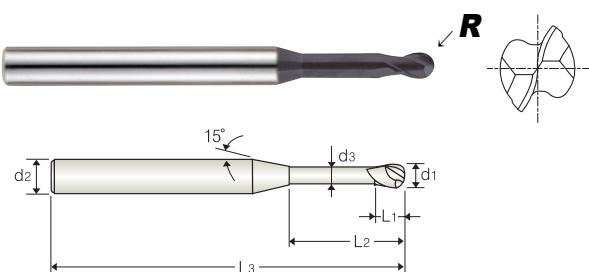
### EM966 Series

Unit : inch

| EDP No. | MILL DIAMETER<br>$d_1$ | SHANK DIAMETER<br>$d_2$ | LENGTH OF CUT<br>$L_1$ | LENGTH BELOW SHANK<br>$L_2$ | OVERALL LENGTH<br>$L_3$ | NECK DIAMETER<br>$d_3$ |
|---------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| 93548   | 1/32                   | 1/8                     | 3/64                   | 7/32                        | 2                       | .029                   |
| 93549   | 1/32                   | 1/8                     | 3/64                   | 5/16                        | 2                       | .029                   |
| 93550   | 3/64                   | 1/8                     | 1/16                   | 7/32                        | 2                       | .045                   |
| 93551   | 3/64                   | 1/8                     | 1/16                   | 9/32                        | 2                       | .045                   |
| 93552   | 3/64                   | 1/8                     | 1/16                   | 1/2                         | 2                       | .045                   |
| 93553   | 1/16                   | 1/8                     | 3/32                   | 5/16                        | 2                       | .060                   |
| 93554   | 1/16                   | 1/8                     | 3/32                   | 3/8                         | 2                       | .060                   |
| 93555   | 1/16                   | 1/8                     | 3/32                   | 1/2                         | 2                       | .060                   |
| 93556   | 1/16                   | 1/8                     | 3/32                   | 5/8                         | 2                       | .060                   |
| 93557   | 5/64                   | 1/8                     | 1/8                    | 1/2                         | 2                       | .076                   |
| 93558   | 5/64                   | 1/8                     | 1/8                    | 5/8                         | 2                       | .076                   |
| 93559   | 3/32                   | 1/8                     | 9/64                   | 1/2                         | 2                       | .090                   |
| 93560   | 3/32                   | 1/8                     | 9/64                   | 5/8                         | 2                       | .090                   |
| 93561   | 1/8                    | 1/4                     | 3/16                   | 9/16                        | 2-1/4                   | .120                   |
| 93562   | 1/8                    | 1/4                     | 3/16                   | 3/4                         | 2-1/4                   | .120                   |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0006            | 0<br>-.0003             |

**X-POWER****2 FLUTE, BALL NOSE for RIB PROCESSING**

P.82

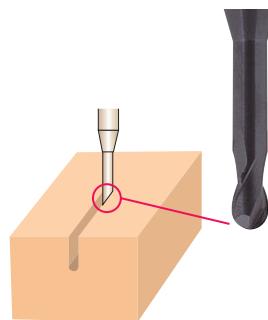
- For 3-D milling, deep slotting and pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.

◇ U.S.A Stock

**EM967 Series**

Unit : inch

| EDP No. | R<br>±.0005 | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------|-------------|---------------------------|----------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 93563   | R1/64       | 1/32                      | 1/8                        | 3/64                      | 7/32                           | 2                          | .029                      |
| 93564   | R1/64       | 1/32                      | 1/8                        | 3/64                      | 5/16                           | 2                          | .029                      |
| 93565   | R.0234      | 3/64                      | 1/8                        | 1/16                      | 7/32                           | 2                          | .045                      |
| 93566   | R.0234      | 3/64                      | 1/8                        | 1/16                      | 9/32                           | 2                          | .045                      |
| 93567   | R.0234      | 3/64                      | 1/8                        | 1/16                      | 1/2                            | 2                          | .045                      |
| 93568   | R1/32       | 1/16                      | 1/8                        | 3/32                      | 5/16                           | 2                          | .060                      |
| 93569   | R1/32       | 1/16                      | 1/8                        | 3/32                      | 1/2                            | 2                          | .060                      |
| 93570   | R1/32       | 1/16                      | 1/8                        | 3/32                      | 5/8                            | 2                          | .060                      |
| 93571   | R.0391      | 5/64                      | 1/8                        | 1/8                       | 5/16                           | 2                          | .076                      |
| 93572   | R.0391      | 5/64                      | 1/8                        | 1/8                       | 5/8                            | 2                          | .076                      |
| 93573   | R.0391      | 5/64                      | 1/8                        | 1/8                       | 3/4                            | 2                          | .076                      |
| 93574   | R3/64       | 3/32                      | 1/8                        | 9/64                      | 5/8                            | 2                          | .090                      |
| 93575   | R3/64       | 3/32                      | 1/8                        | 9/64                      | 3/4                            | 2                          | .090                      |
| 93576   | R1/16       | 1/8                       | 1/4                        | 3/16                      | 5/8                            | 2-1/4                      | .120                      |
| 93577   | R1/16       | 1/8                       | 1/4                        | 3/16                      | 3/4                            | 2-1/4                      | .120                      |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0006            | 0<br>-.0003             |

# 2 FLUTE, SHORT & LONG LENGTH

**METRIC**


- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

Call for Availability

**EM810 Series**

■ SHORT LENGTH

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|
| EM810901 | 1.0           | 6                 | 2.5           | 40             |
| EM810902 | 1.5           | 6                 | 4             | 40             |
| EM810020 | 2.0           | 4                 | 6             | 40             |
| EM810903 | 2.0           | 6                 | 6             | 40             |
| EM810025 | 2.5           | 4                 | 8             | 40             |
| EM810904 | 2.5           | 6                 | 8             | 40             |
| EM810030 | 3.0           | 6                 | 8             | 45             |
| EM810035 | 3.5           | 6                 | 10            | 45             |
| EM810040 | 4.0           | 6                 | 11            | 45             |
| EM810045 | 4.5           | 6                 | 11            | 45             |
| EM810050 | 5.0           | 6                 | 13            | 50             |
| EM810055 | 5.5           | 6                 | 13            | 50             |
| EM810060 | 6.0           | 6                 | 13            | 50             |
| EM810065 | 6.5           | 8                 | 16            | 60             |
| EM810070 | 7.0           | 8                 | 16            | 60             |
| EM810075 | 7.5           | 8                 | 16            | 60             |
| EM810080 | 8.0           | 8                 | 19            | 60             |
| EM810085 | 8.5           | 10                | 19            | 70             |
| EM810090 | 9.0           | 10                | 19            | 70             |
| EM810095 | 9.5           | 10                | 19            | 70             |
| EM810100 | 10.0          | 10                | 22            | 70             |
| EM810105 | 10.5          | 12                | 22            | 75             |
| EM810110 | 11.0          | 12                | 22            | 75             |
| EM810115 | 11.5          | 12                | 22            | 75             |
| EM810120 | 12.0          | 12                | 26            | 75             |
| EM810906 | 13.0          | 12                | 26            | 85             |
| EM810140 | 14.0          | 14                | 26            | 85             |
| EM810905 | 14.0          | 16                | 26            | 85             |
| EM810908 | 15.0          | 16                | 26            | 90             |
| EM810160 | 16.0          | 16                | 32            | 100            |
| EM810909 | 17.0          | 16                | 32            | 100            |
| EM810180 | 18.0          | 18                | 32            | 100            |
| EM810911 | 19.0          | 20                | 32            | 100            |
| EM810200 | 20.0          | 20                | 38            | 105            |
| EM810220 | 22.0          | 20                | 38            | 105            |
| EM810240 | 24.0          | 25                | 45            | 120            |
| EM810250 | 25.0          | 25                | 45            | 120            |

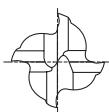
**EM816 Series**

■ LONG LENGTH

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|
| EM816020 | 2.0           | 4                 | 8             | 40             |
| EM816030 | 3.0           | 6                 | 12            | 50             |
| EM816040 | 4.0           | 6                 | 15            | 50             |
| EM816050 | 5.0           | 6                 | 20            | 60             |
| EM816060 | 6.0           | 6                 | 20            | 60             |
| EM816080 | 8.0           | 8                 | 25            | 70             |
| EM816100 | 10.0          | 10                | 30            | 90             |
| EM816120 | 12.0          | 12                | 30            | 90             |
| EM816140 | 14.0          | 16                | 40            | 110            |
| EM816160 | 16.0          | 16                | 50            | 110            |
| EM816180 | 18.0          | 20                | 50            | 110            |
| EM816200 | 20.0          | 20                | 55            | 110            |
| EM816250 | 25.0          | 25                | 75            | 140            |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

**X-POWER****4 FLUTE, SHORT & LONG LENGTH****METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

◇ *Call for Availability*

X-POWER

**EM811 Series**

■ SHORT LENGTH

Unit : mm

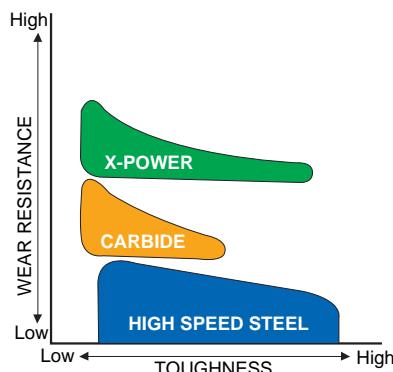
| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|
| EM811020 | 2.0           | 4                 | 6             | 40             |
| EM811901 | 2.0           | 6                 | 6             | 40             |
| EM811025 | 2.5           | 4                 | 8             | 40             |
| EM811902 | 2.5           | 6                 | 8             | 40             |
| EM811030 | 3.0           | 6                 | 8             | 45             |
| EM811035 | 3.5           | 6                 | 10            | 45             |
| EM811040 | 4.0           | 6                 | 11            | 45             |
| EM811045 | 4.5           | 6                 | 11            | 45             |
| EM811050 | 5.0           | 6                 | 13            | 50             |
| EM811055 | 5.5           | 6                 | 13            | 50             |
| EM811060 | 6.0           | 6                 | 13            | 50             |
| EM811065 | 6.5           | 8                 | 16            | 60             |
| EM811070 | 7.0           | 8                 | 16            | 60             |
| EM811075 | 7.5           | 8                 | 16            | 60             |
| EM811080 | 8.0           | 8                 | 19            | 60             |
| EM811085 | 8.5           | 10                | 19            | 70             |
| EM811090 | 9.0           | 10                | 19            | 70             |
| EM811095 | 9.5           | 10                | 19            | 70             |
| EM811100 | 10.0          | 10                | 22            | 70             |
| EM811105 | 10.5          | 12                | 22            | 75             |
| EM811110 | 11.0          | 12                | 22            | 75             |
| EM811115 | 11.5          | 12                | 22            | 75             |
| EM811120 | 12.0          | 12                | 26            | 75             |
| EM811904 | 13.0          | 12                | 26            | 85             |
| EM811140 | 14.0          | 14                | 26            | 85             |
| EM811905 | 14.0          | 12                | 26            | 85             |
| EM811903 | 14.0          | 16                | 26            | 85             |
| EM811906 | 15.0          | 16                | 26            | 90             |
| EM811160 | 16.0          | 16                | 32            | 100            |
| EM811907 | 17.0          | 16                | 32            | 100            |
| EM811180 | 18.0          | 18                | 32            | 100            |
| EM811908 | 18.0          | 16                | 32            | 100            |
| EM811909 | 19.0          | 20                | 32            | 100            |
| EM811200 | 20.0          | 20                | 38            | 105            |
| EM811220 | 22.0          | 20                | 38            | 105            |
| EM811240 | 24.0          | 25                | 45            | 120            |
| EM811250 | 25.0          | 25                | 45            | 120            |

**EM817 Series**

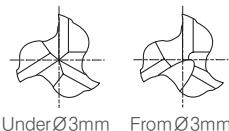
■ LONG LENGTH

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|
| EM817020 | 2.0           | 4                 | 8             | 40             |
| EM817030 | 3.0           | 6                 | 12            | 50             |
| EM817040 | 4.0           | 6                 | 15            | 50             |
| EM817050 | 5.0           | 6                 | 20            | 60             |
| EM817060 | 6.0           | 6                 | 20            | 60             |
| EM817080 | 8.0           | 8                 | 25            | 70             |
| EM817100 | 10.0          | 10                | 30            | 90             |
| EM817120 | 12.0          | 12                | 30            | 90             |
| EM817140 | 14.0          | 16                | 40            | 110            |
| EM817160 | 16.0          | 16                | 50            | 110            |
| EM817180 | 18.0          | 20                | 50            | 110            |
| EM817200 | 20.0          | 20                | 55            | 110            |
| EM817250 | 25.0          | 25                | 75            | 140            |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

**X-POWER****3 FLUTE, 38° HELIX, SHORT LENGTH****METRIC**

Under Ø3mm From Ø3mm



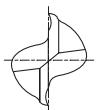
- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Possesses the advantage of 2 flute and 4 flute end mill.
- Superior workpiece finishes.

**◇ Call for Availability****EM895 Series**

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|----------|---------------|-------------------|---------------|----------------|
| EM895010 | 1.0           | 3                 | 2.5           | 38             | EM895050 | 5.0           | 5                 | 14            | 50             |
| EM895015 | 1.5           | 4                 | 5             | 50             | EM89504  | 5.0           | 6                 | 14            | 57             |
| EM895025 | 2.5           | 3                 | 7             | 38             | EM895060 | 6.0           | 6                 | 16            | 57             |
| EM895030 | 3.0           | 3                 | 10            | 38             | EM895080 | 8.0           | 8                 | 20            | 63             |
| EM895901 | 3.0           | 6                 | 10            | 50             | EM895100 | 10.0          | 10                | 22            | 72             |
| EM895035 | 3.5           | 4                 | 12            | 50             | EM895120 | 12.0          | 12                | 25            | 73             |
| EM895902 | 3.5           | 6                 | 12            | 50             | EM895140 | 14.0          | 14                | 25            | 75             |
| EM895040 | 4.0           | 4                 | 12            | 50             | EM895160 | 16.0          | 16                | 32            | 82             |
| EM895903 | 4.0           | 6                 | 12            | 50             | EM895180 | 18.0          | 18                | 32            | 92             |
| EM895045 | 4.5           | 6                 | 14            | 57             | EM895200 | 20.0          | 20                | 38            | 92             |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

**X-POWER****2 FLUTE, MINIATURE****METRIC**

- High precision milling in medical, optical, electronics and aero space industries.
- Excellent performance on high hardened steel(HRc70).

**◇ Call for Availability****EM810 Series**

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|----------|---------------|-------------------|---------------|----------------|
| EM810004 | 0.4           | 3                 | 0.8           | 40             | EM810010 | 1.0           | 4                 | 2.5           | 40             |
| EM810005 | 0.5           | 3                 | 1.0           | 40             | EM810011 | 1.1           | 4                 | 2.5           | 40             |
| EM810006 | 0.6           | 3                 | 1.2           | 40             | EM810012 | 1.2           | 4                 | 4.0           | 40             |
| EM810007 | 0.7           | 3                 | 1.4           | 40             | EM810013 | 1.3           | 4                 | 4.0           | 40             |
| EM810008 | 0.8           | 3                 | 1.6           | 40             | EM810014 | 1.4           | 4                 | 4.0           | 40             |
| EM810009 | 0.9           | 3                 | 2.0           | 40             | EM810015 | 1.5           | 4                 | 4.0           | 40             |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

**X-POWER****2&4 FLUTE, LONG LENGTH, CORNER RADIUS****METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased production.

◇ *Call for Availability*

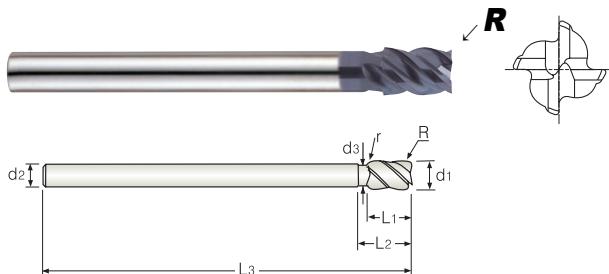
**EM818, EM819 Series**

Unit : mm

| EDP No.<br>2FLUTE<br>EM818 | EDP No.<br>4FLUTE<br>EM819 | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------------------------|----------------------------|-----------------------|------------------|-------------------------|------------------|-------------------|
| EM818030                   | EM819030                   | R0.3                  | 3.0              | 6                       | 12               | 50                |
| EM818040                   | EM819040                   | R0.3                  | 4.0              | 6                       | 15               | 50                |
| EM818911                   | EM819911                   | R0.5                  | 4.0              | 6                       | 15               | 50                |
| EM818050                   | EM819050                   | R0.3                  | 5.0              | 6                       | 20               | 60                |
| EM818912                   | EM819912                   | R0.5                  | 5.0              | 6                       | 20               | 60                |
| EM818913                   | EM819913                   | R0.3                  | 6.0              | 6                       | 20               | 60                |
| EM818060                   | EM819060                   | R0.5                  | 6.0              | 6                       | 20               | 60                |
| EM818901                   | EM819901                   | R1.0                  | 6.0              | 6                       | 20               | 60                |
| EM818914                   | EM819914                   | R0.3                  | 8.0              | 8                       | 25               | 70                |
| EM818080                   | EM819080                   | R0.5                  | 8.0              | 8                       | 25               | 70                |
| EM818902                   | EM819902                   | R1.0                  | 8.0              | 8                       | 25               | 70                |
| EM818903                   | EM819903                   | R1.5                  | 8.0              | 8                       | 25               | 70                |
| EM818904                   | EM819904                   | R2.0                  | 8.0              | 8                       | 25               | 70                |
| EM818915                   | EM819915                   | R0.3                  | 10.0             | 10                      | 30               | 90                |
| EM818100                   | EM819100                   | R0.5                  | 10.0             | 10                      | 30               | 90                |
| EM818905                   | EM819905                   | R1.0                  | 10.0             | 10                      | 30               | 90                |
| EM818906                   | EM819906                   | R1.5                  | 10.0             | 10                      | 30               | 90                |
| EM818907                   | EM819907                   | R2.0                  | 10.0             | 10                      | 30               | 90                |
| EM818120                   | EM819120                   | R0.5                  | 12.0             | 12                      | 30               | 90                |
| EM818908                   | EM819908                   | R1.0                  | 12.0             | 12                      | 30               | 90                |
| EM818909                   | EM819909                   | R1.5                  | 12.0             | 12                      | 30               | 90                |
| EM818910                   | EM819910                   | R2.0                  | 12.0             | 12                      | 30               | 90                |
| EM818160                   | EM819160                   | R0.5                  | 16.0             | 16                      | 50               | 110               |
| EM818916                   | EM819916                   | R1.0                  | 16.0             | 16                      | 50               | 110               |
| EM818917                   | EM819917                   | R1.5                  | 16.0             | 16                      | 50               | 110               |
| EM818918                   | EM819918                   | R2.0                  | 16.0             | 16                      | 50               | 110               |
| EM818200                   | EM819200                   | R0.5                  | 20.0             | 20                      | 55               | 110               |
| EM818919                   | EM819919                   | R1.0                  | 20.0             | 20                      | 55               | 110               |
| EM818920                   | EM819920                   | R1.5                  | 20.0             | 20                      | 55               | 110               |
| EM818921                   | EM819921                   | R2.0                  | 20.0             | 20                      | 55               | 110               |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

**X-POWER****4 FLUTE, 45° HELIX, SHORT LENGTH, CORNER RADIUS****METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- 4 flute allows for better workpiece finishes.
- Increased productivity.

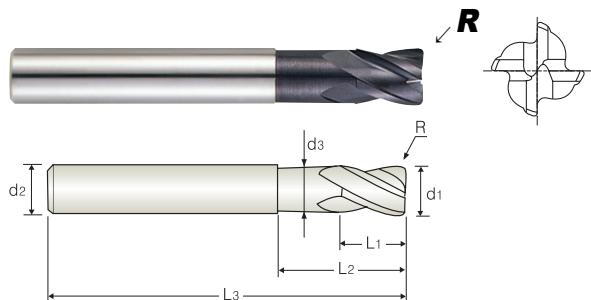
◇ *Call for Availability*

**EM905 Series**

Unit : mm

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|----------|-----------------|------------------------------|-------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| EM905100 | R0.5            | 10.0                         | 8                             | 15                           | 19.2                              | 130                           | 7.5                          |
| EM905901 | R1.0            | 10.0                         | 8                             | 15                           | 19.2                              | 130                           | 7.5                          |
| EM905120 | R0.5            | 12.0                         | 10                            | 18                           | 22.2                              | 150                           | 9.5                          |
| EM905902 | R1.0            | 12.0                         | 10                            | 18                           | 22.2                              | 150                           | 9.5                          |
| EM905140 | R0.5            | 14.0                         | 12                            | 21                           | 25.2                              | 160                           | 11.5                         |
| EM905903 | R1.0            | 14.0                         | 12                            | 21                           | 25.2                              | 160                           | 11.5                         |
| EM905180 | R0.5            | 18.0                         | 16                            | 27                           | 31.2                              | 180                           | 15.5                         |
| EM905904 | R1.0            | 18.0                         | 16                            | 27                           | 31.2                              | 180                           | 15.5                         |
| EM905220 | R0.5            | 22.0                         | 20                            | 33                           | 37.2                              | 200                           | 19.5                         |
| EM905905 | R1.0            | 22.0                         | 20                            | 33                           | 37.2                              | 200                           | 19.5                         |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0                      | h6<br>-0.02             |

**X-POWER****4 FLUTE, STUB CUT LENGTH, CORNER RADIUS****METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Superior workpiece finishes.
- Increased feed rate.

◇ *Call for Availability*

**EM839 Series**

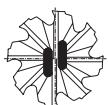
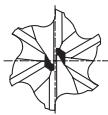
Unit : mm

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d <sub>1</sub> | SHANK DIAMETER d <sub>2(h6)</sub> | LENGTH OF CUT L <sub>1</sub> | LENGTH BELOW SHANK L <sub>2</sub> | OVERALL LENGTH L <sub>3</sub> | NECK DIAMETER d <sub>3</sub> |
|----------|-----------------|------------------------------|-----------------------------------|------------------------------|-----------------------------------|-------------------------------|------------------------------|
| EM839020 | R0.2            | 2.0                          | 6                                 | 2.5                          | 5                                 | 50                            | 1.9                          |
| EM839025 | R0.25           | 2.5                          | 6                                 | 3                            | 6                                 | 50                            | 2.4                          |
| EM839030 | R0.3            | 3.0                          | 6                                 | 4                            | 7                                 | 50                            | 2.8                          |
| EM839035 | R0.35           | 3.5                          | 6                                 | 4.5                          | 8                                 | 50                            | 3.2                          |
| EM839040 | R0.4            | 4.0                          | 6                                 | 5                            | 9                                 | 50                            | 3.7                          |
| EM839050 | R0.5            | 5.0                          | 6                                 | 6                            | 12                                | 50                            | 4.6                          |
| EM839060 | R0.6            | 6.0                          | 6                                 | 7                            | 14                                | 55                            | 5.6                          |
| EM839080 | R0.8            | 8.0                          | 8                                 | 10                           | 18                                | 60                            | 7.4                          |
| EM839100 | R1.0            | 10.0                         | 10                                | 12                           | 25                                | 70                            | 9.4                          |
| EM839120 | R1.2            | 12.0                         | 12                                | 15                           | 30                                | 80                            | 11.4                         |
| EM839160 | R1.6            | 16.0                         | 16                                | 18                           | 35                                | 90                            | 15.4                         |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0                      | h6<br>-0.02             |

**X-POWER**

# 6&8 FLUTE, 45° HELIX, LONG & EXTRA LONG LENGTH

**METRIC**

MG

6&amp;8

45°

PLAIN

- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rate.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.
- Corner Protection against chipping.

*Call for Availability*

**EM812 Series**

■ LONG LENGTH

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|---------------|-------------------|---------------|----------------|--------------|
| EM812060 | 6.0           | 6                 | 13            | 57             | 6            |
| EM812070 | 7.0           | 8                 | 16            | 63             | 6            |
| EM812080 | 8.0           | 8                 | 19            | 63             | 6            |
| EM812090 | 9.0           | 10                | 19            | 72             | 6            |
| EM812100 | 10.0          | 10                | 22            | 72             | 6            |
| EM812120 | 12.0          | 12                | 26            | 83             | 6            |
| EM812140 | 14.0          | 14                | 26            | 83             | 6            |
| EM812901 | 14.0          | 16                | 26            | 83             | 6            |
| EM812160 | 16.0          | 16                | 32            | 92             | 6            |
| EM812180 | 18.0          | 18                | 32            | 92             | 8            |
| EM812200 | 20.0          | 20                | 38            | 104            | 8            |
| EM812250 | 25.0          | 25                | 44            | 104            | 8            |

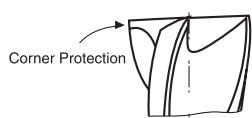
**EM834 Series**

■ EXTRA LONG LENGTH

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|---------------|-------------------|---------------|----------------|--------------|
| EM834060 | 6.0           | 6                 | 26            | 70             | 6            |
| EM834080 | 8.0           | 8                 | 36            | 90             | 6            |
| EM834100 | 10.0          | 10                | 46            | 100            | 6            |
| EM834120 | 12.0          | 12                | 56            | 110            | 6            |
| EM834160 | 16.0          | 16                | 66            | 130            | 6            |
| EM834200 | 20.0          | 20                | 76            | 140            | 6            |
| EM834250 | 25.0          | 25                | 92            | 180            | 6            |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.03             | h6                      |



**X-POWER****6 FLUTE, 45° HELIX, LONG LENGTH,  
CORNER RADIUS****METRIC**

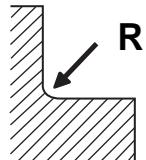
- Designed to machine high hardened materials.
- Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
- Excellent workpiece finishes.
- Corner radius against chipping in high speed machining.
- Higher wear-resistance.

◇ *Call for Availability*

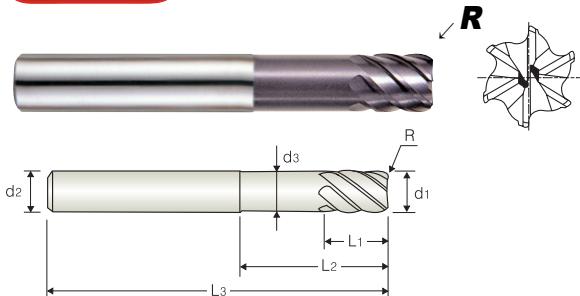
**EM835 Series**

Unit : mm

| EDP No.  | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|-----------------------|------------------|-------------------------|------------------|-------------------|
| EM835060 | R0.5                  | 6.0              | 6                       | 13               | 70                |
| EM835080 | R0.5                  | 8.0              | 8                       | 19               | 90                |
| EM835100 | R0.5                  | 10.0             | 10                      | 22               | 100               |
| EM835901 | R1.0                  | 10.0             | 10                      | 22               | 100               |
| EM835120 | R0.5                  | 12.0             | 12                      | 26               | 110               |
| EM835902 | R1.0                  | 12.0             | 12                      | 26               | 110               |
| EM835160 | R1.0                  | 16.0             | 16                      | 32               | 130               |
| EM835903 | R1.5                  | 16.0             | 16                      | 32               | 130               |
| EM835200 | R1.0                  | 20.0             | 20                      | 38               | 140               |
| EM835904 | R1.5                  | 20.0             | 20                      | 38               | 140               |
| EM835905 | R2.0                  | 20.0             | 20                      | 38               | 140               |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

**X-POWER****6 FLUTE, 45° HELIX, STUB CUT LENGTH,  
CORNER RADIUS****METRIC**

- Designed to machine high hardened materials.
- High speed cutting and finish milling with high feed rates.
- Superior workpiece finishes.
- Superior wear resistant.
- Suitable for dry milling.
- Cutting up to the dimension three times as much as the diameter by reduced Neck

◇ *Call for Availability*

**EM897 Series**

Unit : mm

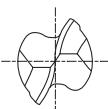
| EDP No.  | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2(h6) | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|----------|-----------------------|------------------------|-----------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| EM897060 | R0.5                  | 6.0                    | 6                           | 6                      | 14                          | 50                      | 5.7                    |
| EM897080 | R0.5                  | 8.0                    | 8                           | 8                      | 24                          | 60                      | 7.65                   |
| EM897100 | R1.0                  | 10.0                   | 10                          | 10                     | 30                          | 70                      | 9.65                   |
| EM897120 | R1.0                  | 12.0                   | 12                          | 12                     | 30                          | 75                      | 11.6                   |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |



# X-POWER 2 FLUTE, SHORT LENGTH, BALL NOSE

**METRIC**



► Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

► For copy-milling machines.

◇ Call for Availability

## EM876 Series

Unit : mm

| EDP No.<br>PLAIN | R<br>±0.01 | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|------------------|------------|------------------|-------------------------|------------------|-------------------|
| <b>EM876010</b>  | R0.5       | 1.0              | 3                       | 3                | 38                |
| <b>EM876012</b>  | R0.6       | 1.2              | 3                       | 3                | 38                |
| <b>EM876015</b>  | R0.75      | 1.5              | 3                       | 3                | 38                |
| <b>EM876020</b>  | R1.0       | 2.0              | 6                       | 3                | 50                |
| <b>EM876030</b>  | R1.5       | 3.0              | 6                       | 4                | 50                |
| <b>EM876040</b>  | R2.0       | 4.0              | 6                       | 5                | 54                |
| <b>EM876050</b>  | R2.5       | 5.0              | 6                       | 6                | 54                |
| <b>EM876060</b>  | R3.0       | 6.0              | 6                       | 7                | 54                |
| <b>EM876070</b>  | R3.5       | 7.0              | 8                       | 8                | 58                |
| <b>EM876080</b>  | R4.0       | 8.0              | 8                       | 9                | 58                |
| <b>EM876090</b>  | R4.5       | 9.0              | 10                      | 10               | 66                |
| <b>EM876100</b>  | R5.0       | 10.0             | 10                      | 11               | 66                |
| <b>EM876120</b>  | R6.0       | 12.0             | 12                      | 12               | 73                |
| <b>EM876140</b>  | R7.0       | 14.0             | 14                      | 14               | 75                |
| <b>EM876160</b>  | R8.0       | 16.0             | 16                      | 16               | 82                |
| <b>EM876180</b>  | R9.0       | 18.0             | 18                      | 18               | 84                |
| <b>EM876200</b>  | R10.0      | 20.0             | 20                      | 20               | 92                |
| <b>EM876250</b>  | R12.5      | 25.0             | 25                      | 25               | 104               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

X-POWER

## 2&amp;4 FLUTE, LONG LENGTH, BALL NOSE

METRIC



MG

2&amp;4

30°

R  
± 0.01

PLAIN

FLAT

► Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

► For copy-milling machines.

◇ U.S.A Stock

EM813, EM823, EM815, EM825 Series

Unit :mm

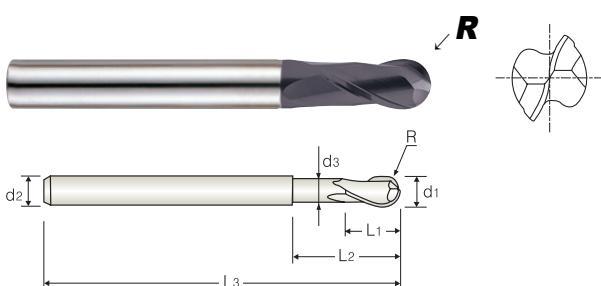
| EDP No. (2 FLUTE) |               | EDP No. (4 FLUTE) |               | R<br>± 0.01 | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-------------------|---------------|-------------------|---------------|-------------|------------------|-------------------------|------------------|-------------------|
| PLAIN<br>EM813    | FLAT<br>EM823 | PLAIN<br>EM815    | FLAT<br>EM825 |             |                  |                         |                  |                   |
| 93302             | —             | 93335             | —             | R0.5        | 1.0              | 4                       | 2.5              | 50                |
| 93303             | —             | —                 | —             | R0.6        | 1.2              | 4                       | 3                | 50                |
| 93304             | —             | 93336             | —             | R0.75       | 1.5              | 4                       | 4                | 50                |
| 93305             | 93320         | 93337             | 93352         | R1.0        | 2.0              | 6                       | 5                | 50                |
| 93306             | 93321         | 93338             | 93353         | R1.5        | 3.0              | 6                       | 8                | 60                |
| 93307             | 93322         | 93339             | 93354         | R2.0        | 4.0              | 6                       | 8                | 70                |
| 93308             | 93323         | 93340             | 93355         | R2.5        | 5.0              | 6                       | 10               | 80                |
| 93309             | 93324         | 93341             | 93356         | R3.0        | 6.0              | 6                       | 12               | 90                |
| 93310             | 93325         | 93342             | 93357         | R3.5        | 7.0              | 8                       | 14               | 90                |
| 93311             | 93326         | 93343             | 93358         | R4.0        | 8.0              | 8                       | 14               | 100               |
| 93312             | 93327         | 93344             | 93359         | R4.5        | 9.0              | 10                      | 18               | 100               |
| 93313             | 93328         | 93345             | 93360         | R5.0        | 10.0             | 10                      | 18               | 100               |
| 93314             | 93329         | 93346             | 93361         | R6.0        | 12.0             | 12                      | 22               | 110               |
| 93315             | 93330         | 93347             | 93362         | R7.0        | 14.0             | 14                      | 26               | 110               |
| 93316             | 93331         | 93348             | 93363         | R8.0        | 16.0             | 16                      | 30               | 140               |
| 93317             | 93332         | 93349             | 93364         | R9.0        | 18.0             | 18                      | 34               | 140               |
| 93318             | 93333         | 93350             | 93365         | R10.0       | 20.0             | 20                      | 38               | 160               |
| 93319             | 93334         | 93351             | 93366         | R12.5       | 25.0             | 25                      | 50               | 180               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |



# X-POWER 2 FLUTE, MEDIUM LENGTH, BALL NOSE

**METRIC**



**MG**

**2**

**30°**

**R**  
 $\pm 0.01$

**PLAIN**

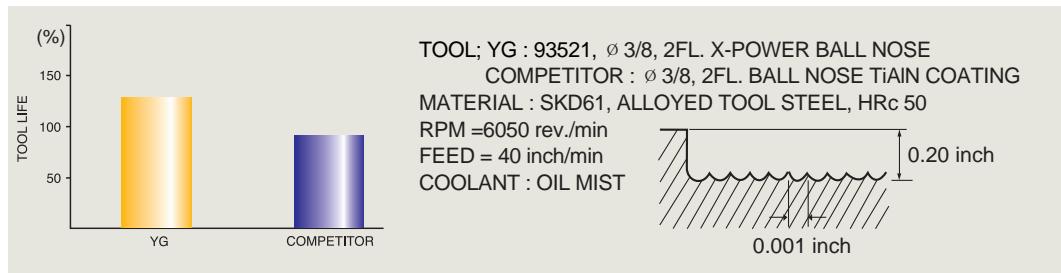
- Deep slotting milling is possible by reduced neck.
- High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ Call for Availability

**EM899 Series**

Unit : mm

| EDP No.  | R<br>$\pm 0.01$ | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2(h6)$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|----------|-----------------|---------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| EM899030 | R1.5            | 3.0                       | 6                              | 8                         | —                              | 70                         | —                         |
| EM899040 | R2.0            | 4.0                       | 6                              | 8                         | —                              | 70                         | —                         |
| EM899050 | R2.5            | 5.0                       | 6                              | 12                        | —                              | 80                         | —                         |
| EM899060 | R3.0            | 6.0                       | 6                              | 12                        | 22                             | 80                         | 5.8                       |
| EM899070 | R3.5            | 7.0                       | 8                              | 14                        | —                              | 90                         | —                         |
| EM899080 | R4.0            | 8.0                       | 8                              | 14                        | 27                             | 90                         | 7.8                       |
| EM899100 | R5.0            | 10.0                      | 10                             | 18                        | 31                             | 100                        | 9.8                       |
| EM899120 | R6.0            | 12.0                      | 12                             | 22                        | 35                             | 110                        | 11.8                      |
| EM899140 | R7.0            | 14.0                      | 12                             | 26                        | —                              | 120                        | —                         |
| EM899160 | R8.0            | 16.0                      | 16                             | 30                        | 50                             | 140                        | 15.8                      |
| EM899180 | R9.0            | 18.0                      | 16                             | 34                        | —                              | 140                        | —                         |
| EM899200 | R10.0           | 20.0                      | 20                             | 38                        | 58                             | 160                        | 19.8                      |
| EM899250 | R12.5           | 25.0                      | 25                             | 55                        | 75                             | 180                        | 24.8                      |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

YG

# X-POWER 2 FLUTE, LONG REACH, BALL NOSE

**METRIC**

► Longer overall length than EM813, EM823 type and suitable for machining deeply located area.

◊ *Call for Availability*

## EM838 Series

Unit : mm

| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|------------------|-------------------------|------------------|-------------------|
| EM838020 | R1.0       | 2.0              | 3                       | 6                | 80                |
| EM838030 | R1.5       | 3.0              | 3                       | 8                | 100               |
| EM838040 | R2.0       | 4.0              | 4                       | 8                | 100               |
| EM838050 | R2.5       | 5.0              | 6                       | 10               | 120               |
| EM838060 | R3.0       | 6.0              | 6                       | 10               | 120               |
| EM838080 | R4.0       | 8.0              | 8                       | 14               | 140               |
| EM838100 | R5.0       | 10.0             | 10                      | 18               | 180               |
| EM838120 | R6.0       | 12.0             | 12                      | 22               | 200               |
| EM838160 | R8.0       | 16.0             | 16                      | 30               | 250               |
| EM838200 | R10.0      | 20.0             | 20                      | 38               | 250               |

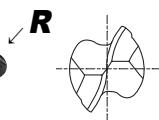
X-POWER

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |



# X-POWER 2 FLUTE, MINIATURE, BALL NOSE

**METRIC**



- High precision milling in medical, optical, electronics and aerospace industrials.
- Excellent performance at dry cutting conditon.
- Excellent performance on high hardened steel up to HRc70.

◇ U.S.A Stock

## EM865 Series

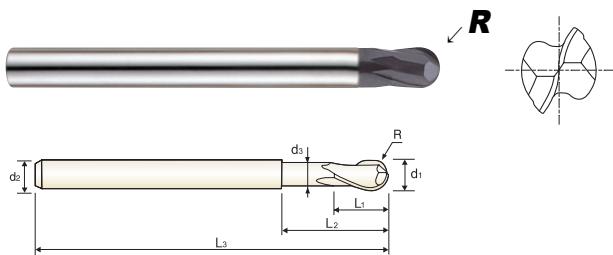
Unit : mm

| EDP No. | R<br>±0.01 | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|------------|------------------|-------------------------|------------------|-------------------|
| 93424   | R0.30      | 0.6              | 3                       | 1.1              | 40                |
| 93425   | R0.35      | 0.7              | 3                       | 1.5              | 40                |
| 93426   | R0.40      | 0.8              | 3                       | 2.0              | 40                |
| 93427   | R0.45      | 0.9              | 3                       | 2.2              | 40                |
| 93428   | R0.50      | 1.0              | 3                       | 2.5              | 40                |
| 93429   | R0.55      | 1.1              | 3                       | 3.0              | 40                |
| 93430   | R0.60      | 1.2              | 3                       | 3.0              | 40                |
| 93431   | R0.65      | 1.3              | 3                       | 3.5              | 40                |
| 93432   | R0.70      | 1.4              | 3                       | 3.5              | 40                |
| 93433   | R0.75      | 1.5              | 3                       | 4.0              | 40                |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

**X-POWER**

# 2 FLUTE, 15° HELIX, STUB CUT LENGTH, BALL NOSE for OVER HRc55

**METRIC****HRc55 ~ HRc70**

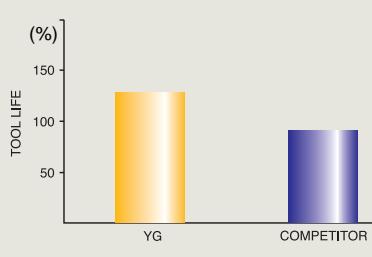
- Suitable for HRc55~HRc70 high hardened materials.
- Strong cutting edges and higher tool rigidity.

◊ Call for Availability

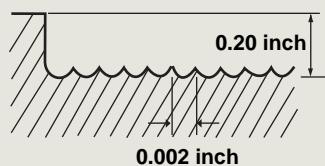
**EM868 Series**

Unit : mm

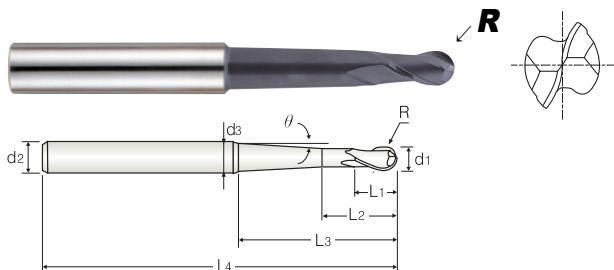
| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2(h6) | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|----------|------------|------------------------|-----------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| EM868010 | R0.5       | 1.0                    | 4                           | 1                      | 2.2                         | 50                      | 0.95                   |
| EM868011 | R0.5       | 1.0                    | 6                           | 1                      | 2.2                         | 50                      | 0.95                   |
| EM868012 | R0.6       | 1.2                    | 4                           | 1.2                    | 2.6                         | 50                      | 1.1                    |
| EM868015 | R0.75      | 1.5                    | 4                           | 1.5                    | 3                           | 50                      | 1.4                    |
| EM868020 | R1.0       | 2.0                    | 6                           | 2                      | 4                           | 50                      | 1.9                    |
| EM868030 | R1.5       | 3.0                    | 6                           | 3                      | 6                           | 60                      | 2.9                    |
| EM868040 | R2.0       | 4.0                    | 6                           | 4                      | 8                           | 70                      | 3.9                    |
| EM868050 | R2.5       | 5.0                    | 6                           | 5                      | 10                          | 80                      | 4.9                    |
| EM868060 | R3.0       | 6.0                    | 6                           | 6                      | 12                          | 90                      | 5.9                    |
| EM868070 | R3.5       | 7.0                    | 8                           | 7                      | 14                          | 90                      | 6.9                    |
| EM868080 | R4.0       | 8.0                    | 8                           | 8                      | 16                          | 100                     | 7.9                    |
| EM868090 | R4.5       | 9.0                    | 10                          | 9                      | 18                          | 100                     | 8.9                    |
| EM868100 | R5.0       | 10.0                   | 10                          | 10                     | 20                          | 100                     | 9.9                    |
| EM868120 | R6.0       | 12.0                   | 12                          | 12                     | 24                          | 110                     | 11.9                   |
| EM868140 | R7.0       | 14.0                   | 14                          | 14                     | 28                          | 110                     | 13.8                   |
| EM868160 | R8.0       | 16.0                   | 16                          | 16                     | 32                          | 140                     | 15.8                   |
| EM868180 | R9.0       | 18.0                   | 18                          | 18                     | 36                          | 140                     | 17.8                   |
| EM868200 | R10.0      | 20.0                   | 20                          | 20                     | 40                          | 160                     | 19.8                   |
| EM868250 | R12.5      | 25.0                   | 25                          | 25                     | 50                          | 180                     | 24.8                   |



TOOL; YG : 93492, Ø 3/8, 2FL. X-POWER BALL NOSE  
 COMPETITOR : Ø 3/8, 2FL. BALL NOSE, TiAIN COATING  
 MATERIAL : SKD11, ALLOYED TOOL STEEL (HRc 60)  
 RPM = 3820 rev./min  
 FEED = 36 inch/min  
 COOLANT : OIL MIST



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

**X-POWER****2 FLUTE, BALL NOSE with TAPER NECK****METRIC**

MG

2

30°

R

± 0.01

PLAIN

► High efficiency milling is possible in deep slotting with projection of the end mill being long.

◇ Call for Availability

**EM902 Series**

Unit : mm

| EDP No.  | R<br>± 0.01 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> (h6) | LENGTH<br>OF CUT<br>L <sub>1</sub> | L <sub>2</sub> | LENGTH<br>BELOW SHANK<br>L <sub>3</sub> | OVERALL<br>LENGTH<br>L <sub>4</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> | NECK<br>TAPER ANGLE<br>θ |
|----------|-------------|------------------------------------|--|------------------------------------|----------------|---|-------------------------------------|------------------------------------|--------------------------|
| EM902010 | R0.5        | 1.0                                | 6  | 2                                  | 4              | 23                                      | 60                                  | 2.0                                | 1°30'                    |
| EM902901 | R0.5        | 1.0                                | 6  | 2                                  | 4              | 23                                      | 60                                  | 4.3                                | 5°                       |
| EM902902 | R0.5        | 1.0                                | 6  | 2                                  | 4              | 42                                      | 80                                  | 5.0                                | 3°                       |
| EM902020 | R1.0        | 2.0                                | 6  | 4                                  | 6              | 23                                      | 60                                  | 2.9                                | 1°30'                    |
| EM902903 | R1.0        | 2.0                                | 6  | 4                                  | 6              | 23                                      | 60                                  | 5.0                                | 5°                       |
| EM902904 | R1.0        | 2.0                                | 6  | 4                                  | 6              | 41                                      | 80                                  | 5.7                                | 3°                       |
| EM902030 | R1.5        | 3.0                                | 6  | 6                                  | 8              | 32                                      | 70                                  | 5.6                                | 3°                       |
| EM902905 | R1.5        | 3.0                                | 6  | 6                                  | 8              | 52                                      | 90                                  | 5.3                                | 1°30'                    |
| EM902040 | R2.0        | 4.0                                | 6  | 8                                  | 10             | 28                                      | 70                                  | 6.0                                | 3°                       |
| EM902906 | R2.0        | 4.0                                | 6  | 8                                  | 10             | 49                                      | 90                                  | 6.0                                | 1°30'                    |
| EM902050 | R2.5        | 5.0                                | 8  | 10                                 | 12             | 41                                      | 90                                  | 8.0                                | 3°                       |
| EM902907 | R2.5        | 5.0                                | 8  | 10                                 | 12             | 61                                      | 110                                 | 7.6                                | 1°30'                    |
| EM902060 | R3.0        | 6.0                                | 8  | 12                                 | 15             | 34                                      | 90                                  | 8.0                                | 3°                       |
| EM902908 | R3.0        | 6.0                                | 8  | 12                                 | 15             | 53                                      | 110                                 | 8.0                                | 1°30'                    |
| EM902080 | R4.0        | 8.0                                | 10                                       | 14                                 | 17             | 36                                      | 100                                 | 10.0                               | 3°                       |
| EM902909 | R4.0        | 8.0                                | 10                                       | 14                                 | 17             | 55                                      | 120                                 | 10.0                               | 1°30'                    |
| EM902100 | R5.0        | 10.0                               | 12                                       | 18                                 | 21             | 40                                      | 110                                 | 12.0                               | 3°                       |
| EM902910 | R5.0        | 10.0                               | 12                                       | 18                                 | 21             | 59                                      | 130                                 | 12.0                               | 1°30'                    |
| EM902120 | R6.0        | 12.0                               | 16                                       | 22                                 | 25             | 63                                      | 140                                 | 16.0                               | 3°                       |
| EM902911 | R6.0        | 12.0                               | 16                                       | 22                                 | 25             | 83                                      | 160                                 | 15.0                               | 1°30'                    |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

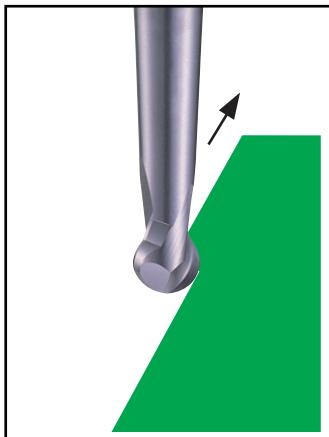
### Useful Field Area

- Die & Mold making, Turbine manufacturing and Aircraft Industry, etc.
- Difficult 3-D Forms.
- Profiling of up to HRc 70 high hardened steels and Alloy steels, Nickel base alloys, Titanium alloys.

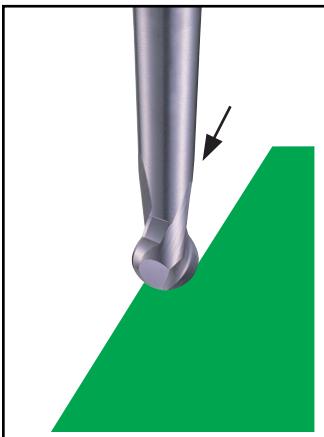
### Characteristic

- Ultra micro grain carbide which increases both toughness and hardness.
- YG-1's unique X-POWER coating suitable for dry cutting and high speed cutting.
- Outstanding tool geometry and sphere shape ball enables more increased tool life and higher speed and feed operation.

### Surpassing Milling Operation

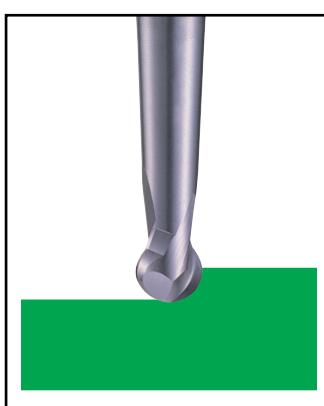


(Favorable Back Milling)

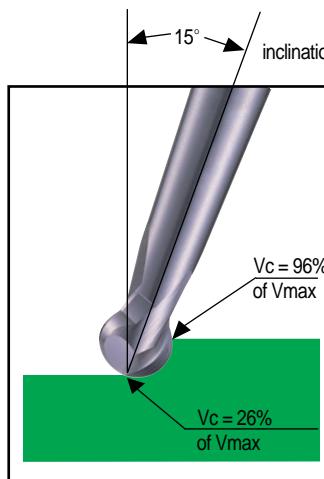


(Unfavorable Drilling)

- Operating angle 14°~16°, higher speed and feed can be achieved by decreased cutting resistance at cutting edges contacting the workpiece.
- Excellent surface roughness and higher milling process.
- Enable to milling with higher speed and feed when Back Milling.

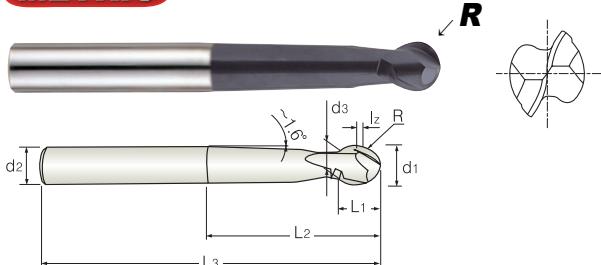


(Unfavorable Profiling)



(Favorable Profiling)

- When 15° inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.

**X-POWER****2 FLUTE, LONG LENGTH, BALL NOSE****METRIC**

MG

2

30°

R

±0.01

PLAIN

► Designed for copy milling.

► Increased feed rates.

► 15° inclination.

► Easy to regrind.

◇ Call for Availability

X-POWER

EM669 Series

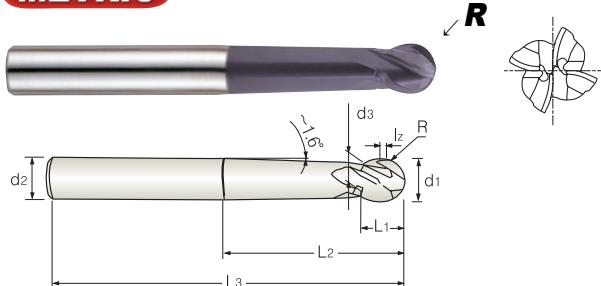
MMC-ECONOMY TYPE

Unit : mm

| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> (h6) | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> | l <sub>z</sub> |
|----------|------------|------------------------------------|--|------------------------------------|---|-------------------------------------|------------------------------------|----------------|
| EM669030 | R1.5       | 3.0                                | 6  | 4                                  | 30                                      | 80                                  | 2.5                                | 1.5            |
| EM669040 | R2.0       | 4.0                                | 6  | 5                                  | 30                                      | 80                                  | 3.3                                | 1.5            |
| EM669050 | R2.5       | 5.0                                | 6  | 6                                  | 43                                      | 80                                  | 4.1                                | 2.0            |
| EM669060 | R3.0       | 6.0                                | 6  | 7                                  | 30                                      | 100                                 | 4.7                                | 2.0            |
| EM669080 | R4.0       | 8.0                                | 8  | 9                                  | 36                                      | 100                                 | 6.5                                | 3.0            |
| EM669100 | R5.0       | 10.0                               | 10                                       | 11                                 | 43                                      | 100                                 | 8.2                                | 3.0            |
| EM669120 | R6.0       | 12.0                               | 12                                       | 13                                 | 52                                      | 100                                 | 9.8                                | 3.0            |
| EM669160 | R8.0       | 16.0                               | 16                                       | 15                                 | 61                                      | 150                                 | 13.4                               | 3.0            |

※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPPENING THAN SPHERE TYPE.

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

**X-POWER****4 FLUTE, LONG LENGTH, BALL NOSE****METRIC**

MG

4

30°

R

±0.01

PLAIN

► Designed for copy milling.

► Increased feed rates.

► 15° inclination.

► Easy to regrind.

◇ Call for Availability

EM673 Series

MMC-ECONOMY TYPE

Unit : mm

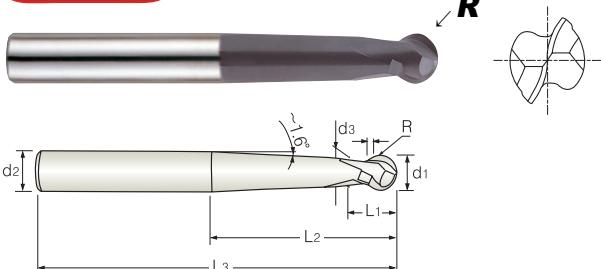
| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> (h6) | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> | l <sub>z</sub> |
|----------|------------|------------------------------------|--|------------------------------------|---|-------------------------------------|------------------------------------|----------------|
| EM673050 | R2.5       | 5.0                                | 6  | 6                                  | 43                                      | 80                                  | 4.1                                | 2.0            |
| EM673060 | R3.0       | 6.0                                | 6  | 7                                  | 30                                      | 100                                 | 4.7                                | 2.0            |
| EM673080 | R4.0       | 8.0                                | 8  | 9                                  | 36                                      | 100                                 | 6.5                                | 3.0            |
| EM673100 | R5.0       | 10.0                               | 10                                       | 11                                 | 43                                      | 100                                 | 8.2                                | 3.0            |
| EM673120 | R6.0       | 12.0                               | 12                                       | 13                                 | 52                                      | 100                                 | 9.8                                | 3.0            |
| EM673160 | R8.0       | 16.0                               | 16                                       | 15                                 | 61                                      | 150                                 | 13.4                               | 3.0            |

※ ECONOMIC TYPE HAS MORE ADVANTAGE IN RESHARPPENING THAN SPHERE TYPE.

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.02             | h6                      |

TOLERANCE  
OF MILL DIA.TOLERANCE  
OF SHANK DIA.0  
-0.02

h6

**X-POWER****2 FLUTE, LONG LENGTH, BALL NOSE****METRIC**

MG

2

30°

R

±0.01

PLAIN

► Designed for copy milling.

► Increased feed rates.

► 15° inclination.

◊ Call for Availability

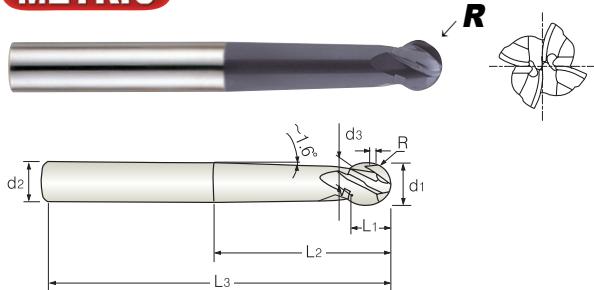
**EM863 Series**

■ MMC-SPHERE TYPE

Unit : mm

| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2(h6)</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|----------|------------|------------------------------------|---|------------------------------------|---|-------------------------------------|------------------------------------|
| EM863030 | R1.5       | 3.0                                | 6                                       | 2.3                                | 30                                      | 80                                  | 2.5                                |
| EM863040 | R2.0       | 4.0                                | 6                                       | 3.1                                | 30                                      | 80                                  | 3.3                                |
| EM863050 | R2.5       | 5.0                                | 6                                       | 3.9                                | 38                                      | 80                                  | 4.1                                |
| EM863060 | R3.0       | 6.0                                | 6                                       | 4.9                                | 28                                      | 100                                 | 4.7                                |
| EM863080 | R4.0       | 8.0                                | 8                                       | 6.3                                | 33                                      | 100                                 | 6.5                                |
| EM863100 | R5.0       | 10.0                               | 10                                      | 7.9                                | 40                                      | 100                                 | 8.2                                |
| EM863120 | R6.0       | 12.0                               | 12                                      | 9.5                                | 49                                      | 100                                 | 9.8                                |
| EM863160 | R8.0       | 16.0                               | 16                                      | 12.4                               | 59                                      | 150                                 | 13.4                               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

**X-POWER****4 FLUTE, LONG LENGTH, BALL NOSE****METRIC**

MG

4

30°

R

±0.01

PLAIN

► Designed for copy milling.

► Increased feed rates.

► 15° inclination.

◊ Call for Availability

**EM864 Series**

■ MMC-SPHERE TYPE

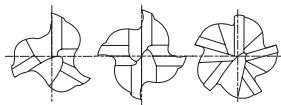
Unit : mm

| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2(h6)</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|----------|------------|------------------------------------|---|------------------------------------|---|-------------------------------------|------------------------------------|
| EM864050 | R2.5       | 5.0                                | 6                                       | 3.9                                | 38                                      | 80                                  | 4.1                                |
| EM864060 | R3.0       | 6.0                                | 6                                       | 4.9                                | 28                                      | 100                                 | 4.7                                |
| EM864080 | R4.0       | 8.0                                | 8                                       | 6.3                                | 33                                      | 100                                 | 6.5                                |
| EM864100 | R5.0       | 10.0                               | 10                                      | 7.9                                | 40                                      | 100                                 | 8.2                                |
| EM864120 | R6.0       | 12.0                               | 12                                      | 9.5                                | 49                                      | 100                                 | 9.8                                |
| EM864160 | R8.0       | 16.0                               | 16                                      | 12.4                               | 59                                      | 150                                 | 13.4                               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

**X-POWER**

# MULTI FLUTE, 20° HELIX, SHORT LENGTH, FINE PITCH ROUGHING

**METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

◇ *Call for Availability*

EM832 Series

Unit : mm

| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EM832060 | 6.0               | 6                 | 7             | 54             | 3            |
| EM832070 | 7.0               | 8                 | 8             | 58             | 3            |
| EM832080 | 8.0               | 8                 | 9             | 58             | 3            |
| EM832090 | 9.0               | 10                | 13            | 66             | 4            |
| EM832100 | 10.0              | 10                | 14            | 66             | 4            |
| EM832120 | 12.0              | 12                | 16            | 73             | 4            |
| EM832140 | 14.0              | 14                | 18            | 75             | 4            |
| EM832160 | 16.0              | 16                | 22            | 82             | 4            |
| EM832180 | 18.0              | 18                | 24            | 84             | 4            |
| EM832200 | 20.0              | 20                | 26            | 92             | 4            |
| EM832250 | 25.0              | 25                | 25            | 110            | 5            |

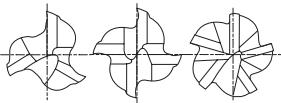
#### Tolerances according to DIN 7160 & 7161

|     | Tolerance range in $\mu\text{m}$ |             |              |               |               |
|-----|----------------------------------|-------------|--------------|---------------|---------------|
|     | Nominal-Diameter in mm           |             |              |               |               |
|     | from 1 to 3                      | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0<br>— 40                        | 0<br>— 48   | 0<br>— 58    | 0<br>— 70     | 0<br>— 84     |
| h6  | 0<br>— 6                         | 0<br>— 8    | 0<br>— 9     | 0<br>— 11     | 0<br>— 13     |

$\mu\text{m}$  = 1/1000mm

**X-POWER**

# MULTI FLUTE, 20° HELIX, LONG LENGTH, FINE PITCH ROUGHING

**METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

◇ *Call for Availability*

EM814 Series

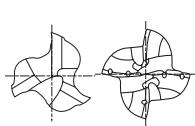
Unit : mm

| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EM814060 | 6.0               | 6                 | 16            | 57             | 3            |
| EM814070 | 7.0               | 8                 | 16            | 63             | 3            |
| EM814080 | 8.0               | 8                 | 16            | 63             | 3            |
| EM814090 | 9.0               | 10                | 19            | 72             | 4            |
| EM814100 | 10.0              | 10                | 22            | 72             | 4            |
| EM814120 | 12.0              | 12                | 26            | 83             | 4            |
| EM814140 | 14.0              | 14                | 26            | 83             | 4            |
| EM814901 | 14.0              | 16                | 26            | 83             | 4            |
| EM814160 | 16.0              | 16                | 32            | 92             | 4            |
| EM814180 | 18.0              | 18                | 32            | 92             | 4            |
| EM814200 | 20.0              | 20                | 38            | 104            | 4            |
| EM814250 | 25.0              | 25                | 45            | 121            | 5            |

#### Tolerances according to DIN 7160 & 7161

|     | Tolerance range in $\mu\text{m}$ |             |              |               |               |
|-----|----------------------------------|-------------|--------------|---------------|---------------|
|     | Nominal-Diameter in mm           |             |              |               |               |
|     | from 1 to 3                      | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| h10 | 0<br>— 40                        | 0<br>— 48   | 0<br>— 58    | 0<br>— 70     | 0<br>— 84     |
| h6  | 0<br>— 6                         | 0<br>— 8    | 0<br>— 9     | 0<br>— 11     | 0<br>— 13     |

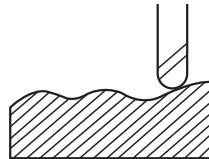
$\mu\text{m}$  = 1/1000mm

**X-POWER****3&4 FLUTE, 20° HELIX, LONG LENGTH,  
FINE PITCH ROUGHING, BALL NOSE****METRIC**

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- High velocity milling of hardened steels.
- For dry and wet milling.
- Fast chip ejection.

◇ Call for Availability

Unit : mm

**EM833 Series**

| EDP No.  | R<br>± 0.02 | MILL<br>DIAMETER<br>h10 | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------|-------------|-------------------------|-------------------------|------------------|-------------------|-----------------|
| EM833060 | R3.0        | 6.0                     | 6                       | 16               | 57                | 3               |
| EM833080 | R4.0        | 8.0                     | 8                       | 16               | 63                | 3               |
| EM833100 | R5.0        | 10.0                    | 10                      | 22               | 72                | 4               |
| EM833120 | R6.0        | 12.0                    | 12                      | 26               | 83                | 4               |
| EM833140 | R7.0        | 14.0                    | 14                      | 26               | 83                | 4               |
| EM833160 | R8.0        | 16.0                    | 16                      | 32               | 92                | 4               |
| EM833180 | R9.0        | 18.0                    | 18                      | 32               | 92                | 4               |
| EM833200 | R10.0       | 20.0                    | 20                      | 38               | 104               | 4               |

**Tolerances according to DIN 7160 & 7161**

| Tolerance range in $\mu\text{m}$ |             |             |              |               |           |
|----------------------------------|-------------|-------------|--------------|---------------|-----------|
| Nominal-Diameter in mm           |             |             |              |               |           |
|                                  | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 |           |
| <b>h10</b>                       | 0<br>— 40   | 0<br>— 48   | 0<br>— 58    | 0<br>— 70     | 0<br>— 84 |
| <b>h6</b>                        | 0<br>— 6    | 0<br>— 8    | 0<br>— 9     | 0<br>— 11     | 0<br>— 13 |

$\mu\text{m} = 1/1000\text{mm}$

**X-POWER****2 FLUTE, TAPER****METRIC**

- Designed for milling die cavity.
- Suitable for machining tool steels alloy steels, mold steels and other high hardened materials.

◇ Call for Availability

Unit : mm

**EM837 Series**

| EDP No.  | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH | TAPER<br>ANGLE |
|----------|------------------|-------------------------|------------------|-------------------|----------------|
| EM837913 | 2.0              | 4                       | 6                | 45                | 30°            |
| EM837020 | 2.0              | 4                       | 6                | 45                | 1°             |
| EM837901 | 2.0              | 4                       | 6                | 45                | 2°             |
| EM837902 | 2.0              | 4                       | 6                | 45                | 3°             |
| EM837914 | 3.0              | 6                       | 10               | 55                | 30°            |
| EM837030 | 3.0              | 6                       | 10               | 55                | 1°             |
| EM837903 | 3.0              | 6                       | 10               | 55                | 2°             |
| EM837904 | 3.0              | 6                       | 10               | 55                | 3°             |
| EM837915 | 4.0              | 6                       | 15               | 55                | 30°            |
| EM837040 | 4.0              | 6                       | 15               | 55                | 1°             |
| EM837905 | 4.0              | 6                       | 15               | 55                | 2°             |
| EM837906 | 4.0              | 6                       | 15               | 55                | 3°             |

| EDP No.  | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH | TAPER<br>ANGLE |
|----------|------------------|-------------------------|------------------|-------------------|----------------|
| EM837916 | 5.0              | 6                       | 15               | 60                | 30°            |
| EM837050 | 5.0              | 6                       | 15               | 60                | 1°             |
| EM837907 | 5.0              | 6                       | 15               | 60                | 2°             |
| EM837908 | 5.0              | 6                       | 15               | 60                | 3°             |
| EM837917 | 6.0              | 6                       | 20               | 60                | 30°            |
| EM837060 | 6.0              | 6                       | 20               | 60                | 1°             |
| EM837909 | 6.0              | 6                       | 20               | 60                | 2°             |
| EM837910 | 6.0              | 8                       | 20               | 65                | 3°             |
| EM837918 | 8.0              | 8                       | 25               | 70                | 30°            |
| EM837080 | 8.0              | 8                       | 25               | 70                | 1°             |
| EM837911 | 8.0              | 8                       | 25               | 70                | 2°             |
| EM837912 | 8.0              | 10                      | 25               | 75                | 3°             |

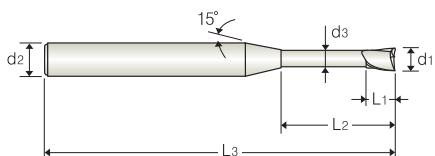
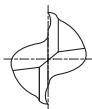
► We can supply various sizes and taper angle.

TOLERANCE OF MILL DIA. TOLERANCE OF SHANK DIA.

|       |    |
|-------|----|
| 0     | h6 |
| -0.02 |    |

**X-POWER****2 FLUTE for RIB PROCESSING**

X-POWER

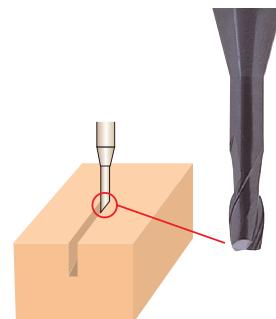
**METRIC****MG****2****30°****PLAIN**

- ▶ For deep slotting & pocketing.
- ▶ For depths of 6 to 10X cutting diameter.
- ▶ Machine carbon steel, alloy steel, tool steel, die and mold steels.
- ▶ Suitable for high speed cutting and high precision machining.
- ▶ Designed with reinforced shank for higher stability and rigidity.
- ▶ Long neck design for deep machining near walls.

**◊ Call for Availability****EM883 Series**

Unit : mm

| EDP No.  | MILL DIAMETER $d_1$ | SHANK DIAMETER $d_2(h6)$ | LENGTH OF CUT $L_1$ | LENGTH BELOW SHANK $L_2$ | OVERALL LENGTH $L_3$ | NECK DIAMETER $d_3$ |
|----------|---------------------|--------------------------|---------------------|--------------------------|----------------------|---------------------|
| EM883908 | 0.8                 | 4                        | 1.2                 | 6                        | 45                   | 0.75                |
| EM883909 | 0.8                 | 4                        | 1.2                 | 8                        | 45                   | 0.75                |
| EM883010 | 1.0                 | 4                        | 1.5                 | 6                        | 45                   | 0.97                |
| EM883912 | 1.0                 | 4                        | 1.5                 | 8                        | 45                   | 0.95                |
| EM883914 | 1.0                 | 4                        | 1.5                 | 12                       | 45                   | 0.93                |
| EM883915 | 1.2                 | 4                        | 1.8                 | 8                        | 45                   | 1.15                |
| EM883917 | 1.2                 | 4                        | 1.8                 | 12                       | 45                   | 1.13                |
| EM883920 | 1.4                 | 4                        | 2.1                 | 12                       | 45                   | 1.33                |
| EM883923 | 1.5                 | 4                        | 2.3                 | 8                        | 45                   | 1.45                |
| EM883924 | 1.5                 | 4                        | 2.3                 | 10                       | 45                   | 1.45                |
| EM883925 | 1.5                 | 4                        | 2.3                 | 12                       | 45                   | 1.43                |
| EM883927 | 1.5                 | 4                        | 2.3                 | 16                       | 50                   | 1.41                |
| EM883932 | 1.6                 | 4                        | 2.4                 | 12                       | 45                   | 1.53                |
| EM883946 | 1.8                 | 4                        | 2.7                 | 12                       | 45                   | 1.73                |
| EM883960 | 2.0                 | 4                        | 3.0                 | 12                       | 45                   | 1.93                |
| EM883962 | 2.0                 | 4                        | 3.0                 | 16                       | 50                   | 1.91                |
| EM883968 | 2.5                 | 4                        | 3.7                 | 12                       | 45                   | 2.40                |
| EM883970 | 2.5                 | 4                        | 3.7                 | 16                       | 55                   | 2.40                |
| EM883977 | 3.0                 | 6                        | 4.5                 | 14                       | 50                   | 2.85                |
| EM883979 | 3.0                 | 6                        | 4.5                 | 18                       | 55                   | 2.85                |

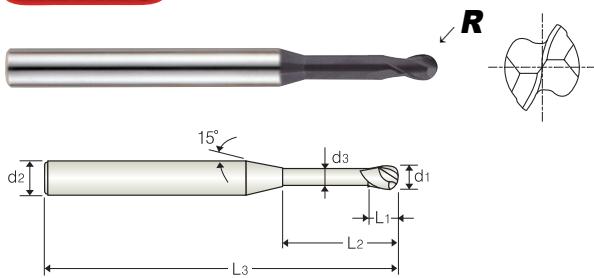


| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.015            | h6                      |

**X-POWER**

# 2 FLUTE, BALL NOSE for RIB PROCESSING

**METRIC**



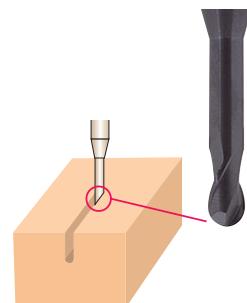
- For 3-D milling, deep slotting and pocketing.
- For depths of 6 to 10X cutting diameter.
- Machine carbon steel, alloy steel, tool steel, die and mold steels.
- Suitable for high speed cutting and high precision machining.
- Designed with reinforced shank for higher stability and rigidity.
- Long neck design for deep machining near walls.

◊ Call for Availability

## EM886 Series

Unit : mm

| EDP No.  | R<br>±0.01 | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2(h6)$ | LENGTH<br>OF CUT<br>$l_1$ | LENGTH<br>BELOW SHANK<br>$l_2$ | OVERALL<br>LENGTH<br>$l_3$ | NECK<br>DIAMETER<br>$d_3$ |
|----------|------------|---------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| EM886006 | R0.3       | 0.6                       | 3                              | 0.9                       | 6                              | 35                         | 0.55                      |
| EM886008 | R0.4       | 0.8                       | 4                              | 1.2                       | 6                              | 45                         | 0.75                      |
| EM886901 | R0.4       | 0.8                       | 4                              | 1.2                       | 8                              | 45                         | 0.75                      |
| EM886010 | R0.5       | 1.0                       | 4                              | 1.5                       | 6                              | 45                         | 0.97                      |
| EM886902 | R0.5       | 1.0                       | 4                              | 1.5                       | 8                              | 45                         | 0.95                      |
| EM886904 | R0.5       | 1.0                       | 4                              | 1.5                       | 12                             | 45                         | 0.93                      |
| EM886012 | R0.6       | 1.2                       | 4                              | 1.8                       | 8                              | 45                         | 1.15                      |
| EM886905 | R0.6       | 1.2                       | 4                              | 1.8                       | 12                             | 45                         | 1.13                      |
| EM886014 | R0.7       | 1.4                       | 4                              | 2.1                       | 12                             | 45                         | 1.33                      |
| EM886015 | R0.75      | 1.5                       | 4                              | 2.3                       | 8                              | 45                         | 1.45                      |
| EM886906 | R0.75      | 1.5                       | 4                              | 2.3                       | 12                             | 45                         | 1.43                      |
| EM886907 | R0.75      | 1.5                       | 4                              | 2.3                       | 16                             | 50                         | 1.41                      |
| EM886016 | R0.8       | 1.6                       | 4                              | 2.4                       | 16                             | 50                         | 1.51                      |
| EM886018 | R0.9       | 1.8                       | 4                              | 2.7                       | 16                             | 50                         | 1.71                      |
| EM886020 | R1.0       | 2.0                       | 4                              | 3.0                       | 8                              | 45                         | 1.95                      |
| EM886909 | R1.0       | 2.0                       | 4                              | 3.0                       | 16                             | 50                         | 1.91                      |
| EM886910 | R1.0       | 2.0                       | 4                              | 3.0                       | 20                             | 55                         | 1.89                      |
| EM886030 | R1.5       | 3.0                       | 6                              | 4.5                       | 16                             | 55                         | 2.85                      |
| EM886911 | R1.5       | 3.0                       | 6                              | 4.5                       | 20                             | 60                         | 2.85                      |
| EM886040 | R2.0       | 4.0                       | 6                              | 6.0                       | 16                             | 60                         | 3.85                      |
| EM886912 | R2.0       | 4.0                       | 6                              | 6.0                       | 20                             | 65                         | 3.85                      |

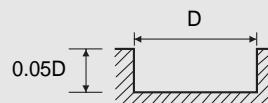


| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.02                | h6                         |

## 2 FLUTE, FINISH, SLOTTING

## EM154 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>TOOL STEELS  |      | STAINLESS STEELS |      | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|--|-------|------------------------------|------|------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30                                     |       | HRc30 ~ HRc45                |      |                  |      | HRc45 ~ HRc55                |      | HRc55 ~ HRc65           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |       | 1000 ~ 1500N/mm <sup>2</sup> |      |                  |      | 1500 ~ 2000N/mm <sup>2</sup> |      | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM  | FEED  | RPM                          | FEED | RPM              | FEED | RPM                          | FEED | RPM                     | FEED |
| 1/16     | 11560                                      | 7.50  | 7560                         | 4.70 | 6300             | 3.55 | 5040                         | 1.40 |                         |      |
| 1/8      | 8920                                       | 8.25  | 5560                         | 5.50 | 4620             | 4.70 | 3360                         | 1.55 | 1900                    | 1.55 |
| 3/16     | 6300                                       | 12.60 | 3780                         | 7.50 | 3160             | 6.30 | 2320                         | 1.95 | 1260                    | 1.55 |
| 1/4      | 5560                                       | 13.80 | 3360                         | 8.65 | 2840             | 7.10 | 2000                         | 2.15 | 1100                    | 1.55 |
| 5/16     | 4200                                       | 14.95 | 2520                         | 7.85 | 2100             | 7.10 | 1680                         | 2.95 | 840                     | 1.55 |
| 3/8      | 3260                                       | 13.00 | 2000                         | 6.30 | 1680             | 6.30 | 1360                         | 2.35 | 680                     | 1.40 |
| 1/2      | 2740                                       | 11.00 | 1680                         | 5.10 | 1360             | 5.10 | 1160                         | 2.15 | 560                     | 1.40 |
| 5/8      | 2200                                       | 8.65  | 1360                         | 4.30 | 1060             | 4.30 | 900                          | 1.55 | 440                     | 0.80 |
| 3/4      | 1680                                       | 6.70  | 1060                         | 3.15 | 840              | 3.15 | 680                          | 1.20 | 320                     | 0.80 |
| 1        | 1360                                       | 5.10  | 840                          | 2.75 | 680              | 2.35 | 540                          | 0.80 | 260                     | 0.60 |

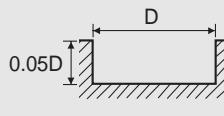
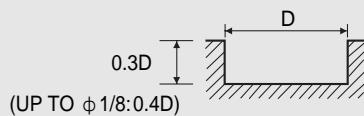


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, LONG LENGTH, FINISH, SLOTTING

## EM206 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |      | ALLOY STEELS<br>TOOL STEELS  |      | STAINLESS STEELS             |      |
|----------|--|------|------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc30                                     |      | HRc30 ~ HRc45                |      | HRc45 ~ HRc55                |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |      | 1000 ~ 1500N/mm <sup>2</sup> |      | 1500 ~ 2000N/mm <sup>2</sup> |      |
| DIAMETER | RPM  | FEED | RPM                          | FEED | RPM                          | FEED |
| 1/8      | 4410                                       | 7.8  | 3570                         | 2.4  | 2200                         | 1.2  |
| 3/16     | 3050                                       | 4.1  | 2420                         | 3.3  | 1580                         | 1.6  |
| 1/4      | 2630                                       | 4.9  | 2100                         | 4.1  | 1370                         | 2.0  |
| 5/16     | 2000                                       | 5.3  | 1580                         | 4.1  | 1050                         | 2.0  |
| 3/8      | 1680                                       | 5.3  | 1370                         | 4.1  | 840                          | 2.0  |
| 1/2      | 1370                                       | 4.1  | 1160                         | 3.7  | 700                          | 1.6  |
| 5/8      | 1160                                       | 3.7  | 890                          | 3.0  | 560                          | 1.4  |
| 3/4      | 840  | 2.8  | 680                          | 2.0  | 420                          | 1.0  |
| 1        | 610  | 2.0  | 540                          | 1.6  | 330                          | 0.7  |

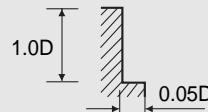


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, FINISH, SIDE CUTTING

## EM153 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>TOOL STEELS  |       | STAINLESS STEELS |       | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|--|-------|------------------------------|-------|------------------|-------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30                                     |       | HRc30 ~ HRc45                |       |                  |       | HRc45 ~ HRc55                |      | HRc55 ~ HRc65           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |       | 1000 ~ 1500N/mm <sup>2</sup> |       |                  |       | 1500 ~ 2000N/mm <sup>2</sup> |      | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM  | FEED  | RPM                          | FEED  | RPM              | FEED  | RPM                          | FEED | RPM                     | FEED |
| 1/16     | 11560                                      | 11.00 | 7560                         | 6.70  | 6300             | 5.50  | 5040                         | 1.95 |                         |      |
| 1/8      | 8920                                       | 12.60 | 5560                         | 7.85  | 4620             | 6.70  | 3360                         | 2.35 | 1900                    | 2.35 |
| 3/16     | 6300                                       | 23.60 | 3780                         | 14.15 | 3160             | 11.80 | 2320                         | 2.75 | 1260                    | 2.35 |
| 1/4      | 5560                                       | 26.00 | 3360                         | 16.15 | 2840             | 13.00 | 2000                         | 3.15 | 1100                    | 2.35 |
| 5/16     | 4200                                       | 27.95 | 2520                         | 14.95 | 2100             | 13.80 | 1680                         | 4.30 | 840                     | 2.35 |
| 3/8      | 3260                                       | 24.00 | 2000                         | 11.80 | 1680             | 11.80 | 1360                         | 3.55 | 680                     | 1.95 |
| 1/2      | 2740                                       | 20.50 | 1680                         | 9.85  | 1360             | 9.45  | 1160                         | 3.15 | 560                     | 1.95 |
| 5/8      | 2200                                       | 16.15 | 1360                         | 7.85  | 1060             | 7.85  | 900                          | 2.35 | 440                     | 1.20 |
| 3/4      | 1680                                       | 12.60 | 1060                         | 6.30  | 840              | 5.90  | 680                          | 1.55 | 320                     | 1.20 |
| 1        | 1360                                       | 9.85  | 840                          | 5.10  | 680              | 4.70  | 540                          | 1.20 | 260                     | 0.80 |

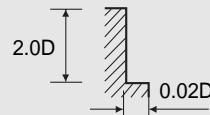
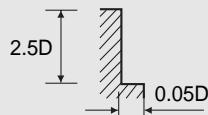


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, LONG LENGTH, SIDE CUTTING

## EM207 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |      | ALLOY STEELS<br>TOOL STEELS  |      | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|--|------|------------------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30                                     |      | HRc30 ~ HRc45                |      | HRc45 ~ HRc55                |      | HRc55 ~ HRc65           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |      | 1000 ~ 1500N/mm <sup>2</sup> |      | 1500 ~ 2000N/mm <sup>2</sup> |      | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM  | FEED | RPM                          | FEED | RPM                          | FEED | RPM                     | FEED |
| 1/8      | 4410                                       | 4.5  | 3570                         | 3.9  | 2200                         | 2.2  | 1890                    | 1.2  |
| 3/16     | 3050                                       | 7.1  | 2420                         | 5.5  | 1580                         | 2.8  | 1260                    | 1.6  |
| 1/4      | 2630                                       | 8.5  | 2100                         | 7.1  | 1370                         | 3.5  | 1160                    | 2.0  |
| 5/16     | 2000                                       | 9.1  | 1580                         | 7.1  | 1050                         | 3.5  | 840                     | 2.0  |
| 3/8      | 1680                                       | 9.1  | 1370                         | 7.1  | 840                          | 3.5  | 670                     | 2.0  |
| 1/2      | 1370                                       | 7.1  | 1160                         | 6.3  | 700                          | 2.8  | 560                     | 1.6  |
| 5/8      | 1160                                       | 6.3  | 890                          | 4.9  | 560                          | 2.4  | 440                     | 1.4  |
| 3/4      | 840  | 4.5  | 680                          | 3.5  | 420                          | 1.8  | 340                     | 1.0  |
| 1        | 670  | 4.5  | 540                          | 3.5  | 340                          | 1.8  | 270                     | 1.0  |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM959 Series

| MATERIAL | ALLOY STEELS<br>TOOL STEELS  |       | HARDENED STEELS              |      |
|----------|------------------------------|-------|------------------------------|------|
| HARDNESS | HRc30 ~ HRc45                |       | HRc45 ~ HRc55                |      |
| STRENGTH | 1000 ~ 1500N/mm <sup>2</sup> |       | 1500 ~ 2000N/mm <sup>2</sup> |      |
| DIAMETER | RPM                          | FEED  | RPM                          | FEED |
| .016     | 30000                        | 7.10  | 23000                        | 3.90 |
| .031     | 24000                        | 11.80 | 18000                        | 5.10 |
| .040     | 20000                        | 12.60 | 15000                        | 5.90 |
| .047     | 16000                        | 12.60 | 12000                        | 5.90 |
| .062     | 12000                        | 11.80 | 9000                         | 5.50 |

D < .040  
Depth=0.15×D  
D ≥ .040  
Depth=0.25×D

D < .040  
Depth=0.02×D  
D ≥ .040  
Depth=0.05×D

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM636, EM637, EM211 Series

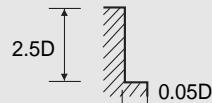
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>TOOL STEELS  |               | HARDENED STEELS              |               | HARDENED STEELS       |               |
|----------|--|--------|------------------------------|---------------|------------------------------|---------------|-----------------------|---------------|
|          | HARDNESS                                   | ~HRc30 | HARDNESS                     | HRc30 ~ HRc50 | HARDNESS                     | HRc50 ~ HRc55 | HARDNESS              | HRc55 ~ HRc65 |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |        | 1000 ~ 1750N/mm <sup>2</sup> |               | 1750 ~ 2000N/mm <sup>2</sup> |               | 2000N/mm <sup>2</sup> |               |
| DIAMETER | RPM  | FEED   | RPM                          | FEED          | RPM                          | FEED          | RPM                   | FEED          |
| 1/4      | 2630                                       | 4.90   | 2100                         | 4.20          | 1370                         | 2.00          | 1160                  | 1.40          |
| 5/16     | 2000                                       | 5.30   | 1580                         | 4.20          | 1050                         | 2.00          | 840                   | 1.40          |
| 3/8      | 1680                                       | 5.30   | 1370                         | 4.20          | 840                          | 2.00          | 670                   | 1.40          |
| 1/2      | 1370                                       | 4.20   | 1160                         | 3.80          | 700                          | 1.50          | 550                   | 1.00          |

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, CORNER RADIUS, SIDE CUTTING

## EM639, EM649, EM212 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |      | ALLOY STEELS<br>TOOL STEELS  |      | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|--|------|------------------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30                                     |      | HRc30 ~ HRc50                |      | HRc50 ~ HRc55                |      | HRc55 ~ HRc65           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |      | 1000 ~ 1750N/mm <sup>2</sup> |      | 1750 ~ 2000N/mm <sup>2</sup> |      | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM  | FEED | RPM                          | FEED | RPM                          | FEED | RPM                     | FEED |
| 1/4      | 2630                                       | 8.50 | 2100                         | 7.10 | 1370                         | 3.30 | 1160                    | 2.00 |
| 5/16     | 2000                                       | 9.00 | 1580                         | 7.10 | 1050                         | 3.30 | 840                     | 2.00 |
| 3/8      | 1680                                       | 9.00 | 1370                         | 7.10 | 840                          | 3.30 | 670                     | 2.00 |
| 1/2      | 1370                                       | 7.10 | 1160                         | 6.30 | 700                          | 2.80 | 550                     | 1.50 |



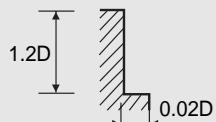
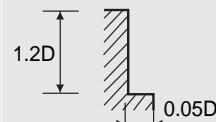
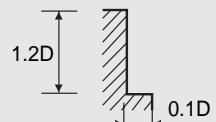
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, 45° HELIX, SIDE CUTTING

## EM102 Series

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |       | STAINLESS STEELS |      | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|---|-------|--|-------|------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30  |       | HRc30 ~ HRc45                            |       |                  |      | HRc45 ~ HRc55                |      | HRc55 ~ HRc60           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                          |       | 1000 ~ 1500N/mm <sup>2</sup>             |       |                  |      | 1500 ~ 2000N/mm <sup>2</sup> |      | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM   | FEED  | RPM                                      | FEED  | RPM              | FEED | RPM                          | FEED | RPM                     | FEED |
| 3/8      | 3010  | 31.50 | 2610                                     | 14.30 | 1600             | 7.70 | 1400                         | 5.30 | 1000                    | 2.60 |
| 1/2      | 2260  | 27.00 | 1950                                     | 12.30 | 1200             | 6.30 | 1050                         | 4.60 | 750                     | 2.00 |
| 5/8      | 1800  | 22.60 | 1560                                     | 10.10 | 960              | 5.10 | 840                          | 4.10 | 600                     | 1.70 |
| 3/4      | 1500  | 19.00 | 1300                                     | 8.50  | 800              | 4.50 | 700                          | 3.90 | 500                     | 1.60 |
| 7/8      | 1290  | 16.10 | 1120                                     | 7.60  | 690              | 4.50 | 600                          | 3.90 | 430                     | 1.60 |

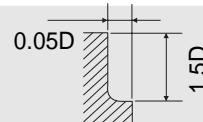


## 4 FLUTE, 45° HELIX, CORNER RADIUS, SIDE CUTTING

### EM103 Series

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |       | STAINLESS STEELS |       | HARDENED STEELS              |       | HARDENED STEELS         |       |
|----------|---|-------|--|-------|------------------|-------|------------------------------|-------|-------------------------|-------|
| HARDNESS | ~HRc30  |       | HRc30 ~ HRc45                            |       |                  |       | HRc45 ~ HRc55                |       | HRc55 ~ HRc65           |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                          |       | 1000 ~ 1500N/mm <sup>2</sup>             |       |                  |       | 1500 ~ 2000N/mm <sup>2</sup> |       | 2000N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM   | FEED  | RPM                                      | FEED  | RPM              | FEED  | RPM                          | FEED  | RPM                     | FEED  |
| 3/8      | 7690  | 79.00 | 7690                                     | 48.00 | 5680             | 36.00 | 5680                         | 29.00 | 3840                    | 19.00 |
| 1/2      | 5760  | 79.00 | 5760                                     | 48.00 | 4260             | 36.00 | 4260                         | 29.00 | 2880                    | 19.00 |
| 5/8      | 4600  | 71.00 | 4600                                     | 48.00 | 3410             | 36.00 | 3410                         | 29.00 | 2300                    | 19.00 |
| 3/4      | 3850  | 60.00 | 3850                                     | 48.00 | 2840             | 36.00 | 2840                         | 29.00 | 1920                    | 19.00 |
| 7/8      | 3300  | 51.00 | 3300                                     | 48.00 | 2430             | 36.00 | 2430                         | 29.00 | 1650                    | 19.00 |

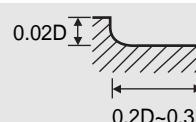
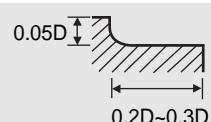
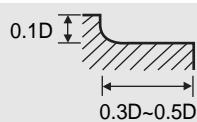


## 4 FLUTE, 45° HELIX, CORNER RADIUS, CONTOURING

### EM103 Series

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

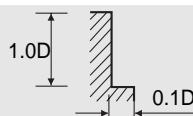
| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |       | STAINLESS STEELS |       | HARDENED STEELS              |       | HARDENED STEELS         |       |
|----------|---|-------|--|-------|------------------|-------|------------------------------|-------|-------------------------|-------|
| HARDNESS | ~HRc30  |       | HRc30 ~ HRc45                            |       |                  |       | HRc45 ~ HRc55                |       | HRc55 ~ HRc65           |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                          |       | 1000 ~ 1500N/mm <sup>2</sup>             |       |                  |       | 1500 ~ 2000N/mm <sup>2</sup> |       | 2000N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM   | FEED  | RPM                                      | FEED  | RPM              | FEED  | RPM                          | FEED  | RPM                     | FEED  |
| 3/8      | 7690  | 45.00 | 5680                                     | 36.00 | 5680             | 31.00 | 5680                         | 18.00 | 3840                    | 11.00 |
| 1/2      | 5760  | 45.00 | 4260                                     | 36.00 | 4260             | 31.00 | 4260                         | 18.00 | 2880                    | 11.00 |
| 5/8      | 4600  | 45.00 | 3410                                     | 36.00 | 3410             | 31.00 | 3410                         | 18.00 | 2300                    | 11.00 |
| 3/4      | 4850  | 45.00 | 2840                                     | 36.00 | 2840             | 31.00 | 2840                         | 18.00 | 1920                    | 11.00 |
| 7/8      | 3300  | 45.00 | 2430                                     | 36.00 | 2430             | 31.00 | 2430                         | 18.00 | 1650                    | 11.00 |



## 4 FLUTE, 55° HELIX, SIDE CUTTING

## EM964 Series

| MATERIAL | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | STAINLESS STEELS |       | HARDENED STEELS              |       | HARDENED STEELS         |       |
|----------|---------------------------------------|-------|------------------|-------|------------------------------|-------|-------------------------|-------|
| HARDNESS | HRc30 ~ HRc40                         |       |                  |       | HRc40 ~ HRc50                |       | HRc50 ~ HRc65           |       |
| STRENGTH | 1000 ~ 1250N/mm <sup>2</sup>          |       |                  |       | 1250 ~ 1700N/mm <sup>2</sup> |       | 1500N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM                                   | FEED  | RPM              | FEED  | RPM                          | FEED  | RPM                     | FEED  |
| 1/8      | 21000                                 | 32.00 | 13000            | 21.00 | 13000                        | 9.50  | 7300                    | 9.50  |
| 3/16     | 18000                                 | 56.00 | 11000            | 33.00 | 11000                        | 9.50  | 4800                    | 9.50  |
| 1/4      | 13000                                 | 66.00 | 7500             | 40.00 | 7500                         | 13.00 | 4200                    | 9.50  |
| 5/16     | 9500                                  | 61.00 | 6500             | 39.00 | 6500                         | 17.00 | 3200                    | 9.50  |
| 3/8      | 7700                                  | 48.00 | 5700             | 39.00 | 5700                         | 22.00 | 3850                    | 12.00 |
| 1/2      | 5800                                  | 48.00 | 4260             | 39.00 | 4260                         | 25.00 | 2900                    | 15.00 |
| 5/8      | 4200                                  | 48.00 | 3100             | 39.00 | 3100                         | 29.00 | 2100                    | 19.00 |

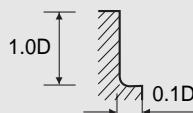


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

4 FLUTE, 55° HELIX, CORNER RADIUS,  
SIDE CUTTING

## EM965 Series

| MATERIAL | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | STAINLESS STEELS |       | HARDENED STEELS              |       | HARDENED STEELS         |       |
|----------|---------------------------------------|-------|------------------|-------|------------------------------|-------|-------------------------|-------|
| HARDNESS | HRc30 ~ HRc40                         |       |                  |       | HRc40 ~ HRc50                |       | HRc50 ~ HRc65           |       |
| STRENGTH | 1000 ~ 1250N/mm <sup>2</sup>          |       |                  |       | 1250 ~ 1700N/mm <sup>2</sup> |       | 1500N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM                                   | FEED  | RPM              | FEED  | RPM                          | FEED  | RPM                     | FEED  |
| 1/8      | 21000                                 | 32.00 | 13000            | 21.00 | 13000                        | 9.50  | 7300                    | 9.50  |
| 3/16     | 18000                                 | 56.00 | 11000            | 33.00 | 11000                        | 9.50  | 4800                    | 9.50  |
| 1/4      | 13000                                 | 66.00 | 7500             | 40.00 | 7500                         | 13.00 | 4200                    | 9.50  |
| 5/16     | 9500                                  | 61.00 | 6500             | 39.00 | 6500                         | 17.00 | 3200                    | 9.50  |
| 3/8      | 7700                                  | 48.00 | 5700             | 39.00 | 5700                         | 22.00 | 3850                    | 12.00 |
| 1/2      | 5800                                  | 48.00 | 4260             | 39.00 | 4260                         | 25.00 | 2900                    | 15.00 |
| 5/8      | 4200                                  | 48.00 | 3100             | 39.00 | 3100                         | 29.00 | 2100                    | 19.00 |

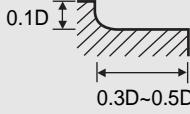
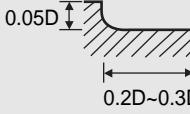
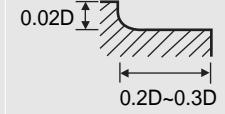


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# 4 FLUTE, 55° HELIX, CORNER RADIUS, CONTOURING

## EM965 Series

| MATERIAL | ALLOY STEELS<br>HEAT RESISTANT STEELS |      | STAINLESS STEELS |      | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|---------------------------------------|------|------------------|------|------------------------------|------|-------------------------|------|
| HARDNESS | HRc30 ~ HRc40                         |      |                  |      | HRc40 ~ HRc50                |      | HRc50 ~ HRc65           |      |
| STRENGTH | 1000 ~ 1250N/mm <sup>2</sup>          |      |                  |      | 1250 ~ 1700N/mm <sup>2</sup> |      | 1500N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM                                   | FEED | RPM              | FEED | RPM                          | FEED | RPM                     | FEED |
| 1/8      | 21000                                 | 24   | 13000            | 18   | 13000                        | 6    | 7300                    | 5.5  |
| 3/16     | 18000                                 | 42   | 11000            | 29   | 11000                        | 6    | 4800                    | 5.5  |
| 1/4      | 13000                                 | 50   | 7500             | 35   | 7500                         | 8    | 4200                    | 5.5  |
| 5/16     | 9500                                  | 46   | 6500             | 34   | 6500                         | 10   | 3200                    | 5.5  |
| 3/8      | 7700                                  | 36   | 5700             | 34   | 5700                         | 12   | 3850                    | 7.5  |
| 1/2      | 5800                                  | 36   | 4260             | 34   | 4260                         | 15   | 2900                    | 9.5  |
| 5/8      | 4200                                  | 36   | 3100             | 34   | 3100                         | 18   | 2100                    | 11.5 |

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# 6&8 FLUTE, 45° HELIX, LONG LENGTH, SIDE CUTTING

## EM208 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>TOOL STEELS  |       | HARDENED STEELS              |      | HARDENED STEELS         |      |
|----------|--|-------|------------------------------|-------|------------------------------|------|-------------------------|------|
| HARDNESS | ~HRc30                                     |       | HRc30 ~ HRc50                |       | HRc50 ~ HRc55                |      | HRc60 ~ HRc65           |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                     |       | 1000 ~ 1750N/mm <sup>2</sup> |       | 1750 ~ 2080N/mm <sup>2</sup> |      | 2080N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM  | FEED  | RPM                          | FEED  | RPM                          | FEED | RPM                     | FEED |
| 1/4      | 5560                                       | 79.00 | 3880                         | 54.00 | 1580                         | 8.25 | 1100                    | 5.10 |
| 5/16     | 4200                                       | 79.00 | 2940                         | 54.00 | 1160                         | 8.25 | 840                     | 5.10 |
| 3/8      | 3360                                       | 79.00 | 2320                         | 54.00 | 1000                         | 8.25 | 680                     | 5.10 |
| 1/2      | 2840                                       | 66.00 | 2000                         | 46.00 | 840                          | 7.10 | 560                     | 4.35 |
| 5/8      | 2100                                       | 50.00 | 1480                         | 35.00 | 640                          | 5.10 | 420                     | 2.75 |
| 3/4      | 1680                                       | 40.00 | 1160                         | 27.00 | 500                          | 4.35 | 320                     | 2.35 |
| 1        | 1260                                       | 25.00 | 870                          | 17.50 | 375                          | 3.00 | 240                     | 1.54 |

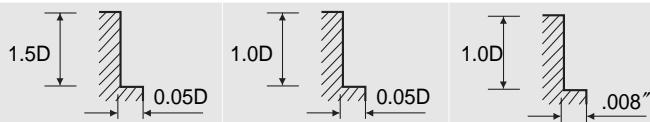


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM208 Series

(HIGH SPEED CUTTING)

| MATERIAL | CARBON STEELS<br>TOOL STEELS |        | HARDENED STEELS       |        | HARDENED STEELS         |       |
|----------|------------------------------|--------|-----------------------|--------|-------------------------|-------|
| HARDNESS | ~HRc50                       |        | HRc50 ~ HRc60         |        | HRc60 ~                 |       |
| STRENGTH | ~1750N/mm <sup>2</sup>       |        | 1750N/mm <sup>2</sup> |        | 1750N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM                          | FEED   | RPM                   | FEED   | RPM                     | FEED  |
| 1/4      | 16800                        | 240.00 | 8400                  | 120.00 | 4200                    | 58.00 |
| 5/16     | 12600                        | 240.00 | 6300                  | 120.00 | 3160                    | 58.00 |
| 3/8      | 9980                         | 235.00 | 5040                  | 120.00 | 2520                    | 58.00 |
| 1/2      | 8400                         | 199.00 | 4200                  | 100.00 | 2100                    | 50.00 |
| 5/8      | 6300                         | 149.00 | 3160                  | 75.00  | 1580                    | 37.00 |
| 3/4      | 5040                         | 120.00 | 2520                  | 58.00  | 1260                    | 30.00 |
| 1        | 3790                         | 75.00  | 1890                  | 38.00  | 950                     | 19.00 |



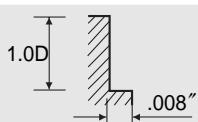
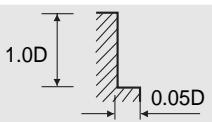
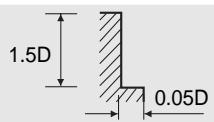
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 6&8 FLUTE, 45° HELIX, CORNER RADIUS, SIDE CUTTING

### EM668 Series

(HIGH SPEED CUTTING)

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>TOOL STEELS  |        | HARDENED STEELS         |       |
|----------|--|--------|------------------------------|--------|-------------------------|-------|
| HARDNESS | ~ HRc50                                    |        | HRc50 ~ HRc60                |        | HRc60 ~ HRc65           |       |
| STRENGTH | ~ 1750N/mm <sup>2</sup>                    |        | 1750 ~ 2080N/mm <sup>2</sup> |        | 2080N/mm <sup>2</sup> ~ |       |
| DIAMETER | RPM  | FEED   | RPM                          | FEED   | RPM                     | FEED  |
| 1/4      | 16800                                      | 240.00 | 8400                         | 120.00 | 4200                    | 58.00 |
| 5/16     | 12600                                      | 240.00 | 6300                         | 120.00 | 3200                    | 58.00 |
| 3/8      | 10000                                      | 235.00 | 5000                         | 120.00 | 2500                    | 58.00 |
| 1/2      | 8400                                       | 200.00 | 4200                         | 100.00 | 2100                    | 50.00 |
| 5/8      | 6300                                       | 150.00 | 3150                         | 75.00  | 1600                    | 37.00 |
| 3/4      | 5000                                       | 120.00 | 2500                         | 58.00  | 1260                    | 30.00 |

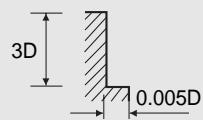
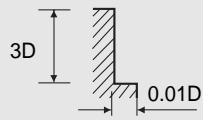


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 6&8 FLUTE, 45° HELIX, EXTRA LONG LENGTH, SIDE CUTTING

### EM208, EM999 Series

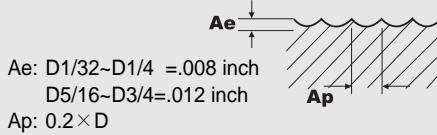
| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |       | HARDENED STEELS              |       | HARDENED STEELS         |      |
|----------|---|-------|--|-------|------------------------------|-------|-------------------------|------|
| HARDNESS | ~HRc40  |       | HRc40 ~ HRc50                            |       | HRc50 ~ HRc60                |       | HRc60 ~ HRc65           |      |
| STRENGTH | ~1250N/mm <sup>2</sup>                          |       | 1250 ~ 1750N/mm <sup>2</sup>             |       | 1750 ~ 2080N/mm <sup>2</sup> |       | 2080N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM   | FEED  | RPM                                      | FEED  | RPM                          | FEED  | RPM                     | FEED |
| 1/4      | 2230  | 19.00 | 1670                                     | 14.00 | 1390                         | 10.00 | 1110                    | 8.00 |
| 5/16     | 1670  | 18.00 | 1250                                     | 13.00 | 1050                         | 9.50  | 840                     | 7.00 |
| 3/8      | 1330  | 17.00 | 1000                                     | 12.00 | 840                          | 9.00  | 680                     | 6.30 |
| 1/2      | 1110  | 16.00 | 840                                      | 11.00 | 690                          | 8.50  | 560                     | 6.00 |
| 5/8      | 840   | 13.00 | 630                                      | 9.00  | 530                          | 6.50  | 420                     | 5.00 |
| 3/4      | 670   | 11.00 | 500                                      | 8.00  | 420                          | 6.00  | 320                     | 4.70 |
| 1        | 540   | 9.50  | 400                                      | 6.50  | 340                          | 5.00  | 270                     | 3.70 |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM209 Series

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |                        | HARDENED STEELS |      |      |     |      |     |      |
|--------------|---|--------|--|------------------------|-----------------|------|------|-----|------|-----|------|
|              | HARDNESS  | ~HRc30 | STRENGTH                                 | ~1000N/mm <sup>2</sup> | DIAMETER        | RPM  | FEED | RPM | FEED | RPM | FEED |
| R1/64 × 1/32 | 15760   | 9.80   | 12720                                    | 7.80                   | 5800            | 3.50 |      |     |      |     |      |
| R1/32 × 1/16 | 15760   | 13.80  | 12140                                    | 10.60                  | 5320            | 4.70 |      |     |      |     |      |
| R3/64 × 3/32 | 14400   | 29.50  | 10700                                    | 19.30                  | 4680            | 5.90 |      |     |      |     |      |
| R1/16 × 1/8  | 13100   | 26.70  | 10000                                    | 18.10                  | 4520            | 5.90 |      |     |      |     |      |
| R3/32 × 3/16 | 9140  | 32.30  | 7300                                     | 22.80                  | 3680            | 7.10 |      |     |      |     |      |
| R1/8 × 1/4   | 7780  | 33.00  | 6300                                     | 24.80                  | 3160            | 7.50 |      |     |      |     |      |
| R5/32 × 5/16 | 5260  | 37.50  | 4420                                     | 26.00                  | 2100            | 7.50 |      |     |      |     |      |
| R3/16 × 3/8  | 4620  | 40.10  | 3780                                     | 28.00                  | 1780            | 7.50 |      |     |      |     |      |
| R1/4 × 1/2   | 3780  | 35.40  | 2940                                     | 26.00                  | 1360            | 7.50 |      |     |      |     |      |
| R5/16 × 5/8  | 2740  | 36.20  | 2320                                     | 26.00                  | 1160            | 7.50 |      |     |      |     |      |
| R3/8 × 3/4   | 2100  | 33.00  | 1900                                     | 25.00                  | 840             | 7.50 |      |     |      |     |      |



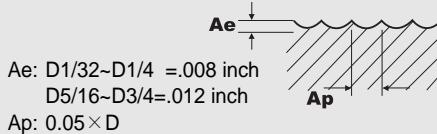
Ae: D1/32~D1/4 =.008 inch  
D5/16~D3/4=.012 inch  
Ap: 0.1 × D

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM209 Series

(HIGH SPEED CUTTING)

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | HARDENED STEELS |                        |
|--------------|---|--------|-----------------|------------------------|
|              | HARDNESS  | ~HRc45 | STRENGTH        | ~1500N/mm <sup>2</sup> |
| DIAMETER     | RPM   | FEED   | RPM             | FEED                   |
| R1/64 × 1/32 | 25000   | 25.60  | 25000           | 15.70                  |
| R1/32 × 1/16 | 23000   | 27.50  | 23000           | 16.90                  |
| R3/64 × 3/32 | 21000   | 34.60  | 19000           | 19.30                  |
| R1/16 × 1/8  | 21000   | 39.40  | 17000           | 20.50                  |
| R3/32 × 3/16 | 21000   | 70.90  | 12000           | 23.60                  |
| R1/8 × 1/4   | 21000   | 90.90  | 10500           | 24.80                  |
| R5/32 × 5/16 | 15760   | 111.80 | 7880            | 29.10                  |
| R3/16 × 3/8  | 13660   | 120.00 | 6300            | 33.00                  |
| R1/4 × 1/2   | 10500   | 103.50 | 5260            | 33.00                  |
| R5/16 × 5/8  | 8200  | 103.50 | 3780            | 28.00                  |
| R3/8 × 3/4   | 6300  | 99.00  | 2940            | 20.80                  |

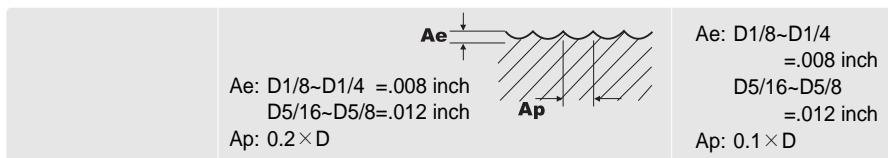


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 4 FLUTE, LONG LENGTH, BALL NOSE

## EM210 Series

| MATERIAL   | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>TOOL STEELS |       | HARDENED STEELS         |       |
|------------|--|-------|-----------------------------|-------|-------------------------|-------|
| HARDNESS   | ~HRc30                                     |       | HRc30 ~ HRc40               |       | HRc45 ~ HRc65           |       |
| STRENGTH   | ~1000N/mm <sup>2</sup>                     |       | 1000~1250N/mm <sup>2</sup>  |       | 1500N/mm <sup>2</sup> ~ |       |
| DIAMETER   | RPM  | FEED  | RPM                         | FEED  | RPM                     | FEED  |
| R1/16×1/8  | 13100                                      | 40.10 | 10000                       | 27.00 | 4520                    | 8.85  |
| R3/32×3/16 | 9140                                       | 48.50 | 7300                        | 34.00 | 3680                    | 10.50 |
| R1/8×1/4   | 7780                                       | 49.50 | 6300                        | 37.00 | 3160                    | 11.25 |
| R5/32×5/16 | 5260                                       | 56.00 | 4420                        | 39.00 | 2100                    | 11.25 |
| R3/16×3/8  | 4620                                       | 60.00 | 3780                        | 42.00 | 1780                    | 11.25 |
| R1/4×1/2   | 3780                                       | 53.00 | 2940                        | 39.00 | 1360                    | 11.25 |
| R5/16×5/8  | 2740                                       | 54.50 | 2320                        | 38.50 | 1160                    | 11.25 |

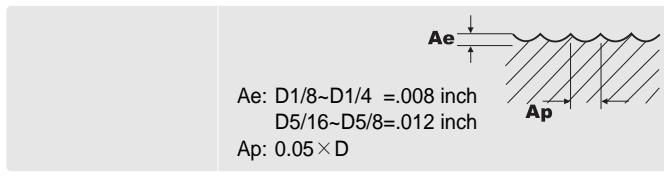


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM210 Series

## (HIGH SPEED CUTTING)

| MATERIAL   | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>TOOL STEELS |       |
|------------|--|--------|-----------------------------|-------|
| HARDNESS   | ~HRc45                                     |        | HRc45 ~ HRc65               |       |
| STRENGTH   | ~1500N/mm <sup>2</sup>                     |        | 1500N/mm <sup>2</sup> ~     |       |
| DIAMETER   | RPM  | FEED   | RPM                         | FEED  |
| R1/16×1/8  | 21000                                      | 59.00  | 17000                       | 30.50 |
| R3/32×3/16 | 21000                                      | 106.25 | 12000                       | 35.50 |
| R1/8×1/4   | 21000                                      | 136.50 | 10500                       | 37.00 |
| R5/32×5/16 | 15760                                      | 167.50 | 7880                        | 43.50 |
| R3/16×3/8  | 13660                                      | 180.00 | 6300                        | 49.50 |
| R1/4×1/2   | 10500                                      | 155.50 | 5260                        | 49.50 |
| R5/16×5/8  | 8200                                       | 155.50 | 3780                        | 42.00 |



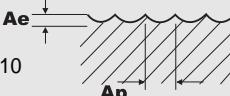
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM961 Series

| MATERIAL   | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|------------|---------------------------------------|-------|------------------------------|-------|---|-------|
| HARDNESS   | HRc30 ~ HRc40                         |       | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH   | 1000 ~ 1250N/mm <sup>2</sup>          |       | 1500 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER   | RPM                                   | FEED  | RPM                          | FEED  | RPM   | FEED  |
| R1/16×1/8  | 10000                                 | 18.10 | 12700                        | 43.30 | 12300   | 41.30 |
| R3/32×3/16 | 7300                                  | 22.80 | 9400                         | 43.30 | 9050  | 41.30 |
| R1/8×1/4   | 6300                                  | 24.80 | 8600                         | 45.30 | 8250  | 43.30 |
| R5/32×5/16 | 4420                                  | 26.00 | 7000                         | 41.30 | 6700  | 39.40 |
| R3/16×3/8  | 3780                                  | 28.00 | 6050                         | 39.40 | 5800  | 37.80 |
| R1/4×1/2   | 2940                                  | 26.00 | 5450                         | 39.40 | 5200  | 37.80 |
| R5/16×5/8  | 2320                                  | 26.00 | 4350                         | 34.30 | 4150  | 32.70 |
| R3/8×3/4   | 1900                                  | 25.00 | 3500                         | 27.20 | 3300  | 25.60 |
| R1/2×1     | 1520                                  | 25.00 | 2800                         | 27.20 | 2650  | 25.60 |

Ae: D1/8 ~ D1/4 =.008  
D5/16 ~ D1=.012  
Ap: 0.2×D

Ae: D1/8 =.006  
D3/16 ~ D5/16=.010  
D3/8 ~ D1=.012  
Ap: 0.1×D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

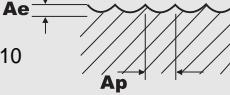
## EM961 Series

(HIGH SPEED CUTTING)

| MATERIAL   | ALLOY STEELS<br>HEAT RESISTANT STEELS |        | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|------------|---------------------------------------|--------|------------------------------|-------|---|-------|
| HARDNESS   | ~ HRc45                               |        | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH   | 1000 ~ 1250N/mm <sup>2</sup>          |        | 1500 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER   | RPM                                   | FEED   | RPM                          | FEED  | RPM   | FEED  |
| R1/16×1/8  | 21000                                 | 39.40  | 12700                        | 68.90 | 12300   | 65.70 |
| R3/32×3/16 | 21000                                 | 70.90  | 9400                         | 65.00 | 9050  | 61.80 |
| R1/8×1/4   | 21000                                 | 90.90  | 8600                         | 69.00 | 8250  | 65.70 |
| R5/32×5/16 | 15760                                 | 111.80 | 7000                         | 61.00 | 6700  | 57.50 |
| R3/16×3/8  | 13660                                 | 120.10 | 6050                         | 57.10 | 5800  | 53.50 |
| R1/4×1/2   | 10500                                 | 103.50 | 5450                         | 55.90 | 5200  | 52.40 |
| R5/16×5/8  | 8200                                  | 103.50 | 4350                         | 48.40 | 4150  | 44.50 |
| R3/8×3/4   | 6300                                  | 99.20  | 3500                         | 39.40 | 3300  | 35.40 |
| R1/2×1     | 5040                                  | 99.20  | 2800                         | 39.40 | 2650  | 35.40 |

Ae: D1/8 ~ D1/4 =.008  
D5/16 ~ D1=.012  
Ap: 0.05×D

Ae: D1/8 =.006  
D3/16 ~ D5/16=.010  
D3/8 ~ D1=.012  
Ap: 0.05×D

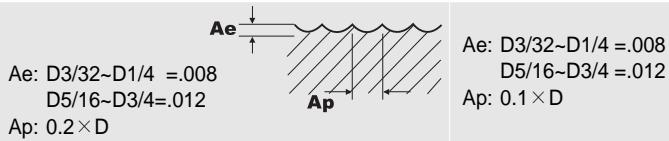


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, LONG REACH, BALL NOSE

## EM962 Series

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |       | HARDENED STEELS         |      |
|--------------|---|-------|--|-------|-------------------------|------|
| HARDNESS     | ~HRc30  |       | HRc30 ~ HRc40                            |       | HRc45 ~ HRc65           |      |
| STRENGTH     | ~1000N/mm <sup>2</sup>                          |       | 1000 ~ 1250N/mm <sup>2</sup>             |       | 1500N/mm <sup>2</sup> ~ |      |
| DIAMETER     | RPM   | FEED  | RPM                                      | FEED  | RPM                     | FEED |
| R3/64 × 3/32 | 12600   | 16.50 | 9250                                     | 10.20 | 3870                    | 3.50 |
| R1/16 × 1/8  | 10500   | 21.30 | 8000                                     | 14.60 | 3620                    | 4.70 |
| R3/32 × 3/16 | 7310  | 26.00 | 5840                                     | 18.10 | 2940                    | 5.50 |
| R1/8 × 1/4   | 6220  | 26.40 | 5040                                     | 19.70 | 2530                    | 5.90 |
| R5/32 × 5/16 | 4210  | 29.90 | 3540                                     | 20.70 | 1680                    | 5.90 |
| R3/16 × 3/8  | 3700  | 32.30 | 3020                                     | 22.40 | 1420                    | 5.90 |
| R1/4 × 1/2   | 3020  | 28.30 | 2350                                     | 20.90 | 1090                    | 5.90 |
| R5/16 × 5/8  | 2190  | 29.10 | 1860                                     | 20.50 | 930                     | 5.90 |
| R3/8 × 3/4   | 1680  | 26.40 | 1520                                     | 19.70 | 670                     | 5.90 |

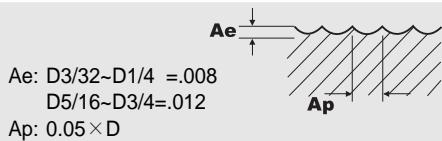


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM962 Series

(HIGH SPEED CUTTING)

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       | HARDENED STEELS         |       |
|--------------|---|-------|-------------------------|-------|
| HARDNESS     | ~HRc45  |       | HRc45 ~ HRc65           |       |
| STRENGTH     | ~1500N/mm <sup>2</sup>                          |       | 1500N/mm <sup>2</sup> ~ |       |
| DIAMETER     | RPM   | FEED  | RPM                     | FEED  |
| R3/64 × 3/32 | 16800   | 23.20 | 16800                   | 15.00 |
| R1/16 × 1/8  | 16800   | 31.50 | 13600                   | 16.50 |
| R3/32 × 3/16 | 16800   | 56.70 | 9600                    | 18.90 |
| R1/8 × 1/4   | 16800   | 72.80 | 8400                    | 19.70 |
| R5/32 × 5/16 | 12610   | 89.40 | 6300                    | 23.20 |
| R3/16 × 3/8  | 10930   | 96.10 | 5040                    | 26.40 |
| R1/4 × 1/2   | 8400  | 82.70 | 4210                    | 26.40 |
| R5/16 × 5/8  | 6560  | 82.70 | 3020                    | 22.40 |
| R3/8 × 3/4   | 5040  | 79.50 | 2350                    | 16.50 |

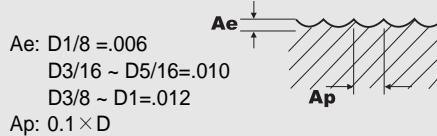


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, BALL NOSE for OVER HRc55

## EM109 Series

| MATERIAL   | HARDENED STEELS              |       | HARDENED STEELS              |       | HARDENED STEELS              |       | HARDENED STEELS         |       |
|------------|------------------------------|-------|------------------------------|-------|------------------------------|-------|-------------------------|-------|
| HARDNESS   | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                |       | HRc55 ~ HRc60                |       | HRc60 ~ HRc65           |       |
| STRENGTH   | 1500 ~ 1750N/mm <sup>2</sup> |       | 1750 ~ 2000N/mm <sup>2</sup> |       | 2000 ~ 2080N/mm <sup>2</sup> |       | 2080N/mm <sup>2</sup> ~ |       |
| DIAMETER   | RPM                          | FEED  | RPM                          | FEED  | RPM                          | FEED  | RPM                     | FEED  |
| R1/16×1/8  | 12700                        | 43.30 | 12300                        | 41.30 | 11800                        | 39.40 | 8400                    | 26.00 |
| R3/32×3/16 | 9400                         | 43.30 | 9050                         | 41.30 | 8600                         | 37.40 | 5600                    | 26.80 |
| R1/8×1/4   | 8600                         | 45.30 | 8250                         | 43.30 | 7850                         | 37.40 | 4850                    | 27.60 |
| R5/32×5/16 | 7000                         | 41.30 | 6700                         | 39.40 | 6350                         | 37.40 | 3800                    | 25.60 |
| R3/16×3/8  | 6050                         | 39.40 | 5800                         | 37.80 | 5450                         | 35.40 | 3200                    | 24.40 |
| R1/4×1/2   | 5450                         | 39.40 | 5200                         | 37.80 | 4900                         | 35.40 | 2750                    | 24.00 |
| R5/16×5/8  | 4350                         | 34.30 | 4150                         | 32.70 | 3900                         | 32.30 | 2150                    | 10.40 |
| R3/8×3/4   | 3500                         | 27.20 | 3300                         | 25.60 | 3150                         | 24.80 | 1700                    | 8.70  |
| R1/2×1     | 2800                         | 27.20 | 2650                         | 25.60 | 2520                         | 24.80 | 1360                    | 8.70  |

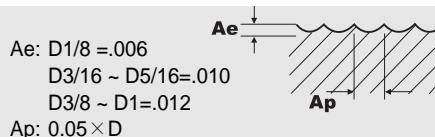


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM109 Series

(HIGH SPEED CUTTING)

| MATERIAL   | HARDENED STEELS              |       | HARDENED STEELS              |       | HARDENED STEELS              |       |
|------------|------------------------------|-------|------------------------------|-------|------------------------------|-------|
| HARDNESS   | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                |       | HRc55 ~ HRc65                |       |
| STRENGTH   | 1500 ~ 1750N/mm <sup>2</sup> |       | 1750 ~ 2000N/mm <sup>2</sup> |       | 2000 ~ 2080N/mm <sup>2</sup> |       |
| DIAMETER   | RPM                          | FEED  | RPM                          | FEED  | RPM                          | FEED  |
| R1/16×1/8  | 12700                        | 68.90 | 12300                        | 65.70 | 11800                        | 33.90 |
| R3/32×3/16 | 9400                         | 65.00 | 9050                         | 61.80 | 8600                         | 29.50 |
| R1/8×1/4   | 8600                         | 68.90 | 8250                         | 65.70 | 7850                         | 27.60 |
| R5/32×5/16 | 7000                         | 61.00 | 6700                         | 57.50 | 6350                         | 25.60 |
| R3/16×3/8  | 6050                         | 57.10 | 5800                         | 53.50 | 5450                         | 24.40 |
| R1/4×1/2   | 5450                         | 55.90 | 5200                         | 52.40 | 4900                         | 24.00 |
| R5/16×5/8  | 4350                         | 48.40 | 4150                         | 44.50 | 3900                         | 10.40 |
| R3/8×3/4   | 3500                         | 39.40 | 3300                         | 35.40 | 3150                         | 8.70  |
| R1/2×1     | 2800                         | 39.40 | 2640                         | 35.40 | 2520                         | 8.70  |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, BALL NOSE with TAPER NECK

## EM963 Series

| MATERIAL     | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|--------------|---------------------------------------|-------|------------------------------|-------|---|-------|
| HARDNESS     | HRc30 ~ HRc40                         |       | HRc40 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH     | 1000 ~ 1250N/mm <sup>2</sup>          |       | 1250 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER     | RPM                                   | FEED  | RPM                          | FEED  | RPM   | FEED  |
| R1/32 × 1/16 | 97000                                 | 8.30  | 13800                        | 19.90 | 13600   | 17.90 |
| R1/16 × 1/8  | 8000                                  | 14.60 | 10200                        | 34.60 | 9800  | 33.50 |
| R3/32 × 3/16 | 5840                                  | 18.10 | 7500                         | 34.60 | 7200  | 33.50 |
| R1/8 × 1/4   | 5040                                  | 19.70 | 6900                         | 36.20 | 6500  | 34.60 |
| R5/32 × 5/16 | 3540                                  | 20.90 | 5600                         | 33.10 | 5300  | 31.50 |
| R3/16 × 3/8  | 3020                                  | 22.40 | 4850                         | 31.50 | 4650  | 30.30 |
| R1/4 × 1/2   | 2350                                  | 20.90 | 4350                         | 31.50 | 4150  | 30.30 |

Ae: D1/16 ~ D1/4 = .008  
D5/16 ~ D1/2 = .012  
Ap: 0.2 × D

Ae: D1/16 ~ D1/8 = 0.05 × D  
D3/16 ~ D5/16 = .010  
D3/8 ~ D1/2 = .012  
Ap: 0.1 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

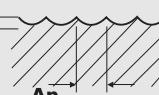
## EM963 Series

(HIGH SPEED CUTTING)

| MATERIAL     | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|--------------|---------------------------------------|-------|------------------------------|-------|---|-------|
| HARDNESS     | ~ HRc45                               |       | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH     | 1500N/mm <sup>2</sup>                 |       | 1250 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER     | RPM                                   | FEED  | RPM                          | FEED  | RPM   | FEED  |
| R1/32 × 1/16 | 18400                                 | 21.90 | 13800                        | 28.90 | 13600   | 30.10 |
| R1/16 × 1/8  | 16800                                 | 31.50 | 10200                        | 55.10 | 9800  | 51.20 |
| R3/32 × 3/16 | 16800                                 | 56.70 | 7500                         | 52.00 | 7200  | 49.20 |
| R1/8 × 1/4   | 16800                                 | 72.80 | 6900                         | 55.10 | 6500  | 53.10 |
| R5/32 × 5/16 | 12600                                 | 89.40 | 5600                         | 49.20 | 5300  | 45.30 |
| R3/16 × 3/8  | 10930                                 | 96.10 | 4850                         | 45.30 | 4650  | 43.30 |
| R1/4 × 1/2   | 8400                                  | 82.70 | 4350                         | 44.50 | 4150  | 41.30 |

Ae: D1/16 ~ D1/4 = .008  
D5/16 ~ D1/2 = .012  
Ap: 0.05 × D

Ae: D1/16 ~ D1/8 = 0.05 × D  
D3/16 ~ D5/16 = .010  
D3/8 ~ D1/2 = .012  
Ap: 0.05 × D



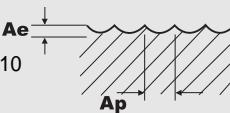
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM979 Series

| MATERIAL     | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|--------------|---------------------------------------|-------|------------------------------|-------|---|-------|
| HARDNESS     | HRc30 ~ HRc40                         |       | HRc40 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH     | 1000 ~ 1250N/mm <sup>2</sup>          |       | 1250 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER     | RPM                                   | FEED  | RPM                          | FEED  | RPM   | FEED  |
| R3/12 × 3/16 | 4670                                  | 14.50 | 6000                         | 27.70 | 5760  | 26.80 |
| R1/8 × 1/4   | 4030                                  | 15.80 | 5520                         | 29.00 | 5200  | 27.70 |
| R5/32 × 5/16 | 2830                                  | 16.70 | 4480                         | 26.50 | 4240  | 25.20 |
| R3/16 × 3/8  | 2420                                  | 17.90 | 3880                         | 25.20 | 3720  | 24.20 |
| R1/4 × 1/2   | 1880                                  | 16.70 | 3480                         | 25.20 | 3320  | 24.20 |

Ae: D3/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.2 × D

Ae: D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.1 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

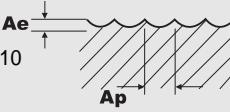
## EM979 Series

(HIGH SPEED CUTTING)

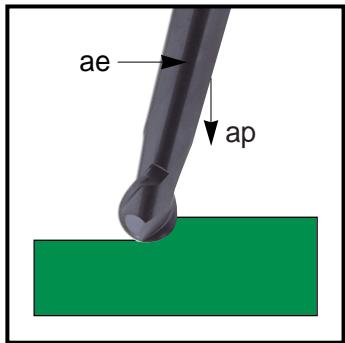
| MATERIAL     | ALLOY STEELS<br>HEAT RESISTANT STEELS |       | HARDENED STEELS              |       | HARDENED STEELS                               |       |
|--------------|---------------------------------------|-------|------------------------------|-------|---|-------|
| HARDNESS     | ~ HRc45                               |       | HRc45 ~ HRc50                |       | HRc50 ~ HRc55                                 |       |
| STRENGTH     | ~ 1500N/mm <sup>2</sup>               |       | 1250 ~ 1750N/mm <sup>2</sup> |       | 1750N/mm <sup>2</sup> ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER     | RPM                                   | FEED  | RPM                          | FEED  | RPM   | FEED  |
| R3/12 × 3/16 | 13440                                 | 45.40 | 6000                         | 41.60 | 5760  | 39.40 |
| R1/8 × 1/4   | 13440                                 | 58.20 | 5520                         | 44.10 | 5200  | 42.50 |
| R5/32 × 5/16 | 10080                                 | 71.50 | 4480                         | 39.40 | 4240  | 36.20 |
| R3/16 × 3/8  | 8740                                  | 76.90 | 3880                         | 36.30 | 3720  | 34.60 |
| R1/4 × 1/2   | 6720                                  | 66.20 | 3480                         | 35.60 | 3320  | 33.00 |

Ae: D3/16 ~ D1/4 =.008  
D5/16 ~ D1/2 =.012  
Ap: 0.05 × D

Ae: D3/16 ~ D5/16=.010  
D3/8 ~ D1/2=.012  
Ap: 0.05 × D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## RECOMMENDED CUTTING CONDITIONS

- $ae = 0.05 \times d_1$
- $ap = 0.02 \times d_1$

### EM084, EM096 Series

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOYED STEELS<br>HEAT RESISTANT<br>STEELS |        | HARDENED STEELS    |       |
|--------------|---|--------|--|--------|--------------------|-------|
| HARDNESS     | $\sim HRc30$                                    |        | $HRc30 \sim HRc40$                         |        | $HRc45 \sim HRc65$ |       |
| STRENGTH     | $\sim 1000N/mm^2$                               |        | $1000 \sim 1250N/mm^2$                     |        | $1500N/mm^2$       |       |
| DIAMETER     | RPM   | FEED   | RPM  | FEED   | RPM                | FEED  |
| R1/16 × 1/8  | 35000   | 110.20 | 33000                                      | 102.40 | 12000              | 35.43 |
| R5/64 × 5/32 | 26000   | 90.55  | 25000                                      | 86.61  | 9000               | 31.50 |
| R3/32 × 3/16 | 21000   | 82.68  | 20000                                      | 78.74  | 7000               | 27.56 |
| R1/8 × 1/4   | 17000   | 74.80  | 16000                                      | 70.87  | 6000               | 25.60 |
| R5/32 × 5/16 | 13000   | 66.93  | 12000                                      | 62.99  | 4500               | 21.65 |
| R3/16 × 3/8  | 10500   | 57.09  | 10000                                      | 55.12  | 3500               | 19.69 |
| R1/4 × 1/2   | 9000  | 55.12  | 8000                                       | 51.18  | 3000               | 17.72 |
| R5/16 × 5/8  | 6000  | 47.24  | 5500                                       | 43.31  | 2000               | 15.75 |

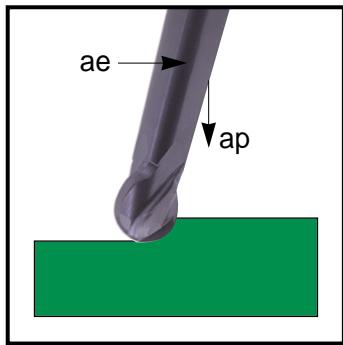
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

### EM084, EM096 Series

(HIGH SPEED CUTTING)

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOYED STEELS<br>HEAT RESISTANT<br>STEELS |        | HARDENED STEELS    |       |
|--------------|---|--------|--|--------|--------------------|-------|
| HARDNESS     | $\sim HRc30$                                    |        | $HRc30 \sim HRc40$                         |        | $HRc45 \sim HRc65$ |       |
| STRENGTH     | $\sim 1000N/mm^2$                               |        | $1000 \sim 1250N/mm^2$                     |        | $1500N/mm^2$       |       |
| DIAMETER     | RPM   | FEED   | RPM  | FEED   | RPM                | FEED  |
| R1/16 × 1/8  | 47000   | 145.70 | 44000                                      | 137.80 | 17000              | 55.12 |
| R5/64 × 5/32 | 35000   | 126.00 | 33000                                      | 118.10 | 13000              | 47.24 |
| R3/32 × 3/16 | 28000   | 110.20 | 27000                                      | 102.40 | 10000              | 43.31 |
| R1/8 × 1/4   | 23000   | 102.40 | 22000                                      | 94.49  | 8000               | 37.40 |
| R5/32 × 5/16 | 18000   | 90.55  | 17000                                      | 82.68  | 6000               | 33.46 |
| R3/16 × 3/8  | 14000   | 78.74  | 13000                                      | 74.80  | 5000               | 29.53 |
| R1/4 × 1/2   | 12000   | 70.87  | 11000                                      | 70.87  | 4000               | 27.56 |
| R5/16 × 5/8  | 9000  | 62.99  | 8000                                       | 59.06  | 3300               | 23.62 |

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## RECOMMENDED CUTTING CONDITIONS

- $ae = 0.05 \times d_1$
- $ap = 0.02 \times d_1$

### EM093, EM097 Series

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOYED STEELS<br>HEAT RESISTANT<br>STEELS |        | HARDENED STEELS    |       |
|--------------|---|--------|--|--------|--------------------|-------|
| HARDNESS     | $\sim HRc30$                                    |        | $HRc30 \sim HRc40$                         |        | $HRc45 \sim HRc65$ |       |
| STRENGTH     | $\sim 1000N/mm^2$                               |        | $1000 \sim 1250N/mm^2$                     |        | $1500N/mm^2$       |       |
| DIAMETER     | RPM   | FEED   | RPM  | FEED   | RPM                | FEED  |
| R3/32 × 3/16 | 21000   | 157.50 | 20000                                      | 157.50 | 7000               | 55.12 |
| R1/8 × 1/4   | 17000   | 157.50 | 16000                                      | 137.80 | 6000               | 51.18 |
| R5/32 × 5/16 | 13000   | 137.80 | 12000                                      | 118.10 | 4500               | 43.31 |
| R3/16 × 3/8  | 10500   | 118.10 | 10000                                      | 98.43  | 3500               | 39.37 |
| R1/4 × 1/2   | 9000  | 110.20 | 8000                                       | 98.43  | 3000               | 37.40 |
| R5/16 × 5/8  | 6000  | 110.20 | 5500                                       | 86.61  | 2000               | 31.50 |

RPM=REVOLUTION PER MIN.

FEED=inch/min.

### EM093, EM097 Series

(HIGH SPEED CUTTING)

| MATERIAL     | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOYED STEELS<br>HEAT RESISTANT<br>STEELS |        | HARDENED STEELS    |       |
|--------------|---|--------|--|--------|--------------------|-------|
| HARDNESS     | $\sim HRc30$                                    |        | $HRc30 \sim HRc40$                         |        | $HRc45 \sim HRc65$ |       |
| STRENGTH     | $\sim 1000N/mm^2$                               |        | $1000 \sim 1250N/mm^2$                     |        | $1500N/mm^2$       |       |
| DIAMETER     | RPM   | FEED   | RPM  | FEED   | RPM                | FEED  |
| R3/32 × 3/16 | 28000   | 220.50 | 27000                                      | 208.70 | 11000              | 82.68 |
| R1/8 × 1/4   | 23000   | 200.10 | 22000                                      | 192.90 | 9000               | 74.80 |
| R5/32 × 5/16 | 18000   | 181.10 | 17000                                      | 169.30 | 7000               | 66.93 |
| R3/16 × 3/8  | 14000   | 153.50 | 13000                                      | 145.70 | 5000               | 55.12 |
| R1/4 × 1/2   | 12000   | 145.70 | 11000                                      | 137.80 | 4500               | 51.18 |
| R5/16 × 5/8  | 9000  | 122.00 | 8000                                       | 118.10 | 3300               | 43.31 |

RPM=REVOLUTION PER MIN.

FEED=inch/min.

## 2 FLUTE, MINIATURE, BALL NOSE

## EM960 Series

| MATERIAL      | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |               | HARDENED STEELS              |       |
|---------------|---|---------------|------------------------------|-------|
|               | HARDNESS  | HRc30 ~ HRc45 | HRc45 ~ HRc55                |       |
| STRENGTH      | 1000 ~ 1500N/mm <sup>2</sup>                    |               | 1500 ~ 2000N/mm <sup>2</sup> |       |
| DIAMETER      | RPM   | FEED          | RPM                          | FEED  |
| R.012 x .024  | 30000   | 23.60         | 30000                        | 11.80 |
| R.0155 x .031 | 27000   | 25.60         | 27000                        | 15.00 |
| R.020 x .040  | 25000   | 25.60         | 25000                        | 15.70 |
| R.0235 x .047 | 24000   | 26.40         | 24000                        | 16.50 |
| R.031 x .062  | 23000   | 27.60         | 23000                        | 16.90 |

D < .040  
Ae: 0.05 x D  
Ap: 0.15 x D

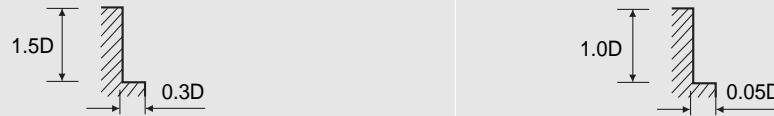
D ≥ .040  
Ae: 0.075 x D  
Ap: 0.15 x D

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## MULTI FLUTE, ROUGHING, SIDE CUTTING

## EM666, EM156 Series

| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>HEAT RESISTANT STEELS |               | ALLOY STEELS<br>HEAT RESISTANT STEELS |               | HARDENED STEELS              |       | HARDENED STEELS         |      |
|----------|---|--------|---------------------------------------|---------------|---------------------------------------|---------------|------------------------------|-------|-------------------------|------|
|          | HARDNESS  | ~HRc30 | HRc30 ~ HRc38                         | HRc38 ~ HRc45 | HRc45 ~ HRc55                         | HRc55 ~ HRc65 |                              |       |                         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                          |        | 1000 ~ 1200N/mm <sup>2</sup>          |               | 1200 ~ 1400N/mm <sup>2</sup>          |               | 1400 ~ 2000N/mm <sup>2</sup> |       | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER | RPM   | FEED   | RPM                                   | FEED          | RPM                                   | FEED          | RPM                          | FEED  | RPM                     | FEED |
| 1/4      | 15600   | 91.35  | 12400                                 | 33.10         | 8400                                  | 22.45         | 3400                         | 10.25 | 2400                    | 7.50 |
| 5/16     | 11600   | 91.35  | 9200                                  | 33.10         | 6300                                  | 22.45         | 2400                         | 9.50  | 1800                    | 7.10 |
| 3/8      | 9200  | 91.35  | 7600                                  | 33.10         | 5100                                  | 22.45         | 2000                         | 11.40 | 1300                    | 7.50 |
| 1/2      | 8000  | 94.50  | 6000                                  | 31.50         | 4200                                  | 22.45         | 1680                         | 10.25 | 1200                    | 7.50 |
| 5/8      | 6000  | 94.50  | 4800                                  | 29.90         | 3300                                  | 20.05         | 1200                         | 6.30  | 800                     | 4.35 |
| 3/4      | 5200  | 91.35  | 4400                                  | 28.35         | 2700                                  | 16.55         | 1100                         | 5.90  | 700                     | 3.95 |
| 1        | 4800  | 85.05  | 3600                                  | 22.05         | 2400                                  | 14.15         | 1000                         | 5.90  | 660                     | 3.95 |

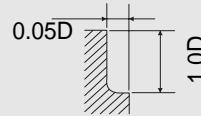
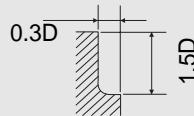


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## MULTI FLUTE, ROUGHING, BALL NOSE, SIDE CUTTING

### EM662 Series

| MATERIAL   | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |        | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |               | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS  |       | HARDENED STEELS              |   | HARDENED STEELS         |      |
|------------|---|--------|--|---------------|---|-------|------------------------------|---|-------------------------|------|
|            | HARDNESS  | ~HRc30 |  | HRc30 ~ HRc38 | HRc38 ~ HRc45 <th data-kind="ghost"></th> <th>HRc45 ~ HRc55</th> <td data-cs="2" data-kind="parent">HRc55 ~ HRc65<th data-kind="ghost"></th></td> |       | HRc45 ~ HRc55                | HRc55 ~ HRc65 <th data-kind="ghost"></th> |                         |      |
| STRENGTH   | ~1000N/mm <sup>2</sup>                          |        | 1000 ~ 1200N/mm <sup>2</sup>             |               | 1200 ~ 1400N/mm <sup>2</sup>  |       | 1400 ~ 2000N/mm <sup>2</sup> |   | 2000N/mm <sup>2</sup> ~ |      |
| DIAMETER   | RPM   | FEED   | RPM                                      | FEED          | RPM   | FEED  | RPM                          | FEED                                      | RPM                     | FEED |
| R1/8×1/4   | 15600   | 91.30  | 12400                                    | 33.00         | 8400  | 22.40 | 3400                         | 10.20                                     | 2400                    | 7.50 |
| R5/32×5/16 | 11600   | 91.30  | 9200                                     | 33.00         | 6300  | 22.40 | 2400                         | 9.40                                      | 1800                    | 7.10 |
| R3/16×3/8  | 9200  | 91.30  | 7600                                     | 33.00         | 5100  | 22.40 | 2000                         | 11.40                                     | 1300                    | 7.50 |
| R1/4×1/2   | 8000  | 94.50  | 6000                                     | 31.50         | 4200  | 22.40 | 1680                         | 10.20                                     | 1200                    | 7.50 |
| R5/16×5/8  | 6000  | 94.50  | 4800                                     | 29.90         | 3300  | 20.10 | 1200                         | 6.30                                      | 800                     | 4.30 |
| R3/8×3/4   | 4800  | 85.00  | 3600                                     | 22.00         | 2400  | 14.10 | 1000                         | 5.90                                      | 660                     | 3.90 |



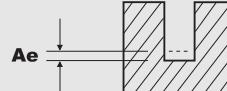
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 2 FLUTE, FINISH for RIB PROCESSING

### EM966 Series

| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |          |                              | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |                              |               | HARDENED STEELS |         |             |
|----------|---|----------|------------------------------|--|------------------------------|---------------|-----------------|---------|-------------|
|          | HARDNESS  | ~ HRc30  |                              | HRc30 ~ HRc45                            |                              | HRc45 ~ HRc55 |                 |         |             |
| STRENGTH | ~ 1000N/mm <sup>2</sup>                         |          | 1000 ~ 1500N/mm <sup>2</sup> |  | 1500 ~ 2000N/mm <sup>2</sup> |               |                 |         |             |
| DIAMETER | RPM   | FEED     | Ae (inch)                    | RPM                                      | FEED                         | Ae (inch)     | RPM             | FEED    | Ae (inch)   |
| 1/32     | 27000~35000                                     | 7.5~16.5 | .0006~.0014                  | 19500~24500                              | 2.4~9.5                      | .0006~.0014   | 12500~14800     | 1.4~3.7 | .0003~.0006 |
| 3/64     | 18500~23500                                     | 7.5~23.6 | .0022~.0039                  | 13000~16500                              | 3.7~11.8                     | .0022~.0039   | 8300~10500      | 2.0~3.9 | .0004~.0009 |
| 1/16     | 14000~18000                                     | 7.5~23.6 | .0030~.0057                  | 10200~12800                              | 3.7~11.8                     | .0030~.0057   | 6400~8000       | 2.0~3.9 | .0006~.0012 |
| 5/64     | 12000~14500                                     | 7.5~23.6 | .0035~.0071                  | 8300~10500                               | 3.7~11.8                     | .0035~.0071   | 5300~6600       | 2.0~3.9 | .0007~.0014 |
| 3/32     | 9500~12000                                      | 7.5~23.6 | .0044~.0093                  | 6700~8500                                | 3.7~11.8                     | .0044~.0093   | 4300~5300       | 2.0~3.9 | .0009~.0018 |
| 1/8      | 8000~10000                                      | 7.5~23.6 | .0053~.0106                  | 5500~7000                                | 3.7~11.8                     | .0053~.0106   | 3500~4400       | 2.0~3.9 | .0011~.0022 |

(Depth of Cut per one pass)

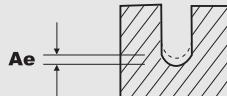


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## EM967 Series

| MATERIAL    | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |          |                              | ALLOY STEELS<br>HEAT RESISTANT<br>STEELS |          |                              | HARDENED STEELS |         |             |
|-------------|---|----------|------------------------------|--|----------|------------------------------|-----------------|---------|-------------|
|             | HARDNESS  | ~ HRc30  |                              | HRc30 ~ HRc45                            |          |                              | HRc45 ~ HRc55   |         |             |
| STRENGTH    | ~ 1000N/mm <sup>2</sup>                         |          | 1000 ~ 1500N/mm <sup>2</sup> |  |          | 1500 ~ 2000N/mm <sup>2</sup> |                 |         |             |
| DIAMETER    | RPM   | FEED     | Ae (inch)                    | RPM                                      | FEED     | Ae (inch)                    | RPM             | FEED    | Ae (inch)   |
| R1/64×1/32  | 27000~35000                                     | 7.5~16.5 | .0006~.0014                  | 19500~24500                              | 2.4~9.5  | .0006~.0014                  | 12500~14800     | 1.4~3.7 | .0003~.0006 |
| R.0234×3/64 | 18500~23500                                     | 7.5~23.6 | .0022~.0039                  | 13000~16500                              | 3.7~11.8 | .0022~.0039                  | 8300~10500      | 2.0~3.9 | .0004~.0009 |
| R1/32×1/16  | 14000~18000                                     | 7.5~23.6 | .0030~.0057                  | 10200~12800                              | 3.7~11.8 | .0030~.0057                  | 6400~8000       | 2.0~3.9 | .0006~.0012 |
| R.0391×5/64 | 12000~14500                                     | 7.5~23.6 | .0035~.0071                  | 8300~10500                               | 3.7~11.8 | .0035~.0071                  | 5300~6600       | 2.0~3.9 | .0007~.0014 |
| R3/64×3/32  | 9500~12000                                      | 7.5~23.6 | .0044~.0093                  | 6700~8500                                | 3.7~11.8 | .0044~.0093                  | 4300~5300       | 2.0~3.9 | .0009~.0018 |
| R1/16×1/8   | 8000~10000                                      | 7.5~23.6 | .0053~.0106                  | 5500~7000                                | 3.7~11.8 | .0053~.0106                  | 3500~4400       | 2.0~3.9 | .0011~.0022 |

(Depth of Cut per one pass)



RPM=REVOLUTION PER MIN.  
FEED=inch/min.



# V7 MILL™

## SOLID CARBIDE END MILLS

Patent pending

### ● Completely New Milling Generation

- Breakup of the chattering and Minimized tool deflection by optimum design for faster & deeper machining
- Supreme surface finish
- Increased cutting depth and feed rates

### ● Outstanding Tool Life

- Made from Prime Grade Carbide
- Improved Oxidation resistance and Toughness with AlTiN coated
- Corner Protection against chipping

### ● Application materials

- Mild Steels
- Cast Iron
- Tool steels
- Titanium Alloys
- Prehardened Steels
- Low hardness material under HRc 40
- Stainless Steels





# V7 MILL SOLID CARBIDE END MILLS SELECTION GUIDE



**Low amplitude sine wave design  
eliminates vibration.  
Allowing deeper cuts, higher speeds  
and increased metal removal rates.**

**Patent pending**

## INCH

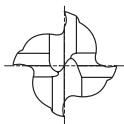
| EDP No.        | APPEARANCE | SPECIFICATION                                   | STOCK | PAGE |
|----------------|------------|---|-------|------|
| EMB12<br>EMB37 |            | 4 FLUTE, REGULAR LENGTH END MILL                |       | 85   |
| EMB13<br>EMB38 |            | 4 FLUTE, REGULAR LENGTH, CORNER RADIUS END MILL |       | 86   |
| EMB20          |            | 4 FLUTE EXTENDED LENGTH, LONG REACH END MILL    |       | 87   |
| EMB78<br>EMB79 |            | 4 FLUTE REGULAR LENGTH BALL END MILL            |       | 88   |
| EMB76<br>EMB77 |            | 5 FLUTE REGULAR LENGTH END MILL                 |       | 89   |

## METRIC

| EDP No.        | APPEARANCE | SPECIFICATION                                | STOCK | PAGE |
|----------------|------------|--|-------|------|
| EMB14<br>EMB39 |            | 4 FLUTE, LONG LENGTH END MILL                |       | 90   |
| EMB15<br>EMB40 |            | 4 FLUTE, LONG LENGTH, CORNER RADIUS END MILL |       | 91   |
| EMB74<br>EMB75 |            | 4 FLUTE LONG LENGTH BALL END MILL            |       | 92   |
| EMB72<br>EMB73 |            | 5 FLUTE LONG LENGTH END MILL                 |       | 93   |

SPEED & FEED DATA

94 ~ 96

**V7 MILL****4 FLUTE, REGULAR LENGTH END MILL**

P.94

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

**EMB12, EMB37 Series**

Unit : inch

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB12008           | -                 | 1/8              | 1/8                     | 3/8              | 1-1/2             |
| EMB12010           | -                 | 5/32             | 3/16                    | 7/16             | 2                 |
| EMB12012           | -                 | 3/16             | 3/16                    | 7/16             | 2                 |
| EMB12014           | -                 | 7/32             | 1/4                     | 7/16             | 2-1/2             |
| EMB12016           | -                 | 1/4              | 1/4                     | 1/2              | 2-1/2             |
| EMB12018           | -                 | 9/32             | 5/16                    | 5/8              | 2-1/2             |
| EMB12020           | -                 | 5/16             | 5/16                    | 13/16            | 2-1/2             |
| EMB12022           | -                 | 11/32            | 3/8                     | 13/16            | 2-1/2             |
| -                  | EMB37024          | 3/8              | 3/8                     | 7/8              | 2-1/2             |
| -                  | EMB37026          | 13/32            | 7/16                    | 15/16            | 2-3/4             |
| -                  | EMB37028          | 7/16             | 7/16                    | 1                | 2-3/4             |
| -                  | EMB37030          | 15/32            | 1/2                     | 1                | 3                 |
| -                  | EMB37032          | 1/2              | 1/2                     | 1                | 3                 |
| -                  | EMB37036          | 9/16             | 9/16                    | 1-1/8            | 3-1/2             |
| -                  | EMB37040          | 5/8              | 5/8                     | 1-1/4            | 3-1/2             |
| -                  | EMB37048          | 3/4              | 3/4                     | 1-1/2            | 4                 |
| -                  | EMB37064          | 1                | 1                       | 1-1/2            | 4                 |

\* Shanks 3/8 " and over come standard with Flats.

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**V7 MILL****4 FLUTE, REGULAR LENGTH,  
CORNER RADIUS END MILL**

P.94

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

V7 MILL

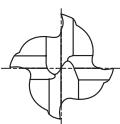
**EMB13, EMB38 Series**

Unit : inch

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | CORNER<br>RADIUS<br><i>R</i> | MILL<br>DIAMETER | SHANK<br>DIAMETER<br><i>h6</i> | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------------------|------------------|--------------------------------|------------------|-------------------|
| <b>EMB13008</b>    | -                 | .010-.015                    | 1/8              | 1/8                            | 3/8              | 1-1/2             |
| <b>EMB13012</b>    | -                 | .010-.015                    | 3/16             | 3/16                           | 7/16             | 2                 |
| <b>EMB13016</b>    | -                 | .015-.020                    | 1/4              | 1/4                            | 1/2              | 2-1/2             |
| <b>EMB13020</b>    | -                 | .015-.020                    | 5/16             | 5/16                           | 13/16            | 2-1/2             |
| -                  | <b>EMB38024</b>   | .015-.020                    | 3/8              | 3/8                            | 7/8              | 2-1/2             |
| -                  | <b>EMB38028</b>   | .015-.020                    | 7/16             | 7/16                           | 1                | 2-3/4             |
| -                  | <b>EMB38032</b>   | .025-.030                    | 1/2              | 1/2                            | 1                | 3                 |
| -                  | <b>EMB38036</b>   | .025-.030                    | 9/16             | 9/16                           | 1-1/8            | 3-1/2             |
| -                  | <b>EMB38040</b>   | .035-.040                    | 5/8              | 5/8                            | 1-1/4            | 3-1/2             |
| -                  | <b>EMB38048</b>   | .035-.040                    | 3/4              | 3/4                            | 1-1/2            | 4                 |
| -                  | <b>EMB38064</b>   | .035-.040                    | 1                | 1                              | 1-1/2            | 4                 |

\* Shanks 3/8 " and over come standard with Flats.

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**V7 MILL****4 FLUTE EXTENDED LENGTH,  
LONG REACH END MILL**

P.94

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

V7 MILL

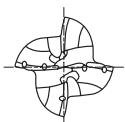
**EMB20 Series**

Unit : inch

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | REACH<br>LENGTH | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-----------------|-------------------|
| EMB20160           | -                 | 1/4              | 1/4                     | 3/8              | 1-1/4           | 4                 |
| -                  | EMB20240          | 3/8              | 3/8                     | 1/2              | 1-7/8           | 4                 |
| -                  | EMB20320          | 1/2              | 1/2                     | 5/8              | 2-1/4           | 4                 |
| -                  | EMB20400          | 5/8              | 5/8                     | 3/4              | 2-1/4           | 4-1/8             |
| -                  | EMB20401          | 5/8              | 5/8                     | 3/4              | 3-1/4           | 5                 |
| -                  | EMB20480          | 3/4              | 3/4                     | 1                | 2-1/4           | 4-1/4             |
| -                  | EMB20481          | 3/4              | 3/4                     | 1                | 3-1/4           | 5-1/2             |
| -                  | EMB20640          | 1                | 1                       | 1-1/8            | 2-1/4           | 4-1/2             |
| -                  | EMB20641          | 1                | 1                       | 1-1/8            | 3-1/4           | 5-1/2             |
| -                  | EMB20642          | 1                | 1                       | 1-1/8            | 4-1/4           | 6-1/2             |

\* Shanks 3/8 " and over come standard with Flats.

TOLERANCE  
OF MILL DIA.TOLERANCE  
OF SHANK DIA.0  
-.00120  
-.0003

**V7 MILL****4 FLUTE REGULAR LENGTH BALL END MILL**

P.95

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

V7 MILL

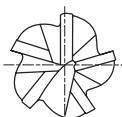
**EMB78, EMB79 Series**

Unit : mm

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB78008           | -                 | 1/8              | 1/8                     | 3/8              | 1 1/2             |
| EMB78010           | -                 | 5/32             | 3/16                    | 7/16             | 2                 |
| EMB78012           | -                 | 3/16             | 3/16                    | 7/16             | 2                 |
| EMB78016           | -                 | 1/4              | 1/4                     | 1/2              | 2 1/2             |
| EMB78020           | -                 | 5/16             | 5/16                    | 13/16            | 2 1/2             |
| -                  | EMB79024          | 3/8              | 3/8                     | 7/8              | 2 1/2             |
| -                  | EMB79032          | 1/2              | 1/2                     | 1                | 3                 |
| -                  | EMB79040          | 5/8              | 5/8                     | 1-1/4            | 3 1/2             |
| -                  | EMB79048          | 3/4              | 3/4                     | 1-1/2            | 4                 |
| -                  | EMB79064          | 1                | 1                       | 1-1/2            | 4                 |

\* Shanks 3/8 " and over come standard with Flats.

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**V7 MILL****5 FLUTE REGULAR LENGTH END MILL**

P.96

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

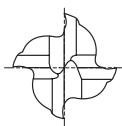
**EMB76, EMB77 Series**

Unit : mm

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB76016           | -                 | 1/4              | 1/4                     | 1/2              | 2-1/2             |
| EMB76020           | -                 | 5/16             | 5/16                    | 13/16            | 2-1/2             |
| -                  | EMB77024          | 3/8              | 3/8                     | 7/8              | 2-1/2             |
| -                  | EMB77032          | 1/2              | 1/2                     | 1                | 3                 |
| -                  | EMB77036          | 9/16             | 9/16                    | 1-1/8            | 3-1/2             |
| -                  | EMB77040          | 5/8              | 5/8                     | 1-1/4            | 3-1/2             |
| -                  | EMB77048          | 3/4              | 3/4                     | 1-1/2            | 4                 |
| -                  | EMB77064          | 1                | 1                       | 1-1/2            | 4                 |

\* Shanks 3/8 " and over come standard with Flats.

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**V7 MILL****4 FLUTE, LONG LENGTH END MILL****METRIC****MG****4****PLAIN****FLAT****DATA**

P.94

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

V7 MILL

**EMB14, EMB39 Series**

Unit : mm

| EDP No.<br>(PLANT) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB14030           | -                 | 3                | 6                       | 8                | 57                |
| EMB14040           | -                 | 4                | 6                       | 11               | 57                |
| EMB14050           | -                 | 5                | 6                       | 13               | 57                |
| EMB14060           | -                 | 6                | 6                       | 13               | 57                |
| EMB14080           | -                 | 8                | 8                       | 19               | 63                |
| EMB14100           | -                 | 10               | 10                      | 22               | 72                |
| -                  | EMB39120          | 12               | 12                      | 26               | 83                |
| -                  | EMB39140          | 14               | 14                      | 26               | 83                |
| -                  | EMB39160          | 16               | 16                      | 32               | 92                |
| -                  | EMB39180          | 18               | 18                      | 32               | 92                |
| -                  | EMB39200          | 20               | 20                      | 38               | 104               |
| -                  | EMB39250          | 25               | 25                      | 38               | 104               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

**V7 MILL****4 FLUTE, LONG LENGTH, CORNER RADIUS END MILL****METRIC****MG****4****PLAIN****FLAT****DATA**

P.94

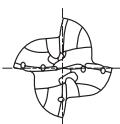
- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

**EMB15, EMB40 Series**

Unit : mm

| EDP No.<br>(PLANT) | EDP No.<br>(FLAT) | CORNER<br>RADIUS<br><i>R</i> | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------------------|------------------|-------------------------|------------------|-------------------|
| EMB15030           | -                 | 0.25~0.38                    | 3                | 6                       | 8                | 57                |
| EMB15040           | -                 | 0.25~0.38                    | 4                | 6                       | 11               | 57                |
| EMB15050           | -                 | 0.25~0.38                    | 5                | 6                       | 13               | 57                |
| EMB15060           | -                 | 0.38~0.51                    | 6                | 6                       | 13               | 57                |
| EMB15080           | -                 | 0.38~0.51                    | 8                | 8                       | 19               | 63                |
| EMB15100           | -                 | 0.38~0.51                    | 10               | 10                      | 22               | 72                |
| -                  | EMB40120          | 0.64~0.76                    | 12               | 12                      | 26               | 83                |
| -                  | EMB40140          | 0.64~0.76                    | 14               | 14                      | 26               | 83                |
| -                  | EMB40160          | 0.89~1.02                    | 16               | 16                      | 32               | 92                |
| -                  | EMB40180          | 0.89~1.02                    | 18               | 18                      | 32               | 92                |
| -                  | EMB40200          | 0.89~1.02                    | 20               | 20                      | 38               | 104               |
| -                  | EMB40250          | 0.89~1.02                    | 25               | 25                      | 38               | 104               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

**V7 MILL****4 FLUTE LONG LENGTH BALL END MILL****METRIC****MG****4****R****PLAIN****FLAT****DATA**

P.95

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

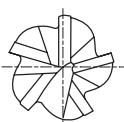
V7 MILL

**EMB74, EMB75 Series**

Unit : mm

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB74030           | EMB75030          | 3                | 6                       | 8                | 57                |
| EMB74040           | EMB75040          | 4                | 6                       | 11               | 57                |
| EMB74050           | EMB75050          | 5                | 6                       | 13               | 57                |
| EMB74060           | EMB75060          | 6                | 6                       | 13               | 57                |
| EMB74080           | EMB75080          | 8                | 8                       | 19               | 63                |
| EMB74100           | EMB75100          | 10               | 10                      | 22               | 72                |
| EMB74120           | EMB75120          | 12               | 12                      | 26               | 83                |
| EMB74160           | EMB75160          | 16               | 16                      | 32               | 92                |
| EMB74200           | EMB75200          | 20               | 20                      | 38               | 104               |
| EMB74250           | EMB75250          | 25               | 25                      | 38               | 104               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

**V7 MILL****5 FLUTE LONG LENGTH END MILL****METRIC**

MG

5

PLAIN

FLAT

DATA

P.96

- Higher speeds, deeper cuts and metal removal rates.
- Improved surface finishes
- New "NANO" AlTiN coating
- Machining of most materials under 40Rc.

**EMB72, EMB73 Series**

Unit : mm

| EDP No.<br>(PLAIN) | EDP No.<br>(FLAT) | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------------|-------------------|------------------|-------------------------|------------------|-------------------|
| EMB72060           | EMB73060          | 6                | 6                       | 13               | 57                |
| EMB72080           | EMB73080          | 8                | 8                       | 19               | 63                |
| EMB72100           | EMB73100          | 10               | 10                      | 22               | 72                |
| EMB72120           | EMB73120          | 12               | 12                      | 26               | 83                |
| EMB72140           | EMB73140          | 14               | 14                      | 26               | 83                |
| EMB72160           | EMB73160          | 16               | 16                      | 32               | 92                |
| EMB72180           | EMB73180          | 18               | 18                      | 32               | 92                |
| EMB72200           | EMB73200          | 20               | 20                      | 38               | 104               |
| EMB72250           | EMB73250          | 25               | 25                      | 38               | 104               |

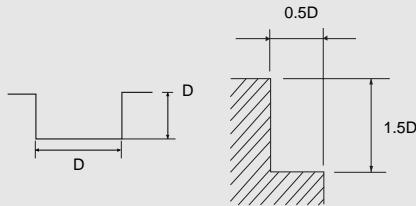
| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

# 4 FLUTE, SQUARE END MILL & CORNER RADIUS END MILL

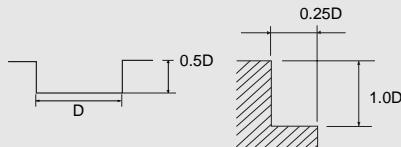
## EMB12, EMB13, EMB14, EMB15, EMB20, EMB37, EMB38, EMB39, EMB40 Series

| MATERIAL | ALLOY STEELS<br>CAST IRON |       | STAINLESS STEELS<br>300SERIES |       | STAINLESS STEELS<br>400SERIES |       | TITANIUM |       | INCONEL |      |
|----------|---------------------------|-------|-------------------------------|-------|-------------------------------|-------|----------|-------|---------|------|
| HARDNESS | ~ HB 230                  |       |                               |       |                               |       |          |       |         |      |
| STRENGTH | ~ 1000N/mm <sup>2</sup>   |       |                               |       |                               |       |          |       |         |      |
| DIAMETER | RPM                       | FEED  | RPM                           | FEED  | RPM                           | FEED  | RPM      | FEED  | RPM     | FEED |
| 3        | 13475                     | 10.83 | 8700                          | 7.48  | 10400                         | 9.45  | 8700     | 7.48  | 3080    | 1.69 |
| 4        | 10105                     | 12.99 | 6525                          | 9.84  | 7800                          | 12.20 | 6525     | 9.84  | 2305    | 2.20 |
| 5        | 8085                      | 14.57 | 5220                          | 12.01 | 6240                          | 14.96 | 5220     | 12.01 | 1850    | 2.68 |
| 6        | 6735                      | 17.13 | 4355                          | 13.98 | 5170                          | 17.32 | 4355     | 13.98 | 1540    | 3.15 |
| 8        | 5050                      | 21.85 | 3265                          | 18.11 | 3900                          | 22.44 | 3260     | 17.91 | 1155    | 4.06 |
| 10       | 4455                      | 27.17 | 2665                          | 20.28 | 2880                          | 21.85 | 2665     | 20.28 | 890     | 2.72 |
| 12       | 3710                      | 27.36 | 2230                          | 20.47 | 2335                          | 21.42 | 2230     | 20.47 | 745     | 2.72 |
| 14       | 3180                      | 24.41 | 1910                          | 18.90 | 2000                          | 19.88 | 1910     | 18.90 | 640     | 2.52 |
| 16       | 2785                      | 23.23 | 1670                          | 17.32 | 1750                          | 18.11 | 1670     | 17.32 | 555     | 2.32 |
| 18       | 2475                      | 23.03 | 1485                          | 17.20 | 1555                          | 18.11 | 1485     | 17.32 | 495     | 2.28 |
| 20       | 2225                      | 22.83 | 1340                          | 17.13 | 1400                          | 17.91 | 1340     | 17.13 | 445     | 2.28 |
| 25       | 1780                      | 17.72 | 1070                          | 13.78 | 1120                          | 14.57 | 1070     | 13.78 | 355     | 1.85 |

\* ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM



• INCONEL



RPM = REVOLUTION PER MIN.  
FEED = inch/min.

### \* Titanium Machining

- On full slot cuts, Reduce R.P.M and I.P.M by 35%
- Speeds and feeds subject to coolant quality, quantity and pressure.

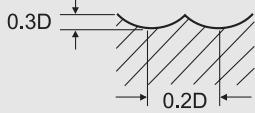
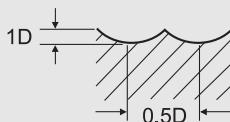
# 4 FLUTE SINUSOIDAL HELIX BALL END MILL CUTTING CONDITION

## EMB74, EMB75, EMB78, EMB79 Series

| MATERIAL | ALLOY STEELS<br>CAST IRON |       | STAINLESS STEELS<br>300SERIES |       | STAINLESS STEELS<br>400SERIES |       | TITANIUM |       | INCONEL |      |
|----------|---------------------------|-------|-------------------------------|-------|-------------------------------|-------|----------|-------|---------|------|
| HARDNESS | ~ HB 230                  |       |                               |       |                               |       |          |       |         |      |
| STRENGTH | ~ 1000N/mm <sup>2</sup>   |       |                               |       |                               |       |          |       |         |      |
| DIAMETER | RPM                       | FEED  | RPM                           | FEED  | RPM                           | FEED  | RPM      | FEED  | RPM     | FEED |
| 3        | 14324                     | 56.30 | 8220                          | 25.59 | 7420                          | 17.32 | 5830     | 11.02 | 3180    | 5.51 |
| 4        | 10740                     | 42.13 | 6160                          | 19.29 | 5570                          | 12.99 | 4370     | 8.27  | 2380    | 3.94 |
| 5        | 8590                      | 40.55 | 4930                          | 19.29 | 4450                          | 17.32 | 3500     | 8.27  | 1910    | 3.15 |
| 6        | 7460                      | 44.88 | 4110                          | 26.38 | 3710                          | 17.32 | 2910     | 9.06  | 1590    | 3.94 |
| 8        | 5370                      | 50.39 | 3080                          | 21.65 | 2780                          | 17.32 | 2180     | 10.24 | 1190    | 4.72 |
| 10       | 4290                      | 40.55 | 2460                          | 19.29 | 2220                          | 15.75 | 1750     | 8.27  | 950     | 3.94 |
| 12       | 3580                      | 39.37 | 2050                          | 17.72 | 1850                          | 14.57 | 1450     | 9.06  | 790     | 4.72 |
| 16       | 2680                      | 31.50 | 1540                          | 14.57 | 1390                          | 11.81 | 1090     | 7.48  | 590     | 4.33 |
| 18       | 2380                      | 29.92 | 1370                          | 13.78 | 1230                          | 11.42 | 970      | 7.48  | 530     | 4.33 |
| 20       | 2140                      | 30.31 | 1230                          | 12.60 | 1110                          | 10.24 | 870      | 8.27  | 470     | 3.94 |
| 25       | 1710                      | 26.77 | 980                           | 10.63 | 890                           | 8.27  | 700      | 7.48  | 380     | 3.15 |

• ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM

• INCONEL



RPM = REVOLUTION PER MIN.

FEED = inch/min.

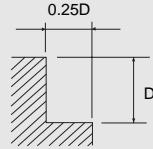
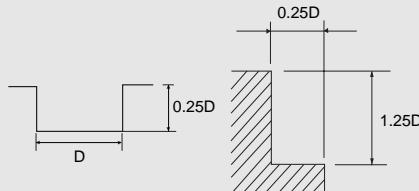
# 5 FLUTE SINUSOIDAL HELIX END MILL CUTTING CONDITION

## EMB72, EMB73, EMB76, EMB77 Series

| MATERIAL | ALLOY STEELS<br>CAST IRON |       | STAINLESS STEELS<br>300SERIES |       | STAINLESS STEELS<br>400SERIES |       | TITANIUM |       | INCONEL |      |
|----------|---------------------------|-------|-------------------------------|-------|-------------------------------|-------|----------|-------|---------|------|
| HARDNESS | ~ HB 230                  |       |                               |       |                               |       |          |       |         |      |
| STRENGTH | ~ 1000N/mm <sup>2</sup>   |       |                               |       |                               |       |          |       |         |      |
| DIAMETER | RPM                       | FEED  | RPM                           | FEED  | RPM                           | FEED  | RPM      | FEED  | RPM     | FEED |
| 6        | 7270                      | 48.82 | 6060                          | 36.22 | 5660                          | 33.86 | 4440     | 26.38 | 1450    | 4.72 |
| 8        | 5450                      | 40.94 | 4540                          | 28.35 | 4240                          | 26.38 | 3330     | 20.47 | 1090    | 4.33 |
| 10       | 4360                      | 43.31 | 3630                          | 27.17 | 3390                          | 25.20 | 2660     | 19.69 | 870     | 4.33 |
| 12       | 3630                      | 45.28 | 3030                          | 37.80 | 3830                          | 32.28 | 2220     | 22.05 | 720     | 5.12 |
| 14       | 3110                      | 42.52 | 2600                          | 33.46 | 2420                          | 30.31 | 1900     | 21.26 | 620     | 5.51 |
| 16       | 2720                      | 40.94 | 2270                          | 30.71 | 2120                          | 28.35 | 1660     | 20.47 | 540     | 5.12 |
| 18       | 2420                      | 39.37 | 2020                          | 27.95 | 1880                          | 26.38 | 1480     | 20.08 | 480     | 5.12 |
| 20       | 2180                      | 38.19 | 1810                          | 27.17 | 1690                          | 25.20 | 1330     | 19.69 | 430     | 5.12 |
| 25       | 1740                      | 34.65 | 1450                          | 25.20 | 1350                          | 23.62 | 1060     | 18.50 | 340     | 5.12 |

• ALLOY STEELS CAST IRON / STAINLESS STEELS 300, 400SERIES / TITANIUM

• INCONEL



RPM = REVOLUTION PER MIN.

FEED = inch/min.

# JET-POWER END MILLS

- For Stainless steel, Titanium, Inconel
- For general steels up to HRc 45





# JET-POWER END MILLS SELECTION GUIDE

★:U.S.A Stock ○:Call for Availability

## INCH

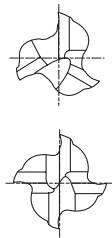
| EDP No.        | APPEARANCE | SPECIFICATION  | STOCK | PAGE |
|----------------|------------|--|-------|------|
| EH108          |            | CARBIDE, 3&4 FLUTE, 50° HELIX, REGULAR LENGTH                          | ★     | 99   |
| EE882          |            | YPM, 6 FLUTE, 35° HELIX, REGULAR LENGTH                                | ★     | 99   |
| E5075<br>E5105 |            | CARBIDE, 3 FLUTE, 35° HELIX , STUB LENGTH,<br>CORNER RADIUS - "HOSS"   | ★     | 100  |
| E5074<br>E5104 |            | CARBIDE, 3 FLUTE, 35° HELIX, REGULAR LENGTH,<br>CORNER RADIUS - "HOSS" | ★     | 101  |
| EH094          |            | CARBIDE, MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING                 | ★     | 103  |
| EH095          |            | CARBIDE, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING                 | ★     | 103  |
| EH969          |            | CARBIDE, MULTI FLUTE, 45° HELIX, LONG LENGTH,<br>FINE PITCH ROUGHING   | ★     | 104  |
| EH970          |            | CARBIDE, MULTI FLUTE, 45° HELIX, LONG REACH,<br>FINE PITCH ROUGHING    | ★     | 105  |

## METRIC

| EDP No.        | APPEARANCE | SPECIFICATION  | STOCK | PAGE |
|----------------|------------|--|-------|------|
| EH830          |            | CARBIDE, 3 FLUTE, 50° HELIX, LONG LENGTH                                     | ○     | 106  |
| EH830          |            | CARBIDE, 4 FLUTE, 50° HELIX, LONG LENGTH                                     | ○     | 106  |
| EE515          |            | YPM, 4&6 FLUTE, SHORT LENGTH   | ○     | 106  |
| EH852          |            | CARBIDE, MULTI FLUTE, SHORT, FINE PITCH ROUGHING                             | ○     | 107  |
| EH831          |            | CARBIDE, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING                       | ○     | 107  |
| EH917<br>EH919 |            | CARBIDE, MULTI FLUTE, 45° HELIX, SHORT & LONG LENGTH,<br>FINE PITCH ROUGHING | ○     | 108  |
| EH921          |            | CARBIDE, MULTI FLUTE, 45° HELIX, LONG REACH,<br>FINE PITCH ROUGHING          | ○     | 109  |

## SPEED & FEED DATA

110 ~ 112

**JET-POWER****3&4 FLUTE, 50° HELIX, REGULAR LENGTH**

P.110

► Suitable for low hardness materials (under HRc 45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, inconel, nimonic, etc.

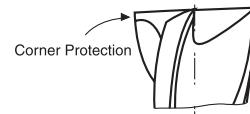
► Corner Protection against chipping.

◇ **U.S.A Stock**

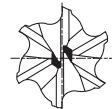
**EH108 Series**

Unit : inch

| EDP No.<br>PLAIN | EDP No.<br>FLAT | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|------------------|-----------------|------------------|-------------------|------------------|-------------------|-----------------|
| 95063            | —               | 1/8              | 1/8               | 1/2              | 1-1/2             | 3               |
| 95064            | —               | 3/16             | 3/16              | 5/8              | 2                 | 3               |
| 95065            | —               | 1/4              | 1/4               | 3/4              | 2-1/2             | 3               |
| 95066            | —               | 5/16             | 5/16              | 13/16            | 2-1/2             | 3               |
| —                | 95067           | 3/8              | 3/8               | 1                | 2-1/2             | 3               |
| 95115            | —               | 7/16             | 7/16              | 1                | 2-3/4             | 3               |
| —                | 95068           | 1/2              | 1/2               | 1                | 3                 | 3               |
| —                | 95069           | 5/8              | 5/8               | 1-1/4            | 3-1/2             | 3               |
| —                | 95070           | 3/4              | 3/4               | 1-1/2            | 4                 | 4               |
| —                | 95071           | 1                | 1                 | 1-1/2            | 4                 | 4               |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0                         | 0                          |
| -.0012                    | -.0003                     |

**JET-POWER****6 FLUTE, 35° HELIX, REGULAR LENGTH**

P.111

► Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic, etc.

► High velocity milling operation and good surface finishes.

◇ **U.S.A Stock**

**EE882 Series**

Unit : inch

| EDP No. | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|------------------|-------------------|------------------|-------------------|
| 95094   | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 95095   | 7/8              | 7/8               | 1-7/8            | 4-1/8             |
| 95096   | 1                | 1                 | 2                | 4-1/2             |
| 95097   | 1-1/4            | 1-1/4             | 2                | 4-1/2             |
| 95098   | 1-1/2            | 1-1/4             | 2                | 4-1/2             |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| +.0010                    | 0                          |
| 0                         | -.0003                     |

JET-POWER

# 3 FLUTE, 35° HELIX, STUB LENGTH, CORNER RADIUS - "HOSS"



P.102

- #1 Choice for slotting, ramping & pocket work on stainless, monel & other alloys up to HRc35.
- Dry milling is recommended on steel alloys to reduce thermal shock and increase the life (YG:TYLON F or E COATING).

◇ U.S.A Stock

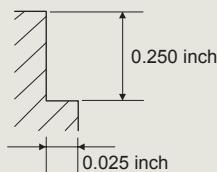
E5075(~ 5/16), E5105(11/32~1") Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiN COATED | EDP No.<br>TiCN COATED | EDP No.<br>YG:TYLON F | EDP No.<br>YG:TYLON E | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 57558               | 57558TN               | 57558TC                | 57558TF               | 57558TE               | .008~.010             | 1/8              | 1/8               | 1/4              | 1-1/2             |
| 57561               | 57561TN               | 57561TC                | 57561TF               | 57561TE               | .008~.010             | 5/32             | 3/16              | 5/16             | 2                 |
| 57565               | 57565TN               | 57565TC                | 57565TF               | 57565TE               | .008~.010             | 3/16             | 3/16              | 5/16             | 2                 |
| 57570               | 57570TN               | 57570TC                | 57570TF               | 57570TE               | .015~.020             | 7/32             | 1/4               | 3/8              | 2                 |
| 57573               | 57573TN               | 57573TC                | 57573TF               | 57573TE               | .015~.020             | 1/4              | 1/4               | 3/8              | 2                 |
| 57576               | 57576TN               | 57576TC                | 57576TF               | 57576TE               | .015~.020             | 9/32             | 5/16              | 7/16             | 2                 |
| 57579               | 57579TN               | 57579TC                | 57579TF               | 57579TE               | .015~.020             | 5/16             | 5/16              | 7/16             | 2                 |
| 57582               | 57582TN               | 57582TC                | 57582TF               | 57582TE               | .015~.020             | 11/32            | 3/8               | 1/2              | 2                 |
| 57584               | 57584TN               | 57584TC                | 57584TF               | 57584TE               | .015~.020             | 3/8              | 3/8               | 1/2              | 2                 |
| 57588               | 57588TN               | 57588TC                | 57588TF               | 57588TE               | .015~.020             | 7/16             | 7/16              | 9/16             | 2-1/2             |
| 57593               | 57593TN               | 57593TC                | 57593TF               | 57593TE               | .030~.035             | 1/2              | 1/2               | 5/8              | 2-1/2             |
| 57595               | 57595TN               | 57595TC                | 57595TF               | 57595TE               | .030~.035             | 5/8              | 5/8               | 3/4              | 3                 |
| 57598               | 57598TN               | 57598TC                | 57598TF               | 57598TE               | .030~.035             | 3/4              | 3/4               | 1                | 3                 |
| 57600               | 57600TN               | 57600TC                | 57600TF               | 57600TE               | .030~.035             | 1                | 1                 | 1-1/4            | 3                 |



TOOL ; YG : Ø 1/4, 3FL. STUB, UN-COATED  
COMPETITOR : Ø 1/4, 3FL. STUB, UN-COATING  
MATERIAL : STAINLESS STEEL, SUS304  
RPM : 4100 rev/min  
Feed : 12.50 inch/min  
COOLANT : WATER SOLUBLE OIL



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**JET-POWER**

# 3 FLUTE, 35° HELIX, REGULAR LENGTH, CORNER RADIUS - "HOSS"



P.102

- #1 Choice for slotting, ramping & pocket work on stainless, monel & other alloys up to HRc35.
- Dry milling is recommended on steel alloys to reduce thermal shock and increase the life (YG:TYLON F or E COATING).

◇ U.S.A Stock

E5074(~5/16), E5104(11/32~1") Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TIN COATED | EDP No.<br>TiCN COATED | EDP No.<br>YG:TYLON F | EDP No.<br>YG:TYLON E | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 56558               | 56558TN               | 56558TC                | 56558TF               | 56558TE               | .008~.010             | 1/8              | 1/8               | 1/2              | 1-1/2             |
| 56561               | 56561TN               | 56561TC                | 56561TF               | 56561TE               | .008~.010             | 5/32             | 3/16              | 9/16             | 2                 |
| 56565               | 56565TN               | 56565TC                | 56565TF               | 56565TE               | .008~.010             | 3/16             | 3/16              | 9/16             | 2                 |
| 56570               | 56570TN               | 56570TC                | 56570TF               | 56570TE               | .015~.020             | 7/32             | 1/4               | 3/4              | 2-1/2             |
| 56573               | 56573TN               | 56573TC                | 56573TF               | 56573TE               | .015~.020             | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 56576               | 56576TN               | 56576TC                | 56576TF               | 56576TE               | .015~.020             | 9/32             | 5/16              | 13/16            | 2-1/2             |
| 56579               | 56579TN               | 56579TC                | 56579TF               | 56579TE               | .015~.020             | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 56582               | 56582TN               | 56582TC                | 56582TF               | 56582TE               | .015~.020             | 11/32            | 3/8               | 1                | 2-1/2             |
| 56584               | 56584TN               | 56584TC                | 56584TF               | 56584TE               | .015~.020             | 3/8              | 3/8               | 1                | 2-1/2             |
| 56588               | 56588TN               | 56588TC                | 56588TF               | 56588TE               | .015~.020             | 7/16             | 7/16              | 1                | 2-3/4             |
| 56593               | 56593TN               | 56593TC                | 56593TF               | 56593TE               | .030~.035             | 1/2              | 1/2               | 1-1/4            | 3                 |
| 56595               | 56595TN               | 56595TC                | 56595TF               | 56595TE               | .030~.035             | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 56598               | 56598TN               | 56598TC                | 56598TF               | 56598TE               | .030~.035             | 3/4              | 3/4               | 1-5/8            | 4                 |
| 56600               | 56600TN               | 56600TC                | 56600TF               | 56600TE               | .030~.035             | 1                | 1                 | 2                | 4                 |

JET-POWER

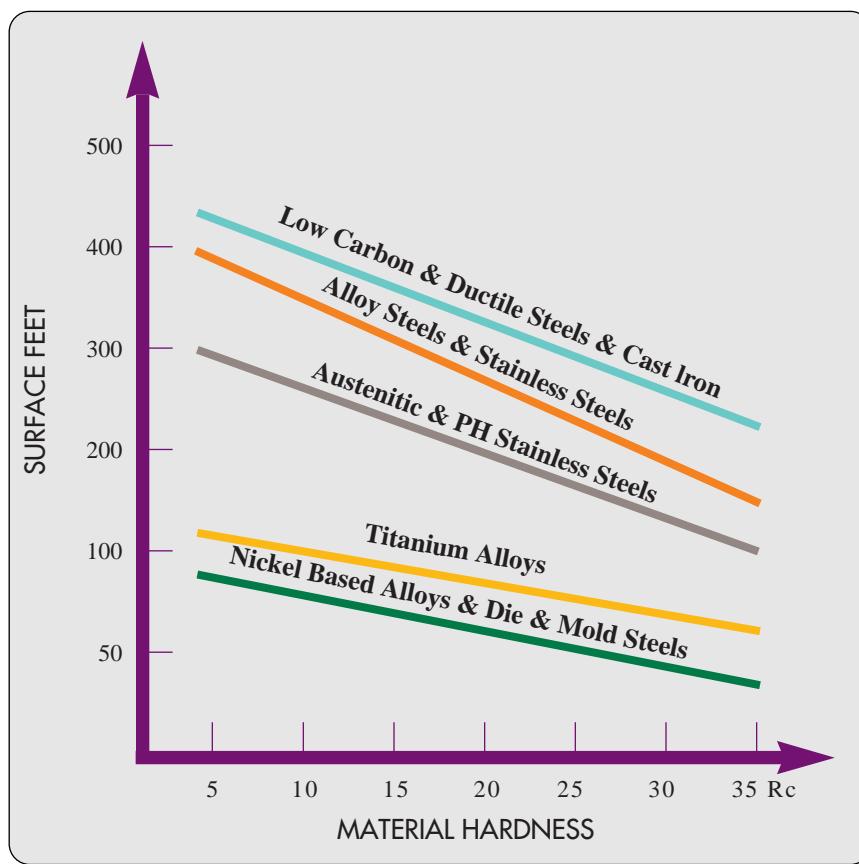
| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

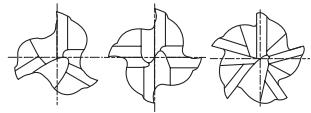
## RECOMMENDED CUTTING CONDITIONS

- ▶ Use stub length whenever possible
- ▶ Hardslick coating is recommended on soft gummy material  
Especially on tools 3/16 and under

CUTTING TOOL DIAMETER

|             |            |            |            |             |           |             |            |           |           |
|-------------|------------|------------|------------|-------------|-----------|-------------|------------|-----------|-----------|
| 1/8         | 3/16       | 1/4        | 5/16       | 3/8         | 7/16      | 1/2         | 5/8        | 3/4       | 1.00      |
| .0003-.0015 | .0004-.002 | .001-.0025 | .0015-.003 | .0015-.0035 | .002-.004 | .0025-.0045 | .0025-.005 | .003-.006 | .003-.007 |



**JET-POWER****MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING**

P.112

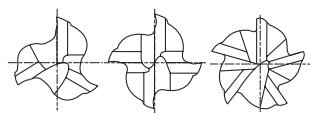
- Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- High velocity milling operation.
- Fast chip ejection.

◇ U.S.A Stock

**EH094 Series**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 95072   | 1/4           | 1/4            | 5/16          | 2-1/8          | 3            |
| 95073   | 5/16          | 5/16           | 3/8           | 2-1/4          | 3            |
| 95074   | 3/8           | 3/8            | 9/16          | 2-1/2          | 3            |
| 95075   | 1/2           | 1/2            | 5/8           | 3              | 4            |
| 95076   | 5/8           | 5/8            | 7/8           | 3-1/4          | 4            |
| 95077   | 3/4           | 3/4            | 1             | 3-3/4          | 4            |
| 95078   | 1             | 1              | 1             | 4              | 5            |

**JET-POWER****MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING**

P.112

- Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- High velocity milling operation.
- Fast chip ejection.

◇ U.S.A Stock

**EH095 Series**

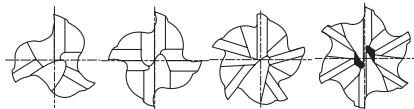
Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 95079   | 1/4           | 1/4            | 3/4           | 2-1/2          | 3            |
| 95080   | 5/16          | 5/16           | 3/4           | 2-1/2          | 3            |
| 95081   | 3/8           | 3/8            | 7/8           | 2-1/2          | 3            |
| 95082   | 1/2           | 1/2            | 1             | 3              | 4            |
| 95083   | 5/8           | 5/8            | 1-1/4         | 3-1/2          | 4            |
| 95084   | 3/4           | 3/4            | 1-5/8         | 4              | 4            |
| 95085   | 1             | 1              | 1-3/4         | 4              | 5            |

| MILL DIA.               | 1/4~3/8    | 1/2~5/8     | 3/4~1      |
|-------------------------|------------|-------------|------------|
| TOLERANCE OF MILL DIA.  | 0 ~ -.0022 | 0 ~ -.0027  | 0 ~ -.0033 |
| TOLERANCE OF SHANK DIA. |            | 0<br>-.0003 |            |

**JET-POWER**

# MULTI FLUTE, 45° HELIX, LONG LENGTH, FINE PITCH ROUGHING



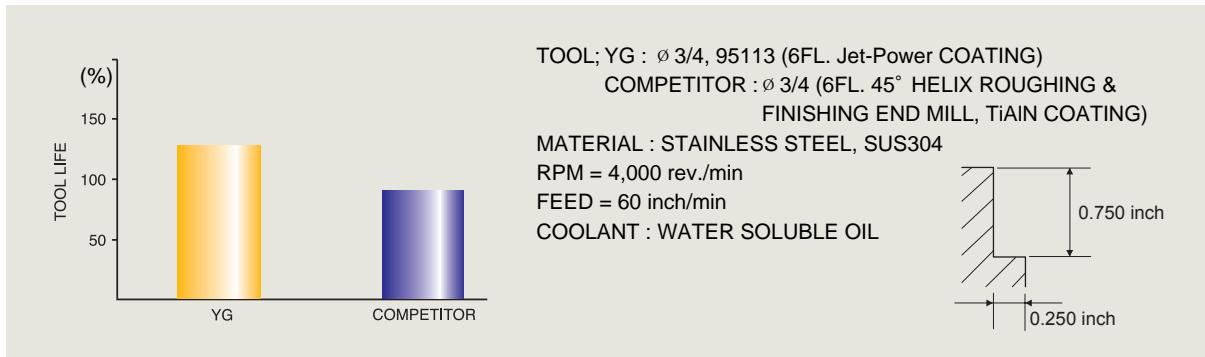
P.112

- ▶ Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
  - ▶ High chip removed and minimizing breakages of cutting edges.
  - ▶ Corner Protection against chipping.
- ◇ U.S.A Stock

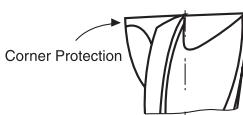
**EH969 Series**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 95107   | 3/16          | 1/4            | 1/2           | 2-1/4          | 3            |
| 95108   | 1/4           | 1/4            | 3/4           | 2-1/2          | 4            |
| 95109   | 5/16          | 5/16           | 3/4           | 2-1/2          | 4            |
| 95110   | 3/8           | 3/8            | 7/8           | 2-1/2          | 4            |
| 95111   | 1/2           | 1/2            | 1             | 3              | 4            |
| 95112   | 5/8           | 5/8            | 1-1/4         | 3-1/2          | 5            |
| 95113   | 3/4           | 3/4            | 1-5/8         | 4              | 6            |
| 95114   | 1             | 1              | 1-3/4         | 4              | 6            |

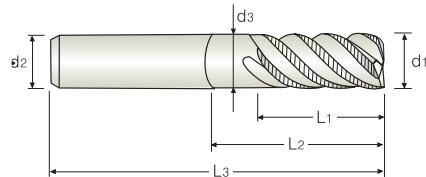
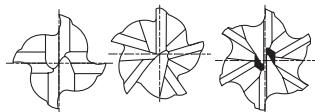


| MILL DIA.               | 1/4~3/8    | 1/2~5/8     | 3/4~1      |
|-------------------------|------------|-------------|------------|
| TOLERANCE OF MILL DIA.  | 0 ~ -.0022 | 0 ~ -.0027  | 0 ~ -.0033 |
| TOLERANCE OF SHANK DIA. |            | 0<br>-.0003 |            |



JET-POWER

# MULTI FLUTE, 45° HELIX, LONG REACH, FINE PITCH ROUGHING



P.112

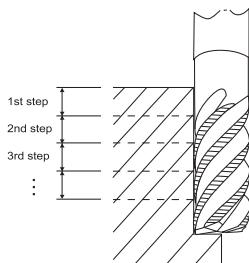
- ▶ Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
- ▶ High chip removed and minimizing breakages of cutting edges.
- ▶ Corner Protection against chipping.

◇ U.S.A Stock

## EH970 Series

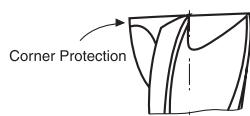
Unit : inch

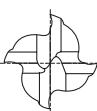
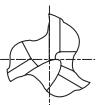
| EDP No. | MILL DIAMETER<br>$d_1$ | SHANK DIAMETER<br>$d_2$ | LENGTH OF CUT<br>$L_1$ | LENGTH BELOW SHANK<br>$L_2$ | OVERALL LENGTH<br>$L_3$ | NECK DIAMETER<br>$d_3$ | NO. OF FLUTE |
|---------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|--------------|
| 95101   | 1/4                    | 1/4                     | 3/4                    | 7/8                         | 2-1/2                   | .230                   | 4            |
| 95102   | 5/16                   | 5/16                    | 3/4                    | 1                           | 2-1/2                   | .292                   | 4            |
| 95103   | 3/8                    | 3/8                     | 7/8                    | 1-1/4                       | 2-1/2                   | .355                   | 4            |
| 95104   | 1/2                    | 1/2                     | 1                      | 1-1/2                       | 3                       | .480                   | 4            |
| 95105   | 5/8                    | 5/8                     | 1-1/4                  | 2                           | 4                       | .605                   | 5            |
| 95106   | 3/4                    | 3/4                     | 1-5/8                  | 2-3/8                       | 4-3/8                   | .719                   | 6            |



JET-POWER

| MILL DIA.               | 1/4~3/8    | 1/2~5/8    | 3/4~1      |
|-------------------------|------------|------------|------------|
| TOLERANCE OF MILL DIA.  | 0 ~ -.0022 | 0 ~ -.0027 | 0 ~ -.0033 |
| TOLERANCE OF SHANK DIA. |            | 0          | -.0003     |



**JET-POWER****3&4 FLUTE, 50° HELIX, LONG LENGTH****METRIC**

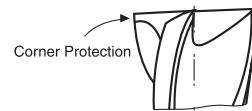
- ▶ Suitable for low hardness materials (under HRc 45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steels, inconel, nimonic, etc.
- ▶ Corner Protection against chipping.

◇ *Call for Availability*

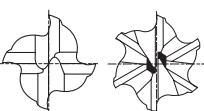
**EH830 Series**

Unit : mm

| EDP No.<br>PLAIN | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|------------------|------------------|-------------------------|------------------|-------------------|-----------------|
| EH830060         | 6.0              | 6                       | 13               | 50                | 3               |
| EH830901         | 6.0              | 6                       | 13               | 50                | 4               |
| EH830080         | 8.0              | 8                       | 19               | 60                | 3               |
| EH830100         | 10.0             | 10                      | 22               | 70                | 3               |
| EH830120         | 12.0             | 12                      | 25               | 75                | 3               |
| EH830160         | 16.0             | 16                      | 32               | 90                | 3               |
| EH830180         | 18.0             | 18                      | 32               | 90                | 3               |
| EH830200         | 20.0             | 20                      | 38               | 100               | 4               |
| EH830250         | 25.0             | 25                      | 45               | 120               | 4               |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>– 0.03               | h6                         |

**JET-POWER****4&6 FLUTE, SHORT LENGTH****METRIC**

- ▶ Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic, etc.
- ▶ High velocity milling operation and good surface finishes.

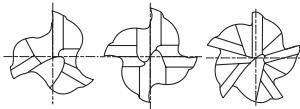
◇ *Call for Availability*

**EE515 Series**

Unit : mm

| EDP No.  | MILL<br>DIAMETER | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------|------------------|-------------------------|------------------|-------------------|-----------------|
| EE515030 | 3.0              | 6                       | 8                | 52                | 4               |
| EE515040 | 4.0              | 6                       | 11               | 55                | 4               |
| EE515050 | 5.0              | 6                       | 13               | 57                | 4               |
| EE515060 | 6.0              | 6                       | 13               | 57                | 4               |
| EE515080 | 8.0              | 10                      | 19               | 69                | 4               |
| EE515100 | 10.0             | 10                      | 22               | 72                | 4               |
| EE515120 | 12.0             | 12                      | 26               | 83                | 4               |
| EE515140 | 14.0             | 12                      | 26               | 83                | 4               |
| EE515160 | 16.0             | 16                      | 32               | 92                | 6               |
| EE515180 | 18.0             | 16                      | 32               | 92                | 6               |
| EE515200 | 20.0             | 20                      | 38               | 104               | 6               |
| EE515250 | 25.0             | 25                      | 45               | 121               | 6               |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| + 0.03<br>0               | h6                         |

**JET-POWER****MULTI FLUTE, SHORT & LONG LENGTH,  
FINE PITCH ROUGHING****METRIC**

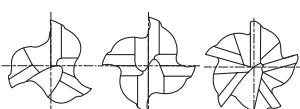
- Designed to machine low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, inconel, nimonic.
- High velocity milling operation.
- Fast chip ejection.

◇ Call for Availability

**EH852 Series****■ SHORT LENGTH**

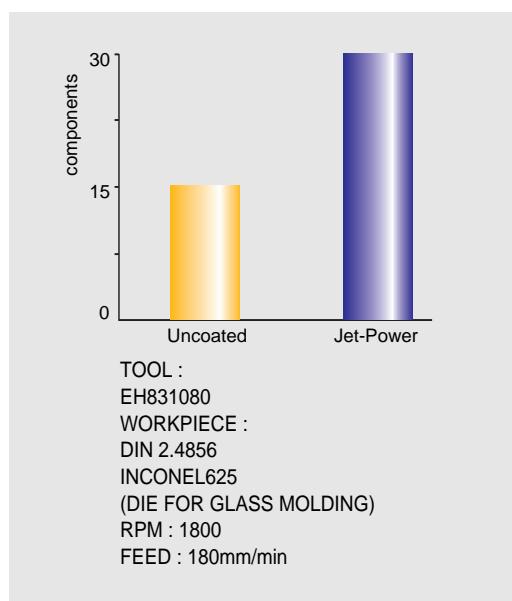
Unit :mm

| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EH852060 | 6.0               | 6                 | 7             | 54             | 3            |
| EH852070 | 7.0               | 8                 | 8             | 58             | 3            |
| EH852080 | 8.0               | 8                 | 9             | 58             | 3            |
| EH852090 | 9.0               | 10                | 13            | 66             | 4            |
| EH852100 | 10.0              | 10                | 14            | 66             | 4            |
| EH852120 | 12.0              | 12                | 16            | 73             | 4            |
| EH852140 | 14.0              | 14                | 18            | 75             | 4            |
| EH852160 | 16.0              | 16                | 22            | 82             | 4            |
| EH852180 | 18.0              | 18                | 24            | 84             | 4            |
| EH852200 | 20.0              | 20                | 26            | 92             | 4            |
| EH852250 | 25.0              | 25                | 25            | 110            | 5            |

**EH831 Series****■ LONG LENGTH**

Unit :mm

| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EH831060 | 6.0               | 6                 | 16            | 57             | 3            |
| EH831070 | 7.0               | 8                 | 16            | 63             | 3            |
| EH831080 | 8.0               | 8                 | 16            | 63             | 3            |
| EH831090 | 9.0               | 10                | 19            | 72             | 4            |
| EH831100 | 10.0              | 10                | 22            | 72             | 4            |
| EH831120 | 12.0              | 12                | 26            | 83             | 4            |
| EH831140 | 14.0              | 14                | 26            | 83             | 4            |
| EH831160 | 16.0              | 16                | 32            | 92             | 4            |
| EH831180 | 18.0              | 18                | 32            | 92             | 4            |
| EH831200 | 20.0              | 20                | 38            | 104            | 4            |
| EH831250 | 25.0              | 25                | 45            | 121            | 5            |

**Tolerances according to DIN 7160 & 7161**Tolerance range in  $\mu\text{m}$ 

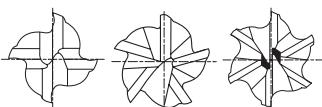
Nominal-Diameter in mm

|     | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
|-----|-------------|-------------|--------------|---------------|---------------|
| h10 | 0<br>— 40   | 0<br>— 48   | 0<br>— 58    | 0<br>— 70     | 0<br>— 84     |
| h6  | 0<br>— 6    | 0<br>— 8    | 0<br>— 9     | 0<br>— 11     | 0<br>— 13     |

 $\mu\text{m} = 1/1000\text{mm}$

**JET-POWER**

# MULTI FLUTE, 45° HELIX, SHORT & LONG LENGTH, FINE PITCH ROUGHING

**METRIC**

MG

4-6

45°

PLAIN

FINE

- ▶ Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
  - ▶ High chip removed and minimizing breakages of cutting edges.
  - ▶ Corner Protection against chipping.
- ◇ *Call for Availability*

**EH917 Series**

■ SHORT LENGTH

Unit : mm

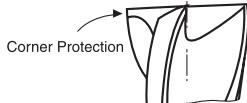
| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EH917060 | 6.0               | 6                 | 7             | 54             | 4            |
| EH917080 | 8.0               | 8                 | 9             | 58             | 4            |
| EH917100 | 10.0              | 10                | 14            | 66             | 4            |
| EH917120 | 12.0              | 12                | 16            | 73             | 4            |
| EH917160 | 16.0              | 16                | 22            | 82             | 5            |
| EH917200 | 20.0              | 20                | 26            | 92             | 6            |

**EH919 Series**

■ LONG LENGTH

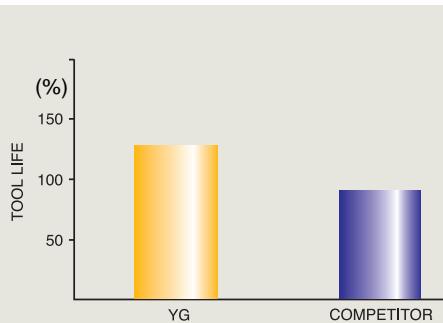
Unit : mm

| EDP No.  | MILL DIAMETER h10 | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|-------------------|---------------|----------------|--------------|
| EH919040 | 4.0               | 6                 | 11            | 57             | 3            |
| EH919050 | 5.0               | 6                 | 13            | 57             | 4            |
| EH919060 | 6.0               | 6                 | 16            | 57             | 4            |
| EH919070 | 7.0               | 8                 | 16            | 63             | 4            |
| EH919080 | 8.0               | 8                 | 16            | 63             | 4            |
| EH919090 | 9.0               | 10                | 19            | 72             | 4            |
| EH919100 | 10.0              | 10                | 22            | 72             | 4            |
| EH919120 | 12.0              | 12                | 26            | 83             | 4            |
| EH919140 | 14.0              | 14                | 26            | 83             | 5            |
| EH919160 | 16.0              | 16                | 32            | 92             | 5            |
| EH919200 | 20.0              | 20                | 38            | 104            | 6            |
| EH919250 | 25.0              | 25                | 45            | 121            | 6            |



### Tolerances according to DIN 7160 & 7161

|            | Tolerance range in $\mu\text{m}$ |             |              |               |               |
|------------|----------------------------------|-------------|--------------|---------------|---------------|
|            | Nominal-Diameter in mm           |             |              |               |               |
|            | from 1 to 3                      | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| <b>h10</b> | 0<br>— 40                        | 0<br>— 48   | 0<br>— 58    | 0<br>— 70     | 0<br>— 84     |
| <b>h6</b>  | 0<br>— 6                         | 0<br>— 8    | 0<br>— 9     | 0<br>— 11     | 0<br>— 13     |

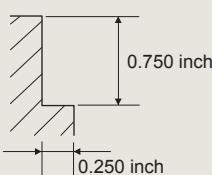
 $\mu\text{m} = 1/1000\text{mm}$ TOOL; YG :  $\varnothing 3/4$ , 95113 (6FL. Jet-Power COATING)COMPETITOR :  $\varnothing 3/4$  (6FL. 45° HELIX ROUGHING &  
FINISHING END MILL, TiAIN COATING)

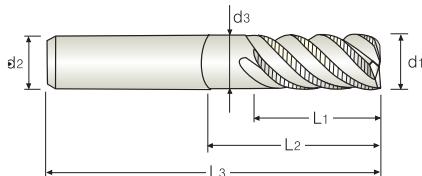
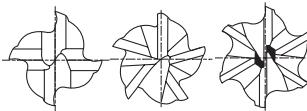
MATERIAL : STAINLESS STEEL, SUS304

RPM = 4,000 rev./min

FEED = 60 inch/min

COOLANT : WATER SOLUBLE OIL



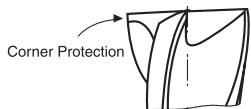
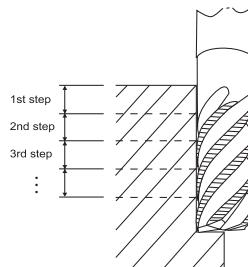
**JET-POWER****MULTI FLUTE, 45° HELIX, LONG REACH,  
FINE PITCH ROUGHING****METRIC**

- ▶ Suitable for low hardness materials (under HRc45), alloy steels, tool steels, carbon steels, prehardened steels, stainless steel, titanium, inconel, nimonic, etc.
  - ▶ High chip removed and minimizing breakages of cutting edges.
  - ▶ Corner Protection against chipping.
- ◇ *Call for Availability*

**EH921 Series**

| EDP No.  | MILL DIAMETER<br>d1 (h10) | SHANK DIAMETER<br>d2 (h6) | LENGTH OF CUT<br>L1 | LENGTH BELOW SHANK<br>L2 | OVERALL LENGTH<br>L3 | NECK DIAMETER<br>d3 | NO. OF FLUTE |
|----------|---------------------------|---------------------------|---------------------|--------------------------|----------------------|---------------------|--------------|
| EH921060 | 6.0                       | 6                         | 16                  | 20                       | 57                   | 5.5                 | 4            |
| EH921080 | 8.0                       | 8                         | 16                  | 26                       | 63                   | 7.5                 | 4            |
| EH921100 | 10.0                      | 10                        | 22                  | 31                       | 72                   | 9.5                 | 4            |
| EH921120 | 12.0                      | 12                        | 26                  | 37                       | 83                   | 11.5                | 4            |
| EH921160 | 16.0                      | 16                        | 32                  | 51                       | 100                  | 15.5                | 5            |
| EH921200 | 20.0                      | 20                        | 38                  | 59                       | 110                  | 19.2                | 6            |

Unit :mm

**Tolerances according to DIN 7160 & 7161**

|            | Tolerance range in $\mu\text{m}$ |             |              |               |               |
|------------|----------------------------------|-------------|--------------|---------------|---------------|
|            | Nominal-Diameter in mm           |             |              |               |               |
|            | from 1 to 3                      | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 |
| <b>h10</b> | 0                                | 0           | 0            | 0             | 0             |
|            | — 40                             | — 48        | — 58         | — 70          | — 84          |
| <b>h6</b>  | 0                                | 0           | 0            | 0             | 0             |
|            | — 6                              | — 8         | — 9          | — 11          | — 13          |

 $\mu\text{m} = 1/1000\text{mm}$ 

JET-POWER

## 3&amp;4 FLUTE, FINISH, SLOTTING

## EH108 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS STEELS |      | TITANIUM ALLOY |      | INCONEL |      |
|----------|--|-------|--|------|------------------|------|----------------|------|---------|------|
| HARDNESS | ~HRc30                                       |       | HRc30 ~ HRc45                                |      |                  |      |                |      |         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |       | 1000 ~ 1500N/mm <sup>2</sup>                 |      |                  |      |                |      |         |      |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM              | FEED | RPM            | FEED | RPM     | FEED |
| 1/4      | 5560   | 12.20 | 3360   | 7.85 | 2840             | 6.30 | 1500           | 2.15 | 1160    | 1.60 |
| 5/16     | 4200   | 13.40 | 2520   | 7.10 | 2100             | 6.30 | 1090           | 2.15 | 840     | 1.60 |
| 3/8      | 3260   | 11.80 | 2000   | 5.50 | 1680             | 5.50 | 870            | 2.15 | 670     | 1.60 |
| 1/2      | 2740   | 9.80  | 1680   | 4.70 | 1370             | 4.70 | 730            | 1.75 | 560     | 1.20 |
| 5/8      | 2200   | 7.85  | 1360   | 3.90 | 1050             | 4.00 | 550            | 1.35 | 420     | 1.00 |
| 3/4      | 1750   | 6.90  | 1100   | 3.35 | 880              | 3.35 | 480            | 1.20 | 350     | 1.20 |
| 1        | 1360   | 4.50  | 840  | 2.35 | 670              | 2.35 | 350            | 0.80 | 270     | 0.60 |



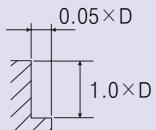
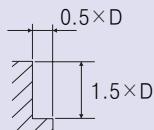
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 3&amp;4 FLUTE, FINISH, SIDE CUTTING

## EH108 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS STEELS |      | TITANIUM ALLOY |      | INCONEL |      |
|----------|--|-------|--|------|------------------|------|----------------|------|---------|------|
| HARDNESS | ~HRc30                                       |       | HRc30 ~ HRc45                                |      |                  |      |                |      |         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |       | 1000 ~ 1500N/mm <sup>2</sup>                 |      |                  |      |                |      |         |      |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM              | FEED | RPM            | FEED | RPM     | FEED |
| 1/4      | 5560   | 15.75 | 3360   | 9.85 | 2840             | 8.30 | 1360           | 2.95 | 1050    | 2.20 |
| 5/16     | 4200   | 16.50 | 2520   | 9.05 | 2100             | 8.70 | 1090           | 2.75 | 840     | 2.00 |
| 3/8      | 3260   | 14.55 | 2000   | 7.10 | 1680             | 8.70 | 880            | 2.75 | 680     | 2.00 |
| 1/2      | 2740   | 12.20 | 1680   | 5.90 | 1370             | 7.10 | 730            | 2.55 | 560     | 1.80 |
| 5/8      | 2200   | 9.85  | 1360   | 4.70 | 1050             | 5.30 | 550            | 1.95 | 420     | 1.40 |
| 3/4      | 1750   | 8.65  | 1100   | 4.35 | 880              | 5.40 | 480            | 1.55 | 350     | 1.20 |
| 1        | 1360   | 5.90  | 840  | 2.95 | 670              | 4.50 | 350            | 1.35 | 270     | 1.00 |



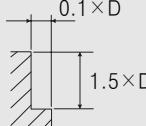
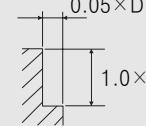
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# 6 FLUTE, SUPER POWDER METALLURGY(YPM), SIDE CUTTING

## EE882 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS STEELS |      | TITANIUM ALLOY |      | INCONEL |      |
|----------|--|------|--|------|------------------|------|----------------|------|---------|------|
| HARDNESS | ~HRc30                                       |      | HRc30 ~ HRc45                                |      |                  |      |                |      |         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |      | 1000 ~ 1500N/mm <sup>2</sup>                 |      |                  |      |                |      |         |      |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM              | FEED | RPM            | FEED | RPM     | FEED |
| 3/4      | 960  | 8.00 | 215  | 0.80 | 480              | 4.80 | 220            | 1.35 | 170     | 0.95 |
| 7/8      | 730  | 7.25 | 180  | 0.65 | 365              | 4.35 | 190            | 1.10 | 145     | 0.78 |
| 1        | 640  | 6.60 | 165  | 0.60 | 320              | 3.95 | 170            | 1.00 | 130     | 0.70 |
| 1-1/4    | 520  | 5.25 | 130  | 0.45 | 260              | 3.15 | 140            | 0.77 | 105     | 0.55 |
| 1-1/2    | 430  | 4.35 | 105  | 0.37 | 215              | 2.60 | 110            | 0.63 | 85      | 0.45 |

※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## MULTI FLUTE, ROUGHING, SLOTTING

## EH094, EH095, EH969, EH970 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | STAINLESS STEELS |       | TITANIUM ALLOY |       | INCONEL |      |
|----------|--|-------|--|-------|------------------|-------|----------------|-------|---------|------|
| HARDNESS | ~HRc30                                       |       | HRc30 ~ HRc45                                |       |                  |       |                |       |         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |       | 1000 ~ 1500N/mm <sup>2</sup>                 |       |                  |       |                |       |         |      |
| DIAMETER | RPM  | FEED  | RPM  | FEED  | RPM              | FEED  | RPM            | FEED  | RPM     | FEED |
| 1/4      | 15600  | 91.35 | 12400  | 33.10 | 8400             | 22.45 | 3150           | 10.60 | 2400    | 7.50 |
| 5/16     | 11600  | 91.35 | 9200   | 33.10 | 6300             | 22.45 | 2350           | 9.80  | 1800    | 7.10 |
| 3/8      | 9200   | 91.35 | 7600   | 33.10 | 5100             | 22.45 | 1700           | 10.20 | 1300    | 7.50 |
| 1/2      | 8000   | 94.50 | 6000   | 31.50 | 4200             | 22.45 | 1560           | 10.20 | 1200    | 7.50 |
| 5/8      | 6000   | 94.50 | 4800   | 29.90 | 3300             | 20.10 | 1040           | 5.80  | 800     | 4.30 |
| 3/4      | 5200   | 91.35 | 4400   | 28.35 | 2500             | 16.55 | 910            | 5.50  | 675     | 4.00 |
| 1        | 4300   | 84.65 | 3200   | 24.40 | 2160             | 16.15 | 780            | 5.10  | 600     | 4.30 |

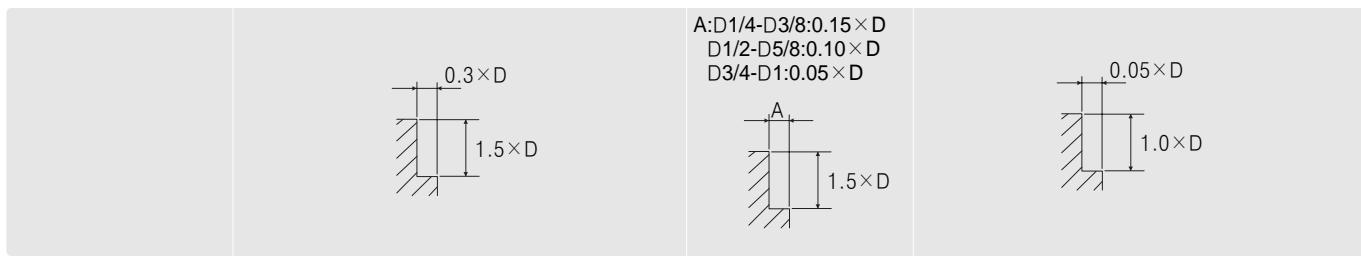
\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=mm/min.

## MULTI FLUTE, ROUGHING, SIDE CUTTING

## EH094, EH095, EH969, EH970 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | STAINLESS STEELS |       | TITANIUM ALLOY |       | INCONEL |      |
|----------|--|-------|--|-------|------------------|-------|----------------|-------|---------|------|
| HARDNESS | ~HRc30                                       |       | HRc30 ~ HRc45                                |       |                  |       |                |       |         |      |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |       | 1000 ~ 1500N/mm <sup>2</sup>                 |       |                  |       |                |       |         |      |
| DIAMETER | RPM  | FEED  | RPM  | FEED  | RPM              | FEED  | RPM            | FEED  | RPM     | FEED |
| 1/4      | 15600  | 91.35 | 12400  | 33.10 | 8400             | 22.45 | 3150           | 10.60 | 2400    | 7.50 |
| 5/16     | 11600  | 91.35 | 9200   | 33.10 | 6300             | 22.45 | 2350           | 9.80  | 1800    | 7.10 |
| 3/8      | 9200   | 91.35 | 7600   | 33.10 | 5100             | 22.45 | 1700           | 10.20 | 1300    | 7.50 |
| 1/2      | 8000   | 94.50 | 6000   | 31.50 | 4200             | 22.45 | 1560           | 10.20 | 1200    | 7.50 |
| 5/8      | 6000   | 94.50 | 4800   | 29.90 | 3300             | 22.10 | 1040           | 5.90  | 800     | 4.30 |
| 3/4      | 5200   | 91.35 | 4400   | 28.35 | 2700             | 16.55 | 910            | 5.50  | 700     | 4.00 |
| 1        | 4300   | 84.65 | 3200   | 24.40 | 2160             | 16.15 | 780            | 5.10  | 600     | 4.30 |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# ALU-POWER

## MICRO GRAIN CARBIDE END MILLS

● *For Aluminum and Non-Ferrous Materials.*





# ALU-POWER CARBIDE END MILLS SELECTION GUIDE

★:U.S.A Stock ○:Call for Availability

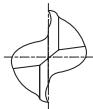
## INCH

| EDP No. | APPEARANCE | SPECIFICATION  | STOCK | PAGE |
|---------|------------|--|-------|------|
| E5253   |            | 2 FLUTE, 42° HELIX, REGULAR & LONG LENGTH - "BANSHEE"    | ★     | 115  |
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| E5976   |            | 2 FLUTE, 37° HELIX with EXTENDED NECK                    | ★     | 116  |
| E5980   |            | 3 FLUTE, 45° HELIX, STUB LENGTH                          | ★     | 117  |
| E5981   |            | 3 FLUTE, 45° HELIX, REGULAR LENGTH                       | ★     | 118  |
| E5983   |            | 3 FLUTE, 45° HELIX, REGULAR LENGTH, CORNER RADIUS        | ★     | 118  |
| E5982   |            | 3 FLUTE, 45° HELIX, LONG LENGTH                          | ★     | 119  |
| E5984   |            | 3 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS           | ★     | 119  |
| E5977   |            | 3 FLUTE, 37° HELIX with EXTENDED NECK                    | ★     | 120  |
| E5985   |            | 3 FLUTE, 37° HELIX with EXTENDED NECK, CORNER RADIUS     | ★     | 121  |
| E5973   |            | 2 FLUTE, CORNER RADIUS with NECK                         | ★     | 122  |
| E5974   |            | 2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK | ★     | 123  |
| E5978   |            | 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE                | ★     | 124  |
| E5975   |            | 3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK     |       | 125  |

## METRIC

| EDP No. | APPEARANCE | SPECIFICATION   | STOCK | PAGE |
|---------|------------|---|-------|------|
| E5522   |            | 2 FLUTE, 45° HELIX, LONG LENGTH                                       | ○     | 126  |
| EI926   |            | 2 FLUTE, 45° HELIX, LONG LENGTH, DIAMOND COATED                       | ○     | 127  |
| EG930   |            | 2 FLUTE, 25° HELIX, STUB CUT LENGTH, CORNER RADIUS, TiCN COATED       | ○     | 128  |
| EG909   |            | 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with NECK, TiCN COATED        | ○     | 129  |
| EG910   |            | 2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK, TiCN COATED | ○     | 130  |
| EG908   |            | 3 FLUTE, 40° HELIX, LONG LENGTH, BALL NOSE with NECK, TiCN COATED     | ○     | 131  |

YG-1

**ALU-POWER 2 FLUTE, 42° HELIX, REGULAR - "BANSHEE"**

P.132

- High velocity milling of aluminum & other non ferrous materials.
- Excellent plunging capabilities.
- Improved surface roughness-cylindrical margin which is controlled tightly.
- Maximum-stock removal, chip ejection, stability.

**◇ U.S.A Stock**

Unit : inch

**E5253 Series ■ FLAT SHANK**

| EDP No.<br>UNCOATED | EDP No.<br>TiN COATED | EDP No.<br>TiCN COATED | EDP No.<br>YG:TYLON F | EDP No.<br>YG:TYLON E | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|-----------------------|------------------------|-----------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 17574               | 17574TN               | 17574TC                | 17574TF               | 17574TE               | 1/4              | 3/8               | 3/4              | 2-1/2             |
| 17580               | 17580TN               | 17580TC                | 17580TF               | 17580TE               | 5/16             | 3/8               | 13/16            | 2-1/2             |
| 17584               | 17584TN               | 17584TC                | 17584TF               | 17584TE               | 3/8              | 3/8               | 1                | 2-1/2             |
| 17593               | 17593TN               | 17593TC                | 17593TF               | 17593TE               | 1/2              | 1/2               | 1                | 3                 |
| 18593               | 18593TN               | 18593TC                | 18593TF               | 18593TE               | 1/2              | 1/2               | 2                | 4                 |
| 17595               | 17595TN               | 17595TC                | 17595TF               | 17595TE               | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 17598               | 17598TN               | 17598TC                | 17598TF               | 17598TE               | 3/4              | 3/4               | 1-1/2            | 4                 |
| 18598               | 18598TN               | 18598TC                | 18598TF               | 18598TE               | 3/4              | 3/4               | 3                | 5-1/2             |
| 17600               | 17600TN               | 17600TC                | 17600TF               | 17600TE               | 1                | 1                 | 1-1/2            | 4                 |
| 18600               | 18600TN               | 18600TC                | 18600TF               | 18600TE               | 1                | 1                 | 3                | 5-1/2             |

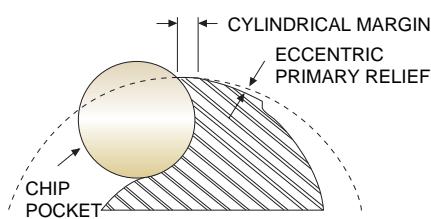
**E5254 Series ■ PLAIN SHANK**

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiN COATED | EDP No.<br>TiCN COATED | EDP No.<br>YG:TYLON F | EDP No.<br>YG:TYLON E | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|-----------------------|------------------------|-----------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 21554               | 21554TN               | 21554TC                | 21554TF               | 21554TE               | 1/16             | 1/8               | 1/8              | 1-1/2             |
| 21556               | 21556TN               | 21556TC                | 21556TF               | 21556TE               | 3/32             | 1/8               | 1/4              | 1-1/2             |
| 21601               | 21601TN               | 21601TC                | 21601TF               | 21601TE               | 1/8              | 1/4               | 5/16             | 1-3/4             |
| 21566               | 21566TN               | 21566TC                | 21566TF               | 21566TE               | 3/16             | 1/4               | 7/16             | 2                 |
| 21574               | 21574TN               | 21574TC                | 21574TF               | 21574TE               | 1/4              | 3/8               | 3/4              | 2-1/2             |
| 21580               | 21580TN               | 21580TC                | 21580TF               | 21580TE               | 5/16             | 3/8               | 13/16            | 2-1/2             |
| 21584               | 21584TN               | 21584TC                | 21584TF               | 21584TE               | 3/8              | 3/8               | 1                | 2-1/2             |
| 21588               | 21588TN               | 21588TC                | 21588TF               | 21588TE               | 7/16             | 7/16              | 1                | 2-3/4             |
| 21593               | 21593TN               | 21593TC                | 21593TF               | 21593TE               | 1/2              | 1/2               | 1                | 3                 |
| 21901               | 21901TN               | 21901TC                | 21901TF               | 21901TE               | 1/2              | 1/2               | 2                | 4                 |
| 21595               | 21595TN               | 21595TC                | 21595TF               | 21595TE               | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 21598               | 21598TN               | 21598TC                | 21598TF               | 21598TE               | 3/4              | 3/4               | 1-1/2            | 4                 |
| 21902               | 21902TN               | 21902TC                | 21902TF               | 21902TE               | 3/4              | 3/4               | 3                | 5-1/2             |
| 21600               | 21600TN               | 21600TC                | 21600TF               | 21600TE               | 1                | 1                 | 1-1/2            | 4                 |
| 21903               | 21903TN               | 21903TC                | 21903TF               | 21903TE               | 1                | 1                 | 3                | 5-1/2             |

| ALUMINUM MACHINING DATA |            |                  |
|-------------------------|------------|------------------|
| Diameter                | Speed(RPM) | Feed(inch/tooth) |
| 1/4                     | 10,000     | .002~.006        |
| 5/16                    | 8,000      | .002~.006        |
| 3/8                     | 8,000      | .002~.008        |
| 1/2                     | 8,000      | .002~.008        |
| 5/8                     | 6,000      | .002~.010        |
| 3/4                     | 4,000      | .002~.010        |
| 1                       | 4,000      | .002~.010        |

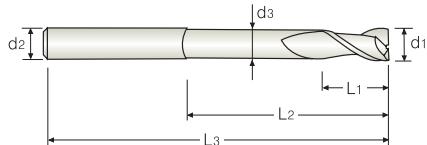
| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0                         | 0                          |
| -.0012                    | -.0003                     |



- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(42°), bigger chip pocket.



# 2 FLUTE, 37° HELIX with EXTENDED NECK



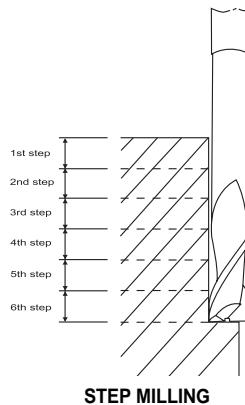
P.135

- High velocity milling of aluminum & other non-ferrous materials.
  - Excellent plunging capabilities.
  - Improved surface roughness-cylindrical margin which is controlled tightly (see page 111).
  - Maximum - stock removal, chip ejection, stability.
- ◇ U.S.A Stock**

## E5976 Series

Unit : inch

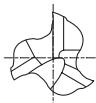
| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH BELOW<br>SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------------------|------------------------|---------------------------|----------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 39573               | 39573TC                | 1/4                       | 1/4                        | 3/8                       | 2-1/4                          | 4                          | .220                      |
| 39584               | 39584TC                | 3/8                       | 3/8                        | 1/2                       | 2-1/4                          | 4                          | .345                      |
| 39593               | 39593TC                | 1/2                       | 1/2                        | 5/8                       | 2-1/4                          | 5                          | .470                      |
| 39908               | 39908TC                | 1/2                       | 1/2                        | 5/8                       | 3-1/4                          | 6                          | .470                      |
| 39901               | 39901TC                | 1/2                       | 1/2                        | 5/8                       | 4                              | 6                          | .470                      |
| 39595               | 39595TC                | 5/8                       | 5/8                        | 3/4                       | 2-1/4                          | 5                          | .585                      |
| 39902               | 39902TC                | 5/8                       | 5/8                        | 3/4                       | 3-1/4                          | 6                          | .585                      |
| 39903               | 39903TC                | 5/8                       | 5/8                        | 3/4                       | 4-1/4                          | 7                          | .585                      |
| 39598               | 39598TC                | 3/4                       | 3/4                        | 1                         | 2-1/4                          | 5                          | .710                      |
| 39904               | 39904TC                | 3/4                       | 3/4                        | 1                         | 3-1/4                          | 6                          | .710                      |
| 39905               | 39905TC                | 3/4                       | 3/4                        | 1                         | 4-1/4                          | 7                          | .710                      |
| 39600               | 39600TC                | 1                         | 1                          | 1-1/8                     | 2-1/4                          | 5                          | .960                      |
| 39906               | 39906TC                | 1                         | 1                          | 1-1/8                     | 3-1/4                          | 6                          | .960                      |
| 39907               | 39907TC                | 1                         | 1                          | 1-1/8                     | 4-1/4                          | 7                          | .960                      |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |

YG-1

# ALU-POWER 3 FLUTE, 45° HELIX, STUB LENGTH



P.133

► Designed to machine aluminium at high speed condition.

► Improved surface roughness-cylindrical margin which is controlled tightly.

◇ U.S.A Stock

## E5980 Series

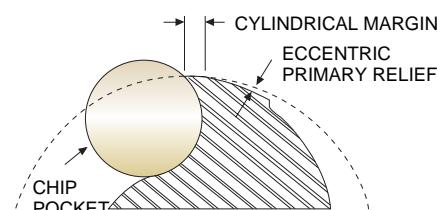
Unit : inch

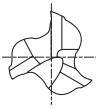
| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 25558               | 25558TC                | 1/8              | 1/8               | 1/4              | 1-1/2             |
| 25565               | 25565TC                | 3/16             | 3/16              | 5/16             | 2                 |
| 25573               | 25573TC                | 1/4              | 1/4               | 3/8              | 2                 |
| 25579               | 25579TC                | 5/16             | 5/16              | 7/16             | 2                 |
| 25584               | 25584TC                | 3/8              | 3/8               | 1/2              | 2                 |
| 25588               | 25588TC                | 7/16             | 7/16              | 9/16             | 2-1/2             |
| 25593               | 25593TC                | 1/2              | 1/2               | 5/8              | 2-1/2             |
| 25595               | 25595TC                | 5/8              | 5/8               | 3/4              | 3                 |
| 25598               | 25598TC                | 3/4              | 3/4               | 1                | 3                 |
| 25600               | 25600TC                | 1                | 1                 | 1-1/4            | 3                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |



- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(45°), bigger chip pocket.



**ALU-POWER****3 FLUTE, 45° HELIX, REGULAR LENGTH**

P.133

- High velocity milling of aluminum & other non-ferrous materials.
- 3 flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly
- Maximum-stock removal, chip ejection, stability.

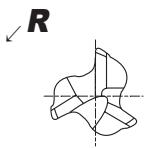
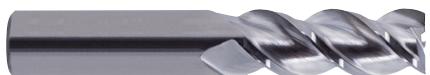
◇ U.S.A Stock

**E5981 Series**

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 28558               | 28558TC                | 1/8              | 1/8               | 3/8              | 1-1/2             |
| 28565               | 28565TC                | 3/16             | 3/16              | 9/16             | 2                 |
| 28573               | 28573TC                | 1/4              | 1/4               | 5/8              | 2-1/2             |
| 28579               | 28579TC                | 5/16             | 5/16              | 5/8              | 2-1/2             |
| 28584               | 28584TC                | 3/8              | 3/8               | 1                | 2-1/2             |
| 28588               | 28588TC                | 7/16             | 7/16              | 1-1/4            | 2-3/4             |
| 28593               | 28593TC                | 1/2              | 1/2               | 1-1/4            | 3                 |
| 28595               | 28595TC                | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 28598               | 28598TC                | 3/4              | 3/4               | 1-5/8            | 4                 |
| 28600               | 28600TC                | 1                | 1                 | 2                | 5                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |

**ALU-POWER****3 FLUTE, 45° HELIX, REGULAR LENGTH,  
CORNER RADIUS**

P.133

- High velocity milling of aluminum & other non-ferrous materials.
- 3 flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly
- Maximum-stock removal, chip ejection, stability.

◇ U.S.A Stock

**E5983 Series**

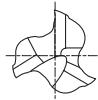
Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|------------------|-------------------|------------------|-------------------|
| EA50321             | EA50321C               | .060             | 1/2              | 1/2               | 1 1/4            | 3                 |
| EA50401             | EA50401C               | .060             | 5/8              | 5/8               | 1 5/8            | 3 1/2             |
| EA50481             | EA50481C               | .060             | 3/4              | 3/4               | 1 5/8            | 4                 |
| EA50641             | EA50641C               | .060             | 1                | 1                 | 2                | 5                 |
| EA20321             | EA20321C               | .120             | 1/2              | 1/2               | 1 1/4            | 3                 |
| EA20401             | EA20401C               | .120             | 5/8              | 5/8               | 1 5/8            | 3 1/2             |
| EA20481             | EA20481C               | .120             | 3/4              | 3/4               | 1 5/8            | 4                 |
| EA20641             | EA20641C               | .120             | 1                | 1                 | 2                | 5                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |



## 3 FLUTE, 45° HELIX, LONG LENGTH



P.133

- High velocity milling of aluminum & other non-ferrous materials.
- 3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly
- Maximum-stock removal, chip ejection, stability.

◇ ***U.S.A Stock***

### E5982 Series

Unit : inch

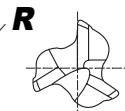
| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 36573               | 36573TC                | 1/4              | 1/4               | 1-1/4            | 3-1/4             |
| 36579               | 36579TC                | 5/16             | 5/16              | 1-1/4            | 3-1/2             |
| 36584               | 36584TC                | 3/8              | 3/8               | 1-1/2            | 3-1/2             |
| 36588               | 36588TC                | 7/16             | 7/16              | 2                | 4                 |
| 36593               | 36593TC                | 1/2              | 1/2               | 2                | 4                 |
| 36595               | 36595TC                | 5/8              | 5/8               | 2-1/2            | 5                 |
| 36598               | 36598TC                | 3/4              | 3/4               | 3-1/4            | 6                 |
| 36600               | 36600TC                | 1                | 1                 | 3-1/4            | 6                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |

ALU-POWER



## 3 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS



P.133

- High velocity milling of aluminum & other non-ferrous materials.
- 3flute and 45° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly
- Maximum-stock removal, chip ejection, stability.

◇ ***U.S.A Stock***

### E5984 Series

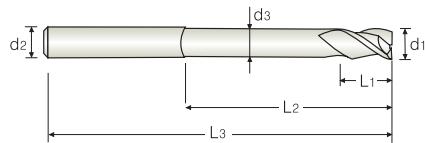
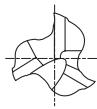
Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|------------------|-------------------|------------------|-------------------|
| EA60321             | EA60321C               | .060             | 1/2              | 1/2               | 2                | 4                 |
| EA60401             | EA60401C               | .060             | 5/8              | 5/8               | 2 1/2            | 5                 |
| EA60481             | EA60481C               | .060             | 3/4              | 3/4               | 3 1/4            | 6                 |
| EA60641             | EA60641C               | .060             | 1                | 1                 | 3 1/4            | 6                 |
| EA30321             | EA30321C               | .120             | 1/2              | 1/2               | 2                | 4                 |
| EA30401             | EA30401C               | .120             | 5/8              | 5/8               | 2 1/2            | 5                 |
| EA30481             | EA30481C               | .120             | 3/4              | 3/4               | 3 1/4            | 6                 |
| EA30641             | EA30641C               | .120             | 1                | 1                 | 3 1/4            | 6                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |



# 3 FLUTE, 37° HELIX with EXTENDED NECK



P.134

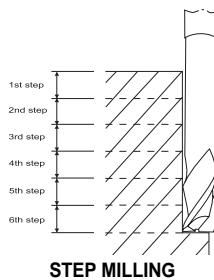
- High velocity milling of aluminum & other non-ferrous materials.
- 3flute and 37° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly(see page 113).
- Maximum-stock removal, chip ejection, stability.

◇ U.S.A Stock

## E5977 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TICN COATED | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------------------|------------------------|---------------------------|----------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 40573               | 40573TC                | 1/4                       | 1/4                        | 3/8                       | 2-1/4                          | 4                          | .220                      |
| 40584               | 40584TC                | 3/8                       | 3/8                        | 1/2                       | 2-1/4                          | 4                          | .345                      |
| 40593               | 40593TC                | 1/2                       | 1/2                        | 5/8                       | 2-1/4                          | 5                          | .470                      |
| 40901               | 40901TC                | 1/2                       | 1/2                        | 5/8                       | 3-1/4                          | 6                          | .470                      |
| 40902               | 40902TC                | 1/2                       | 1/2                        | 5/8                       | 4                              | 6                          | .470                      |
| 40595               | 40595TC                | 5/8                       | 5/8                        | 3/4                       | 2-1/4                          | 5                          | .585                      |
| 40903               | 40903TC                | 5/8                       | 5/8                        | 3/4                       | 3-1/4                          | 6                          | .585                      |
| 40904               | 40904TC                | 5/8                       | 5/8                        | 3/4                       | 4-1/4                          | 7                          | .585                      |
| 40598               | 40598TC                | 3/4                       | 3/4                        | 1                         | 2-1/4                          | 5                          | .710                      |
| 40905               | 40905TC                | 3/4                       | 3/4                        | 1                         | 3-1/4                          | 6                          | .710                      |
| 40906               | 40906TC                | 3/4                       | 3/4                        | 1                         | 4-1/4                          | 7                          | .710                      |
| 40600               | 40600TC                | 1                         | 1                          | 1-1/8                     | 2-1/4                          | 5                          | .960                      |
| 40907               | 40907TC                | 1                         | 1                          | 1-1/8                     | 3-1/4                          | 6                          | .960                      |
| 40908               | 40908TC                | 1                         | 1                          | 1-1/8                     | 4-1/4                          | 7                          | .960                      |



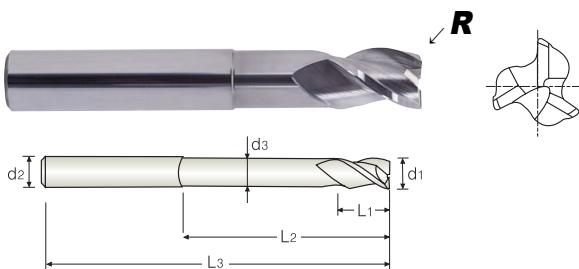
STEP MILLING

ALU-POWER

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0005               | 0<br>-.0003                |

**ALU-POWER**

## 3 FLUTE, 37° HELIX with EXTENDED NECK, CORNER RADIUS



P.134

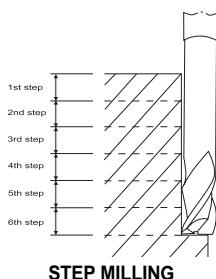
- High velocity milling of aluminum & other non-ferrous materials.
- 3 flute and 37° helix allow harmonic balance at high speed condition and smooth cutting.
- Improved surface roughness-cylindrical margin which is controlled tightly (see page 115).
- Maximum-stock removal, chip ejection, stability.

◇ U.S.A Stock

### E5985 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|---------------------|------------------------|-----------------------|------------------------------------|-------------------------------------|------------------------------------|---|-------------------------------------|------------------------------------|
| EA40321             | EA40321C               | .060                  | 1/2                                | 1/2                                 | 5/8                                | 3 1/4                                   | 6                                   | .470                               |
| EA40322             | EA40322C               | .060                  | 1/2                                | 1/2                                 | 5/8                                | 4                                       | 6                                   | .470                               |
| EA40401             | EA40401C               | .060                  | 5/8                                | 5/8                                 | 3/4                                | 2 1/4                                   | 5                                   | .585                               |
| EA40402             | EA40402C               | .060                  | 5/8                                | 5/8                                 | 3/4                                | 3 1/4                                   | 6                                   | .585                               |
| EA40403             | EA40403C               | .060                  | 5/8                                | 5/8                                 | 3/4                                | 4 1/4                                   | 7                                   | .585                               |
| EA40481             | EA40481C               | .060                  | 3/4                                | 3/4                                 | 1                                  | 2 1/4                                   | 5                                   | .710                               |
| EA40482             | EA40482C               | .060                  | 3/4                                | 3/4                                 | 1                                  | 3 1/4                                   | 6                                   | .710                               |
| EA40483             | EA40483C               | .060                  | 3/4                                | 3/4                                 | 1                                  | 4 1/4                                   | 7                                   | .710                               |
| EA40641             | EA40641C               | .060                  | 1                                  | 1                                   | 1 1/8                              | 2 1/4                                   | 5                                   | .960                               |
| EA40642             | EA40642C               | .060                  | 1                                  | 1                                   | 1 1/8                              | 3 1/4                                   | 6                                   | .960                               |
| EA40643             | EA40643C               | .060                  | 1                                  | 1                                   | 1 1/8                              | 4 1/4                                   | 7                                   | .960                               |
| EA10321             | EA10321C               | .120                  | 1/2                                | 1/2                                 | 5/8                                | 3 1/4                                   | 6                                   | .470                               |
| EA10322             | EA10322C               | .120                  | 1/2                                | 1/2                                 | 5/8                                | 4                                       | 6                                   | .470                               |
| EA10401             | EA10401C               | .120                  | 5/8                                | 5/8                                 | 3/4                                | 2 1/4                                   | 5                                   | .585                               |
| EA10402             | EA10402C               | .120                  | 5/8                                | 5/8                                 | 3/4                                | 3 1/4                                   | 6                                   | .585                               |
| EA10403             | EA10403C               | .120                  | 5/8                                | 5/8                                 | 3/4                                | 4 1/4                                   | 7                                   | .585                               |
| EA10481             | EA10481C               | .120                  | 3/4                                | 3/4                                 | 1                                  | 2 1/4                                   | 5                                   | .710                               |
| EA10482             | EA10482C               | .120                  | 3/4                                | 3/4                                 | 1                                  | 3 1/4                                   | 6                                   | .710                               |
| EA10483             | EA10483C               | .120                  | 3/4                                | 3/4                                 | 1                                  | 4 1/4                                   | 7                                   | .710                               |
| EA10641             | EA10641C               | .120                  | 1                                  | 1                                   | 1 1/8                              | 2 1/4                                   | 5                                   | .960                               |
| EA10642             | EA10642C               | .120                  | 1                                  | 1                                   | 1 1/8                              | 3 1/4                                   | 6                                   | .960                               |
| EA10643             | EA10643C               | .120                  | 1                                  | 1                                   | 1 1/8                              | 4 1/4                                   | 7                                   | .960                               |

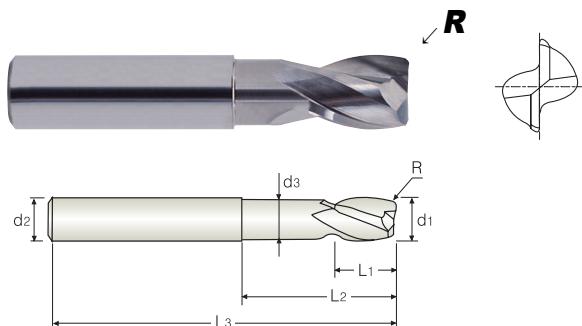


STEP MILLING

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0                         | 0                          |
| -.0005                    | -.0003                     |



## 2 FLUTE, CORNER RADIUS with NECK



P.135

► Excellent cutting qualities on stainless steel, aluminum, copper.

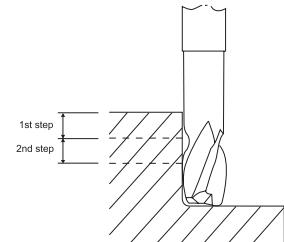
► Increased tool life and higher cutting accuracy.

◇ U.S.A Stock

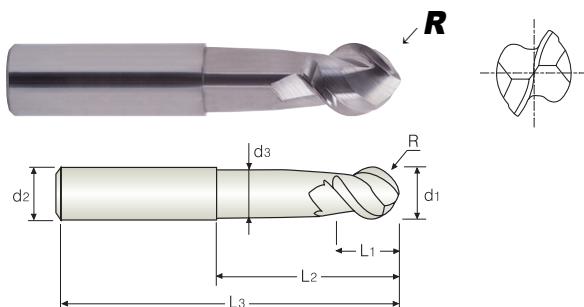
### E5973 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS<br><i>R</i> | MILL<br>DIAMETER<br><i>d</i> <sub>1</sub> | SHANK<br>DIAMETER<br><i>d</i> <sub>2</sub> | LENGTH<br>OF CUT<br><i>L</i> <sub>1</sub> | LENGTH<br>BELOW SHANK<br><i>L</i> <sub>2</sub> | OVERALL<br>LENGTH<br><i>L</i> <sub>3</sub> | NECK<br>DIAMETER<br><i>d</i> <sub>3</sub> |
|---------------------|------------------------|------------------------------|---|--|---|--|--|---|
| 24562               | 24562TC                | R.012                        | 5/32                                      | 1/4  | 3/16                                      | 3/8  | 2  | .140                                      |
| 24573               | 24573TC                | R.020                        | 1/4                                       | 1/4  | 5/16                                      | 3/4  | 2-3/8                                      | .226                                      |
| 24579               | 24579TC                | R.024                        | 5/16                                      | 5/16                                       | 3/8                                       | 1-1/8  | 2-3/4                                      | .282                                      |
| 24584               | 24584TC                | R.031                        | 3/8                                       | 3/8  | 1/2                                       | 1-1/2  | 3-1/8                                      | .336                                      |
| 24593               | 24593TC                | R.040                        | 1/2                                       | 1/2  | 9/16                                      | 1-1/2  | 3-1/2                                      | .460                                      |
| 24595               | 24595TC                | R.051                        | 5/8                                       | 5/8  | 3/4                                       | 1-3/4  | 4  | .566                                      |
| 24598               | 24598TC                | R.063                        | 3/4                                       | 3/4  | 1   | 1-3/4  | 4  | .670                                      |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

YG-1  
ALU-POWER2 FLUTE, 50° HELIX, STUB CUT LENGTH,  
BALL NOSE with NECK

P.137

► Excellent cutting qualities on stainless steel, aluminum, copper.

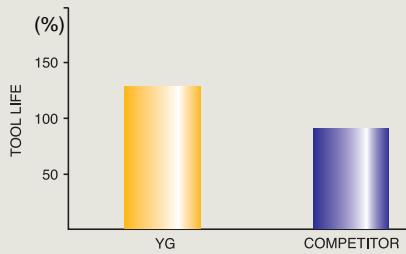
► Increased tool life and higher cutting accuracy.

◇ U.S.A Stock

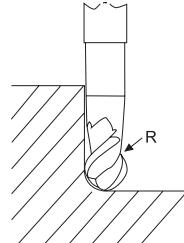
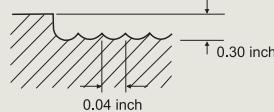
## E5974 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | R<br>±.0005 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|---------------------|------------------------|-------------|------------------------------------|-------------------------------------|------------------------------------|---|-------------------------------------|------------------------------------|
| 37573               | 37573TC                | R 1/8       | 1/4                                | 1/4                                 | 7/32                               | 1                                       | 2-1/4                               | .226                               |
| 37579               | 37579TC                | R 5/32      | 5/16                               | 5/16                                | 9/32                               | 1-1/8                                   | 2-1/2                               | .280                               |
| 37584               | 37584TC                | R 3/16      | 3/8                                | 3/8                                 | 11/32                              | 1-3/8                                   | 3                                   | .335                               |
| 37593               | 37593TC                | R 1/4       | 1/2                                | 1/2                                 | 13/32                              | 1-1/2                                   | 3                                   | .460                               |
| 37595               | 37595TC                | R 5/16      | 5/8                                | 5/8                                 | 9/16                               | 2                                       | 3-1/2                               | .566                               |
| 37598               | 37598TC                | R 3/8       | 3/4                                | 3/4                                 | 11/16                              | 2                                       | 4                                   | .671                               |



TOOL; YG : 37593TC, Ø 1/2, 2FL. BALL NOSE, TiCN COATING  
COMPETITOR : Ø 1/2, 2FL. BALL NOSE, TiCN COATING  
MATERIAL : ALUMINUM 6061  
RPM = 10,000 rev./min  
FEED = 45 inch/min  
COOLANT : WATER SOLUBLE OIL

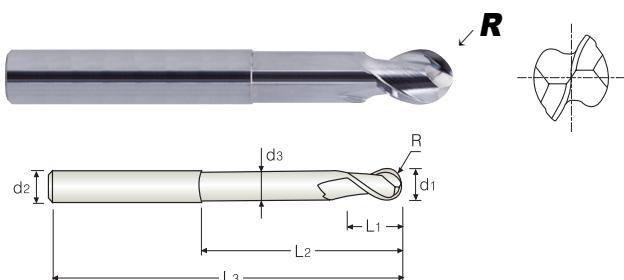


ALU-POWER

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0010               | 0<br>-.0003                |



# 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE



P.136

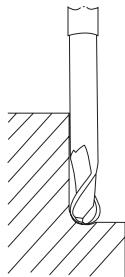
- High velocity milling of aluminum & other non-ferrous materials.
- Extended neck design which is suitable for step milling.
- Improved surface roughness-cylindrical margin which is controlled tightly
- Maximum-stock removal, chip ejection, stability.

◇ U.S.A Stock

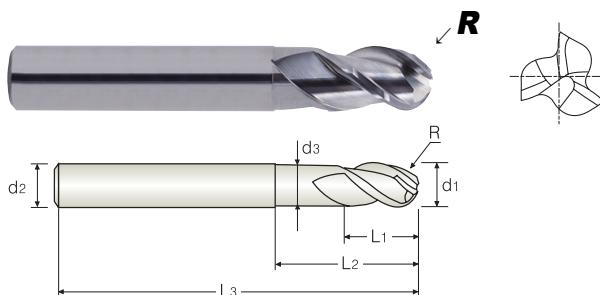
## E5978 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | R<br>±.0010 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|---------------------|------------------------|-------------|------------------------------------|-------------------------------------|------------------------------------|---|-------------------------------------|------------------------------------|
| 89573               | 89573TC                | R 1/8       | 1/4                                | 1/4                                 | 3/8                                | 2-1/4                                   | 4                                   | .220                               |
| 89584               | 89584TC                | R 3/16      | 3/8                                | 3/8                                 | 1/2                                | 2-1/4                                   | 4                                   | .345                               |
| 89593               | 89593TC                | R 1/4       | 1/2                                | 1/2                                 | 5/8                                | 2-1/4                                   | 5                                   | .470                               |
| 89901               | 89901TC                | R 1/4       | 1/2                                | 1/2                                 | 5/8                                | 3-1/4                                   | 6                                   | .470                               |
| 89902               | 89902TC                | R 1/4       | 1/2                                | 1/2                                 | 5/8                                | 4                                       | 6                                   | .470                               |
| 89595               | 89595TC                | R 5/16      | 5/8                                | 5/8                                 | 3/4                                | 2-1/4                                   | 5                                   | .585                               |
| 89903               | 89903TC                | R 5/16      | 5/8                                | 5/8                                 | 3/4                                | 3-1/4                                   | 6                                   | .585                               |
| 89904               | 89904TC                | R 5/16      | 5/8                                | 5/8                                 | 3/4                                | 4-1/4                                   | 7                                   | .585                               |
| 89598               | 89598TC                | R 3/8       | 3/4                                | 3/4                                 | 1                                  | 2-1/4                                   | 5                                   | .710                               |
| 89905               | 89905TC                | R 3/8       | 3/4                                | 3/4                                 | 1                                  | 3-1/4                                   | 6                                   | .710                               |
| 89906               | 89906TC                | R 3/8       | 3/4                                | 3/4                                 | 1                                  | 4-1/4                                   | 7                                   | .710                               |
| 89600               | 89600TC                | R1/2        | 1                                  | 1                                   | 1-1/8                              | 2-1/4                                   | 5                                   | .960                               |
| 89907               | 89907TC                | R1/2        | 1                                  | 1                                   | 1-1/8                              | 3-1/4                                   | 6                                   | .960                               |
| 89908               | 89908TC                | R1/2        | 1                                  | 1                                   | 1-1/8                              | 4-1/4                                   | 7                                   | .960                               |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

YG-1  
ALU-POWER3 FLUTE, 40° HELIX, LONG LENGTH,  
BALL NOSE with NECK

P.137

► Excellent cutting qualities on stainless steel, aluminum, copper.

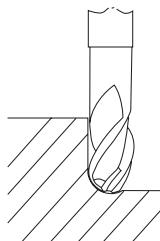
► Increased tool life and higher cutting accuracy.

◇ U.S.A Stock

## E5975 Series

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | R<br>$\pm .0005$ | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------------------|------------------------|------------------|---------------------------|----------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 38602               | 38602TC                | R 3/64           | 3/32                      | 1/4                        | 1/8                       | 3/16                           | 2-3/8                      | .090                      |
| 38601               | 38601TC                | R 1/16           | 1/8                       | 1/4                        | 3/16                      | 1/4                            | 2-3/8                      | .117                      |
| 38566               | 38566TC                | R 3/32           | 3/16                      | 1/4                        | 1/4                       | 3/8                            | 2-1/2                      | .172                      |
| 38573               | 38573TC                | R 1/8            | 1/4                       | 1/4                        | 3/8                       | 1/2                            | 3                          | .235                      |
| 38579               | 38579TC                | R 5/32           | 5/16                      | 5/16                       | 1/2                       | 1                              | 3                          | .289                      |
| 38584               | 38584TC                | R 3/16           | 3/8                       | 3/8                        | 5/8                       | 1-1/4                          | 3-1/8                      | .351                      |
| 38593               | 38593TC                | R 1/4            | 1/2                       | 1/2                        | 3/4                       | 1-3/8                          | 3-1/2                      | .476                      |
| 38595               | 38595TC                | R 5/16           | 5/8                       | 5/8                        | 1                         | 1-1/2                          | 4                          | .601                      |

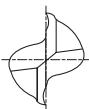


| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



## 2 FLUTE, 45° HELIX, LONG LENGTH

**METRIC**



► Suitable for high speed machining in aluminum and other non-ferrous materials, excellent surface finishes, superior chip removal.

◊ Call for Availability

### E5522 Series

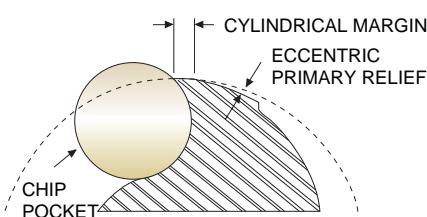
Unit : mm

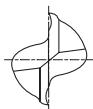
| EDP No.  | MILL DIAMETER | SHANK DIAMETER<br>h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|----------------------|---------------|----------------|
| E5522030 | 3.0           | 6                    | 8             | 57             |
| E5522040 | 4.0           | 6                    | 11            | 57             |
| E5522050 | 5.0           | 6                    | 13            | 57             |
| E5522060 | 6.0           | 6                    | 13            | 57             |
| E5522080 | 8.0           | 8                    | 19            | 63             |
| E5522100 | 10.0          | 10                   | 22            | 72             |
| E5522120 | 12.0          | 12                   | 26            | 83             |
| E5522140 | 14.0          | 14                   | 26            | 83             |
| E5522160 | 16.0          | 16                   | 32            | 92             |
| E5522180 | 18.0          | 18                   | 32            | 92             |
| E5522200 | 20.0          | 20                   | 38            | 104            |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.03             | h6                      |



- High performance in machining aluminum and non-ferrous materials
- Special designed geometry with high rigidity cutting edge
- Improved surface roughness - cylindrical margin which is controlled tightly.
- Excellent chip removal - higher rake angle, higher helix angle(45°), bigger chip pocket.



**YG-1**  
**ALU-POWER****2 FLUTE, 45° HELIX, LONG LENGTH,  
DIAMOND COATED****METRIC****Diamond**

► Designed for the machining aluminum and its alloys, non-ferrous materials.

► YG-1's newly developed diamond film coating increases the tool life surprisingly due to Hv4,500-5,500 high hardness of diamond film.

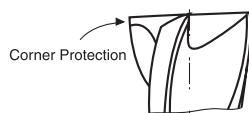
► Maximum-stock removal, chip ejection, stability.  
► Corner Protection against chipping.

◇ *Call for Availability*

**EI926 Series**

Unit : mm

| EDP No.  | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|-------------------|---------------|----------------|
| EI926010 | 1.0           | 4                 | 3             | 40             |
| EI926015 | 1.5           | 4                 | 4             | 40             |
| EI926020 | 2.0           | 4                 | 6             | 40             |
| EI926025 | 2.5           | 4                 | 8             | 40             |
| EI926030 | 3.0           | 6                 | 8             | 45             |
| EI926035 | 3.5           | 6                 | 10            | 45             |
| EI926040 | 4.0           | 6                 | 11            | 45             |
| EI926045 | 4.5           | 6                 | 11            | 50             |
| EI926050 | 5.0           | 6                 | 13            | 50             |
| EI926055 | 5.5           | 6                 | 13            | 50             |
| EI926060 | 6.0           | 6                 | 13            | 50             |
| EI926070 | 7.0           | 8                 | 16            | 60             |
| EI926080 | 8.0           | 8                 | 19            | 60             |
| EI926090 | 9.0           | 10                | 19            | 70             |
| EI926100 | 10.0          | 10                | 22            | 70             |
| EI926110 | 11.0          | 12                | 22            | 75             |
| EI926120 | 12.0          | 12                | 26            | 75             |
| EI926160 | 16.0          | 16                | 32            | 90             |
| EI926200 | 20.0          | 20                | 38            | 100            |

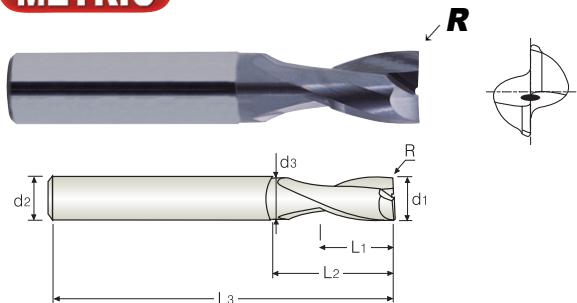


| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.03             | h6                      |



## 2 FLUTE, 25° HELIX, STUB CUT LENGTH, CORNER RADIUS, TiCN COATED

**METRIC**

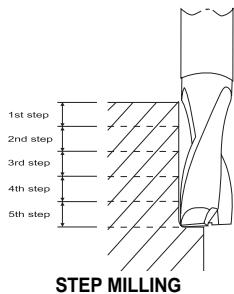


- Designed to machine aluminium at high speed condition.
- Improved surface roughness-cylindrical margin which is controlled tightly (see page 123).
- Corner radius against chipping.
- ◇ Call for Availability

### EG930 Series

Unit : mm

| EDP. No<br>TiCN COATED | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> (h6) | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|------------------------|-----------------------|------------------------------------|--|------------------------------------|---|-------------------------------------|------------------------------------|
| EG930020               | R0.2                  | 2.0                                | 3  | 3                                  | 6                                       | 40                                  | 1.9                                |
| EG930030               | R0.2                  | 3.0                                | 3  | 4                                  | 8                                       | 40                                  | 2.9                                |
| EG930040               | R0.2                  | 4.0                                | 4  | 5                                  | 12                                      | 50                                  | 3.8                                |
| EG930050               | R0.2                  | 5.0                                | 5  | 8                                  | 14                                      | 50                                  | 4.8                                |
| EG930060               | R0.2                  | 6.0                                | 6  | 8                                  | 18                                      | 65                                  | 5.7                                |
| EG930080               | R0.2                  | 8.0                                | 8  | 10                                 | 22                                      | 70                                  | 7.7                                |
| EG930100               | R0.2                  | 10.0                               | 10                                       | 14                                 | 28                                      | 80                                  | 9.7                                |
| EG930120               | R0.2                  | 12.0                               | 12                                       | 16                                 | 35                                      | 90                                  | 11.5                               |
| EG930160               | R0.2                  | 16.0                               | 16                                       | 20                                 | 40                                      | 90                                  | 15.5                               |
| EG930200               | R0.2                  | 20.0                               | 20                                       | 25                                 | 50                                      | 100                                 | 19.5                               |

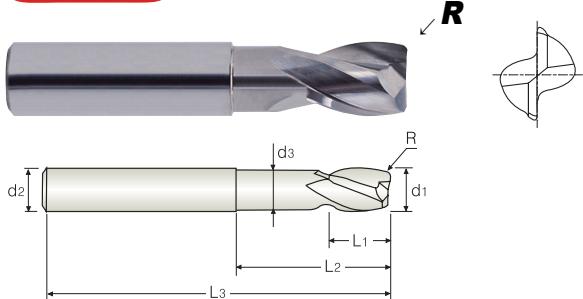


STEP MILLING

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

YG-1  
ALU-POWER

## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with NECK, TiCN COATED

**METRIC**

► Excellent cutting qualities on stainless steel, aluminum, copper.

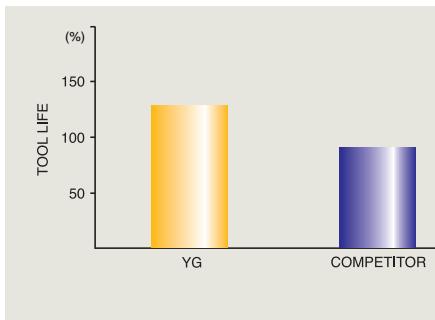
► Increased tool life and higher cutting accuracy.

◊ Call for Availability

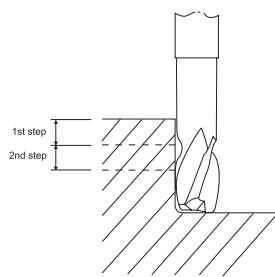
**EG909 Series**

Unit :mm

| EDP No.<br>TiCN COATED | CORNER<br>RADIUS<br><i>R</i> | MILL<br>DIAMETER<br><i>d</i> <sub>1</sub> | SHANK<br>DIAMETER<br><i>d</i> <sub>2(h6)</sub> | LENGTH<br>OF CUT<br><i>L</i> <sub>1</sub> | LENGTH<br>BELOW SHANK<br><i>L</i> <sub>2</sub> | OVERALL<br>LENGTH<br><i>L</i> <sub>3</sub> | NECK<br>DIAMETER<br><i>d</i> <sub>3</sub> |
|------------------------|------------------------------|---|--|---|--|--|---|
| EG909040               | R0.3                         | 4.0                                       | 6  | 5   | 10   | 50   | 3.6                                       |
| EG909060               | R0.5                         | 6.0                                       | 6  | 8   | 20   | 60   | 5.4                                       |
| EG909080               | R0.6                         | 8.0                                       | 8  | 10  | 30   | 70   | 7.2                                       |
| EG909100               | R0.8                         | 10.0                                      | 10   | 12  | 36   | 80   | 9.0                                       |
| EG909120               | R1.0                         | 12.0                                      | 12   | 14  | 40   | 90   | 11.0                                      |
| EG909160               | R1.3                         | 16.0                                      | 16   | 18  | 45   | 100  | 14.5                                      |
| EG909200               | R1.6                         | 20.0                                      | 20   | 24  | 45   | 100  | 18.0                                      |



TOOL; YG : E5973048, Ø 3/4 (2FLUTE. UNCOATING)  
 COMPETITOR : Ø 3/4 (3FLUTE. SPECIAL COATING)  
 MATERIAL : ALUMINUM 6061  
 RPM = 10,000 rev./min  
 FEED = 240 inch/min  
 COOLANT : WATER SOLUBLE OIL

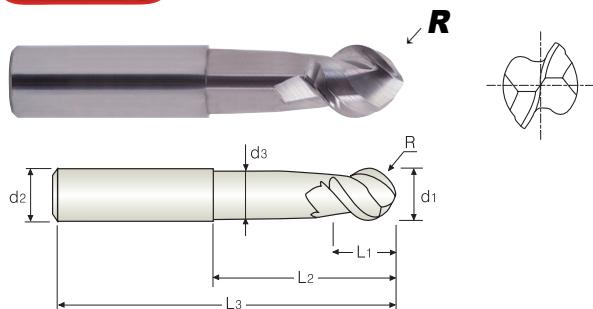


| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |



## 2 FLUTE, 50° HELIX, STUB CUT LENGTH, BALL NOSE with NECK, TiCN COATED

**METRIC**



► Excellent cutting qualities on stainless steel, aluminum, copper.

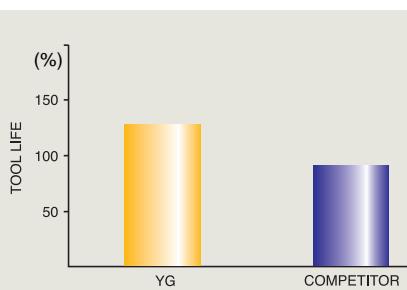
► Increased tool life and higher cutting accuracy.

◊ Call for Availability

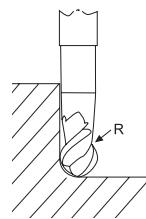
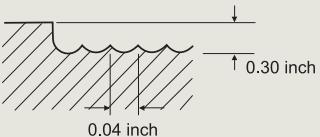
**EG910 Series**

Unit : mm

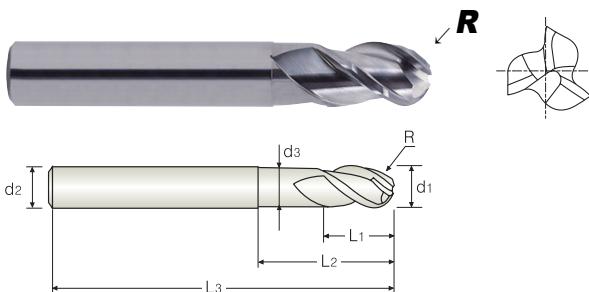
| EDP. No<br>TiCN COATED | R<br>$\pm 0.01$ | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2(h6)$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|------------------------|-----------------|---------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| EG910060               | R 3.0           | 6.0                       | 6                              | 5.5                       | 25                             | 55                         | 5.4                       |
| EG910080               | R 4.0           | 8.0                       | 8                              | 7                         | 30                             | 65                         | 7.2                       |
| EG910100               | R 5.0           | 10.0                      | 10                             | 8.5                       | 35                             | 75                         | 9.0                       |
| EG910120               | R 6.0           | 12.0                      | 12                             | 10.5                      | 40                             | 75                         | 11.0                      |
| EG910160               | R 8.0           | 16.0                      | 16                             | 14                        | 50                             | 90                         | 14.5                      |
| EG910200               | R 10.0          | 20.0                      | 20                             | 17                        | 50                             | 100                        | 18.0                      |



TOOL; YG : EG974048,  $\phi$  1/2, 2FL. BALL NOSE, TiCN COATING  
COMPETITOR :  $\phi$  1/2, 2FL. BALL NOSE, TiCN COATING  
MATERIAL : ALUMINUM 6061  
RPM = 10,000 rev./min  
FEED = 45 inch/min  
COOLANT : WATER SOLUBLE OIL



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| $\pm 0.02$                | h6                         |

**YG-1**  
**ALU-POWER****3 FLUTE, 40° HELIX, LONG LENGTH,  
BALL NOSE with NECK, TiCN COATED****METRIC**

► Excellent cutting qualities on stainless steel, aluminum, copper.

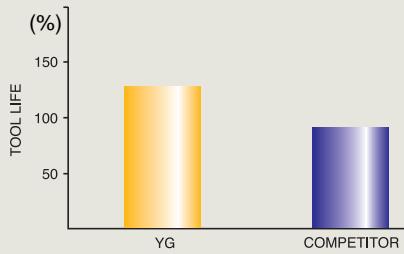
► Increased tool life and higher cutting accuracy.

◇ Call for Availability

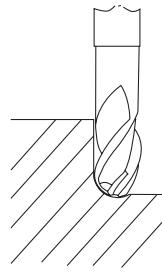
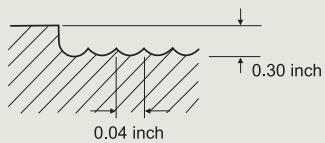
**EG908 Series**

Unit : mm

| EDP. No<br>TiCN COATED | R<br>±0.01 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2(h6) | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|------------------------|------------|------------------------|-----------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| EG908020               | 1.0        | 2.0                    | 6                           | 3                      | 2.5                         | 60                      | 1.9                    |
| EG908025               | 1.25       | 2.5                    | 6                           | 4                      | 6                           | 60                      | 2.4                    |
| EG908030               | 1.5        | 3.0                    | 6                           | 4.5                    | 6.5                         | 60                      | 2.8                    |
| EG908035               | 1.75       | 3.5                    | 6                           | 5                      | 7                           | 65                      | 3.2                    |
| EG908040               | 2.0        | 4.0                    | 6                           | 6                      | 8                           | 65                      | 3.7                    |
| EG908050               | 2.5        | 5.0                    | 6                           | 7.5                    | 10                          | 65                      | 4.6                    |
| EG908060               | 3.0        | 6.0                    | 6                           | 9                      | 12                          | 75                      | 5.6                    |
| EG908080               | 4.0        | 8.0                    | 8                           | 12                     | 25                          | 75                      | 7.4                    |
| EG908100               | 5.0        | 10.0                   | 10                          | 15                     | 30                          | 80                      | 9.4                    |
| EG908120               | 6.0        | 12.0                   | 12                          | 18                     | 36                          | 90                      | 11.4                   |
| EG908160               | 8.0        | 16.0                   | 16                          | 24                     | 40                          | 100                     | 15.4                   |



TOOL; YG :EG975040, Ø 1/2, 3FL. BALL NOSE, TiCN COATING  
COMPETITOR : Ø 1/2, 3FL. BALL NOSE, TiCN COATING  
MATERIAL : ALUMINUM 6061  
RPM = 14,000 rev./min  
FEED = 115 inch/min  
COOLANT : OIL MIST



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |

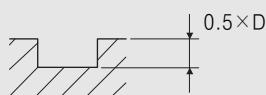
**ALU-POWER**

## 2 FLUTE, 42° HELIX - "BANSHEE"

### E5253, E5254 Series

#### Slotting

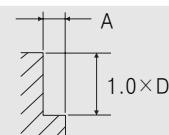
| MATERIAL | ALUMINUM<br>NONFERROUS METALS |       |
|----------|-------------------------------|-------|
| DIAMETER | RPM                           | FEED  |
| 1/8      | 10000                         | 27.56 |
| 5/32     | 10000                         | 35.43 |
| 3/16     | 10000                         | 39.37 |
| 1/4      | 10000                         | 47.24 |
| 5/16     | 8000                          | 55.12 |
| 3/8      | 8000                          | 66.93 |
| 1/2      | 8000                          | 82.68 |
| 9/16     | 6000                          | 70.87 |
| 5/8      | 6000                          | 74.80 |
| 11/16    | 4000                          | 55.12 |
| 13/16    | 4000                          | 62.99 |



\*The FEED, in long & extra long types, should be reduced by around 50%

#### Slotting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 10000                         | 35.43  |
| 5/32     | 10000                         | 43.31  |
| 3/16     | 10000                         | 51.18  |
| 1/4      | 10000                         | 59.06  |
| 5/16     | 8000                          | 70.87  |
| 3/8      | 8000                          | 82.68  |
| 1/2      | 8000                          | 102.40 |
| 9/16     | 6000                          | 86.61  |
| 5/8      | 6000                          | 94.49  |
| 11/16    | 4000                          | 70.87  |
| 13/16    | 4000                          | 74.80  |



A: Ø 1/8~Ø3/8=0.25×D  
Ø1/2~Ø13/16=0.5×D

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**ALU-POWER**

## 2 FLUTE, 42° HELIX, TiCN COATED - "BANSHEE"

### EG253, EG254 Series

#### Slotting

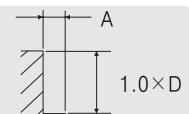
| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 15600                         | 42.52  |
| 5/32     | 15600                         | 56.69  |
| 3/16     | 15600                         | 61.42  |
| 1/4      | 15600                         | 70.87  |
| 5/16     | 12000                         | 85.05  |
| 3/8      | 12000                         | 103.93 |
| 1/2      | 12000                         | 127.56 |
| 9/16     | 9600                          | 108.66 |
| 5/8      | 9600                          | 118.12 |
| 11/16    | 6000                          | 85.04  |
| 13/16    | 6000                          | 94.49  |



\*The FEED, in long & extra long types, should be reduced by around 50%

#### Slotting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 12000                         | 56.69  |
| 5/32     | 12000                         | 66.14  |
| 3/16     | 12000                         | 80.32  |
| 1/4      | 12000                         | 94.49  |
| 5/16     | 9600                          | 108.66 |
| 3/8      | 9600                          | 127.56 |
| 1/2      | 9600                          | 160.56 |
| 9/16     | 7200                          | 132.24 |
| 5/8      | 7200                          | 146.52 |
| 11/16    | 4800                          | 108.66 |
| 13/16    | 4800                          | 118.12 |



A: Ø 1/8~Ø3/8=0.25×D  
Ø1/2~Ø13/16=0.5×D

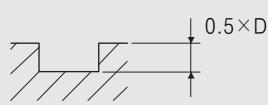
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, 45° HELIX, FINISH

### E5980, E5981, E5982, E5983, 5984 Series Slotting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |       |
|----------|-------------------------------|-------|
| DIAMETER | RPM                           | FEED  |
| 1/8      | 10000                         | 33.05 |
| 5/32     | 10000                         | 42.50 |
| 3/16     | 10000                         | 47.25 |
| 1/4      | 10000                         | 56.70 |
| 5/16     | 8000                          | 66.15 |
| 3/8      | 8000                          | 80.30 |
| 1/2      | 8000                          | 99.15 |
| 9/16     | 6000                          | 85.05 |
| 5/8      | 6000                          | 89.75 |
| 11/16    | 4000                          | 66.15 |
| 13/16    | 4000                          | 75.60 |



\*The FEED, in long & extra long types, should be reduced by around 50%

### E5980, E5981, E5982, E5983, 5984 Series Side Cutting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 10000                         | 42.50  |
| 5/32     | 10000                         | 52.00  |
| 3/16     | 10000                         | 61.40  |
| 1/4      | 10000                         | 70.90  |
| 5/16     | 8000                          | 85.05  |
| 3/8      | 8000                          | 99.20  |
| 1/2      | 8000                          | 122.90 |
| 9/16     | 6000                          | 103.95 |
| 5/8      | 6000                          | 113.40 |
| 11/16    | 4000                          | 85.05  |
| 13/16    | 4000                          | 89.75  |



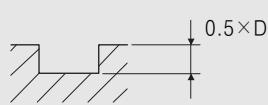
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, 45° HELIX, FINISH, TiCN COATED

### EG980, EG981, EG982, EG983, EG984 Series Slotting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 15600                         | 43.00  |
| 5/32     | 15600                         | 55.25  |
| 3/16     | 15600                         | 61.40  |
| 1/4      | 15600                         | 73.70  |
| 5/16     | 12000                         | 86.00  |
| 3/8      | 12000                         | 104.40 |
| 1/2      | 12000                         | 128.90 |
| 9/16     | 9600                          | 110.55 |
| 5/8      | 9600                          | 116.65 |
| 11/16    | 6000                          | 86.00  |
| 13/16    | 6000                          | 98.30  |



\*The FEED, in long & extra long types, should be reduced by around 50%

### EG980, EG981, EG982, EG983, EG984 Series Side Cutting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/8      | 12000                         | 55.25  |
| 5/32     | 12000                         | 67.60  |
| 3/16     | 12000                         | 79.80  |
| 1/4      | 12000                         | 92.20  |
| 5/16     | 9600                          | 110.55 |
| 3/8      | 9600                          | 129.00 |
| 1/2      | 9600                          | 159.80 |
| 9/16     | 7200                          | 135.15 |
| 5/8      | 7200                          | 147.40 |
| 11/16    | 4800                          | 110.55 |
| 13/16    | 4800                          | 116.65 |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**ALU-POWER**

## 3 FLUTE, 37° HELIX with EXTENDED NECK

### E5977, E5985 Series

#### Slotting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |       |
|----------|-------------------------------|-------|
| DIAMETER | RPM                           | FEED  |
| 1/4      | 8000                          | 45.35 |
| 3/8      | 6400                          | 64.25 |
| 1/2      | 6400                          | 79.40 |
| 5/8      | 4800                          | 71.80 |
| 3/4      | 3200                          | 70.85 |
| 1        | 2600                          | 63.80 |

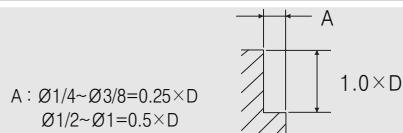


※The FEED, in long & extra long types, should be reduced by around 50%

#### Slotting

#### Side Cutting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |       |
|----------|-------------------------------|-------|
| DIAMETER | RPM                           | FEED  |
| 1/4      | 8000                          | 56.70 |
| 3/8      | 6400                          | 79.40 |
| 1/2      | 6400                          | 98.25 |
| 5/8      | 4800                          | 90.70 |
| 3/4      | 3200                          | 87.40 |
| 1        | 2600                          | 78.65 |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## 3 FLUTE, 37° HELIX with EXTENDED NECK, TiCN COATED

### EG977, EG985 Series

#### Slotting

#### Side Cutting

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/4      | 10500                         | 58.95  |
| 3/8      | 8300                          | 83.50  |
| 1/2      | 8300                          | 103.20 |
| 5/8      | 6200                          | 93.35  |
| 3/4      | 4200                          | 92.10  |
| 1        | 3400                          | 82.95  |



※The FEED, in long & extra long types, should be reduced by around 50%

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |        |
|----------|-------------------------------|--------|
| DIAMETER | RPM                           | FEED   |
| 1/4      | 10500                         | 73.70  |
| 3/8      | 8300                          | 103.20 |
| 1/2      | 8300                          | 127.70 |
| 5/8      | 6200                          | 117.90 |
| 3/4      | 4200                          | 113.60 |
| 1        | 3400                          | 102.00 |



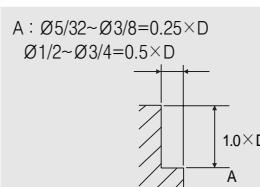
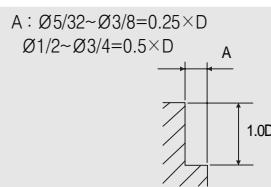
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 2 FLUTE, CORNER RADIUS with NECK

### E5973 Series

| MATERIAL            | ALUMINUM<br>ALUMINUM ALLOY |       |       |        | COPPER ALLOY |       |      |       |      |
|---------------------|----------------------------|-------|-------|--------|--------------|-------|------|-------|------|
|                     | DIAMETER                   | RPM   | FEED  | RPM    | FEED         | RPM   | FEED | RPM   | FEED |
| <b>R.012 × 5/32</b> | 10000                      | 36.35 | 10000 | 42.40  | 3000         | 9.10  | 3000 | 10.60 |      |
| <b>R.020 × 1/4</b>  | 10000                      | 45.40 | 10000 | 60.60  | 3000         | 11.50 | 3000 | 15.15 |      |
| <b>R.024 × 5/16</b> | 8000                       | 54.50 | 8000  | 69.60  | 2300         | 13.60 | 2300 | 17.55 |      |
| <b>R.031 × 3/8</b>  | 8000                       | 66.60 | 8000  | 81.75  | 2300         | 16.65 | 2300 | 20.60 |      |
| <b>R.040 × 1/2</b>  | 8000                       | 81.75 | 8000  | 103.00 | 2300         | 20.55 | 2300 | 25.75 |      |
| <b>R.051 × 5/8</b>  | 6000                       | 75.70 | 6000  | 93.90  | 1800         | 19.05 | 1800 | 23.60 |      |
| <b>R.063 × 3/4</b>  | 4000                       | 60.60 | 4000  | 75.70  | 1150         | 15.15 | 1150 | 19.10 |      |



\*The FEED, in long & extra long types, should be reduced by around 50%

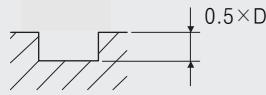
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 2 FLUTE, 37° HELIX with EXTENDED NECK

### E5976 Series

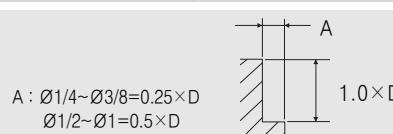
| MATERIAL   | ALUMINUM<br>NONFERROUS METALS |       |      |
|------------|-------------------------------|-------|------|
|            | DIAMETER                      | RPM   | FEED |
| <b>1/4</b> | 8000                          | 37.80 |      |
| <b>3/8</b> | 6400                          | 53.55 |      |
| <b>1/2</b> | 6400                          | 66.15 |      |
| <b>5/8</b> | 4800                          | 59.85 |      |
| <b>3/4</b> | 3200                          | 59.05 |      |
| <b>1</b>   | 2600                          | 53.15 |      |



\*The FEED, in long & extra long types, should be reduced by around 50%

### E5976 Series

| MATERIAL   | ALUMINUM<br>NONFERROUS METALS |       |      |
|------------|-------------------------------|-------|------|
|            | DIAMETER                      | RPM   | FEED |
| <b>1/4</b> | 8000                          | 47.25 |      |
| <b>3/8</b> | 6400                          | 66.15 |      |
| <b>1/2</b> | 6400                          | 81.90 |      |
| <b>5/8</b> | 4800                          | 75.60 |      |
| <b>3/4</b> | 3200                          | 72.85 |      |
| <b>1</b>   | 2600                          | 65.55 |      |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

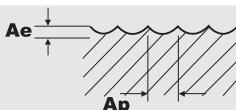


## 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE

### E5978 Series

| MATERIAL     | ALUMINUM<br>NONFERROUS METALS |       |
|--------------|-------------------------------|-------|
| DIAMETER     | RPM                           | FEED  |
| R1/8 × 1/4   | 11200                         | 55.10 |
| R5/32 × 5/16 | 8600                          | 63.00 |
| R3/16 × 3/8  | 8600                          | 74.00 |
| R1/4 × 1/2   | 8600                          | 94.50 |
| R5/16 × 5/8  | 6800                          | 85.00 |
| R3/8 × 3/4   | 4300                          | 69.30 |

Ae=0.2×D  
Ap=0.5×D



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

\*The FEED, in long & extra long types, should be reduced by around 50%

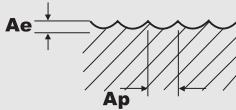


## 2 FLUTE, 37° HELIX, LONG REACH, BALL NOSE, TiCN COATED

### EG978 Series

| MATERIAL     | ALUMINUM<br>NONFERROUS METALS |        |
|--------------|-------------------------------|--------|
| DIAMETER     | RPM                           | FEED   |
| R1/8 × 1/4   | 14500                         | 71.65  |
| R5/32 × 5/16 | 11200                         | 81.90  |
| R3/16 × 3/8  | 11200                         | 96.20  |
| R1/4 × 1/2   | 11200                         | 122.85 |
| R5/16 × 5/8  | 8800                          | 110.50 |
| R3/8 × 3/4   | 5600                          | 104.00 |

Ae=0.2×D  
Ap=0.5×D

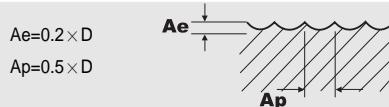


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

\*The FEED, in long & extra long types, should be reduced by around 50%

**ALU-POWER****2 FLUTE, 50° HELIX, BALL NOSE with NECK****E5974 Series**

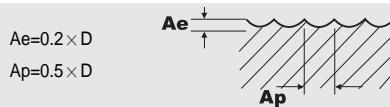
| MATERIAL          | ALUMINUM<br>ALUMINUM ALLOY |       | COPPER ALLOY |       |
|-------------------|----------------------------|-------|--------------|-------|
|                   | DIAMETER                   | RPM   | FEED         | RPM   |
| <b>R1/8×1/4</b>   | 14000                      | 53.00 | 4200         | 13.30 |
| <b>R5/32×5/16</b> | 10800                      | 60.50 | 3200         | 15.10 |
| <b>R3/16×3/8</b>  | 10800                      | 71.20 | 3200         | 17.50 |
| <b>R1/4×1/2</b>   | 10800                      | 90.80 | 3200         | 22.70 |
| <b>R5/16×5/8</b>  | 8500                       | 81.80 | 2500         | 20.30 |
| <b>R3/8×3/4</b>   | 5400                       | 66.60 | 1600         | 16.70 |



※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**ALU-POWER****3 FLUTE, 40° HELIX, BALL NOSE with NECK****E5975 Series**

| MATERIAL          | ALUMINUM<br>ALUMINUM ALLOY |       | COPPER ALLOY |       |
|-------------------|----------------------------|-------|--------------|-------|
|                   | DIAMETER                   | RPM   | FEED         | RPM   |
| <b>R3/64×3/32</b> | 20700                      | 28.80 | 6200         | 7.25  |
| <b>R1/16×1/8</b>  | 13800                      | 28.80 | 4200         | 7.25  |
| <b>R3/32×3/16</b> | 13800                      | 40.90 | 4200         | 10.30 |
| <b>R1/8×1/4</b>   | 13800                      | 53.00 | 4200         | 13.30 |
| <b>R5/32×5/16</b> | 10800                      | 60.55 | 3200         | 15.15 |
| <b>R3/16×3/8</b>  | 10800                      | 71.15 | 3200         | 17.55 |
| <b>R1/4×1/2</b>   | 10800                      | 90.85 | 3200         | 22.70 |
| <b>R5/16×5/8</b>  | 8500                       | 81.75 | 2500         | 20.30 |



※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## Technology and Quality

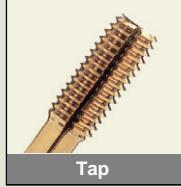
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



End Mill



Drill



Tap



Special products

---

X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING

# D-POWER

## DIAMOND COATED CARBIDE END MILLS

- *Diamond coating for longer tool life*
- *Suitable for Machining graphite*
- *Dry cutting & High speed cutting*





# D-POWER CARBIDE END MILLS SELECTION GUIDE

**INCH**

| EDP No. | APPEARANCE | SPECIFICATION                                    | STOCK | PAGE |
|---------|------------|--|-------|------|
| EI107   |            | 4 FLUTE, REGULAR LENGTH                          | ★     | 141  |
| EI099   |            | 2 FLUTE, REGULAR LENGTH, BALL NOSE               | ★     | 141  |
| EI106   |            | 4 FLUTE, REGULAR LENGTH, BALL NOSE               | ★     | 141  |
| EI971   |            | 2 FLUTE, LONG LENGTH, BALL NOSE                  | ★     | 142  |
| EI972   |            | 2 FLUTE, LONG REACH, BALL NOSE                   | ★     | 143  |
| EIB07   |            | 4 FLUTE, REGULAR LENGTH, BALL NOSE with NECK     | ★     | 144  |
| EIB05   |            | 4 FLUTE, REGULAR LENGTH, CORNER RADIUS           | ★     | 145  |
| EIB06   |            | 4 FLUTE, REGULAR LENGTH, CORNER RADIUS with NECK | ★     | 146  |

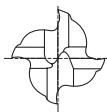
**METRIC**

| EDP No. | APPEARANCE | SPECIFICATION                    | STOCK | PAGE |
|---------|------------|----------------------------------|-------|------|
| EI880   |            | 2 FLUTE, SHORT LENGTH, BALL NOSE | ○     | 147  |
| EI881   |            | 3 FLUTE, SHORT LENGTH, BALL NOSE | ○     | 147  |
| EI451   |            | 2 FLUTE, LONG LENGTH, BALL NOSE  | ★     | 148  |
| EI450   |            | 2 FLUTE, LONG REACH, BALL NOSE   | ★     | 149  |

★:U.S.A Stock ○:Call for Availability

**D-POWER**

## 4 FLUTE, REGULAR LENGTH



for GRAPHITE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

◇ U.S.A Stock

EI107 Series

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 99629   | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 99630   | 3/16          | 3/16           | 5/8           | 2              |
| 99631   | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 99632   | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 99633   | 3/8           | 3/8            | 7/8           | 2-1/2          |
| 99635   | 1/2           | 1/2            | 1             | 3              |

- Recommended Cutting Condition
- Cutting speed : 500~1200 SFPM
- Feed : .002~.006 inch/teeth

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0                      | 0                       |
| -.0012                 | -.0003                  |

**D-POWER**

## 2&4 FLUTE, REGULAR LENGTH, BALL NOSE



for GRAPHITE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

◇ U.S.A Stock

EI099(2 FLUTE), EI106(4 FLUTE) Series

Unit : inch

※ EI106 Cutting Condition

Unit : inch

| EDP No. |         | R<br>±.0008 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|---------|-------------|------------------|-------------------|------------------|-------------------|
| 2 FLUTE | 4 FLUTE |             |                  |                   |                  |                   |
| 99572   | 99621   | R .0391     | 5/64             | 1/8               | 1/4              | 1-1/2             |
| 99573   | 99622   | R 3/64      | 3/32             | 1/8               | 3/8              | 1-1/2             |
| 99574   | 99623   | R 1/16      | 1/8              | 1/8               | 1/2              | 1-1/2             |
| 99575   | 99624   | R 3/32      | 3/16             | 3/16              | 5/8              | 2                 |
| 99576   | 99625   | R 1/8       | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 99577   | 99626   | R 5/32      | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 99578   | 99627   | R 3/16      | 3/8              | 3/8               | 7/8              | 2-1/2             |
| 99583   | 99628   | R 1/4       | 1/2              | 1/2               | 1                | 3                 |

| MATERIAL | GRAPHITE |        |
|----------|----------|--------|
|          | DIAMETER | RPM    |
| 5/64     | 16000    | 62.99  |
| 3/32     | 16000    | 88.19  |
| 1/8      | 16000    | 114.17 |
| 9/64     | 16000    | 137.80 |
| 5/32     | 16000    | 165.35 |
| 3/16     | 15500    | 200.79 |
| 1/4      | 15000    | 232.28 |
| 6/16     | 13000    | 236.22 |
| 3/8      | 11500    | 324.16 |
| 1/2      | 10500    | 248.03 |

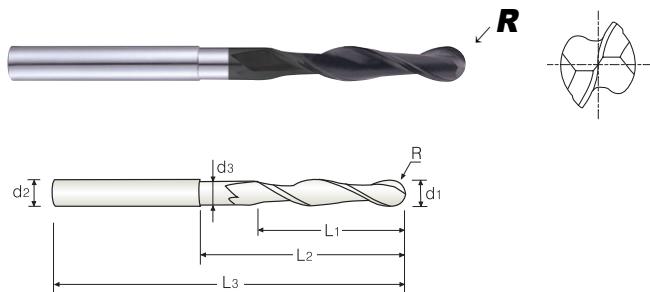
► For E1099 series cutting condition, refer E1971 series

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0                      | 0                       |
| -.0012                 | -.0003                  |

FRPM=REVOLUTION PER MIN. FEED=inch/min



# D-POWER 2 FLUTE, LONG LENGTH, BALL NOSE



MG

2

30°

R

± .0008

PLAIN

for GRAPHITE

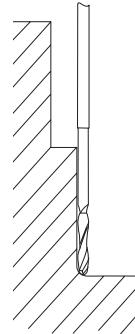
- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.

◇ U.S.A Stock

## EI971 Series

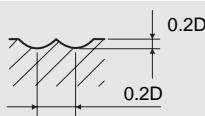
| EDP No. | R<br>± .0008 | MILL<br>DIAMETER<br>d1 | SHANK<br>DIAMETER<br>d2 | LENGTH<br>OF CUT<br>L1 | LENGTH<br>BELOW SHANK<br>L2 | OVERALL<br>LENGTH<br>L3 | NECK<br>DIAMETER<br>d3 |
|---------|--------------|------------------------|-------------------------|------------------------|-----------------------------|-------------------------|------------------------|
| 99671   | R.0391       | 5/64                   | 1/8                     | 3/8                    | 3/4                         | 3-1/4                   | .076                   |
| 99672   | R 1/16       | 1/8                    | 1/8                     | 5/8                    | 1                           | 3-1/4                   | .120                   |
| 99673   | R 3/32       | 3/16                   | 1/4                     | 1-1/8                  | 2                           | 4                       | .185                   |
| 99674   | R 1/8        | 1/4                    | 1/4                     | 1-1/8                  | 2                           | 4                       | .230                   |
| 99675   | R 5/32       | 5/16                   | 5/16                    | 1-1/2                  | 2-3/8                       | 4-1/2                   | .293                   |
| 99676   | R 3/16       | 3/8                    | 3/8                     | 2                      | 2-3/4                       | 4-3/4                   | .355                   |
| 99677   | R1/4         | 1/2                    | 1/2                     | 2-1/8                  | 3                           | 5-1/8                   | .480                   |

Unit : inch



Unit : inch

| MATERIAL | GRAPHITE |        |      |
|----------|----------|--------|------|
|          | DIAMETER | RPM    | FEED |
| 5/64     | 16000    | 31.50  |      |
| 3/32     | 16000    | 44.09  |      |
| 1/8      | 16000    | 57.09  |      |
| 9/64     | 16000    | 58.90  |      |
| 5/32     | 16000    | 82.68  |      |
| 3/16     | 15500    | 100.39 |      |
| 1/4      | 15000    | 116.14 |      |
| 6/16     | 13000    | 118.11 |      |
| 3/8      | 11500    | 120.08 |      |
| 1/2      | 10500    | 124.02 |      |

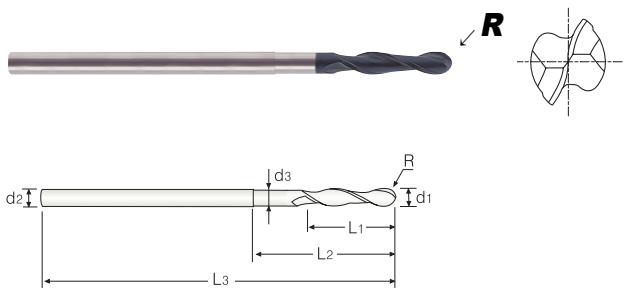


FRPM=REVOLUTION PER MIN.  
FEED=inch/min

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**D-POWER**

# 2 FLUTE, LONG REACH, BALL NOSE



MG

2

30°

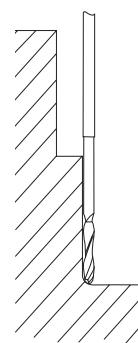
R  
±.0008

PLAIN

for GRAPHITE

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◇ U.S.A Stock



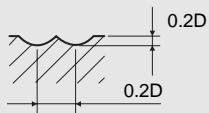
Unit : inch

## EI972 Series

| EDP No. | R<br>± .0008 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|---------|--------------|------------------------------------|-------------------------------------|------------------------------------|---|-------------------------------------|------------------------------------|
| 99678   | R.0391       | 5/64                               | 1/8                                 | 3/8                                | 3/4                                     | 4                                   | .076                               |
| 99679   | R1/16        | 1/8                                | 1/8                                 | 5/8                                | 1                                       | 4                                   | .120                               |
| 99680   | R3/32        | 3/16                               | 1/4                                 | 1-1/8                              | 2                                       | 4-3/4                               | .186                               |
| 99681   | R1/8         | 1/4                                | 1/4                                 | 1-1/8                              | 2                                       | 6                                   | .230                               |
| 99682   | R5/32        | 5/16                               | 5/16                                | 1-1/2                              | 2-3/8                                   | 6                                   | .293                               |

Unit : inch

| MATERIAL | GRAPHITE |        |      |
|----------|----------|--------|------|
|          | DIAMETER | RPM    | FEED |
| 5/64     | 16000    | 31.50  |      |
| 3/32     | 16000    | 44.09  |      |
| 1/8      | 16000    | 57.09  |      |
| 9/64     | 16000    | 58.90  |      |
| 5/32     | 16000    | 82.68  |      |
| 3/16     | 15500    | 100.39 |      |
| 1/4      | 15000    | 116.14 |      |
| 6/16     | 13000    | 118.11 |      |
| 3/8      | 11500    | 120.08 |      |
| 1/2      | 10500    | 124.02 |      |



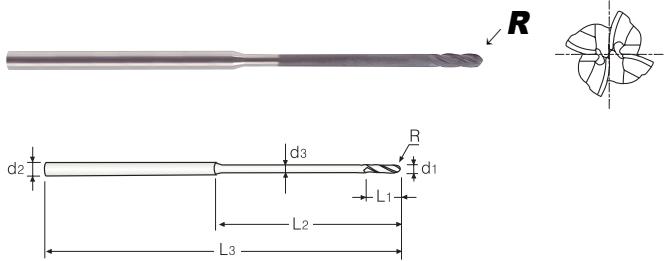
FRPM=REVOLUTION PER MIN.  
FEED=inch/min

D-POWER

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |



# D-POWER 4 FLUTE, REGULAR LENGTH, BALL NOSE with NECK



for GRAPHITE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.

◇ U.S.A Stock

## EIB07 Series

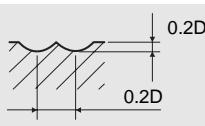
Unit : inch

| EDP No.  | R<br>± .0008 | MILL<br>DIAMETER<br>d <sub>1</sub> | SHANK<br>DIAMETER<br>d <sub>2(h6)</sub> | LENGTH<br>OF CUT<br>L <sub>1</sub> | LENGTH<br>BELOW SHANK<br>L <sub>2</sub> | OVERALL<br>LENGTH<br>L <sub>3</sub> | NECK<br>DIAMETER<br>d <sub>3</sub> |
|----------|--------------|------------------------------------|---|------------------------------------|---|-------------------------------------|------------------------------------|
| EIB07002 | .0156        | 1/32                               | 1/8                                     | 3/32                               | 3/8                                     | 3                                   | .028                               |
| EIB07901 | .0156        | 1/32                               | 1/8                                     | 3/32                               | 1/2                                     | 3                                   | .028                               |
| EIB07003 | .0234        | 3/64                               | 1/8                                     | 9/64                               | 9/16                                    | 3                                   | .043                               |
| EIB07902 | .0234        | 3/64                               | 1/8                                     | 9/64                               | 3/4                                     | 3                                   | .043                               |
| EIB07004 | .0312        | 1/16                               | 1/8                                     | 3/16                               | 3/4                                     | 3                                   | .057                               |
| EIB07903 | .0312        | 1/16                               | 1/8                                     | 3/16                               | 1                                       | 3                                   | .057                               |
| EIB07006 | .0469        | 3/32                               | 1/8                                     | 9/32                               | 1                                       | 3                                   | .086                               |
| EIB07904 | .0469        | 3/32                               | 1/8                                     | 9/32                               | 1-1/2                                   | 3                                   | .086                               |
| EIB07008 | .0625        | 1/8                                | 1/8                                     | 3/8                                | 1-1/2                                   | 3                                   | .115                               |
| EIB07905 | .0625        | 1/8                                | 1/8                                     | 3/8                                | 2                                       | 3                                   | .115                               |

Unit : inch

| MATERIAL | GRAPHITE |        |      |
|----------|----------|--------|------|
|          | DIAMETER | RPM    | FEED |
| 1/32     | 20000    | 30.36  |      |
| 3/64     | 20000    | 33.73  |      |
| 1/16     | 20000    | 37.48  |      |
| 5/64     | 16000    | 44.09  |      |
| 3/32     | 16000    | 61.73  |      |
| 1/8      | 16000    | 79.92  |      |
| 9/64     | 16000    | 96.46  |      |
| 5/32     | 16000    | 115.75 |      |
| 3/16     | 15500    | 140.55 |      |
| 1/4      | 15000    | 162.60 |      |
| 5/16     | 13000    | 165.35 |      |
| 3/8      | 11500    | 168.11 |      |
| 1/2      | 10500    |        |      |

FRPM=REVOLUTION PER MIN.  
FEED=inch/min



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0003                |

**D-POWER****4 FLUTE, REGULAR LENGTH, CORNER RADIUS****for GRAPHITE**

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
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- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.

◇ U.S.A Stock

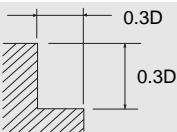
**EIB05 Series**

Unit : inch

| EDP No.  | CORNER RADIUS R | MILL DIAMETER | SHANK DIAMETER h6 | LENGTH OF CUT | OVERALL LENGTH |
|----------|-----------------|---------------|-------------------|---------------|----------------|
| EIB05004 | 0.010           | 1/16          | 1/8               | 3/16          | 1-1/2          |
| EIB05901 | 0.015           | 1/16          | 1/8               | 3/16          | 1-1/2          |
| EIB05008 | 0.015           | 1/8           | 1/8               | 1/2           | 1-1/2          |
| EIB05902 | 0.020           | 1/8           | 1/8               | 1/2           | 1-1/2          |
| EIB05012 | 0.020           | 3/16          | 3/16              | 5/8           | 2              |
| EIB05903 | 0.030           | 3/16          | 3/16              | 5/8           | 2              |
| EIB05016 | 0.020           | 1/4           | 1/4               | 3/4           | 2-1/2          |
| EIB05904 | 0.030           | 1/4           | 1/4               | 3/4           | 2-1/2          |
| EIB05024 | 0.020           | 3/8           | 3/8               | 7/8           | 2-1/2          |
| EIB05905 | 0.030           | 3/8           | 3/8               | 7/8           | 2-1/2          |
| EIB05032 | 0.030           | 1/2           | 1/2               | 1             | 3              |
| EIB05906 | 0.060           | 1/2           | 1/2               | 1             | 3              |

Unit : inch

| MATERIAL | GRAPHITE |        |      |
|----------|----------|--------|------|
|          | DIAMETER | RPM    | FEED |
| 1/16     | 40000    | 125.98 |      |
| 5/64     | 40000    | 157.48 |      |
| 1/8      | 40000    | 220.47 |      |
| 5/32     | 40000    | 314.96 |      |
| 3/16     | 40000    | 377.95 |      |
| 1/4      | 40000    | 440.94 |      |
| 5/16     | 32000    | 440.94 |      |
| 3/8      | 26000    | 451.44 |      |
| 1/2      | 21000    | 430.45 |      |

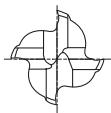
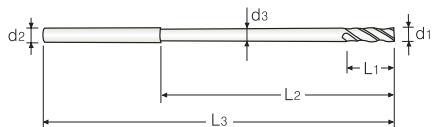


FRPM=REVOLUTION PER MIN.  
FEED=inch/min

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0                      | 0                       |
| -.0012                 | -.0003                  |

**D-POWER**

# 4 FLUTE, REGULAR LENGTH, CORNER RADIUS with NECK



for GRAPHITE

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.metallic materials.

◇ U.S.A Stock

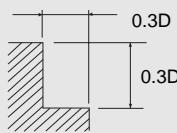
**EIB06 Series**

Unit : inch

| EDP No.  | CORNER RADIUS R | MILL DIAMETER d1 | SHANK DIAMETER d2(h6) | LENGTH OF CUT L1 | LENGTH BELOW SHANK L2 | OVERALL LENGTH L3 | NECK DIAMETER d3 |
|----------|-----------------|------------------|-----------------------|------------------|-----------------------|-------------------|------------------|
| EIB06002 | .005            | 1/32             | 1/8                   | 3/32             | 3/8                   | 3                 | .028             |
| EIB06901 | .005            | 1/32             | 1/8                   | 3/32             | 1/2                   | 3                 | .028             |
| EIB06003 | .010            | 3/64             | 1/8                   | 9/64             | 9/16                  | 3                 | .043             |
| EIB06902 | .010            | 3/64             | 1/8                   | 9/64             | 3/4                   | 3                 | .043             |
| EIB06004 | .010            | 1/16             | 1/8                   | 3/16             | 3/4                   | 3                 | .057             |
| EIB06903 | .010            | 1/16             | 1/8                   | 3/16             | 1                     | 3                 | .057             |
| EIB06006 | .010            | 3/32             | 1/8                   | 9/32             | 1                     | 3                 | .086             |
| EIB06904 | .010            | 3/32             | 1/8                   | 9/32             | 1-1/2                 | 3                 | .086             |
| EIB06008 | .010            | 1/8              | 1/8                   | 3/8              | 1-1/2                 | 3                 | .115             |
| EIB06905 | .010            | 1/8              | 1/8                   | 3/8              | 2                     | 3                 | .115             |

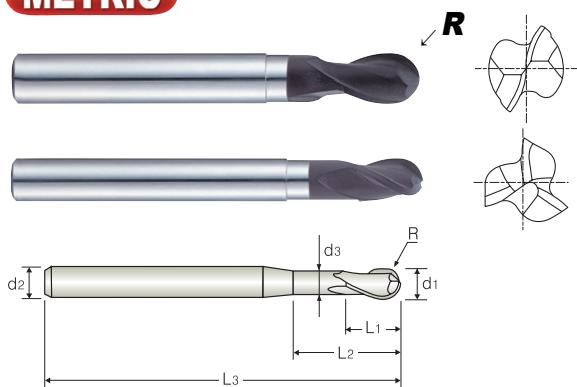
Unit : inch

| MATERIAL | GRAPHITE |        |      |
|----------|----------|--------|------|
|          | DIAMETER | RPM    | FEED |
| 1/32     | 40000    | 44.09  |      |
| 3/64     | 40000    | 66.14  |      |
| 1/16     | 40000    | 88.19  |      |
| 5/64     | 40000    | 110.24 |      |
| 1/8      | 40000    | 154.33 |      |
| 5/32     | 40000    | 220.47 |      |
| 3/16     | 40000    | 264.57 |      |
| 1/4      | 40000    | 308.66 |      |
| 5/16     | 32000    | 308.66 |      |
| 3/89     | 26000    | 316.14 |      |
| 1/2      | 21000    | 301.41 |      |



FRPM=REVOLUTION PER MIN.  
FEED=inch/min

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |

**D-POWER****2&3 FLUTE, SHORT LENGTH, BALL NOSE****METRIC**

MG

2&amp;3

30°

R  
±0.01

PLAIN

**for GRAPHITE**

- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

◇ Call for Availability

**EI880(2 FLUTE), EI881(3 FLUTE) Series**

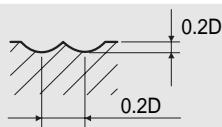
Unit : mm

| EDP No.  |          | R<br>± 0.01 | MILL DIAMETER<br>d <sub>1</sub> | SHANK DIAMETER<br>d <sub>2(h6)</sub> | LENGTH OF CUT<br>L <sub>1</sub> | LENGTH BELOW SHANK<br>L <sub>2</sub> | OVERALL LENGTH<br>L <sub>3</sub> | NECK DIAMETER<br>d <sub>3</sub> |
|----------|----------|-------------|---------------------------------|--------------------------------------|---------------------------------|--------------------------------------|----------------------------------|---------------------------------|
| 2 FLUTE  | 3 FLUTE  |             |                                 |                                      |                                 |                                      |                                  |                                 |
| EI880020 | EI881020 | R1.0        | 2.0                             | 6                                    | 3                               | 5                                    | 60                               | 1.9                             |
| EI880025 | EI881025 | R1.25       | 2.5                             | 6                                    | 4                               | 6                                    | 60                               | 2.4                             |
| EI880030 | EI881030 | R1.5        | 3.0                             | 6                                    | 4.5                             | 6.5                                  | 60                               | 2.8                             |
| EI880035 | EI881035 | R1.75       | 3.5                             | 6                                    | 5                               | 7                                    | 65                               | 3.2                             |
| EI880040 | EI881040 | R2.0        | 4.0                             | 6                                    | 6                               | 8                                    | 65                               | 3.7                             |
| EI880050 | EI881050 | R2.5        | 5.0                             | 6                                    | 7.5                             | 10                                   | 65                               | 4.6                             |
| EI880060 | EI881060 | R3.0        | 6.0                             | 6                                    | 9                               | 12                                   | 75                               | 5.6                             |
| EI880080 | EI881080 | R4.0        | 8.0                             | 8                                    | 12                              | 25                                   | 75                               | 7.4                             |
| EI880100 | EI881100 | R5.0        | 10.0                            | 10                                   | 15                              | 30                                   | 80                               | 9.4                             |
| EI880120 | EI881120 | R6.0        | 12.0                            | 12                                   | 18                              | 36                                   | 90                               | 11.4                            |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-0.03             | h6                      |

**CUTTING CONDITION**

| MATERIAL | GRAPHITE |      |      |
|----------|----------|------|------|
|          | DIAMETER | RPM  | FEED |
| 2        | 16000    | 800  |      |
| 2.5      | 16000    | 1120 |      |
| 3        | 16000    | 1450 |      |
| 3.5      | 16000    | 1750 |      |
| 4        | 16000    | 2100 |      |
| 5        | 15500    | 2550 |      |
| 6        | 15000    | 2950 |      |
| 8        | 13000    | 3000 |      |
| 10       | 11500    | 3050 |      |
| 12       | 10500    | 3150 |      |

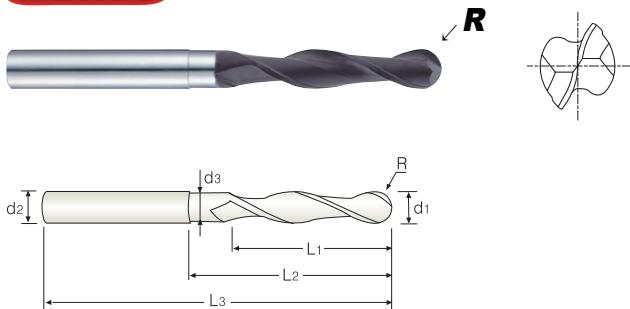
RPM=REVOLUTION PER MIN.  
FEED=mm/min.

\*The FEED, in long &amp; extra long types, should be reduced by around 50%



# 2 FLUTE, LONG LENGTH, BALL NOSE

**METRIC**



MG

2

30°

R  
± 0.01

PLAIN

for GRAPHITE

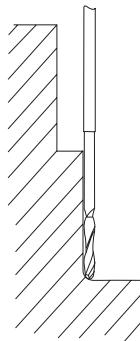
- Higher hardness of film and excellent wear-resistance increase the tool life surprisingly.
- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

◇ U.S.A Stock

## EI451 Series

Unit : mm

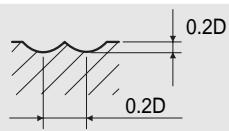
| EDP No. | R<br>± 0.01 | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2(h6)$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------|-------------|---------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 99558   | R1.0        | 2.0                       | 4                              | 10                        | 20                             | 80                         | 1.95                      |
| 99559   | R1.5        | 3.0                       | 4                              | 15                        | 25                             | 80                         | 2.9                       |
| 99560   | R2.0        | 4.0                       | 4                              | 20                        | 30                             | 80                         | 3.9                       |
| 99561   | R2.5        | 5.0                       | 6                              | 30                        | 50                             | 100                        | 4.9                       |
| 99562   | R3.0        | 6.0                       | 6                              | 30                        | 50                             | 100                        | 5.5                       |
| 99563   | R4.0        | 8.0                       | 8                              | 40                        | 60                             | 110                        | 7.5                       |
| 99564   | R5.0        | 10.0                      | 10                             | 50                        | 70                             | 120                        | 9.5                       |
| 99565   | R6.0        | 12.0                      | 12                             | 55                        | 75                             | 130                        | 11.5                      |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>- 0.03               | h6                         |

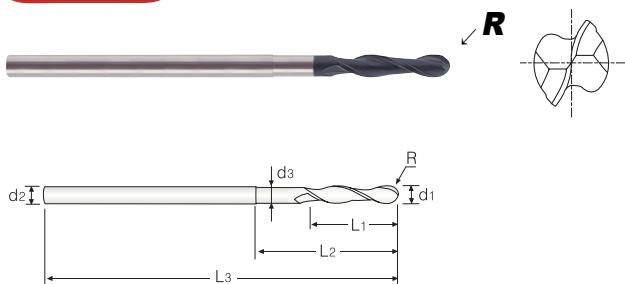
## CUTTING CONDITION

| MATERIAL | GRAPHITE |      |      |
|----------|----------|------|------|
|          | DIAMETER | RPM  | FEED |
| 2        | 16000    | 800  |      |
| 2.5      | 16000    | 1120 |      |
| 3        | 16000    | 1450 |      |
| 3.5      | 16000    | 1750 |      |
| 4        | 16000    | 2100 |      |
| 5        | 15500    | 2550 |      |
| 6        | 15000    | 2950 |      |
| 8        | 13000    | 3000 |      |
| 10       | 11500    | 3050 |      |
| 12       | 10500    | 3150 |      |



RPM=REVOLUTION PER MIN.  
FEED=mm/min.

\*The FEED, in long & extra long types, should be reduced by around 50%

**D-POWER****2 FLUTE, LONG REACH, BALL NOSE****METRIC**

MG

2

30°

R  
±0.01

PLAIN

**for GRAPHITE**

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- Ultra fine film of YG-1's diamond coated carbide ball end mills ensure the smooth and excellent surface on work materials.
- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass, etc.
- YG-1's diamond coated carbide ball end mills may have good result for the machining of non-ferrous metals and non-metallic materials.

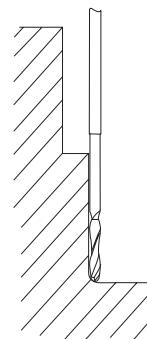
◇ U.S.A Stock

**EI450 Series**

Unit : mm

| EDP No. | R<br>± 0.01 | MILL<br>DIAMETER<br>$d_1$ | SHANK<br>DIAMETER<br>$d_2(h6)$ | LENGTH<br>OF CUT<br>$L_1$ | LENGTH<br>BELOW SHANK<br>$L_2$ | OVERALL<br>LENGTH<br>$L_3$ | NECK<br>DIAMETER<br>$d_3$ |
|---------|-------------|---------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|---------------------------|
| 99566   | R1.0        | 2                         | 4                              | 10                        | 20                             | 100                        | 1.95                      |
| 99567   | R1.5        | 3                         | 4                              | 15                        | 25                             | 100                        | 2.9                       |
| 99568   | R2.0        | 4                         | 4                              | 20                        | 30                             | 100                        | 3.9                       |
| 99569   | R2.5        | 5                         | 6                              | 30                        | 50                             | 120                        | 4.9                       |
| 99570   | R3.0        | 6                         | 6                              | 30                        | 50                             | 150                        | 5.5                       |
| 99571   | R4.0        | 8                         | 8                              | 40                        | 60                             | 150                        | 7.5                       |

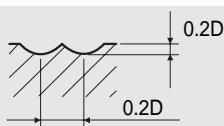
| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-0.03                | h6                         |



D-POWER

**CUTTING CONDITION**

| MATERIAL | GRAPHITE |      |      |
|----------|----------|------|------|
|          | DIAMETER | RPM  | FEED |
| 2        | 16000    | 800  |      |
| 2.5      | 16000    | 1120 |      |
| 3        | 16000    | 1450 |      |
| 3.5      | 16000    | 1750 |      |
| 4        | 16000    | 2100 |      |
| 5        | 15500    | 2550 |      |
| 6        | 15000    | 2950 |      |
| 8        | 13000    | 3000 |      |
| 10       | 11500    | 3050 |      |
| 12       | 10500    | 3150 |      |



RPM=REVOLUTION PER MIN.  
FEED=mm/min.

※ The FEED, in long &amp; extra long types, should be reduced by around 50%



## Technology and Quality

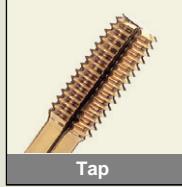
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



End Mill



Drill



Tap



Special products

---

X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING

# CARBIDE END MILLS

- General milling operation
- Slotting, Side cutting, Machining die cavity
- Suitable for most of materials





# CARBIDE END MILLS SELECTION GUIDE

**INCH**

| EDP No.        | APPEARANCE | SPECIFICATION                                     | PAGE |
|----------------|------------|---|------|
| E5020          |            | 2 FLUTE, REGULAR LENGTH                           | 155  |
| E5021          |            | 4 FLUTE, REGULAR LENGTH                           | 156  |
| E5244<br>E5245 |            | 2&4 FLUTE, STUB LENGTH                            | 157  |
| E5011<br>E5012 |            | 2&4 FLUTE, LONG LENGTH                            | 158  |
| E5026<br>E5065 |            | 2&4 FLUTE, EXTRA LONG LENGTH                      | 159  |
| E5022<br>E5023 |            | 2&4 FLUTE, STUB LENGTH, DOUBLE                    | 160  |
| E5025<br>E5024 |            | 2&4 FLUTE, REGULAR LENGTH, DOUBLE                 | 161  |
| E5249<br>E5250 |            | 2&4 FLUTE, REGULAR LENGTH, BALL NOSE              | 162  |
| E5014<br>E5060 |            | 2&4 FLUTE, LONG LENGTH, BALL NOSE                 | 163  |
| E5018<br>E5062 |            | 2&4 FLUTE, EXTRA LONG LENGTH, BALL NOSE           | 164  |
| E5251<br>E5252 |            | 2&4 FLUTE, STUB LENGTH, DOUBLE BALL NOSE          | 165  |
| E5216          |            | 4 FLUTE, REGULAR LENGTH, CORNER RADIUS            | 166  |
| E5067          |            | 5 FLUTE, 45° HELIX, REGULAR LENGTH, CORNER RADIUS | 167  |
| E5243          |            | 3 FLUTE, 45° HELIX, REGULAR LENGTH                | 168  |
| E5059          |            | 3 FLUTE, 50° HELIX, STUB, REGULAR & LONG LENGTH   | 169  |



# CARBIDE END MILLS SELECTION GUIDE

**INCH**

| EDP No.        | APPEARANCE | SPECIFICATION   | PAGE |
|----------------|------------|---|------|
| E5246          |            | 3 FLUTE, 60° HELIX, REGULAR LENGTH                                | 170  |
| E5066<br>E5067 |            | 5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH                         | 171  |
| E5068<br>E5073 |            | 5 FLUTE, 45° HELIX, MEDIUM, LONG & EXTRA LONG LENGTH              | 172  |
| E5058          |            | 6 FLUTE, 40° HELIX, REGULAR LENGTH                                | 173  |
| E5056<br>E5057 |            | 5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH,<br>FINE PITCH ROUGHING | 174  |
| E5077          |            | 3 FLUTE, TAPER  | 175  |
| E5078          |            | 3 FLUTE, TAPER, BALL NOSE   | 176  |

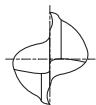
SPEED & FEED DATA

177~182



# CARBIDE END MILLS SELECTION GUIDE

| Selection  | Tool Name  | Slotting              | Profiling             | Material  | Page                 |
|--|--|-----------------------|-----------------------|---|----------------------|
| TOLERANCE: CUTTING DIAMETER: 0 to -.0012<br>SHANK DIAMETER: .0001 to .0005 |  |                       |                       |   |                      |
|  | <b>30° HELIX<br/>2&amp;4 FLUTE</b>                                   | <input type="radio"/> | <input type="radio"/> | Alloy Steel<br>Mold Steel<br>Cast Iron<br>Hard Exotic<br>Alloys | <b>155 ~<br/>165</b> |
|  | <b>30° HELIX<br/>4 FLUTE<br/>CORNER RADIUS</b>                       | <input type="radio"/> | <input type="radio"/> | Alloy Steel<br>Mold Steel<br>Cast Iron<br>Hard Exotic<br>Alloys | <b>166</b>           |
|  | <b>45° HELIX<br/>3 FLUTE</b>   | <input type="radio"/> | <input type="radio"/> | Stainless &<br>Exotic Alloys & Titanium                         | <b>167</b>           |
|  | <b>50° HELIX<br/>3 FLUTE</b>   | <input type="radio"/> | <input type="radio"/> | Stainless &<br>Exotic Alloys                                    | <b>168</b>           |
|  | <b>60° HELIX<br/>3 FLUTE</b>   | <input type="radio"/> | <input type="radio"/> | Stainless &<br>Exotic Alloys                                    | <b>169</b>           |
|  | <b>45° HELIX<br/>5 FLUTE</b>   |                       | <input type="radio"/> | Alloy Steel<br>Cast Iron &<br>Stainless                         | <b>170 ~<br/>171</b> |
|  | <b>40° HELIX<br/>6 FLUTE</b>   |                       | <input type="radio"/> | Alloy Steel<br>Cast Iron &<br>Stainless                         | <b>172</b>           |
|  | <b>45° HELIX<br/>5 FLUTE<br/>Fine Pitch Rougher</b>                  |                       | <input type="radio"/> | Alloy Steel<br>Stainless  | <b>173</b>           |
|  | <b>30° HELIX<br/>Tapered End Mills<br/>Square end &amp; Ball end</b> |                       | <input type="radio"/> | Alloy Steel<br>Mold Steel<br>Cast Iron<br>Alloys                | <b>174 ~<br/>175</b> |

**CARBIDE****2 FLUTE, REGULAR LENGTH**

P.178

► These are designed for slotting, drilling, pocketing and general operation.

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

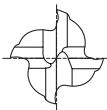
**E5020 Series**

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 01552    | 01552TN    | 01552TC     | 01552TF    | 01552TE    | 1/32             | 1/8               | 5/64             | 1-1/2             |
| 01553    | 01553TN    | 01553TC     | 01553TF    | 01553TE    | 3/64             | 1/8               | 7/64             | 1-1/2             |
| 01554    | 01554TN    | 01554TC     | 01554TF    | 01554TE    | 1/16             | 1/8               | 3/16             | 1-1/2             |
| 01555    | 01555TN    | 01555TC     | 01555TF    | 01555TE    | 5/64             | 1/8               | 3/16             | 1-1/2             |
| 01556    | 01556TN    | 01556TC     | 01556TF    | 01556TE    | 3/32             | 1/8               | 3/8              | 1-1/2             |
| 01557    | 01557TN    | 01557TC     | 01557TF    | 01557TE    | 7/64             | 1/8               | 3/8              | 1-1/2             |
| 01558    | 01558TN    | 01558TC     | 01558TF    | 01558TE    | 1/8              | 1/8               | 1/2              | 1-1/2             |
| 01560    | 01560TN    | 01560TC     | 01560TF    | 01560TE    | 9/64             | 3/16              | 1/2              | 2                 |
| 01562    | 01562TN    | 01562TC     | 01562TF    | 01562TE    | 5/32             | 3/16              | 9/16             | 2                 |
| 01564    | 01564TN    | 01564TC     | 01564TF    | 01564TE    | 11/64            | 3/16              | 5/8              | 2                 |
| 01565    | 01565TN    | 01565TC     | 01565TF    | 01565TE    | 3/16             | 3/16              | 5/8              | 2                 |
| 01569    | 01569TN    | 01569TC     | 01569TF    | 01569TE    | 13/64            | 1/4               | 5/8              | 2-1/2             |
| 01570    | 01570TN    | 01570TC     | 01570TF    | 01570TE    | 7/32             | 1/4               | 5/8              | 2-1/2             |
| 01572    | 01572TN    | 01572TC     | 01572TF    | 01572TE    | 15/64            | 1/4               | 3/4              | 2-1/2             |
| 01573    | 01573TN    | 01573TC     | 01573TF    | 01573TE    | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 01579    | 01579TN    | 01579TC     | 01579TF    | 01579TE    | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 01584    | 01584TN    | 01584TC     | 01584TF    | 01584TE    | 3/8              | 3/8               | 1                | 2-1/2             |
| 01588    | 01588TN    | 01588TC     | 01588TF    | 01588TE    | 7/16             | 7/16              | 1                | 2-3/4             |
| 01593    | 01593TN    | 01593TC     | 01593TF    | 01593TE    | 1/2              | 1/2               | 1                | 3                 |
| 01595    | 01595TN    | 01595TC     | 01595TF    | 01595TE    | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 01598    | 01598TN    | 01598TC     | 01598TF    | 01598TE    | 3/4              | 3/4               | 1-1/2            | 4                 |
| 01600    | 01600TN    | 01600TC     | 01600TF    | 01600TE    | 1                | 1                 | 1-1/2            | 4                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0005                |

# CARBIDE 4 FLUTE, REGULAR LENGTH



P.179

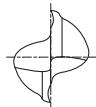
► Possible for high-speed cutting, suitable for high efficiency machining for hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

## E5021 Series

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 07554    | 07554TN    | 07554TC     | 07554TF    | 07554TE    | 1/16          | 1/8            | 3/16          | 1-1/2          |
| 07555    | 07555TN    | 07555TC     | 07555TF    | 07555TE    | 5/64          | 1/8            | 3/16          | 1-1/2          |
| 07556    | 07556TN    | 07556TC     | 07556TF    | 07556TE    | 3/32          | 1/8            | 3/8           | 1-1/2          |
| 07557    | 07557TN    | 07557TC     | 07557TF    | 07557TE    | 7/64          | 1/8            | 3/8           | 1-1/2          |
| 07558    | 07558TN    | 07558TC     | 07558TF    | 07558TE    | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 07560    | 07560TN    | 07560TC     | 07560TF    | 07560TE    | 9/64          | 3/16           | 1/2           | 2              |
| 07561    | 07561TN    | 07561TC     | 07561TF    | 07561TE    | 5/32          | 3/16           | 9/16          | 2              |
| 07564    | 07564TN    | 07564TC     | 07564TF    | 07564TE    | 11/64         | 3/16           | 5/8           | 2              |
| 07565    | 07565TN    | 07565TC     | 07565TF    | 07565TE    | 3/16          | 3/16           | 5/8           | 2              |
| 07569    | 07569TN    | 07569TC     | 07569TF    | 07569TE    | 13/64         | 1/4            | 5/8           | 2-1/2          |
| 07570    | 07570TN    | 07570TC     | 07570TF    | 07570TE    | 7/32          | 1/4            | 5/8           | 2-1/2          |
| 07572    | 07572TN    | 07572TC     | 07572TF    | 07572TE    | 15/64         | 1/4            | 3/4           | 2-1/2          |
| 07573    | 07573TN    | 07573TC     | 07573TF    | 07573TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 07576    | 07576TN    | 07576TC     | 07576TF    | 07576TE    | 9/32          | 5/16           | 3/4           | 2-1/2          |
| 07579    | 07579TN    | 07579TC     | 07579TF    | 07579TE    | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 07584    | 07584TN    | 07584TC     | 07584TF    | 07584TE    | 3/8           | 3/8            | 1             | 2-1/2          |
| 07588    | 07588TN    | 07588TC     | 07588TF    | 07588TE    | 7/16          | 7/16           | 1             | 2-3/4          |
| 07593    | 07593TN    | 07593TC     | 07593TF    | 07593TE    | 1/2           | 1/2            | 1             | 3              |
| 07595    | 07595TN    | 07595TC     | 07595TF    | 07595TE    | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 07598    | 07598TN    | 07598TC     | 07598TF    | 07598TE    | 3/4           | 3/4            | 1-1/2         | 4              |
| 07600    | 07600TN    | 07600TC     | 07600TF    | 07600TE    | 1             | 1              | 1-1/2         | 4              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE****2&4 FLUTE, STUB LENGTH**

P.178,179

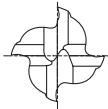
- Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5244 Series**

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 30554    | 30554TN    | 30554TC     | 30554TF    | 30554TE    | 1/16          | 1/8            | 1/8           | 1-1/2          |
| 30556    | 30556TN    | 30556TC     | 30556TF    | 30556TE    | 3/32          | 1/8            | 3/16          | 1-1/2          |
| 30558    | 30558TN    | 30558TC     | 30558TF    | 30558TE    | 1/8           | 1/8            | 1/4           | 1-1/2          |
| 30561    | 30561TN    | 30561TC     | 30561TF    | 30561TE    | 5/32          | 3/16           | 5/16          | 2              |
| 30565    | 30565TN    | 30565TC     | 30565TF    | 30565TE    | 3/16          | 3/16           | 3/8           | 2              |
| 30570    | 30570TN    | 30570TC     | 30570TF    | 30570TE    | 7/32          | 1/4            | 7/16          | 2              |
| 30573    | 30573TN    | 30573TC     | 30573TF    | 30573TE    | 1/4           | 1/4            | 1/2           | 2              |
| 30579    | 30579TN    | 30579TC     | 30579TF    | 30579TE    | 5/16          | 5/16           | 1/2           | 2              |
| 30584    | 30584TN    | 30584TC     | 30584TF    | 30584TE    | 3/8           | 3/8            | 5/8           | 2              |
| 30588    | 30588TN    | 30588TC     | 30588TF    | 30588TE    | 7/16          | 7/16           | 5/8           | 2-1/2          |
| 30593    | 30593TN    | 30593TC     | 30593TF    | 30593TE    | 1/2           | 1/2            | 5/8           | 2-1/2          |
| 30595    | 30595TN    | 30595TC     | 30595TF    | 30595TE    | 5/8           | 5/8            | 3/4           | 3              |
| 30598    | 30598TN    | 30598TC     | 30598TF    | 30598TE    | 3/4           | 3/4            | 1             | 3              |

**E5245 Series**

■ 4 FLUTE

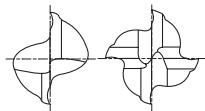
Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 31554    | 31554TN    | 31554TC     | 31554TF    | 31554TE    | 1/16          | 1/8            | 1/8           | 1-1/2          |
| 31556    | 31556TN    | 31556TC     | 31556TF    | 31556TE    | 3/32          | 1/8            | 3/16          | 1-1/2          |
| 31558    | 31558TN    | 31558TC     | 31558TF    | 31558TE    | 1/8           | 1/8            | 1/4           | 1-1/2          |
| 31561    | 31561TN    | 31561TC     | 31561TF    | 31561TE    | 5/32          | 3/16           | 5/16          | 2              |
| 31565    | 31565TN    | 31565TC     | 31565TF    | 31565TE    | 3/16          | 3/16           | 3/8           | 2              |
| 31570    | 31570TN    | 31570TC     | 31570TF    | 31570TE    | 7/32          | 1/4            | 7/16          | 2              |
| 31573    | 31573TN    | 31573TC     | 31573TF    | 31573TE    | 1/4           | 1/4            | 1/2           | 2              |
| 31579    | 31579TN    | 31579TC     | 31579TF    | 31579TE    | 5/16          | 5/16           | 1/2           | 2              |
| 31584    | 31584TN    | 31584TC     | 31584TF    | 31584TE    | 3/8           | 3/8            | 5/8           | 2              |
| 31588    | 31588TN    | 31588TC     | 31588TF    | 31588TE    | 7/16          | 7/16           | 5/8           | 2-1/2          |
| 31593    | 31593TN    | 31593TC     | 31593TF    | 31593TE    | 1/2           | 1/2            | 5/8           | 2-1/2          |
| 31595    | 31595TN    | 31595TC     | 31595TF    | 31595TE    | 5/8           | 5/8            | 3/4           | 3              |
| 31598    | 31598TN    | 31598TC     | 31598TF    | 31598TE    | 3/4           | 3/4            | 1             | 3              |

TOLERANCE  
OF MILL DIA.TOLERANCE  
OF SHANK DIA.0  
-.00120  
-.0005



# CARBIDE 2&4 FLUTE, LONG LENGTH



P.178,179

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

## E5011 Series

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 02558    | 02558TN    | 02558TC     | 02558TF    | 02558TE    | 1/8           | 1/8            | 3/4           | 2-1/4          |
| 02565    | 02565TN    | 02565TC     | 02565TF    | 02565TE    | 3/16          | 3/16           | 3/4           | 2-1/2          |
| 02573    | 02573TN    | 02573TC     | 02573TF    | 02573TE    | 1/4           | 1/4            | 1-1/8         | 3              |
| 02579    | 02579TN    | 02579TC     | 02579TF    | 02579TE    | 5/16          | 5/16           | 1-1/8         | 3              |
| 02584    | 02584TN    | 02584TC     | 02584TF    | 02584TE    | 3/8           | 3/8            | 1-1/8         | 3              |
| 02588    | 02588TN    | 02588TC     | 02588TF    | 02588TE    | 7/16          | 7/16           | 2             | 4              |
| 02593    | 02593TN    | 02593TC     | 02593TF    | 02593TE    | 1/2           | 1/2            | 2             | 4              |
| 02595    | 02595TN    | 02595TC     | 02595TF    | 02595TE    | 5/8           | 5/8            | 2-1/4         | 5              |
| 02598    | 02598TN    | 02598TC     | 02598TF    | 02598TE    | 3/4           | 3/4            | 2-1/4         | 5              |
| 02600    | 02600TN    | 02600TC     | 02600TF    | 02600TE    | 1             | 1              | 2-1/4         | 5              |

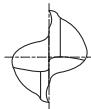
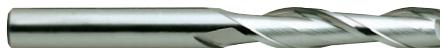
## E5012 Series

■ 4 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 08558    | 08558TN    | 08558TC     | 08558TF    | 08558TE    | 1/8           | 1/8            | 3/4           | 2-1/4          |
| 08565    | 08565TN    | 08565TC     | 08565TF    | 08565TE    | 3/16          | 3/16           | 3/4           | 2-1/2          |
| 08573    | 08573TN    | 08573TC     | 08573TF    | 08573TE    | 1/4           | 1/4            | 1-1/8         | 3              |
| 08579    | 08579TN    | 08579TC     | 08579TF    | 08579TE    | 5/16          | 5/16           | 1-1/8         | 3              |
| 08584    | 08584TN    | 08584TC     | 08584TF    | 08584TE    | 3/8           | 3/8            | 1-1/8         | 3              |
| 08588    | 08588TN    | 08588TC     | 08588TF    | 08588TE    | 7/16          | 7/16           | 2             | 4              |
| 08593    | 08593TN    | 08593TC     | 08593TF    | 08593TE    | 1/2           | 1/2            | 2             | 4              |
| 08595    | 08595TN    | 08595TC     | 08595TF    | 08595TE    | 5/8           | 5/8            | 2-1/4         | 5              |
| 08598    | 08598TN    | 08598TC     | 08598TF    | 08598TE    | 3/4           | 3/4            | 2-1/4         | 5              |
| 08600    | 08600TN    | 08600TC     | 08600TF    | 08600TE    | 1             | 1              | 2-1/4         | 5              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE****2&4 FLUTE, EXTRA LONG LENGTH**

P.178,179

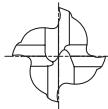
► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5026 Series**

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 54558    | 54558TN    | 54558TC     | 54558TF    | 54558TE    | 1/8           | 1/8            | 1             | 3              |
| 54565    | 54565TN    | 54565TC     | 54565TF    | 54565TE    | 3/16          | 3/16           | 1-1/8         | 3              |
| 54904    | 54904TN    | 54904TC     | 54904TF    | 54904TE    | 3/16          | 3/16           | 1             | 4              |
| 54573    | 54573TN    | 54573TC     | 54573TF    | 54573TE    | 1/4           | 1/4            | 1-1/2         | 4              |
| 54901    | 54901TN    | 54901TC     | 54901TF    | 54901TE    | 1/4           | 1/4            | 1-1/2         | 6              |
| 54579    | 54579TN    | 54579TC     | 54579TF    | 54579TE    | 5/16          | 5/16           | 1-5/8         | 4              |
| 54584    | 54584TN    | 54584TC     | 54584TF    | 54584TE    | 3/8           | 3/8            | 1-3/4         | 4              |
| 54902    | 54902TN    | 54902TC     | 54902TF    | 54902TE    | 3/8           | 3/8            | 1-1/2         | 6              |
| 54588    | 54588TN    | 54588TC     | 54588TF    | 54588TE    | 7/16          | 7/16           | 3             | 6              |
| 54903    | 54903TN    | 54903TC     | 54903TF    | 54903TE    | 1/2           | 1/2            | 1-1/2         | 6              |
| 54593    | 54593TN    | 54593TC     | 54593TF    | 54593TE    | 1/2           | 1/2            | 3             | 6              |
| 54595    | 54595TN    | 54595TC     | 54595TF    | 54595TE    | 5/8           | 5/8            | 3             | 6              |
| 54598    | 54598TN    | 54598TC     | 54598TF    | 54598TE    | 3/4           | 3/4            | 3             | 6              |
| 54600    | 54600TN    | 54600TC     | 54600TF    | 54600TE    | 1             | 1              | 3             | 6              |

**E5065 Series**

■ 4 FLUTE

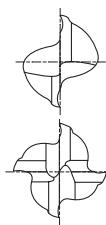
Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 55558    | 55558TN    | 55558TC     | 55558TF    | 55558TE    | 1/8           | 1/8            | 1             | 3              |
| 55565    | 55565TN    | 55565TC     | 55565TF    | 55565TE    | 3/16          | 3/16           | 1-1/8         | 3              |
| 55904    | 55904TN    | 55904TC     | 55904TF    | 55904TE    | 3/16          | 3/16           | 1             | 4              |
| 55573    | 55573TN    | 55573TC     | 55573TF    | 55573TE    | 1/4           | 1/4            | 1-1/2         | 4              |
| 55901    | 55901TN    | 55901TC     | 55901TF    | 55901TE    | 1/4           | 1/4            | 1-1/2         | 6              |
| 55579    | 55579TN    | 55579TC     | 55579TF    | 55579TE    | 5/16          | 5/16           | 1-5/8         | 4              |
| 55584    | 55584TN    | 55584TC     | 55584TF    | 55584TE    | 3/8           | 3/8            | 1-3/4         | 4              |
| 55902    | 55902TN    | 55902TC     | 55902TF    | 55902TE    | 3/8           | 3/8            | 1-1/2         | 6              |
| 55588    | 55588TN    | 55588TC     | 55588TF    | 55588TE    | 7/16          | 7/16           | 3             | 6              |
| 55903    | 55903TN    | 55903TC     | 55903TF    | 55903TE    | 1/2           | 1/2            | 1-1/2         | 6              |
| 55593    | 55593TN    | 55593TC     | 55593TF    | 55593TE    | 1/2           | 1/2            | 3             | 6              |
| 55595    | 55595TN    | 55595TC     | 55595TF    | 55595TE    | 5/8           | 5/8            | 3             | 6              |
| 55598    | 55598TN    | 55598TC     | 55598TF    | 55598TE    | 3/4           | 3/4            | 3             | 6              |
| 55600    | 55600TN    | 55600TC     | 55600TF    | 55600TE    | 1             | 1              | 3             | 6              |

TOLERANCE  
OF MILL DIA.TOLERANCE  
OF SHANK DIA.0  
-.00120  
-.0005



# CARBIDE 2&4 FLUTE, STUB LENGTH, DOUBLE



P.178,179

- ▶ Same construction features as 2&4 flute single end mill in a more economical version.
- ▶ Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

## E5022 Series ■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 32552    | 32552TN    | 32552TC     | 32552TF    | 32552TE    | 1/32          | 1/8            | 1/16          | 1-1/2          |
| 32553    | 32553TN    | 32553TC     | 32553TF    | 32553TE    | 3/64          | 1/8            | 3/32          | 1-1/2          |
| 32554    | 32554TN    | 32554TC     | 32554TF    | 32554TE    | 1/16          | 1/8            | 1/8           | 1-1/2          |
| 32555    | 32555TN    | 32555TC     | 32555TF    | 32555TE    | 5/64          | 1/8            | 1/8           | 1-1/2          |
| 32556    | 32556TN    | 32556TC     | 32556TF    | 32556TE    | 3/32          | 1/8            | 3/16          | 1-1/2          |
| 32557    | 32557TN    | 32557TC     | 32557TF    | 32557TE    | 7/64          | 1/8            | 3/16          | 1-1/2          |
| 32558    | 32558TN    | 32558TC     | 32558TF    | 32558TE    | 1/8           | 1/8            | 1/4           | 1-1/2          |
| 32560    | 32560TN    | 32560TC     | 32560TF    | 32560TE    | 9/64          | 3/16           | 5/16          | 2              |
| 32562    | 32562TN    | 32562TC     | 32562TF    | 32562TE    | 5/32          | 3/16           | 5/16          | 2              |
| 32564    | 32564TN    | 32564TC     | 32564TF    | 32564TE    | 11/64         | 3/16           | 5/16          | 2              |
| 32565    | 32565TN    | 32565TC     | 32565TF    | 32565TE    | 3/16          | 3/16           | 3/8           | 2              |
| 32569    | 32569TN    | 32569TC     | 32569TF    | 32569TE    | 13/64         | 1/4            | 1/2           | 2-1/2          |
| 32570    | 32570TN    | 32570TC     | 32570TF    | 32570TE    | 7/32          | 1/4            | 1/2           | 2-1/2          |
| 32572    | 32572TN    | 32572TC     | 32572TF    | 32572TE    | 15/64         | 1/4            | 1/2           | 2-1/2          |
| 32573    | 32573TN    | 32573TC     | 32573TF    | 32573TE    | 1/4           | 1/4            | 1/2           | 2-1/2          |
| 32579    | 32579TN    | 32579TC     | 32579TF    | 32579TE    | 5/16          | 5/16           | 1/2           | 2-1/2          |
| 32584    | 32584TN    | 32584TC     | 32584TF    | 32584TE    | 3/8           | 3/8            | 9/16          | 2-1/2          |
| 32588    | 32588TN    | 32588TC     | 32588TF    | 32588TE    | 7/16          | 7/16           | 9/16          | 2-3/4          |
| 32593    | 32593TN    | 32593TC     | 32593TF    | 32593TE    | 1/2           | 1/2            | 5/8           | 3              |

## E5023 Series ■ 4 FLUTE

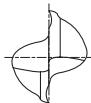
Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 33554    | 33554TN    | 33554TC     | 33554TF    | 33554TE    | 1/16          | 1/8            | 1/8           | 1-1/2          |
| 33555    | 33555TN    | 33555TC     | 33555TF    | 33555TE    | 5/64          | 1/8            | 1/8           | 1-1/2          |
| 33556    | 33556TN    | 33556TC     | 33556TF    | 33556TE    | 3/32          | 1/8            | 3/16          | 1-1/2          |
| 33557    | 33557TN    | 33557TC     | 33557TF    | 33557TE    | 7/64          | 1/8            | 3/16          | 1-1/2          |
| 33558    | 33558TN    | 33558TC     | 33558TF    | 33558TE    | 1/8           | 1/8            | 1/4           | 1-1/2          |
| 33560    | 33560TN    | 33560TC     | 33560TF    | 33560TE    | 9/64          | 3/16           | 5/16          | 2              |
| 33561    | 33561TN    | 33561TC     | 33561TF    | 33561TE    | 5/32          | 3/16           | 5/16          | 2              |
| 33564    | 33564TN    | 33564TC     | 33564TF    | 33564TE    | 11/64         | 3/16           | 5/16          | 2              |
| 33565    | 33565TN    | 33565TC     | 33565TF    | 33565TE    | 3/16          | 3/16           | 3/8           | 2              |
| 33569    | 33569TN    | 33569TC     | 33569TF    | 33569TE    | 13/64         | 1/4            | 1/2           | 2-1/2          |
| 33570    | 33570TN    | 33570TC     | 33570TF    | 33570TE    | 7/32          | 1/4            | 1/2           | 2-1/2          |
| 33572    | 33572TN    | 33572TC     | 33572TF    | 33572TE    | 15/64         | 1/4            | 1/2           | 2-1/2          |
| 33573    | 33573TN    | 33573TC     | 33573TF    | 33573TE    | 1/4           | 1/4            | 1/2           | 2-1/2          |
| 33579    | 33579TN    | 33579TC     | 33579TF    | 33579TE    | 5/16          | 5/16           | 1/2           | 2-1/2          |
| 33584    | 33584TN    | 33584TC     | 33584TF    | 33584TE    | 3/8           | 3/8            | 9/16          | 2-1/2          |
| 33588    | 33588TN    | 33588TC     | 33588TF    | 33588TE    | 7/16          | 7/16           | 9/16          | 2-3/4          |
| 33593    | 33593TN    | 33593TC     | 33593TF    | 33593TE    | 1/2           | 1/2            | 5/8           | 3              |

### TOLERANCE OF MILL DIA.

|         |         |
|---------|---------|
| + 0     | * * 0   |
| - .0012 | — .0020 |

\*\*The shank of end mills is the same diameter as the cutting portion.

**CARBIDE****2&4 FLUTE, REGULAR LENGTH, DOUBLE**

P.178,179

► Same construction features as single end mill in a more economical version.

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5025 Series****■ 2 FLUTE**

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 11559    | 11559TN    | 11559TC     | 11559TF    | 11559TE    | 1/8              | 3/8               | 3/8              | 3-1/16            |
| 11563    | 11563TN    | 11563TC     | 11563TF    | 11563TE    | 5/32             | 3/8               | 7/16             | 3-1/8             |
| 11567    | 11567TN    | 11567TC     | 11567TF    | 11567TE    | 3/16             | 3/8               | 1/2              | 3-1/4             |
| 11571    | 11571TN    | 11571TC     | 11571TF    | 11571TE    | 7/32             | 3/8               | 9/16             | 3-3/8             |
| 11574    | 11574TN    | 11574TC     | 11574TF    | 11574TE    | 1/4              | 3/8               | 5/8              | 3-3/8             |
| 11577    | 11577TN    | 11577TC     | 11577TF    | 11577TE    | 9/32             | 3/8               | 11/16            | 3-3/8             |
| 11580    | 11580TN    | 11580TC     | 11580TF    | 11580TE    | 5/16             | 3/8               | 3/4              | 3-1/2             |
| 11582    | 11582TN    | 11582TC     | 11582TF    | 11582TE    | 11/32            | 3/8               | 3/4              | 3-1/2             |
| 11584    | 11584TN    | 11584TC     | 11584TF    | 11584TE    | 3/8              | 3/8               | 3/4              | 3-1/2             |
| 11589    | 11589TN    | 11589TC     | 11589TF    | 11589TE    | 7/16             | 1/2               | 7/8              | 4                 |
| 11593    | 11593TN    | 11593TC     | 11593TF    | 11593TE    | 1/2              | 1/2               | 1                | 4                 |

**E5024 Series****■ 4 FLUTE**

Unit : inch

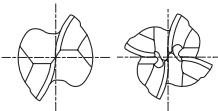
| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 13559    | 13559TN    | 13559TC     | 13559TF    | 13559TE    | 1/8              | 3/8               | 3/8              | 3-1/16            |
| 13563    | 13563TN    | 13563TC     | 13563TF    | 13563TE    | 5/32             | 3/8               | 7/16             | 3-1/8             |
| 13567    | 13567TN    | 13567TC     | 13567TF    | 13567TE    | 3/16             | 3/8               | 1/2              | 3-1/4             |
| 13571    | 13571TN    | 13571TC     | 13571TF    | 13571TE    | 7/32             | 3/8               | 9/16             | 3-3/8             |
| 13574    | 13574TN    | 13574TC     | 13574TF    | 13574TE    | 1/4              | 3/8               | 5/8              | 3-3/8             |
| 13577    | 13577TN    | 13577TC     | 13577TF    | 13577TE    | 9/32             | 3/8               | 11/16            | 3-3/8             |
| 13580    | 13580TN    | 13580TC     | 13580TF    | 13580TE    | 5/16             | 3/8               | 3/4              | 3-1/2             |
| 13582    | 13582TN    | 13582TC     | 13582TF    | 13582TE    | 11/32            | 3/8               | 3/4              | 3-1/2             |
| 13584    | 13584TN    | 13584TC     | 13584TF    | 13584TE    | 3/8              | 3/8               | 3/4              | 3-1/2             |
| 13589    | 13589TN    | 13589TC     | 13589TF    | 13589TE    | 7/16             | 1/2               | 7/8              | 4                 |
| 13593    | 13593TN    | 13593TC     | 13593TF    | 13593TE    | 1/2              | 1/2               | 1                | 4                 |

TOLERANCE  
OF MILL DIA.\* \* 0  
— .0020

\*\*The shank of end mills is the same diameter as the cutting portion.



# CARBIDE 2&4 FLUTE, REGULAR LENGTH, BALL NOSE



P.180,181

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

## E5249 Series

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 41558    | 41558TN    | 41558TC     | 41558TF    | 41558TE    | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 41561    | 41561TN    | 41561TC     | 41561TF    | 41561TE    | 5/32          | 3/16           | 9/16          | 2              |
| 41565    | 41565TN    | 41565TC     | 41565TF    | 41565TE    | 3/16          | 3/16           | 5/8           | 2              |
| 41570    | 41570TN    | 41570TC     | 41570TF    | 41570TE    | 7/32          | 1/4            | 5/8           | 2-1/2          |
| 41573    | 41573TN    | 41573TC     | 41573TF    | 41573TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 41579    | 41579TN    | 41579TC     | 41579TF    | 41579TE    | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 41584    | 41584TN    | 41584TC     | 41584TF    | 41584TE    | 3/8           | 3/8            | 1             | 2-1/2          |
| 41588    | 41588TN    | 41588TC     | 41588TF    | 41588TE    | 7/16          | 7/16           | 1             | 2-3/4          |
| 41593    | 41593TN    | 41593TC     | 41593TF    | 41593TE    | 1/2           | 1/2            | 1             | 3              |
| 41595    | 41595TN    | 41595TC     | 41595TF    | 41595TE    | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 41598    | 41598TN    | 41598TC     | 41598TF    | 41598TE    | 3/4           | 3/4            | 1-1/2         | 4              |
| 41600    | 41600TN    | 41600TC     | 41600TF    | 41600TE    | 1             | 1              | 1-1/2         | 4              |

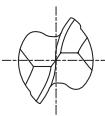
## E5250 Series

■ 4 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 43558    | 43558TN    | 43558TC     | 43558TF    | 43558TE    | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 43561    | 43561TN    | 43561TC     | 43561TF    | 43561TE    | 5/32          | 3/16           | 9/16          | 2              |
| 43565    | 43565TN    | 43565TC     | 43565TF    | 43565TE    | 3/16          | 3/16           | 5/8           | 2              |
| 43570    | 43570TN    | 43570TC     | 43570TF    | 43570TE    | 7/32          | 1/4            | 5/8           | 2-1/2          |
| 43573    | 43573TN    | 43573TC     | 43573TF    | 43573TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 43579    | 43579TN    | 43579TC     | 43579TF    | 43579TE    | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 43584    | 43584TN    | 43584TC     | 43584TF    | 43584TE    | 3/8           | 3/8            | 1             | 2-1/2          |
| 43588    | 43588TN    | 43588TC     | 43588TF    | 43588TE    | 7/16          | 7/16           | 1             | 2-3/4          |
| 43593    | 43593TN    | 43593TC     | 43593TF    | 43593TE    | 1/2           | 1/2            | 1             | 3              |
| 43595    | 43595TN    | 43595TC     | 43595TF    | 43595TE    | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 43598    | 43598TN    | 43598TC     | 43598TF    | 43598TE    | 3/4           | 3/4            | 1-1/2         | 4              |
| 43600    | 43600TN    | 43600TC     | 43600TF    | 43600TE    | 1             | 1              | 1-1/2         | 4              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE****2&4 FLUTE, LONG LENGTH, BALL NOSE**

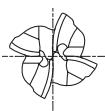
P.180,181

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5014 Series****■ 2 FLUTE**

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 50558    | 50558TN    | 50558TC     | 50558TF    | 50558TE    | 1/8              | 1/8               | 3/4              | 2-1/4             |
| 50565    | 50565TN    | 50565TC     | 50565TF    | 50565TE    | 3/16             | 3/16              | 3/4              | 2-1/2             |
| 50573    | 50573TN    | 50573TC     | 50573TF    | 50573TE    | 1/4              | 1/4               | 1-1/8            | 3                 |
| 50579    | 50579TN    | 50579TC     | 50579TF    | 50579TE    | 5/16             | 5/16              | 1-1/8            | 3                 |
| 50584    | 50584TN    | 50584TC     | 50584TF    | 50584TE    | 3/8              | 3/8               | 1-1/8            | 3                 |
| 50588    | 50588TN    | 50588TC     | 50588TF    | 50588TE    | 7/16             | 7/16              | 2                | 4                 |
| 50593    | 50593TN    | 50593TC     | 50593TF    | 50593TE    | 1/2              | 1/2               | 2                | 4                 |
| 50595    | 50595TN    | 50595TC     | 50595TF    | 50595TE    | 5/8              | 5/8               | 2-1/4            | 5                 |
| 50598    | 50598TN    | 50598TC     | 50598TF    | 50598TE    | 3/4              | 3/4               | 2-1/4            | 5                 |
| 50600    | 50600TN    | 50600TC     | 50600TF    | 50600TE    | 1                | 1                 | 2-1/4            | 5                 |

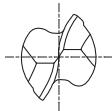
**E5060 Series****■ 4 FLUTE**

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 51558    | 51558TN    | 51558TC     | 51558TF    | 51558TE    | 1/8              | 1/8               | 3/4              | 2-1/4             |
| 51565    | 51565TN    | 51565TC     | 51565TF    | 51565TE    | 3/16             | 3/16              | 3/4              | 2-1/2             |
| 51573    | 51573TN    | 51573TC     | 51573TF    | 51573TE    | 1/4              | 1/4               | 1-1/8            | 3                 |
| 51579    | 51579TN    | 51579TC     | 51579TF    | 51579TE    | 5/16             | 5/16              | 1-1/8            | 3                 |
| 51584    | 51584TN    | 51584TC     | 51584TF    | 51584TE    | 3/8              | 3/8               | 1-1/8            | 3                 |
| 51588    | 51588TN    | 51588TC     | 51588TF    | 51588TE    | 7/16             | 7/16              | 2                | 4                 |
| 51593    | 51593TN    | 51593TC     | 51593TF    | 51593TE    | 1/2              | 1/2               | 2                | 4                 |
| 51595    | 51595TN    | 51595TC     | 51595TF    | 51595TE    | 5/8              | 5/8               | 2-1/4            | 5                 |
| 51598    | 51598TN    | 51598TC     | 51598TF    | 51598TE    | 3/4              | 3/4               | 2-1/4            | 5                 |
| 51600    | 51600TN    | 51600TC     | 51600TF    | 51600TE    | 1                | 1                 | 2-1/4            | 5                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0005                |

# CARBIDE 2&4 FLUTE, EXTRA LONG LENGTH, BALL NOSE



P.180,181

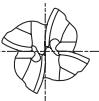
► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

## E5018 Series

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 52558    | 52558TN    | 52558TC     | 52558TF    | 52558TE    | 1/8           | 1/8            | 1             | 3              |
| 52565    | 52565TN    | 52565TC     | 52565TF    | 52565TE    | 3/16          | 3/16           | 1-1/8         | 3              |
| 52904    | 52904TN    | 52904TC     | 52904TF    | 52904TE    | 3/16          | 3/16           | 1             | 4              |
| 52573    | 52573TN    | 52573TC     | 52573TF    | 52573TE    | 1/4           | 1/4            | 1-1/2         | 4              |
| 52901    | 52901TN    | 52901TC     | 52901TF    | 52901TE    | 1/4           | 1/4            | 1-1/2         | 6              |
| 52579    | 52579TN    | 52579TC     | 52579TF    | 52579TE    | 5/16          | 5/16           | 1-5/8         | 4              |
| 52584    | 52584TN    | 52584TC     | 52584TF    | 52584TE    | 3/8           | 3/8            | 1-3/4         | 4              |
| 52902    | 52902TN    | 52902TC     | 52902TF    | 52902TE    | 3/8           | 3/8            | 1-1/2         | 6              |
| 52588    | 52588TN    | 52588TC     | 52588TF    | 52588TE    | 7/16          | 7/16           | 3             | 6              |
| 52903    | 52903TN    | 52903TC     | 52903TF    | 52903TE    | 1/2           | 1/2            | 1-1/2         | 6              |
| 52593    | 52593TN    | 52593TC     | 52593TF    | 52593TE    | 1/2           | 1/2            | 3             | 6              |
| 52595    | 52595TN    | 52595TC     | 52595TF    | 52595TE    | 5/8           | 5/8            | 3             | 6              |
| 52598    | 52598TN    | 52598TC     | 52598TF    | 52598TE    | 3/4           | 3/4            | 3             | 6              |
| 52600    | 52600TN    | 52600TC     | 52600TF    | 52600TE    | 1             | 1              | 3             | 6              |



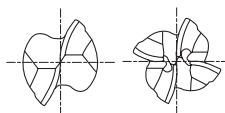
## E5062 Series

■ 4 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 53558    | 53558TN    | 53558TC     | 53558TF    | 53558TE    | 1/8           | 1/8            | 1             | 3              |
| 53565    | 53565TN    | 53565TC     | 53565TF    | 53565TE    | 3/16          | 3/16           | 1-1/8         | 3              |
| 53573    | 53573TN    | 53573TC     | 53573TF    | 53573TE    | 1/4           | 1/4            | 1-1/2         | 4              |
| 53901    | 53901TN    | 53901TC     | 53901TF    | 53901TE    | 1/4           | 1/4            | 1-1/2         | 6              |
| 53579    | 53579TN    | 53579TC     | 53579TF    | 53579TE    | 5/16          | 5/16           | 1-5/8         | 4              |
| 53584    | 53584TN    | 53584TC     | 53584TF    | 53584TE    | 3/8           | 3/8            | 1-3/4         | 4              |
| 53902    | 53902TN    | 53902TC     | 53902TF    | 53902TE    | 3/8           | 3/8            | 1-1/2         | 6              |
| 53588    | 53588TN    | 53588TC     | 53588TF    | 53588TE    | 7/16          | 7/16           | 3             | 6              |
| 53903    | 53903TN    | 53903TC     | 53903TF    | 53903TE    | 1/2           | 1/2            | 1-1/2         | 6              |
| 53593    | 53593TN    | 53593TC     | 53593TF    | 53593TE    | 1/2           | 1/2            | 3             | 6              |
| 53595    | 53595TN    | 53595TC     | 53595TF    | 53595TE    | 5/8           | 5/8            | 3             | 6              |
| 53904    | 53904TN    | 53904TC     | 53904TF    | 53904TE    | 5/8           | 5/8            | 1-1/2         | 6              |
| 53598    | 53598TN    | 53598TC     | 53598TF    | 53598TE    | 3/4           | 3/4            | 3             | 6              |
| 53905    | 53905TN    | 53905TC     | 53905TF    | 53905TE    | 3/4           | 3/4            | 1-1/2         | 6              |
| 53600    | 53600TN    | 53600TC     | 53600TF    | 53600TE    | 1             | 1              | 3             | 6              |
| 53906    | 53906TN    | 53906TC     | 53906TF    | 53906TE    | 1             | 1              | 1-1/2         | 6              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE****2&4 FLUTE, STUB LENGTH, DOUBLE BALL NOSE**

P.180,181

► Same construction features as single end mill in a more economical version.

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5251 Series**

■ 2 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 47570    | 47570TN    | 47570TC     | 47570TF    | 47570TE    | 7/32          | 1/4            | 1/2           | 2-1/2          |
| 47573    | 47573TN    | 47573TC     | 47573TF    | 47573TE    | 1/4           | 1/4            | 1/2           | 2-1/2          |
| 47579    | 47579TN    | 47579TC     | 47579TF    | 47579TE    | 5/16          | 5/16           | 1/2           | 2-1/2          |
| 47584    | 47584TN    | 47584TC     | 47584TF    | 47584TE    | 3/8           | 3/8            | 9/16          | 2-1/2          |
| 47588    | 47588TN    | 47588TC     | 47588TF    | 47588TE    | 7/16          | 7/16           | 9/16          | 2-3/4          |
| 47593    | 47593TN    | 47593TC     | 47593TF    | 47593TE    | 1/2           | 1/2            | 5/8           | 3              |

**E5252 Series**

■ 4 FLUTE

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 48570    | 48570TN    | 48570TC     | 48570TF    | 48570TE    | 7/32          | 1/4            | 1/2           | 2-1/2          |
| 48573    | 48573TN    | 48573TC     | 48573TF    | 48573TE    | 1/4           | 1/4            | 1/2           | 2-1/2          |
| 48579    | 48579TN    | 48579TC     | 48579TF    | 48579TE    | 5/16          | 5/16           | 1/2           | 2-1/2          |
| 48584    | 48584TN    | 48584TC     | 48584TF    | 48584TE    | 3/8           | 3/8            | 9/16          | 2-1/2          |
| 48588    | 48588TN    | 48588TC     | 48588TF    | 48588TE    | 7/16          | 7/16           | 9/16          | 2-3/4          |
| 48593    | 48593TN    | 48593TC     | 48593TF    | 48593TE    | 1/2           | 1/2            | 5/8           | 3              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE****4 FLUTE, REGULAR LENGTH, CORNER RADIUS**

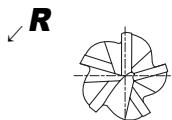
P.179

► Suitable for cutting hardened & high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

**E5216 Series****■ 4 FLUTE**

Unit : inch

| EDP No.    | UNCOATED<br>WITH RADIUS | YG-TYLON F<br>WITH RADIUS | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|------------|-------------------------|---------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 07558-015R | 07558TF-015R            | R.015                     | 1/8                   | 1/8              | 1/8               | 1/2              | 1-1/2             |
| 07558-030R | 07558TF-030R            | R.030                     | 1/8                   | 1/8              | 1/8               | 1/2              | 1-1/2             |
| 07565-015R | 07565TF-015R            | R.015                     | 3/16                  | 3/16             | 3/16              | 5/8              | 2                 |
| 07565-030R | 07565TF-030R            | R.030                     | 3/16                  | 3/16             | 3/16              | 5/8              | 2                 |
| 07573-015R | 07573TF-015R            | R.015                     | 1/4                   | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 07573-030R | 07573TF-030R            | R.030                     | 1/4                   | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 07573-045R | 07573TF-045R            | R.045                     | 1/4                   | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 07579-015R | 07579TF-015R            | R.015                     | 5/16                  | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 07579-030R | 07579TF-030R            | R.030                     | 5/16                  | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 07579-045R | 07579TF-045R            | R.045                     | 5/16                  | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 07584-015R | 07584TF-015R            | R.015                     | 3/8                   | 3/8              | 3/8               | 1                | 2-1/2             |
| 07584-030R | 07584TF-030R            | R.030                     | 3/8                   | 3/8              | 3/8               | 1                | 2-1/2             |
| 07584-045R | 07584TF-045R            | R.045                     | 3/8                   | 3/8              | 3/8               | 1                | 2-1/2             |
| 07584-060R | 07584TF-060R            | R.060                     | 3/8                   | 3/8              | 3/8               | 1                | 2-1/2             |
| 07588-015R | 07588TF-015R            | R.015                     | 7/16                  | 7/16             | 7/16              | 1                | 2-3/4             |
| 07588-030R | 07588TF-030R            | R.030                     | 7/16                  | 7/16             | 7/16              | 1                | 2-3/4             |
| 07588-045R | 07588TF-045R            | R.045                     | 7/16                  | 7/16             | 7/16              | 1                | 2-3/4             |
| 07588-060R | 07588TF-060R            | R.060                     | 7/16                  | 7/16             | 7/16              | 1                | 2-3/4             |
| 07588-090R | 07588TF-090R            | R.090                     | 7/16                  | 7/16             | 7/16              | 1                | 2-3/4             |
| 07593-015R | 07593TF-015R            | R.015                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07593-030R | 07593TF-030R            | R.030                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07593-045R | 07593TF-045R            | R.045                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07593-060R | 07593TF-060R            | R.060                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07593-090R | 07593TF-090R            | R.090                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07593-125R | 07593TF-125R            | R.125                     | 1/2                   | 1/2              | 1/2               | 1                | 3                 |
| 07595-015R | 07595TF-015R            | R.015                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07595-030R | 07595TF-030R            | R.030                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07595-045R | 07595TF-045R            | R.045                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07595-060R | 07595TF-060R            | R.060                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07595-090R | 07595TF-090R            | R.090                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07595-125R | 07595TF-125R            | R.125                     | 5/8                   | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 07598-015R | 07598TF-015R            | R.015                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07598-030R | 07598TF-030R            | R.030                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07598-045R | 07598TF-045R            | R.045                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07598-060R | 07598TF-060R            | R.060                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07598-090R | 07598TF-090R            | R.090                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07598-125R | 07598TF-125R            | R.125                     | 3/4                   | 3/4              | 3/4               | 1-1/2            | 4                 |
| 07600-015R | 07600TF-015R            | R.015                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |
| 07600-030R | 07600TF-030R            | R.030                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |
| 07600-045R | 07600TF-045R            | R.045                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |
| 07600-060R | 07600TF-060R            | R.060                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |
| 07600-090R | 07600TF-090R            | R.090                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |
| 07600-125R | 07600TF-125R            | R.125                     | 1                     | 1                | 1                 | 1-1/2            | 4                 |

**CARBIDE****5 FLUTE, 45° HELIX, REGULAR LENGTH,  
CORNER RADIUS**

P.177

- Designed to machine stainless steels, Inconols and other alloys.
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

**E5067 Series**

Unit : inch

| EDP No.      | CORNER RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|--------------|--------------------|------------------|-------------------|------------------|-------------------|
| 86573TF-030R | R.030              | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 86584TF-030R | R.030              | 3/8              | 3/8               | 1                | 2-1/2             |
| 86584TF-060R | R.060              | 3/8              | 3/8               | 1                | 2-1/2             |
| 86593TF-030R | R.030              | 1/2              | 1/2               | 1-1/4            | 3                 |
| 86593TF-060R | R.060              | 1/2              | 1/2               | 1-1/4            | 3                 |
| 86593TF-090R | R.090              | 1/2              | 1/2               | 1-1/4            | 3                 |
| 86595TF-030R | R.030              | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 86595TF-060R | R.060              | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 86595TF-090R | R.090              | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 86595TF-125R | R.125              | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 86598TF-030R | R.030              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86598TF-060R | R.060              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86598TF-090R | R.090              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86598TF-125R | R.125              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86598TF-156R | R.156              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86598TF-187R | R.187              | 3/4              | 3/4               | 1-5/8            | 4                 |
| 86600TF-030R | R.030              | 1                | 1                 | 2                | 4                 |
| 86600TF-060R | R.060              | 1                | 1                 | 2                | 4                 |
| 86600TF-090R | R.090              | 1                | 1                 | 2                | 4                 |
| 86600TF-125R | R.125              | 1                | 1                 | 2                | 4                 |
| 86600TF-156R | R.156              | 1                | 1                 | 2                | 4                 |
| 86600TF-187R | R.187              | 1                | 1                 | 2                | 4                 |

Any non stocked radius available in 1 week for uncoated tools

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0005                |

**CARBIDE****3 FLUTE, 45° HELIX, REGULAR LENGTH**

P.177

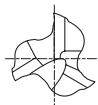
- Designed to machine stainless steel, inconel, titanium and other hard to machine materials.
- It's 3 flute design gives high stability and allows good chip removal in plunging & slotting operations.
- The normal rake angle and 45° medium helix allows an extremely wide range of application.
- YG:TYLON super TiAIN coating are recommended for maximum performance.

**E5243 Series**

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 34558    | 34558TN    | 34558TC     | 34558TF    | 34558TE    | 1/8              | 1/8               | 3/8              | 1-1/2             |
| 34565    | 34565TN    | 34565TC     | 34565TF    | 34565TE    | 3/16             | 3/16              | 9/16             | 2                 |
| 34573    | 34573TN    | 34573TC     | 34573TF    | 34573TE    | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 34579    | 34579TN    | 34579TC     | 34579TF    | 34579TE    | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 34584    | 34584TN    | 34584TC     | 34584TF    | 34584TE    | 3/8              | 3/8               | 7/8              | 2-1/2             |
| 34593    | 34593TN    | 34593TC     | 34593TF    | 34593TE    | 1/2              | 1/2               | 1                | 3                 |
| 34594    | 34594TN    | 34594TC     | 34594TF    | 34594TE    | 9/16             | 9/16              | 1-1/4            | 3-1/2             |
| 34595    | 34595TN    | 34595TC     | 34595TF    | 34595TE    | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 34598    | 34598TN    | 34598TC     | 34598TF    | 34598TE    | 3/4              | 3/4               | 1-1/2            | 4                 |
| 34600    | 34600TN    | 34600TC     | 34600TF    | 34600TE    | 1                | 1                 | 1-1/2            | 4                 |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0005                |

**CARBIDE****3 FLUTE, 50° HELIX, STUB, REGULAR & LONG LENGTH**

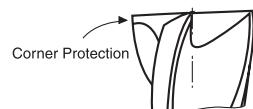
P.177

- Designed to machine stainless steel, inconel, titanium and other hard to machine materials.
- It's 3 flute design gives high stability and allows good chip removal in plunging & slotting operations.
- The high rake angle and 50° helix allows an extremely wide range of application.
- YG:TYLON super TiAIN coating are recommended for maximum performance.

**E5059 Series**

Unit : inch

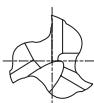
| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 83573    | 83573TN    | 83573TC     | 83573TF    | 83573TE    | 1/4           | 1/4            | 1/2           | 2              |
| 83901    | 83901TN    | 83901TC     | 83901TF    | 83901TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 83902    | 83902TN    | 83902TC     | 83902TF    | 83902TE    | 1/4           | 1/4            | 1-1/4         | 3              |
| 83584    | 83584TN    | 83584TC     | 83584TF    | 83584TE    | 3/8           | 3/8            | 1/2           | 2              |
| 83903    | 83903TN    | 83903TC     | 83903TF    | 83903TE    | 3/8           | 3/8            | 1             | 2-1/2          |
| 83904    | 83904TN    | 83904TC     | 83904TF    | 83904TE    | 3/8           | 3/8            | 1-1/2         | 3-1/2          |
| 83593    | 83593TN    | 83593TC     | 83593TF    | 83593TE    | 1/2           | 1/2            | 5/8           | 2-1/2          |
| 83905    | 83905TN    | 83905TC     | 83905TF    | 83905TE    | 1/2           | 1/2            | 1             | 3              |
| 83906    | 83906TN    | 83906TC     | 83906TF    | 83906TE    | 1/2           | 1/2            | 2             | 4              |
| 83595    | 83595TN    | 83595TC     | 83595TF    | 83595TE    | 5/8           | 5/8            | 7/8           | 3              |
| 83907    | 83907TN    | 83907TC     | 83907TF    | 83907TE    | 5/8           | 5/8            | 2-1/2         | 6              |
| 83598    | 83598TN    | 83598TC     | 83598TF    | 83598TE    | 3/4           | 3/4            | 1             | 3-1/2          |
| 83908    | 83908TN    | 83908TC     | 83908TF    | 83908TE    | 3/4           | 3/4            | 3             | 6              |



| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |



# CARBIDE 3 FLUTE, 60° HELIX, REGULAR LENGTH



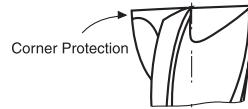
P.177

- Excellent shearing and chip ejection due to 60° Helix.
- 20% ~ 30% increase in chip load recommended over 30° helix tools.

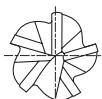
## E5246 Series

Unit : inch

| EDP No.  |            |             |            |            | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                   |                  |                   |
| 20558    | 20558TN    | 20558TC     | 20558TF    | 20558TE    | 1/8              | 1/8               | 3/8              | 1-1/2             |
| 20565    | 20565TN    | 20565TC     | 20565TF    | 20565TE    | 3/16             | 3/16              | 9/16             | 2                 |
| 20573    | 20573TN    | 20573TC     | 20573TF    | 20573TE    | 1/4              | 1/4               | 3/4              | 2-1/2             |
| 20579    | 20579TN    | 20579TC     | 20579TF    | 20579TE    | 5/16             | 5/16              | 13/16            | 2-1/2             |
| 20584    | 20584TN    | 20584TC     | 20584TF    | 20584TE    | 3/8              | 3/8               | 7/8              | 2-1/2             |
| 20593    | 20593TN    | 20593TC     | 20593TF    | 20593TE    | 1/2              | 1/2               | 1                | 3                 |
| 20594    | 20594TN    | 20594TC     | 20594TF    | 20594TE    | 9/16             | 9/16              | 1-1/4            | 3-1/2             |
| 20595    | 20595TN    | 20595TC     | 20595TF    | 20595TE    | 5/8              | 5/8               | 1-1/4            | 3-1/2             |
| 20598    | 20598TN    | 20598TC     | 20598TF    | 20598TE    | 3/4              | 3/4               | 1-1/2            | 4                 |
| 20600    | 20600TN    | 20600TC     | 20600TF    | 20600TE    | 1                | 1                 | 1-1/2            | 4                 |



| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.0012               | 0<br>-.0005                |

**CARBIDE****5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH**

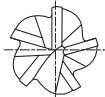
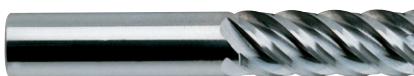
P.177

- Designed to machine stainless steels, inconels and other alloys.
- The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

**E5066 Series****■ STUB LENGTH**

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 85558    | 85558TN    | 85558TC     | 85558TF    | 85558TE    | 1/8           | 1/8            | 1/4           | 1-1/2          |
| 85561    | 85561TN    | 85561TC     | 85561TF    | 85561TE    | 5/32          | 3/16           | 5/16          | 2              |
| 85565    | 85565TN    | 85565TC     | 85565TF    | 85565TE    | 3/16          | 3/16           | 5/16          | 2              |
| 85570    | 85570TN    | 85570TC     | 85570TF    | 85570TE    | 7/32          | 1/4            | 3/8           | 2              |
| 85573    | 85573TN    | 85573TC     | 85573TF    | 85573TE    | 1/4           | 1/4            | 3/8           | 2              |
| 85579    | 85579TN    | 85579TC     | 85579TF    | 85579TE    | 5/16          | 5/16           | 7/16          | 2              |
| 85584    | 85584TN    | 85584TC     | 85584TF    | 85584TE    | 3/8           | 3/8            | 1/2           | 2              |
| 85588    | 85588TN    | 85588TC     | 85588TF    | 85588TE    | 7/16          | 7/16           | 9/16          | 2-1/2          |
| 85593    | 85593TN    | 85593TC     | 85593TF    | 85593TE    | 1/2           | 1/2            | 5/8           | 2-1/2          |
| 85595    | 85595TN    | 85595TC     | 85595TF    | 85595TE    | 5/8           | 5/8            | 3/4           | 3              |
| 85598    | 85598TN    | 85598TC     | 85598TF    | 85598TE    | 3/4           | 3/4            | 1             | 3              |
| 85600    | 85600TN    | 85600TC     | 85600TF    | 85600TE    | 1             | 1              | 1-1/4         | 3              |

**E5067 Series****■ REGULAR LENGTH**

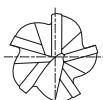
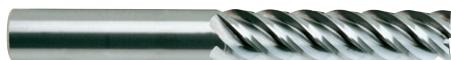
Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 86558    | 86558TN    | 86558TC     | 86558TF    | 86558TE    | 1/8           | 1/8            | 1/2           | 1-1/2          |
| 86561    | 86561TN    | 86561TC     | 86561TF    | 86561TE    | 5/32          | 3/16           | 9/16          | 2              |
| 86565    | 86565TN    | 86565TC     | 86565TF    | 86565TE    | 3/16          | 3/16           | 9/16          | 2              |
| 86570    | 86570TN    | 86570TC     | 86570TF    | 86570TE    | 7/32          | 1/4            | 3/4           | 2-1/2          |
| 86573    | 86573TN    | 86573TC     | 86573TF    | 86573TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 86579    | 86579TN    | 86579TC     | 86579TF    | 86579TE    | 5/16          | 5/16           | 13/16         | 2-1/2          |
| 86584    | 86584TN    | 86584TC     | 86584TF    | 86584TE    | 3/8           | 3/8            | 1             | 2-1/2          |
| 86588    | 86588TN    | 86588TC     | 86588TF    | 86588TE    | 7/16          | 7/16           | 1             | 2-3/4          |
| 86593    | 86593TN    | 86593TC     | 86593TF    | 86593TE    | 1/2           | 1/2            | 1-1/4         | 3              |
| 86595    | 86595TN    | 86595TC     | 86595TF    | 86595TE    | 5/8           | 5/8            | 1-5/8         | 3-1/2          |
| 86598    | 86598TN    | 86598TC     | 86598TF    | 86598TE    | 3/4           | 3/4            | 1-5/8         | 4              |
| 86599    | 86599TN    | 86599TC     | 86599TF    | 86599TE    | 7/8           | 7/8            | 2             | 4              |
| 86600    | 86600TN    | 86600TC     | 86600TF    | 86600TE    | 1             | 1              | 2             | 4              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |

**CARBIDE**

# 5 FLUTE, 45° HELIX, MEDIUM, LONG & EXTRA LONG LENGTH



P.177

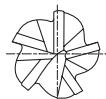
- Designed to machine stainless steel, inconels and other alloys.
- The new design of stub length allows cutting at maximum speeds and feeds with minimum deflection
- 5 Flute and 45° medium helix allow harmonic balance and smooth cutting.

**E5068 Series**

■ MEDIUM &amp; LONG LENGTH

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 58573    | 58573TN    | 58573TC     | 58573TF    | 58573TE    | 1/4           | 1/4            | 1-1/4         | 4              |
| 58579    | 58579TN    | 58579TC     | 58579TF    | 58579TE    | 5/16          | 5/16           | 1-1/4         | 4              |
| 58584    | 58584TN    | 58584TC     | 58584TF    | 58584TE    | 3/8           | 3/8            | 1-1/2         | 4              |
| 58588    | 58588TN    | 58588TC     | 58588TF    | 58588TE    | 7/16          | 7/16           | 2             | 4              |
| 58593    | 58593TN    | 58593TC     | 58593TF    | 58593TE    | 1/2           | 1/2            | 2             | 4              |
| 58595    | 58595TN    | 58595TC     | 58595TF    | 58595TE    | 5/8           | 5/8            | 2-1/2         | 5              |
| 58598    | 58598TN    | 58598TC     | 58598TF    | 58598TE    | 3/4           | 3/4            | 3-1/4         | 6              |
| 58901    | 58901TN    | 58901TC     | 58901TF    | 58901TE    | 3/4           | 3/4            | 2-1/4         | 5              |
| 58600    | 58600TN    | 58600TC     | 58600TF    | 58600TE    | 1             | 1              | 3-1/4         | 6              |
| 58902    | 58902TN    | 58902TC     | 58902TF    | 58902TE    | 1             | 1              | 2-5/8         | 6              |

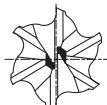
**E5073 Series**

■ EXTRA LONG LENGTH

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 59579    | 59579TN    | 59579TC     | 59579TF    | 59579TE    | 5/16          | 5/16           | 2-1/8         | 4              |
| 59584    | 59584TN    | 59584TC     | 59584TF    | 59584TE    | 3/8           | 3/8            | 2-1/2         | 6              |
| 59593    | 59593TN    | 59593TC     | 59593TF    | 59593TE    | 1/2           | 1/2            | 3-1/8         | 6              |
| 59595    | 59595TN    | 59595TC     | 59595TF    | 59595TE    | 5/8           | 5/8            | 4             | 6              |
| 59598    | 59598TN    | 59598TC     | 59598TF    | 59598TE    | 3/4           | 3/4            | 4             | 6              |
| 59600    | 59600TN    | 59600TC     | 59600TF    | 59600TE    | 1             | 1              | 4-1/8         | 7              |

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0003             |

**CARBIDE****6 FLUTE, 40° HELIX, REGULAR LENGTH**

MG

6

40°

PLAIN

DATA

P.177

► For finishing in most materials.

► 20~40% increase in inches per minute over 4 flute tools.

► YG:TYLON SUPER TiAIN coating recommended for maximum performance.

**E5058 Series**

Unit : inch

| EDP No.  |            |             |            |            | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|---------------|----------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |               |                |               |                |
| 84565    | 84565TN    | 84565TC     | 84565TF    | 84565TE    | 3/16          | 3/16           | 5/8           | 2              |
| 84573    | 84573TN    | 84573TC     | 84573TF    | 84573TE    | 1/4           | 1/4            | 3/4           | 2-1/2          |
| 84579    | 84579TN    | 84579TC     | 84579TF    | 84579TE    | 5/16          | 5/16           | 7/8           | 2-1/2          |
| 84584    | 84584TN    | 84584TC     | 84584TF    | 84584TE    | 3/8           | 3/8            | 7/8           | 2-1/2          |
| 84588    | 84588TN    | 84588TC     | 84588TF    | 84588TE    | 7/16          | 7/16           | 1             | 2-1/2          |
| 84593    | 84593TN    | 84593TC     | 84593TF    | 84593TE    | 1/2           | 1/2            | 1             | 3              |
| 84595    | 84595TN    | 84595TC     | 84595TF    | 84595TE    | 5/8           | 5/8            | 1-1/4         | 3-1/2          |
| 84598    | 84598TN    | 84598TC     | 84598TF    | 84598TE    | 3/4           | 3/4            | 1-1/2         | 4              |

**MATERIAL HARDNESS**

|                     |               |              |
|---------------------|---------------|--------------|
| Recommended Coating | Under 45 Rc F | Over 45 Rc E |
|---------------------|---------------|--------------|

| TOLERANCE OF MILL DIA. | TOLERANCE OF SHANK DIA. |
|------------------------|-------------------------|
| 0<br>-.0012            | 0<br>-.0005             |

**CARBIDE**

# 5 FLUTE, 45° HELIX, STUB & REGULAR LENGTH, FINE PITCH ROUGHING



P.177

- 5 flute design gives minimum harmonic vibration.
- Stub tools for minimum deflection and maximum rigidity.
- Ideal for profile milling.
- Not recommended for slotting.

**E5056 Series**

■ STUB LENGTH

Unit : inch

| EDP No.  |            |             |            |            | CORNER<br>RADIUS | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                  |                   |                  |                   |
| 81584    | 81584TN    | 81584TC     | 81584TF    | 81584TE    | .040             | 3/8              | 3/8               | 1/2              | 2                 |
| 81593    | 81593TN    | 81593TC     | 81593TF    | 81593TE    | .040             | 1/2              | 1/2               | 5/8              | 2-1/2             |
| 81595    | 81595TN    | 81595TC     | 81595TF    | 81595TE    | .060             | 5/8              | 5/8               | 3/4              | 3                 |
| 81598    | 81598TN    | 81598TC     | 81598TF    | 81598TE    | .060             | 3/4              | 3/4               | 1                | 3                 |
| 81600    | 81600TN    | 81600TC     | 81600TF    | 81600TE    | .060             | 1                | 1                 | 1-1/4            | 3                 |

**E5057 Series**

■ REGULAR LENGTH

Unit : inch

| EDP No.  |            |             |            |            | CORNER<br>RADIUS | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|------------|-------------|------------|------------|------------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                  |                  |                   |                  |                   |
| 82584    | 82584TN    | 82584TC     | 82584TF    | 82584TE    | .040             | 3/8              | 3/8               | 1                | 2-1/2             |
| 82593    | 82593TN    | 82593TC     | 82593TF    | 82593TE    | .040             | 1/2              | 1/2               | 1-1/4            | 3                 |
| 82595    | 82595TN    | 82595TC     | 82595TF    | 82595TE    | .060             | 5/8              | 5/8               | 1-5/8            | 3-1/2             |
| 82598    | 82598TN    | 82598TC     | 82598TF    | 82598TE    | .060             | 3/4              | 3/4               | 1-5/8            | 4                 |
| 82600    | 82600TN    | 82600TC     | 82600TF    | 82600TE    | .060             | 1                | 1                 | 2                | 4                 |

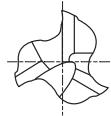
**TECHNICAL NOTES**

| MATERIAL               | Speed<br>SFM | Chip Load<br>Per Tooth(Inches) |           |     |     |   | Recommended<br>Coating |
|------------------------|--------------|--------------------------------|-----------|-----|-----|---|------------------------|
|                        |              | 3/8                            | 1/2       | 5/8 | 3/4 | 1 |                        |
| Steel Alloys           | 100~500      | .001~.003                      | .002~.004 |     | TF  |   |                        |
| Stainless Steel Alloys | 100~400      | .001~.003                      | .002~.004 |     | TF  |   |                        |
| Nickel Based Alloys    | 20~150       | .001~.003                      | .002~.004 |     | TE  |   |                        |

| TOLERANCE<br>OF MILL DIA. | TOLERANCE<br>OF SHANK DIA. |
|---------------------------|----------------------------|
| 0<br>-.003                | 0<br>-.0005                |



# CARBIDE 3 FLUTE, TAPER



P.177

► Designed for milling die cavity.

► Many different center line angles are available on your job requirement.

## E5077 Series

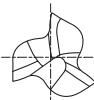
## ■ SQUARE END

Unit : inch

| EDP No.  |            |             |            |            | SHANK DIAMETER | CENTER LINE ANGLE | CUTTING SMALL DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|----------------|-------------------|------------------------|---------------|----------------|
| UNCOATED | TiN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                |                   |                        |               |                |
| 87552    | 87552TN    | 87552TC     | 87552TF    | 87552TE    | 1/4            | 1°                | 1/8                    | 1-1/2         | 3              |
| 87553    | 87553TN    | 87553TC     | 87553TF    | 87553TE    | 1/4            | 1.5°              | 1/8                    | 1-1/2         | 3              |
| 87554    | 87554TN    | 87554TC     | 87554TF    | 87554TE    | 1/4            | 2°                | 1/8                    | 1-1/4         | 3              |
| 87556    | 87556TN    | 87556TC     | 87556TF    | 87556TE    | 1/4            | 3°                | 1/8                    | 1             | 3              |
| 87560    | 87560TN    | 87560TC     | 87560TF    | 87560TE    | 1/4            | 5°                | 1/8                    | 3/4           | 3              |
| 87564    | 87564TN    | 87564TC     | 87564TF    | 87564TE    | 1/4            | 7°                | 1/8                    | 1/2           | 3              |
| 87570    | 87570TN    | 87570TC     | 87570TF    | 87570TE    | 1/4            | 10°               | 3/32                   | 1/2           | 3              |
| 87572    | 87572TN    | 87572TC     | 87572TF    | 87572TE    | 3/8            | 1°                | 3/16                   | 1-3/4         | 3-1/2          |
| 87573    | 87573TN    | 87573TC     | 87573TF    | 87573TE    | 3/8            | 1.5°              | 3/16                   | 1-3/4         | 3-1/2          |
| 87574    | 87574TN    | 87574TC     | 87574TF    | 87574TE    | 3/8            | 2°                | 3/16                   | 1-3/4         | 3-1/2          |
| 87576    | 87576TN    | 87576TC     | 87576TF    | 87576TE    | 3/8            | 3°                | 5/32                   | 1-3/4         | 3-1/2          |
| 87580    | 87580TN    | 87580TC     | 87580TF    | 87580TE    | 3/8            | 5°                | 1/8                    | 1-1/2         | 3-1/2          |
| 87584    | 87584TN    | 87584TC     | 87584TF    | 87584TE    | 3/8            | 7°                | 1/8                    | 1             | 3-1/2          |
| 87590    | 87590TN    | 87590TC     | 87590TF    | 87590TE    | 3/8            | 10°               | 1/8                    | 3/4           | 3-1/2          |
| 87592    | 87592TN    | 87592TC     | 87592TF    | 87592TE    | 1/2            | 1°                | 1/4                    | 2             | 4              |
| 87594    | 87594TN    | 87594TC     | 87594TF    | 87594TE    | 1/2            | 2°                | 1/4                    | 2             | 4              |
| 87596    | 87596TN    | 87596TC     | 87596TF    | 87596TE    | 1/2            | 3°                | 1/4                    | 2             | 4              |
| 87600    | 87600TN    | 87600TC     | 87600TF    | 87600TE    | 1/2            | 5°                | 1/4                    | 1-1/4         | 4              |
| 87902    | 87902TN    | 87902TC     | 87902TF    | 87902TE    | 1/2            | 7°                | 3/16                   | 1-1/4         | 4              |
| 87903    | 87903TN    | 87903TC     | 87903TF    | 87903TE    | 1/2            | 10°               | 1/8                    | 1             | 4              |

|                           |             |          |
|---------------------------|-------------|----------|
| O.D RANGE<br>TOLERANCE    | 1/64~1/4    | 17/64~1  |
|                           | 0~-.0020    | 0~-.0030 |
| TOLERANCE<br>OF SHANK DIA | 0<br>-.0005 |          |

# CARBIDE 3 FLUTE, TAPER, BALL NOSE



P.177

► Designed for milling die cavity.

► Many different center line angles are available on your job requirement.

E5078 Series

■ RADIUS END

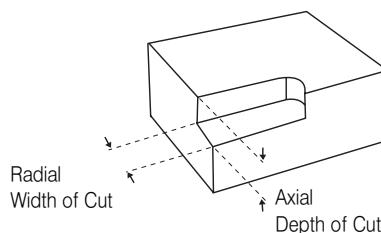
Unit : inch

| EDP No.  |            |             |            |            | SHANK DIAMETER | CENTER LINE ANGLE | TIP RADIUS | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|-------------|------------|------------|----------------|-------------------|------------|---------------|----------------|
| UNCOATED | TIN COATED | TiCN COATED | YG:TYLON F | YG:TYLON E |                |                   |            |               |                |
| 88552    | 88552TN    | 88552TC     | 88552TF    | 88552TE    | 1/4            | 1°                | .062       | 1-1/2         | 3              |
| 88553    | 88553TN    | 88553TC     | 88553TF    | 88553TE    | 1/4            | 1.5°              | .062       | 1-1/2         | 3              |
| 88554    | 88554TN    | 88554TC     | 88554TF    | 88554TE    | 1/4            | 2°                | .062       | 1-1/4         | 3              |
| 88556    | 88556TN    | 88556TC     | 88556TF    | 88556TE    | 1/4            | 3°                | .062       | 1             | 3              |
| 88560    | 88560TN    | 88560TC     | 88560TF    | 88560TE    | 1/4            | 5°                | .062       | 3/4           | 3              |
| 88564    | 88564TN    | 88564TC     | 88564TF    | 88564TE    | 1/4            | 7°                | .062       | 1/2           | 3              |
| 88570    | 88570TN    | 88570TC     | 88570TF    | 88570TE    | 1/4            | 10°               | .047       | 1/2           | 3              |
| 88572    | 88572TN    | 88572TC     | 88572TF    | 88572TE    | 3/8            | 1°                | .093       | 1-3/4         | 3-1/2          |
| 88573    | 88573TN    | 88573TC     | 88573TF    | 88573TE    | 3/8            | 1.5°              | .093       | 1-3/4         | 3-1/2          |
| 88574    | 88574TN    | 88574TC     | 88574TF    | 88574TE    | 3/8            | 2°                | .093       | 1-3/4         | 3-1/2          |
| 88576    | 88576TN    | 88576TC     | 88576TF    | 88576TE    | 3/8            | 3°                | .078       | 1-3/4         | 3-1/2          |
| 88580    | 88580TN    | 88580TC     | 88580TF    | 88580TE    | 3/8            | 5°                | .062       | 1-1/2         | 3-1/2          |
| 88584    | 88584TN    | 88584TC     | 88584TF    | 88584TE    | 3/8            | 7°                | .062       | 1             | 3-1/2          |
| 88590    | 88590TN    | 88590TC     | 88590TF    | 88590TE    | 3/8            | 10°               | .062       | 3/4           | 3-1/2          |
| 88592    | 88592TN    | 88592TC     | 88592TF    | 88592TE    | 1/2            | 1°                | .125       | 2             | 4              |
| 88594    | 88594TN    | 88594TC     | 88594TF    | 88594TE    | 1/2            | 2°                | .125       | 2             | 4              |
| 88596    | 88596TN    | 88596TC     | 88596TF    | 88596TE    | 1/2            | 3°                | .125       | 2             | 4              |
| 88600    | 88600TN    | 88600TC     | 88600TF    | 88600TE    | 1/2            | 5°                | .125       | 1-1/4         | 4              |
| 88902    | 88902TN    | 88902TC     | 88902TF    | 88902TE    | 1/2            | 7°                | .093       | 1-1/4         | 4              |
| 88903    | 88903TN    | 88903TC     | 88903TF    | 88903TE    | 1/2            | 10°               | .062       | 1             | 4              |

|                           |             |           |
|---------------------------|-------------|-----------|
| O.D RANGE<br>TOLERANCE    | 1/64~1/4    | 17/64~1   |
|                           | 0~- .0020   | 0~- .0030 |
| TOLERANCE<br>OF SHANK DIA | 0<br>-.0005 |           |

| Material   | Speed    | Chip Load per Tooth by End Mill Diameter |             |           | Recommended Coating |
|--|----------|--|-------------|-----------|---------------------|
|  |          | Up to 1/4"                               | Up to 1/2"  | Up to 1"  |                     |
| Carbon + Alloy Steel <45Rc                                       | 100-700  | .0002-.002                               | .001-.003   | .003-.007 | TF                  |
| Carbon + Alloy Steel >45Rc                                       | 50-400   | .0002-.001                               | .0005-.0015 | .001-.003 | TE                  |
| Stainless Steels Non-Hardenable 200-300 Series                   | 150-500  | .0002-.001                               | .001-.002   | .002-.006 | TF                  |
| Stainless Steels Hardenable 400 Series Martensitic and PH Series | 100-450  | .0002-.0005                              | .0005-.001  | .001-.005 | TF                  |
| Cast+Ductile Iron  | 100-800  | .0002-.0015                              | .002-.003   | .003-.008 | TF or TE            |
| Nickel+Cobalt Based Alloys                                       | 20-200   | .0003-.0008                              | .0008-.001  | .001-.002 | TE                  |
| Titanium   | 30-200   | .0002-.0008                              | .0008-.002  | .002-.004 | TE                  |
| Aluminum   | 600-2000 | .0002-.002                               | .002-.004   | .004-.008 | TiCN                |
| Copper   | 300-1000 | .0005-.002                               | .002-.003   | .003-.006 | CrN                 |
| Brass+ Bronze Alloys   | 600-1000 | .0005-.002                               | .002-.003   | .003-.006 | TiCN                |
| Graphite   | 600-1000 | .0005-.005                               | .001-.008   | .002-.010 | D                   |
| Plastic  | 600-1200 | .0006-.003                               | .003-.006   | .006-.012 | TF                  |

**TF** = YG:TYLON F  
**TE** = YG:TYLON E  
**D** = DIAMOND  
**CrN** = CROME NITRIDE



#### SPEED & FEED DETERMINANTS

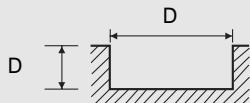
1. MATERIAL HARDNESS
2. MACHINE RIGIDITY
3. TYPE OF COATING
4. TOOL GEOMETRY
5. FINISH REQUIREMENTS
6. DEPTH & WIDTH OF CUT

# CARBIDE

## 2 FLUTE, SLOTTING

### E5020, E5244, E5011, E5026, E5022, E5025 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS<br>STEELS<br>TITANIUM ALLOYS |      | CAST IRON |      | ALUMINUM<br>ALLOYS |       | COPPER, BRASS<br>NON-FERROUS<br>METALS |       |
|----------|--|------|--|------|--|------|--|------|-----------|------|--------------------|-------|--|-------|
| HARDNESS | ~HRc20                                       |      | HRc20 ~ HRc30                                |      | HRc30 ~ HRc40                                |      |  |      |           |      |                    |       |  |       |
| STRENGTH | 500~800N/mm <sup>2</sup>                     |      | 800 ~ 1000N/mm <sup>2</sup>                  |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |  |      |           |      |                    |       |  |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                                    | FEED | RPM       | FEED | RPM                | FEED  | RPM                                    | FEED  |
| 3/32     | 5500   | 3.15 | 4800   | 2.76 | 4000   | 2.17 | 8000                                   | 2.56 | 6500      | 5.91 | 16000              | 12.60 | 12000                                  | 9.45  |
| 1/8      | 3700   | 3.54 | 3200   | 3.15 | 2600   | 2.36 | 5300                                   | 2.56 | 4200      | 5.91 | 11000              | 12.60 | 8000                                   | 9.45  |
| 5/32     | 2800   | 3.54 | 2400   | 3.15 | 2000   | 2.36 | 4000                                   | 2.56 | 3200      | 5.91 | 8000               | 12.60 | 6000                                   | 9.45  |
| 3/16     | 2200   | 3.54 | 1900   | 3.15 | 1600   | 2.36 | 3200                                   | 2.56 | 2500      | 5.91 | 6400               | 12.60 | 4800                                   | 9.45  |
| 1/4      | 1800   | 3.54 | 1600   | 3.15 | 1300   | 2.36 | 2600                                   | 2.56 | 2100      | 7.09 | 5300               | 13.39 | 4000                                   | 10.24 |
| 5/16     | 1400   | 3.54 | 1200   | 3.15 | 1000   | 2.36 | 2000                                   | 2.56 | 1600      | 7.48 | 4000               | 13.39 | 3000                                   | 10.24 |
| 3/8      | 1100   | 3.54 | 950  | 3.15 | 800  | 2.36 | 1600                                   | 2.56 | 1300      | 7.87 | 3200               | 13.39 | 2400                                   | 10.24 |
| 1/2      | 900  | 3.54 | 800  | 3.15 | 660  | 2.36 | 1300                                   | 2.56 | 1000      | 8.27 | 2600               | 13.39 | 2000                                   | 10.24 |
| 9/16     | 800  | 3.54 | 700  | 3.15 | 570  | 2.36 | 1100                                   | 2.56 | 900       | 8.66 | 2300               | 13.39 | 1700                                   | 10.24 |
| 5/8      | 700  | 3.94 | 600  | 3.35 | 500  | 2.95 | 1000                                   | 2.95 | 800       | 8.86 | 2000               | 13.39 | 1500                                   | 10.24 |
| 13/16    | 550  | 3.94 | 480  | 3.35 | 400  | 2.95 | 800                                    | 3.15 | 640       | 9.45 | 1600               | 13.39 | 1200                                   | 10.24 |



\*The FEED, in long & extra long types, should be reduced by around 50%

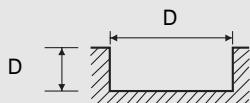
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# CARBIDE

## 2 FLUTE, TiAIN “F” COATED, SLOTTING

### EH020, EH244, EH011, EH026, EH022, EH025 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS<br>STEELS<br>TITANIUM ALLOYS |      | CAST IRON |       | ALUMINUM<br>ALLOYS |       | COPPER, BRASS<br>NON-FERROUS<br>METALS |       |
|----------|--|------|--|------|--|------|--|------|-----------|-------|--------------------|-------|--|-------|
| HARDNESS | ~HRc20                                       |      | HRc20 ~ HRc30                                |      | HRc30 ~ HRc40                                |      |  |      |           |       |                    |       |  |       |
| STRENGTH | 500~800N/mm <sup>2</sup>                     |      | 800 ~ 1000N/mm <sup>2</sup>                  |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |  |      |           |       |                    |       |  |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                                    | FEED | RPM       | FEED  | RPM                | FEED  | RPM                                    | FEED  |
| 3/32     | 8640   | 4.73 | 7440   | 4.25 | 6240   | 3.31 | 12000                                  | 4.02 | 10200     | 9.44  | 24000              | 19.85 | 18000                                  | 14.64 |
| 1/8      | 5760   | 5.66 | 5040   | 4.96 | 4080   | 3.78 | 8280                                   | 4.02 | 6600      | 9.44  | 16800              | 19.85 | 12000                                  | 14.64 |
| 5/32     | 4370   | 5.66 | 3720   | 4.96 | 3120   | 3.78 | 6240                                   | 4.02 | 5040      | 9.44  | 12000              | 19.85 | 9600                                   | 14.64 |
| 3/16     | 3430   | 5.66 | 3000   | 4.96 | 2400   | 3.78 | 5040                                   | 4.02 | 3960      | 9.44  | 9960               | 19.85 | 7440                                   | 14.64 |
| 1/4      | 2880   | 5.66 | 2400   | 4.96 | 2040   | 3.78 | 4080                                   | 4.02 | 3240      | 10.87 | 8280               | 20.78 | 6240                                   | 16.07 |
| 5/16     | 2160   | 5.66 | 1800   | 4.96 | 1560   | 3.78 | 3120                                   | 4.02 | 2400      | 11.81 | 6240               | 20.78 | 4800                                   | 16.07 |
| 3/8      | 1680   | 5.66 | 1440   | 4.96 | 1200   | 3.78 | 2400                                   | 4.02 | 2040      | 12.29 | 5040               | 20.78 | 3720                                   | 16.07 |
| 1/2      | 1440   | 5.66 | 1200   | 4.96 | 1030   | 3.78 | 2040                                   | 4.02 | 1560      | 12.76 | 4080               | 20.78 | 3120                                   | 16.07 |
| 9/16     | 1200   | 5.66 | 1080   | 4.96 | 890  | 3.78 | 1680                                   | 4.02 | 1440      | 13.22 | 3600               | 20.78 | 2640                                   | 16.07 |
| 5/8      | 1080   | 6.14 | 960  | 5.20 | 780  | 4.73 | 1560                                   | 4.73 | 1200      | 13.70 | 3120               | 20.78 | 2400                                   | 16.07 |
| 13/16    | 880  | 6.14 | 740  | 5.20 | 620  | 4.73 | 1200                                   | 4.73 | 1000      | 14.64 | 2400               | 20.78 | 1870                                   | 16.07 |

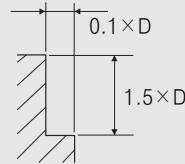


\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**CARBIDE****4 FLUTE, SIDE CUTTING****E5021, E5245, E5012, E5065, E5023, E5024, E5216 Series**

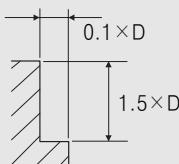
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | STAINLESS<br>STEELS<br>TITANIUM ALLOYS |      | CAST IRON |       | ALUMINUM<br>ALLOYS |       | COPPER, BRASS<br>NON-FERROUS<br>METALS |       |
|----------|--|-------|--|-------|--|------|--|------|-----------|-------|--------------------|-------|--|-------|
| HARDNESS | ~HRc20                                       |       | HRc20 ~ HRc30                                |       | HRc30 ~ HRc40                                |      |  |      |           |       |                    |       |  |       |
| STRENGTH | 500~800N/mm <sup>2</sup>                     |       | 800~1000N/mm <sup>2</sup>                    |       | 1000~1300N/mm <sup>2</sup>                   |      |  |      |           |       |                    |       |  |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED  | RPM  | FEED | RPM                                    | FEED | RPM       | FEED  | RPM                | FEED  | RPM                                    | FEED  |
| 3/32     | 5500   | 9.45  | 4800   | 8.27  | 4000   | 6.30 | 8000                                   | 7.87 | 6500      | 17.72 | 16000              | 37.80 | 12000                                  | 25.35 |
| 1/8      | 3700   | 10.63 | 3200   | 9.45  | 2600   | 7.09 | 5300                                   | 7.87 | 4200      | 17.72 | 11000              | 37.80 | 8000                                   | 25.35 |
| 5/32     | 2800   | 10.63 | 2400   | 9.45  | 2000   | 7.09 | 4000                                   | 7.87 | 3200      | 17.72 | 8000               | 37.80 | 6000                                   | 25.35 |
| 3/16     | 2200   | 10.63 | 1900   | 9.45  | 1600   | 7.09 | 3200                                   | 7.87 | 2500      | 17.72 | 6400               | 37.80 | 4800                                   | 25.35 |
| 1/4      | 1800   | 10.63 | 1600   | 9.45  | 1300   | 7.09 | 2600                                   | 7.87 | 2100      | 21.26 | 5300               | 40.16 | 4000                                   | 30.71 |
| 5/16     | 1400   | 10.63 | 1200   | 9.45  | 1000   | 7.09 | 2000                                   | 7.87 | 1600      | 22.44 | 4000               | 40.16 | 3000                                   | 30.71 |
| 3/8      | 1100   | 10.63 | 950  | 9.45  | 800  | 7.09 | 1600                                   | 7.87 | 1300      | 23.62 | 3200               | 40.16 | 2400                                   | 30.71 |
| 1/2      | 900  | 10.63 | 800  | 9.45  | 660  | 7.09 | 1300                                   | 7.87 | 1000      | 24.80 | 2600               | 40.16 | 2000                                   | 30.71 |
| 9/16     | 800  | 10.63 | 700  | 9.45  | 570  | 7.09 | 1100                                   | 7.87 | 900       | 25.98 | 2300               | 40.16 | 1700                                   | 30.71 |
| 5/8      | 700  | 11.81 | 600  | 10.24 | 500  | 8.66 | 1000                                   | 8.86 | 800       | 26.77 | 2000               | 40.16 | 1500                                   | 30.71 |
| 13/16    | 550  | 11.81 | 480  | 10.24 | 400  | 8.66 | 800                                    | 9.45 | 640       | 28.35 | 1600               | 40.16 | 1200                                   | 30.71 |



※ The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**CARBIDE****4 FLUTE, TiAIN “F” COATED, SIDE CUTTING****EH021, EH245, EH012, EH065, EH023, EH024, EH216 Series**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | STAINLESS<br>STEELS<br>TITANIUM ALLOYS |       | CAST IRON |       | ALUMINUM<br>ALLOYS |       | COPPER, BRASS<br>NON-FERROUS<br>METALS |       |
|----------|--|-------|--|-------|--|-------|--|-------|-----------|-------|--------------------|-------|--|-------|
| HARDNESS | ~HRc20                                       |       | HRc20 ~ HRc30                                |       | HRc30 ~ HRc40                                |       |  |       |           |       |                    |       |  |       |
| STRENGTH | 500~800N/mm <sup>2</sup>                     |       | 800~1000N/mm <sup>2</sup>                    |       | 1000~1300N/mm <sup>2</sup>                   |       |  |       |           |       |                    |       |  |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED  | RPM  | FEED  | RPM                                    | FEED  | RPM       | FEED  | RPM                | FEED  | RPM                                    | FEED  |
| 3/32     | 8640   | 14.65 | 7440   | 12.76 | 6240   | 9.92  | 12000                                  | 12.29 | 10200     | 27.40 | 24000              | 56.69 | 18000                                  | 44.41 |
| 1/8      | 5760   | 16.54 | 5040   | 14.64 | 4080   | 10.87 | 8280                                   | 12.29 | 6600      | 27.40 | 16800              | 56.69 | 12000                                  | 44.41 |
| 5/32     | 4370   | 16.54 | 3720   | 14.64 | 3120   | 10.87 | 6240                                   | 12.29 | 5040      | 27.40 | 12000              | 56.69 | 9600                                   | 44.41 |
| 3/16     | 3430   | 16.54 | 3000   | 14.64 | 2400   | 10.87 | 5040                                   | 12.29 | 3960      | 27.40 | 9960               | 56.69 | 7440                                   | 44.41 |
| 1/4      | 2880   | 16.54 | 2400   | 14.64 | 2040   | 10.87 | 4080                                   | 12.29 | 3240      | 33.07 | 8280               | 61.42 | 6240                                   | 47.24 |
| 5/16     | 2160   | 16.54 | 1800   | 14.64 | 1560   | 10.87 | 3120                                   | 12.29 | 2400      | 34.96 | 6240               | 61.42 | 4800                                   | 47.24 |
| 3/8      | 1680   | 16.54 | 1440   | 14.64 | 1200   | 10.87 | 2400                                   | 12.29 | 2040      | 36.85 | 5040               | 61.42 | 3720                                   | 47.24 |
| 1/2      | 1440   | 16.54 | 1200   | 14.64 | 1030   | 10.87 | 2040                                   | 12.29 | 1560      | 38.74 | 4080               | 61.42 | 3120                                   | 47.24 |
| 9/16     | 1200   | 16.54 | 1080   | 14.64 | 890  | 10.87 | 1680                                   | 12.29 | 1440      | 40.63 | 3600               | 61.42 | 2640                                   | 47.24 |
| 5/8      | 1080   | 18.42 | 960  | 16.07 | 780  | 13.70 | 1560                                   | 13.70 | 1200      | 41.58 | 3120               | 61.42 | 2400                                   | 47.24 |
| 13/16    | 880  | 18.42 | 740  | 16.07 | 620  | 13.70 | 1200                                   | 14.64 | 1000      | 36.85 | 2400               | 61.42 | 1870                                   | 47.24 |



※ The FEED, in long &amp; extra long types, should be reduced by around 50%

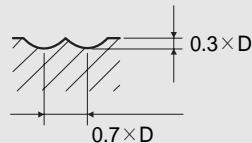
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# CARBIDE

## 2 FLUTE, BALL NOSE

### E5249, E5014, E5018, E5251 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CAST IRON |       | ALUMINUM ALLOYS |       |
|----------|--|------|--|------|-----------|-------|-----------------|-------|
| HARDNESS | ~HRc30                                       |      | HRc30 ~ HRc40                                |      |           |       |                 |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |           |       |                 |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM       | FEED  | RPM             | FEED  |
| 3/32     | 5200   | 3.54 | 4400   | 1.77 | 7300      | 5.91  | 21500           | 11.02 |
| 1/8      | 3500   | 3.94 | 2900   | 1.77 | 4900      | 6.30  | 14300           | 11.02 |
| 5/32     | 2600   | 3.94 | 2100   | 1.77 | 3600      | 7.87  | 10900           | 11.02 |
| 3/16     | 2100   | 4.13 | 1700   | 1.77 | 2900      | 9.06  | 8800            | 12.99 |
| 1/4      | 1700   | 3.94 | 1430   | 1.77 | 2400      | 9.84  | 7260            | 12.99 |
| 5/16     | 1270   | 3.74 | 1100   | 1.77 | 1800      | 12.60 | 5500            | 14.96 |
| 3/8      | 1000   | 3.74 | 870  | 1.77 | 1430      | 12.60 | 4300            | 14.96 |
| 1/2      | 870  | 3.35 | 730  | 1.77 | 1200      | 12.60 | 3600            | 17.32 |
| 9/16     | 750  | 3.35 | 620  | 1.77 | 1000      | 12.80 | 3000            | 17.32 |
| 5/8      | 650  | 3.35 | 540  | 1.77 | 920       | 12.80 | 2700            | 14.96 |
| 11/16    | 580  | 3.35 | 480  | 1.77 | 810       | 12.80 | 2400            | 14.96 |
| 13/16    | 500  | 3.35 | 430  | 1.77 | 730       | 11.42 | 2100            | 14.96 |



\*The FEED, in long & extra long types, should be reduced by around 50%

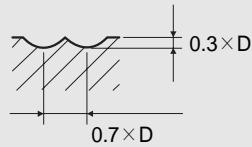
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# CARBIDE

## 2 FLUTE, BALL NOSE, TiAIN "F" COATED

### EH249, EH014, EH018, EH251 Series

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CAST IRON |       | ALUMINUM ALLOYS |       |
|----------|--|------|--|------|-----------|-------|-----------------|-------|
| HARDNESS | ~HRc30                                       |      | HRc30 ~ HRc40                                |      |           |       |                 |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |           |       |                 |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM       | FEED  | RPM             | FEED  |
| 3/32     | 8110   | 5.66 | 6840   | 2.83 | 11400     | 9.44  | 33600           | 17.00 |
| 1/8      | 5400   | 6.14 | 4560   | 2.83 | 7680      | 9.92  | 22320           | 17.00 |
| 5/32     | 4080   | 6.14 | 3240   | 2.83 | 5640      | 12.29 | 16800           | 17.00 |
| 3/16     | 3240   | 6.37 | 2640   | 2.83 | 4560      | 14.17 | 13200           | 20.32 |
| 1/4      | 2640   | 6.14 | 2270   | 2.83 | 3720      | 15.59 | 11280           | 20.32 |
| 5/16     | 1920   | 5.66 | 1680   | 2.83 | 2760      | 19.85 | 8640            | 23.15 |
| 3/8      | 1560   | 5.66 | 1320   | 2.83 | 1680      | 19.85 | 6720            | 23.15 |
| 1/2      | 1320   | 5.20 | 1140   | 2.83 | 1920      | 19.85 | 5640            | 26.93 |
| 9/16     | 1180   | 5.20 | 960  | 2.83 | 1560      | 19.85 | 4680            | 26.93 |
| 5/8      | 1020   | 5.20 | 840  | 2.83 | 1440      | 19.85 | 4200            | 23.15 |
| 11/16    | 900  | 5.20 | 740  | 2.83 | 1200      | 19.85 | 3720            | 23.15 |
| 13/16    | 780  | 5.20 | 670  | 2.83 | 1140      | 17.96 | 3240            | 23.15 |

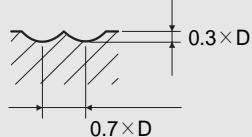


\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**CARBIDE****4 FLUTE, BALL NOSE****E5250, E5060, E5062, E5252 Series**

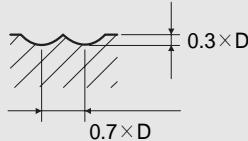
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CAST IRON |       | ALUMINUM ALLOYS |       |
|----------|--|------|--|------|-----------|-------|-----------------|-------|
| HARDNESS | ~HRc30                                       |      | HRc30 ~ HRc40                                |      |           |       |                 |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |           |       |                 |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM       | FEED  | RPM             | FEED  |
| 3/32     | 5200   | 5.51 | 4400   | 2.76 | 7300      | 9.06  | 21500           | 16.54 |
| 1/8      | 3500   | 5.91 | 2900   | 2.76 | 4900      | 9.45  | 14300           | 16.54 |
| 5/32     | 2600   | 5.91 | 2100   | 2.76 | 3600      | 11.81 | 10900           | 16.54 |
| 3/16     | 2100   | 6.30 | 1700   | 2.76 | 2900      | 13.78 | 8800            | 19.69 |
| 1/4      | 1700   | 5.91 | 1430   | 2.76 | 2400      | 14.96 | 7260            | 19.69 |
| 5/16     | 1270   | 5.52 | 1100   | 2.76 | 1800      | 18.90 | 5500            | 22.44 |
| 3/8      | 1000   | 5.52 | 870  | 2.76 | 1430      | 18.90 | 4300            | 22.44 |
| 1/2      | 870  | 5.12 | 730  | 2.76 | 1200      | 18.90 | 3600            | 25.98 |
| 9/16     | 750  | 5.12 | 620  | 2.76 | 1000      | 19.29 | 3000            | 25.98 |
| 5/8      | 650  | 5.12 | 540  | 2.76 | 920       | 19.29 | 2700            | 22.44 |
| 11/16    | 580  | 5.12 | 480  | 2.76 | 810       | 19.29 | 2400            | 22.44 |
| 13/16    | 500  | 5.12 | 430  | 2.76 | 730       | 17.29 | 2100            | 22.44 |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**CARBIDE****4 FLUTE, BALL NOSE, TiAIN "F"COATED****EH250, EH060, EH062, EH252 Series**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CAST IRON |       | ALUMINUM ALLOYS |       |
|----------|--|------|--|------|-----------|-------|-----------------|-------|
| HARDNESS | ~HRc30                                       |      | HRc30 ~ HRc40                                |      |           |       |                 |       |
| STRENGTH | ~1000N/mm <sup>2</sup>                       |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |           |       |                 |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM       | FEED  | RPM             | FEED  |
| 3/32     | 8110   | 8.51 | 6840   | 4.25 | 11400     | 14.17 | 33600           | 25.98 |
| 1/8      | 5400   | 9.44 | 4560   | 4.25 | 7680      | 14.64 | 22320           | 25.98 |
| 5/32     | 4080   | 9.44 | 3240   | 4.25 | 5640      | 18.42 | 16800           | 25.98 |
| 3/16     | 3240   | 9.92 | 2640   | 4.25 | 4560      | 21.26 | 13200           | 30.71 |
| 1/4      | 2640   | 9.44 | 2270   | 4.25 | 3720      | 23.15 | 11280           | 30.71 |
| 5/16     | 1920   | 8.51 | 1680   | 4.25 | 2760      | 29.30 | 8640            | 34.96 |
| 3/8      | 1560   | 8.51 | 1320   | 4.25 | 2270      | 29.30 | 6720            | 34.96 |
| 1/2      | 1320   | 8.03 | 1140   | 4.25 | 1920      | 29.30 | 5640            | 40.62 |
| 9/16     | 1180   | 8.03 | 960  | 4.25 | 1560      | 30.23 | 4680            | 40.62 |
| 5/8      | 1020   | 8.03 | 840  | 4.25 | 1440      | 30.23 | 4200            | 34.96 |
| 11/16    | 900  | 8.03 | 740  | 4.25 | 1200      | 30.23 | 3720            | 34.96 |
| 13/16    | 780  | 8.03 | 670  | 4.25 | 1140      | 26.93 | 3240            | 34.96 |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

|   | Titanium Nitride                  | Titanium Carbonitride  | Super TiAlN "F" Coatings   | Super TiAlN "E" Coatings   |
|---|-----------------------------------|--|--|--|
| <b>Hardness</b>   | 82 Rc                             | 92 Rc  | 92 Rc  | 95 Rc  |
| <b>Coefficient of Friction Against Dry Steel (.8)</b>   | .4                                | .4   | .4   | .4   |
| <b>Coating Thickness<br/>3 Microns = .0001</b>  | 1- 4                              | 1- 4   | 1- 5   | 1- 3   |
| <b>Maximum Working Temperature</b>  | 1100 F                            | 750 F  | 1470 F   | 1470 F   |
| <b>Coating Color</b>  | Gold                              | Blue - Gray  | Violet - Gray  | Violet - Gray  |
| <b>Key Characteristics</b>  | Good General Purpose              | Good Wear Resistance<br>Good Toughness<br>Moderate Heat Resistance | Enhanced Toughness<br>High Heat Resistance   | High Hardness<br>Enhanced Toughness<br>High Heat Resistance  |
| <b>Primary Applications</b>   | Machining of Iron Based Materials | General Machining of Various Materials                             | Steel,<br>Cast Iron,<br>Stainless,<br>Nickel Based Alloys,<br>High Temp and Titanium Alloys,<br>High Speed Machining Wet, Dry, or Semi Dry Condition | Hardened Workpieces,<br>Steel, Cast Iron, Stainless,<br>Nickel Based Alloys,<br>High Temp and Titanium Alloys, Machining Wet, Dry, or Semi Dry Condition |
| <b>YG:TYLON SUPER TiAlN COATED TOOLS CAN BE RUN 20% - 50% FASTER THAN TiN or TiCN ON MOST MATERIALS</b> |                                   |  |  |  |

# TANK POWER

The Next Generation  
of Powered Metal End Mills

- **HIGHER EDGE STRENGTH & FEED RATES**





# TANK-POWER & POWDERED METAL END MILLS SELECTION GUIDE

## TANK-POWER

| EDP No. | APPEARANCE | SPECIFICATION   | PAGE |
|---------|------------|---|------|
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| E9984   |            | 2 FLUTE, REGULAR LENGTH, DOUBLE                                   | 188  |
| E9985   |            | 4 FLUTE, REGULAR LENGTH   | 189  |
| E9986   |            | 4 FLUTE, REGULAR LENGTH, DOUBLE                                   | 190  |
| E9988   |            | 3&4 FLUTE, 60° HELIX, REGULAR LENGTH                              | 191  |
| E9992   |            | 2 FLUTE, REGULAR LENGTH, BALL NOSE                                | 192  |
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## POWDERED METAL

| EDP No. | APPEARANCE | SPECIFICATION  | PAGE |
|---------|------------|--|------|
| E3086   |            | PM, MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING    | 198  |
| E3085   |            | PM, MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING | 198  |
| E3079   |            | PM, MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING    | 199  |
| E3180   |            | PM, 4&5 FLUTE, REGULAR LENGTH, ROUGHING & FINISHING  | 200  |
| E3030   |            | PM, 2 FLUTE, REGULAR LENGTH                          | 201  |



# TANK-POWER & POWDERED METAL END MILLS SELECTION GUIDE

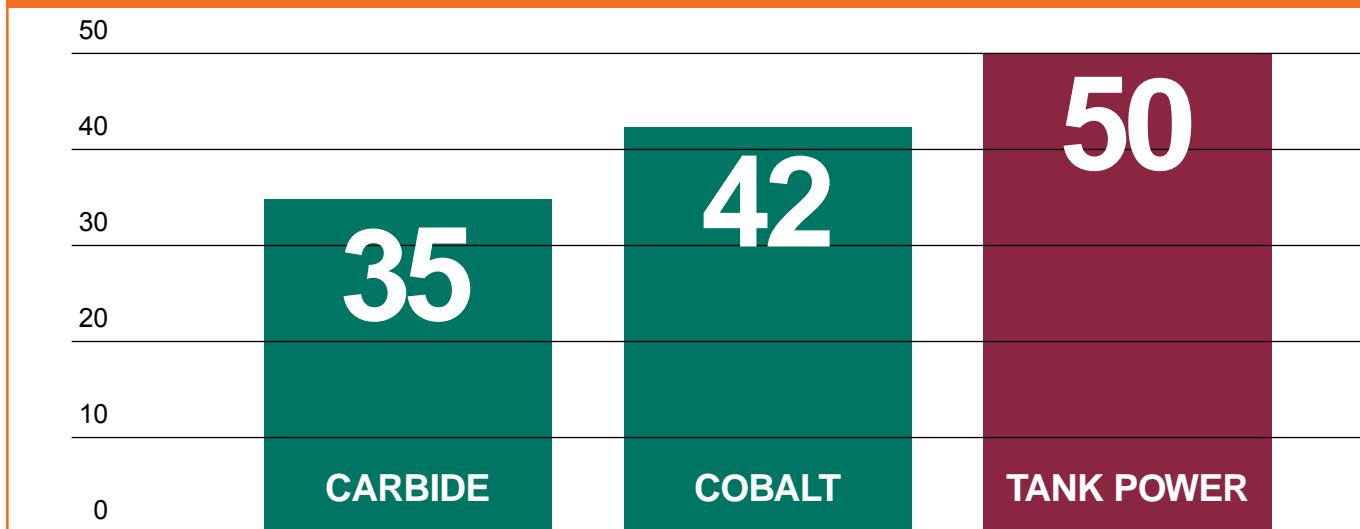
## POWDERED METAL

| EDP No. | APPERANCE | SPECIFICATION   | STOCK | PAGE |
|---------|-----------|---|-------|------|
| E3050   |           | PM, 2 FLUTE, REGULAR LENGTH, DOUBLE   |       | 202  |
| E3039   |           | PM, 4 FLUTE, REGULAR LENGTH   |       | 203  |
| E3053   |           | PM, 4 FLUTE, REGULAR LENGTH, DOUBLE   |       | 204  |
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| EK192   |           | T15, 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING for ALUMINUM                       |       | 208  |
| EK196   |           | 3 FLUTE BALL NOSE, 42° HELIX ROUGHING BALL NOSE REGULAR LENGTH FOR ALUMINUM       |       | 209  |
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| EK194   |           | 3 FLUTE FINISHING WITH CORNER RADIUS & WITHOUT CORNER RADIUS END MEDIUM LENGTH    |       | 210  |
| EK195   |           | 3 FLUTE FINISHING WITH CORNER RADIUS & WITHOUT CORNER RADIUS END LONG LENGTH      |       | 210  |
| EP922   |           | YPM, 3 FLUTE, 42° HELIX, SHORT LENGTH, ROUGHING for ALUMINUM - METRIC             |       | 211  |
| EP924   |           | YPM, 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING for ALUMINUM - METRIC              |       | 211  |

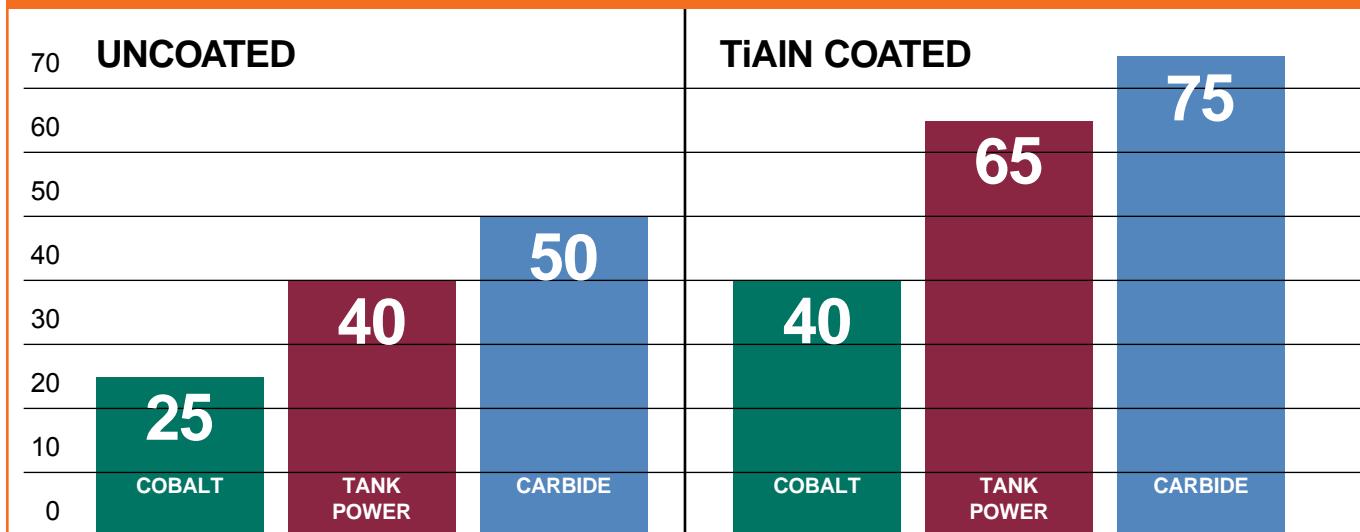
SPEED & FEED DATA

212 ~ 218

# TOUGHNESS VALUE AND EDGE STRENGTH



## APPROXIMATE WEAR VALUES

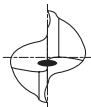


### WHEN TO USE TANK POWER

- Cobalt Tools Wear Rapidly
- Carbide Tools Chip or Break
- Higher Feed Rates Desired

### MATERIALS SUCCESSFULLY MACHINED...up to Rc45

- Alloy and Tool Steels
- Stainless Steels
- Titanium
- Nickel Based Alloys

**TANK-POWER****2 FLUTE, REGULAR LENGTH**

YPM

2

30°

FLAT

DATA

P.213

► Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

◇ U.S.A Stock

**E9983, E9983TF Series**

Unit : inch

| EDP No.  |                   | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|-------------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TANK-POWER COATED |                  |                   |                  |                   |
| E9983008 | E9983008TF        | 1/8              | 3/8               | 3/8              | 2-5/16            |
| E9983012 | E9983012TF        | 3/16             | 3/8               | 7/16             | 2-5/16            |
| E9983016 | E9983016TF        | 1/4              | 3/8               | 1/2              | 2-5/16            |
| E9983020 | E9983020TF        | 5/16             | 3/8               | 9/16             | 2-5/16            |
| E9983024 | E9983024TF        | 3/8              | 3/8               | 9/16             | 2-5/16            |
| E9983032 | E9983032TF        | 1/2              | 1/2               | 1                | 3                 |
| E9983040 | E9983040TF        | 5/8              | 5/8               | 1-5/16           | 3-7/16            |
| E9983048 | E9983048TF        | 3/4              | 3/4               | 1-5/16           | 3-7/16            |
| E9983056 | E9983056TF        | 7/8              | 7/8               | 1-1/2            | 3-3/4             |
| E9983064 | E9983064TF        | 1                | 1                 | 1-5/8            | 4-1/8             |

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| - .0000 | - .0000     |

\*\*The shank of end mills is the same diameter as the cutting portion.



## 2 FLUTE, REGULAR LENGTH, DOUBLE



P.213

► Series E9984, E9984 two flute, end mills are the double end version of E9983, E9983 single-end tools. Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

◇ U.S.A Stock

### E9984, E9984TF Series

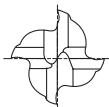
Unit : inch

| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|-------------------|---------------|----------------|---------------|----------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |
| E9984008 | E9984008TF        | 1/8           | 3/8            | 3/8           | 3-1/16         |
| E9984012 | E9984012TF        | 3/16          | 3/8            | 7/16          | 3-1/8          |
| E9984016 | E9984016TF        | 1/4           | 3/8            | 1/2           | 3-1/8          |
| E9984020 | E9984020TF        | 5/16          | 3/8            | 9/16          | 3-1/8          |
| E9984024 | E9984024TF        | 3/8           | 3/8            | 9/16          | 3-1/8          |
| E9984032 | E9984032TF        | 1/2           | 1/2            | 13/16         | 3-3/4          |
| E9984040 | E9984040TF        | 5/8           | 5/8            | 1-1/8         | 4-1/2          |
| E9984048 | E9984048TF        | 3/4           | 3/4            | 1-5/16        | 5              |
| E9984056 | E9984056TF        | 7/8           | 7/8            | 1-9/16        | 5-1/2          |
| E9984064 | E9984064TF        | 1             | 1              | 1-5/8         | 5-7/8          |

#### TOLERANCE OF MILL DIA.

|             |                 |
|-------------|-----------------|
| 0<br>-.0010 | * * 0<br>-.0020 |
|-------------|-----------------|

\*\*The shank of end mills is the same diameter as the cutting portion.

**TANK-POWER****4 FLUTE, REGULAR LENGTH**

YPM

4

30°

FLAT

DATA

P.213

► Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

◇ U.S.A Stock

**E9985, E9985TF Series**

Unit : inch

| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|-------------------|---------------|----------------|---------------|----------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |
| E9985008 | E9985008TF        | 1/8           | 3/8            | 3/8           | 2-5/16         |
| E9985012 | E9985012TF        | 3/16          | 3/8            | 1/2           | 2-3/8          |
| E9985016 | E9985016TF        | 1/4           | 3/8            | 5/8           | 2-7/16         |
| E9985020 | E9985020TF        | 5/16          | 3/8            | 3/4           | 2-1/2          |
| E9985024 | E9985024TF        | 3/8           | 3/8            | 3/4           | 2-1/2          |
| E9985032 | E9985032TF        | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| E9985040 | E9985040TF        | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| E9985048 | E9985048TF        | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| E9985056 | E9985056TF        | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| E9985064 | E9985064TF        | 1             | 1              | 2             | 4-1/2          |

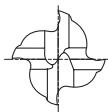
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\*The shank of end mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE



P.213

► Series E9986,EP986 four flute end mills are the double end version of E9985,EP985 single-end tools. Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

◇ U.S.A Stock

## E9986, E9986TF Series

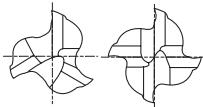
Unit : inch

| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|-------------------|---------------|----------------|---------------|----------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |
| E9986008 | E9986008TF        | 1/8           | 3/8            | 3/8           | 3-1/16         |
| E9986012 | E9986012TF        | 3/16          | 3/8            | 1/2           | 3-1/4          |
| E9986016 | E9986016TF        | 1/4           | 3/8            | 5/8           | 3-3/8          |
| E9986020 | E9986020TF        | 5/16          | 3/8            | 3/4           | 3-1/2          |
| E9986024 | E9986024TF        | 3/8           | 3/8            | 3/4           | 3-1/2          |
| E9986032 | E9986032TF        | 1/2           | 1/2            | 1             | 4-1/8          |
| E9986040 | E9986040TF        | 5/8           | 5/8            | 1-3/8         | 5              |
| E9986048 | E9986048TF        | 3/4           | 3/4            | 1-5/8         | 5-5/8          |
| E9986056 | E9986056TF        | 7/8           | 7/8            | 1-7/8         | 6-1/8          |
| E9986064 | E9986064TF        | 1             | 1              | 1-7/8         | 6-3/8          |

### TOLERANCE OF MILL DIA.

|             |                 |
|-------------|-----------------|
| 0<br>-.0010 | * * 0<br>-.0020 |
|-------------|-----------------|

\*\*The shank of end mills is the same diameter as the cutting portion.

**TANK-POWER****3&4 FLUTE, 60° HELIX, REGULAR LENGTH**

P.214

► Faster feed & speed than normal HSS can be applied to hardened steels up to Rc 45. Accordingly, YPM made by powder metallurgy makes much higher productivity possible.

◇ U.S.A Stock

**E9988, E9988TF Series**

Unit : inch

| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|---------------|----------------|---------------|----------------|--------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |              |
| E9988016 | E9988016TF        | 1/4           | 3/8            | 5/8           | 2-7/16         | 3            |
| E9988020 | E9988020TF        | 5/16          | 3/8            | 3/4           | 2-1/2          | 3            |
| E9988024 | E9988024TF        | 3/8           | 3/8            | 3/4           | 2-1/2          | 3            |
| E9988028 | E9988028TF        | 7/16          | 3/8            | 1             | 2-11/16        | 3            |
| E9988032 | E9988032TF        | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 3            |
| E9988040 | E9988040TF        | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 3            |
| E9988048 | E9988048TF        | 3/4           | 3/4            | 1-5/8         | 3-7/8          | 3            |
| E9988901 | E9988901TF        | 7/8           | 3/4            | 1-7/8         | 4-1/8          | 4            |
| E9988056 | E9988056TF        | 7/8           | 7/8            | 1-7/8         | 4-1/8          | 4            |
| E9988064 | E9988064TF        | 1             | 1              | 2             | 4-1/2          | 4            |

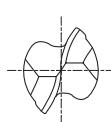
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\*The shank of end mills is the same diameter as the cutting portion.



## 2 FLUTE, REGULAR LENGTH, BALL NOSE



P.215

► The two flute ball end mills are designed for milling of radius bottom slots, fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut. The two flute design provides good chip removal ability in slotting.

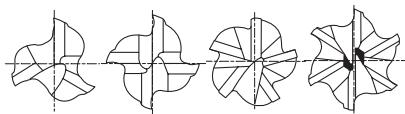
◇ U.S.A Stock

### E9992, E9992TF Series

Unit : inch

| EDP No.  |                   | R<br>±.001 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|-------------------|------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TANK-POWER COATED |            |                  |                   |                  |                   |
| E9992008 | E9992008TF        | R1/16      | 1/8              | 3/8               | 3/8              | 2-5/16            |
| E9992012 | E9992012TF        | R3/32      | 3/16             | 3/8               | 1/2              | 2-3/8             |
| E9992016 | E9992016TF        | R1/8       | 1/4              | 3/8               | 5/8              | 2-7/16            |
| E9992020 | E9992020TF        | R5/32      | 5/16             | 3/8               | 3/4              | 2-1/2             |
| E9992024 | E9992024TF        | R3/16      | 3/8              | 3/8               | 3/4              | 2-1/2             |
| E9992032 | E9992032TF        | R1/4       | 1/2              | 1/2               | 1                | 3                 |
| E9992040 | E9992040TF        | R5/16      | 5/8              | 5/8               | 1-3/8            | 3-1/2             |
| E9992048 | E9992048TF        | R3/8       | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| E9992056 | E9992056TF        | R7/16      | 7/8              | 7/8               | 2                | 4-1/4             |
| E9992064 | E9992064TF        | R1/2       | 1                | 1                 | 2-1/4            | 4-3/4             |

|                           |             |
|---------------------------|-------------|
| TOLERANCE<br>OF MILL DIA. | 0<br>-.0015 |
|---------------------------|-------------|

**TANK-POWER****MULTI FLUTE, REGULAR LENGTH,  
FINE PITCH ROUGHING**

P.214

► This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

◇ U.S.A Stock

**E9990, E9990TF Series**

Unit : inch

| EDP No.  |                   | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------|-------------------|------------------|-------------------|------------------|-------------------|-----------------|
| UNCOATED | TANK-POWER COATED |                  |                   |                  |                   |                 |
| E9990016 | E9990016TF        | 1/4              | 3/8               | 5/8              | 2-7/16            | 3               |
| E9990907 | E9990907TF        | 1/4              | 3/8               | 1-1/8            | 2-15/16           | 3               |
| E9990020 | E9990020TF        | 5/16             | 3/8               | 3/4              | 2-1/2             | 3               |
| E9990024 | E9990024TF        | 3/8              | 3/8               | 3/4              | 2-1/2             | 4               |
| E9990028 | E9990028TF        | 7/16             | 3/8               | 1"               | 2-11/16           | 4               |
| E9990032 | E9990032TF        | 1/2              | 1/2               | 1-1/4            | 3-1/4             | 4               |
| E9990908 | E9990908TF        | 1/2              | 1/2               | 1-5/8            | 3-5/8             | 4               |
| E9990036 | E9990036TF        | 9/16             | 1/2               | 1-3/8            | 3-3/8             | 4               |
| E9990040 | E9990040TF        | 5/8              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| E9990048 | E9990048TF        | 3/4              | 3/4               | 1-5/8            | 3-7/8             | 4               |
| E9990948 | E9990948TF        | 3/4              | 5/8               | 1-5/8            | 3-7/8             | 4               |
| E9990909 | E9990909TF        | 3/4              | 3/4               | 2-1/2            | 4-3/4             | 4               |
| E9990056 | E9990056TF        | 7/8              | 7/8               | 1-7/8            | 4-1/8             | 5               |
| E9990901 | E9990901TF        | 7/8              | 3/4               | 1-7/8            | 4-1/8             | 5               |
| E9990064 | E9990064TF        | 1"               | 1"                | 2"               | 4-1/2             | 5               |
| E9990905 | E9990905TF        | 1"               | 1"                | 3"               | 5-1/2             | 5               |
| E9990108 | E9990108TF        | 1-1/8            | 1"                | 2"               | 4-1/2             | 6               |
| E9990116 | E9990116TF        | 1-1/4            | 1-1/4             | 2"               | 4-1/2             | 6               |
| E9990906 | E9990906TF        | 1-1/4            | 1-1/4             | 3"               | 5-1/2             | 6               |

**TOLERANCE OF MILL DIA.**

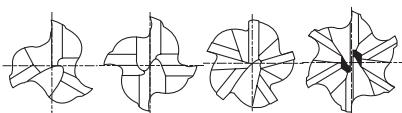
|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**TANK-POWER**

# MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING



P.213



► This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.

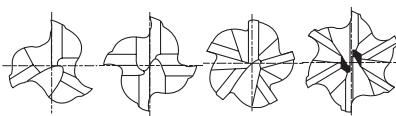
◇ U.S.A Stock

## E9991, E9991TF Series

Unit : inch

| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|---------------|----------------|---------------|----------------|--------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |              |
| E9991016 | E9991016TF        | 1/4           | 3/8            | 5/8           | 2-7/16         | 3            |
| E9991902 | E9991902TF        | 1/4           | 3/8            | 1-1/8         | 2-15/16        | 3            |
| E9991020 | E9991020TF        | 5/16          | 3/8            | 3/4           | 2-1/2          | 3            |
| E9991024 | E9991024TF        | 3/8           | 3/8            | 3/4           | 2-1/2          | 4            |
| E9991028 | E9991028TF        | 7/16          | 3/8            | 1"            | 2-11/16        | 4            |
| E9991032 | E9991032TF        | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 4            |
| E9991903 | E9991903TF        | 1/2           | 1/2            | 1-5/8         | 3-5/8          | 4            |
| E9991036 | E9991036TF        | 9/16          | 1/2            | 1-3/8         | 3-3/8          | 4            |
| E9991040 | E9991040TF        | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 4            |
| E9991048 | E9991048TF        | 3/4           | 3/4            | 1-5/8         | 3-7/8          | 4            |
| E9991948 | E9991948TF        | 3/4           | 5/8            | 1-5/8         | 3-7/8          | 4            |
| E9991904 | E9991904TF        | 3/4           | 3/4            | 2-1/2         | 4-3/4          | 4            |
| E9991056 | E9991056TF        | 7/8           | 7/8            | 1-7/8         | 4-1/8          | 5            |
| E9991901 | E9991901TF        | 7/8           | 3/4            | 1-7/8         | 4-1/8          | 5            |
| E9991064 | E9991064TF        | 1"            | 1"             | 2"            | 4-1/2          | 5            |
| E9991905 | E9991905TF        | 1"            | 1"             | 3"            | 5-1/2          | 5            |
| E9991108 | E9991108TF        | 1-1/8         | 1"             | 2"            | 4-1/2          | 6            |
| E9991116 | E9991116TF        | 1-1/4         | 1-1/4          | 2"            | 4-1/2          | 6            |
| E9991906 | E9991906TF        | 1-1/4         | 1-1/4          | 3"            | 5-1/2          | 6            |

TOLERANCE  
OF MILL DIA.+.0030  
0

**TANK-POWER****MULTI FLUTE, LONG LENGTH,  
FINE PITCH ROUGHING**

P.214

► This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.

◇ U.S.A Stock

**E9A86, E9A86TF Series**

Unit : inch

| EDP No.  |                   | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------|-------------------|------------------|-------------------|------------------|-------------------|-----------------|
| UNCOATED | TANK-POWER COATED |                  |                   |                  |                   |                 |
| E9A86020 | E9A86020TF        | 5/16             | 3/8               | 1-3/8            | 3-3/16            | 3               |
| E9A86024 | E9A86024TF        | 3/8              | 3/8               | 1-1/2            | 3-1/4             | 4               |
| E9A86924 | E9A86924TF        | 3/8              | 3/8               | 1-1/2            | 4                 | 4               |
| E9A86032 | E9A86032TF        | 1/2              | 1/2               | 2                | 4                 | 4               |
| E9A86040 | E9A86040TF        | 5/8              | 5/8               | 2-1/2            | 4-5/8             | 4               |
| E9A86048 | E9A86048TF        | 3/4              | 5/8               | 3                | 5-1/8             | 4               |
| E9990902 | E9990902TF        | 3/4              | 3/4               | 3                | 5-1/4             | 4               |
| E9A86056 | E9A86056TF        | 7/8              | 3/4               | 3-1/2            | 5-3/4             | 5               |
| E9A86956 | E9A86956TF        | 7/8              | 7/8               | 3-1/2            | 5-3/4             | 5               |
| E9990903 | E9990903TF        | 1                | 1                 | 4                | 6-1/2             | 5               |
| E9A86116 | E9A86116TF        | 1-1/4            | 3/4               | 4                | 6-1/4             | 6               |
| E9990904 | E9990904TF        | 1-1/4            | 1-1/4             | 4                | 6-1/2             | 6               |

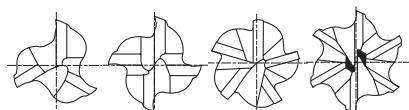
|                           |              |
|---------------------------|--------------|
| TOLERANCE<br>OF MILL DIA. | + .0030<br>0 |
|---------------------------|--------------|

**TANK-POWER**

# MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING



P.214



► This TANK-POWER rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths.

◇ U.S.A Stock

## E9A87, E9A87TF Series

Unit : inch

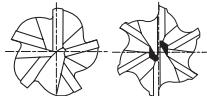
| EDP No.  |                   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|----------|-------------------|---------------|----------------|---------------|----------------|--------------|
| UNCOATED | TANK-POWER COATED |               |                |               |                |              |
| E9A87020 | E9A87020TF        | 5/16          | 3/8            | 1-3/8         | 3-3/16         | 3            |
| E9A87024 | E9A87024TF        | 3/8           | 3/8            | 1-1/2         | 3-1/4          | 4            |
| E9A87924 | E9A87924TF        | 3/8           | 3/8            | 1-1/2         | 4              | 4            |
| E9A87032 | E9A87032TF        | 1/2           | 1/2            | 2             | 4              | 4            |
| E9A87040 | E9A87040TF        | 5/8           | 5/8            | 2-1/2         | 4-5/8          | 4            |
| E9A87048 | E9A87048TF        | 3/4           | 5/8            | 3             | 5-1/8          | 4            |
| E9A87948 | E9A87948TF        | 3/4           | 3/4            | 3             | 5-1/4          | 4            |
| E9A87056 | E9A87056TF        | 7/8           | 3/4            | 3-1/2         | 5-3/4          | 5            |
| E9A87956 | E9A87956TF        | 7/8           | 7/8            | 3-1/2         | 5-3/4          | 5            |
| E9A87064 | E9A87064TF        | 1             | 1              | 4             | 6-1/2          | 5            |
| E9A87116 | E9A87116TF        | 1-1/4         | 3/4            | 4             | 6-1/4          | 6            |
| E9A87917 | E9A87917TF        | 1-1/4         | 1-1/4          | 4             | 6-1/2          | 6            |

**TANK-POWER**

# MULTI FLUTE FINE PITCH ROUGHING EXTENDED NECK, CENTER CUTTING



P.212



► High performance metal removal in Titanium

► Corner radius against chipping

◇ U.S.A Stock

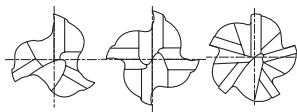
**E9921 Series**

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiAIN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | REACH<br>EXTENDED<br>NECK | OVERALL<br>LENGTH | NO.OF<br>FLUTE |
|---------------------|-------------------------|------------------|-------------------|------------------|---------------------------|-------------------|----------------|
| EP20322             | EP20322F                | 1/2              | 1/2               | 1 1/4            | 3                         | 5                 | 5              |
| EP20402             | EP20402F                | 5/8              | 5/8               | 1 5/8            | 4                         | 6 1/8             | 5              |
| EP20482             | EP20482F                | 3/4              | 3/4               | 1 5/8            | 4                         | 6 1/4             | 5              |
| EP20484             | EP20484F                | 3/4              | 3/4               | 1 5/8            | 6                         | 8 1/4             | 5              |
| EP20642             | EP20642F                | 1                | 1                 | 2                | 4                         | 6 1/2             | 6              |
| EP20643             | EP20643F                | 1                | 1                 | 2                | 6                         | 8 1/2             | 6              |
| EP21161             | EP21161F                | 1 1/4            | 1 1/4             | 2                | 4                         | 6 1/2             | 6              |
| EP21162             | EP21162F                | 1 1/4            | 1 1/4             | 2                | 6                         | 8 1/2             | 6              |

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**POWDERED  
METAL****MULTI FLUTE, STUB & REGULAR LENGTH,  
FINE PITCH ROUGHING**

P.218

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

► Suitable for high-feed roughing milling.

◇ U.S.A Stock

TANK-POWER &amp; ADDITIONAL POWDERED METAL

**E3086 Series**

■ STUB LENGTH

Unit : inch

| EDP No.  |              | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO.OF FLUTE |
|----------|--------------|---------------|----------------|---------------|----------------|-------------|
| UNCOATED | TiAIN COATED |               |                |               |                |             |
| 75507    | 75507 PE     | 1/4           | 3/8            | 1/4           | 2-1/16         | 3           |
| 75511    | 75511 PE     | 3/8           | 3/8            | 3/8           | 2-5/32         | 3           |
| 75515    | 75515 PE     | 1/2           | 1/2            | 1/2           | 2-1/2          | 3           |
| 75519    | 75519 PE     | 5/8           | 5/8            | 5/8           | 2-3/4          | 3           |
| 75524    | 75524 PE     | 3/4           | 3/4            | 3/4           | 2-7/8          | 3           |
| 75529    | 75529 PE     | 7/8           | 3/4            | 7/8           | 3-1/8          | 3           |
| 75540    | 75540 PE     | 1             | 1              | 1             | 3-1/2          | 3           |

**E3085 Series**

■ REGULAR LENGTH

Unit : inch

| EDP No.  |              | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO.OF FLUTE |
|----------|--------------|---------------|----------------|---------------|----------------|-------------|
| UNCOATED | TiAIN COATED |               |                |               |                |             |
| 77507    | 77507 PE     | 1/4           | 3/8            | 5/8           | 2-7/16         | 3           |
| 77511    | 77511 PE     | 3/8           | 3/8            | 3/4           | 2-1/2          | 4           |
| 77515    | 77515 PE     | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 4           |
| 77519    | 77519 PE     | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 4           |
| 77524    | 77524 PE     | 3/4           | 3/4            | 1-5/8         | 3-7/8          | 4           |
| 77529    | 77529 PE     | 7/8           | 3/4            | 1-7/8         | 4-1/8          | 5           |
| 77540    | 77540 PE     | 1             | 1              | 2             | 4-1/2          | 5           |

■ Coating Codes for Powdered Metal Tools(PM)

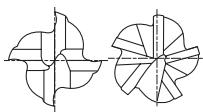
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAIN F), PE(TiAIN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

|                        |              |
|------------------------|--------------|
| TOLERANCE OF MILL DIA. | + .0030<br>0 |
|------------------------|--------------|

**POWDERED  
METAL**

## MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING



P.218

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

► Suitable for high-feed roughing milling.

◇ U.S.A Stock

### E3079 Series

Unit : inch

| EDP No.  |              | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO.OF<br>FLUTE |
|----------|--------------|------------------|-------------------|------------------|-------------------|----------------|
| UNCOATED | TiAIN COATED |                  |                   |                  |                   |                |
| 78507    | 78507 PE     | 1/4              | 3/8               | 1-1/4            | 3-1/16            | 4              |
| 78511    | 78511 PE     | 3/8              | 3/8               | 1-1/2            | 3-1/8             | 4              |
| 78515    | 78515 PE     | 1/2              | 1/2               | 2                | 4                 | 4              |
| 78519    | 78519 PE     | 5/8              | 5/8               | 2-1/2            | 4-5/8             | 4              |
| 78524    | 78524 PE     | 3/4              | 3/4               | 3                | 5-1/4             | 4              |
| 78529    | 78529 PE     | 7/8              | 7/8               | 3-1/2            | 5-3/4             | 5              |
| 78540    | 78540 PE     | 1                | 1                 | 4                | 6-1/2             | 5              |

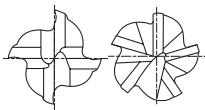
■ Coating Codes for Powdered Metal Tools(PM)

Uncoated EDP No. + PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

TOLERANCE  
OF MILL DIA.

+ .0030  
0

**POWDERED  
METAL****4&5 FLUTE, REGULAR LENGTH,  
ROUGHING & FINISHING**

P.218

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

► Suitable for high-feed roughing milling.

◇ U.S.A Stock

**E3180 Series**

Unit : inch

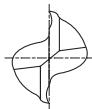
| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO.OF FLUTE |
|---------|---------------|----------------|---------------|----------------|-------------|
| 79507   | 1/4           | 3/8            | 5/8           | 2-7/16         | 4           |
| 79511   | 3/8           | 3/8            | 3/4           | 2-1/2          | 4           |
| 79515   | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 4           |
| 79519   | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 4           |
| 79524   | 3/4           | 3/4            | 1-5/8         | 3-3/4          | 4           |
| 79529   | 7/8           | 3/4            | 1-7/8         | 4-1/8          | 5           |
| 79540   | 1             | 1              | 2             | 4-1/2          | 5           |

- The TiN coated, TiCN Coated or TiAlN coated is available on your request.
- Coating Codes for Powdered Metal Tools(PM)  
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)
- Coated Price Shown in Price List, Call for Availability

|                           |                    |
|---------------------------|--------------------|
| TOLERANCE<br>OF MILL DIA. | + .0025<br>— .0005 |
|---------------------------|--------------------|

**POWDERED  
METAL**

## 2 FLUTE, REGULAR LENGTH



P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ U.S.A Stock

### E3030(P2SRS) Series

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 01503   | P2SRS-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 01505   | P2SRS-1203 | 3/16          | 3/8            | 7/16          | 2-5/16         |
| 01507   | P2SRS-1603 | 1/4           | 3/8            | 1/2           | 2-5/16         |
| 01509   | P2SRS-2003 | 5/16          | 3/8            | 9/16          | 2-5/16         |
| 01511   | P2SRS-2403 | 3/8           | 3/8            | 9/16          | 2-5/16         |
| 01515   | P2SRS-3204 | 1/2           | 1/2            | 1             | 3              |
| 01519   | P2SRS-4005 | 5/8           | 5/8            | 1-5/16        | 3-7/16         |
| 01524   | P2SRS-4806 | 3/4           | 3/4            | 1-5/16        | 3-7/16         |
| 01530   | P2SRS-5607 | 7/8           | 7/8            | 1-1/2         | 3-3/4          |
| 01540   | P2SRS-6408 | 1             | 1              | 1-5/8         | 4-1/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Powdered Metal Tools(PM)

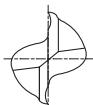
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED  
METAL****2 FLUTE, REGULAR LENGTH, DOUBLE**

P.217

► Series P2DRS two flute end mills are the double end version of P2SRS single-end tools. Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ **U.S.A Stock**

**E3050(P2DRS) Series**

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 11503   | P2DRS-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 11505   | P2DRS-1203 | 3/16          | 3/8            | 7/16          | 3-1/8          |
| 11507   | P2DRS-1603 | 1/4           | 3/8            | 1/2           | 3-1/8          |
| 11509   | P2DRS-2003 | 5/16          | 3/8            | 9/16          | 3-1/8          |
| 11511   | P2DRS-2403 | 3/8           | 3/8            | 9/16          | 3-1/8          |
| 11515   | P2DRS-3204 | 1/2           | 1/2            | 13/16         | 3-3/4          |
| 11519   | P2DRS-4005 | 5/8           | 5/8            | 1-1/8         | 4-1/2          |
| 11524   | P2DRS-4806 | 3/4           | 3/4            | 1-5/16        | 5              |
| 11530   | P2DRS-5607 | 7/8           | 7/8            | 1-9/16        | 5-1/2          |
| 11540   | P2DRS-6408 | 1             | 1              | 1-5/8         | 5-7/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Powdered Metal Tools(PM)

Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

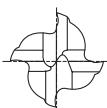
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| 0       | * * — .0002 |
| — .0010 | — .0015     |

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED  
METAL**

## 4 FLUTE, REGULAR LENGTH



P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRC 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ U.S.A Stock

### E3039(P4SRC) Series

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 07503   | P4SRC-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 07505   | P4SRC-1203 | 3/16          | 3/8            | 1/2           | 2-3/8          |
| 07507   | P4SRC-1603 | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 07509   | P4SRC-2003 | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 07511   | P4SRC-2403 | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 07515   | P4SRC-3204 | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 07519   | P4SRC-4005 | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 07524   | P4SRC-4806 | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 07530   | P4SRC-5607 | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 07540   | P4SRC-6408 | 1             | 1              | 2             | 4-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Powdered Metal Tools(PM)

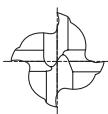
Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED  
METAL****4 FLUTE, REGULAR LENGTH, DOUBLE**

P.217

► Series P4DRC four flute end mills are the double end version of P4SRC single-end tools. Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ ***U.S.A Stock***

**E3053(P4DRC) Series**

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 13503   | P4DRC-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 13505   | P4DRC-1203 | 3/16          | 3/8            | 1/2           | 3-1/4          |
| 13507   | P4DRC-1603 | 1/4           | 3/8            | 5/8           | 3-3/8          |
| 13509   | P4DRC-2003 | 5/16          | 3/8            | 3/4           | 3-1/2          |
| 13511   | P4DRC-2403 | 3/8           | 3/8            | 3/4           | 3-1/2          |
| 13515   | P4DRC-3204 | 1/2           | 1/2            | 1             | 4-1/8          |
| 13519   | P4DRC-4005 | 5/8           | 5/8            | 1-3/8         | 5              |
| 13524   | P4DRC-4806 | 3/4           | 3/4            | 1-5/8         | 5-5/8          |
| 13530   | P4DRC-5607 | 7/8           | 7/8            | 1-7/8         | 6-1/8          |
| 13540   | P4DRC-6408 | 1             | 1              | 1-7/8         | 6-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Powdered Metal Tools(PM)

Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

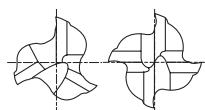
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| 0       | * * — .0002 |
| — .0010 | — .0015     |

\*\*The shank of end mills is the same diameter as the cutting portion.

**POWDERED  
METAL**

## 3&4 FLUTE, 60° HELIX, REGULAR LENGTH



P.217

► Faster feed & speed than normal HSS can be applied to even hardened steels over HRc 35. Accordingly, powdered metallurgy makes much higher productivity possible.

◇ U.S.A Stock

### E3120(P3SRH) Series

■ 3 FLUTE

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 20507   | P3SRH-1603 | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 20509   | P3SRH-2003 | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 20511   | P3SRH-2403 | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 20513   | P3SRH-2803 | 7/16          | 3/8            | 1             | 2-11/16        |
| 20515   | P3SRH-3204 | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 20519   | P3SRH-4005 | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 20524   | P3SRH-4806 | 3/4           | 3/4            | 1-5/8         | 3-7/8          |

### E3121(P4SRH) Series

■ 4 FLUTE

Unit : inch

| EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|------------|---------------|----------------|---------------|----------------|
| 20529   | P4SRH-5606 | 7/8           | 3/4            | 1-7/8         | 4-1/8          |
| 20530   | P4SRH-5607 | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 20540   | P4SRH-6408 | 1             | 1              | 2             | 4-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Powdered Metal Tools(PM)

Uncoated EDP No. +PN (TiN), PC(TiCN), PF(TiAlN F), PE(TiAlN E), PH(Hardslick)

► Coated Price Shown in Price List, Call for Availability

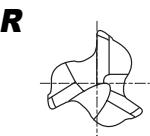
#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\*The shank of end mills is the same diameter as the cutting portion.

**SPEED  
FREEK**

# 3 FLUTE, 42° HELIX, REGULAR & MEDIUM LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM



P.212

► High performance metal removal in aluminum alloys.

► Corner radius against chipping

◇ U.S.A Stock

**EK191 Series**

## ■ REGULAR LENGTH – “Speed freek”

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 66903               | 66903 PC               | R .060                | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 66904               | 66904 PC               | R .090                | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 66905               | 66905 PC               | R .120                | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 66906               | 66906 PC               | R .060                | 1                | 1                 | 2                | 4-1/2             |
| 66907               | 66907 PC               | R .090                | 1                | 1                 | 2                | 4-1/2             |
| 66908               | 66908 PC               | R .120                | 1                | 1                 | 2                | 4-1/2             |
| 66909               | 66909 PC               | R .060                | 1-1/4            | 1-1/4             | 2                | 4-1/2             |
| 66910               | 66910 PC               | R .090                | 1-1/4            | 1-1/4             | 2                | 4-1/2             |
| 66911               | 66911 PC               | R .120                | 1-1/4            | 1-1/4             | 2                | 4-1/2             |

**EK226 Series**

## ■ MEDIUM LENGTH – “Speed freek”

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|-----------------------|------------------|-------------------|------------------|-------------------|
| 80901               | 80901 PC               | R .060                | 3/4              | 3/4               | 2-1/4            | 4-5/8             |
| 80902               | 80902 PC               | R .090                | 3/4              | 3/4               | 2-1/4            | 4-5/8             |
| 80903               | 80903 PC               | R .120                | 3/4              | 3/4               | 2-1/4            | 4-5/8             |
| 80904               | 80904 PC               | R .060                | 1                | 1                 | 3                | 5-1/2             |
| 80905               | 80905 PC               | R .090                | 1                | 1                 | 3                | 5-1/2             |
| 80906               | 80906 PC               | R .120                | 1                | 1                 | 3                | 5-1/2             |
| 80907               | 80907 PC               | R .060                | 1-1/4            | 1-1/4             | 3                | 5-1/2             |
| 80908               | 80908 PC               | R .090                | 1-1/4            | 1-1/4             | 3                | 5-1/2             |
| 80909               | 80909 PC               | R .120                | 1-1/4            | 1-1/4             | 3                | 5-1/2             |

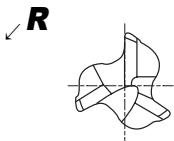
■ The TiN coated, or TiAlN coated is available on your request.

**TOLERANCE OF MILL DIA.**

|          |         |
|----------|---------|
| up to 1" | + .0030 |
|          | 0       |
| over 1"  | + .0060 |
|          | 0       |

**SPEED  
FREEK**

# 3 FLUTE, 42° HELIX, LONG LENGTH, ROUGHING with CORNER RADIUS for ALUMINUM



P.212

► High performance metal in aluminum alloys.

► Corner radius against chipping

◇ U.S.A Stock

**EK192 Series**

■ LONG LENGTH - "Speed freek"

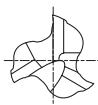
Unit : inch

| EDP No.  |             | CORNER<br>RADIUS<br>R | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------|-------------|-----------------------|------------------|-------------------|------------------|-------------------|
| UNCOATED | TiCN COATED |                       |                  |                   |                  |                   |
| 67904    | 67904 PC    | R .060                | 3/4              | 3/4               | 3                | 5-1/4             |
| 67905    | 67905 PC    | R .090                | 3/4              | 3/4               | 3                | 5-1/4             |
| 67906    | 67906 PC    | R .120                | 3/4              | 3/4               | 3                | 5-1/4             |
| 67907    | 67907 PC    | R .060                | 1                | 1                 | 4                | 6-1/2             |
| 67908    | 67908 PC    | R .090                | 1                | 1                 | 4                | 6-1/2             |
| 67909    | 67909 PC    | R .120                | 1                | 1                 | 4                | 6-1/2             |
| 67910    | 67910 PC    | R .060                | 1-1/4            | 1-1/4             | 4                | 6-1/2             |
| 67911    | 67911 PC    | R .090                | 1-1/4            | 1-1/4             | 4                | 6-1/2             |
| 67912    | 67912 PC    | R .120                | 1-1/4            | 1-1/4             | 4                | 6-1/2             |
| 67913    | 67913 PC    | R .060                | 1-1/4            | 1-1/4             | 6                | 8-1/2             |
| 67914    | 67914 PC    | R .090                | 1-1/4            | 1-1/4             | 6                | 8-1/2             |
| 67915    | 67915 PC    | R .120                | 1-1/4            | 1-1/4             | 6                | 8-1/2             |

■ The TiN coated or TiAlN coated is available on your request.

**TOLERANCE OF MILL DIA.**

|          |         |
|----------|---------|
| up to 1" | + .0030 |
|          | 0       |
| over 1"  | + .0060 |
|          | 0       |

**SPEED  
FREEK****3 FLUTE, 42° HELIX, REGULAR, MEDIUM & LONG LENGTH, ROUGHING for ALUMINUM**POWDER  
T15

3

42°

FLAT

AI

DATA

P.212

► High performance metal removal in aluminum alloys.

◇ U.S.A Stock

**EK191 Series****■ REGULAR LENGTH – “Speed freek”**

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 66515               | 66515 PC               | 1/2              | 1/2               | 1-1/4            | 3-1/4             |
| 66519               | 66519 PC               | 5/8              | 5/8               | 1-5/8            | 3-3/4             |
| 66524               | 66524 PC               | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 66540               | 66540 PC               | 1                | 1                 | 2                | 4-1/2             |
| 66541               | 66541 PC               | 1-1/4            | 1-1/4             | 2                | 4-1/2             |
| 66542               | 66542 PC               | 1-1/2            | 1-1/4             | 2                | 4-1/2             |
| 66543               | 66543 PC               | 2                | 2                 | 2                | 5-3/4             |

**EK226 Series****■ MEDIUM LENGTH – “Speed freek”**

Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 80524               | 80524 PC               | 3/4              | 3/4               | 2-1/4            | 4-5/8             |
| 80540               | 80540 PC               | 1                | 1                 | 3                | 5-1/2             |
| 80541               | 80541 PC               | 1-1/4            | 1-1/4             | 3                | 5-1/2             |
| 80542               | 80542 PC               | 1-1/2            | 1-1/4             | 3                | 5-1/2             |
| 80543               | 80543 PC               | 2                | 2                 | 3                | 6-3/4             |

**EK192 Series****■ LONG LENGTH – “Speed freek”**

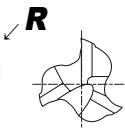
Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|
| 67515               | 67515 PC               | 1/2              | 1/2               | 2                | 4                 |
| 67519               | 67519 PC               | 5/8              | 5/8               | 2-1/2            | 4-5/8             |
| 67524               | 67524 PC               | 3/4              | 3/4               | 3                | 5-1/4             |
| 67540               | 67540 PC               | 1                | 1                 | 4                | 6-1/2             |
| 67541               | 67541 PC               | 1-1/4            | 1-1/4             | 4                | 6-1/2             |
| 67542               | 67542 PC               | 1-1/2            | 1-1/4             | 4                | 6-1/2             |
| 67543               | 67543 PC               | 2                | 2                 | 4                | 7-3/4             |
| 67544               | 67544 PC               | 1-1/4            | 1-1/4             | 6                | 8-1/2             |
| 67545               | 67545 PC               | 1-1/2            | 1-1/4             | 6                | 8-1/2             |
| 67546               | 67546 PC               | 2                | 2                 | 6                | 9-3/4             |

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

■ The TiN coated, or TiAlN coated is available on your request.

**SPEED  
FREEK****3 FLUTE, 42° HELIX ROUGHING BALL  
NOSE REGULAR LENGTH FOR ALUMINUM**

P.215

- High performance metal removal in aluminum alloys.
- Corner radius against chipping

◇ U.S.A Stock

**EK196 Series**

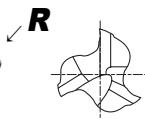
Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | R±.001 | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------------------|------------------------|--------|------------------|-------------------|------------------|-------------------|
| EP12032             | EP12032C               | 1/4    | 1/2              | 1/2               | 1 1/4            | 3 1/4             |
| EP12040             | EP12040C               | 5/16   | 5/8              | 5/8               | 1 5/8            | 3 3/4             |
| EP12048             | EP12048C               | 3/8    | 3/4              | 3/4               | 1 5/8            | 3 7/8             |
| EP12064             | EP12064C               | 1/2    | 1                | 1                 | 2                | 4 1/2             |
| EP12110             | EP12110C               | 5/8    | 1 1/4            | 1 1/4             | 2                | 4 1/2             |

■ The TiN coated, or TiAlN coated is available on your request.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**SPEED  
FREEK****3 FLUTE FINISHING WITH CORNER RADIUS END REGULAR  
LENGTH & MEDIUM LENGTH & LONG LENGTH**POWDER  
T15

3

42°

FLAT

DATA

P.216

► High performance metal removal in aluminum alloys.

► Corner radius against chipping

◇ U.S.A Stock

TANK-POWER &amp; ADDITIONAL POWDERED METAL

**EK193 Series**

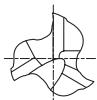
Unit : inch

| EDP No.<br>UNCOATED | EDP No.<br>TiCN COATED | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | CORNER<br>RADIUS |
|---------------------|------------------------|------------------|-------------------|------------------|-------------------|------------------|
| EP10323             | EP10323C               | 1/2              | 1/2               | 1 1/4            | 3 1/4             | -                |
| EP10324             | EP10324C               | 1/2              | 1/2               | 2                | 4                 | -                |
| EP10403             | EP10403C               | 5/8              | 5/8               | 1 5/8            | 3 3/4             | -                |
| EP10404             | EP10404C               | 5/8              | 5/8               | 2 1/2            | 4 5/8             | -                |
| EP10484             | EP10484C               | 3/4              | 3/4               | 1 5/8            | 3 7/8             | -                |
| EP10485             | EP10485C               | 3/4              | 3/4               | 2 1/4            | 4 5/8             | -                |
| EP10486             | EP10486C               | 3/4              | 3/4               | 3                | 5 1/4             | -                |
| EP10644             | EP10644C               | 1                | 1                 | 2                | 4 1/2             | -                |
| EP10645             | EP10645C               | 1                | 1                 | 3                | 5 1/2             | -                |
| EP10646             | EP10646C               | 1                | 1                 | 4                | 6 1/2             | -                |
| EP11165             | EP11165C               | 1 1/4            | 1 1/4             | 2                | 4 1/2             | -                |
| EP11166             | EP11166C               | 1 1/4            | 1 1/4             | 3                | 5 1/2             | -                |
| EP11167             | EP11167C               | 1 1/4            | 1 1/4             | 4                | 6 1/2             | -                |
| EP11324             | EP11324C               | 1 1/4            | 1 1/4             | 2                | 4 1/2             | -                |
| EP11325             | EP11325C               | 1 1/4            | 1 1/4             | 3                | 5 1/2             | -                |
| EP11326             | EP11326C               | 1 1/4            | 1 1/4             | 4                | 6 1/2             | -                |
| EP10321             | EP10321C               | 1/2              | 1/2               | 1 1/4            | 3 1/4             | R.120            |
| EP10322             | EP10322C               | 1/2              | 1/2               | 2                | 4                 | R.120            |
| EP10401             | EP10401C               | 5/8              | 5/8               | 1 5/8            | 3 3/4             | R.120            |
| EP10402             | EP10402C               | 5/8              | 5/8               | 2 1/2            | 4 5/8             | R.120            |
| EP10481             | EP10481C               | 3/4              | 3/4               | 1 5/8            | 3 7/8             | R.120            |
| EP10482             | EP10482C               | 3/4              | 3/4               | 2 1/4            | 4 5/8             | R.120            |
| EP10483             | EP10483C               | 3/4              | 3/4               | 3                | 5 1/4             | R.120            |
| EP10641             | EP10641C               | 1                | 1                 | 2                | 4 1/2             | R.120            |
| EP10642             | EP10642C               | 1                | 1                 | 3                | 5 1/2             | R.120            |
| EP10643             | EP10643C               | 1                | 1                 | 4                | 6 1/2             | R.120            |
| EP11162             | EP11162C               | 1 1/4            | 1 1/4             | 2                | 4 1/2             | R.120            |
| EP11163             | EP11163C               | 1 1/4            | 1 1/4             | 3                | 5 1/2             | R.120            |
| EP11164             | EP11164C               | 1 1/4            | 1 1/4             | 4                | 6 1/2             | R.120            |
| EP11321             | EP11321C               | 1 1/4            | 1 1/4             | 2                | 4 1/2             | R.120            |
| EP11322             | EP11322C               | 1 1/4            | 1 1/4             | 3                | 5 1/2             | R.120            |
| EP11323             | EP11323C               | 1 1/4            | 1 1/4             | 4                | 6 1/2             | R.120            |

■ The TiN coated, or TiAlN coated is available on your request.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**SPEED  
FREEK****3 FLUTE, 42° HELIX, SHORT & LONG LENGTH,  
ROUGHING for ALUMINUM****METRIC**

► Maximum stock removal rates at High Speed Condition.

► Reduces vibrations and improves surface roughness.

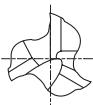
◊ *Call for Availability*

**EP922 Series**

■ SHORT LENGTH – “Speed freek”

Unit : mm

| EDP No.<br>TiAIN COATED | MILL<br>DIAMETER<br>js12 | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-------------------------|--------------------------|-------------------------|------------------|-------------------|
| EP922120                | 12.0                     | 12                      | 26               | 83                |
| EP922140                | 14.0                     | 12                      | 26               | 83                |
| EP922160                | 16.0                     | 16                      | 32               | 92                |
| EP922180                | 18.0                     | 16                      | 32               | 92                |
| EP922200                | 20.0                     | 20                      | 38               | 104               |
| EP922220                | 22.0                     | 20                      | 38               | 104               |
| EP922250                | 25.0                     | 25                      | 45               | 121               |
| EP922280                | 28.0                     | 25                      | 45               | 121               |
| EP922320                | 32.0                     | 32                      | 53               | 133               |

**EP924 Series**

■ LONG LENGTH – “Speed freek”

Unit : mm

| EDP No.<br>TiAIN COATED | MILL<br>DIAMETER<br>js12 | SHANK<br>DIAMETER<br>h6 | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|-------------------------|--------------------------|-------------------------|------------------|-------------------|
| EP924120                | 12.0                     | 12                      | 53               | 110               |
| EP924140                | 14.0                     | 12                      | 53               | 110               |
| EP924160                | 16.0                     | 16                      | 63               | 123               |
| EP924180                | 18.0                     | 16                      | 63               | 123               |
| EP924200                | 20.0                     | 20                      | 75               | 141               |
| EP924220                | 22.0                     | 20                      | 75               | 141               |
| EP924250                | 25.0                     | 25                      | 90               | 166               |
| EP924280                | 28.0                     | 25                      | 90               | 166               |
| EP924320                | 32.0                     | 32                      | 106              | 186               |

**Tolerances according to DIN 7160 & 7161**Tolerance range in  $\mu\text{m}$ 

Nominal-Diameter in mm

|      | from 1 to 3 | over 3 to 6 | over 6 to 10 | over 10 to 18 | over 18 to 30 | over 30 to 50 |
|------|-------------|-------------|--------------|---------------|---------------|---------------|
| js12 | $\pm 50$    | $\pm 60$    | $\pm 75$     | $\pm 90$      | $\pm 105$     | $\pm 125$     |
| h6   | 0           | 0           | 0            | 0             | 0             | 0             |

 $\mu\text{m} = 1/1000\text{mm}$

**YG T-15 3 FLUTE ALUMINUM ROUGHER****SPEEDS & FEEDS**

| MATERIAL                              | UNCOATED | TiCN      | CHIP LOAD PER TOOTH & CUTTING DIAMETER |      |      |      |      |
|---------------------------------------|----------|-----------|--|------|------|------|------|
|                                       | SFM      | SFM       | 1/2                                    | 3/4  | 1.00 | 1.25 | 2.00 |
| ALUMINUM [SOFT]                       | 250–500  | 400–2,500 | .005                                   | .007 | .010 | .012 | .015 |
| AIRCRAFT ALUMINUM [UNDER 10% SILICON] | 250–750  | 500–3,250 | .005                                   | .007 | .010 | .012 | .015 |

**3/4 DIA. / TiCN COATED  
10,186 RPM [2,000 SFM] @ 213 IPM**

|              |   |
|--------------|---|
| SFM          | 0.262 X CUTTER DIA X RPM                      |
| RPM          | 3.82 X $\frac{\text{SFM}}{\text{CUTTER DIA}}$ |
| IPM          | FPT X N X RPM                                 |
| FPT          | $\frac{\text{IPM}}{\text{N X RPM}}$           |
| IPR          | $\frac{\text{IPM}}{\text{RPM}}$               |
| CUTTING TIME | $\frac{\text{LENGTH OF CUT}}{\text{IPM}}$     |

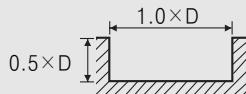
SFM = SURFACE FEET PER MINUTE  
 RPM = REVOLUTIONS PER MINUTE  
 N = NUMBER OF TEETH  
 IPR = INCHES PER REVOLUTION  
 IPM = INCHES PER MINUTE  
 FPT = FEED PER TOOTH



## 2 FLUTE, FINISH, SLOTTING

### E9983, E9984 Series

| MATERIAL | Structural Steels,<br>Carbon Steels |       | Structural Steels,<br>Carbon Steels,<br>Cast Irons |      | Carbon Steels,<br>Alloy Steels,<br>Tool Steels |      | Prehardened Steels,<br>Alloy Steels,<br>Tool Steels |      | Alloy Steels, Tool Steels<br>Austenitic<br>Stainless Steels |      |
|----------|-------------------------------------|-------|--|------|--|------|---|------|---|------|
| HARDNESS |                                     |       | ~HRc20   |      | HRc20-HRc30                                    |      | HRc30-HRc35   |      | HRc35-HRc40   |      |
| STRENGTH | ~ 500N/mm <sup>2</sup>              |       | 500~800N/mm <sup>2</sup>                           |      | 800~1000N/mm <sup>2</sup>                      |      | 1000~1100N/mm <sup>2</sup>                          |      | 1100~1300N/mm <sup>2</sup>                                  |      |
| DIAMETER | RPM                                 | FEED  | RPM  | FEED | RPM  | FEED | RPM   | FEED | RPM   | FEED |
| 1/8      | 4600                                | 5.93  | 3800   | 4.97 | 3150   | 4.21 | 2150  | 2.82 | 1650  | 2.23 |
| 3/16     | 3800                                | 8.47  | 3150   | 6.70 | 2600   | 6.11 | 1650  | 3.45 | 1350  | 2.56 |
| 1/4      | 3150                                | 9.12  | 2650   | 7.46 | 2100   | 6.56 | 1350  | 3.77 | 1050  | 2.95 |
| 5/16     | 2500                                | 9.44  | 2100   | 8.24 | 1700   | 6.88 | 1100  | 3.93 | 855   | 2.95 |
| 3/8      | 2100                                | 10.05 | 1800   | 8.87 | 1450   | 7.64 | 910   | 4.24 | 715   | 3.40 |
| 1/2      | 1650                                | 9.31  | 1350   | 8.13 | 1050   | 6.95 | 665   | 3.87 | 525   | 2.88 |
| 5/8      | 1300                                | 9.06  | 1100   | 7.32 | 855  | 6.14 | 535   | 3.56 | 425   | 2.76 |
| 3/4      | 995                                 | 7.85  | 820  | 6.18 | 710  | 5.31 | 450   | 3.24 | 360   | 2.46 |
| 7/8      | 795                                 | 6.23  | 675  | 5.09 | 560  | 4.30 | 375   | 2.74 | 300   | 1.95 |
| 1        | 710                                 | 5.24  | 590  | 4.65 | 465  | 3.90 | 335   | 2.52 | 235   | 1.73 |



※The FEED, in long & extra long types, should be reduced by around 50%

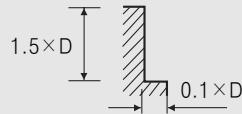
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 4 FLUTE, FINISH, SIDE CUTTING

### E9985, E9986 Series

| MATERIAL | Structural Steels,<br>Carbon Steels |       | Structural Steels,<br>Carbon Steels,<br>Cast Irons |       | Carbon Steels,<br>Alloy Steels,<br>Tool Steels |       | Prehardened Steels,<br>Alloy Steels,<br>Tool Steels |      | Alloy Steels, Tool Steels<br>Austenitic<br>Stainless Steels |      |
|----------|-------------------------------------|-------|--|-------|--|-------|---|------|---|------|
| HARDNESS |                                     |       | ~HRc20   |       | HRc20-HRc30                                    |       | HRc30-HRc35   |      | HRc35-HRc40   |      |
| STRENGTH | ~ 500N/mm <sup>2</sup>              |       | 500~800N/mm <sup>2</sup>                           |       | 800~1000N/mm <sup>2</sup>                      |       | 1000~1100N/mm <sup>2</sup>                          |      | 1100~1300N/mm <sup>2</sup>                                  |      |
| DIAMETER | RPM                                 | FEED  | RPM  | FEED  | RPM  | FEED  | RPM   | FEED | RPM   | FEED |
| 1/8      | 6100                                | 14.59 | 5500   | 12.16 | 4050   | 8.94  | 2700  | 6.24 | 2250  | 4.47 |
| 3/16     | 4400                                | 17.14 | 4000   | 14.38 | 2950   | 10.69 | 2000  | 7.34 | 1650  | 5.42 |
| 1/4      | 3600                                | 18.71 | 3250   | 15.56 | 2400   | 11.46 | 1650  | 7.94 | 1350  | 6.14 |
| 5/16     | 3000                                | 19.65 | 2550   | 16.50 | 1900   | 12.56 | 1300  | 8.26 | 1100  | 6.29 |
| 3/8      | 2400                                | 21.19 | 2100   | 17.74 | 1600   | 12.90 | 1050  | 8.87 | 910   | 6.75 |
| 1/2      | 1850                                | 19.41 | 1650   | 16.26 | 1250   | 12.32 | 815   | 8.13 | 660   | 6.16 |
| 5/8      | 1550                                | 17.42 | 1300   | 14.64 | 959  | 11.44 | 655   | 7.50 | 525   | 5.72 |
| 3/4      | 1300                                | 15.33 | 1100   | 13.16 | 800  | 10.01 | 550   | 6.38 | 450   | 4.91 |
| 7/8      | 995                                 | 14.06 | 895  | 10.98 | 645  | 8.60  | 445   | 5.48 | 375   | 4.51 |
| 1        | 935                                 | 12.40 | 785  | 10.24 | 590  | 7.74  | 395   | 5.05 | 335   | 4.27 |



※The FEED, in long & extra long types, should be reduced by around 50%

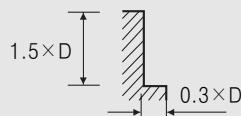
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3&4 FLUTE, 60° HELIX, SIDE CUTTING

### E9988 Series

| MATERIAL | Structural Steels,<br>Carbon Steels,<br>Cast Irons |       | Carbon Steels,<br>Alloy Steels,<br>Tool Steels |       | Alloy Steels, Tool Steels<br>Austenitic<br>Stainless Steels |       |
|----------|--|-------|--|-------|---|-------|
| HARDNESS | ~HRc20   |       | HRc20 ~ HRc30                                  |       | HRc30 ~ HRc40   |       |
| STRENGTH | 500 ~ 800N/mm <sup>2</sup>                         |       | 800 ~ 1000N/mm <sup>2</sup>                    |       | 1000 ~ 1300N/mm <sup>2</sup>                                |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED  | RPM   | FEED  |
| 1/4      | 3850   | 7.87  | 2500   | 5.32  | 1900  | 3.54  |
| 5/16     | 3050   | 7.87  | 2100   | 6.26  | 1700  | 3.54  |
| 3/8      | 2700   | 8.47  | 1700   | 6.30  | 1450  | 3.84  |
| 1/2      | 1850   | 9.72  | 1200   | 6.30  | 960   | 4.07  |
| 5/8      | 1300   | 10.97 | 845  | 8.51  | 690   | 5.44  |
| 3/4      | 895  | 14.59 | 580  | 11.85 | 475   | 7.87  |
| 7/8      | 720  | 16.63 | 475  | 14.00 | 380   | 8.75  |
| 1        | 630  | 19.00 | 415  | 16.00 | 335   | 10.00 |



\* The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.

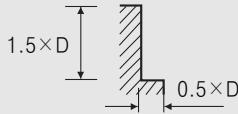
FEED=inch/min.



## MULTI FLUTE, ROUGHING, SIDE CUTTING

### E9990, E9991, E9A86, E9A87 Series

| MATERIAL | Structural Steels,<br>Carbon Steels |       | Structural Steels,<br>Carbon Steels,<br>Cast Irons |       | Carbon Steels,<br>Alloy Steels,<br>Tool Steels |      | Prehardened Steels,<br>Alloy Steels,<br>Tool Steels |      |
|----------|-------------------------------------|-------|--|-------|--|------|---|------|
| HARDNESS | ~HRc20                              |       | HRc20 ~ HRc30                                      |       | HRc30 ~ HRc35                                  |      | HRc35 ~ HRc40                                       |      |
| STRENGTH | ~800N/mm <sup>2</sup>               |       | 800 ~ 1000N/mm <sup>2</sup>                        |       | 1000 ~ 1100N/mm <sup>2</sup>                   |      | 1100 ~ 1300N/mm <sup>2</sup>                        |      |
| DIAMETER | RPM                                 | FEED  | RPM  | FEED  | RPM  | FEED | RPM   | FEED |
| 1/4      | 2650                                | 7.81  | 2050   | 6.25  | 1450   | 4.38 | 1200  | 3.44 |
| 3/8      | 1900                                | 13.14 | 1500   | 10.13 | 1050   | 6.41 | 885   | 5.23 |
| 1/2      | 1450                                | 14.17 | 1100   | 11.42 | 805  | 7.87 | 665   | 6.10 |
| 5/8      | 1150                                | 14.17 | 905  | 11.42 | 630  | 7.87 | 525   | 6.10 |
| 3/4      | 960                                 | 14.38 | 780  | 11.42 | 540  | 7.87 | 445   | 6.10 |
| 7/8      | 845                                 | 14.54 | 615  | 11.37 | 445  | 7.84 | 375   | 6.10 |
| 1        | 740                                 | 13.98 | 560  | 10.64 | 395  | 7.39 | 315   | 6.01 |



\* The FEED, in long & extra long types, should be reduced by around 50%

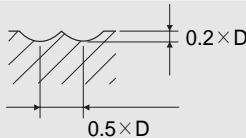
RPM=REVOLUTION PER MIN.

FEED=inch/min.

## 2 FLUTE, BALL NOSE, PROFILING

## E9992 Series

| MATERIAL | Structural Steels,<br>Carbon Steels |       | Structural Steels,<br>Carbon Steels,<br>Cast Irons |       | Carbon Steels,<br>Alloy Steels,<br>Tool Steels |      | Prehardened Steels,<br>Alloy Steels,<br>Tool Steels |      |
|----------|-------------------------------------|-------|--|-------|--|------|---|------|
| HARDNESS |                                     |       | ~ Rc20   |       | Rc20 ~ Rc30                                    |      | Rc30 ~ Rc40   |      |
| STRENGTH | ~500N/mm <sup>2</sup>               |       | 500 ~ 800N/mm <sup>2</sup>                         |       | 800 ~ 1000N/mm <sup>2</sup>                    |      | 1000 ~ 1300N/mm <sup>2</sup>                        |      |
| DIAMETER | RPM                                 | FEED  | RPM  | FEED  | RPM  | FEED | RPM   | FEED |
| 1/8      | 6800                                | 12.29 | 5300   | 8.22  | 3550   | 4.54 | 1850  | 2.07 |
| 3/16     | 5100                                | 15.32 | 4000   | 10.29 | 2650   | 5.74 | 1350  | 2.71 |
| 1/4      | 4050                                | 16.81 | 3150   | 11.23 | 2100   | 6.24 | 1100  | 2.95 |
| 5/16     | 3250                                | 18.06 | 2550   | 12.17 | 1700   | 6.87 | 860   | 2.95 |
| 3/8      | 2750                                | 19.91 | 2100   | 13.41 | 1450   | 7.64 | 700   | 3.40 |
| 1/2      | 2100                                | 17.83 | 1600   | 12.00 | 1100   | 6.75 | 530   | 2.92 |
| 5/8      | 1600                                | 16.58 | 1250   | 11.06 | 860  | 6.13 | 425   | 2.76 |
| 3/4      | 1350                                | 14.73 | 1050   | 9.82  | 700  | 5.35 | 360   | 2.46 |
| 7/8      | 1100                                | 12.60 | 865  | 8.40  | 560  | 4.59 | 300   | 2.10 |
| 1        | 890                                 | 10.51 | 690  | 6.99  | 445  | 3.89 | 235   | 1.73 |



\*The FEED, in long & extra long types, should be reduced by around 50%

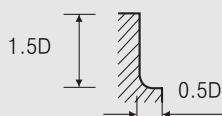
RPM=REVOLUTION PER MIN.

FEED=inch/min.

## 3 FLUTE, 42° HELIX SPEED-FREAK BALL NOSE

## EK196 Series

| MATERIAL | F/L | Aluminum<br>Aluminum Alloys |       |
|----------|-----|-----------------------------|-------|
|          |     | RPM                         | FEED  |
| 1/4      | 3   | 4500                        | 7.90  |
| 5/16     | 3   | 3100                        | 9.10  |
| 3/8      | 3   | 2500                        | 13.80 |
| 1/2      | 3   | 2000                        | 15.80 |
| 5/8      | 3   | 1600                        | 17.70 |



\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.

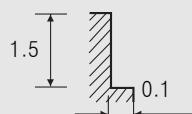
FEED=inch/min.



## 3 FLUTE, 42° FINISHING WITH CORNER RADIUS

### EK193 Series

| MATERIAL | M42      |      |     | Aluminum<br>Aluminum Alloys |  |
|----------|----------|------|-----|-----------------------------|--|
|          | DIAMETER | F/L  | RPM | FEED                        |  |
| 1/2      | 3        | 4500 | 38  |                             |  |
| 5/8      | 2        | 3500 | 26  |                             |  |
| 3/4      | 2        | 2300 | 27  |                             |  |
| 1        | 2        | 2000 | 27  |                             |  |
| 1 1/4    | 2        | 1600 | 26  |                             |  |
| 1 1/2    | 2        | 1350 | 25  |                             |  |



\*The FEED, in long & extra long types, should be reduced by around 50%

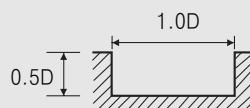
RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, 42° FINISHING WITH CORNER RADIUS

### EK193 Series

| MATERIAL | M42      |      |     | Aluminum<br>Aluminum Alloys |  |
|----------|----------|------|-----|-----------------------------|--|
|          | DIAMETER | F/L  | RPM | FEED                        |  |
| 1/2      | 3        | 4095 | 38  |                             |  |
| 5/8      | 3        | 3185 | 39  |                             |  |
| 3/4      | 3        | 2093 | 41  |                             |  |
| 1        | 3        | 1820 | 40  |                             |  |
| 1 1/4    | 3        | 1456 | 38  |                             |  |
| 1 1/2    | 3        | 1229 | 38  |                             |  |



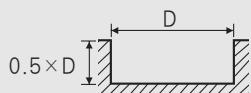
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## POWDERED METAL

## PM, 2 FLUTE, FINISH, SLOTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      |
|----------|--|------|--|------|--|------|
| HARDNESS | ~HRc20                                       |      | HRc20 ~ HRc30                                |      | HRc30 ~ HRc40                                |      |
| STRENGTH | 500 ~ 800N/mm <sup>2</sup>                   |      | 800 ~ 1000N/mm <sup>2</sup>                  |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED |
| 1/8      | 3500   | 2.00 | 2800   | 1.80 | 1800   | 0.80 |
| 3/16     | 2000   | 3.00 | 1800   | 2.60 | 1000   | 1.60 |
| 1/4      | 1800   | 3.50 | 1300   | 2.60 | 900  | 1.80 |
| 5/16     | 1200   | 4.00 | 1000   | 3.00 | 600  | 2.00 |
| 3/8      | 1000   | 4.00 | 900  | 3.50 | 500  | 2.00 |
| 1/2      | 900  | 4.30 | 700  | 3.50 | 450  | 2.20 |
| 5/8      | 600  | 4.00 | 500  | 3.00 | 300  | 2.00 |
| 11/16    | 550  | 4.00 | 450  | 3.00 | 280  | 2.00 |
| 7/8      | 500  | 4.00 | 400  | 3.00 | 250  | 2.00 |
| 1        | 450  | 3.50 | 350  | 2.60 | 200  | 1.60 |

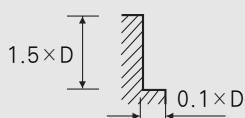


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## POWDERED METAL

## PM, MULTI FLUTE, FINISH, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      |
|----------|--|------|--|------|--|------|
| HARDNESS | ~HRc20                                       |      | HRc20 ~ HRc30                                |      | HRc30 ~ HRc40                                |      |
| STRENGTH | 500 ~ 800N/mm <sup>2</sup>                   |      | 800 ~ 1000N/mm <sup>2</sup>                  |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED |
| 1/8      | 3500   | 90   | 2800   | 2.60 | 1800   | 1.40 |
| 3/16     | 2000   | 5.50 | 1800   | 4.00 | 1000   | 2.20 |
| 1/4      | 1800   | 6.30 | 1300   | 4.00 | 900  | 2.60 |
| 5/16     | 1200   | 7.10 | 1000   | 4.50 | 600  | 2.80 |
| 3/8      | 1000   | 7.10 | 900  | 5.10 | 500  | 2.80 |
| 1/2      | 900  | 7.90 | 700  | 5.10 | 450  | 3.10 |
| 5/8      | 600  | 7.10 | 500  | 4.50 | 300  | 2.80 |
| 11/16    | 550  | 7.10 | 450  | 4.50 | 280  | 2.80 |
| 7/8      | 500  | 7.10 | 400  | 4.50 | 250  | 2.80 |
| 1        | 450  | 6.30 | 350  | 4.00 | 200  | 2.20 |



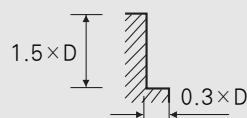
RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## POWDERED METAL

## PM, MULTI FLUTE, 60° HELIX, FINISH, SIDE CUTTING

TANK-POWER & ADDITIONAL POWDERED METAL

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      |
|----------|--|------|--|------|--|------|
| HARDNESS | ~HRc20                                       |      | HRc20 ~ HRc30                                |      | HRc30 ~ HRc40                                |      |
| STRENGTH | 500 ~ 800N/mm <sup>2</sup>                   |      | 800 ~ 1000N/mm <sup>2</sup>                  |      | 1000 ~ 1300N/mm <sup>2</sup>                 |      |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED |
| 1/4      | 2000   | 4.00 | 1600   | 2.60 | 1200   | 1.80 |
| 5/16     | 1500   | 4.00 | 1300   | 3.10 | 1000   | 1.80 |
| 3/8      | 1300   | 4.30 | 1000   | 3.10 | 800  | 2.00 |
| 1/2      | 1000   | 4.70 | 800  | 3.10 | 600  | 2.00 |
| 5/8      | 800  | 5.10 | 650  | 3.10 | 500  | 2.20 |
| 13/16    | 660  | 5.50 | 520  | 4.30 | 400  | 2.80 |
| 1        | 500  | 7.10 | 400  | 5.50 | 310  | 4.00 |
| 1-1/4    | 400  | 7.50 | 330  | 6.30 | 250  | 4.00 |

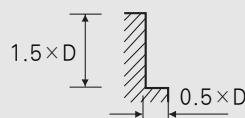


RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## POWDERED METAL

## PM, MULTI FLUTE, ROUGHING, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>CAST IRON |       | ALLOY STEELS<br>TOOL STEELS |      | HARDENED STEELS              |      | HARDENED STEELS              |      |
|----------|--|-------|-----------------------------|------|------------------------------|------|------------------------------|------|
| HARDNESS | ~HRc20                                     |       | HRc20 ~ HRc30               |      | HRc30 ~ HRc35                |      | HRc35 ~ HRc40                |      |
| STRENGTH | ~800N/mm <sup>2</sup>                      |       | 800 ~ 1000N/mm <sup>2</sup> |      | 1000 ~ 1100N/mm <sup>2</sup> |      | 1100 ~ 1300N/mm <sup>2</sup> |      |
| DIAMETER | RPM  | FEED  | RPM                         | FEED | RPM                          | FEED | RPM                          | FEED |
| 1/4      | 2300                                       | 3.94  | 2000                        | 2.95 | 1500                         | 2.76 | 1000                         | 1.38 |
| 5/16     | 1800                                       | 5.12  | 1400                        | 3.74 | 1100                         | 3.15 | 700                          | 1.77 |
| 3/8      | 1400                                       | 7.48  | 1100                        | 5.90 | 1000                         | 5.51 | 560                          | 2.95 |
| 1/2      | 1100                                       | 9.06  | 1000                        | 7.07 | 800                          | 5.51 | 500                          | 3.35 |
| 5/8      | 900  | 9.06  | 700                         | 7.07 | 560                          | 5.51 | 350                          | 3.35 |
| 11/16    | 800  | 9.06  | 600                         | 7.07 | 500                          | 5.51 | 300                          | 3.35 |
| 7/8      | 600  | 11.02 | 560                         | 8.27 | 450                          | 7.09 | 300                          | 4.13 |
| 1        | 560  | 11.02 | 500                         | 8.27 | 400                          | 7.09 | 230                          | 4.13 |
| 1-1/8    | 500  | 10.24 | 450                         | 7.87 | 350                          | 7.09 | 200                          | 4.13 |
| 1-1/4    | 450  | 10.24 | 400                         | 7.87 | 300                          | 7.09 | 200                          | 4.13 |



RPM=REVOLUTION PER MIN.  
FEED=inch/min.

# COBALT 8% & HSS END MILLS

- Suitable for general-purpose operation slotting, drilling, profiling.
- Good performance in machining General Steel, Stainless Steel, Aluminum, non ferrous materials  
*Finishing Cutter, Roughing Cutter*





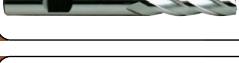
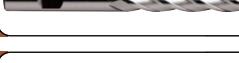
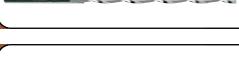
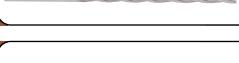
# HSS END MILLS SELECTION GUIDE

INCH ➤

| EDP No.        | APPEARANCE | SPECIFICATION                              | STOCK | PAGE |
|----------------|------------|--|-------|------|
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| E2110<br>E1110 |            | 2 FLUTE, REGULAR LENGTH, BALL NOSE         |       | 232  |
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# HSS END MILLS SELECTION GUIDE

**INCH**

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| E2069          |  | 4 FLUTE, REGULAR LENGTH, BALL NOSE, DOUBLE                     |       | 245  |
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| E2039<br>E2042 |  | MULTI FLUTE, MEDIUM LENGTH, CENTER CUTTING                     |       | 249  |
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| E2162<br>E1162 |  | 6 FLUTE, LONG LENGTH, CENTER CUTTING                           |       | 250  |
| E2041<br>E1041 |  | 4 FLUTE, EXTRA LONG LENGTH, CENTER CUTTING                     |       | 251  |
| E2175<br>E1175 |  | 6 FLUTE, EXTRA LONG LENGTH, CENTER CUTTING                     |       | 251  |
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# HSS END MILLS SELECTION GUIDE

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| E2004<br>E1004 |            | 4 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE                          |       | 258  |
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| E2008<br>E1008 |            | 2 FLUTE, MINIATURE, STUB LENGTH, BALL NOSE, DOUBLE                  |       | 259  |
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| E1071          |            | 2 FLUTE, 42° HELIX, LONG LENGTH for ALUMINUM                        |       | 262  |
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| E2086          |            | MULTI FLUTE, STUB LENGTH, FINE PITCH ROUGHING,<br>CENTER CUTTING    |       | 264  |
| E2085          |            | MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING,<br>CENTER CUTTING |       | 264  |

# HSS END MILLS SELECTION GUIDE

**INCH**

| EDP No.        | APPEARANCE  | SPECIFICATION  | STOCK | PAGE |
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| E2170          |    | MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING                 |       | 268  |
| E2171          |  | MULTI FLUTE, MEDIUM LENGTH, COARSE PITCH ROUGHING                  |       | 269  |
| E2172          |  | MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING                    |       | 269  |
| E2241          |  | 3 FLUTE, STUB LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING        |       | 270  |
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| E2197          |  | MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING    |       | 272  |
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| E2125          |  | MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING, BALL NOSE         |       | 273  |
| E2248          |  | MULTI FLUTE, REGULAR LENGTH, ROUGHING & FINISHING                  |       | 274  |
| E2191          |  | 3 FLUTE, 37° HELIX, REGULAR LENGTH, ROUGHING for ALUMINUM          |       | 275  |
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# HSS END MILLS SELECTION GUIDE

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| E2483<br>E1483 |    | 4 FLUTE, REGULAR LENGTH - METRIC      |       | 279  |
| E2120          |    | 3 FLUTE, 60° HELIX, REGULAR LENGTH    |       | 280  |
| E2121          |  | 4 FLUTE, 60° HELIX, REGULAR LENGTH    |       | 280  |
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**HSS****SUPER CUTTING END MILLS****YG-1 STANDARD END MILLS WITH CLOSER TOLERANCE**

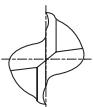
| TYPE                   | NO. OF FLUTE | DESCRIPTION                 |                    | YG-1  | **ANSI                                    | REMARK |
|------------------------|--------------|-----------------------------|--------------------|---|---|--------|
|                        |              | LENGTH OF CUT               | TYPE OF END        |   |   |        |
| SINGLE END             | 2            | REGULAR<br>LONG<br>EX. LONG | ALL                | + .0010<br>.0000<br>* ( + .0015 )<br>.0000  | + .0030<br>.0000                          |        |
|                        | MULTIPLE     | ALL                         | ALL                | + .0010<br>.0000<br>* ( + .0015 )<br>.0000  | + .0030<br>.0000                          |        |
| KEY WAY                | 2            | ALL                         | CENTER CUTTING     | + .0000<br>- .0015                          | + .0000<br>- .0015                        |        |
| DOUBLE END             | 2            | REGULAR                     | ALL                | .0000<br>- .0010<br>* ( - .0002 )<br>-.0015 | .0000<br>- .0015                          |        |
|                        | 4            | ALL                         | CENTER CUTTING     | .0000<br>- .0010<br>* ( - .0002 )<br>-.0015 | .0000<br>- .0015                          |        |
|                        | 4            | ALL                         | NON CENTER CUTTING | + .0010<br>.0000<br>* ( - .0002 )<br>-.0015 | + .0030<br>.0000<br>* ( .0000 )<br>-.0025 |        |
| 3/16" SHANK DOUBLE END | 2            | STUB REGULAR                | ALL                | .0000<br>- .0010<br>* ( - .0002 )<br>-.0015 | .0000<br>- .0015                          |        |
|                        |              | LONG                        | ALL                | + .0010<br>.0000<br>* ( - .0002 )<br>-.0015 | + .0030<br>.0000<br>* ( .0000 )<br>-.0025 |        |
|                        | 4            | ALL                         | ALL                | + .0010<br>.0000<br>* ( - .0002 )<br>-.0015 | + .0030<br>.0000<br>* ( .0000 )<br>-.0025 |        |
| ROUGHING               | MULTIPLE     | ALL                         | ALL                | + .0060<br>.0000                            | + .025<br>- .005                          |        |
| ROUGHING & FINISHING   | MULTIPLE     | REGULAR                     | ALL                | + .0025<br>+ .0005                          |   |        |
| HELICAL 60°            | 3.4          | REGULAR                     | CENTER CUTTING     | + .0010<br>.0000<br>* ( + .0015 )<br>.0000  |   |        |
| THROW AWAY 1/4" SHANK  | 3            | ALL                         | CENTER CUTTING     | - .0005<br>- .0013                          |   |        |

\* The shank of End Mills is the same diameter as the cutting portion.

\*\* ANSI B94-19-1977 published by the American Society of Mechanical Engineers.



# HSS 2 FLUTE, REGULAR LENGTH



P.285,291,295

► These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flattened for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.

## E2030(C2SRS), E1030(2SRS) Series

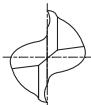
Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 01289           | C2SRS-0803 | 01039    | 2SRS-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 01291           | C2SRS-1003 | 01041    | 2SRS-1003 | 5/32          | 3/8            | 7/16          | 2-5/16         |
| 01293           | C2SRS-1203 | 01043    | 2SRS-1203 | 3/16          | 3/8            | 7/16          | 2-5/16         |
| 01295           | C2SRS-1403 | 01045    | 2SRS-1403 | 7/32          | 3/8            | 1/2           | 2-5/16         |
| 01297           | C2SRS-1603 | 01047    | 2SRS-1603 | 1/4           | 3/8            | 1/2           | 2-5/16         |
| 01299           | C2SRS-1803 | 01049    | 2SRS-1803 | 9/32          | 3/8            | 9/16          | 2-5/16         |
| 01301           | C2SRS-2003 | 01051    | 2SRS-2003 | 5/16          | 3/8            | 9/16          | 2-5/16         |
| 01303           | C2SRS-2203 | 01053    | 2SRS-2203 | 11/32         | 3/8            | 9/16          | 2-5/16         |
| 01305           | C2SRS-2403 | 01055    | 2SRS-2403 | 3/8           | 3/8            | 9/16          | 2-5/16         |
| 01308           | C2SRS-2603 | 01058    | 2SRS-2603 | 13/32         | 3/8            | 13/16         | 2-1/2          |
| 01312           | C2SRS-2803 | 01062    | 2SRS-2803 | 7/16          | 3/8            | 13/16         | 2-1/2          |
| 01316           | C2SRS-3003 | 01066    | 2SRS-3003 | 15/32         | 3/8            | 13/16         | 2-1/2          |
| 01320           | C2SRS-3203 | 01070    | 2SRS-3203 | 1/2           | 3/8            | 13/16         | 2-1/2          |
| 01321           | C2SRS-3204 | 01071    | 2SRS-3204 | 1/2           | 1/2            | 1             | 3              |
| 01328           | C2SRS-3604 | 01078    | 2SRS-3604 | 9/16          | 1/2            | 1-1/8         | 3-1/8          |
| 01336           | C2SRS-4004 | 01086    | 2SRS-4004 | 5/8           | 1/2            | 1-1/8         | 3-1/8          |
| 01337           | C2SRS-4005 | 01087    | 2SRS-4005 | 5/8           | 5/8            | 1-5/16        | 3-7/16         |
| 01348           | C2SRS-4405 | 01098    | 2SRS-4405 | 11/16         | 5/8            | 1-5/16        | 3-7/16         |
| 01357           | C2SRS-4804 | 01107    | 2SRS-4804 | 3/4           | 1/2            | 1-5/16        | 3-5/16         |
| 01358           | C2SRS-4805 | 01108    | 2SRS-4805 | 3/4           | 5/8            | 1-5/16        | 3-7/16         |
| 01359           | C2SRS-4806 | 01109    | 2SRS-4806 | 3/4           | 3/4            | 1-5/16        | 3-7/16         |
| 01373           | C2SRS-5205 | 01123    | 2SRS-5205 | 13/16         | 5/8            | 1-1/2         | 3-5/8          |
| 01391           | C2SRS-5606 | 01141    | 2SRS-5606 | 7/8           | 3/4            | 1-1/2         | 3-3/4          |
| 01394           | C2SRS-5607 | 01144    | 2SRS-5607 | 7/8           | 7/8            | 1-1/2         | 3-3/4          |
| 01409           | C2SRS-6007 | 01159    | 2SRS-6007 | 15/16         | 7/8            | 1-1/2         | 3-3/4          |
| 01420           | C2SRS-6405 | 01170    | 2SRS-6405 | 1             | 5/8            | 1-1/2         | 3-5/8          |
| 01422           | C2SRS-6406 | 01172    | 2SRS-6406 | 1             | 3/4            | 1-1/2         | 3-3/4          |
| 01426           | C2SRS-6408 | 01176    | 2SRS-6408 | 1             | 1              | 1-5/8         | 4-1/8          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |                  |
|------------------------|------------------|
| + .0010<br>0           | * * + .0015<br>0 |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, REGULAR LENGTH**HSS  
Co8

HSS

2

30°

FLAT

DATA

P.285,291,295

► These end mills are furnished as regular with right-hand cutting and right-hand helical flutes. All shanks are flattened for holder set screw. These are designed for slotting, drilling, pocketing and general-purpose operation.

**E2030(C2SRS), E1030(2SRS) Series**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 01435           | C2SRS-B0808 | 01185    | 2SRS-B0808 | 1-1/8         | 1              | 1-5/8         | 4-1/8          |
| 01445           | C2SRS-B1610 | 01195    | 2SRS-B1610 | 1-1/4         | 1-1/4          | 1-5/8         | 4-1/8          |
| 01451           | C2SRS-B2408 | 01201    | 2SRS-B2408 | 1-3/8         | 1              | 1-5/8         | 4-1/8          |
| 01453           | C2SRS-B2410 | 01203    | 2SRS-B2410 | 1-3/8         | 1-1/4          | 1-5/8         | 4-1/8          |
| 01459           | C2SRS-B3208 | 01209    | 2SRS-B3208 | 1-1/2         | 1              | 1-5/8         | 4-1/8          |
| 01461           | C2SRS-B3210 | 01211    | 2SRS-B3210 | 1-1/2         | 1-1/4          | 1-5/8         | 4-1/8          |
| 01469           | C2SRS-B4810 | 01219    | 2SRS-B4810 | 1-3/4         | 1-1/4          | 1-5/8         | 4-1/8          |
| 01477           | C2SRS-B6410 | 01227    | 2SRS-B6410 | 2             | 1-1/4          | 1-5/8         | 4-1/8          |
| 01480           | C2SRS-B6416 | 01230    | 2SRS-B6416 | 2             | 2              | 2             | 5-3/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

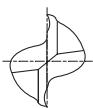
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



## 2 FLUTE, LONG LENGTH



P.285,291,295

► Longer flute length than E2030 type and allows deeper cutting.

### E2080(C2SLE), E1080(2SLE) Series

Unit : inch

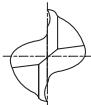
| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 02297           | C2SLE-1603  | 02047    | 2SLE-1603  | 1/4           | 3/8            | 1-1/4         | 3-1/8          |
| 02301           | C2SLE-2003  | 02051    | 2SLE-2003  | 5/16          | 3/8            | 1-3/8         | 3-1/8          |
| 02305           | C2SLE-2403  | 02055    | 2SLE-2403  | 3/8           | 3/8            | 1-1/2         | 3-1/4          |
| 02321           | C2SLE-3204  | 02071    | 2SLE-3204  | 1/2           | 1/2            | 2             | 4              |
| 02337           | C2SLE-4005  | 02087    | 2SLE-4005  | 5/8           | 5/8            | 2             | 4-1/8          |
| 02359           | C2SLE-4806  | 02109    | 2SLE-4806  | 3/4           | 3/4            | 2-1/4         | 4-1/2          |
| 02394           | C2SLE-5607  | 02144    | 2SLE-5607  | 7/8           | 7/8            | 2-1/2         | 4-3/4          |
| 02426           | C2SLE-6408  | 02176    | 2SLE-6408  | 1             | 1              | 3             | 5-1/2          |
| 02435           | C2SLE-B0808 | 02185    | 2SLE-B0808 | 1-1/8         | 1              | 3             | 5-1/2          |
| 02443           | C2SLE-B1608 | 02193    | 2SLE-B1608 | 1-1/4         | 1              | 3             | 5-1/2          |
| 02445           | C2SLE-B1610 | 02195    | 2SLE-B1610 | 1-1/4         | 1-1/4          | 3             | 5-1/2          |
| 02461           | C2SLE-B3210 | 02211    | 2SLE-B3210 | 1-1/2         | 1-1/4          | 3             | 5-1/2          |
| 02469           | C2SLE-B4810 | 02219    | 2SLE-B4810 | 1-3/4         | 1-1/4          | 3             | 5-1/2          |
| 02477           | C2SLE-B6410 | 02227    | 2SLE-B6410 | 2             | 1-1/4          | 3             | 5-1/2          |
| 02482           | C2SLE-B6416 | 02232    | 2SLE-B6416 | 2             | 2              | 3             | 6-3/4          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, EXTENDED LENGTH**

P.285,291,295

► Provided with the longest flute length and suitable for high accuracy machining of deep step.

**E2033(C2SLS), E1033(2SLS) Series**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | LENGTH BELOW SHANK | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|--------------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                    |                |
| 03289           | C2SLS-0803  | 03039    | 2SLS-0803  | 1/8           | 3/8            | 3/8           | 13/16              | 2-3/8          |
| 03293           | C2SLS-1203  | 03043    | 2SLS-1203  | 3/16          | 3/8            | 1/2           | 1-1/8              | 2-11/16        |
| 03297           | C2SLS-1603  | 03047    | 2SLS-1603  | 1/4           | 3/8            | 5/8           | 1-1/2              | 3-1/16         |
| 03301           | C2SLS-2003  | 03051    | 2SLS-2003  | 5/16          | 3/8            | 3/4           | 1-3/4              | 3-5/16         |
| 03305           | C2SLS-2403  | 03055    | 2SLS-2403  | 3/8           | 3/8            | 3/4           | 1-3/4              | 3-5/16         |
| 03321           | C2SLS-3204  | 03071    | 2SLS-3204  | 1/2           | 1/2            | 1             | 2-7/32             | 4              |
| 03337           | C2SLS-4005  | 03087    | 2SLS-4005  | 5/8           | 5/8            | 1-3/8         | 2-23/32            | 4-5/8          |
| 03359           | C2SLS-4806  | 03109    | 2SLS-4806  | 3/4           | 3/4            | 1-5/8         | 3-11/32            | 5-3/8          |
| 03394           | C2SLS-5607  | 03144    | 2SLS-5607  | 7/8           | 7/8            | 2             | 4                  | 6              |
| 03426           | C2SLS-6408  | 03176    | 2SLS-6408  | 1             | 1              | 2-1/2         | 4-31/32            | 7-1/4          |
| 03445           | C2SLS-B1610 | 03195    | 2SLS-B1610 | 1-1/4         | 1-1/4          | 3             | 4-31/32            | 7-1/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

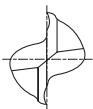
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



## 2 FLUTE, REGULAR LENGTH, DOUBLE



P.285,291,295

► Series E2050 two flute end mills are the double-end version of E2030 single-end tools. Same excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.

### E2050(C2DRS), E1050(2DRS) Series

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 11289           | C2DRS-0803 | 11039    | 2DRS-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 11290           | C2DRS-0903 | 11040    | 2DRS-0903 | 9/64          | 3/8            | 7/16          | 3-1/8          |
| 11291           | C2DRS-1003 | 11041    | 2DRS-1003 | 5/32          | 3/8            | 7/16          | 3-1/8          |
| 11292           | C2DRS-1103 | 11042    | 2DRS-1103 | 11/64         | 3/8            | 7/16          | 3-1/8          |
| 11293           | C2DRS-1203 | 11043    | 2DRS-1203 | 3/16          | 3/8            | 7/16          | 3-1/8          |
| 11294           | C2DRS-1303 | 11044    | 2DRS-1303 | 13/64         | 3/8            | 1/2           | 3-1/8          |
| 11295           | C2DRS-1403 | 11045    | 2DRS-1403 | 7/32          | 3/8            | 1/2           | 3-1/8          |
| 11296           | C2DRS-1503 | 11046    | 2DRS-1503 | 15/64         | 3/8            | 1/2           | 3-1/8          |
| 11297           | C2DRS-1603 | 11047    | 2DRS-1603 | 1/4           | 3/8            | 1/2           | 3-1/8          |
| 11298           | C2DRS-1703 | 11048    | 2DRS-1703 | 17/64         | 3/8            | 9/16          | 3-1/8          |
| 11299           | C2DRS-1803 | 11049    | 2DRS-1803 | 9/32          | 3/8            | 9/16          | 3-1/8          |
| 11300           | C2DRS-1903 | 11050    | 2DRS-1903 | 19/64         | 3/8            | 9/16          | 3-1/8          |
| 11301           | C2DRS-2003 | 11051    | 2DRS-2003 | 5/16          | 3/8            | 9/16          | 3-1/8          |
| 11302           | C2DRS-2103 | 11052    | 2DRS-2103 | 21/64         | 3/8            | 9/16          | 3-1/8          |
| 11303           | C2DRS-2203 | 11053    | 2DRS-2203 | 11/32         | 3/8            | 9/16          | 3-1/8          |
| 11304           | C2DRS-2303 | 11054    | 2DRS-2303 | 23/64         | 3/8            | 9/16          | 3-1/8          |
| 11305           | C2DRS-2403 | 11055    | 2DRS-2403 | 3/8           | 3/8            | 9/16          | 3-1/8          |
| 11307           | C2DRS-2504 | 11057    | 2DRS-2504 | 25/64         | 1/2            | 13/16         | 3-3/4          |
| 11309           | C2DRS-2604 | 11059    | 2DRS-2604 | 13/32         | 1/2            | 13/16         | 3-3/4          |
| 11311           | C2DRS-2704 | 11061    | 2DRS-2704 | 27/64         | 1/2            | 13/16         | 3-3/4          |
| 11313           | C2DRS-2804 | 11063    | 2DRS-2804 | 7/16          | 1/2            | 13/16         | 3-3/4          |
| 11315           | C2DRS-2904 | 11065    | 2DRS-2904 | 29/64         | 1/2            | 13/16         | 3-3/4          |
| 11317           | C2DRS-3004 | 11067    | 2DRS-3004 | 15/32         | 1/2            | 13/16         | 3-3/4          |
| 11319           | C2DRS-3104 | 11069    | 2DRS-3104 | 31/64         | 1/2            | 13/16         | 3-3/4          |
| 11321           | C2DRS-3204 | 11071    | 2DRS-3204 | 1/2           | 1/2            | 13/16         | 3-3/4          |
| 11326           | C2DRS-3405 | 11076    | 2DRS-3405 | 17/32         | 5/8            | 1-1/8         | 4-1/2          |
| 11330           | C2DRS-3605 | 11080    | 2DRS-3605 | 9/16          | 5/8            | 1-1/8         | 4-1/2          |

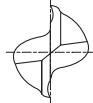
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, REGULAR LENGTH, DOUBLE**HSS  
Co8

HSS

2

30°

FLAT

DATA

P.285,291,295

► Series E2050 two flute end mills are the double-end version of E2030 single-end tools. Same excellent tool geometry for slotting, keying and general purpose milling, plus the added economy offered by the double-end design.

**E2050(C2DRS), E1050(2DRS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 11334           | C2DRS-3805 | 11084    | 2DRS-3805 | 19/32         | 5/8            | 1-1/8         | 4-1/2          |
| 11337           | C2DRS-4005 | 11087    | 2DRS-4005 | 5/8           | 5/8            | 1-1/8         | 4-1/2          |
| 11344           | C2DRS-4206 | 11094    | 2DRS-4206 | 21/32         | 3/4            | 1-5/16        | 5              |
| 11350           | C2DRS-4406 | 11100    | 2DRS-4406 | 11/16         | 3/4            | 1-5/16        | 5              |
| 11354           | C2DRS-4606 | 11104    | 2DRS-4606 | 23/32         | 3/4            | 1-5/16        | 5              |
| 11359           | C2DRS-4806 | 11109    | 2DRS-4806 | 3/4           | 3/4            | 1-5/16        | 5              |
| 11368           | C2DRS-5007 | 11118    | 2DRS-5007 | 25/32         | 7/8            | 1-9/16        | 5-1/2          |
| 11377           | C2DRS-5207 | 11127    | 2DRS-5207 | 13/16         | 7/8            | 1-9/16        | 5-1/2          |
| 11384           | C2DRS-5407 | 11134    | 2DRS-5407 | 27/32         | 7/8            | 1-9/16        | 5-1/2          |
| 11394           | C2DRS-5607 | 11144    | 2DRS-5607 | 7/8           | 7/8            | 1-9/16        | 5-1/2          |
| 11402           | C2DRS-5808 | 11152    | 2DRS-5808 | 29/32         | 1              | 1-5/8         | 5-7/8          |
| 11410           | C2DRS-6008 | 11160    | 2DRS-6008 | 15/16         | 1              | 1-5/8         | 5-7/8          |
| 11417           | C2DRS-6208 | 11167    | 2DRS-6208 | 31/32         | 1              | 1-5/8         | 5-7/8          |
| 11426           | C2DRS-6408 | 11176    | 2DRS-6408 | 1             | 1              | 1-5/8         | 5-7/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

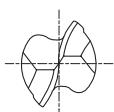
**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.



## 2 FLUTE, REGULAR LENGTH, BALL NOSE



P.288,293,297

► The two flute ball end mills are designed for milling of radius bottom slots, fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut. The two flute design provides good chip removal ability in slotting.

### E2110(C2SRB), E1110(2SRB) Series

Unit : inch

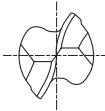
| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 41289           | C2SRB-0803  | 41039    | 2SRB-0803  | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 41293           | C2SRB-1203  | 41043    | 2SRB-1203  | 3/16          | 3/8            | 1/2           | 2-3/8          |
| 41297           | C2SRB-1603  | 41047    | 2SRB-1603  | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 41301           | C2SRB-2003  | 41051    | 2SRB-2003  | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 41305           | C2SRB-2403  | 41055    | 2SRB-2403  | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 41313           | C2SRB-2804  | 41063    | 2SRB-2804  | 7/16          | 1/2            | 1             | 3              |
| 41321           | C2SRB-3204  | 41071    | 2SRB-3204  | 1/2           | 1/2            | 1             | 3              |
| 41328           | C2SRB-3604  | 41078    | 2SRB-3604  | 9/16          | 1/2            | 1-1/8         | 3-1/8          |
| 41336           | C2SRB-4004  | 41086    | 2SRB-4004  | 5/8           | 1/2            | 1-1/8         | 3-1/8          |
| 41337           | C2SRB-4005  | 41087    | 2SRB-4005  | 5/8           | 5/8            | 1-3/8         | 3-1/2          |
| 41357           | C2SRB-4804  | 41107    | 2SRB-4804  | 3/4           | 1/2            | 1-5/16        | 3-5/16         |
| 41359           | C2SRB-4806  | 41109    | 2SRB-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 41391           | C2SRB-5606  | 41141    | 2SRB-5606  | 7/8           | 3/4            | 2             | 4-1/4          |
| 41394           | C2SRB-5607  | 41144    | 2SRB-5607  | 7/8           | 7/8            | 2             | 4-1/4          |
| 41422           | C2SRB-6406  | 41172    | 2SRB-6406  | 1             | 3/4            | 2-1/4         | 4-1/2          |
| 41426           | C2SRB-6408  | 41176    | 2SRB-6408  | 1             | 1              | 2-1/4         | 4-3/4          |
| 41431           | C2SRB-B0806 | 41181    | 2SRB-B0806 | 1-1/8         | 3/4            | 1-5/8         | 3-7/8          |
| 41435           | C2SRB-B0808 | 41185    | 2SRB-B0808 | 1-1/8         | 1              | 2-1/4         | 4-3/4          |
| 41439           | C2SRB-B1606 | 41189    | 2SRB-B1606 | 1-1/4         | 3/4            | 1-5/8         | 3-7/8          |
| 41445           | C2SRB-B1610 | 41195    | 2SRB-B1610 | 1-1/4         | 1-1/4          | 2-1/2         | 5              |
| 41449           | C2SRB-B2406 | 41199    | 2SRB-B2406 | 1-3/8         | 3/4            | 1-5/8         | 4-1/8          |
| 41453           | C2SRB-B2410 | 41203    | 2SRB-B2410 | 1-3/8         | 1-1/4          | 2-1/2         | 5              |
| 41457           | C2SRB-B3206 | 41207    | 2SRB-B3206 | 1-1/2         | 3/4            | 1-5/8         | 4-1/8          |
| 41461           | C2SRB-B3210 | 41211    | 2SRB-B3210 | 1-1/2         | 1-1/4          | 2-1/2         | 5              |
| 41478           | C2SRB-B6410 | 41227    | 2SRB-B6410 | 2             | 1-1/4          | 2-1/2         | 5              |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |                  |
|------------------------|------------------|
| + .0010<br>0           | * * + .0015<br>0 |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, EXTENDED LENGTH, BALL NOSE**

P.288,293,297

► Longer flute length than E2110 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

**E2111(C2SLB), E1111(2SLB) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | LENGTH BELOW SHANK | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|--------------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                    |                |
| 42289           | C2SLB-0803 | 42039    | 2SLB-0803 | 1/8           | 3/8            | 3/8           | 13/16              | 2-3/8          |
| 42293           | C2SLB-1203 | 42043    | 2SLB-1203 | 3/16          | 3/8            | 1/2           | 1-1/8              | 2-11/16        |
| 42297           | C2SLB-1603 | 42047    | 2SLB-1603 | 1/4           | 3/8            | 5/8           | 1-1/2              | 3-1/16         |
| 42301           | C2SLB-2003 | 42051    | 2SLB-2003 | 5/16          | 3/8            | 3/4           | 1-3/4              | 3-5/16         |
| 42305           | C2SLB-2403 | 42055    | 2SLB-2403 | 3/8           | 3/8            | 3/4           | 1-3/4              | 3-5/16         |
| 42313           | C2SLB-2804 | 42063    | 2SLB-2804 | 7/16          | 1/2            | 1             | 1-7/8              | 3-11/16        |
| 42321           | C2SLB-3204 | 42071    | 2SLB-3204 | 1/2           | 1/2            | 1             | 2-1/4              | 4              |
| 42337           | C2SLB-4005 | 42087    | 2SLB-4005 | 5/8           | 5/8            | 1-3/8         | 2-3/4              | 4-5/8          |
| 42359           | C2SLB-4806 | 42109    | 2SLB-4806 | 3/4           | 3/4            | 1-5/8         | 3-3/8              | 5-3/8          |
| 42426           | C2SLB-6408 | 42176    | 2SLB-6408 | 1             | 1              | 2-1/2         | 5                  | 7-1/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

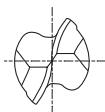
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



## 2 FLUTE, REGULAR LENGTH, BALL NOSE, DOUBLE



P.288,293,297

► Same construction features as E2110 end mill in a more economical version. Removes more material per grind. Machine ground notch assures positive anchorage in tool holder.

### E2112(C2DRB), E1112(2DRB) Series

Unit : inch

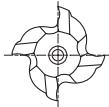
| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 45289           | C2DRB-0803 | 45039    | 2DRB-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 45293           | C2DRB-1203 | 45043    | 2DRB-1203 | 3/16          | 3/8            | 7/16          | 3-1/8          |
| 45297           | C2DRB-1603 | 45047    | 2DRB-1603 | 1/4           | 3/8            | 1/2           | 3-1/8          |
| 45301           | C2DRB-2003 | 45051    | 2DRB-2003 | 5/16          | 3/8            | 9/16          | 3-1/8          |
| 45305           | C2DRB-2403 | 45055    | 2DRB-2403 | 3/8           | 3/8            | 9/16          | 3-1/8          |
| 45313           | C2DRB-2804 | 45063    | 2DRB-2804 | 7/16          | 1/2            | 13/16         | 3-3/4          |
| 45321           | C2DRB-3204 | 45071    | 2DRB-3204 | 1/2           | 1/2            | 13/16         | 3-3/4          |
| 45337           | C2DRB-4005 | 45087    | 2DRB-4005 | 5/8           | 5/8            | 1-1/8         | 4-1/2          |
| 45359           | C2DRB-4806 | 45109    | 2DRB-4806 | 3/4           | 3/4            | 1-5/16        | 5              |
| 45426           | C2DRB-6408 | 45176    | 2DRB-6408 | 1             | 1              | 1-5/8         | 5-7/8          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|        |             |
|--------|-------------|
| 0      | * * - .0002 |
| -.0010 | -.0015      |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH**

P.287,292,296

► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

**E2031(C4SRS), E1031(4SRS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 04289           | C4SRS-0803 | 04039    | 4SRS-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 04290           | C4SRS-0903 | 04040    | 4SRS-0903 | 9/64          | 3/8            | 7/16          | 2-3/8          |
| 04291           | C4SRS-1003 | 04041    | 4SRS-1003 | 5/32          | 3/8            | 7/16          | 2-3/8          |
| 04292           | C4SRS-1103 | 04042    | 4SRS-1103 | 11/64         | 3/8            | 1/2           | 2-3/8          |
| 04293           | C4SRS-1203 | 04043    | 4SRS-1203 | 3/16          | 3/8            | 1/2           | 2-3/8          |
| 04294           | C4SRS-1303 | 04044    | 4SRS-1303 | 13/64         | 3/8            | 9/16          | 2-7/16         |
| 04295           | C4SRS-1403 | 04045    | 4SRS-1403 | 7/32          | 3/8            | 9/16          | 2-7/16         |
| 04296           | C4SRS-1503 | 04046    | 4SRS-1503 | 15/64         | 3/8            | 5/8           | 2-7/16         |
| 04297           | C4SRS-1603 | 04047    | 4SRS-1603 | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 04298           | C4SRS-1703 | 04048    | 4SRS-1703 | 17/64         | 3/8            | 11/16         | 2-1/2          |
| 04299           | C4SRS-1803 | 04049    | 4SRS-1803 | 9/32          | 3/8            | 11/16         | 2-1/2          |
| 04300           | C4SRS-1903 | 04050    | 4SRS-1903 | 19/64         | 3/8            | 3/4           | 2-1/2          |
| 04301           | C4SRS-2003 | 04051    | 4SRS-2003 | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 04302           | C4SRS-2103 | 04052    | 4SRS-2103 | 21/64         | 3/8            | 3/4           | 2-1/2          |
| 04303           | C4SRS-2203 | 04053    | 4SRS-2203 | 11/32         | 3/8            | 3/4           | 2-1/2          |
| 04304           | C4SRS-2303 | 04054    | 4SRS-2303 | 23/64         | 3/8            | 3/4           | 2-1/2          |
| 04305           | C4SRS-2403 | 04055    | 4SRS-2403 | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 04306           | C4SRS-2503 | 04056    | 4SRS-2503 | 25/64         | 3/8            | 1             | 2-11/16        |
| 04308           | C4SRS-2603 | 04058    | 4SRS-2603 | 13/32         | 3/8            | 1             | 2-11/16        |
| 04310           | C4SRS-2703 | 04060    | 4SRS-2703 | 27/64         | 3/8            | 1             | 2-11/16        |
| 04312           | C4SRS-2803 | 04062    | 4SRS-2803 | 7/16          | 3/8            | 1             | 2-11/16        |
| 04315           | C4SRS-2904 | 04065    | 4SRS-2904 | 29/64         | 1/2            | 1-1/4         | 3-1/4          |
| 04317           | C4SRS-3004 | 04067    | 4SRS-3004 | 15/32         | 1/2            | 1-1/4         | 3-1/4          |
| 04319           | C4SRS-3104 | 04069    | 4SRS-3104 | 31/64         | 1/2            | 1-1/4         | 3-1/4          |
| 04320           | C4SRS-3203 | 04070    | 4SRS-3203 | 1/2           | 3/8            | 1             | 2-11/16        |
| 04321           | C4SRS-3204 | 04071    | 4SRS-3204 | 1/2           | 1/2            | 1-1/4         | 3-1/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH



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► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

## E2031(C4SRS), E1031(4SRS) Series

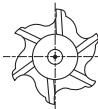
Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 04324           | C4SRS-3404 | 04074    | 4SRS-3404 | 17/32         | 1/2            | 1-3/8         | 3-3/8          |
| 04328           | C4SRS-3604 | 04078    | 4SRS-3604 | 9/16          | 1/2            | 1-3/8         | 3-3/8          |
| 04332           | C4SRS-3804 | 04082    | 4SRS-3804 | 19/32         | 1/2            | 1-3/8         | 3-3/8          |
| 04336           | C4SRS-4004 | 04086    | 4SRS-4004 | 5/8           | 1/2            | 1-3/8         | 3-3/8          |
| 04337           | C4SRS-4005 | 04087    | 4SRS-4005 | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 04340           | C4SRS-4204 | 04090    | 4SRS-4204 | 21/32         | 1/2            | 1-5/8         | 3-5/8          |
| 04348           | C4SRS-4405 | 04098    | 4SRS-4405 | 11/16         | 5/8            | 1-5/8         | 3-3/4          |
| 04352           | C4SRS-4604 | 04102    | 4SRS-4604 | 23/32         | 1/2            | 1-5/8         | 3-5/8          |
| 04357           | C4SRS-4804 | 04107    | 4SRS-4804 | 3/4           | 1/2            | 1-5/8         | 3-5/8          |
| 04358           | C4SRS-4805 | 04108    | 4SRS-4805 | 3/4           | 5/8            | 1-5/8         | 3-3/4          |
| 04359           | C4SRS-4806 | 04109    | 4SRS-4806 | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 04364           | C4SRS-5005 | 04114    | 4SRS-5005 | 25/32         | 5/8            | 1-7/8         | 4              |
| 04375           | C4SRS-5206 | 04125    | 4SRS-5206 | 13/16         | 3/4            | 1-7/8         | 4-1/8          |
| 04380           | C4SRS-5405 | 04130    | 4SRS-5405 | 27/32         | 5/8            | 1-7/8         | 4              |
| 04391           | C4SRS-5606 | 04141    | 4SRS-5606 | 7/8           | 3/4            | 1-7/8         | 4-1/8          |
| 04394           | C4SRS-5607 | 04144    | 4SRS-5607 | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 04399           | C4SRS-5806 | 04149    | 4SRS-5806 | 29/32         | 3/4            | 1-7/8         | 4-1/8          |
| 04407           | C4SRS-6006 | 04157    | 4SRS-6006 | 15/16         | 3/4            | 1-7/8         | 4-1/8          |
| 04414           | C4SRS-6206 | 04164    | 4SRS-6206 | 31/32         | 3/4            | 1-7/8         | 4-1/8          |
| 04420           | C4SRS-6405 | 04170    | 4SRS-6405 | 1             | 5/8            | 1-7/8         | 4              |
| 04422           | C4SRS-6406 | 04172    | 4SRS-6406 | 1             | 3/4            | 1-7/8         | 4-1/8          |
| 04426           | C4SRS-6408 | 04176    | 4SRS-6408 | 1             | 1              | 2             | 4-1/2          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |                  |
|------------------------|------------------|
| + .0010<br>0           | * * + .0015<br>0 |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****6 FLUTE, REGULAR LENGTH**

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► Possible for high-speed cutting, suitable for high efficiency machining. Easy to regrind.

**E2032(C6SRS), E1032(6SRS) Series**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 04338           | C6SRS-4005  | 04088    | 6SRS-4005  | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 04360           | C6SRS-4806  | 04110    | 6SRS-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 04376           | C6SRS-5206  | 04126    | 6SRS-5206  | 13/16         | 3/4            | 1-7/8         | 4-1/8          |
| 04390           | C6SRS-5605  | 04140    | 6SRS-5605  | 7/8           | 5/8            | 1-7/8         | 4              |
| 04395           | C6SRS-5607  | 04145    | 6SRS-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 04405           | C6SRS-6005  | 04155    | 6SRS-6005  | 15/16         | 5/8            | 1-7/8         | 4              |
| 04421           | C6SRS-6405  | 04171    | 6SRS-6405  | 1             | 5/8            | 1-7/8         | 4              |
| 04427           | C6SRS-6408  | 04177    | 6SRS-6408  | 1             | 1              | 2             | 4-1/2          |
| 04432           | C6SRS-B0806 | 04182    | 6SRS-B0806 | 1-1/8         | 3/4            | 2             | 4-1/4          |
| 04436           | C6SRS-B0808 | 04186    | 6SRS-B0808 | 1-1/8         | 1              | 2             | 4-1/2          |
| 04440           | C6SRS-B1606 | 04190    | 6SRS-B1606 | 1-1/4         | 3/4            | 2             | 4-1/4          |
| 04444           | C6SRS-B1608 | 04194    | 6SRS-B1608 | 1-1/4         | 1              | 2             | 4-1/2          |
| 04446           | C6SRS-B1610 | 04196    | 6SRS-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 04452           | C6SRS-B2408 | 04202    | 6SRS-B2408 | 1-3/8         | 1              | 2             | 4-1/2          |
| 04460           | C6SRS-B3208 | 04210    | 6SRS-B3208 | 1-1/2         | 1              | 2             | 4-1/2          |
| 04462           | C6SRS-B3210 | 04212    | 6SRS-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |
| 04470           | C6SRS-B4810 | 04220    | 6SRS-B4810 | 1-3/4         | 1-1/4          | 2             | 4-1/2          |
| 04478           | C6SRS-B6410 | 04228    | 6SRS-B6410 | 2             | 1-1/4          | 2             | 4-1/2          |
| 04481           | C6SRS-B6416 | 04231    | 6SRS-B6416 | 2             | 2              | 2             | 5-3/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4&6 FLUTE, LONG LENGTH**

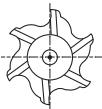
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► Longer flute length than E2031 type and allows deeper cutting. Easy to regrind.

**E2034(C4SLS), E1034(4SLS) Series****■ 4 FLUTE**

Unit : inch

| EDP No.         | ITEM No.   | EDP No. | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|---------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            |         |           |               |                |               |                |
| 05297           | C4SLS-1603 | 05047   | 4SLS-1603 | 1/4           | 3/8            | 1-1/4         | 3-1/16         |
| 05301           | C4SLS-2003 | 05051   | 4SLS-2003 | 5/16          | 3/8            | 1-3/8         | 3-1/8          |
| 05305           | C4SLS-2403 | 05055   | 4SLS-2403 | 3/8           | 3/8            | 1-1/2         | 3-1/4          |
| 05313           | C4SLS-2804 | 05063   | 4SLS-2804 | 7/16          | 1/2            | 1-3/4         | 3-3/4          |
| 05321           | C4SLS-3204 | 05071   | 4SLS-3204 | 1/2           | 1/2            | 2             | 4              |
| 05337           | C4SLS-4005 | 05087   | 4SLS-4005 | 5/8           | 5/8            | 2-1/2         | 4-5/8          |
| 05359           | C4SLS-4806 | 05109   | 4SLS-4806 | 3/4           | 3/4            | 3             | 5-1/4          |
| 05394           | C4SLS-5607 | 05144   | 4SLS-5607 | 7/8           | 7/8            | 3-1/2         | 5-3/4          |
| 05426           | C4SLS-6408 | 05176   | 4SLS-6408 | 1             | 1              | 4             | 6-1/2          |

**E2035(C6SLS), E1035(6SLS) Series****■ 6 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No. | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|---------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             |         |            |               |                |               |                |
| 05436           | C6SLS-B0808 | 05186   | 6SLS-B0808 | 1-1/8         | 1              | 4             | 6-1/2          |
| 05444           | C6SLS-B1608 | 05194   | 6SLS-B1608 | 1-1/4         | 1              | 4             | 6-1/2          |
| 05446           | C6SLS-B1610 | 05196   | 6SLS-B1610 | 1-1/4         | 1-1/4          | 4             | 6-1/2          |
| 05460           | C6SLS-B3208 | 05210   | 6SLS-B3208 | 1-1/2         | 1              | 4             | 6-1/2          |
| 05462           | C6SLS-B3210 | 05212   | 6SLS-B3210 | 1-1/2         | 1-1/4          | 4             | 6-1/2          |
| 05470           | C6SLS-B4810 | 05220   | 6SLS-B4810 | 1-3/4         | 1-1/4          | 4             | 6-1/2          |
| 05478           | C6SLS-B6410 | 05228   | 6SLS-B6410 | 2             | 1-1/4          | 4             | 6-1/2          |
| 05485           | C6SLS-B6416 | 05235   | 6SLS-B6416 | 2             | 2              | 4             | 7-3/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|              |                  |
|--------------|------------------|
| + .0010<br>0 | * * + .0015<br>0 |
|--------------|------------------|

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4&6 FLUTE, EXTRA LONG LENGTH**

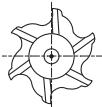
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► Provided with the longest flute length and suitable for high accuracy machining of deep step. Easy to regrind.

**E2036(C4SES), E1036(4SES) Series****■ 4 FLUTE**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 06297           | C4SES-1603 | 06047    | 4SES-1603 | 1/4           | 3/8            | 1-3/4         | 3-9/16         |
| 06301           | C4SES-2003 | 06051    | 4SES-2003 | 5/16          | 3/8            | 2             | 3-3/4          |
| 06305           | C4SES-2403 | 06055    | 4SES-2403 | 3/8           | 3/8            | 2-1/2         | 4-1/4          |
| 06321           | C4SES-3204 | 06071    | 4SES-3204 | 1/2           | 1/2            | 3             | 5              |
| 06337           | C4SES-4005 | 06087    | 4SES-4005 | 5/8           | 5/8            | 4             | 6-1/8          |
| 06359           | C4SES-4806 | 06109    | 4SES-4806 | 3/4           | 3/4            | 4             | 6-1/4          |
| 06394           | C4SES-5607 | 06144    | 4SES-5607 | 7/8           | 7/8            | 5             | 7-1/4          |
| 06426           | C4SES-6408 | 06176    | 4SES-6408 | 1             | 1              | 6             | 8-1/2          |

**E2037(C6SES), E1037(6SES) Series****■ 6 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 06446           | C6SES-B1610 | 06196    | 6SES-B1610 | 1-1/4         | 1-1/4          | 6             | 8-1/2          |
| 06462           | C6SES-B3210 | 06212    | 6SES-B3210 | 1-1/2         | 1-1/4          | 8             | 10-1/2         |
| 06491           | C6SES-B6416 | 06241    | 6SES-B6416 | 2             | 2              | 8             | 11-3/4         |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE



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► Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.

## E2051(C4DRS), E1051(4DRS) Series

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 12289           | C4DRS-0803 | 12039    | 4DRS-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 12290           | C4DRS-0903 | 12040    | 4DRS-0903 | 9/64          | 3/8            | 7/16          | 3-1/8          |
| 12291           | C4DRS-1003 | 12041    | 4DRS-1003 | 5/32          | 3/8            | 7/16          | 3-1/8          |
| 12292           | C4DRS-1103 | 12042    | 4DRS-1103 | 11/64         | 3/8            | 1/2           | 3-1/4          |
| 12293           | C4DRS-1203 | 12043    | 4DRS-1203 | 3/16          | 3/8            | 1/2           | 3-1/4          |
| 12294           | C4DRS-1303 | 12044    | 4DRS-1303 | 13/64         | 3/8            | 9/16          | 3-1/4          |
| 12295           | C4DRS-1403 | 12045    | 4DRS-1403 | 7/32          | 3/8            | 9/16          | 3-1/4          |
| 12296           | C4DRS-1503 | 12046    | 4DRS-1503 | 15/64         | 3/8            | 5/8           | 3-3/8          |
| 12297           | C4DRS-1603 | 12047    | 4DRS-1603 | 1/4           | 3/8            | 5/8           | 3-3/8          |
| 12298           | C4DRS-1703 | 12048    | 4DRS-1703 | 17/64         | 3/8            | 11/16         | 3-3/8          |
| 12299           | C4DRS-1803 | 12049    | 4DRS-1803 | 9/32          | 3/8            | 11/16         | 3-3/8          |
| 12300           | C4DRS-1903 | 12050    | 4DRS-1903 | 19/64         | 3/8            | 3/4           | 3-1/2          |
| 12301           | C4DRS-2003 | 12051    | 4DRS-2003 | 5/16          | 3/8            | 3/4           | 3-1/2          |
| 12302           | C4DRS-2103 | 12052    | 4DRS-2103 | 21/64         | 3/8            | 3/4           | 3-1/2          |
| 12303           | C4DRS-2203 | 12053    | 4DRS-2203 | 11/32         | 3/8            | 3/4           | 3-1/2          |
| 12304           | C4DRS-2303 | 12054    | 4DRS-2303 | 23/64         | 3/8            | 3/4           | 3-1/2          |
| 12305           | C4DRS-2403 | 12055    | 4DRS-2403 | 3/8           | 3/8            | 3/4           | 3-1/2          |
| 12307           | C4DRS-2504 | 12057    | 4DRS-2504 | 25/64         | 1/2            | 1             | 4-1/8          |
| 12309           | C4DRS-2604 | 12059    | 4DRS-2604 | 13/32         | 1/2            | 1             | 4-1/8          |
| 12311           | C4DRS-2704 | 12061    | 4DRS-2704 | 27/64         | 1/2            | 1             | 4-1/8          |
| 12313           | C4DRS-2804 | 12063    | 4DRS-2804 | 7/16          | 1/2            | 1             | 4-1/8          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |            |
|------------------------|------------|
| 0                      | * * -.0002 |
| -.0010                 | -.0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, DOUBLE**

P.287,292,296

► Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.

**E2051(C4DRS), E1051(4DRS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 12315           | C4DRS-2904 | 12065    | 4DRS-2904 | 29/64         | 1/2            | 1             | 4-1/8          |
| 12317           | C4DRS-3004 | 12067    | 4DRS-3004 | 15/32         | 1/2            | 1             | 4-1/8          |
| 12319           | C4DRS-3104 | 12069    | 4DRS-3104 | 31/64         | 1/2            | 1             | 4-1/8          |
| 12321           | C4DRS-3204 | 12071    | 4DRS-3204 | 1/2           | 1/2            | 1             | 4-1/8          |
| 12330           | C4DRS-3605 | 12080    | 4DRS-3605 | 9/16          | 5/8            | 1-3/8         | 5              |
| 12337           | C4DRS-4005 | 12087    | 4DRS-4005 | 5/8           | 5/8            | 1-3/8         | 5              |
| 12350           | C4DRS-4406 | 12100    | 4DRS-4406 | 11/16         | 3/4            | 1-5/8         | 5-5/8          |
| 12359           | C4DRS-4806 | 12109    | 4DRS-4806 | 3/4           | 3/4            | 1-5/8         | 5-5/8          |
| 12377           | C4DRS-5207 | 12127    | 4DRS-5207 | 13/16         | 7/8            | 1-7/8         | 6-1/8          |
| 12394           | C4DRS-5607 | 12144    | 4DRS-5607 | 7/8           | 7/8            | 1-7/8         | 6-1/8          |
| 12410           | C4DRS-6008 | 12160    | 4DRS-6008 | 15/16         | 1              | 1-7/8         | 6-3/8          |
| 12426           | C4DRS-6408 | 12176    | 4DRS-6408 | 1             | 1              | 1-7/8         | 6-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|             |                      |
|-------------|----------------------|
| 0<br>-.0010 | * * -.0002<br>-.0015 |
|-------------|----------------------|

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4, 6&8 FLUTE, REGULAR LENGTH, 3/4" SHANK**HSS  
Co8

HSS

4-8

30°

FLAT

DATA

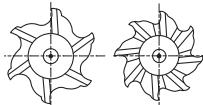
P.287,292,296

► E2031(3/4" shank, multiple flute, general purpose end mills) are recommended for finishing operations for Bridgeport machines and other similar operations. Easy to regrind.

**E2031(C4SRS), E1031(4SRS) Series****■ 4 FLUTE**

Unit : inch

| EDP No.                | ITEM No.   | EDP No. | ITEM No.        | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|------------------------|------------|---------|-----------------|---------------|----------------|---------------|----------------|--------------|
| <b>8% COBALT (M42)</b> |            |         |                 |               |                |               |                |              |
|                        |            |         | <b>HSS (M2)</b> |               |                |               |                |              |
| 04359                  | C4SRS-4806 | 04109   | 4SRS-4806       | 3/4           | 3/4            | 1-5/8         | 3-7/8          | 4            |
| 04375                  | C4SRS-5206 | 04125   | 4SRS-5206       | 13/16         | 3/4            | 1-7/8         | 4-1/8          | 4            |
| 04391                  | C4SRS-5606 | 04141   | 4SRS-5606       | 7/8           | 3/4            | 1-7/8         | 4-1/8          | 4            |
| 04407                  | C4SRS-6006 | 04157   | 4SRS-6006       | 15/16         | 3/4            | 1-7/8         | 4-1/8          | 4            |
| 04422                  | C4SRS-6406 | 04172   | 4SRS-6406       | 1             | 3/4            | 1-7/8         | 4-1/8          | 4            |

**E2032(C6SRS), E1032(6SRS) Series****■ 6&8 FLUTE**

Unit : inch

| EDP No.                | ITEM No.    | EDP No. | ITEM No.        | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|------------------------|-------------|---------|-----------------|---------------|----------------|---------------|----------------|--------------|
| <b>8% COBALT (M42)</b> |             |         |                 |               |                |               |                |              |
|                        |             |         | <b>HSS (M2)</b> |               |                |               |                |              |
| 04432                  | C6SRS-B0806 | 04182   | 6SRS-B0806      | 1-1/8         | 3/4            | 2             | 4-1/4          | 6            |
| 04440                  | C6SRS-B1606 | 04190   | 6SRS-B1606      | 1-1/4         | 3/4            | 2             | 4-1/4          | 6            |
| 04458                  | C6SRS-B3206 | 04208   | 6SRS-B3206      | 1-1/2         | 3/4            | 2             | 4-1/4          | 6            |
| 04468                  | C6SRS-B4806 | 04218   | 6SRS-B4806      | 1-3/4         | 3/4            | 2             | 4-1/2          | 6            |
| 04476                  | C8SRS-B6406 | 04226   | 8SRS-B6406      | 2             | 3/4            | 2             | 4-1/2          | 8            |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

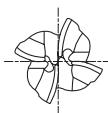
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, BALL NOSE**HSS  
Co8

4

30°

FLAT

DATA

P.288,293,297

- The four flute ball end mills are designed for milling of radius bottom slots fillets and special contours. The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut.

**E2020(C4SRB) Series**

Unit : inch

| EDP No.                | ITEM No.    | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|------------------------|-------------|---------------|----------------|---------------|----------------|
| <b>8% COBALT (M42)</b> |             |               |                |               |                |
| 43289                  | C4SRB-0803  | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 43293                  | C4SRB-1203  | 3/16          | 3/8            | 1/2           | 2-3/8          |
| 43297                  | C4SRB-1603  | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 43301                  | C4SRB-2003  | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 43305                  | C4SRB-2403  | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 43312                  | C4SRB-2803  | 7/16          | 3/8            | 1             | 2-11/16        |
| 43321                  | C4SRB-3204  | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 43337                  | C4SRB-4005  | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 43350                  | C4SRB-4405  | 11/16         | 5/8            | 1-5/8         | 3-3/4          |
| 43359                  | C4SRB-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 43394                  | C4SRB-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 43426                  | C4SRB-6408  | 1             | 1              | 2             | 4-1/2          |
| 43435                  | C4SRB-B0808 | 1-1/8         | 1              | 2             | 4-1/2          |
| 43445                  | C4SRB-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 43461                  | C4SRB-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |
| 43477                  | C4SRB-B6410 | 2             | 1-1/4          | 2             | 4-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

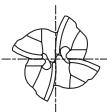
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, LONG LENGTH, BALL NOSE**HSS  
Co8

4

30°

FLAT

DATA

P.288,293,297

► Longer flute length than E2020 type and suitable for high efficient copying process and deep cutting of die mold corner radius.

**E2021(C4SLB) Series**

Unit : inch

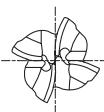
| EDP No. | ITEM No.   | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|---------|------------|------------------|-------------------|------------------|-------------------|
|         |            | 8% COBALT (M42)  |                   |                  |                   |
| 44297   | C4SLB-1603 | 1/4              | 3/8               | 1-1/4            | 3-1/16            |
| 44301   | C4SLB-2003 | 5/16             | 3/8               | 1-3/8            | 3-1/8             |
| 44305   | C4SLB-2403 | 3/8              | 3/8               | 1-1/2            | 3-1/4             |
| 44321   | C4SLB-3204 | 1/2              | 1/2               | 2                | 4                 |
| 44337   | C4SLB-4005 | 5/8              | 5/8               | 2-1/2            | 4-5/8             |
| 44359   | C4SLB-4806 | 3/4              | 3/4               | 3                | 5-1/4             |
| 44394   | C4SLB-5607 | 7/8              | 7/8               | 3-1/2            | 5-3/4             |
| 44426   | C4SLB-6408 | 1                | 1                 | 4                | 6-1/2             |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt
  - Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
  - Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|              |                  |
|--------------|------------------|
| + .0010<br>0 | * * + .0015<br>0 |
|--------------|------------------|

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, BALL NOSE, DOUBLE**HSS  
Co8

4

30°

FLAT

DATA

P.288,293,297

- Same construction features as E2020 end mill in a more economical version. Removes more material per grind. Machine ground notch assures positive anchorage in tool holder.

**E2069(C4DRB) Series**

Unit : inch

| EDP No.                | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|------------------------|------------|---------------|----------------|---------------|----------------|
| <b>8% COBALT (M42)</b> |            |               |                |               |                |
| 46289                  | C4DRB-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 46293                  | C4DRB-1203 | 3/16          | 3/8            | 1/2           | 3-1/4          |
| 46297                  | C4DRB-1603 | 1/4           | 3/8            | 5/8           | 3-3/8          |
| 46301                  | C4DRB-2003 | 5/16          | 3/8            | 3/4           | 3-1/2          |
| 46305                  | C4DRB-2403 | 3/8           | 3/8            | 3/4           | 3-1/2          |
| 46313                  | C4DRB-2804 | 7/16          | 1/2            | 1             | 4-1/8          |
| 46321                  | C4DRB-3204 | 1/2           | 1/2            | 1             | 4-1/8          |
| 46337                  | C4DRB-4005 | 5/8           | 5/8            | 1-3/8         | 5              |
| 46359                  | C4DRB-4806 | 3/4           | 3/4            | 1-5/8         | 5-5/8          |
| 46426                  | C4DRB-6408 | 1             | 1              | 1-7/8         | 6-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TIN), CC(TICN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

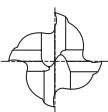
**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, CENTER CUTTING



P.287,292,296

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

## E2039(C4SRC), E1039(4SRC) Series

Unit : inch

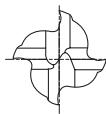
| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 07289           | C4SRC-0803 | 07039    | 4SRC-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 07291           | C4SRC-1003 | 07041    | 4SRC-1003 | 5/32          | 3/8            | 7/16          | 2-3/8          |
| 07293           | C4SRC-1203 | 07043    | 4SRC-1203 | 3/16          | 3/8            | 1/2           | 2-3/8          |
| 07295           | C4SRC-1403 | 07045    | 4SRC-1403 | 7/32          | 3/8            | 9/16          | 2-7/16         |
| 07297           | C4SRC-1603 | 07047    | 4SRC-1603 | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 07299           | C4SRC-1803 | 07049    | 4SRC-1803 | 9/32          | 3/8            | 11/16         | 2-1/2          |
| 07301           | C4SRC-2003 | 07051    | 4SRC-2003 | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 07303           | C4SRC-2203 | 07053    | 4SRC-2203 | 11/32         | 3/8            | 3/4           | 2-1/2          |
| 07305           | C4SRC-2403 | 07055    | 4SRC-2403 | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 07308           | C4SRC-2603 | 07058    | 4SRC-2603 | 13/32         | 3/8            | 1             | 2-11/16        |
| 07312           | C4SRC-2803 | 07062    | 4SRC-2803 | 7/16          | 3/8            | 1             | 2-11/16        |
| 07316           | C4SRC-3003 | 07066    | 4SRC-3003 | 15/32         | 3/8            | 1             | 2-11/16        |
| 07320           | C4SRC-3203 | 07070    | 4SRC-3203 | 1/2           | 3/8            | 1             | 2-11/16        |
| 07321           | C4SRC-3204 | 07071    | 4SRC-3204 | 1/2           | 1/2            | 1-1/4         | 3-1/4          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, CENTER CUTTING**HSS  
Co8

HSS

4

30°

FLAT

DATA

P.287,292,296

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

**E2039(C4SRC), E1039(4SRC) Series**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 07336           | C4SRC-4004  | 07086    | 4SRC-4004  | 5/8           | 1/2            | 1-3/8         | 3-3/8          |
| 07337           | C4SRC-4005  | 07087    | 4SRC-4005  | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 07348           | C4SRC-4405  | 07098    | 4SRC-4405  | 11/16         | 5/8            | 1-5/8         | 3-3/4          |
| 07357           | C4SRC-4804  | 07107    | 4SRC-4804  | 3/4           | 1/2            | 1-5/8         | 3-5/8          |
| 07358           | C4SRC-4805  | 07108    | 4SRC-4805  | 3/4           | 5/8            | 1-5/8         | 3-3/4          |
| 07359           | C4SRC-4806  | 07109    | 4SRC-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 07391           | C4SRC-5606  | 07141    | 4SRC-5606  | 7/8           | 3/4            | 1-7/8         | 4-1/8          |
| 07394           | C4SRC-5607  | 07144    | 4SRC-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 07420           | C4SRC-6405  | 07170    | 4SRC-6405  | 1             | 5/8            | 1-7/8         | 4              |
| 07422           | C4SRC-6406  | 07172    | 4SRC-6406  | 1             | 3/4            | 1-7/8         | 4-1/8          |
| 07426           | C4SRC-6408  | 07176    | 4SRC-6408  | 1             | 1              | 2             | 4-1/2          |
| 07435           | C4SRC-B0808 | 07185    | 4SRC-B0808 | 1-1/8         | 1              | 2             | 4-1/2          |
| 07445           | C4SRC-B1610 | 07195    | 4SRC-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 07461           | C4SRC-B3210 | 07211    | 4SRC-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 6 FLUTE, REGULAR LENGTH, CENTER CUTTING



P.287,292,296

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

## E2042(C6SRC), E1042(6SRC) Series

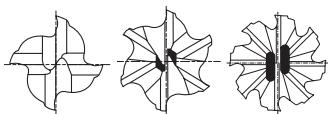
Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 07322           | C6SRC-3204  | 07072    | 6SRC-3204  | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 07338           | C6SRC-4005  | 07088    | 6SRC-4005  | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 07349           | C6SRC-4405  | 07099    | 6SRC-4405  | 11/16         | 5/8            | 1-5/8         | 3-3/4          |
| 07360           | C6SRC-4806  | 07110    | 6SRC-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 07395           | C6SRC-5607  | 07145    | 6SRC-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 07427           | C6SRC-6408  | 07177    | 6SRC-6408  | 1             | 1              | 2             | 4-1/2          |
| 07436           | C6SRC-B0808 | 07186    | 6SRC-B0808 | 1-1/8         | 1              | 2             | 4-1/2          |
| 07446           | C6SRC-B1610 | 07196    | 6SRC-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 07462           | C6SRC-B3210 | 07212    | 6SRC-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |
| 07478           | C6SRC-B6410 | 07228    | 6SRC-B6410 | 2             | 1-1/4          | 2             | 4-1/2          |
| 07481           | C6SRC-B6416 | 07231    | 6SRC-B6416 | 2             | 2              | 2             | 5-3/4          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |                  |
|------------------------|------------------|
| + .0010<br>0           | * * + .0015<br>0 |

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****MULTI FLUTE, MEDIUM LENGTH, CENTER CUTTING**HSS  
Co8

4-8

30°

FLAT

DATA

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

**E2039(4 FLUTE), E2042(6,8 FLUTE) Series**

Unit : inch

| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 07901                      | 1                | 1                 | 3                | 5-1/2             | 4               |
| 07902                      | 1-1/4            | 1-1/4             | 3                | 5-1/2             | 4               |
| 07903                      | 1-1/2            | 1-1/4             | 3                | 5-1/2             | 4               |
| 07094                      | 1                | 1                 | 3                | 5-1/2             | 6               |
| 07095                      | 1-1/4            | 1-1/4             | 3                | 5-1/2             | 6               |
| 07096                      | 1-1/2            | 1-1/4             | 3                | 5-1/2             | 6               |
| 07097                      | 1-3/4            | 1-1/4             | 3                | 5-1/2             | 6               |
| 99098                      | 2                | 1-1/4             | 3                | 5-1/2             | 8               |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

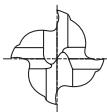
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4&6 FLUTE, LONG LENGTH, CENTER CUTTING**

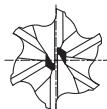
P.287,292,296

► Longer flute length than E2039 type, E2042 and allows deeper cutting.

**E2040(C4SLC), E1040(4SLC) Series****■ 4 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 08297           | C4SLC-1603  | 08047    | 4SLC-1603  | 1/4           | 3/8            | 1-1/4         | 3-1/16         |
| 08301           | C4SLC-2003  | 08051    | 4SLC-2003  | 5/16          | 3/8            | 1-3/8         | 3-1/8          |
| 08305           | C4SLC-2403  | 08055    | 4SLC-2403  | 3/8           | 3/8            | 1-1/2         | 3-1/4          |
| 08321           | C4SLC-3204  | 08071    | 4SLC-3204  | 1/2           | 1/2            | 2             | 4              |
| 08337           | C4SLC-4005  | 08087    | 4SLC-4005  | 5/8           | 5/8            | 2-1/2         | 4-5/8          |
| 08359           | C4SLC-4806  | 08109    | 4SLC-4806  | 3/4           | 3/4            | 3             | 5-1/4          |
| 08394           | C4SLC-5607  | 08144    | 4SLC-5607  | 7/8           | 7/8            | 3-1/2         | 5-3/4          |
| 08426           | C4SLC-6408  | 08176    | 4SLC-6408  | 1             | 1              | 4             | 6-1/2          |
| 08445           | C4SLC-B1610 | 08195    | 4SLC-B1610 | 1-1/4         | 1-1/4          | 4             | 6-1/2          |
| 08461           | C4SLC-B3210 | 08211    | 4SLC-B3210 | 1-1/2         | 1-1/4          | 4             | 6-1/2          |

**E2162(C6SLC), E1162(6SLC) Series****■ 6 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 08322           | C6SLC-3204  | 08072    | 6SLC-3204  | 1/2           | 1/2            | 2             | 4              |
| 08338           | C6SLC-4005  | 08088    | 6SLC-4005  | 5/8           | 5/8            | 2-1/2         | 4-5/8          |
| 08360           | C6SLC-4806  | 08110    | 6SLC-4806  | 3/4           | 3/4            | 3             | 5-1/4          |
| 08395           | C6SLC-5607  | 08145    | 6SLC-5607  | 7/8           | 7/8            | 3-1/2         | 5-3/4          |
| 08427           | C6SLC-6408  | 08177    | 6SLC-6408  | 1             | 1              | 4             | 6-1/2          |
| 08446           | C6SLC-B1610 | 08196    | 6SLC-B1610 | 1-1/4         | 1-1/4          | 4             | 6-1/2          |
| 08462           | C6SLC-B3210 | 08212    | 6SLC-B3210 | 1-1/2         | 1-1/4          | 4             | 6-1/2          |
| 08478           | C6SLC-B6410 | 08228    | 6SLC-B6410 | 2             | 1-1/4          | 4             | 6-1/2          |
| 08485           | C6SLC-B6416 | 08235    | 6SLC-B6416 | 2             | 2              | 4             | 7-3/4          |
| 08489           | C6SLC-B6401 | 08239    | 6SLC-B6401 | 2             | 2              | 6             | 9-3/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

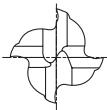
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|              |                  |
|--------------|------------------|
| + .0010<br>0 | * * + .0015<br>0 |
|--------------|------------------|

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4&6 FLUTE, EXTRA LONG LENGTH,  
CENTER CUTTING**HSS  
Co8

HSS

4&amp;6

30°

FLAT

DATA

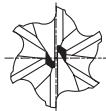
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- Provided with longest flute length and suitable for high accuracy machining of deep step.

**E2041(C4SEC), E1041(4SEC) Series****■ 4 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 09297           | C4SEC-1603  | 09047    | 4SEC-1603  | 1/4           | 3/8            | 1-3/4         | 3-9/16         |
| 09301           | C4SEC-2003  | 09051    | 4SEC-2003  | 5/16          | 3/8            | 2             | 3-3/4          |
| 09305           | C4SEC-2403  | 09055    | 4SEC-2403  | 3/8           | 3/8            | 2-1/2         | 4-1/4          |
| 09321           | C4SEC-3204  | 09071    | 4SEC-3204  | 1/2           | 1/2            | 3             | 5              |
| 09337           | C4SEC-4005  | 09087    | 4SEC-4005  | 5/8           | 5/8            | 4             | 6-1/8          |
| 09359           | C4SEC-4806  | 09109    | 4SEC-4806  | 3/4           | 3/4            | 4             | 6-1/4          |
| 09394           | C4SEC-5607  | 09144    | 4SEC-5607  | 7/8           | 7/8            | 5             | 7-1/4          |
| 09426           | C4SEC-6408  | 09176    | 4SEC-6408  | 1             | 1              | 6             | 8-1/2          |
| 09445           | C4SEC-B1610 | 09195    | 4SEC-B1610 | 1-1/4         | 1-1/4          | 6             | 8-1/2          |

**E2175(C6SEC), E1175(6SEC) Series****■ 6 FLUTE**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 09322           | C6SEC-3204  | 09072    | 6SEC-3204  | 1/2           | 1/2            | 3             | 5              |
| 09338           | C6SEC-4005  | 09088    | 6SEC-4005  | 5/8           | 5/8            | 4             | 6-1/8          |
| 09360           | C6SEC-4806  | 09110    | 6SEC-4806  | 3/4           | 3/4            | 4             | 6-1/4          |
| 09395           | C6SEC-5607  | 09145    | 6SEC-5607  | 7/8           | 7/8            | 5             | 7-1/4          |
| 09427           | C6SEC-6408  | 09177    | 6SEC-6408  | 1             | 1              | 6             | 8-1/2          |
| 09446           | C6SEC-B1610 | 09196    | 6SEC-B1610 | 1-1/4         | 1-1/4          | 6             | 8-1/2          |
| 09462           | C6SEC-B3210 | 09212    | 6SEC-B3210 | 1-1/2         | 1-1/4          | 8             | 10-1/2         |
| 09491           | C6SEC-B6416 | 09241    | 6SEC-B6416 | 2             | 2              | 8             | 11-3/4         |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

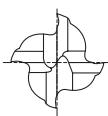
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.



# 4 FLUTE, REGULAR LENGTH, DOUBLE, CENTER CUTTING



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► Series E2053 end mills are the double-end version of E2039 center cutting single-end tools. They are used for slotting, shallow pocketing, tracer milling or die sinking and similar operation.

## E2053(C4DRC), E1053(4DRC) Series

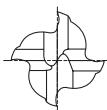
Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 13289           | C4DRC-0803 | 13039    | 4DRC-0803 | 1/8           | 3/8            | 3/8           | 3-1/16         |
| 13290           | C4DRC-0903 | 13040    | 4DRC-0903 | 9/64          | 3/8            | 7/16          | 3-1/8          |
| 13291           | C4DRC-1003 | 13041    | 4DRC-1003 | 5/32          | 3/8            | 7/16          | 3-1/8          |
| 13292           | C4DRC-1103 | 13042    | 4DRC-1103 | 11/64         | 3/8            | 1/2           | 3-1/4          |
| 13293           | C4DRC-1203 | 13043    | 4DRC-1203 | 3/16          | 3/8            | 1/2           | 3-1/4          |
| 13294           | C4DRC-1303 | 13044    | 4DRC-1303 | 13/64         | 3/8            | 9/16          | 3-1/4          |
| 13295           | C4DRC-1403 | 13045    | 4DRC-1403 | 7/32          | 3/8            | 9/16          | 3-1/4          |
| 13296           | C4DRC-1503 | 13046    | 4DRC-1503 | 15/64         | 3/8            | 5/8           | 3-3/8          |
| 13297           | C4DRC-1603 | 13047    | 4DRC-1603 | 1/4           | 3/8            | 5/8           | 3-3/8          |
| 13298           | C4DRC-1703 | 13048    | 4DRC-1703 | 17/64         | 3/8            | 11/16         | 3-3/8          |
| 13299           | C4DRC-1803 | 13049    | 4DRC-1803 | 9/32          | 3/8            | 11/16         | 3-3/8          |
| 13300           | C4DRC-1903 | 13050    | 4DRC-1903 | 19/64         | 3/8            | 3/4           | 3-1/2          |
| 13301           | C4DRC-2003 | 13051    | 4DRC-2003 | 5/16          | 3/8            | 3/4           | 3-1/2          |
| 13302           | C4DRC-2103 | 13052    | 4DRC-2103 | 21/64         | 3/8            | 3/4           | 3-1/2          |
| 13303           | C4DRC-2203 | 13053    | 4DRC-2203 | 11/32         | 3/8            | 3/4           | 3-1/2          |
| 13304           | C4DRC-2303 | 13054    | 4DRC-2303 | 23/64         | 3/8            | 3/4           | 3-1/2          |
| 13305           | C4DRC-2403 | 13055    | 4DRC-2403 | 3/8           | 3/8            | 3/4           | 3-1/2          |
| 13307           | C4DRC-2504 | 13057    | 4DRC-2504 | 25/64         | 1/2            | 1             | 4-1/8          |
| 13309           | C4DRC-2604 | 13059    | 4DRC-2604 | 13/32         | 1/2            | 1             | 4-1/8          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |             |
|------------------------|-------------|
| 0                      | * * - .0002 |
| -.0010                 | -.0015      |

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH, DOUBLE,  
CENTER CUTTING**

P.287,292,296

- Series E2053 end mills are the double-end version of E2039 center cutting single-end tools. They are used for slotting, shallow pocketing, tracer milling or die sinking and similar operation.

**E2053(C4DRC), E1053(4DRC) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 13311           | C4DRC-2704 | 13061    | 4DRC-2704 | 27/64         | 1/2            | 1             | 4-1/8          |
| 13313           | C4DRC-2804 | 13063    | 4DRC-2804 | 7/16          | 1/2            | 1             | 4-1/8          |
| 13315           | C4DRC-2904 | 13065    | 4DRC-2904 | 29/64         | 1/2            | 1             | 4-1/8          |
| 13317           | C4DRC-3004 | 13067    | 4DRC-3004 | 15/32         | 1/2            | 1             | 4-1/8          |
| 13319           | C4DRC-3104 | 13069    | 4DRC-3104 | 31/64         | 1/2            | 1             | 4-1/8          |
| 13321           | C4DRC-3204 | 13071    | 4DRC-3204 | 1/2           | 1/2            | 1             | 4-1/8          |
| 13330           | C4DRC-3605 | 13080    | 4DRC-3605 | 9/16          | 5/8            | 1-3/8         | 5              |
| 13337           | C4DRC-4005 | 13087    | 4DRC-4005 | 5/8           | 5/8            | 1-3/8         | 5              |
| 13350           | C4DRC-4406 | 13100    | 4DRC-4406 | 11/16         | 3/4            | 1-5/8         | 5-5/8          |
| 13359           | C4DRC-4806 | 13109    | 4DRC-4806 | 3/4           | 3/4            | 1-5/8         | 5-5/8          |
| 13377           | C4DRC-5207 | 13127    | 4DRC-5207 | 13/16         | 7/8            | 1-7/8         | 6-1/8          |
| 13394           | C4DRC-5607 | 13144    | 4DRC-5607 | 7/8           | 7/8            | 1-7/8         | 6-1/8          |
| 13426           | C4DRC-6408 | 13176    | 4DRC-6408 | 1             | 1              | 1-7/8         | 6-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

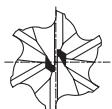
**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.



## 6 FLUTE, REGULAR with COMBINATION 2" SHANK, CENTER CUTTING



P.287,292,296

- These are to be used for heavy hogging cuts in die-sinking, tape & tracer controlled milling and similar work. The Heavy-Duty end mills are made with toughened Combination shank, heavy web construction, accurate machine-ground end-teeth notching and a special surface treatment to reduce cutting-edge wear.

### E2100(C6ERC), E1100(6ERC) Series

Unit : inch

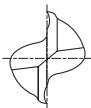
| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |               |                |               |                |
| 10481           | C6ERC-B6402 | 10231    | 6ERC-B6402 |               | 2              | 2             | 2              |
| 10485           | C6ERC-B6404 | 10235    | 6ERC-B6404 |               | 2              | 2             | 4              |
| 10487           | C6ERC-B6405 | 10237    | 6ERC-B6405 |               | 2              | 2             | 5              |
| 10489           | C6ERC-B6406 | 10239    | 6ERC-B6406 |               | 2              | 2             | 6              |
| 10491           | C6ERC-B6408 | 10241    | 6ERC-B6408 |               | 2              | 2             | 8              |
|                 |             |          |            |               | 11-3/4         |               |                |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, MINIATURE, STUB LENGTH, DOUBLE**

P.290

► Tools under Miniature end mills have 3/16" shank diameter without flats. They are designed with positive rake angle geometry and a high helix angle to insure free cutting action. The flute design provides good strength behind the cutting edge. Suitable for finishing of precision components such as watch, camera, electronic apparatus molds, etc.

**E2001(C2MSS), E1001(2MSS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 49252           | C2MSS-0201 | 49002    | 2MSS-0201 | 1/32          | 3/16           | 3/64          | 2              |
| 49254           | C2MSS-0301 | 49004    | 2MSS-0301 | 3/64          | 3/16           | 1/16          | 2              |
| 49256           | C2MSS-0401 | 49006    | 2MSS-0401 | 1/16          | 3/16           | 3/32          | 2              |
| 49258           | C2MSS-0501 | 49008    | 2MSS-0501 | 5/64          | 3/16           | 1/8           | 2              |
| 49260           | C2MSS-0601 | 49010    | 2MSS-0601 | 3/32          | 3/16           | 9/64          | 2              |
| 49262           | C2MSS-0701 | 49012    | 2MSS-0701 | 7/64          | 3/16           | 5/32          | 2              |
| 49264           | C2MSS-0801 | 49014    | 2MSS-0801 | 1/8           | 3/16           | 3/16          | 2              |
| 49266           | C2MSS-0901 | 49016    | 2MSS-0901 | 9/64          | 3/16           | 7/32          | 2              |
| 49268           | C2MSS-1001 | 49018    | 2MSS-1001 | 5/32          | 3/16           | 15/64         | 2              |
| 49270           | C2MSS-1101 | 49020    | 2MSS-1101 | 11/64         | 3/16           | 1/4           | 2              |
| 49272           | C2MSS-1201 | 49022    | 2MSS-1201 | 3/16          | 3/16           | 9/32          | 2              |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

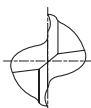
**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.



## 2 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE



P.290

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

### E2003(C2MRS), E1003(2MRS) Series

Unit : inch

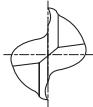
| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 50252           | C2MRS-0201 | 50002    | 2MRS-0201 | 1/32          | 3/16           | 3/32          | 2-1/4          |
| 50254           | C2MRS-0301 | 50004    | 2MRS-0301 | 3/64          | 3/16           | 9/64          | 2-1/4          |
| 50256           | C2MRS-0401 | 50006    | 2MRS-0401 | 1/16          | 3/16           | 3/16          | 2-1/4          |
| 50258           | C2MRS-0501 | 50008    | 2MRS-0501 | 5/64          | 3/16           | 15/64         | 2-1/4          |
| 50260           | C2MRS-0601 | 50010    | 2MRS-0601 | 3/32          | 3/16           | 9/32          | 2-1/4          |
| 50262           | C2MRS-0701 | 50012    | 2MRS-0701 | 7/64          | 3/16           | 21/64         | 2-1/4          |
| 50264           | C2MRS-0801 | 50014    | 2MRS-0801 | 1/8           | 3/16           | 3/8           | 2-1/4          |
| 50266           | C2MRS-0901 | 50016    | 2MRS-0901 | 9/64          | 3/16           | 13/32         | 2-1/4          |
| 50268           | C2MRS-1001 | 50018    | 2MRS-1001 | 5/32          | 3/16           | 7/16          | 2-1/4          |
| 50270           | C2MRS-1101 | 50020    | 2MRS-1101 | 11/64         | 3/16           | 1/2           | 2-1/4          |
| 50272           | C2MRS-1201 | 50022    | 2MRS-1201 | 3/16          | 3/16           | 1/2           | 2-1/4          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|        |             |
|--------|-------------|
| 0      | * * - .0002 |
| -.0010 | -.0015      |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, MINIATURE, LONG LENGTH, DOUBLE**

P.290

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

**E2005(C2MLS), E1005(2MLS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 51256           | C2MLS-0401 | 51006    | 2MLS-0401 | 1/16          | 3/16           | 7/32          | 2-1/2          |
| 51258           | C2MLS-0501 | 51008    | 2MLS-0501 | 5/64          | 3/16           | 1/4           | 2-1/2          |
| 51260           | C2MLS-0601 | 51010    | 2MLS-0601 | 3/32          | 3/16           | 9/32          | 2-5/8          |
| 51262           | C2MLS-0701 | 51012    | 2MLS-0701 | 7/64          | 3/16           | 9/32          | 2-5/8          |
| 51264           | C2MLS-0801 | 51014    | 2MLS-0801 | 1/8           | 3/16           | 3/4           | 3-1/8          |
| 51266           | C2MLS-0901 | 51016    | 2MLS-0901 | 9/64          | 3/16           | 3/4           | 3-1/8          |
| 51268           | C2MLS-1001 | 51018    | 2MLS-1001 | 5/32          | 3/16           | 7/8           | 3-1/4          |
| 51270           | C2MLS-1101 | 51020    | 2MLS-1101 | 11/64         | 3/16           | 7/8           | 3-1/4          |
| 51272           | C2MLS-1201 | 51022    | 2MLS-1201 | 3/16          | 3/16           | 1             | 3-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

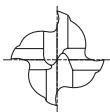
**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.



## 4FLUTE, MINIATURE, STUB LENGTH, DOUBLE



P.290

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

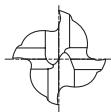
### E2002(C4MSS), E1002(4MSS) Series

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 52256           | C4MSS-0401 | 52006    | 4MSS-0401 | 1/16          | 3/16           | 3/32          | 2              |
| 52258           | C4MSS-0501 | 52008    | 4MSS-0501 | 5/64          | 3/16           | 1/8           | 2              |
| 52260           | C4MSS-0601 | 52010    | 4MSS-0601 | 3/32          | 3/16           | 9/64          | 2              |
| 52262           | C4MSS-0701 | 52012    | 4MSS-0701 | 7/64          | 3/16           | 5/32          | 2              |
| 52264           | C4MSS-0801 | 52014    | 4MSS-0801 | 1/8           | 3/16           | 3/16          | 2              |
| 52266           | C4MSS-0901 | 52016    | 4MSS-0901 | 9/64          | 3/16           | 7/32          | 2              |
| 52268           | C4MSS-1001 | 52018    | 4MSS-1001 | 5/32          | 3/16           | 15/64         | 2              |
| 52270           | C4MSS-1101 | 52020    | 4MSS-1101 | 11/64         | 3/16           | 1/4           | 2              |
| 52272           | C4MSS-1201 | 52022    | 4MSS-1201 | 3/16          | 3/16           | 9/32          | 2              |



## 4 FLUTE, MINIATURE, REGULAR LENGTH, DOUBLE



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

### E2004(C4MRS), E1004(4MRS) Series

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 53256           | C4MRS-0401 | 53006    | 4MRS-0401 | 1/16          | 3/16           | 3/16          | 2-1/4          |
| 53258           | C4MRS-0501 | 53008    | 4MRS-0501 | 5/64          | 3/16           | 15/64         | 2-1/4          |
| 53260           | C4MRS-0601 | 53010    | 4MRS-0601 | 3/32          | 3/16           | 9/32          | 2-1/4          |
| 53262           | C4MRS-0701 | 53012    | 4MRS-0701 | 7/64          | 3/16           | 21/64         | 2-1/4          |
| 53264           | C4MRS-0801 | 53014    | 4MRS-0801 | 1/8           | 3/16           | 3/8           | 2-1/4          |
| 53266           | C4MRS-0901 | 53016    | 4MRS-0901 | 9/64          | 3/16           | 13/32         | 2-1/4          |
| 53268           | C4MRS-1001 | 53018    | 4MRS-1001 | 5/32          | 3/16           | 7/16          | 2-1/4          |
| 53270           | C4MRS-1101 | 53020    | 4MRS-1101 | 11/64         | 3/16           | 1/2           | 2-1/4          |
| 53272           | C4MRS-1201 | 53022    | 4MRS-1201 | 3/16          | 3/16           | 1/2           | 2-1/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

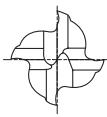
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * - .0002 |
| 0       | - .0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, MINIATURE, LONG LENGTH, DOUBLE**HSS  
Co8

HSS

4

39°  
~3/3230°  
7/64~

PLAIN

DATA

P.290

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

**E2006(C4MLS), E1006(4MLS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 54256           | C4MLS-0401 | 54006    | 4MLS-0401 | 1/16          | 3/16           | 7/32          | 2-1/2          |
| 54258           | C4MLS-0501 | 54008    | 4MLS-0501 | 5/64          | 3/16           | 1/4           | 2-1/2          |
| 54260           | C4MLS-0601 | 54010    | 4MLS-0601 | 3/32          | 3/16           | 9/32          | 2-5/8          |
| 54262           | C4MLS-0701 | 54012    | 4MLS-0701 | 7/64          | 3/16           | 9/32          | 2-5/8          |
| 54264           | C4MLS-0801 | 54014    | 4MLS-0801 | 1/8           | 3/16           | 3/4           | 3-1/8          |
| 54266           | C4MLS-0901 | 54016    | 4MLS-0901 | 9/64          | 3/16           | 3/4           | 3-1/8          |
| 54268           | C4MLS-1001 | 54018    | 4MLS-1001 | 5/32          | 3/16           | 7/8           | 3-1/4          |
| 54270           | C4MLS-1101 | 54020    | 4MLS-1101 | 11/64         | 3/16           | 7/8           | 3-1/4          |
| 54272           | C4MLS-1201 | 54022    | 4MLS-1201 | 3/16          | 3/16           | 1             | 3-3/8          |

**TOLERANCE OF MILL DIA.**

|         |            |
|---------|------------|
| + .0010 | * * —.0002 |
| 0       | —.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

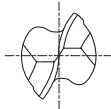
■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**HSS****2 FLUTE, MINIATURE, STUB LENGTH, BALL NOSE, DOUBLE**HSS  
Co8

HSS

2

39°  
~3/3230°  
7/64~

PLAIN

DATA

P.284

► Helical flute in the nose radius.

Suitable for high efficient copying process and cutting of die mold corner radius.

**E2008(C2MSB), E1008(2MSB) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 55256           | C2MSB-0401 | 55006    | 2MSB-0401 | 1/16          | 3/16           | 3/32          | 2              |
| 55260           | C2MSB-0601 | 55010    | 2MSB-0601 | 3/32          | 3/16           | 9/64          | 2              |
| 55264           | C2MSB-0801 | 55014    | 2MSB-0801 | 1/8           | 3/16           | 3/16          | 2              |
| 55268           | C2MSB-1001 | 55018    | 2MSB-1001 | 5/32          | 3/16           | 15/64         | 2              |
| 55272           | C2MSB-1201 | 55022    | 2MSB-1201 | 3/16          | 3/16           | 9/32          | 2              |

**TOLERANCE OF MILL DIA.**

|        |            |
|--------|------------|
| 0      | * * —.0002 |
| —.0010 | —.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)

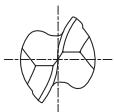
■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAIN F), HE(TiAIN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.



## 2 FLUTE, MINIATURE, REGULAR & LONG LENGTH, BALL NOSE, DOUBLE



P.290

► Helical flute in the nose radius.

Suitable for high efficient copying process and cutting of die mold corner radius.

### E2013(C2MRB), E1013(2MRB) Series

■ REGULAR LENGTH

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 56252           | C2MRB-0201 | 56002    | 2MRB-0201 | 1/32          | 3/16           | 3/32          | 2-1/4          |
| 56254           | C2MRB-0301 | 56004    | 2MRB-0301 | 3/64          | 3/16           | 9/64          | 2-1/4          |
| 56256           | C2MRB-0401 | 56006    | 2MRB-0401 | 1/16          | 3/16           | 3/16          | 2-1/4          |
| 56258           | C2MRB-0501 | 56008    | 2MRB-0501 | 5/64          | 3/16           | 15/64         | 2-1/4          |
| 56260           | C2MRB-0601 | 56010    | 2MRB-0601 | 3/32          | 3/16           | 9/32          | 2-1/4          |
| 56262           | C2MRB-0701 | 56012    | 2MRB-0701 | 7/64          | 3/16           | 21/64         | 2-1/4          |
| 56264           | C2MRB-0801 | 56014    | 2MRB-0801 | 1/8           | 3/16           | 3/8           | 2-1/4          |
| 56266           | C2MRB-0901 | 56016    | 2MRB-0901 | 9/64          | 3/16           | 13/32         | 2-1/4          |
| 56268           | C2MRB-1001 | 56018    | 2MRB-1001 | 5/32          | 3/16           | 7/16          | 2-1/4          |
| 56270           | C2MRB-1101 | 56020    | 2MRB-1101 | 11/64         | 3/16           | 1/2           | 2-1/4          |
| 56272           | C2MRB-1201 | 56022    | 2MRB-1201 | 3/16          | 3/16           | 1/2           | 2-1/4          |

## TOLERANCE OF MILL DIA.

|        |            |
|--------|------------|
| 0      | * * -.0002 |
| -.0010 | -.0015     |

\* \* The shank of End Mills is the same diameter as the cutting portion.

### E2015(C2MLB), E1015(2MLB) Series

■ LONG LENGTH

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 57256           | C2MLB-0401 | 57006    | 2MLB-0401 | 1/16          | 3/16           | 7/32          | 2-1/2          |
| 57260           | C2MLB-0601 | 57010    | 2MLB-0601 | 3/32          | 3/16           | 9/32          | 2-5/8          |
| 57264           | C2MLB-0801 | 57014    | 2MLB-0801 | 1/8           | 3/16           | 3/4           | 3-1/8          |
| 57268           | C2MLB-1001 | 57018    | 2MLB-1001 | 5/32          | 3/16           | 7/8           | 3-1/4          |
| 57272           | C2MLB-1201 | 57022    | 2MLB-1201 | 3/16          | 3/16           | 1             | 3-3/8          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

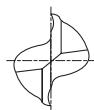
## TOLERANCE OF MILL DIA.

|         |            |
|---------|------------|
| + .0010 | * * -.0002 |
| 0       | -.0015     |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS**

## 2 FLUTE, 42° HELIX, REGULAR & MEDIUM LENGTH for ALUMINUM



P.285

- The two flute end mills for aluminum have High Helix flute design making them well suited for milling aluminum and other non-ferrous materials.
- Special rake angles and low micro inch finishes on the primary clearance angles and flute faces insure free cutting action, fine finishes and longer tool life for both non-ferrous materials as well as harder alloys. These tools are made from regular H.S.S.(M2), which is good for aluminum cutting.

**E1070(2SRA) Series****REGULAR LENGTH**

Unit : inch

| EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|---------------|----------------|---------------|----------------|
| HSS (M2) |            |               |                |               |                |
| 17047    | 2SRA-1603  | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 17051    | 2SRA-2003  | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 17055    | 2SRA-2403  | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 17062    | 2SRA-2803  | 7/16          | 3/8            | 1             | 2-11/16        |
| 17071    | 2SRA-3204  | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 17087    | 2SRA-4005  | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 17109    | 2SRA-4806  | 3/4           | 3/4            | 1-5/8         | 3-7/8          |
| 17141    | 2SRA-5606  | 7/8           | 3/4            | 1-7/8         | 4-1/8          |
| 17144    | 2SRA-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 17172    | 2SRA-6406  | 1             | 3/4            | 1-7/8         | 4-1/8          |
| 17176    | 2SRA-6408  | 1             | 1              | 2             | 4-1/2          |
| 17195    | 2SRA-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 17211    | 2SRA-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |
| 17219    | 2SRA-B4810 | 1-3/4         | 1-1/4          | 2             | 4-1/2          |
| 17227    | 2SRA-B6410 | 2             | 1-1/4          | 2             | 4-1/2          |

**E1070 Series****MEDIUM LENGTH**

Unit : inch

| EDP No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|---------------|----------------|---------------|----------------|
| HSS (M2) |               |                |               |                |
| 99089    | 1             | 1              | 3             | 5-1/2          |
| 99090    | 1-1/4         | 1-1/4          | 3             | 5-1/2          |
| 99091    | 1-1/2         | 1-1/4          | 3             | 5-1/2          |
| 99092    | 1-3/4         | 1-1/4          | 3             | 5-1/2          |
| 99093    | 2             | 1-1/4          | 3             | 5-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for HSS

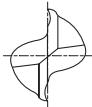
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****2 FLUTE, 42° HELIX, LONG LENGTH for ALUMINUM**

P.285

- Sharp cutting most suitable flute shape for cutting aluminum alloy, etc.

These tools are made from regular H.S.S(M2), which is good for aluminum cutting.

**E1071(2SLA) Series**

Unit : inch

| EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|---------------|----------------|---------------|----------------|
| HSS (M2) |            |               |                |               |                |
| 18047    | 2SLA-1603  | 1/4           | 3/8            | 1-1/4         | 3-1/16         |
| 18051    | 2SLA-2003  | 5/16          | 3/8            | 1-3/8         | 3-1/8          |
| 18055    | 2SLA-2403  | 3/8           | 3/8            | 1-1/2         | 3-1/4          |
| 18063    | 2SLA-2803  | 7/16          | 1/2            | 1-3/4         | 3-3/4          |
| 18071    | 2SLA-3204  | 1/2           | 1/2            | 2             | 4              |
| 18087    | 2SLA-4005  | 5/8           | 5/8            | 2-1/2         | 4-5/8          |
| 18109    | 2SLA-4806  | 3/4           | 3/4            | 3             | 5-1/4          |
| 18176    | 2SLA-6408  | 1             | 1              | 4             | 6-1/2          |
| 18195    | 2SLA-B1610 | 1-1/4         | 1-1/4          | 4             | 6-1/2          |
| 18211    | 2SLA-B3210 | 1-1/2         | 1-1/4          | 4             | 6-1/2          |
| 18227    | 2SLA-B6410 | 2             | 1-1/4          | 4             | 6-1/2          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

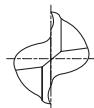
**TOLERANCE OF MILL DIA.**

|              |                  |
|--------------|------------------|
| + .0010<br>0 | * * + .0015<br>0 |
|--------------|------------------|

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS**

## 2 FLUTE, 42° HELIX, EXTRA LONG LENGTH for ALUMINUM



P.285

- ▶ Sharp cutting most suitable flute shape for cutting aluminum alloy, etc.
- ▶ These tools are made from regular H.S.S(M2), which is good for aluminum cutting.

### E1072(2SEA) Series

Unit : inch

| EDP No.  | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|----------|------------|---------------|----------------|---------------|----------------|
| HSS (M2) |            |               |                |               |                |
| 19047    | 2SEA-1603  | 1/4           | 3/8            | 1-3/4         | 3-9/16         |
| 19051    | 2SEA-2003  | 5/16          | 3/8            | 2             | 3-3/4          |
| 19055    | 2SEA-2403  | 3/8           | 3/8            | 2-1/2         | 4-1/4          |
| 19071    | 2SEA-3204  | 1/2           | 1/2            | 3             | 5              |
| 19087    | 2SEA-4005  | 5/8           | 5/8            | 4             | 6-1/8          |
| 19109    | 2SEA-4806  | 3/4           | 3/4            | 4             | 6-1/4          |
| 19176    | 2SEA-6408  | 1             | 1              | 6             | 8-1/2          |
| 19195    | 2SEA-B1610 | 1-1/4         | 1-1/4          | 6             | 8-1/2          |
| 19211    | 2SEA-B3210 | 1-1/2         | 1-1/4          | 8             | 10-1/2         |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

▶ Coated Price Shown in Price List. Call for Availability.

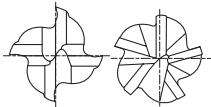
#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS**

# MULTI FLUTE, STUB & REGULAR LENGTH, FINE PITCH ROUGHING, CENTER CUTTING



P.289,294,298

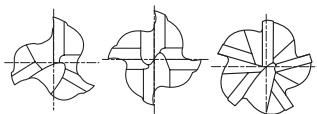
► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2086 Series**

■ STUB LENGTH

Unit : inch

| EDP NO.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 75297                      | 1/4              | 3/8               | 1/4              | 2-1/16            | 4               |
| 75305                      | 3/8              | 3/8               | 3/8              | 2-5/32            | 4               |
| 75313                      | 7/16             | 1/2               | 1/2              | 2-1/2             | 4               |
| 75321                      | 1/2              | 1/2               | 1/2              | 2-1/2             | 4               |
| 75337                      | 5/8              | 5/8               | 5/8              | 2-3/4             | 4               |
| 75359                      | 3/4              | 3/4               | 3/4              | 2-7/8             | 4               |
| 75391                      | 7/8              | 3/4               | 7/8              | 3-1/8             | 5               |
| 75426                      | 1                | 1                 | 1                | 3-1/2             | 5               |

**E2085 Series**

■ REGULAR LENGTH

Unit : inch

| EDP NO.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 76297                      | 1/4              | 3/8               | 5/8              | 2-7/16            | 3               |
| 76301                      | 5/16             | 3/8               | 3/4              | 2-1/2             | 3               |
| 76305                      | 3/8              | 3/8               | 3/4              | 2-1/2             | 4               |
| 76312                      | 7/16             | 3/8               | 1                | 2-11/16           | 4               |
| 76321                      | 1/2              | 1/2               | 1-1/4            | 3-1/4             | 4               |
| 76328                      | 9/16             | 1/2               | 1-3/8            | 3-3/8             | 4               |
| 76337                      | 5/8              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 76359                      | 3/4              | 3/4               | 1-5/8            | 3-7/8             | 4               |
| 76391                      | 7/8              | 3/4               | 1-7/8            | 4-1/8             | 5               |
| 76394                      | 7/8              | 7/8               | 1-7/8            | 4-1/8             | 5               |
| 76422                      | 1                | 3/4               | 2                | 4-1/4             | 5               |
| 76426                      | 1                | 1                 | 2                | 4-1/2             | 5               |

■ The TiN coated, TiCN coated or TiAIN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAIN F), CE(TiAIN E), CH(Hardslick)

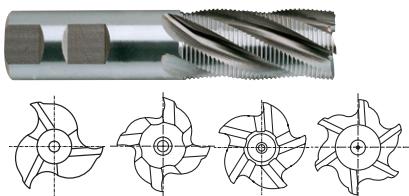
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**HSS**

# MULTI FLUTE, REGULAR LENGTH, FINE PITCH ROUGHING



P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2079 Series**

Unit : inch

| EDP NO.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 70297                      | 1/4              | 3/8               | 5/8              | 2-7/16            | 3               |
| 70301                      | 5/16             | 3/8               | 3/4              | 2-1/2             | 3               |
| 70305                      | 3/8              | 3/8               | 3/4              | 2-1/2             | 4               |
| 70312                      | 7/16             | 3/8               | 1                | 2-11/16           | 4               |
| 70321                      | 1/2              | 1/2               | 1-1/4            | 3-1/4             | 4               |
| 70328                      | 9/16             | 1/2               | 1-3/8            | 3-3/8             | 4               |
| 70337                      | 5/8              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 70358                      | 3/4              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 70359                      | 3/4              | 3/4               | 1-5/8            | 3-7/8             | 4               |
| 70391                      | 7/8              | 3/4               | 1-7/8            | 4-1/8             | 5               |
| 70394                      | 7/8              | 7/8               | 1-7/8            | 4-1/8             | 5               |
| 70422                      | 1                | 3/4               | 2                | 4-1/4             | 5               |
| 70426                      | 1                | 1                 | 2                | 4-1/2             | 5               |
| 70431                      | 1-1/8            | 3/4               | 2                | 4-1/4             | 6               |
| 70435                      | 1-1/8            | 1                 | 2                | 4-1/2             | 6               |
| 70439                      | 1-1/4            | 3/4               | 2                | 4-1/4             | 6               |
| 70445                      | 1-1/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 70449                      | 1-3/8            | 3/4               | 2                | 4-1/4             | 6               |
| 70457                      | 1-1/2            | 3/4               | 2                | 4-1/4             | 6               |
| 70461                      | 1-1/2            | 1-1/4             | 2                | 4-1/2             | 6               |
| 70469                      | 1-3/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 70475                      | 2                | 3/4               | 2                | 4-1/4             | 6               |
| 70477                      | 2                | 1-1/4             | 2                | 4-1/2             | 6               |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

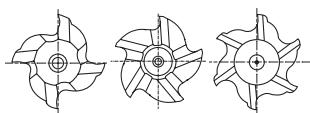
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**HSS**

# MULTI FLUTE, LONG LENGTH, FINE PITCH ROUGHING



P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2077 Series**

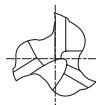
Unit : inch

| EDP NO.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 71321                      | 1/2              | 1/2               | 2                | 4                 | 4               |
| 71337                      | 5/8              | 5/8               | 2-1/2            | 4-5/8             | 4               |
| 71358                      | 3/4              | 5/8               | 3                | 5-1/8             | 4               |
| 71359                      | 3/4              | 3/4               | 3                | 5-1/4             | 4               |
| 71394                      | 7/8              | 7/8               | 3-1/2            | 5-3/4             | 5               |
| 71426                      | 1                | 1                 | 4                | 6-1/2             | 5               |
| 71445                      | 1-1/4            | 1-1/4             | 4                | 6-1/2             | 6               |
| 71457                      | 1-1/2            | 3/4               | 4                | 6-1/4             | 6               |
| 71461                      | 1-1/2            | 1-1/4             | 4                | 6-1/2             | 6               |
| 71469                      | 1-3/4            | 1-1/4             | 4                | 6-1/2             | 6               |
| 71477                      | 2                | 1-1/4             | 4                | 6-1/2             | 6               |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**HSS****3 FLUTE, STUB LENGTH, FINE PITCH ROUGHING,  
CENTER CUTTING**HSS  
Co8

3

30°

FLAT

FINE

DATA

P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2086 Series**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|---------|---------------|----------------|---------------|----------------|
| 72297   | 1/4           | 3/8            | 1/4           | 2-1/16         |
| 72305   | 3/8           | 3/8            | 3/8           | 2-5/32         |
| 72321   | 1/2           | 1/2            | 1/2           | 2-1/2          |
| 72337   | 5/8           | 5/8            | 5/8           | 2-3/4          |
| 72359   | 3/4           | 3/4            | 3/4           | 2-7/8          |
| 72391   | 7/8           | 3/4            | 7/8           | 3-1/8          |
| 72422   | 1             | 3/4            | 1             | 3-1/4          |
| 72426   | 1             | 1              | 1             | 3-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

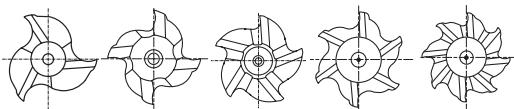
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |              |
|----------|--------------|
| up to 1" | + .0030<br>0 |
| over 1"  | + .0060<br>0 |

**HSS**

# MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING

HSS  
Co8

3-8

30°

FLAT

COARSE

DATA

P.289,294,298

- This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials.  
The end tooth of this tool has a center hole design for many accurate resharpenings between centers.

**E2170 Series**

Unit : inch

| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 60297                      | 1/4              | 3/8               | 5/8              | 2-7/16            | 3               |
| 60301                      | 5/16             | 3/8               | 3/4              | 2-1/2             | 3               |
| 60305                      | 3/8              | 3/8               | 3/4              | 2-1/2             | 4               |
| 60312                      | 7/16             | 3/8               | 1                | 2-11/16           | 4               |
| 60321                      | 1/2              | 1/2               | 1-1/4            | 3-1/4             | 4               |
| 60328                      | 9/16             | 1/2               | 1-3/8            | 3-3/8             | 4               |
| 60337                      | 5/8              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 60348                      | 11/16            | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 60358                      | 3/4              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 60359                      | 3/4              | 3/4               | 1-5/8            | 3-3/4             | 4               |
| 60375                      | 13/16            | 3/4               | 1-7/8            | 4-1/8             | 4               |
| 60391                      | 7/8              | 3/4               | 1-7/8            | 4-1/8             | 5               |
| 60394                      | 7/8              | 7/8               | 1-7/8            | 4-1/8             | 5               |
| 60409                      | 15/16            | 7/8               | 1-7/8            | 4-1/8             | 5               |
| 60422                      | 1                | 3/4               | 2                | 4-1/4             | 5               |
| 60426                      | 1                | 1                 | 2                | 4-1/2             | 5               |
| 60431                      | 1-1/8            | 3/4               | 2                | 4-1/4             | 6               |
| 60435                      | 1-1/8            | 1                 | 2                | 4-1/2             | 6               |
| 60439                      | 1-1/4            | 3/4               | 2                | 4-1/4             | 6               |
| 60445                      | 1-1/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 60449                      | 1-3/8            | 3/4               | 2                | 4-1/4             | 6               |
| 60457                      | 1-1/2            | 3/4               | 2                | 4-1/4             | 6               |
| 60461                      | 1-1/2            | 1-1/4             | 2                | 4-1/2             | 6               |
| 60467                      | 1-3/4            | 3/4               | 2                | 4-1/4             | 6               |
| 60469                      | 1-3/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 60475                      | 2                | 3/4               | 2                | 4-1/4             | 6               |
| 60477                      | 2                | 1-1/4             | 2                | 4-1/2             | 6               |
| 60480                      | 2                | 2                 | 2                | 5-3/4             | 8               |
| 60482                      | 2                | 2                 | 3                | 6-3/4             | 8               |
| 60484                      | 2                | 2                 | 4                | 7-3/4             | 8               |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

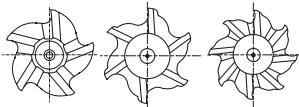
► Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |                    |
|------------------------|--------------------|
| up to 1"               | + .0030<br>- .0000 |
| over 1"                | + .0060<br>- .0000 |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS**

# MULTI FLUTE, MEDIUM & LONG LENGTH, COARSE PITCH ROUGHING

HSS  
Co8

4-8

30°

FLAT

COARSE

DATA

P.289,294,298

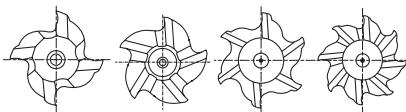
- This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a center hole design for many accurate resharpenings between centers.

**E2171 Series**

■ MEDIUM LENGTH

Unit : inch

| EDP No.         | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|-----------------|---------------|----------------|---------------|----------------|--------------|
| 8% COBALT (M42) |               |                |               |                |              |
| 61426           | 1             | 1              | 3             | 5-1/2          | 5            |
| 61445           | 1-1/4         | 1-1/4          | 3             | 5-1/2          | 6            |
| 61461           | 1-1/2         | 1-1/4          | 3             | 5-1/2          | 6            |
| 61488           | 2             | 2              | 6             | 9-3/4          | 8            |

**E2172 Series**

■ LONG LENGTH

Unit : inch

| EDP No.         | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|-----------------|---------------|----------------|---------------|----------------|--------------|
| 8% COBALT (M42) |               |                |               |                |              |
| 62321           | 1/2           | 1/2            | 2             | 4              | 4            |
| 62337           | 5/8           | 5/8            | 2-1/2         | 4-5/8          | 4            |
| 62358           | 3/4           | 5/8            | 3             | 5-1/8          | 4            |
| 62359           | 3/4           | 3/4            | 3             | 5-1/4          | 4            |
| 62391           | 7/8           | 3/4            | 3-1/2         | 5-3/4          | 5            |
| 62422           | 1             | 3/4            | 4             | 6-1/4          | 5            |
| 62426           | 1             | 1              | 4             | 6-1/2          | 5            |
| 62439           | 1-1/4         | 3/4            | 4             | 6-1/4          | 6            |
| 62445           | 1-1/4         | 1-1/4          | 4             | 6-1/2          | 6            |
| 62457           | 1-1/2         | 3/4            | 4             | 6-1/4          | 6            |
| 62461           | 1-1/2         | 1-1/4          | 4             | 6-1/2          | 6            |
| 62469           | 1-3/4         | 1-1/4          | 4             | 6-1/2          | 6            |
| 62477           | 2             | 1-1/4          | 4             | 6-1/2          | 6            |
| 62490           | 2             | 2              | 8             | 11-3/4         | 8            |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

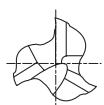
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |



## 3FLUTE, STUB LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING



P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting steel grades and many non-ferrous materials. The end tooth of this tool has a center hole design for many accurate resharpenings between centers.

### E2241 Series

Unit : inch

| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------------------------|------------------|-------------------|------------------|-------------------|
| 63297                      | 1/4              | 3/8               | 1/4              | 2-1/16            |
| 63305                      | 3/8              | 3/8               | 3/8              | 2-5/32            |
| 63321                      | 1/2              | 1/2               | 1/2              | 2-1/2             |
| 63337                      | 5/8              | 5/8               | 5/8              | 2-3/4             |
| 63359                      | 3/4              | 3/4               | 3/4              | 2-7/8             |
| 63426                      | 1                | 1                 | 1                | 3-1/2             |

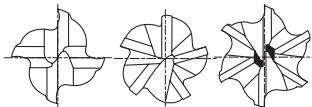
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt
  - Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS**

# MULTI FLUTE, REGULAR LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING

HSS  
Co8

4-6

30°

FLAT

COARSE

DATA

P.289,294,298

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

**E2195 Series**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 64321   | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 4            |
| 64337   | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 4            |
| 64359   | 3/4           | 3/4            | 1-5/8         | 3-7/8          | 4            |
| 64426   | 1             | 1              | 2             | 4-1/2          | 5            |
| 64445   | 1-1/4         | 1-1/4          | 2             | 4-1/2          | 6            |
| 64461   | 1-1/2         | 1-1/4          | 2             | 4-1/2          | 6            |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

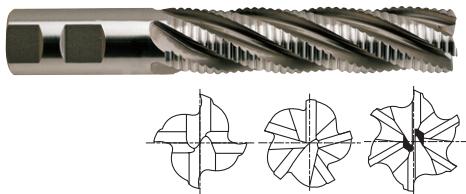
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS**

# MULTI FLUTE, LONG LENGTH, COARSE PITCH ROUGHING, CENTER CUTTING

HSS  
Co8

4-6

30°

FLAT

COARSE

DATA

P.289,294,298

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

**E2197 Series**

Unit : inch

| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 65321                      | 1/2              | 1/2               | 2                | 4                 | 4               |
| 65337                      | 5/8              | 5/8               | 2-1/2            | 4-5/8             | 4               |
| 65359                      | 3/4              | 3/4               | 3                | 5-1/4             | 4               |
| 65426                      | 1                | 1                 | 4                | 6-1/2             | 5               |
| 65445                      | 1-1/4            | 1-1/4             | 4                | 6-1/2             | 6               |
| 65461                      | 1-1/2            | 1-1/4             | 4                | 6-1/2             | 6               |

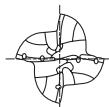
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt
  - Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
  - Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS**

# MULTI FLUTE, REGULAR & LONG LENGTH, COARSE PITCH ROUGHING, BALL NOSE



P.289,294,298

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

**E2193 Series****■ REGULAR LENGTH**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 68297   | 1/4           | 3/8            | 5/8           | 2-7/16         | 3            |
| 68301   | 5/16          | 3/8            | 3/4           | 2-1/2          | 3            |
| 68305   | 3/8           | 3/8            | 3/4           | 2-1/2          | 4            |
| 68321   | 1/2           | 1/2            | 1-1/4         | 3-1/4          | 4            |
| 68337   | 5/8           | 5/8            | 1-5/8         | 3-3/4          | 4            |
| 68359   | 3/4           | 3/4            | 1-3/4         | 4              | 4            |
| 68422   | 1             | 3/4            | 2             | 4-1/2          | 5            |
| 68426   | 1             | 1              | 2             | 4-1/2          | 5            |
| 68439   | 1-1/4         | 3/4            | 2             | 4-1/2          | 6            |
| 68445   | 1-1/4         | 1-1/4          | 2             | 4-1/2          | 6            |
| 68457   | 1-1/2         | 3/4            | 2             | 4-1/2          | 6            |
| 68461   | 1-1/2         | 1-1/4          | 2             | 4-1/2          | 6            |

**E2125 Series****■ LONG LENGTH**

Unit : inch

| EDP No. | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH | NO. OF FLUTE |
|---------|---------------|----------------|---------------|----------------|--------------|
| 69321   | 1/2           | 1/2            | 2-1/2         | 4-1/2          | 4            |
| 69337   | 5/8           | 5/8            | 2-1/2         | 4-5/8          | 4            |
| 69359   | 3/4           | 3/4            | 3             | 5-1/4          | 4            |
| 69426   | 1             | 1              | 4             | 6-1/2          | 5            |
| 69445   | 1-1/4         | 1-1/4          | 4             | 6-1/2          | 6            |
| 69461   | 1-1/2         | 1-1/4          | 4             | 6-1/2          | 6            |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

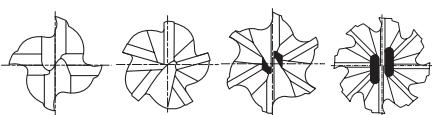
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS**

# MULTI FLUTE, REGULAR LENGTH, ROUGHING & FINISHING

HSS  
Co8

4-8

30°

FLAT

NF

DATA

P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2248 Series**

Unit : inch

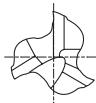
| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH | NO. OF<br>FLUTE |
|----------------------------|------------------|-------------------|------------------|-------------------|-----------------|
| 73297                      | 1/4              | 3/8               | 5/8              | 2-7/16            | 4               |
| 73301                      | 5/16             | 3/8               | 3/4              | 2-1/2             | 4               |
| 73305                      | 3/8              | 3/8               | 3/4              | 2-1/2             | 4               |
| 73312                      | 7/16             | 3/8               | 1                | 2-11/16           | 4               |
| 73321                      | 1/2              | 1/2               | 1-1/4            | 3-1/4             | 4               |
| 73328                      | 9/16             | 1/2               | 1-3/8            | 3-3/8             | 4               |
| 73337                      | 5/8              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 73348                      | 11/16            | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 73358                      | 3/4              | 5/8               | 1-5/8            | 3-3/4             | 4               |
| 73359                      | 3/4              | 3/4               | 1-5/8            | 3-3/4             | 4               |
| 73391                      | 7/8              | 3/4               | 1-7/8            | 4-1/8             | 5               |
| 73394                      | 7/8              | 7/8               | 1-7/8            | 4-1/8             | 5               |
| 73422                      | 1                | 3/4               | 2                | 4-1/4             | 5               |
| 73426                      | 1                | 1                 | 2                | 4-1/2             | 5               |
| 73431                      | 1-1/8            | 3/4               | 2                | 4-1/4             | 6               |
| 73435                      | 1-1/8            | 1                 | 2                | 4-1/2             | 6               |
| 73439                      | 1-1/4            | 3/4               | 2                | 4-1/4             | 6               |
| 73445                      | 1-1/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 73457                      | 1-1/2            | 3/4               | 2                | 4-1/4             | 6               |
| 73461                      | 1-1/2            | 1-1/4             | 2                | 4-1/2             | 6               |
| 73467                      | 1-3/4            | 3/4               | 2                | 4-1/4             | 6               |
| 73469                      | 1-3/4            | 1-1/4             | 2                | 4-1/2             | 6               |
| 73475                      | 2                | 3/4               | 2                | 4-1/4             | 6               |
| 73477                      | 2                | 1-1/4             | 2                | 4-1/2             | 6               |
| 73480                      | 2                | 2                 | 2                | 5-3/4             | 8               |
| 73482                      | 2                | 2                 | 3                | 6-3/4             | 8               |
| 73484                      | 2                | 2                 | 4                | 7-3/4             | 8               |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt
  - Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

|                           |                    |
|---------------------------|--------------------|
| TOLERANCE<br>OF MILL DIA. | + .0025<br>+ .0005 |
|---------------------------|--------------------|

**HSS**

# 3 FLUTE, 37° HELIX, REGULAR LENGTH, ROUGHING for ALUMINUM

HSS  
Co8

3

37°

FLAT

AI

DATA

P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is suitable for a very broad spectrum of materials having up to high tensile strengths. In many cases, the milled surfaces are of acceptable quality.

**E2191 Series**

Unit : inch

| EDP No.<br>8% COBALT (M42) | MILL<br>DIAMETER | SHANK<br>DIAMETER | LENGTH<br>OF CUT | OVERALL<br>LENGTH |
|----------------------------|------------------|-------------------|------------------|-------------------|
| 66297                      | 1/4              | 3/8               | 5/8              | 2-7/16            |
| 66301                      | 5/16             | 3/8               | 3/4              | 2-1/2             |
| 66305                      | 3/8              | 3/8               | 3/4              | 2-1/2             |
| 66321                      | 1/2              | 1/2               | 1-1/4            | 3-1/4             |
| 66337                      | 5/8              | 5/8               | 1-5/8            | 3-3/4             |
| 66359                      | 3/4              | 3/4               | 1-5/8            | 3-7/8             |
| 66391                      | 7/8              | 3/4               | 1-7/8            | 4-1/8             |
| 66426                      | 1                | 1                 | 2                | 4-1/2             |
| 66445                      | 1-1/4            | 1-1/4             | 2                | 4-1/2             |
| 66461                      | 1-1/2            | 1-1/4             | 2                | 4-1/2             |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

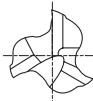
► Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS**

# 3 FLUTE, 37° HELIX, MEDIUM & LONG LENGTH, ROUGHING for ALUMINUM



P.289,294,298

► This general purpose rougher is designed for high production metal removal in a wide range of work piece material. It is recommended for cutting aluminum, aluminum alloy and many non-ferrous materials.

**E2226 Series**

■ MEDIUM LENGTH

Unit : inch

| EDP No.         | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |               |                |               |                |
| 66901           | 1             | 1              | 3             | 5-1/2          |
| 66902           | 1-1/4         | 1-1/4          | 3             | 5-1/2          |

**E2192 Series**

■ LONG LENGTH

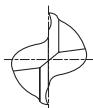
Unit : inch

| EDP No.         | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |               |                |               |                |
| 67321           | 1/2           | 1/2            | 2             | 4              |
| 67337           | 5/8           | 5/8            | 2-1/2         | 4-5/8          |
| 67359           | 3/4           | 3/4            | 3             | 5-1/4          |
| 67426           | 1             | 1              | 4             | 6-1/2          |
| 67445           | 1-1/4         | 1-1/4          | 4             | 6-1/2          |
| 67461           | 1-1/2         | 1-1/4          | 4             | 6-1/2          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

**TOLERANCE OF MILL DIA.**

|          |                    |
|----------|--------------------|
| up to 1" | + .0030<br>— .0000 |
| over 1"  | + .0060<br>— .0000 |

**HSS****2 FLUTE, 15° HELIX for KEYWAY CUTTING**HSS  
Co8

HSS

2

15°

FLAT

DATA

P.285,291,295

- E2163(E1163) are keyway cutting end mills that have the same design as the general purpose of two flute single end mill, but are held to a mill diameter tolerance of +.0000 - .0015. These close tolerance end mills are recommended for cutting keyway which must be held close to nominal size.

**E2163(C2SKS), E1163(2SKS) Series**

Unit : inch

| EDP No.         | ITEM No.   | EDP No.  | ITEM No.  | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|----------|-----------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            | HSS (M2) |           |               |                |               |                |
| 14289           | C2SKS-0803 | 14039    | 2SKS-0803 | 1/8           | 3/8            | 3/8           | 2-5/16         |
| 14293           | C2SKS-1203 | 14043    | 2SKS-1203 | 3/16          | 3/8            | 7/16          | 2-5/16         |
| 14297           | C2SKS-1603 | 14047    | 2SKS-1603 | 1/4           | 3/8            | 1/2           | 2-5/16         |
| 14301           | C2SKS-2003 | 14051    | 2SKS-2003 | 5/16          | 3/8            | 9/16          | 2-5/16         |
| 14305           | C2SKS-2403 | 14055    | 2SKS-2403 | 3/8           | 3/8            | 9/16          | 2-5/16         |
| 14312           | C2SKS-2803 | 14062    | 2SKS-2803 | 7/16          | 3/8            | 13/16         | 2-1/2          |
| 14321           | C2SKS-3204 | 14071    | 2SKS-3204 | 1/2           | 1/2            | 1             | 3              |
| 14337           | C2SKS-4005 | 14087    | 2SKS-4005 | 5/8           | 5/8            | 1-5/16        | 3-7/16         |
| 14359           | C2SKS-4806 | 14109    | 2SKS-4806 | 3/4           | 3/4            | 1-5/16        | 3-9/16         |
| 14394           | C2SKS-5607 | 14144    | 2SKS-5607 | 7/8           | 7/8            | 1-1/2         | 3-3/4          |
| 14426           | C2SKS-6408 | 14176    | 2SKS-6408 | 1             | 1              | 1-5/8         | 4-1/8          |

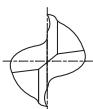
- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt
  - Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS
  - Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

TOLERANCE  
OF MILL DIA.0  
-.0015



# HSS 2 FLUTE, REGULAR LENGTH

**METRIC**



► Two flute end mills with metric cutting diameter are especially recommended for slotting operation, pocketing keyway cutting and other general purpose work including plunge cutting.

## E2482(C2TRA), E1482(2TRA) Series

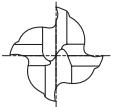
Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER mm | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|------------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |                  |                |               |                |
| 15252           | C2TRA-02003 | 15002    | 2TRA-02003 | 2.0              | 3/8            | 5/16          | 2-5/16         |
| 15253           | C2TRA-02503 | 15003    | 2TRA-02503 | 2.5              | 3/8            | 5/16          | 2-5/16         |
| 15254           | C2TRA-03003 | 15004    | 2TRA-03003 | 3.0              | 3/8            | 5/16          | 2-5/16         |
| 15255           | C2TRA-03503 | 15005    | 2TRA-03503 | 3.5              | 3/8            | 7/16          | 2-5/16         |
| 15256           | C2TRA-04003 | 15006    | 2TRA-04003 | 4.0              | 3/8            | 7/16          | 2-5/16         |
| 15257           | C2TRA-04503 | 15007    | 2TRA-04503 | 4.5              | 3/8            | 1/2           | 2-5/16         |
| 15258           | C2TRA-05003 | 15008    | 2TRA-05003 | 5.0              | 3/8            | 1/2           | 2-5/16         |
| 15259           | C2TRA-05503 | 15009    | 2TRA-05503 | 5.5              | 3/8            | 1/2           | 2-5/16         |
| 15260           | C2TRA-06003 | 15010    | 2TRA-06003 | 6.0              | 3/8            | 1/2           | 2-5/16         |
| 15261           | C2TRA-07003 | 15011    | 2TRA-07003 | 7.0              | 3/8            | 9/16          | 2-5/16         |
| 15262           | C2TRA-08003 | 15012    | 2TRA-08003 | 8.0              | 3/8            | 9/16          | 2-5/16         |
| 15263           | C2TRA-09003 | 15013    | 2TRA-09003 | 9.0              | 3/8            | 9/16          | 2-5/16         |
| 15264           | C2TRA-10003 | 15014    | 2TRA-10003 | 10.0             | 3/8            | 13/16         | 2-1/2          |
| 15265           | C2TRA-11003 | 15015    | 2TRA-11003 | 11.0             | 3/8            | 13/16         | 2-1/2          |
| 15266           | C2TRA-12003 | 15016    | 2TRA-12003 | 12.0             | 3/8            | 13/16         | 2-1/2          |
| 15267           | C2TRA-12504 | 15017    | 2TRA-12504 | 12.5             | 1/2            | 1-1/8         | 3-1/8          |
| 15268           | C2TRA-13004 | 15018    | 2TRA-13004 | 13.0             | 1/2            | 1-1/8         | 3-1/8          |
| 15270           | C2TRA-14004 | 15020    | 2TRA-14004 | 14.0             | 1/2            | 1-1/8         | 3-1/8          |
| 15276           | C2TRA-16005 | 15026    | 2TRA-16005 | 16.0             | 5/8            | 1-5/16        | 3-7/16         |
| 15280           | C2TRA-18005 | 15030    | 2TRA-18005 | 18.0             | 5/8            | 1-5/16        | 3-7/16         |
| 15282           | C2TRA-20005 | 15032    | 2TRA-20005 | 20.0             | 5/8            | 1-1/2         | 3-3/4          |
| 15284           | C2TRA-22006 | 15034    | 2TRA-22006 | 22.0             | 3/4            | 1-1/2         | 3-3/4          |
| 15288           | C2TRA-24006 | 15038    | 2TRA-24006 | 24.0             | 3/4            | 2             | 4-1/2          |
| 15290           | C2TRA-25008 | 15040    | 2TRA-25008 | 25.0             | 1              | 2             | 4-1/2          |
| 15296           | C2TRA-32008 | 15046    | 2TRA-32008 | 32.0             | 1              | 2             | 4-1/2          |
| 15298           | C2TRA-36008 | 15048    | 2TRA-36008 | 36.0             | 1              | 2             | 4-1/2          |
| 15300           | C2TRA-40010 | 15050    | 2TRA-40010 | 40.0             | 1-1/4          | 2             | 4-1/2          |
| 15302           | C2TRA-45010 | 15052    | 2TRA-45010 | 45.0             | 1-1/4          | 2             | 4-1/2          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

| TOLERANCE OF MILL DIA. |             |
|------------------------|-------------|
| + .0010                | * * + .0015 |
| 0                      | 0           |

\* \* The shank of End Mills is the same diameter as the cutting portion.

**HSS****4 FLUTE, REGULAR LENGTH****METRIC**

- E2483 have an extensive range of standard regular length in metric diameter.
- End mills with center cutting are recommended for a wide range of cutting jobs, including slotting, shallow pocketing and tracer milling.

**E2483(C4TRA), E1483(4TRA) Series**

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | MILL DIAMETER mm | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|----------|------------|------------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |                  |                |               |                |
| 16252           | C4TRA-02003 | 16002    | 4TRA-02003 | 2.0              | 3/8            | 3/8           | 2-5/16         |
| 16253           | C4TRA-02503 | 16003    | 4TRA-02503 | 2.5              | 3/8            | 3/8           | 2-5/16         |
| 16254           | C4TRA-03003 | 16004    | 4TRA-03003 | 3.0              | 3/8            | 3/8           | 2-5/16         |
| 16255           | C4TRA-03503 | 16005    | 4TRA-03503 | 3.5              | 3/8            | 1/2           | 2-3/8          |
| 16256           | C4TRA-04003 | 16006    | 4TRA-04003 | 4.0              | 3/8            | 1/2           | 2-3/8          |
| 16257           | C4TRA-04503 | 16007    | 4TRA-04503 | 4.5              | 3/8            | 9/16          | 2-1/2          |
| 16258           | C4TRA-05003 | 16008    | 4TRA-05003 | 5.0              | 3/8            | 9/16          | 2-1/2          |
| 16259           | C4TRA-05503 | 16009    | 4TRA-05503 | 5.5              | 3/8            | 5/8           | 2-1/2          |
| 16260           | C4TRA-06003 | 16010    | 4TRA-06003 | 6.0              | 3/8            | 5/8           | 2-1/2          |
| 16261           | C4TRA-07003 | 16011    | 4TRA-07003 | 7.0              | 3/8            | 11/16         | 2-1/2          |
| 16262           | C4TRA-08003 | 16012    | 4TRA-08003 | 8.0              | 3/8            | 3/4           | 2-1/2          |
| 16263           | C4TRA-09003 | 16013    | 4TRA-09003 | 9.0              | 3/8            | 3/4           | 2-1/2          |
| 16264           | C4TRA-10003 | 16014    | 4TRA-10003 | 10.0             | 3/8            | 1             | 2-11/16        |
| 16265           | C4TRA-11003 | 16015    | 4TRA-11003 | 11.0             | 3/8            | 1             | 2-11/16        |
| 16266           | C4TRA-12003 | 16016    | 4TRA-12003 | 12.0             | 3/8            | 1             | 2-11/16        |
| 16267           | C4TRA-12504 | 16017    | 4TRA-12504 | 12.5             | 1/2            | 1-1/4         | 3-1/4          |
| 16268           | C4TRA-13004 | 16018    | 4TRA-13004 | 13.0             | 1/2            | 1-1/4         | 3-1/4          |
| 16270           | C4TRA-14004 | 16020    | 4TRA-14004 | 14.0             | 1/2            | 1-3/8         | 3-3/8          |
| 16276           | C4TRA-16005 | 16026    | 4TRA-16005 | 16.0             | 5/8            | 1-5/8         | 3-3/4          |
| 16280           | C4TRA-18005 | 16030    | 4TRA-18005 | 18.0             | 5/8            | 1-5/8         | 3-3/4          |
| 16282           | C4TRA-20005 | 16032    | 4TRA-20005 | 20.0             | 5/8            | 1-7/8         | 4-1/8          |
| 16284           | C4TRA-22006 | 16034    | 4TRA-22006 | 22.0             | 3/4            | 1-7/8         | 4-1/8          |
| 16288           | C4TRA-24006 | 16038    | 4TRA-24006 | 24.0             | 3/4            | 2             | 4-1/2          |
| 16290           | C4TRA-25008 | 16040    | 4TRA-25008 | 25.0             | 1              | 2             | 4-1/2          |
| 16296           | C4TRA-32008 | 16046    | 4TRA-32008 | 32.0             | 1              | 2             | 4-1/2          |
| 16298           | C4TRA-36008 | 16048    | 4TRA-36008 | 36.0             | 1              | 2             | 4-1/2          |
| 16300           | C4TRA-40010 | 16050    | 4TRA-40010 | 40.0             | 1-1/4          | 2             | 4-1/2          |
| 16302           | C4TRA-45010 | 16052    | 4TRA-45010 | 45.0             | 1-1/4          | 2             | 4-1/2          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

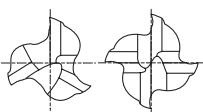
**TOLERANCE OF MILL DIA.**

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\* \* The shank of End Mills is the same diameter as the cutting portion.



# 3&4 FLUTE, 60° HELIX, REGULAR LENGTH

HSS  
Co8

3&amp;4

60°

FLAT

DATA

P.287

- Provided with high helix angle(60°)  
Smooth cutting and small cutting resistance.  
Suitable for machining of difficult-to-cut materials.

## E2120(C3SRH) Series

### ■ 3 FLUTE

Unit : inch

| EDP No.         | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            |               |                |               |                |
| 20297           | C3SRH-1603 | 1/4           | 3/8            | 5/8           | 2-7/16         |
| 20301           | C3SRH-2003 | 5/16          | 3/8            | 3/4           | 2-1/2          |
| 20305           | C3SRH-2403 | 3/8           | 3/8            | 3/4           | 2-1/2          |
| 20312           | C3SRH-2803 | 7/16          | 3/8            | 1             | 2-11/16        |
| 20321           | C3SRH-3204 | 1/2           | 1/2            | 1-1/4         | 3-1/4          |
| 20337           | C3SRH-4005 | 5/8           | 5/8            | 1-5/8         | 3-3/4          |
| 20359           | C3SRH-4806 | 3/4           | 3/4            | 1-5/8         | 3-7/8          |

## E2121(C4SRH) Series

### ■ 4 FLUTE

Unit : inch

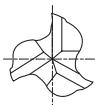
| EDP No.         | ITEM No.    | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|-------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |             |               |                |               |                |
| 20394           | C4SRH-5607  | 7/8           | 7/8            | 1-7/8         | 4-1/8          |
| 20426           | C4SRH-6408  | 1             | 1              | 2             | 4-1/2          |
| 20445           | C4SRH-B1610 | 1-1/4         | 1-1/4          | 2             | 4-1/2          |
| 20461           | C4SRH-B3210 | 1-1/2         | 1-1/4          | 2             | 4-1/2          |
| 20477           | C4SRH-B6410 | 2             | 1-1/4          | 2             | 4-1/2          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

#### TOLERANCE OF MILL DIA.

|         |             |
|---------|-------------|
| + .0010 | * * + .0015 |
| 0       | 0           |

\*\* The shank of End Mills is the same diameter as the cutting portion.

**HSS****3 FLUTE, SHORT & LONG LENGTH, THROW AWAY**HSS  
Co8

3

30°

B.S.

DATA

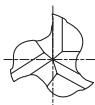
P.286

- Well balanced web design to minimize deflection & chattering. High accuracy for O.D. is guaranteed under the strict tolerance control. Much higher(50%) table speed than 2 Flute is allowed.

**E2160(C3CSC) Series****■ SHORT LENGTH**

Unit : inch

| EDP No.         | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            |               |                |               |                |
| 22257           | C3CSC-0402 | 1/16          | 1/4            | 3/32          | 31/32          |
| 22261           | C3CSC-0602 | 3/32          | 1/4            | 5/32          | 1-1/64         |
| 22265           | C3CSC-0802 | 1/8           | 1/4            | 3/16          | 1-3/32         |
| 22269           | C3CSC-1002 | 5/32          | 1/4            | 1/4           | 1-9/32         |
| 22273           | C3CSC-1202 | 3/16          | 1/4            | 9/32          | 1-11/32        |
| 22277           | C3CSC-1402 | 7/32          | 1/4            | 5/16          | 1-13/32        |
| 22281           | C3CSC-1602 | 1/4           | 1/4            | 3/8           | 1-13/32        |

**E2161(C3CLC) Series****■ LONG LENGTH**

Unit : inch

| EDP No.         | ITEM No.   | MILL DIAMETER | SHANK DIAMETER | LENGTH OF CUT | OVERALL LENGTH |
|-----------------|------------|---------------|----------------|---------------|----------------|
| 8% COBALT (M42) |            |               |                |               |                |
| 23257           | C3CLC-0402 | 1/16          | 1/4            | 5/32          | 1-3/32         |
| 23261           | C3CLC-0602 | 3/32          | 1/4            | 1/4           | 1-1/4          |
| 23265           | C3CLC-0802 | 1/8           | 1/4            | 5/16          | 1-11/32        |
| 23269           | C3CLC-1002 | 5/32          | 1/4            | 3/8           | 1-17/32        |
| 23273           | C3CLC-1202 | 3/16          | 1/4            | 7/16          | 1-21/32        |
| 23277           | C3CLC-1402 | 7/32          | 1/4            | 1/2           | 1-3/4          |
| 23281           | C3CLC-1602 | 1/4           | 1/4            | 5/8           | 1-3/4          |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

|                        |                    |
|------------------------|--------------------|
| TOLERANCE OF MILL DIA. | — .0005<br>— .0013 |
|------------------------|--------------------|



## 4 FLUTE, CORNER ROUNDING



► This general corner rounding end mills are designed for machining fillets on workpiece.

### E2237(C4RDG), E1237(4RDG) Series

Unit : inch

| EDP No.         | ITEM No.    | EDP No.  | ITEM No.   | RADIUS | MILL DIAMETER | SHANK DIAMETER | OVERALL LENGTH |
|-----------------|-------------|----------|------------|--------|---------------|----------------|----------------|
| 8% COBALT (M42) |             | HSS (M2) |            |        |               |                |                |
| 29251           | C4RDG-2803  | 29001    | 4RDG-2803  | 1/16   | 7/16          | 3/8            | 2-1/2          |
| 29252           | C4RDG-3203  | 29002    | 4RDG-3203  | 3/32   | 1/2           | 3/8            | 2-1/2          |
| 29253           | C4RDG-4004  | 29003    | 4RDG-4004  | 1/8    | 5/8           | 1/2            | 3              |
| 29254           | C4RDG-4804  | 29004    | 4RDG-4804  | 5/32   | 3/4           | 1/2            | 3              |
| 29255           | C4RDG-5604  | 29005    | 4RDG-5604  | 3/16   | 7/8           | 1/2            | 3              |
| 29256           | C4RDG-5606  | 29006    | 4RDG-5606  | 3/16   | 7/8           | 3/4            | 3-1/8          |
| 29257           | C4RDG-5604R | 29007    | 4RDG-5604R | 7/32   | 7/8           | 1/2            | 3-1/4          |
| 29258           | C4RDG-6404  | 29008    | 4RDG-6404  | 1/4    | 1             | 1/2            | 3              |
| 29259           | C4RDG-6405  | 29009    | 4RDG-6405  | 9/32   | 1             | 5/8            | 3              |
| 29260           | C4RDG-6406  | 29010    | 4RDG-6406  | 1/4    | 1             | 3/4            | 3-1/4          |
| 29261           | C4RDG-B0804 | 29011    | 4RDG-B0804 | 5/16   | 1-1/8         | 1/2            | 3-1/4          |
| 29262           | C4RDG-B0805 | 29012    | 4RDG-B0805 | 5/16   | 1-1/8         | 5/8            | 3-1/2          |
| 29263           | C4RDG-B0806 | 29013    | 4RDG-B0806 | 5/16   | 1-1/8         | 3/4            | 3-1/2          |
| 29264           | C4RDG-B0807 | 29014    | 4RDG-B0807 | 5/16   | 1-1/8         | 7/8            | 3-1/2          |
| 29265           | C4RDG-B1604 | 29015    | 4RDG-B1604 | 3/8    | 1-1/4         | 1/2            | 3-1/2          |
| 29266           | C4RDG-B1606 | 29016    | 4RDG-B1606 | 3/8    | 1-1/4         | 3/4            | 3-3/4          |
| 29267           | C4RDG-B1607 | 29017    | 4RDG-B1607 | 3/8    | 1-1/4         | 7/8            | 3-3/4          |
| 29268           | C4RDG-B2406 | 29018    | 4RDG-B2406 | 7/16   | 1-3/8         | 3/4            | 3-3/4          |
| 29269           | C4RDG-B2408 | 29019    | 4RDG-B2408 | 7/16   | 1-3/8         | 1              | 4              |
| 29270           | C4RDG-B3206 | 29020    | 4RDG-B3206 | 1/2    | 1-1/2         | 3/4            | 3-7/8          |
| 29271           | C4RDG-B3208 | 29021    | 4RDG-B3208 | 1/2    | 1-1/2         | 1              | 4-1/8          |
| 29272           | C4RDG-B4006 | 29022    | 4RDG-B4006 | 5/8    | 1-5/8         | 3/4            | 4              |
| 29273           | C4RDG-B4008 | 29023    | 4RDG-B4008 | 5/8    | 1-5/8         | 1              | 4              |
| 29274           | C4RDG-B6006 | 29024    | 4RDG-B6006 | 5/8    | 1-15/16       | 3/4            | 4              |
| 29275           | C4RDG-B6008 | 29025    | 4RDG-B6008 | 5/8    | 1-15/16       | 1              | 4-1/4          |
| 29276           | C4RDG-B5606 | 29026    | 4RDG-B5606 | 3/4    | 1-7/8         | 3/4            | 4              |
| 29277           | C4RDG-B5608 | 29027    | 4RDG-B5608 | 3/4    | 1-7/8         | 1              | 4              |
| 29278           | C4RDG-C1606 | 29028    | 4RDG-C1606 | 3/4    | 2-1/4         | 3/4            | 4-1/8          |
| 29279           | C4RDG-C1608 | 29029    | 4RDG-C1608 | 3/4    | 2-1/4         | 1              | 4-5/16         |
| 29280           | C4RDG-C3206 | 29030    | 4RDG-C3206 | 7/8    | 2-1/2         | 3/4            | 4-1/2          |
| 29281           | C4RDG-C4006 | 29031    | 4RDG-C4006 | 1      | 2-5/8         | 3/4            | 4-1/2          |
| 29282           | C4RDG-C4808 | 29032    | 4RDG-C4808 | 1      | 2-3/4         | 1              | 4-3/4          |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

**HSS****END MILL SET SERIES**

► Various range of sizes in these end mill sets gives you a plenty of opportunities of reduce manufacturing costs and improve productivity.

## ■ SET OF MINIATURE, (3/16" SHANK) DOUBLE

| EDP NO.         | ITEM NO. | EDP NO.  | ITEM NO. | TYPE             | LENGTH  | MILL DIAMETER   | NO. OF FLUTES |
|-----------------|----------|----------|----------|------------------|---------|---|---------------|
| 8% COBALT (M42) |          | HSS (M2) |          |                  |         |   |               |
| 96002           | CMR211   | 96001    | MR211    | Sq. END (11PCS.) | REGULAR | 1/32, 3/64, 1/16, 5/64, 3/32, 7/64,<br>1/8, 9/64, 5/32, 11/64, 3/16 | 2             |
| 96004           | CMR409   | 96003    | MR409    | Sq. END (9PCS.)  | REGULAR | 1/16, 5/64, 3/32, 7/64, 1/8, 9/64,<br>5/32, 11/64, 3/16             | 4             |
| 96006           | CMS211   | 96005    | MS211    | Sq. END (11PCS.) | STUB    | 1/32, 3/64, 1/16, 5/64, 3/32, 7/64,<br>1/8, 9/64, 5/32, 11/64, 3/16 | 2             |
| 96008           | CMS409   | 96007    | MS409    | Sq. END (9PCS.)  | STUB    | 1/16, 5/64, 3/32, 7/64, 1/8, 9/64,<br>5/32, 11/64, 3/16             | 4             |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

\* WITH TRANSPARENT PLASTIC CASE

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.

## ■ SET OF 3/8" SHANK, (WELDON) SINGLE

| EDP NO.         | ITEM NO. | EDP NO.  | ITEM NO. | TYPE               | LENGTH  | MILL DIAMETER             | NO. OF FLUTES |
|-----------------|----------|----------|----------|--------------------|---------|---------------------------|---------------|
| 8% COBALT (M42) |          | HSS (M2) |          |                    |         |                           |               |
| 96010           | CWR205   | 96009    | WR205    | Sq. END (5PCS.)    | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 2             |
| 96012           | CWR405   | 96011    | WR405    | Sq. END (5PCS.)    | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 4             |
| 96014           | CWRC05   | 96013    | WRC05    | CENTER CUT (5PCS.) | REGULAR | 1/8, 3/16, 1/4, 5/16, 3/8 | 4             |

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.

\* WITH TRANSPARENT PLASTIC CASE

■ Coating Codes for Cobalt

Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)

■ Coating Codes for HSS

Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)

► Coated Price Shown in Price List. Call for Availability.



## END MILL SET SERIES

► Various range of sizes in these end mill sets gives you a plenty of opportunities to reduce manufacturing costs and improve productivity.

### ■ SET OF 3/8" SHANK, (WELDON) DOUBLE

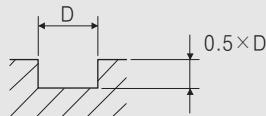
| EDP NO.         | ITEM NO. | EDP NO.  | ITEM NO. | TYPE                  | LENGTH  | MILL DIAMETER   | NO. OF FLUTES |
|-----------------|----------|----------|----------|-----------------------|---------|---|---------------|
| 8% COBALT (M42) |          | HSS (M2) |          |                       |         |   |               |
| 96016           | CDR209   | 96015    | DR209    | Sq. END<br>(9PCS.)    | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32,<br>5/16, 11/32, 3/8 | 2             |
| 96018           | CDR409   | 96017    | DR409    | Sq. END<br>(9PCS.)    | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32,<br>5/16, 11/32, 3/8 | 4             |
| 96020           | CDRC09   | 96019    | DRC09    | CENTER CUT<br>(9PCS.) | REGULAR | 1/8, 5/32, 3/16, 7/32, 1/4, 9/32,<br>5/16, 11/32, 3/8 | 4             |

- The TiN coated, TiCN coated or TiAlN coated is available on your request.
- Coating Codes for Cobalt  
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
- Coating Codes for HSS  
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
- Coated Price Shown in Price List. Call for Availability.

\* WITH TRANSPARENT PLASTIC CASE

**HSS****2 FLUTE, FINISH, SLOTTING**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 3500   | 2.20 | 3200   | 1.80 | 2500   | 1.60 | 1600   | 0.80 | 11000                       | 9.80  |
| 1/4      | 1800   | 3.50 | 1600   | 3.10 | 1200   | 2.40 | 800  | 1.60 | 5600                        | 12.20 |
| 3/8      | 1100   | 4.00 | 900  | 3.50 | 800  | 3.10 | 450  | 1.80 | 3100                        | 15.80 |
| 1/2      | 900  | 4.30 | 800  | 4.00 | 630  | 3.10 | 400  | 2.00 | 2500                        | 15.00 |
| 5/8      | 700  | 4.30 | 560  | 3.50 | 450  | 2.80 | 280  | 1.80 | 2000                        | 13.80 |
| 3/4      | 630  | 4.00 | 500  | 3.50 | 400  | 2.80 | 250  | 1.80 | 1800                        | 13.80 |
| 7/8      | 500  | 4.00 | 450  | 3.50 | 350  | 2.80 | 220  | 1.80 | 1400                        | 11.80 |
| 1        | 450  | 3.50 | 400  | 3.10 | 310  | 2.40 | 180  | 1.40 | 1200                        | 11.00 |
| 1-1/8    | 400  | 3.10 | 350  | 2.80 | 280  | 2.20 | 160  | 1.20 | 1100                        | 10.50 |
| 1-3/8    | 310  | 2.40 | 250  | 2.00 | 200  | 1.60 | 120  | 1.00 | 900                         | 8.70  |
| 1-1/2    | 310  | 2.40 | 250  | 2.00 | 200  | 1.60 | 120  | 1.00 | 900                         | 8.70  |
| 1-3/4    | 280  | 2.40 | 220  | 2.00 | 180  | 1.60 | 110  | 1.00 | 800                         | 7.80  |
| 2        | 250  | 2.00 | 190  | 1.80 | 110  | 1.00 | 80   | 0.80 | 630                         | 6.30  |

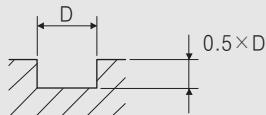


※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****2 FLUTE, 42° HELIX, FINISH for ALUMINUM**

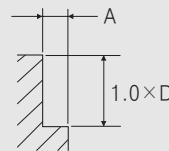
## &lt;Slotting&gt;

| MATERIAL | ALUMINUM<br>NONFERROUS METALS |       |
|----------|-------------------------------|-------|
| DIAMETER | RPM                           | FEED  |
| 1/8      | 8000                          | 22.50 |
| 3/16     | 7400                          | 25.00 |
| 1/4      | 6800                          | 28.50 |
| 5/16     | 5200                          | 43.50 |
| 7/16     | 5000                          | 47.00 |
| 1/2      | 4500                          | 47.00 |
| 9/16     | 3500                          | 49.00 |
| 5/8      | 3500                          | 49.00 |
| 3/4      | 2300                          | 51.00 |
| 13/16    | 2000                          | 51.00 |

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

## &lt;Side Cutting&gt;

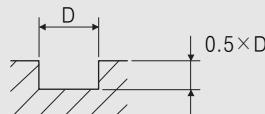
| MATERIAL | NON-ALLOYED STEELS<br>ALLOY STEELS<br>CAST IRON |       |
|----------|---|-------|
| DIAMETER | RPM   | FEED  |
| 1/8      | 8000  | 29.00 |
| 3/16     | 7400  | 32.50 |
| 1/4      | 6800  | 37.00 |
| 5/16     | 5200  | 55.00 |
| 7/16     | 5000  | 47.00 |
| 1/2      | 4500  | 61.00 |
| 9/16     | 3500  | 63.00 |
| 5/8      | 3500  | 63.00 |
| 3/4      | 2300  | 67.00 |
| 13/16    | 2000  | 67.00 |

A : φ1/8 ~ φ5/16=0.25×D  
φ7/16 ~ φ13/16=0.5×DRPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, FINISH, SLOTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 5600   | 2.40 | 4500   | 1.80 | 4000   | 1.80 | 2200   | 0.80 | 12000                       | 9.40  |
| 1/8      | 3500   | 3.12 | 3200   | 2.60 | 2500   | 2.40 | 1600   | 1.20 | 11000                       | 15.00 |
| 1/4      | 1800   | 5.30 | 1600   | 4.70 | 1200   | 3.50 | 800  | 2.40 | 5600                        | 18.50 |
| 3/8      | 1100   | 6.00 | 900  | 5.30 | 800  | 4.70 | 450  | 2.60 | 3100                        | 23.60 |
| 1/2      | 900  | 6.50 | 800  | 6.00 | 630  | 4.70 | 400  | 3.00 | 2500                        | 22.40 |
| 9/16     | 800  | 6.50 | 700  | 5.30 | 560  | 4.70 | 350  | 3.00 | 2200                        | 20.90 |
| 5/8      | 700  | 6.50 | 560  | 5.30 | 450  | 4.10 | 280  | 2.60 | 2000                        | 20.90 |
| 7/8      | 500  | 6.00 | 450  | 5.30 | 350  | 4.10 | 220  | 2.60 | 1400                        | 17.70 |
| 1        | 450  | 5.3  | 400  | 4.70 | 310  | 3.50 | 180  | 2.00 | 1200                        | 16.50 |
| 1-1/8    | 400  | 4.70 | 350  | 4.10 | 280  | 3.10 | 160  | 1.80 | 1100                        | 15.80 |



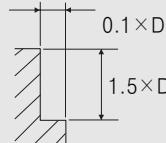
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, FINISH, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 5600   | 2.40 | 4500   | 1.60 | 4000   | 1.40 | 2200   | 0.60 | 12000                       | 7.10  |
| 1/8      | 3500   | 3.10 | 3200   | 2.40 | 2500   | 1.80 | 1600   | 0.80 | 11000                       | 11.00 |
| 5/32     | 2800   | 4.10 | 2200   | 3.00 | 1800   | 2.00 | 1100   | 1.20 | 8000                        | 13.00 |
| 3/16     | 2200   | 5.30 | 1800   | 3.70 | 1600   | 2.60 | 900  | 1.40 | 6300                        | 13.80 |
| 1/4      | 1800   | 5.30 | 1600   | 4.30 | 1200   | 2.60 | 800  | 1.80 | 5600                        | 13.80 |
| 5/16     | 1400   | 6.00 | 1100   | 4.70 | 900  | 3.10 | 560  | 2.00 | 4000                        | 17.30 |
| 3/8      | 1100   | 6.00 | 900  | 4.70 | 800  | 3.80 | 450  | 2.00 | 3100                        | 17.70 |
| 1/2      | 900  | 6.50 | 800  | 5.30 | 630  | 3.80 | 400  | 2.20 | 2500                        | 16.90 |
| 9/16     | 800  | 6.50 | 700  | 4.70 | 560  | 3.80 | 350  | 2.20 | 2200                        | 15.80 |
| 5/8      | 700  | 6.50 | 560  | 4.70 | 450  | 3.10 | 280  | 2.00 | 2000                        | 15.80 |
| 11/16    | 630  | 6.00 | 500  | 4.70 | 400  | 3.10 | 250  | 2.00 | 1800                        | 15.80 |
| 13/16    | 560  | 6.00 | 450  | 4.70 | 400  | 3.10 | 220  | 2.00 | 1600                        | 14.20 |
| 7/8      | 500  | 6.00 | 450  | 4.70 | 350  | 3.10 | 220  | 2.00 | 1400                        | 13.40 |
| 1        | 450  | 5.30 | 400  | 4.30 | 310  | 2.60 | 180  | 1.40 | 1200                        | 12.60 |
| 1-1/8    | 400  | 4.70 | 350  | 3.70 | 280  | 2.40 | 160  | 1.20 | 1100                        | 11.80 |
| 1-3/16   | 350  | 4.10 | 310  | 3.10 | 250  | 2.20 | 160  | 1.20 | 1100                        | 11.80 |

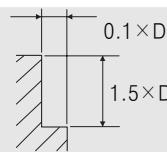


\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****MULTI FLUTE, FINISH, SIDE CUTTING**

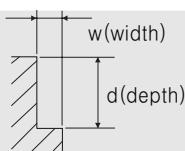
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 3500   | 4.30 | 3200   | 3.10 | 2500   | 2.40 | 1600   | 1.20 | 11000                       | 15.00 |
| 1/4      | 1800   | 7.10 | 1600   | 5.70 | 1200   | 3.50 | 800  | 2.40 | 5600                        | 18.50 |
| 3/8      | 1100   | 7.90 | 900  | 6.30 | 800  | 4.70 | 450  | 2.60 | 3100                        | 23.60 |
| 1/2      | 900  | 8.70 | 800  | 7.10 | 630  | 4.70 | 400  | 3.00 | 2500                        | 22.40 |
| 5/8      | 700  | 8.70 | 560  | 6.30 | 450  | 4.10 | 280  | 2.60 | 2000                        | 20.90 |
| 3/4      | 630  | 7.90 | 500  | 6.30 | 400  | 4.10 | 250  | 2.60 | 1800                        | 20.90 |
| 13/16    | 500  | 7.90 | 450  | 6.30 | 350  | 4.10 | 220  | 2.60 | 1400                        | 17.70 |
| 15/16    | 500  | 7.90 | 450  | 6.30 | 350  | 4.10 | 220  | 2.60 | 1400                        | 17.70 |
| 1        | 450  | 7.10 | 400  | 5.70 | 310  | 3.50 | 180  | 2.00 | 1200                        | 16.50 |
| 1-1/2    | 310  | 4.70 | 250  | 3.50 | 200  | 2.40 | 120  | 1.40 | 900                         | 13.00 |
| 1-3/4    | 280  | 4.70 | 220  | 3.50 | 150  | 2.40 | 110  | 1.40 | 800                         | 11.80 |
| 2        | 280  | 4.70 | 190  | 3.50 | 110  | 1.80 | 80   | 1.00 | 630                         | 11.80 |



※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****MULTI FLUTE, 60° HELIX, FINISH, SIDE CUTTING**

| MATERIAL | MILD STEELS |      | ALLOY STEELS |      | TOOL STEELS<br>STAINLESS STEELS |     | CAST IRON |      |      |
|----------|-------------|------|--------------|------|---------------------------------|-----|-----------|------|------|
| HARDNESS | ~HRc13      |      | HRc13~HRc32  |      | HRc25~HRc35                     |     | ~HRc20    |      |      |
| DIAMETER | w × d       | RPM  | FEED         | RPM  | FEED                            | RPM | FEED      | RPM  | FEED |
| 1/4      | 0.02 × 0.35 | 1840 | 3.60         | 1250 | 2.20                            | 980 | 1.80      | 2050 | 4.80 |
| 1/4      | 0.08 × 0.35 | 1600 | 3.60         | 650  | 2.20                            | 510 | 1.60      | 1100 | 4.50 |
| 5/8      | 0.02 × 1    | 750  | 2.90         | 460  | 2.00                            | 390 | 1.40      | 840  | 4.10 |
| 5/8      | 0.18 × 1    | 650  | 2.90         | 400  | 2.00                            | 340 | 1.40      | 730  | 4.10 |
| 3/4      | 0.02 × 1.2  | 520  | 2.50         | 370  | 1.80                            | 300 | 1.40      | 630  | 4.10 |
| 3/4      | 0.26 × 1.2  | 450  | 2.50         | 320  | 1.80                            | 260 | 1.40      | 550  | 4.10 |
| 1        | 0.02 × 1.6  | 460  | 2.90         | 290  | 1.80                            | 240 | 1.40      | 510  | 4.30 |
| 1        | 0.30 × 1.6  | 400  | 2.90         | 250  | 1.80                            | 210 | 1.40      | 440  | 4.30 |
| 1-1/2    | 0.02 × 1.6  | 280  | 2.50         | 170  | 1.40                            | 150 | 1.30      | 320  | 3.60 |
| 1-1/2    | 0.80 × 1.6  | 240  | 2.50         | 150  | 1.40                            | 130 | 1.30      | 280  | 3.60 |
| 2        | 0.02 × 2    | 220  | 2.20         | 140  | 1.30                            | 115 | 1.10      | 260  | 2.90 |
| 2        | 1.60 × 2    | 190  | 2.20         | 120  | 1.30                            | 100 | 1.10      | 225  | 2.90 |

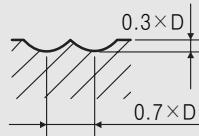


※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****2 FLUTE, BALL NOSE**

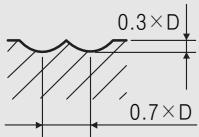
| MATERIAL     | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|--------------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS     |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH     | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER     | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| R1/16 × 1/8  | 4500   | 3.70 | 3400   | 2.80 | 2000   | 1.20 | 1400   | 0.80 | 11000                       | 9.10  |
| R5/64 × 5/32 | 3200   | 4.50 | 2400   | 3.10 | 1400   | 1.40 | 1000   | 1.00 | 8000                        | 10.20 |
| R1/8 × 1/4   | 2200   | 5.30 | 1700   | 3.50 | 1000   | 1.80 | 700  | 1.00 | 5600                        | 11.00 |
| R5/32 × 5/16 | 1600   | 6.30 | 1200   | 4.10 | 700  | 2.00 | 500  | 1.20 | 4000                        | 13.80 |
| R3/16 × 3/8  | 1300   | 7.10 | 1000   | 4.70 | 560  | 2.40 | 400  | 1.40 | 3200                        | 14.20 |
| R1/4 × 1/2   | 1000   | 6.70 | 800  | 4.10 | 450  | 2.20 | 320  | 1.40 | 2500                        | 13.40 |
| R5/16 × 5/8  | 800  | 6.00 | 600  | 4.00 | 350  | 2.20 | 250  | 1.40 | 2000                        | 11.80 |
| R3/32 × 3/16 | 600  | 5.50 | 500  | 3.40 | 300  | 2.00 | 200  | 1.40 | 1600                        | 11.00 |
| R1/2 × 1     | 500  | 5.10 | 400  | 2.80 | 220  | 1.60 | 160  | 1.20 | 1300                        | 9.80  |



※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****MULTI FLUTE, BALL NOSE**

| MATERIAL     | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|--------------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS     |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH     | ~ 500N/mm <sup>2</sup>                       |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER     | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| R1/8 × 1/4   | 2200   | 7.90  | 1700   | 5.30 | 1000   | 2.80 | 700  | 1.60 | 5600                        | 16.50 |
| R5/32 × 5/16 | 1600   | 9.40  | 1200   | 6.30 | 700  | 3.00 | 500  | 1.80 | 4000                        | 20.90 |
| R3/16 × 3/8  | 1300   | 10.60 | 1000   | 7.10 | 560  | 3.50 | 400  | 2.00 | 3200                        | 21.30 |
| R1/4 × 1/2   | 1000   | 10.20 | 800  | 6.30 | 450  | 3.10 | 320  | 2.00 | 2500                        | 20.10 |
| R5/16 × 5/8  | 800  | 9.10  | 600  | 6.00 | 350  | 3.10 | 250  | 2.00 | 2000                        | 17.70 |
| R3/32 × 3/16 | 600  | 8.30  | 500  | 5.10 | 300  | 3.00 | 200  | 2.00 | 1600                        | 16.50 |
| R1/2 × 1     | 500  | 7.90  | 400  | 4.10 | 220  | 2.40 | 160  | 1.80 | 1300                        | 15.00 |

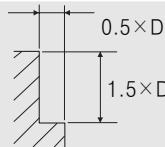


※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****MULTI FLUTE, ROUGHING, SIDE CUTTING**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 1800   | 3.10 | 1600   | 2.40 | 1200   | 2.20 | 800  | 1.20 | 4500                        | 7.90  |
| 5/16     | 1400   | 4.10 | 1100   | 3.00 | 900  | 2.60 | 560  | 1.40 | 3100                        | 9.10  |
| 3/8      | 1100   | 6.00 | 900  | 4.70 | 800  | 4.30 | 450  | 2.40 | 2500                        | 13.80 |
| 1/2      | 900  | 7.10 | 800  | 5.50 | 630  | 4.30 | 400  | 2.80 | 2000                        | 15.80 |
| 5/8      | 700  | 7.10 | 560  | 5.50 | 450  | 4.30 | 280  | 2.80 | 1600                        | 17.70 |
| 11/16    | 630  | 7.10 | 500  | 5.50 | 400  | 4.30 | 250  | 2.80 | 1400                        | 18.50 |
| 7/8      | 500  | 8.70 | 450  | 6.70 | 350  | 5.50 | 220  | 3.40 | 1100                        | 18.50 |
| 1        | 450  | 8.70 | 400  | 6.70 | 310  | 5.50 | 180  | 3.40 | 1000                        | 17.70 |
| 1-1/8    | 400  | 8.10 | 350  | 6.30 | 280  | 5.10 | 160  | 3.40 | 900                         | 20.10 |
| 1-1/4    | 350  | 8.10 | 280  | 6.30 | 220  | 5.10 | 140  | 3.40 | 800                         | 19.70 |
| 1-3/8    | 310  | 8.10 | 250  | 6.30 | 200  | 5.10 | 120  | 3.40 | 700                         | 18.50 |
| 1-3/4    | 280  | 7.90 | 220  | 6.00 | 180  | 4.70 | 110  | 3.10 | 630                         | 17.70 |
| 2        | 220  | 7.90 | 180  | 6.70 | 160  | 5.50 | 90   | 3.10 | 500                         | 14.60 |



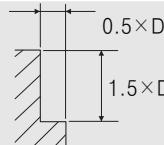
※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

COBALT AND HSS END MILLS

**HSS****MULTI FLUTE, BALL NOSE, ROUGHING,  
SIDE CUTTING**

| MATERIAL     | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|--------------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS     |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH     | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER     | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| R5/32 × 5/16 | 1400   | 4.10 | 1100   | 3.00 | 900  | 2.60 | 560  | 1.40 | 3100                        | 9.10  |
| R3/16 × 3/8  | 1100   | 6.00 | 900  | 4.70 | 800  | 4.30 | 450  | 2.40 | 2500                        | 9.80  |
| R1/4 × 1/2   | 900  | 7.10 | 800  | 5.50 | 630  | 4.30 | 400  | 2.80 | 2000                        | 15.80 |
| R5/16 × 5/8  | 700  | 7.10 | 560  | 5.50 | 450  | 4.30 | 280  | 2.80 | 1600                        | 17.70 |
| R7/16 × 7/8  | 560  | 7.10 | 450  | 5.50 | 400  | 4.30 | 220  | 2.80 | 1200                        | 19.70 |
| R1/2 × 1     | 450  | 8.70 | 400  | 6.70 | 310  | 5.50 | 180  | 3.40 | 1000                        | 17.70 |
| R5/8 × 1-1/4 | 350  | 8.10 | 280  | 6.30 | 220  | 5.10 | 140  | 3.40 | 800                         | 19.70 |
| R7/8 × 1-3/4 | 280  | 7.90 | 220  | 6.00 | 180  | 4.70 | 110  | 3.10 | 630                         | 17.70 |



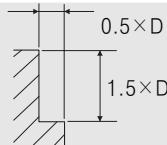
※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, ROUGHING & FINISHING, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 1800   | 2.50 | 1300   | 2.00 | 1200   | 1.80 | 800  | 1.00 | 4500                        | 6.30  |
| 5/16     | 1400   | 3.35 | 1100   | 2.40 | 900  | 2.20 | 560  | 1.20 | 3100                        | 7.30  |
| 3/8      | 1100   | 4.70 | 900  | 3.70 | 800  | 3.50 | 450  | 2.00 | 2500                        | 11.00 |
| 1/2      | 900  | 5.70 | 800  | 4.30 | 630  | 3.50 | 400  | 2.20 | 2000                        | 12.60 |
| 5/8      | 700  | 5.70 | 560  | 4.30 | 450  | 3.50 | 280  | 2.20 | 1600                        | 14.20 |
| 11/16    | 630  | 5.70 | 500  | 4.30 | 400  | 3.50 | 250  | 2.20 | 1400                        | 15.00 |
| 7/8      | 500  | 6.90 | 450  | 5.30 | 350  | 4.30 | 220  | 2.80 | 1100                        | 15.00 |
| 1        | 450  | 6.90 | 400  | 5.30 | 310  | 4.30 | 180  | 2.80 | 1000                        | 14.20 |
| 1-1/4    | 350  | 6.70 | 280  | 5.10 | 220  | 4.10 | 140  | 2.80 | 800                         | 15.80 |
| 1-3/8    | 310  | 6.70 | 250  | 5.10 | 200  | 4.10 | 120  | 2.80 | 700                         | 15.00 |
| 2        | 240  | 5.35 | 190  | 4.00 | 150  | 3.40 | 110  | 2.60 | 500                         | 11.20 |



\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MINIATURE

| MATERIAL | HIGH TENSILE STEELS<br>MEDIUM STRENGTH |      | MEDIUM TENSILE<br>STEELS<br>UNALLOYED TITANIUM<br>TOOL STEELS |      | VILD STEEL FORGING<br>HARD BRASS<br>& BRONZE<br>COPPER |      | ALUMINUM<br>ALUMINUM ALLOYS<br>PLASTIC<br>WOODS |      | ALUMINUM<br>ALUMINUM ALLOYS |      |
|----------|--|------|---|------|--|------|---|------|-----------------------------|------|
| DIAMETER | RPM                                    | FEED | RPM   | FEED | RPM  | FEED | RPM   | FEED | RPM                         | FEED |
| 1/4      | 6600~8800                              | 0.34 | 11000 up  | 0.45 | 11000 up   | 0.79 | 11000 up  | 1.24 | 11000 up                    | 1.46 |
| 1/32     | 3300~4400                              | 0.45 | 5500~5600   | 0.56 | 7700~9900  | 1.58 | 11000 up  | 1.58 | 11000 up                    | 2.48 |
| 3/64     | 2200~2935                              | 0.56 | 3665~4400   | 0.56 | 5135~6600  | 2.48 | 7335~8800                                       | 2.03 | 11000 up                    | 2.59 |
| 1/16     | 1650~2260                              | 0.56 | 2750~3300   | 1.01 | 3350~4950  | 3.26 | 5500~6600                                       | 2.59 | 11000 up                    | 4.16 |
| 5/64     | 1320~1760                              | 0.56 | 2200~2640   | 1.01 | 3850~3960  | 3.26 | 4400~5820                                       | 2.59 | 8500 up                     | 4.16 |
| 3/32     | 1100~1285                              | 0.56 | 1835~2200   | 1.01 | 2565~3300  | 3.26 | 3665~4400                                       | 2.59 | 7330up                      | 4.16 |
| 7/64     | 345~1255                               | 0.56 | 1570~1885   | 1.01 | 2200~2830  | 3.26 | 3140~3770                                       | 2.59 | 5625 up                     | 4.28 |
| 1/8      | 825~1100                               | 0.56 | 1375~1650   | 1.01 | 1925~2475  | 3.26 | 2750~3300                                       | 2.81 | 5500 up                     | 4.50 |
| 9/64     | 735~980                                | 0.62 | 1220~1465   | 1.01 | 1710~2200  | 3.38 | 2445~3770                                       | 2.81 | 4890~9780                   | 4.50 |
| 5/32     | 560~880                                | 0.79 | 1100~1320   | 1.13 | 1540~1980  | 3.60 | 2205~2640                                       | 2.93 | 4400~8800                   | 4.50 |
| 11/64    | 600~800                                | 0.90 | 1000~1200   | 1.24 | 1400~1800  | 3.71 | 2000~2400                                       | 3.04 | 4000~3000                   | 4.61 |
| 3/16     | 550~735                                | 1.01 | 915~1100  | 1.35 | 1285~1650  | 3.33 | 1535~2200                                       | 3.26 | 3685~7335                   | 4.73 |

NOTES:

(1) The cutting conditions in this table are given for reference, which should be varied depending on

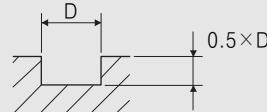
the machine, tooling, depth of cut, cutting fluid and other conditons.

(2) Use a holder of strong gripping force and machine of high stiffness

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****2 FLUTE, FINISH, TiN-COATED, SLOTTING**

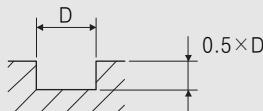
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 4200   | 2.64 | 3840   | 2.16 | 3000   | 1.92 | 1920   | 0.96 | 13200                       | 11.76 |
| 1/4      | 2160   | 4.20 | 1920   | 3.72 | 1440   | 2.88 | 960  | 1.92 | 6720                        | 14.64 |
| 3/8      | 1320   | 4.80 | 1080   | 4.20 | 960  | 3.72 | 540  | 2.16 | 3720                        | 18.96 |
| 1/2      | 1090   | 5.16 | 960  | 4.80 | 756  | 3.72 | 480  | 2.40 | 3000                        | 18.00 |
| 5/8      | 840  | 5.16 | 672  | 4.20 | 540  | 3.72 | 336  | 2.16 | 2400                        | 16.56 |
| 3/4      | 756  | 4.80 | 600  | 4.20 | 480  | 3.36 | 300  | 2.16 | 2160                        | 16.56 |
| 7/8      | 600  | 4.80 | 540  | 4.20 | 420  | 3.36 | 264  | 2.16 | 1680                        | 14.16 |
| 1        | 540  | 4.20 | 480  | 3.72 | 372  | 2.88 | 260  | 2.16 | 1440                        | 13.20 |
| 1-1/8    | 480  | 3.72 | 420  | 3.36 | 336  | 2.64 | 432  | 1.68 | 1320                        | 12.60 |
| 1-3/8    | 372  | 2.88 | 300  | 2.40 | 240  | 1.92 | 144  | 1.20 | 1080                        | 10.44 |
| 1-1/2    | 372  | 2.88 | 300  | 2.40 | 240  | 1.92 | 144  | 1.20 | 1080                        | 10.44 |
| 1-3/4    | 336  | 2.88 | 264  | 2.40 | 216  | 1.92 | 132  | 1.20 | 960                         | 9.48  |
| 2        | 300  | 2.40 | 228  | 2.16 | 132  | 1.20 | 96   | 0.96 | 756                         | 7.56  |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****3 FLUTE, FINISH, TiN-COATED, SLOTTING**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 6720   | 2.80 | 5400   | 2.16 | 4800   | 2.16 | 2640   | 0.96 | 14400                       | 11.28 |
| 1/5      | 4200   | 3.72 | 3840   | 3.12 | 3000   | 2.88 | 1920   | 1.44 | 13200                       | 18.00 |
| 1/4      | 2160   | 6.36 | 1920   | 5.64 | 1440   | 4.20 | 960  | 2.88 | 6720                        | 21.66 |
| 3/8      | 1320   | 7.20 | 1080   | 6.36 | 960  | 5.64 | 540  | 3.12 | 3720                        | 28.32 |
| 1/2      | 1080   | 7.80 | 960  | 7.20 | 756  | 5.64 | 480  | 3.60 | 3000                        | 26.88 |
| 5/8      | 840  | 7.80 | 672  | 6.36 | 540  | 4.92 | 336  | 3.12 | 2400                        | 25.08 |
| 11/16    | 756  | 7.20 | 600  | 6.36 | 480  | 4.92 | 300  | 3.12 | 2160                        | 25.08 |
| 7/8      | 600  | 7.20 | 540  | 6.36 | 420  | 4.92 | 264  | 3.12 | 1680                        | 21.24 |
| 1        | 540  | 6.36 | 480  | 5.64 | 372  | 4.20 | 216  | 2.40 | 1440                        | 19.80 |
| 1-1/8    | 430  | 5.62 | 420  | 4.92 | 336  | 3.72 | 192  | 2.16 | 1320                        | 18.96 |
| 1-3/16   | 420  | 4.92 | 372  | 4.20 | 300  | 3.60 | 192  | 2.16 | 1320                        | 18.96 |



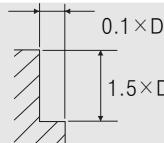
\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, FINISH, TiN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 6720   | 2.88 | 5400   | 1.92 | 4800   | 1.68 | 2640   | 0.72 | 14400                       | 8.52  |
| 1/8      | 4200   | 3.72 | 3840   | 2.88 | 3000   | 2.16 | 1920   | 0.96 | 13200                       | 13.20 |
| 1/4      | 2160   | 6.36 | 1920   | 5.16 | 1440   | 3.12 | 960  | 2.16 | 6720                        | 16.56 |
| 3/8      | 1320   | 7.20 | 1080   | 5.64 | 960  | 4.20 | 540  | 2.40 | 3720                        | 21.24 |
| 1/2      | 1080   | 7.80 | 960  | 6.36 | 756  | 4.20 | 480  | 2.64 | 3000                        | 20.28 |
| 9/16     | 960  | 7.80 | 840  | 5.64 | 672  | 4.20 | 420  | 2.64 | 2640                        | 18.96 |
| 5/8      | 840  | 7.80 | 672  | 5.64 | 540  | 3.72 | 336  | 2.40 | 2400                        | 18.96 |
| 11/16    | 756  | 7.20 | 600  | 5.64 | 480  | 3.72 | 300  | 2.40 | 2160                        | 18.96 |
| 7/8      | 600  | 7.20 | 540  | 5.64 | 420  | 3.72 | 264  | 2.40 | 1680                        | 16.08 |
| 1        | 540  | 6.36 | 480  | 5.16 | 372  | 3.12 | 216  | 1.68 | 1440                        | 15.12 |
| 1-1/8    | 430  | 5.64 | 420  | 4.44 | 336  | 2.88 | 192  | 1.44 | 1320                        | 14.16 |



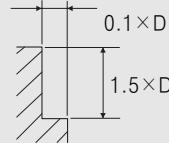
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, FINISH, TiN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 4200   | 5.16  | 3840   | 3.72 | 3000   | 2.88 | 1920   | 1.44 | 13200                       | 18.00 |
| 1/4      | 2640   | 8.52  | 1920   | 6.84 | 1440   | 4.20 | 960  | 2.88 | 6720                        | 22.20 |
| 3/8      | 1320   | 9.48  | 1080   | 7.56 | 960  | 5.64 | 540  | 3.12 | 3700                        | 28.32 |
| 1/2      | 1080   | 10.44 | 960  | 8.52 | 756  | 5.64 | 480  | 3.60 | 3000                        | 26.88 |
| 5/8      | 840  | 10.44 | 672  | 7.56 | 540  | 4.92 | 336  | 3.12 | 2400                        | 25.08 |
| 3/4      | 756  | 9.48  | 600  | 7.56 | 480  | 4.92 | 300  | 3.12 | 2160                        | 25.08 |
| 7/8      | 600  | 9.48  | 540  | 7.56 | 420  | 4.92 | 264  | 3.12 | 1680                        | 21.24 |
| 15/16    | 600  | 9.48  | 540  | 7.56 | 420  | 4.92 | 264  | 3.12 | 1680                        | 21.24 |
| 1        | 540  | 8.52  | 480  | 6.84 | 372  | 4.20 | 216  | 2.40 | 1440                        | 19.80 |
| 1-1/2    | 372  | 5.64  | 300  | 4.20 | 240  | 2.88 | 144  | 1.68 | 1080                        | 15.60 |
| 1-3/4    | 336  | 5.64  | 264  | 4.20 | 216  | 2.88 | 132  | 1.68 | 960                         | 14.16 |
| 2        | 336  | 5.64  | 264  | 4.20 | 168  | 2.16 | 96   | 1.20 | 960                         | 14.16 |

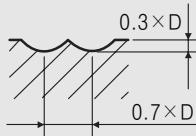


\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****2 FLUTE, BALL NOSE, TiN-COATED**

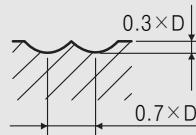
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 5400   | 4.44 | 4080   | 3.36 | 2400   | 1.44 | 1680   | 0.96 | 13200                       | 10.92 |
| 5/32     | 3840   | 5.40 | 2880   | 3.72 | 1680   | 1.68 | 1200   | 1.20 | 9600                        | 12.24 |
| 1/2      | 2640   | 6.36 | 2040   | 4.20 | 720  | 2.16 | 840  | 1.20 | 6720                        | 13.20 |
| 5/16     | 1920   | 7.56 | 1440   | 4.92 | 840  | 2.40 | 600  | 1.44 | 4800                        | 16.56 |
| 3/8      | 1560   | 8.52 | 1200   | 5.64 | 672  | 2.88 | 480  | 1.68 | 3840                        | 17.04 |
| 1/2      | 1200   | 8.04 | 960  | 4.92 | 540  | 2.64 | 384  | 1.68 | 3330                        | 16.08 |
| 5/8      | 960  | 7.20 | 720  | 4.80 | 420  | 2.64 | 300  | 1.68 | 2400                        | 14.16 |
| 13/16    | 720  | 6.60 | 600  | 4.08 | 360  | 2.40 | 240  | 1.68 | 1923                        | 13.20 |
| 1        | 600  | 6.12 | 480  | 3.36 | 264  | 1.92 | 192  | 1.44 | 1560                        | 11.76 |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****MULTI FLUTE, BALL NOSE, TiN-COATED**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2640   | 9.48  | 2040   | 6.36 | 1200   | 3.36 | 840  | 1.92 | 6720                        | 19.80 |
| 5/16     | 1920   | 11.28 | 1440   | 7.56 | 840  | 3.60 | 600  | 2.16 | 4800                        | 25.08 |
| 3/8      | 1560   | 12.72 | 1200   | 8.52 | 672  | 4.20 | 480  | 2.40 | 3840                        | 25.56 |
| 1/2      | 1200   | 12.24 | 960  | 7.56 | 540  | 3.72 | 384  | 2.40 | 3000                        | 24.12 |
| 5/8      | 960  | 10.92 | 720  | 7.20 | 420  | 3.72 | 300  | 2.40 | 2400                        | 21.24 |
| 13/16    | 720  | 9.96  | 600  | 6.12 | 380  | 3.60 | 240  | 2.40 | 1920                        | 19.80 |
| 1        | 600  | 9.48  | 480  | 4.80 | 264  | 2.88 | 192  | 2.16 | 1560                        | 18.00 |



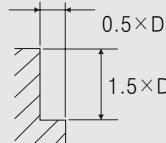
\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, ROUGHING, TiN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm²                                   |       | 500~800N/mm²                                 |      | 800~1000N/mm²                                |      | 1000~1300N/mm²                               |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2160   | 3.72  | 1920   | 2.88 | 1440   | 2.64 | 960  | 1.44 | 5400                        | 9.48  |
| 5/16     | 1680   | 4.92  | 1320   | 3.60 | 1080   | 3.12 | 672  | 1.68 | 3720                        | 10.92 |
| 3/8      | 1320   | 7.20  | 1080   | 5.64 | 960  | 5.16 | 540  | 2.88 | 3000                        | 16.56 |
| 1/2      | 1080   | 8.52  | 960  | 6.60 | 756  | 5.16 | 480  | 3.36 | 2400                        | 18.96 |
| 5/8      | 840  | 8.52  | 672  | 6.60 | 540  | 5.16 | 336  | 3.36 | 1920                        | 22.20 |
| 11/16    | 756  | 8.52  | 600  | 6.60 | 480  | 5.16 | 300  | 3.36 | 1680                        | 22.20 |
| 7/8      | 600  | 10.44 | 540  | 8.04 | 420  | 6.60 | 264  | 4.08 | 1320                        | 21.24 |
| 1        | 540  | 10.44 | 480  | 8.04 | 372  | 6.60 | 216  | 4.08 | 1200                        | 21.24 |
| 1-1/8    | 480  | 9.72  | 420  | 7.56 | 336  | 6.12 | 192  | 4.08 | 1680                        | 24.12 |
| 1-1/4    | 420  | 9.72  | 336  | 7.56 | 264  | 6.12 | 168  | 4.08 | 960                         | 23.64 |
| 1-3/8    | 372  | 9.72  | 300  | 7.56 | 240  | 6.12 | 144  | 4.08 | 840                         | 22.20 |
| 1-3/4    | 336  | 9.48  | 264  | 7.20 | 216  | 5.64 | 132  | 3.72 | 756                         | 21.24 |
| 2        | 264  | 9.48  | 216  | 8.04 | 192  | 6.60 | 108  | 3.72 | 600                         | 7.52  |



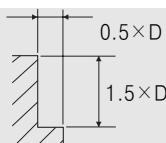
※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, ROUGHING & FINISHING, TiN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm²                                   |      | 500~800N/mm²                                 |      | 800~1000N/mm²                                |      | 1000~1300N/mm²                               |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2160   | 3.00 | 1920   | 2.40 | 1440   | 2.16 | 960  | 1.20 | 5400                        | 7.56  |
| 5/16     | 1680   | 4.02 | 1320   | 2.88 | 1080   | 2.40 | 672  | 1.44 | 3720                        | 8.76  |
| 3/8      | 1320   | 5.64 | 1080   | 4.44 | 960  | 4.20 | 540  | 2.40 | 3000                        | 13.20 |
| 1/2      | 1080   | 6.84 | 960  | 5.16 | 756  | 4.20 | 480  | 2.64 | 2400                        | 15.12 |
| 5/8      | 840  | 6.84 | 672  | 5.16 | 540  | 4.20 | 336  | 2.64 | 1920                        | 17.64 |
| 11/16    | 756  | 6.84 | 600  | 5.16 | 480  | 4.20 | 300  | 2.64 | 1680                        | 18.00 |
| 7/8      | 600  | 8.28 | 540  | 6.36 | 420  | 5.16 | 264  | 3.36 | 1320                        | 18.00 |
| 1        | 540  | 8.28 | 480  | 6.36 | 372  | 5.16 | 216  | 3.36 | 1200                        | 17.64 |
| 1-1/4    | 420  | 8.04 | 336  | 6.12 | 264  | 4.92 | 168  | 3.36 | 960                         | 18.96 |
| 1-3/8    | 372  | 8.04 | 300  | 6.12 | 240  | 4.92 | 144  | 3.36 | 840                         | 18.00 |
| 2        | 288  | 6.42 | 228  | 4.80 | 192  | 4.08 | 132  | 3.12 | 600                         | 13.44 |

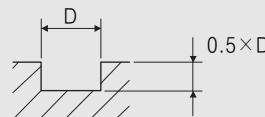


※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****2 FLUTE, FINISH, TiCN-COATED, SLOTTING**

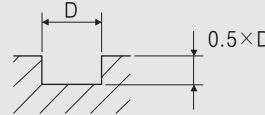
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 4550   | 2.86 | 3840   | 2.34 | 3250   | 2.08 | 2048   | 1.04 | 14300                       | 12.74 |
| 1/4      | 2340   | 4.55 | 2080   | 4.03 | 1560   | 3.12 | 1040   | 3.24 | 7280                        | 15.86 |
| 3/8      | 1430   | 5.20 | 1170   | 4.55 | 1040   | 4.03 | 585  | 3.24 | 4030                        | 20.54 |
| 1/2      | 1170   | 5.59 | 1040   | 5.20 | 819  | 4.03 | 520  | 2.80 | 3250                        | 19.50 |
| 5/8      | 910  | 5.59 | 728  | 4.55 | 585  | 3.64 | 364  | 2.34 | 2600                        | 17.94 |
| 3/4      | 819  | 5.20 | 650  | 4.55 | 520  | 3.64 | 325  | 2.34 | 2340                        | 17.94 |
| 7/8      | 650  | 5.20 | 585  | 4.55 | 455  | 3.64 | 286  | 2.34 | 1820                        | 15.34 |
| 1        | 585  | 4.55 | 520  | 4.03 | 403  | 3.12 | 234  | 1.82 | 1560                        | 14.30 |
| 1-1/8    | 520  | 4.03 | 455  | 3.64 | 364  | 2.86 | 208  | 1.56 | 1430                        | 13.65 |
| 1-3/8    | 403  | 3.12 | 325  | 2.60 | 260  | 2.08 | 156  | 1.30 | 1170                        | 11.31 |
| 1-1/2    | 403  | 3.12 | 325  | 2.60 | 260  | 2.08 | 156  | 1.30 | 1170                        | 11.31 |
| 1-3/4    | 364  | 3.12 | 286  | 2.60 | 234  | 2.08 | 143  | 1.30 | 1040                        | 10.27 |
| 2        | 325  | 2.60 | 228  | 2.34 | 143  | 1.30 | 104  | 1.04 | 819                         | 8.19  |



※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****3 FLUTE, FINISH, TiCN-COATED, SLOTTING**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 7280   | 3.12 | 5850   | 2.34 | 5200   | 2.34 | 2860   | 1.04 | 15600                       | 12.22 |
| 1/8      | 4550   | 4.03 | 2340   | 3.38 | 3250   | 3.12 | 2080   | 1.56 | 14300                       | 19.50 |
| 1/4      | 2340   | 6.89 | 2080   | 6.11 | 1560   | 4.55 | 1040   | 3.12 | 7280                        | 23.46 |
| 3/8      | 1430   | 7.80 | 1170   | 6.89 | 1040   | 6.11 | 585  | 3.38 | 4030                        | 30.68 |
| 1/2      | 1170   | 8.45 | 1040   | 7.80 | 819  | 6.11 | 520  | 3.80 | 3250                        | 29.12 |
| 9/16     | 1040   | 8.45 | 910  | 6.89 | 728  | 6.11 | 455  | 3.80 | 2860                        | 27.17 |
| 5/8      | 910  | 8.45 | 728  | 6.89 | 585  | 5.33 | 364  | 3.38 | 2600                        | 27.17 |
| 7/8      | 650  | 7.80 | 585  | 6.89 | 455  | 5.33 | 286  | 3.38 | 1820                        | 23.01 |
| 1        | 585  | 6.89 | 520  | 6.11 | 403  | 4.55 | 324  | 2.6  | 1560                        | 21.45 |
| 1-1/8    | 520  | 6.89 | 455  | 5.33 | 364  | 4.33 | 208  | 2.34 | 1430                        | 20.54 |



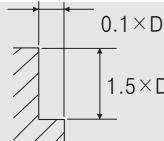
※The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## 3 FLUTE, FINISH, TiCN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 3/32     | 7280   | 3.12 | 5850   | 2.08 | 5200   | 1.82 | 2860   | 0.78 | 15600                       | 9.23  |
| 1/8      | 4550   | 4.03 | 4160   | 3.12 | 3250   | 2.34 | 2080   | 1.04 | 14300                       | 14.30 |
| 1/4      | 2240   | 6.89 | 2080   | 5.59 | 1560   | 3.38 | 1040   | 2.34 | 7280                        | 17.94 |
| 5/16     | 1820   | 7.80 | 1430   | 5.11 | 1170   | 4.03 | 728  | 2.60 | 5200                        | 22.49 |
| 1/2      | 1170   | 8.45 | 1040   | 6.89 | 819  | 4.55 | 520  | 2.86 | 3250                        | 21.97 |
| 9/16     | 1040   | 8.45 | 910  | 6.11 | 728  | 4.55 | 455  | 2.86 | 2860                        | 20.54 |
| 5/8      | 910  | 8.45 | 728  | 6.11 | 585  | 4.55 | 364  | 2.60 | 2600                        | 20.54 |
| 11/16    | 819  | 7.80 | 650  | 6.11 | 520  | 4.03 | 325  | 2.60 | 2340                        | 20.54 |
| 7/8      | 650  | 7.80 | 585  | 6.11 | 455  | 4.03 | 286  | 2.60 | 1820                        | 17.42 |
| 1        | 585  | 6.89 | 520  | 5.59 | 403  | 3.38 | 234  | 1.82 | 1560                        | 16.38 |
| 1-1/8    | 520  | 6.11 | 455  | 4.81 | 362  | 3.12 | 208  | 1.56 | 1430                        | 15.34 |



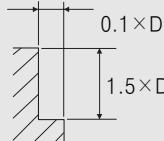
※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, FINISH, TiCN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 4550   | 9.49  | 4160   | 4.03 | 3250   | 3.12 | 22080  | 1.56 | 14300                       | 19.50 |
| 1/4      | 2340   | 9.23  | 2090   | 8.41 | 1560   | 4.55 | 1040   | 3.12 | 7280                        | 24.05 |
| 3/8      | 1430   | 10.27 | 1170   | 8.19 | 1040   | 6.11 | 585  | 3.38 | 4030                        | 30.68 |
| 1/2      | 1170   | 11.31 | 1040   | 9.23 | 818  | 6.11 | 520  | 3.90 | 3250                        | 29.12 |
| 5/8      | 910  | 11.31 | 728  | 8.19 | 585  | 5.33 | 364  | 3.38 | 2600                        | 27.17 |
| 3/4      | 819  | 10.27 | 819  | 8.19 | 520  | 5.33 | 325  | 3.38 | 2340                        | 27.17 |
| 7/8      | 650  | 10.27 | 585  | 8.19 | 455  | 5.33 | 286  | 3.38 | 1820                        | 23.01 |
| 15/16    | 650  | 10.27 | 585  | 8.19 | 455  | 5.33 | 234  | 3.38 | 1820                        | 23.01 |
| 1        | 585  | 9.23  | 520  | 8.41 | 403  | 4.55 | 208  | 2.60 | 1560                        | 21.85 |
| 1-1/2    | 403  | 6.11  | 325  | 4.55 | 260  | 3.12 | 156  | 1.82 | 1170                        | 16.90 |
| 1-3/4    | 364  | 6.11  | 286  | 4.55 | 234  | 3.12 | 143  | 1.82 | 1040                        | 15.34 |
| 2        | 364  | 6.11  | 286  | 4.55 | 182  | 2.34 | 104  | 1.30 | 1040                        | 15.34 |

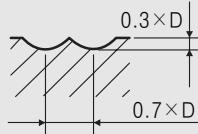


※The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.

**HSS****2 FLUTE, BALL NOSE, TiCN-COATED**

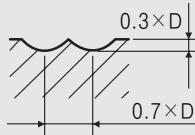
| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/8      | 5850   | 4.81 | 4420   | 3.64 | 2600   | 1.56 | 1820   | 1.04 | 14300                       | 11.83 |
| 5/32     | 4160   | 5.85 | 3120   | 4.03 | 1820   | 1.82 | 1300   | 1.30 | 10400                       | 13.26 |
| 1/2      | 2860   | 6.89 | 2210   | 4.55 | 1300   | 2.34 | 910  | 1.30 | 7280                        | 12.30 |
| 5/16     | 2080   | 8.19 | 1560   | 5.33 | 910  | 2.60 | 650  | 1.56 | 5200                        | 17.94 |
| 3/8      | 1690   | 9.23 | 1300   | 6.11 | 728  | 3.12 | 520  | 1.82 | 4160                        | 18.46 |
| 1/2      | 1300   | 8.71 | 1040   | 5.33 | 585  | 2.86 | 416  | 1.82 | 3250                        | 17.42 |
| 5/8      | 1043   | 7.80 | 780  | 5.20 | 455  | 2.86 | 325  | 1.82 | 2600                        | 15.34 |
| 13/16    | 780  | 7.15 | 650  | 4.42 | 390  | 2.60 | 263  | 1.82 | 2080                        | 14.80 |
| 1        | 650  | 6.63 | 520  | 3.64 | 286  | 2.08 | 208  | 1.56 | 1690                        | 12.74 |



\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.**HSS****MULTI FLUTE, BALL NOSE, TiCN-COATED**

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~ 500N/mm <sup>2</sup>                       |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2860   | 10.27 | 2210   | 6.89 | 1300   | 3.64 | 910  | 2.08 | 7280                        | 21.45 |
| 5/16     | 2080   | 12.22 | 1560   | 8.19 | 910  | 3.90 | 650  | 2.34 | 5200                        | 27.17 |
| 3/8      | 1690   | 13.78 | 1300   | 9.23 | 728  | 4.55 | 520  | 2.60 | 4160                        | 27.69 |
| 1/2      | 1300   | 13.26 | 1040   | 8.19 | 585  | 4.03 | 416  | 2.60 | 3250                        | 26.13 |
| 5/8      | 1040   | 11.83 | 780  | 7.80 | 455  | 4.03 | 325  | 2.60 | 2600                        | 23.01 |
| 13/16    | 780  | 10.79 | 650  | 6.63 | 390  | 3.90 | 260  | 2.60 | 2080                        | 21.45 |
| 1        | 650  | 10.27 | 520  | 5.20 | 286  | 3.12 | 208  | 2.34 | 1690                        | 19.50 |



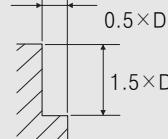
\*The FEED, in long &amp; extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, SIDE CUTTING, ROUGHING, TiCN-COATED

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |       | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|-------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |       | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |       | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED  | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2340   | 4.03  | 2080   | 3.12 | 1560   | 2.86 | 1040   | 1.56 | 5850                        | 10.27 |
| 5/16     | 1820   | 5.33  | 1430   | 3.90 | 1170   | 3.38 | 728  | 1.82 | 4030                        | 11.53 |
| 3/8      | 1430   | 7.80  | 1170   | 6.11 | 1040   | 5.59 | 585  | 3.12 | 3250                        | 17.94 |
| 1/2      | 1170   | 9.23  | 1040   | 7.15 | 819  | 5.59 | 520  | 3.64 | 2600                        | 20.54 |
| 5/8      | 910  | 9.23  | 728  | 7.15 | 585  | 5.59 | 364  | 3.64 | 2080                        | 24.05 |
| 11/16    | 819  | 9.23  | 650  | 7.15 | 520  | 5.59 | 325  | 3.64 | 1820                        | 24.05 |
| 7/8      | 650  | 11.31 | 585  | 8.71 | 455  | 7.15 | 286  | 4.42 | 1430                        | 23.01 |
| 1        | 585  | 11.31 | 520  | 8.71 | 403  | 7.15 | 234  | 4.42 | 1300                        | 23.01 |
| 1-1/8    | 520  | 10.53 | 455  | 8.19 | 364  | 6.63 | 208  | 4.42 | 1170                        | 26.13 |
| 1-1/4    | 455  | 10.53 | 364  | 8.19 | 286  | 6.63 | 182  | 4.42 | 1040                        | 25.61 |
| 1-3/8    | 403  | 10.53 | 325  | 8.19 | 260  | 6.63 | 156  | 4.42 | 910                         | 24.05 |
| 1-3/4    | 364  | 10.27 | 286  | 7.80 | 234  | 6.11 | 143  | 4.03 | 819                         | 23.01 |
| 2        | 286  | 10.27 | 234  | 8.71 | 208  | 7.15 | 117  | 4.03 | 650                         | 18.98 |



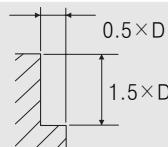
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



## MULTI FLUTE, ROUGHING & FINISHING, TiCN-COATED, SIDE CUTTING

| MATERIAL | CARBON STEELS<br>ALLOY STEELS<br>TOOL STEELS |      | ALUMINUM<br>ALUMINUM ALLOYS |       |
|----------|--|------|--|------|--|------|--|------|-----------------------------|-------|
| HARDNESS |  |      | ~HRc20                                       |      | HRc20~HRc30                                  |      | HRc30~HRc40                                  |      |                             |       |
| STRENGTH | ~500N/mm <sup>2</sup>                        |      | 500~800N/mm <sup>2</sup>                     |      | 800~1000N/mm <sup>2</sup>                    |      | 1000~1300N/mm <sup>2</sup>                   |      |                             |       |
| DIAMETER | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM  | FEED | RPM                         | FEED  |
| 1/4      | 2340   | 3.25 | 2080   | 2.60 | 1560   | 2.34 | 1040   | 1.30 | 5850                        | 8.19  |
| 5/16     | 1820   | 4.35 | 1430   | 3.12 | 1170   | 2.60 | 728  | 1.56 | 4030                        | 9.49  |
| 3/8      | 1430   | 6.11 | 1170   | 4.81 | 1040   | 4.55 | 585  | 2.60 | 3250                        | 14.30 |
| 1/2      | 1170   | 7.41 | 1040   | 5.59 | 819  | 4.55 | 520  | 2.86 | 2600                        | 16.38 |
| 5/8      | 910  | 7.41 | 728  | 5.59 | 585  | 4.55 | 364  | 2.86 | 2080                        | 18.46 |
| 11/16    | 819  | 7.41 | 650  | 5.59 | 520  | 4.55 | 325  | 2.86 | 1820                        | 19.50 |
| 7/8      | 650  | 8.97 | 585  | 6.89 | 455  | 5.59 | 286  | 3.64 | 1430                        | 19.50 |
| 1        | 585  | 8.97 | 520  | 6.89 | 403  | 5.59 | 234  | 3.64 | 1300                        | 18.46 |
| 1-1/4    | 455  | 8.71 | 384  | 6.63 | 286  | 5.33 | 182  | 3.64 | 1040                        | 20.54 |
| 1-3/4    | 403  | 8.71 | 325  | 6.63 | 260  | 5.33 | 156  | 3.64 | 910                         | 19.50 |
| 2        | 312  | 6.95 | 247  | 5.20 | 238  | 4.42 | 143  | 3.38 | 650                         | 14.56 |



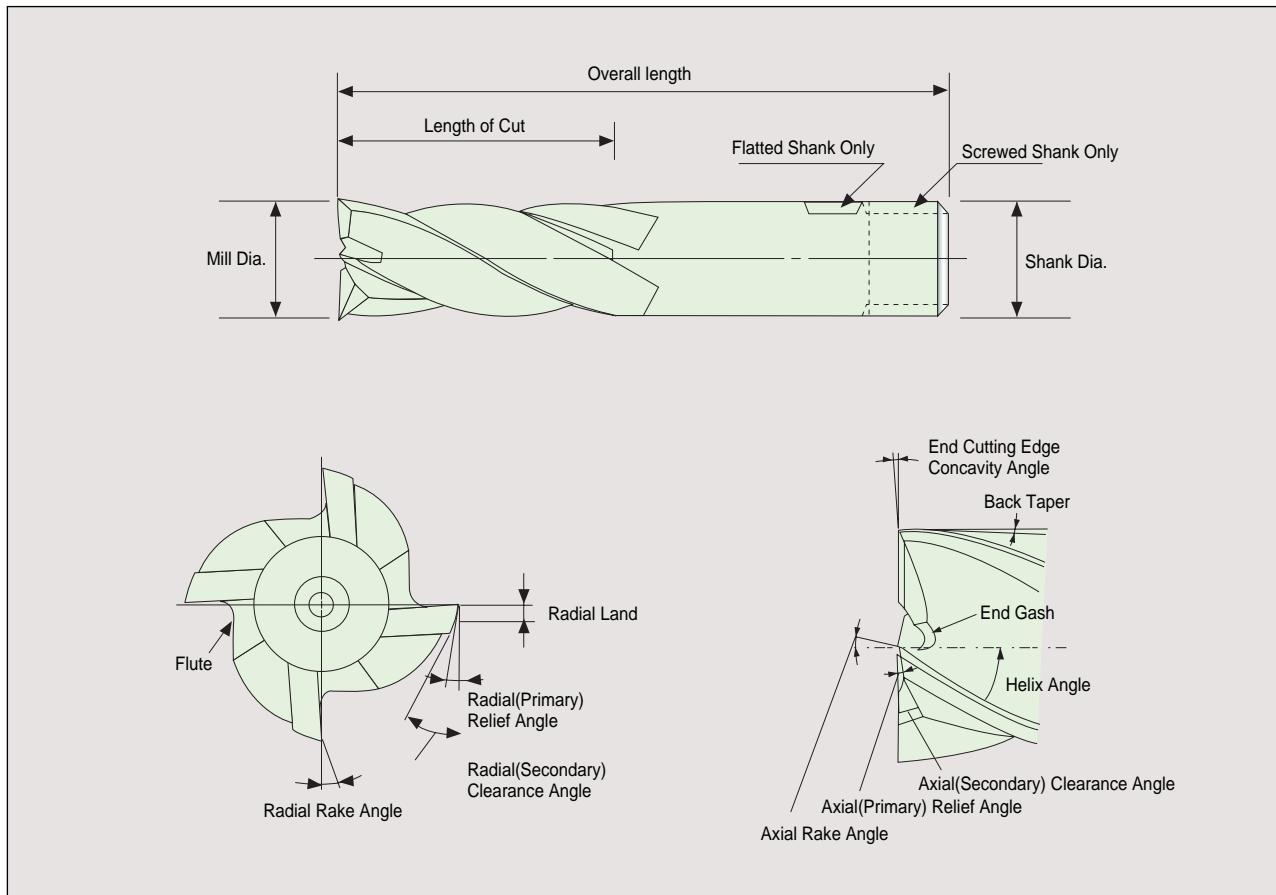
\*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.  
FEED=inch/min.



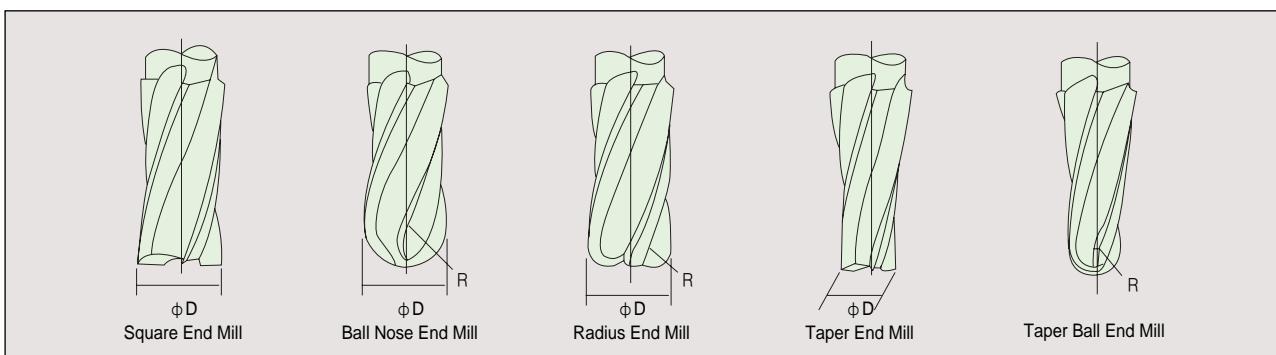
# SUPER CUTTING END MILLS

## 1. Names of End Mill Parts



COBALT AND HSS END MILLS

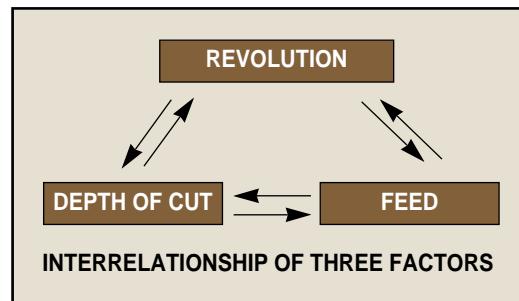
## 2. Type of End Mill





# SUPER CUTTING END MILLS

Speed, feeds, and depth of cut are the most important factors to consider for best results in milling. Improper feeds and speeds often cause low production, poor work quality and unnecessary damage to the cutter. This section covers the basic principles of speed and feed selection for milling cutters and end mills. It will serve as a guide in setting-up new milling jobs.



## 3. SPEEDS

In milling, SPEED is measured in peripheral feet per minute.(revolution per minute times cutter circumference in feet) This is frequently referred to as "peripheral speed." "cutting speed." or "surface speed."

Revolutions per Minute

$$R.P.M = \frac{S.F.M. \times 12}{D \times 3.1416}$$

D:Diameter of Tool(Inch)

S.F.M.:Surface Speed(Feet per Minute)

They will have to be tempered to suit the conditions ON THE JOB. For example:

### Use Lower Speed Ranges For

- Hard materials
- Tough materials
- Abrasive materials
- Heavy cuts
- Minimum tool wear
- Maximum cutter life

### Use Higher Speed Ranges For

- Softer materials
- Better finishes
- Smaller diameter cutters
- Light cuts
- Fragile work pieces or set-ups
- Hand feed operations
- Maximum production rates
- Non-metallics

## 4. FEEDS

Feed is usually measured in inches per minute. It is the product of feed per tooth times revolution per minute times the number of teeth in the cutter. Due to variations in cutter sizes, numbers of teeth and revolutions per minute, all feed rates should be calculated from feed per tooth.

Feed per tooth is the basis of all feed rates per minute, whether the cutters are large or small, fine or coarse tooth, and are run at high or low peripheral speed. Because feed per tooth affects chip thickness. It is a very important factor in cutter life.

Highest possible feed per tooth will usually give longer cutter life between grinds and greater production per grind. Excessive feeds may over load the cutter teeth and cause breakage or chipping of the cutting edges. The following factors should be kept in mind when using the recommended starting feed per tooth.



# SUPER CUTTING END MILLS

Feed in inches  
per Minute

$$F.M = F.R. \times R.P.M$$

F.R. : Feed per Revolutions in inches  
R.P.M. :: Revolutions per Minutes

The following factors should be kept in mind when using the recommended stating feed per tooth.

## Use Higher Feeds For

- Heavy, roughing cuts
- Rigid set-ups
- Easy-to-machine work materials
- Rugged cutters
- Slab milling cuts
- Low tensile strength materials
- Coarse tooth cutters
- Abrasive materials

## Use Lower Feeds For

- Light, and finishing cuts
- Frail set-ups
- Hard to machine work materials
- Frail and small cutters
- Deep slots
- High tensile strength materials
- Fine tooth cutters

## SPEED AND FEED CALCULATIONS FOR MILLING CUTTERS AND OTHER ROTATING TOOLS

| TO FIND   | HAVING   |                        | FORMULA   |
|---|--|------------------------|---|
| Surface(or Periphery)<br>Speed in Feet<br>Per Minute=S.F.M. | Diameter of Tool in inches<br>Revolutions per Minute                                   | =D<br>=R.P.M.          | $S.F.M. = \frac{D \times 3.1416 \times R.P.M.}{12}$ |
| Revolutions<br>Per Minute=R.P.M.                            | Surface Speed Feet per Minute<br>Diameter of Tool in inches                            | =S.F.M.<br>=D          | $R.P.M. = \frac{S.F.M. \times 12}{D \times 3.1416}$ |
| Feed per Revolution<br>inches-F.R.                          | Feed in inches per Minute<br>Revolution per Minute                                     | =F.M.<br>=R.P.M.       | $F.R. = \frac{F.M.}{R.P.M.}$                        |
| Feed in inches<br>Per Minute=F.M.                           | Feed per Revolution in inches<br>Revolution per Minute                                 | =F.R.<br>=R.P.M.       | $F.M. = F.R. \times R.P.M.$                         |
| Number of Cutting Teeth<br>per Minute=T.M.                  | Number of Teeth in Tool<br>Revolution per Minute                                       | =T<br>=R.P.M.          | $T.M = T \times R.P.M.$                             |
| Feed per tooth=F.T.   | Number of Teeth in Tool<br>Feed per Revolution in inches                               | =T<br>=R.P.M.          | $F.T. = \frac{F.R.}{T}$                             |
| Feed per Tooth=F.T.   | Number of Teeth in Tool<br>Feed in inches per Minute<br>Speed in Revolution per Minute | =T<br>=F.M.<br>=R.P.M. | $F.T. = \frac{F.M.}{T \times R.P.M.}$               |



## SUPER CUTTING END MILLS

### 5. CASE OF RESHARPENING

When the product finish become worse, the cutting edge must get dulled, chips become smaller and the cutting sound gets louder. In such cases, a end mill must be resharpened. The following are the damages of end mills when the resharpening is required.

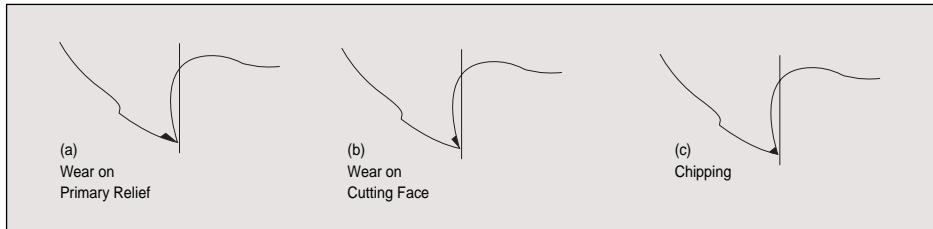


Fig. 1. Damages of Cutting Edge

### 6. SHARPEN AT PREDETERMINED WEARLAND

Cutters should be sharpened as soons as the wear land(Fig. 2.) reaches a predetermined width. This width should permit sharpening without excessive loss of tool life. It may vary from a few thousandth to 1/16 inch, depending on the type of cutter and the finish required on the product. This method is used on production runs where uneven amounts of stock is removed or where the material varies in machinability. It is also used on small quantity product lots.

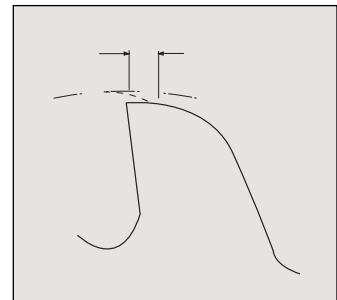


Fig. 2. Wear Land

### 7. RESHARPENING PERIPHERAL CUTTING EDGE

#### 1) RESHARPENING PRIMARY LAND

The geometry of relief angle in an end mill consist of three methods as shown in Fig.3 concave, flat, and eccentric. Recently, most end mills have the eccentric relief(eccentric sharpening). In this method, since the relief is formed an eccentric are surface in cylindrical grinding method, the roughness of the finished surface of the relief improves and the strength of cutting edge increase at the same time.(Fig.4) As a result, the tool life is improved.

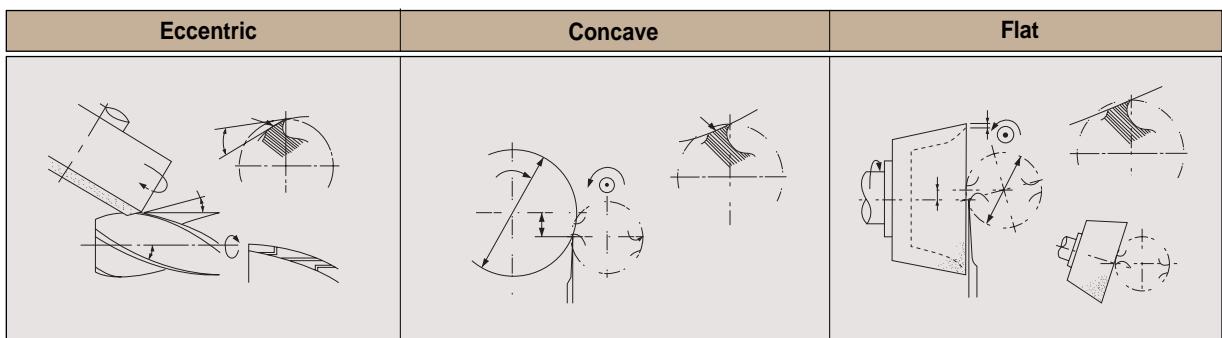


Fig. 3. Three Types of Primary Relief



# SUPER CUTTING END MILLS

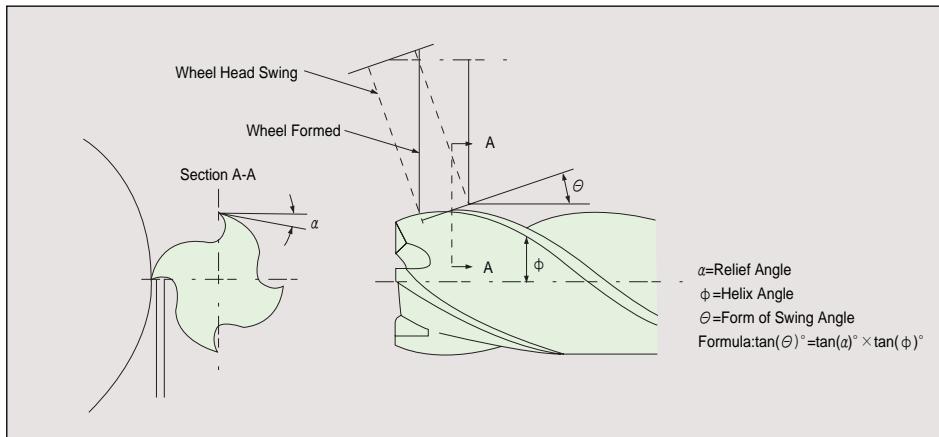


Fig. 4. Tooothing of Eccentric Relief Angle

## 2) ANGLE OF WHEEL INCLINATION

Eccentric relief is produced with a plain wheel positioned with its axis parallel or at a slight angle with the cutter axis. The degree of relief is varied by changing the angle of wheel inclination.

**Table 1. RECOMMENDED RELIEF ON END MILLS**

| Mill Diameter (inches) | Eccentric relief indicator drop for relief Angles shown | Checking Distance | Wheel Angles(Deg.) $\theta$ |           |           | Radial Relief Angles( $\alpha$ ) | Clearance Angles( $\alpha_2$ ) |
|------------------------|---|-------------------|-----------------------------|-----------|-----------|----------------------------------|--------------------------------|
|                        |   |                   | 15° Helix                   | 30° Helix | 60° Helix |                                  |                                |
| -                      | Min   | Max.              | -                           | *Angle    | *Angle    | *Angle                           | *Angle                         |
| 1/8                    | .0040   | .0052             | .015                        | 4° 42'    | 10° 02'   | 27° 58'                          | 17° 03'                        |
| 1/4                    | .0035   | .0050             | .020                        | 3° 15'    | 6° 59'    | 20° 12'                          | 12° 00'                        |
| 1/2                    | .0040   | .0053             | .025                        | 2° 51'    | 6° 07'    | 17° 51'                          | 10° 32'                        |
| 1                      | .0038   | .0055             | 1/32                        | 2° 16'    | 4° 54'    | 14° 27'                          | 8° 27'                         |
| 1-1/2                  | .0033   | .0050             | 1/32                        | 2° 02'    | 4° 22'    | 12° 57'                          | 7° 33'                         |
| 2                      | .0033   | .0050             | 1/32                        | 2° 02'    | 4° 22'    | 12° 57'                          | 7° 33'                         |

The actual at the radial relief angle is normally kept within the range shown but may be varied to suit the cutter material, the work material and the operating conditions.

\*Angle is calculated from the basic mean at the radical angle.



# SUPER CUTTING END MILLS

## 8. RESHARPPENING END TEETH

The three necessary operations and one option feature, along with setup suggestions are shown in Fig.5 A to D in each drawing, the shaded area indicates the surface being ground.

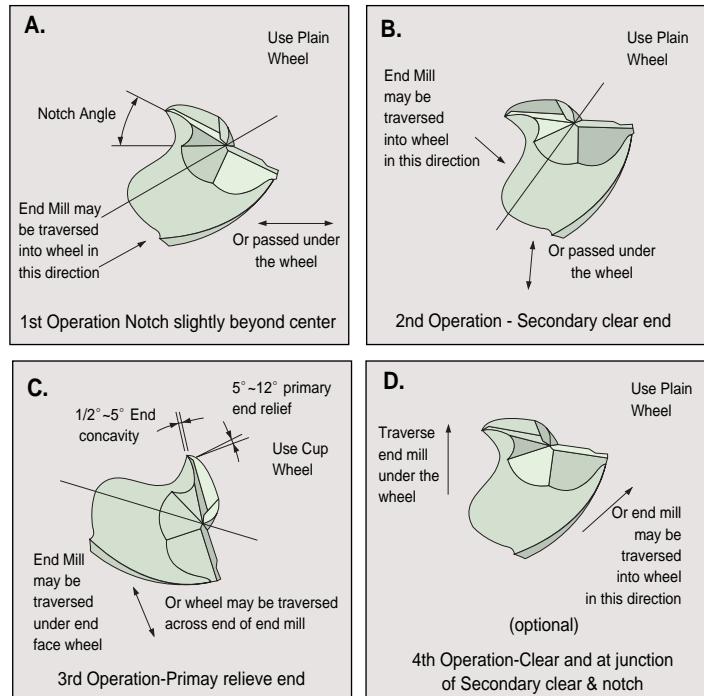


Fig 5. PROCEDURE FOR SHARPENING END OF 2 FLUTE SQUARE END MILLS

## 9. INSPECTION

The inspection is calculated by using the formula shown in Table1.

Procedure To Check  
Radial Relief Angles  
With Indicators.

- 1-Mount the cutter to rotate freely with no end movement.
- 2-Adjust the sharp pointed indicator to bear at the very tip of the cutting edge, pointing in a radial line, shown in Figure6
- 3-Roll the outer the tabulated amount gives under "checking distance" using the second indicator as control.
- 4-Consult chart for amount of drop for the particular diameter and relief angle.

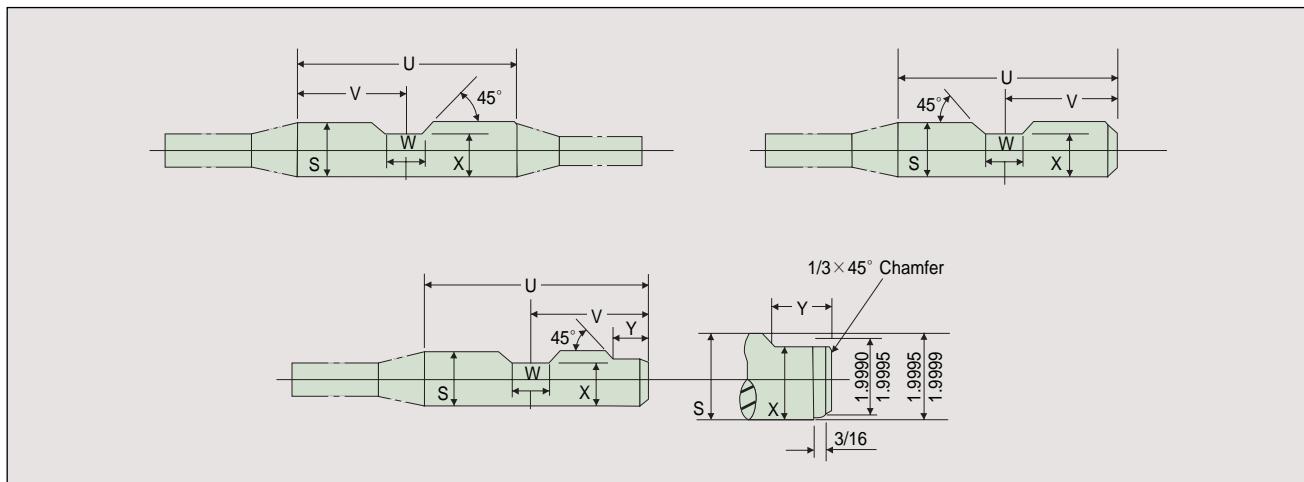
| Radial Relief | Peripheral Cutting Edge | Cutting Angle |
|---------------|-------------------------|---------------|
|               |                         |               |

Fig. 6. Indicator Set-Up for Checking



# SUPER CUTTING END MILLS

## 10. Standard Weldon Shanks



## 11. Dimensions

All dimensions are given in inches.

| Diameter<br>of Shank<br><b>S</b> | Length<br>of Shank<br><b>U</b> | <b>V</b> | <b>W</b> |       | <b>X</b> | <b>Y</b> |
|----------------------------------|--------------------------------|----------|----------|-------|----------|----------|
|                                  |                                |          | Min.     | Max.  |          |          |
| 3/8                              | 1-9/16                         | 25/32    | 0.280    | 0.282 | 0.325    | -        |
| 1/2                              | 1-25/32                        | 57/64    | 0.330    | 0.332 | 0.440    | -        |
| 5/8                              | 1-29/32                        | 61/64    | 0.400    | 0.402 | 0.560    | -        |
| 3/4                              | 2-1/32                         | 1-1/64   | 0.455    | 0.457 | 0.675    | -        |
| 7/8                              | 2-1/32                         | 1-1/64   | 0.455    | 0.457 | 0.810    | 1/2      |
| 1                                | 2-9/32                         | 1-9/64   | 0.515    | 0.517 | 0.925    | 1/2      |
| 1-1/4                            | 2-9/32                         | 1-9/64   | 0.515    | 0.517 | 1.156    | 1/2      |
| 1-1/2                            | 2-11/16                        | 1-3/16   | 0.515    | 0.517 | 1.406    | 9/16     |
| 2                                | 3-1/4                          | 1-27/32  | 0.700    | 0.702 | 1.900    | 27/32    |
| 2-1/2                            | 3-1/2                          | 1-15/16  | 0.700    | 0.702 | 2.400    | 27/32    |

## 12. Tolerances

| Element              | Range             | Direction     | Tolerance      |
|----------------------|-------------------|---------------|----------------|
| Diameter of Shank, S | All Sizes         | minus         | .0001 to .0005 |
| Length of Shank, U   | All Sizes         | plus or minus | 1/32           |
| Dimension, V         | All Sizes         | plus or minus | 1/64           |
| Dimension, X         | All Sizes         | minus         | 1/64           |
| Dimension, Y         | 7/8 to 2-1/2 inc. | plus or minus | 1/32           |

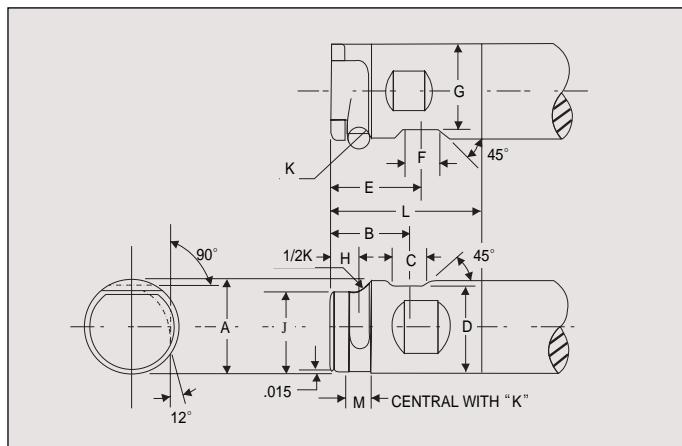
Extracted from Milling Cutters and End Mills. MCTI 1989.



## SUPER CUTTING END MILLS

### 13. Combination Shanks for End Mills

Right hand End Mill shank shown. For left hand End Mills flat "F" and pin groove "K" should be located 180° from that shown, maintaining 12° relationship of flat "F" and groove "K"



### 14. Dimensions

All dimensions are given in inches.

| Diameter of Shank<br>A | Length of Shank<br>L | B       | C     | D     | E     | F     | G     | H    | J     | K     | M    |
|------------------------|----------------------|---------|-------|-------|-------|-------|-------|------|-------|-------|------|
| 1-1/2                  | 2-11/16              | 1-3/16  | 0.515 | 1.406 | 1-1/2 | 0.515 | 1.371 | 9/16 | 1.302 | 0.377 | 7/16 |
| 2                      | 3-1/4                | 1-23/32 | 0.700 | 1.900 | 1-3/4 | 0.700 | 1.809 | 5/8  | 1.772 | 0.440 | 1/2  |
| 2-1/2                  | 3-1/2                | 1-15/16 | 0.700 | 2.400 | 2     | 0.700 | 2.312 | 3/4  | 2.245 | 0.503 | 9/16 |

### 15. Tolerances

| Element              | Direction     | Tolerance      |
|----------------------|---------------|----------------|
| Diameter of Shank, A | minus         | .0001 to .0005 |
| Length of Shank, L   | plus or minus | 1/32           |
| Dimension, B         | plus or minus | 1/64           |
| Dimension, C         | plus          | .002           |
| Dimension, D         | minus         | 1/64           |
| Dimension, E         | plus or minus | 1/64           |
| Dimension, F         | plus or minus | .005           |
| Dimension, G         | minus         | 1/64           |
| Dimension, H         | plus          | 1/64           |
| Dimension, J         | plus or minus | .002           |
| Dimension, K         | plus          | .003           |

Extracted from Milling Cutters and End Mills. MCTI 1989.



## SUPER CUTTING END MILLS

### 16. TROUBLESHOOTING

| Trouble                   | Occurrences of trouble  | Countermeasures  |
|---------------------------|---|--|
| Breaking of tool          | · At time of engaging with work material<br>· When ending cut | 1. Decrease feed rate.<br>2. Decrease projection amount<br>3. Shorten cutting edge length to required minimum limit  |
|                           | · During normal cutting                                       | 1. Decrease feed rate<br>2. Control wear → replace tool early<br>3. Replace chuck or collet<br>4. Decrease projection amount<br>5. Carry out honing<br>6. If 4 flute, reduce to 2 flute(clogging of chipping)<br>7. If dry cutting change to wet cutting utilize cutting fluid. In case of wet cutting flow oil supplied from the front, change to from rear angle of side top. Use ample with rate. |
|                           | · When changing direction of feed                             | 1. Utilize circular interpolation(in case of NC machine) or temporarily stop feed(Dowelling)<br>2. Reduce feed rate before and after change of directions<br>3. Replace chuck or collect   |
| Fracture of cutting edge  | · Fracture of corners   | 1. Carry out chamfering or nose with hand lapper.<br>2. Down cut → Up cut  |
|                           | · Fracture at boundary of depth of cut                        | 1. Down cut → Up cut<br>2. Reduce cutting speed  |
|                           | · Chipping at center part or overall                          | 1. Carry out honing. Or enlarge.<br>2. Change number of rotation(in case machine vibrates)<br>3. Increase cutting speed<br>4. In case of squeaking noise during cutting, increase feed.<br>5. If dry cutting use cutting fluid or blow air.<br>6. Replace chuck or collet<br>7. Reduce cutting speed   |
|                           | · Large fracturing of cutting edge                            | 1. Decrease feed rate<br>2. If 4 flute reduce to 2 flute<br>3. Carry out honing. Or enlarge<br>4. Replace chuck or collet<br>5. Reduce cutting speed<br>6. If dry cutting, change to wet cutting. In case oil supply in wet cutting is from the front, change to rear at an angle or from side top. Use ample supply.  |
| Rapid tool wear           |   | 1. Reduce cutting speed<br>2. Up cut → Down cut<br>3. Increase feed<br>4. Utilize wet cutting or air<br>5. If reground tool, improve surface roughness of flank.   |
| Inferior finished surface | · Surface is good but rough                                   | 1. Decrease feed<br>2. In case using 2 flute, increase to 4 flute  |



## SUPER CUTTING END MILLS

### 16. TROUBLESHOOTING

| Trouble                   | Occurrences of trouble                | Countermeasures  |
|---------------------------|---------------------------------------|--|
| Inferior finished surface | · Small chip welding                  | 1. Increase cutting speed<br>2. Utilize wet cutting air blow(ample supply)<br>3. Carry out fine honing<br>4. Up cut → Down cut<br>5. Increase feed or enlarge finish allowance   |
|                           | · With transverse streaks             | 1. Carry out fine honing<br>2. Use water insoluble cutting fluid<br>3. Down cut → Up cut   |
|                           | · Signs of excessive cutting          | 1. Reduce finishing depth of cut<br>2. Increase cutting speed<br>3. Reduce feed  |
| Poor machining accuracy   | · Finish dimensions are on minus side | 1. Up cut → Down cut<br>2. Reduce finishing depth of cut<br>3. Replace chuck or collet<br>4. Reduce projection amount<br>5. Increase cutting speed   |
|                           | · Poor perpendicularity               | 1. Reduce finishing depth of cut<br>2. Replace chuck or collet<br>3. Reduce projection amount<br>4. Increase cutting speed<br>5. 2Flute → 4 Flute<br>6. Reduce feed<br>7. Check wear rate → Replace tool   |
| Chattering                |                                       | 1. Increase feed rate(in case over .002 inch/tooth, try reducing)<br>2. Change cutting speed<br>3. Replace chuck or collet<br>4. Reduce projection amount<br>5. Use 2 flute cutter for rough cutting and 4 flute for finishing<br>6. Down cut → Up cut |

# HARDslick

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NICKEL ALLOYS  
ALUMINUM**

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- Extends Life with Minimal Coolant
- Reduces Tap Inventory

HARD 340 BHN



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## HIGH PERFORMANCE TAPS RECOMMENDATION TABLE

**Super HSS : Premium HSS Metallurgy**

**P-HSS : Powdered Metallurgy**

**HSSE-V3 : 3% Vanadium Alloy HSS**

**HSS-V : Vanadium Alloy HSS**

● = RECOMMENDED

○ = SUITABLE

|                    |   | STANDARD TAPS                |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|--------------------|---|------------------------------|-------------------------------------|-----------------------------------|----------------------------------|-------------------------|---|---|-------------------------------------|-----------------------------------|----------------------------------|------------------------------------|---|--|--------------------------|--------------------------|---------------|-----|
|                    |   | DESCRIPTION                  |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    |   | ANSI / DIN LENGTH ANSI SHANK |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| PAGE               |   | 316                          | 317                                 | 318                               | 319-320                          | 321                     | 322                                     | 323-324                                 | 325                                 | 326                               | 327                              | 328-329                            | 330                                     | 331-332                                    | 333                      | 334-335                  | 336           | 337 |
| THREADS            |   | UNC/UNF                      | UNC/UNF                             | UNC/UNF                           | UNC/UNF                          | UNC/UNF                 | UNC/UNF                                 | UNC/UNF                                 | UNC/UNF                             | UNC/UNF                           | UNC/UNF                          | UNC/UNF                            | UNC/UNF                                 | NPT/F                                      | NPT/F                    | NPT/F                    | UNC/UNF       |     |
| TAP MATERIALS      |   | Super HSS                    | P-HSS                               | P-HSS                             | HSSE-V3 P-HSS                    | HSSE-V3                 | HSSE-V3                                 | HSS-V                                   | Super HSS                           | P-HSS                             | P-HSS                            | HSSE-V3 P-HSS                      | HSSE-V3                                 | HSS-V                                      | HSSE-V3                  | HSSE-V3                  | HSSE-V3       |     |
| CHAMFER LENGTH     |   | 2-3P                         | 2-3P                                | 2-3P                              | 2-3P 4-5P                        | 2-3P                    | 2-3P                                    | 1.5-2P 2-3P                             | 4-5P                                | 4-5P                              | 4-5P                             | 4-5P                               | 4-5P                                    | 4-5P                                       | 2-3P                     | 2-3P                     | 4-5P 1.5-2P   |     |
| SURFACE TREATMENT  |   | Steam Oxide Hardslick        | Bright Finish TiCN Coated Hardslick | Steam Oxide TiCN Coated Hardslick | Steam Oxide TiN Coated Hardslick | Bright Finish Hardslick | Steam Oxide Bright Finish TiN/Hardslick | Steam Oxide Bright Finish TiN/Hardslick | Bright Finish TiCN Coated Hardslick | Steam Oxide TiCN Coated Hardslick | Steam Oxide TiN Coated Hardslick | Bright Finish TiN Coated Hardslick | Steam Oxide Bright Finish TiN/Hardslick | Bright Finish Ni-Steam Oxide TiN/Hardslick | Bright Finish TiN Coated | Bright Finish TiN Coated |               |     |
| SPIRAL FLUTE ANGLE |   | R40°                         | R15°                                | R15°                              | R45°/L15°                        | R45°                    | R50°                                    | R50°/R45°                               | -                                   | -                                 | -                                | -                                  | -                                       | R15°                                       | R15°/ -                  | -                        | -             |     |
| HOLE TYPE          |   | Blind                        | Blind                               | Blind                             | Blind                            | Blind                   | Blind                                   | Through                                 | Through                             | Through                           | Through                          | Through                            | Through                                 | Blind                                      | Blind Through            | Through                  | Blind Through |     |
| REMARK             |   |                              |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Material Group     | Material Sub-Group                            | Hardness (HRc)               | Hardness (BHN)                      | Cutting Speed (SFM)<br>Uncoated   | Cutting Speed (SFM)<br>Coated    |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Steel              | Low carbon steels                             | < 15                         | < 180                               | 25 - 50                           | 50 - 80                          | ○                       |   | ○                                       |                                     | ●                                 | ○                                |                                    | ○                                       | ●  | ○                        | ●                        | ●             |     |
|                    | Free machining carbon steels                  |                              |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Medium to high carbon steels                  | < 23                         | < 240                               | 25 - 50                           | 50 - 80                          | ●                       |   | ●                                       | ●                                   | ●                                 | ●                                |                                    | ●                                       | ●  | ●                        | ●                        | ●             |     |
|                    | Low alloyed steels                            |                              |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Steel castings & forgings                     | > 24                         | > 250                               | 6 - 30                            | 10 - 35                          | ●                       | ○                                       |   | ●                                   |                                   | ○                                | ●                                  | ○                                       |  |                          |                          |               |     |
|                    | Heat-treatable alloy steels                   | ≤ 38                         | ≤ 350                               |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Stainless Steel    | Alloyed tool steels                           | > 38                         | > 350                               | 6 - 12                            | -                                | ●                       |   |   |                                     |                                   |                                  | ●                                  |   |  |                          |                          |               |     |
|                    | Mold steels                                   | ≤ 44                         | ≤ 420                               |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Hardened steels                               | ≤ 63                         | -                                   | -                                 | -                                |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Free machining stainless steels               | < 23                         | < 240                               | 12 - 35                           | 20 - 50                          | ●                       |   | ●                                       | ○                                   | ○                                 | ●                                |                                    | ●                                       | ○  | ●                        | ○                        | ●             |     |
|                    | Heat-and corrosion-resistant stainless steels | > 24                         | > 250                               | 12 - 15                           | 12 - 15                          | ●                       | ○                                       |   | ○                                   | ○                                 | ●                                | ○                                  | ○                                       | ○  | ○                        | ○                        |               |     |
|                    | Valve stainless steels                        | ≤ 38                         | ≤ 350                               |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Cast Iron          | Stainless steel castings                      | > 38                         | > 350                               | 12 - 15                           | -                                | ●                       |   |   |                                     |                                   |                                  | ●                                  |   |  |                          |                          |               |     |
|                    | Precipitation hardening stainless steels      | ≤ 44                         | ≤ 420                               |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Grey cast iron                                | -                            | ≤ 220                               | 35 - 50                           | 50 - 65                          |                         |   |   |                                     |                                   |                                  |                                    |   |  | ●                        | ●                        |               |     |
|                    | Nodular cast iron                             | Chilled cast iron            |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  | ○                        | ○                        | ●             |     |
|                    | Meehanite iron                                | Ductile iron                 | -                                   | ≥ 250                             | 12 - 45                          | 25 - 55                 |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Pure aluminium                                | -                            | -                                   | 50 - 65                           | -                                | ○                       |   | ○                                       |                                     | ●                                 | ○                                |                                    | ○                                       |  |                          |                          | ●             |     |
| Aluminium          | Aluminium alloys                              | -                            | -                                   |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Aluminium alloy castings                      | -                            | -                                   | 40 - 65                           | 45 - 90                          |                         |   |   |                                     | ●                                 | ○                                |                                    |   | ○  | ○                        | ○                        | ●             |     |
| Nickel Alloys      | 718 & 625 INCO                                | Waspaloy                     |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Hastelloy                                     | Invar                        | ≤ 38                                | ≤ 350                             | 10 - 15                          | -                       | ○                                       | ●                                       |                                     | ○                                 |                                  | ○                                  | ●                                       | ○  |                          |                          |               |     |
|                    | Monel   | Incloy                       |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Titanium           | 718 Inconel                                   |                              | > 38                                | > 350                             | 10 - 12                          | -                       | ○                                       | ●                                       |                                     |                                   |                                  | ○                                  | ●                                       |  |                          |                          |               |     |
|                    | A286  |                              | ≤ 44                                | ≤ 420                             |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    |   |                              | ≤ 38                                | ≤ 350                             | 3 - 15                           | -                       | ○                                       | ●                                       |                                     |                                   |                                  | ○                                  | ●                                       |  |                          |                          |               |     |
| Copper             | Pure and alloyed copper                       | -                            | -                                   | 50 - 60                           | 65 - 100                         | ○                       |   | ○                                       |                                     | ○                                 |                                  | ○                                  |   | ○  |                          | ●                        |               |     |
|                    | Free machining brass                          |                              |                                     | 30 - 65                           | -                                | ○                       |   | ○                                       |                                     | ○                                 |                                  | ○                                  |   | ○  |                          | ●                        |               |     |
| Bronze             | Alloyed brass                                 | -                            | -                                   |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
| Zinc               |   |                              | < 44                                | < 420                             | 12 - 20                          | 35 - 80                 | ●                                       |   |                                     |                                   |                                  | ●                                  |   |  |                          |                          |               |     |
| Magnesium          |   |                              |                                     |                                   | 25 - 65                          | 50 - 80                 | ○                                       |   | ○                                   |                                   | ○                                |                                    | ○                                       |  | ○                        | ●                        |               |     |
| Plastics           | Thermoplastics                                |                              |                                     |                                   | 45 - 100                         | 5 - 30                  | -                                       | 25 - 150                                |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |
|                    | Thermosetting / Reinforced Plastics           |                              |                                     |                                   |                                  |                         |   |   |                                     |                                   |                                  |                                    |   |  |                          |                          |               |     |

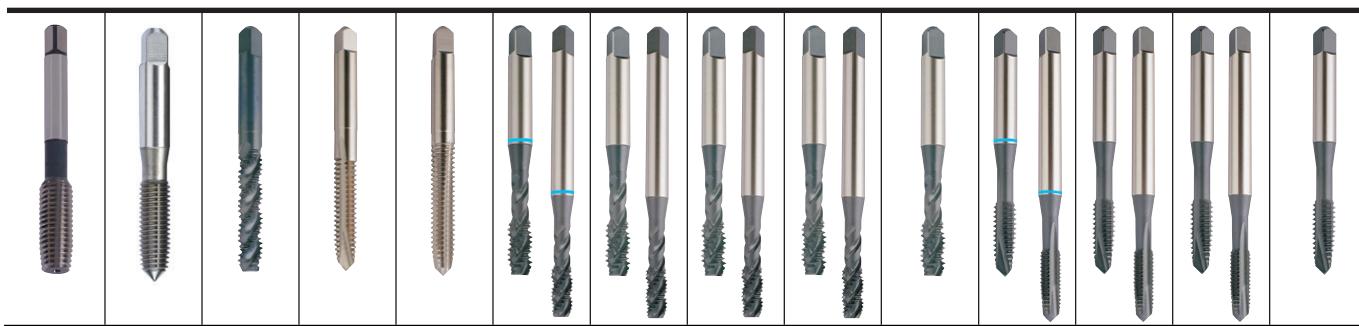
# TAPS

● Spiral Flute and Spiral Point

● Machine TAPS and Hand Taps

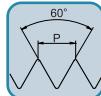
● High Performance in various work materials





ANSI / DIN LENGTH ANSI SHANK

| 338                         | 339                         | 340   | 341  | 342              | 343                      | 344                                     | 345                                     | 346                        | 347                                       | 348                      | 349                                     | 350                                     | 351                                       |
|-----------------------------|-----------------------------|---|--|------------------|--------------------------|---|---|----------------------------|---|--------------------------|---|---|---|
| UNC/UNF                     | M/MF                        | UNC/UNF                                       | UNC/UNF                                    | UNC/UNF          | M/MF                     | M/MF                                    | M/MF                                    | M/MF                       | M/MF                                      | M/MF                     | M/MF                                    | M/MF                                    | M/MF                                      |
| HSSE-V3                     | HSSE-V3                     | HSSE-V3                                       | HSSE-V3                                    | HSS-V            | Super HSS                | HSSE-V3                                 | HSSE-V3                                 | HSSE-V3                    | HSS-V                                     | Super HSS                | HSSE-V3                                 | HSSE-V3                                 | HSS-V                                     |
| 4-5P<br>1.5-2P              | 4-5P<br>1.5-2P              | 1.5-2P  | 4-5P                                       | 9.0/4.0/1.5P     | 2-3P                     | 2-3P                                    | 2-3P                                    | 2-3P                       | 1.5-2P                                    | 4-5P                     | 4-5P                                    | 4-5P                                    | 4-5P                                      |
| Bright Finish<br>TiN Coated | Bright Finish<br>TiN Coated | Steam Oxide<br>Bright Finish<br>TiN/Hardslick | Steam Oxide<br>Bright Finish<br>TiN Coated | Bright Finish    | Steam Oxide<br>Hardslick | Steam Oxide<br>TiCN Coated<br>Hardslick | Steam Oxide<br>TiCN Coated<br>Hardslick | Bright Finish<br>Hardslick | Bright Finish<br>TiCN Coated<br>Hardslick | Steam Oxide<br>Hardslick | Steam Oxide<br>TiCN Coated<br>Hardslick | Steam Oxide<br>TiCN Coated<br>Hardslick | Bright Finish<br>TiCN Coated<br>Hardslick |
| -                           | -                           | R45°  | -  | -                | R40°                     | R45°                                    | R45°                                    | R50°                       | R50°                                      | -                        | -                                       | -                                       | -   |
| Blind<br>Through            | Blind<br>Through            | Blind   | Through                                    | Blind<br>Through | Blind                    | Blind                                   | Blind                                   | Blind                      | Blind                                     | Through                  | Through                                 | Through                                 | Through                                   |
|                             |                             |   |  |                  |                          |   |   |                            |   |                          |   |   |   |
| ●                           | ●                           | ●   | ●  | ●                | ○                        | ○                                       |   |                            | ●   | ○                        |   |   | ●   |
| ●                           | ●                           | ●   | ●  | ●                | ●                        | ●                                       | ●                                       | ○                          | ●   | ●                        | ●                                       | ●                                       | ●   |
|                             |                             | ○   | ○  |                  |                          |   | ●                                       |                            | ○   | ●                        | ○                                       | ○                                       | ○   |
| ●                           | ●                           | ○   | ○  | ●                | ●                        | ●                                       | ●                                       | ○                          | ●   | ●                        | ●                                       | ●                                       | ●   |
|                             |                             | ○   | ○  |                  |                          |   | ●                                       |                            | ○   | ●                        | ○                                       | ○                                       | ○   |
| ●                           | ●                           | ○   | ○  |                  | c                        | ○                                       | ○                                       |                            | ●   |                          | ○                                       |   | ○   |
| ●                           | ●                           | ○   | ○  | ●                |                          |   |   | ○                          | ●   | ○                        | ○                                       | ○                                       | ○   |
|                             |                             |   |  |                  |                          |   |   |                            |   |                          |   |   |   |
| ●                           | ●                           |   |  | ●                | ○                        | ○                                       |   |                            |   | ○                        |   |   |   |
| ●                           | ●                           |   |  | ●                | ○                        | ○                                       |   |                            |   | ○                        |   |   |   |
|                             |                             |   |  |                  |                          |   |   |                            |   |                          |   |   |   |
| ●                           | ●                           |   |  | ●                | ○                        | ○                                       |   |                            |   | ○                        |   |   |   |
| ●                           | ●                           |   |  | ●                | ○                        | ○                                       |   |                            |   | ○                        |   |   |   |
|                             |                             |   |  |                  |                          |   |   |                            |   |                          |   |   |   |

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****for Steels & Stainless Steels up to 35HRc**Super  
HSSUNC  
UNF

BB/BI

ANSI



BF/BK

DIN Length  
ANSI Shank

| Steam Oxide | Hardslick Coated | EDP No.     |                  | Size  | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------------|-------------|------------------|-------|-----------------|-----|---------------|-------|
|             |                  | Steam Oxide | Hardslick Coated |       | UNC             | UNF |               |       |
| BB082       | BI082            | BF082       | BK082            | 2     | 56              |     | 2             | H2    |
| BB162       | BI162            | BF162       | BK162            | 4     | 40              |     | 2             | H2    |
| BB202       | BI202            | BF202       | BK202            | 5     | 40              |     | 3             | H2    |
| BB243       | BI243            | BF243       | BK243            | 6     | 32              |     | 3             | H3    |
| BB283       | BI283            | BF283       | BK283            | 8     | 32              |     | 3             | H3    |
| BB323       | BI323            | BF323       | BK323            | 10    | 24              |     | 3             | H3    |
| BB343       | BI343            | BF343       | BK343            |       |                 | 32  | 3             | H3    |
| BB403       | BI403            | BF403       | BK403            | 1/4   | 20              |     | 3             | H3    |
| BB405       | BI405            | BF405       | BK405            |       |                 |     | 3             | H5    |
| BB423       | BI423            | BF423       | BK423            |       |                 | 28  | 3             | H3    |
| BB424       | BI424            | BF424       | BK424            |       |                 |     | 3             | H4    |
| BB445       | BI445            | BF445       | BK445            | 5/16  | 18              |     | 3             | H5    |
| BB464       | BI464            | BF464       | BK464            |       |                 | 24  | 3             | H4    |
| BB485       | BI485            | BF485       | BK485            | 3/8   | 16              |     | 3             | H5    |
| BB504       | BI504            | BF504       | BK504            |       |                 | 24  | 3             | H4    |
| BB525       | BI525            | BF525       | BK525            | 7/16  | 14              |     | 3             | H5    |
| BB545       | BI545            | BF545       | BK545            |       |                 | 20  | 3             | H5    |
| BB565       | BI565            | BF565       | BK565            | 1/2   | 13              |     | 3             | H5    |
| BB585       | BI585            | BF585       | BK585            |       |                 | 20  | 3             | H5    |
| BB605       | BI605            | BF605       | BK605            | 9/16  | 12              |     | 3             | H5    |
| BB625       | BI625            | BF625       | BK625            |       |                 | 18  | 3             | H5    |
| BB645       | BI645            | BF645       | BK645            | 5/8   | 11              |     | 4             | H5    |
| BB665       | BI665            | BF665       | BK665            |       |                 | 18  | 4             | H5    |
| BB705       | BI705            | BF705       | BK705            | 3/4   | 10              |     | 4             | H5    |
| BB725       | BI725            | BF725       | BK725            |       |                 | 16  | 4             | H5    |
| BB746       | BI746            | BF746       | BK746            | 7/8   | 9               |     | 4             | H6    |
| BB766       | BI766            | BF766       | BK766            |       |                 | 14  | 4             | H6    |
| BB786       | BI786            | BF786       | BK786            | 1     | 8               |     | 4             | H6    |
| BB806       | BI806            | BF806       | BK806            |       |                 | 12  | 4             | H6    |
| BB836       | BI836            | BF836       | BK836            | 1*1/8 | 8               |     | 4             | H6    |
| BB876       | BI876            | BF876       | BK876            | 1*1/4 | 8               |     | 4             | H6    |
| BB916       | BI916            | BF916       | BK916            | 1*3/8 | 8               |     | 4             | H6    |
| BB956       | BI956            | BF956       | BK956            | 1*1/2 | 8               |     | 4             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 &amp; 356.

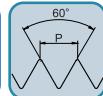
TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****Steels up to 45HRc**

H6/H7/H8

ANSI

P-HSS

UNC  
UNF

| EDP No.       |             |                  | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|-------------|------------------|------|-----------------|-----|---------------|-------|
| Bright Finish | TiCN Coated | Hardslick Coated |      | UNC             | UNF |               |       |
| H6082         | H7082       | H8082            | 2    | 56              |     | 3             | H2    |
| H6162         | H7162       | H8162            | 4    | 40              |     | 3             | H2    |
| H6202         | H7202       | H8202            | 5    | 40              |     | 3             | H2    |
| H6243         | H7243       | H8243            | 6    | 32              |     | 3             | H3    |
| H6283         | H7283       | H8283            | 8    | 32              |     | 3             | H3    |
| H6323         | H7323       | H8323            | 10   | 24              |     | 3             | H3    |
| H6343         | H7343       | H8343            |      |                 | 32  | 3             | H3    |
| H6405         | H7405       | H8405            | 1/4  | 20              |     | 3             | H5    |
| H6424         | H7424       | H8424            |      |                 | 28  | 3             | H4    |
| H6445         | H7445       | H8445            | 5/16 | 18              |     | 3             | H5    |
| H6464         | H7464       | H8464            |      |                 | 24  | 3             | H4    |
| H6485         | H7485       | H8485            | 3/8  | 16              |     | 3             | H5    |
| H6504         | H7504       | H8504            |      |                 | 24  | 3             | H4    |
| H6525         | H7525       | H8525            | 7/16 | 14              |     | 3             | H5    |
| H6545         | H7545       | H8545            |      |                 | 20  | 3             | H5    |
| H6565         | H7565       | H8565            | 1/2  | 13              |     | 3             | H5    |
| H6585         | H7585       | H8585            |      |                 | 20  | 3             | H5    |
| H6645         | H7645       | H8645            | 5/8  | 11              |     | 4             | H5    |
| H6665         | H7665       | H8665            |      |                 | 18  | 4             | H5    |
| H6705         | H7705       | H8705            | 3/4  | 10              |     | 4             | H5    |
| H6725         | H7725       | H8725            |      |                 | 16  | 4             | H5    |

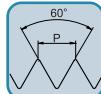
\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE**

**for Titanium Alloys & Nickel Base Alloys  
up to 44HRc**

P-HSS

UNC  
UNF

B3/H9/B5/D6

ANSI

| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------|-------------|------------------|------|-----------------|-----|---------------|-------|
|             |            |             |                  |      | UNC             | UNF |               |       |
| B3082       | H9082      | B5082       | D6082            | 2    | 56              |     | 3             | H2    |
| B3162       | H9162      | B5162       | D6162            | 4    | 40              |     | 3             | H2    |
| B3202       | H9202      | B5202       | D6202            | 5    | 40              |     | 3             | H2    |
| B3243       | H9243      | B5243       | D6243            | 6    | 32              |     | 3             | H3    |
| B3283       | H9283      | B5283       | D6283            | 8    | 32              |     | 3             | H3    |
| B3323       | H9323      | B5323       | D6323            | 10   | 24              |     | 3             | H3    |
| B3343       | H9343      | B5343       | D6343            |      |                 | 32  | 3             | H3    |
| B3403       | H9403      | B5403       | D6403            | 1/4  | 20              |     | 3             | H3    |
| B3405       | H9405      | B5405       | D6405            |      |                 |     | 3             | H5    |
| B3423       | H9423      | B5423       | D6423            |      |                 | 28  | 3             | H3    |
| B3424       | H9424      | B5424       | D6424            |      |                 |     | 3             | H4    |
| B3443       | H9443      | B5443       | D6443            | 5/16 | 18              |     | 3             | H3    |
| B3445       | H9445      | B5445       | D6445            |      |                 |     | 3             | H5    |
| B3463       | H9463      | B5463       | D6463            |      |                 | 24  | 3             | H3    |
| B3483       | H9483      | B5483       | D6483            | 3/8  | 16              |     | 3             | H3    |
| B3485       | H9485      | B5485       | D6485            |      |                 |     | 3             | H5    |
| B3503       | H9503      | B5503       | D6503            |      |                 | 24  | 3             | H3    |
| B3504       | H9504      | B5504       | D6504            |      |                 |     | 3             | H4    |
| B3523       | H9523      | B5523       | D6523            | 7/16 | 14              |     | 3             | H3    |
| B3525       | H9525      | B5525       | D6525            |      |                 |     | 3             | H5    |
| B3543       | H9543      | B5543       | D6543            |      |                 | 20  | 3             | H3    |
| B3545       | H9545      | B5545       | D6545            |      |                 |     | 3             | H5    |
| B3563       | H9563      | B5563       | D6563            | 1/2  | 13              |     | 3             | H3    |
| B3565       | H9565      | B5565       | D6565            |      |                 |     | 3             | H5    |
| B3583       | H9583      | B5583       | D6583            |      |                 | 20  | 3             | H3    |
| B3585       | H9585      | B5585       | D6585            |      |                 |     | 3             | H5    |
| B3603       | H9603      | B5603       | D6603            | 9/16 | 12              |     | 3             | H3    |
| B3605       | H9605      | B5605       | D6605            |      |                 |     | 3             | H5    |
| B3623       | H9623      | B5623       | D6623            |      |                 | 18  | 3             | H3    |
| B3625       | H9625      | B5625       | D6625            |      |                 |     | 3             | H5    |
| B3643       | H9643      | B5643       | D6643            | 5/8  | 11              |     | 4             | H3    |
| B3645       | H9645      | B5645       | D6645            |      |                 |     | 4             | H5    |
| B3663       | H9663      | B5663       | D6663            |      |                 | 18  | 4             | H3    |
| B3665       | H9665      | B5665       | D6665            |      |                 |     | 4             | H5    |
| B3703       | H9703      | B5703       | D6703            | 3/4  | 10              |     | 4             | H3    |
| B3705       | H9705      | B5705       | D6705            |      |                 |     | 4             | H5    |
| B3723       | H9723      | B5723       | D6723            |      |                 | 16  | 4             | H3    |
| B3725       | H9725      | B5725       | D6725            |      |                 |     | 4             | H5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

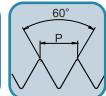


# SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

for Stainless Steels up to 28HRc

HSSE-V3

UNC  
UNF



B0/B2/D2 / ANSI

| EDP No.     |            |                  | Size    | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------|------------------|---------|-----------------|-----|---------------|-------|
| Steam Oxide | TiN Coated | Hardslick Coated |         | UNC             | UNF |               |       |
| B0082       | B2082      | D2082            | 2       | 56              |     | 2             | H2    |
| B0162       | B2162      | D2162            | 4       | 40              |     | 2             | H2    |
| B0202       | B2202      | D2202            | 5       | 40              |     | 3             | H2    |
| B0203       | B2203      | D2203            |         |                 |     | 3             | H3    |
| B0243       | B2243      | D2243            | 6       | 32              |     | 3             | H3    |
| B0283       | B2283      | D2283            | 8       | 32              |     | 3             | H3    |
| B0323       | B2323      | D2323            | 10      | 24              |     | 3             | H3    |
| B0343       | B2343      | D2343            |         |                 | 32  | 3             | H3    |
| B0403       | B2403      | D2403            | 1/4     | 20              |     | 3             | H3    |
| B0405       | B2405      | D2405            |         |                 |     | 3             | H5    |
| B0423       | B2423      | D2423            |         |                 | 28  | 3             | H3    |
| B0443       | B2443      | D2443            | 5/16    | 18              |     | 3             | H3    |
| B0445       | B2445      | D2445            |         |                 |     | 3             | H5    |
| B0463       | B2463      | D2463            |         |                 | 24  | 3             | H3    |
| B0483       | B2483      | D2483            | 3/8     | 16              |     | 3             | H3    |
| B0485       | B2485      | D2485            |         |                 |     | 3             | H5    |
| B0503       | B2503      | D2503            |         |                 | 24  | 3             | H3    |
| B0523       | B2523      | D2523            | 7/16    | 14              |     | 3             | H3    |
| B0525       | B2525      | D2525            |         |                 |     | 3             | H5    |
| B0543       | B2543      | D2543            |         |                 | 20  | 3             | H3    |
| B0545       | B2545      | D2545            |         |                 |     | 3             | H5    |
| B0563       | B2563      | D2563            | 1/2     | 13              |     | 3             | H3    |
| B0565       | B2565      | D2565            |         |                 |     | 3             | H5    |
| B0583       | B2583      | D2583            |         |                 | 20  | 3             | H3    |
| B0603       | B2603      | D2603            | 9/16    | 12              |     | 3             | H3    |
| B0623       | B2623      | D2623            |         |                 | 18  | 3             | H3    |
| B0625       | B2625      | D2625            |         |                 |     | 3             | H5    |
| B0643       | B2643      | D2643            | 5/8     | 11              |     | 4             | H3    |
| B0645       | B2645      | D2645            |         |                 |     | 4             | H5    |
| B0663       | B2663      | D2663            |         |                 | 18  | 4             | H3    |
| B0665       | B2665      | D2665            |         |                 |     | 4             | H5    |
| B0703       | B2703      | D2703            | 3/4     | 10              |     | 4             | H3    |
| B0705       | B2705      | D2705            |         |                 |     | 4             | H5    |
| B0723       | B2723      | D2723            |         |                 | 16  | 4             | H3    |
| B0725       | B2725      | D2725            |         |                 |     | 4             | H5    |
| B0744       | B2744      | D2744            | 7/8     | 9               |     | 4             | H4    |
| B0746       | B2746      | D2746            |         |                 |     | 4             | H6    |
| B0764       | B2764      | D2764            |         |                 | 14  | 4             | H4    |
| B0766       | B2766      | D2766            |         |                 |     | 4             | H6    |
| B0784       | B2784      | D2784            | 1       | 8               |     | 4             | H4    |
| B0786       | B2786      | D2786            |         |                 |     | 4             | H6    |
| B0804       | B2804      | D2804            |         |                 | 12  | 4             | H4    |
| B0806       | B2806      | D2806            |         |                 |     | 4             | H6    |
| B0824       | B2824      | D2824            | 1 * 1/8 | 7               |     | 4             | H4    |
| B0864       | B2864      | D2864            | 1 * 1/4 | 7               |     | 4             | H4    |
| B0904       | B2904      | D2904            | 1 * 3/8 | 6               |     | 4             | H4    |
| B0944       | B2944      | D2944            | 1 * 1/2 | 6               |     | 4             | H4    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

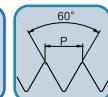
TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****for Stainless Steels up to 28HRc**

G7/G8/G9/H0

ANSI Long Shank

P-HSS

UNC  
UNF

Maximum Tapping Depth is 50% Deeper than Standard ANSI Taps.

| TiN Coated 4" OAL | TiN Coated 6" OAL | Hardslick Coated 4" OAL | Hardslick Coated 6" OAL | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------------|-------------------|-------------------------|-------------------------|------|-----------------|-----|---------------|-------|
|                   |                   |                         |                         |      | UNC             | UNF |               |       |
| G7162             | —                 | G9162                   | —                       | 4    | 40              |     | 3             | H2    |
| G7243             | G8243             | G9243                   | H0243                   | 6    | 32              |     | 3             | H3    |
| G7283             | G8283             | G9283                   | H0283                   | 8    | 32              |     | 3             | H3    |
| G7323             | G8323             | G9323                   | H0323                   | 10   | 24              |     | 3             | H3    |
| G7343             | G8343             | G9343                   | H0343                   |      |                 | 32  | 3             | H3    |
| G7403             | G8403             | G9403                   | H0403                   | 1/4  | 20              |     | 3             | H3    |
| —                 | G8423             | —                       | H0423                   |      |                 | 28  | 3             | H3    |
| —                 | G8443             | —                       | H0443                   | 5/16 | 18              |     | 3             | H3    |
| —                 | G8463             | —                       | H0463                   |      |                 | 24  | 3             | H3    |
| —                 | G8483             | —                       | H0483                   | 3/8  | 16              |     | 3             | H3    |
| —                 | G8503             | —                       | H0503                   |      |                 | 24  | 3             | H3    |
| —                 | G8523             | —                       | H0523                   | 7/16 | 14              |     | 3             | H3    |
| —                 | G8543             | —                       | H0543                   |      |                 | 20  | 3             | H3    |
| —                 | G8563             | —                       | H0563                   | 1/2  | 13              |     | 3             | H3    |
| —                 | G8583             | —                       | H0583                   |      |                 | 20  | 3             | H3    |
| —                 | G8643             | —                       | H0643                   | 5/8  | 11              |     | 4             | H3    |



H1/H2/H3/H4

ANSI Long Shank

**Machining Center Tap**

Left hand spiral, right hand cut

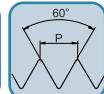
Reduces chip packing in deep holes

Maximum Tapping Depth is 50% Deeper than Standard ANSI Taps.

| TiN Coated 4" OAL | TiN Coated 6" OAL | Hardslick Coated 4" OAL | Hardslick Coated 6" OAL | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------------|-------------------|-------------------------|-------------------------|------|-----------------|-----|---------------|-------|
|                   |                   |                         |                         |      | UNC             | UNF |               |       |
| H1403             | H2403             | H3403                   | H4403                   | 1/4  | 20              |     | 2             | H3    |
| —                 | H2423             | —                       | H4423                   |      |                 | 28  | 3             | H3    |
| —                 | H2443             | —                       | H4443                   | 5/16 | 18              |     | 3             | H3    |
| —                 | H2483             | —                       | H4483                   | 3/8  | 16              |     | 3             | H3    |
| —                 | H2523             | —                       | H4523                   | 7/16 | 14              |     | 3             | H3    |
| —                 | H2563             | —                       | H4563                   | 1/2  | 13              |     | 3             | H3    |
| —                 | H2643             | —                       | H4643                   | 5/8  | 11              |     | 3             | H3    |

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****Steels up to 38HRc**

HSSE-V3

UNC  
UNF

D4/E0

ANSI

| Bright Finish | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------------|------|-----------------|-----|---------------|-------|
|               |                  |      | UNC             | UNF |               |       |
| D4082         | E0082            | 2    | 56              |     | 2             | H2    |
| D4162         | E0162            | 4    | 40              |     | 2             | H2    |
| D4202         | E0202            | 5    | 40              |     | 3             | H2    |
| D4243         | E0243            | 6    | 32              |     | 3             | H3    |
| D4283         | E0283            | 8    | 32              |     | 3             | H3    |
| D4323         | E0323            | 10   | 24              |     | 3             | H3    |
| D4343         | E0343            |      |                 | 32  | 3             | H3    |
| D4403         | E0403            | 1/4  | 20              |     | 3             | H3    |
| D4405         | E0405            |      |                 |     | 3             | H5    |
| D4423         | E0423            |      |                 | 28  | 3             | H3    |
| D4425         | E0425            |      |                 |     | 3             | H5    |
| D4443         | E0443            | 5/16 | 18              |     | 3             | H3    |
| D4445         | E0445            |      |                 |     | 3             | H5    |
| D4463         | E0463            |      |                 | 24  | 3             | H3    |
| D4465         | E0465            |      |                 |     | 3             | H5    |
| D4483         | E0483            | 3/8  | 16              |     | 3             | H3    |
| D4485         | E0485            |      |                 |     | 3             | H5    |
| D4503         | E0503            |      |                 | 24  | 3             | H3    |
| D4505         | E0505            |      |                 |     | 3             | H5    |
| D4523         | E0523            | 7/16 | 14              |     | 3             | H3    |
| D4525         | E0525            |      |                 |     | 3             | H5    |
| D4543         | E0543            |      |                 | 20  | 3             | H3    |
| D4545         | E0545            |      |                 |     | 3             | H5    |
| D4563         | E0563            | 1/2  | 13              |     | 3             | H3    |
| D4565         | E0565            |      |                 |     | 3             | H5    |
| D4583         | E0583            |      |                 | 20  | 3             | H3    |
| D4585         | E0585            |      |                 |     | 3             | H5    |
| D4605         | E0605            | 9/16 | 12              |     | 3             | H5    |
| D4625         | E0625            |      |                 | 18  | 3             | H5    |
| D4643         | E0643            | 5/8  | 11              |     | 4             | H3    |
| D4645         | E0645            |      |                 |     | 4             | H5    |
| D4663         | E0663            |      |                 | 18  | 4             | H3    |
| D4665         | E0665            |      |                 |     | 4             | H5    |
| D4703         | E0703            | 3/4  | 10              |     | 4             | H3    |
| D4705         | E0705            |      |                 |     | 4             | H5    |
| D4723         | E0723            |      |                 | 16  | 4             | H3    |
| D4725         | E0725            |      |                 |     | 4             | H5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****for Aluminum Alloys or Die Cast Aluminum**

HSSE-V3

UNC  
UNF

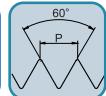
C0/D8

ANSI

| EDP No.       |                  | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------------|------|-----------------|-----|---------------|-------|
| Bright Finish | Hardslick Coated |      | UNC             | UNF |               |       |
| C0162         | D8162            | 4    | 40              |     | 2             | H2    |
| C0242         | D8242            | 6    | 32              |     | 2             | H2    |
| C0243         | D8243            |      |                 |     | 2             | H3    |
| C0283         | D8283            | 8    | 32              |     | 2             | H3    |
| C0323         | D8323            | 10   | 24              |     | 2             | H3    |
| C0343         | D8343            |      |                 | 32  | 2             | H3    |
| C0403         | D8403            | 1/4  | 20              |     | 2             | H3    |
| C0405         | D8405            |      |                 |     | 2             | H5    |
| C0423         | D8423            |      |                 | 28  | 2             | H3    |
| C0443         | D8443            | 5/16 | 18              |     | 2             | H3    |
| C0445         | D8445            |      |                 |     | 2             | H5    |
| C0463         | D8463            |      |                 | 24  | 2             | H3    |
| C0465         | D8465            |      |                 |     | 2             | H5    |
| C0483         | D8483            | 3/8  | 16              |     | 2             | H3    |
| C0485         | D8485            |      |                 |     | 2             | H5    |
| C0503         | D8503            |      |                 | 24  | 2             | H3    |
| C0505         | D8505            |      |                 |     | 2             | H5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL FLUTED TAPS BOTTOMING STYLE****for Multi Purpose****HSS-V****UNC  
UNF**

F4/F8/F6

ANSI

| Steam Oxide | TiN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------|------------------|------|-----------------|-----|---------------|-------|
|             |            |                  |      | UNC             | UNF |               |       |
| F4082       | F8082      | F6082            | 2    | 56              |     | 2             | H2    |
| F4162       | F8162      | F6162            | 4    | 40              |     | 2             | H2    |
| F4202       | F8202      | F6202            | 5    | 40              |     | 2             | H2    |
| F4243       | F8243      | F6243            | 6    | 32              |     | 2             | H3    |
| F4283       | F8283      | F6283            | 8    | 32              |     | 3             | H3    |
| F4323       | F8323      | F6323            | 10   | 24              |     | 3             | H3    |
| F4343       | F8343      | F6343            |      |                 | 32  | 3             | H3    |
| F4403       | F8403      | F6403            | 1/4  | 20              |     | 3             | H3    |
| F4405       | F8405      | F6405            |      |                 |     | 3             | H5    |
| F4423       | F8423      | F6423            |      |                 | 28  | 3             | H3    |
| F4443       | F8443      | F6443            | 5/16 | 18              |     | 3             | H3    |
| F4445       | F8445      | F6445            |      |                 |     | 3             | H5    |
| F4463       | F8463      | F6463            |      |                 | 24  | 3             | H3    |
| F4483       | F8483      | F6483            | 3/8  | 16              |     | 3             | H3    |
| F4485       | F8485      | F6485            |      |                 |     | 3             | H5    |
| F4503       | F8503      | F6503            |      |                 | 24  | 3             | H3    |
| F4523       | F8523      | F6523            | 7/16 | 14              |     | 3             | H3    |
| F4525       | F8525      | F6525            |      |                 |     | 3             | H5    |
| F4543       | F8543      | F6543            |      |                 | 20  | 3             | H3    |
| F4545       | F8545      | F6545            |      |                 |     | 3             | H5    |
| F4563       | F8563      | F6563            | 1/2  | 13              |     | 3             | H3    |
| F4565       | F8565      | F6565            |      |                 |     | 3             | H5    |
| F4583       | F8583      | F6583            |      |                 | 20  | 3             | H3    |
| F4585       | F8585      | F6585            |      |                 |     | 3             | H5    |
| F4603       | F8603      | F6603            | 9/16 | 12              |     | 3             | H3    |
| F4605       | F8605      | F6605            |      |                 |     | 3             | H5    |
| F4623       | F8623      | F6623            |      |                 | 18  | 3             | H3    |
| F4625       | F8625      | F6625            |      |                 |     | 3             | H5    |
| F4643       | F8643      | F6643            | 5/8  | 11              |     | 4             | H3    |
| F4645       | F8645      | F6645            |      |                 |     | 4             | H5    |
| F4663       | F8663      | F6663            |      |                 | 18  | 4             | H3    |
| F4665       | F8665      | F6665            |      |                 |     | 4             | H5    |
| F4703       | F8703      | F6703            | 3/4  | 10              |     | 4             | H3    |
| F4705       | F8705      | F6705            |      |                 |     | 4             | H5    |
| F4723       | F8723      | F6723            |      |                 | 16  | 4             | H3    |
| F4725       | F8725      | F6725            |      |                 |     | 4             | H5    |
| F4744       | F8744      | F6744            | 7/8  | 9               |     | 4             | H4    |
| F4746       | F8746      | F6746            |      |                 |     | 4             | H6    |
| F4764       | F8764      | F6764            |      |                 | 14  | 4             | H4    |
| F4766       | F8766      | F6766            |      |                 |     | 4             | H6    |
| F4784       | F8784      | F6784            | 1    | 8               |     | 4             | H4    |
| F4786       | F8786      | F6786            |      |                 |     | 4             | H6    |
| F4806       | F8806      | F6806            |      |                 | 12  | 4             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE****for Multi Purpose****HSS-V****UNC  
UNF**

G0/G1/G2

DIN Length  
ANSI Shank

| Bright Finish | TiN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------|------------------|------|-----------------|-----|---------------|-------|
|               |            |                  |      | UNC             | UNF |               |       |
| G0082         | G1082      | G2082            | 2    | 56              |     | 2             | H2    |
| G0162         | G1162      | G2162            | 4    | 40              |     | 2             | H2    |
| G0202         | G1202      | G2202            | 5    | 40              |     | 3             | H2    |
| G0243         | G1243      | G2243            | 6    | 32              |     | 3             | H3    |
| G0283         | G1283      | G2283            | 8    | 32              |     | 3             | H3    |
| G0323         | G1323      | G2323            | 10   | 24              |     | 3             | H3    |
| G0343         | G1343      | G2343            |      |                 | 32  | 3             | H3    |
| G0403         | G1403      | G2403            | 1/4  | 20              |     | 3             | H3    |
| G0405         | G1405      | G2405            |      |                 |     | 3             | H5    |
| G0423         | G1423      | G2423            |      |                 | 28  | 3             | H3    |
| G0443         | G1443      | G2443            | 5/16 | 18              |     | 3             | H3    |
| G0445         | G1445      | G2445            |      |                 |     | 3             | H5    |
| G0463         | G1463      | G2463            |      |                 | 24  | 3             | H3    |
| G0483         | G1483      | G2483            | 3/8  | 16              |     | 3             | H3    |
| G0485         | G1485      | G2485            |      |                 |     | 3             | H5    |
| G0503         | G1503      | G2503            |      |                 | 24  | 3             | H3    |
| G0523         | G1523      | G2523            | 7/16 | 14              |     | 3             | H3    |
| G0525         | G1525      | G2525            |      |                 |     | 3             | H5    |
| G0543         | G1543      | G2543            |      |                 | 20  | 3             | H3    |
| G0545         | G1545      | G2545            |      |                 |     | 3             | H5    |
| G0563         | G1563      | G2563            | 1/2  | 13              |     | 3             | H3    |
| G0565         | G1565      | G2565            |      |                 |     | 3             | H5    |
| G0583         | G1583      | G2583            |      |                 | 20  | 3             | H3    |
| G0585         | G1585      | G2585            |      |                 |     | 3             | H5    |
| G0603         | G1603      | G2603            | 9/16 | 12              |     | 3             | H3    |
| G0605         | G1605      | G2605            |      |                 |     | 3             | H5    |
| G0623         | G1623      | G2623            |      |                 | 18  | 3             | H3    |
| G0625         | G1625      | G2625            |      |                 |     | 3             | H5    |
| G0643         | G1643      | G2643            | 5/8  | 11              |     | 4             | H3    |
| G0645         | G1645      | G2645            |      |                 |     | 4             | H5    |
| G0663         | G1663      | G2663            |      |                 | 18  | 4             | H3    |
| G0665         | G1665      | G2665            |      |                 |     | 4             | H5    |
| G0703         | G1703      | G2703            | 3/4  | 10              |     | 4             | H3    |
| G0705         | G1705      | G2705            |      |                 |     | 4             | H5    |
| G0723         | G1723      | G2723            |      |                 | 16  | 4             | H3    |
| G0725         | G1725      | G2725            |      |                 |     | 4             | H5    |
| G0746         | G1746      | G2746            | 7/8  | 9               |     | 4             | H6    |
| G0764         | G1764      | G2764            |      |                 | 14  | 4             | H4    |
| G0766         | G1766      | G2766            |      |                 |     | 4             | H6    |
| G0786         | G1786      | G2786            | 1    | 8               |     | 4             | H6    |
| G0804         | G1804      | G2804            |      |                 | 12  | 4             | H4    |
| G0806         | G1806      | G2806            |      |                 |     | 4             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

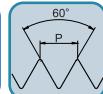
**TAPS****SPIRAL POINTED TAPS PLUG STYLE****for Steels & Stainless Steels up to 35HRc**

M9/O1

ANSI

Super HSS

UNC UNF



N4/O5

DIN Length  
ANSI Shank

| EDP No.     |                  |             |                  | Size  | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------------|-------------|------------------|-------|-----------------|-----|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated |       | UNC             | UNF |               |       |
| M9082       | O1082            | N4082       | O5082            | 2     | 56              |     | 2             | H2    |
| M9162       | O1162            | N4162       | O5162            | 4     | 40              |     | 2             | H2    |
| M9202       | O1202            | N4202       | O5202            | 5     | 40              |     | 3             | H2    |
| M9243       | O1243            | N4243       | O5243            | 6     | 32              |     | 3             | H3    |
| M9283       | O1283            | N4283       | O5283            | 8     | 32              |     | 3             | H3    |
| M9323       | O1323            | N4323       | O5323            | 10    | 24              |     | 3             | H3    |
| M9343       | O1343            | N4343       | O5343            |       |                 | 32  | 3             | H3    |
| M9403       | O1403            | N4403       | O5403            | 1/4   | 20              |     | 3             | H3    |
| M9405       | O1405            | N4405       | O5405            |       |                 |     | 3             | H5    |
| M9423       | O1423            | N4423       | O5423            |       |                 | 28  | 3             | H3    |
| M9445       | O1445            | N4445       | O5445            | 5/16  | 18              |     | 3             | H5    |
| M9464       | O1464            | N4464       | O5464            |       |                 | 24  | 3             | H4    |
| M9485       | O1485            | N4485       | O5485            | 3/8   | 16              |     | 3             | H5    |
| M9504       | O1504            | N4504       | O5504            |       |                 | 24  | 3             | H4    |
| M9525       | O1525            | N4525       | O5525            | 7/16  | 14              |     | 3             | H5    |
| M9545       | O1545            | N4545       | O5545            |       |                 | 20  | 3             | H5    |
| M9565       | O1565            | N4565       | O5565            | 1/2   | 13              |     | 3             | H5    |
| M9585       | O1585            | N4585       | O5585            |       |                 | 20  | 3             | H5    |
| M9605       | O1605            | N4605       | O5605            | 9/16  | 12              |     | 3             | H5    |
| M9625       | O1625            | N4625       | O5625            |       |                 | 18  | 3             | H5    |
| M9645       | O1645            | N4645       | O5645            | 5/8   | 11              |     | 3             | H5    |
| M9665       | O1665            | N4665       | O5665            |       |                 | 18  | 3             | H5    |
| M9705       | O1705            | N4705       | O5705            | 3/4   | 10              |     | 3             | H5    |
| M9725       | O1725            | N4725       | O5725            |       |                 | 16  | 3             | H5    |
| M9746       | O1746            | N4746       | O5746            | 7/8   | 9               |     | 3             | H6    |
| M9766       | O1766            | N4766       | O5766            |       |                 | 14  | 3             | H6    |
| M9786       | O1786            | N4786       | O5786            | 1     | 8               |     | 3             | H6    |
| M9806       | O1806            | N4806       | O5806            |       |                 | 12  | 3             | H6    |
| M9836       | O1836            | N4836       | O5836            | 1*1/8 | 8               |     | 4             | H6    |
| M9876       | O1876            | N4876       | O5876            | 1*1/4 | 8               |     | 4             | H6    |
| M9916       | O1916            | N4916       | O5916            | 1*3/8 | 8               |     | 4             | H6    |
| M9956       | O1956            | N4956       | O5956            | 1*1/2 | 8               |     | 4             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 &amp; 356.

TAPS

**TAPS****SPIRAL POINTED TAPS PLUG STYLE****Steels up to 45HRc****P-HSS****UNC  
UNF**

M5/M6/M7

ANSI

| Bright Finish | TiCN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|-------------|------------------|------|-----------------|-----|---------------|-------|
|               |             |                  |      | UNC             | UNF |               |       |
| M5082         | M6082       | M7082            | 2    | 56              |     | 2             | H2    |
| M5162         | M6162       | M7162            | 4    | 40              |     | 2             | H2    |
| M5202         | M6202       | M7202            | 5    | 40              |     | 3             | H2    |
| M5243         | M6243       | M7243            | 6    | 32              |     | 3             | H3    |
| M5283         | M6283       | M7283            | 8    | 32              |     | 3             | H3    |
| M5323         | M6323       | M7323            | 10   | 24              |     | 3             | H3    |
| M5343         | M6343       | M7343            |      |                 | 32  | 3             | H3    |
| M5405         | M6405       | M7405            | 1/4  | 20              |     | 3             | H5    |
| M5424         | M6424       | M7424            |      |                 | 28  | 3             | H4    |
| M5445         | M6445       | M7445            | 5/16 | 18              |     | 3             | H5    |
| M5464         | M6464       | M7464            |      |                 | 24  | 3             | H4    |
| M5485         | M6485       | M7485            | 3/8  | 16              |     | 3             | H5    |
| M5504         | M6504       | M7504            |      |                 | 24  | 3             | H4    |
| M5525         | M6525       | M7525            | 7/16 | 14              |     | 3             | H5    |
| M5545         | M6545       | M7545            |      |                 | 20  | 3             | H5    |
| M5565         | M6565       | M7565            | 1/2  | 13              |     | 3             | H5    |
| M5585         | M6585       | M7585            |      |                 | 20  | 3             | H5    |
| M5605         | M6605       | M7605            | 9/16 | 12              |     | 3             | H5    |
| M5625         | M6625       | M7625            |      |                 | 18  | 3             | H5    |
| M5645         | M6645       | M7645            | 5/8  | 11              |     | 3             | H5    |
| M5665         | M6665       | M7665            |      |                 |     | 3             | H5    |
| M5705         | M6705       | M7705            | 3/4  | 10              |     | 3             | H5    |
| M5725         | M6725       | M7725            |      |                 | 16  | 3             | H5    |

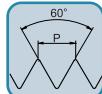
\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL POINTED TAPS PLUG STYLE**

**for Titanium Alloys & Nickel Base Alloys  
up to 44HRc**

P-HSS

UNC  
UNF

I3/M8/I5/J6

ANSI

| Steam Oxide | TiN Coated | TiCN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------|-------------|------------------|------|-----------------|-----|---------------|-------|
|             |            |             |                  |      | UNC             | UNF |               |       |
| I3082       | M8082      | I5082       | J6082            | 2    | 56              |     | 2             | H2    |
| I3162       | M8162      | I5162       | J6162            | 4    | 40              |     | 2             | H2    |
| I3202       | M8202      | I5202       | J6202            | 5    | 40              |     | 3             | H2    |
| I3243       | M8243      | I5243       | J6243            | 6    | 32              |     | 3             | H3    |
| I3283       | M8283      | I5283       | J6283            | 8    | 32              |     | 3             | H3    |
| I3323       | M8323      | I5323       | J6323            | 10   | 24              |     | 3             | H3    |
| I3343       | M8343      | I5343       | J6343            |      |                 | 32  | 3             | H3    |
| I3403       | M8403      | I5403       | J6403            | 1/4  | 20              |     | 3             | H3    |
| I3405       | M8405      | I5405       | J6405            |      |                 |     | 3             | H5    |
| I3423       | M8423      | I5423       | J6423            |      |                 | 28  | 3             | H3    |
| I3424       | M8424      | I5424       | J6424            |      |                 |     | 3             | H4    |
| I3443       | M8443      | I5443       | J6443            | 5/16 | 18              |     | 3             | H3    |
| I3445       | M8445      | I5445       | J6445            |      |                 |     | 3             | H5    |
| I3463       | M8463      | I5463       | J6463            |      |                 | 24  | 3             | H3    |
| I3483       | M8483      | I5483       | J6483            | 3/8  | 16              |     | 3             | H3    |
| I3485       | M8485      | I5485       | J6485            |      |                 |     | 3             | H5    |
| I3503       | M8503      | I5503       | J6503            |      |                 | 24  | 3             | H3    |
| I3504       | M8504      | I5504       | J6504            |      |                 |     | 3             | H4    |
| I3523       | M8523      | I5523       | J6523            | 7/16 | 14              |     | 3             | H3    |
| I3525       | M8525      | I5525       | J6525            |      |                 |     | 3             | H5    |
| I3543       | M8543      | I5543       | J6543            |      |                 | 20  | 3             | H3    |
| I3545       | M8545      | I5545       | J6545            |      |                 |     | 3             | H5    |
| I3563       | M8563      | I5563       | J6563            | 1/2  | 13              |     | 3             | H3    |
| I3565       | M8565      | I5565       | J6565            |      |                 |     | 3             | H5    |
| I3583       | M8583      | I5583       | J6583            |      |                 | 20  | 3             | H3    |
| I3585       | M8585      | I5585       | J6585            |      |                 |     | 3             | H5    |
| I3603       | M8603      | I5603       | J6603            | 9/16 | 12              |     | 3             | H3    |
| I3605       | M8605      | I5605       | J6605            |      |                 |     | 3             | H5    |
| I3623       | M8623      | I5623       | J6623            |      |                 | 18  | 3             | H3    |
| I3625       | M8625      | I5625       | J6625            |      |                 |     | 3             | H5    |
| I3643       | M8643      | I5643       | J6643            | 5/8  | 11              |     | 3             | H3    |
| I3645       | M8645      | I5645       | J6645            |      |                 |     | 3             | H5    |
| I3663       | M8663      | I5663       | J6663            |      |                 | 18  | 3             | H3    |
| I3665       | M8665      | I5665       | J6665            |      |                 |     | 3             | H5    |
| I3703       | M8703      | I5703       | J6703            | 3/4  | 10              |     | 3             | H3    |
| I3705       | M8705      | I5705       | J6705            |      |                 |     | 3             | H5    |
| I3723       | M8723      | I5723       | J6723            |      |                 | 16  | 3             | H3    |
| I3725       | M8725      | I5725       | J6725            |      |                 |     | 3             | H5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL POINTED TAPS PLUG STYLE****for Stainless Steels up to 28HRc**

HSSE-V3

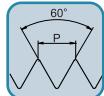
UNC  
UNF

I0/I2/J2

ANSI

| Steam Oxide | TiN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|------------|------------------|------|-----------------|-----|---------------|-------|
|             |            |                  |      | UNC             | UNF |               |       |
| I0082       | I2082      | J2082            | 2    | 56              |     | 2             | H2    |
| I0162       | I2162      | J2162            | 4    | 40              |     | 2             | H2    |
| I0202       | I2202      | J2202            | 5    | 40              |     | 3             | H2    |
| I0203       | I2203      | J2203            |      |                 |     | 3             | H3    |
| I0243       | I2243      | J2243            | 6    | 32              |     | 3             | H3    |
| I0283       | I2283      | J2283            | 8    | 32              |     | 3             | H3    |
| I0323       | I2323      | J2323            | 10   | 24              |     | 3             | H3    |
| I0343       | I2343      | J2343            |      |                 | 32  | 3             | H3    |
| I0403       | I2403      | J2403            | 1/4  | 20              |     | 3             | H3    |
| I0405       | I2405      | J2405            |      |                 |     | 3             | H5    |
| I0423       | I2423      | J2423            |      |                 | 28  | 3             | H3    |
| I0443       | I2443      | J2443            | 5/16 | 18              |     | 3             | H3    |
| I0445       | I2445      | J2445            |      |                 |     | 3             | H5    |
| I0463       | I2463      | J2463            |      |                 | 24  | 3             | H3    |
| I0483       | I2483      | J2483            | 3/8  | 16              |     | 3             | H3    |
| I0485       | I2485      | J2485            |      |                 |     | 3             | H5    |
| I0503       | I2503      | J2503            |      |                 | 24  | 3             | H3    |
| I0523       | I2523      | J2523            | 7/16 | 14              |     | 3             | H3    |
| I0525       | I2525      | J2525            |      |                 |     | 3             | H5    |
| I0543       | I2543      | J2543            |      |                 | 20  | 3             | H3    |
| I0545       | I2545      | J2545            |      |                 |     | 3             | H5    |
| I0563       | I2563      | J2563            | 1/2  | 13              |     | 3             | H3    |
| I0565       | I2565      | J2565            |      |                 |     | 3             | H5    |
| I0583       | I2583      | J2583            |      |                 | 20  | 3             | H3    |
| I0603       | I2603      | J2603            | 9/16 | 12              |     | 3             | H3    |
| I0623       | I2623      | J2623            |      |                 | 18  | 3             | H3    |
| I0643       | I2643      | J2643            | 5/8  | 11              |     | 3             | H3    |
| I0645       | I2645      | J2645            |      |                 |     | 3             | H5    |
| I0665       | I2665      | J2665            |      |                 | 18  | 3             | H5    |
| I0703       | I2703      | J2703            | 3/4  | 10              |     | 3             | H3    |
| I0705       | I2705      | J2705            |      |                 |     | 3             | H5    |
| I0744       | I2744      | J2744            | 7/8  | 9               |     | 3             | H4    |
| I0746       | I2746      | J2746            |      |                 |     | 3             | H6    |
| I0766       | I2766      | J2766            |      |                 | 14  | 3             | H6    |
| I0784       | I2784      | J2784            | 1    | 8               |     | 3             | H4    |
| I0786       | I2786      | J2786            |      |                 |     | 3             | H6    |
| I0806       | I2806      | J2806            |      |                 | 12  | 3             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

**TAPS****SPIRAL POINTED TAPS PLUG STYLE****for Stainless Steels up to 28HRc****P-HSS****UNC  
UNF**

M0/M1/M2/M3

ANSI Long Shank

| TiN Coated<br>4" OAL | TiN Coated<br>6" OAL | EDP No.                    |                            | Size | Thread Per Inch |     | No. of<br>Flutes | Limit | Maximum<br>Tapping<br>Depth |
|----------------------|----------------------|----------------------------|----------------------------|------|-----------------|-----|------------------|-------|-----------------------------|
|                      |                      | Hardslick Coated<br>4" OAL | Hardslick Coated<br>6" OAL |      | UNC             | UNF |                  |       |                             |
| M0162                | —                    | M2162                      | —                          | 4    | 40              |     | 2                | H2    | 0.844                       |
| M0243                | M1243                | M2243                      | M3243                      | 6    | 32              |     | 2                | H3    | 1.031                       |
| M0283                | M1283                | M2283                      | M3283                      | 8    | 32              |     | 3                | H3    | 1.125                       |
| M0323                | M1323                | M2323                      | M3323                      | 10   | 24              |     | 3                | H3    | 1.312                       |
| M0343                | M1343                | M2343                      | M3343                      |      |                 | 32  | 3                | H3    | 1.312                       |
| M0403                | M1403                | M2403                      | M3403                      | 1/4  | 20              |     | 3                | H3    | 1.500                       |
| —                    | M1423                | —                          | M3423                      |      |                 | 28  | 3                | H3    | 1.500                       |
| —                    | M1443                | —                          | M3443                      | 5/16 | 18              |     | 3                | H3    | 1.688                       |
| —                    | M1463                | —                          | M3463                      |      |                 | 24  | 3                | H3    | 1.688                       |
| —                    | M1483                | —                          | M3483                      | 3/8  | 16              |     | 3                | H3    | 1.875                       |
| —                    | M1503                | —                          | M3503                      |      |                 | 24  | 3                | H3    |                             |
| —                    | M1523                | —                          | M3523                      | 7/16 | 14              |     | 3                | H3    |                             |
| —                    | M1543                | —                          | M3543                      |      |                 | 20  | 3                | H3    |                             |
| —                    | M1563                | —                          | M3563                      | 1/2  | 13              |     | 3                | H3    |                             |
| —                    | M1583                | —                          | M3583                      |      |                 | 20  | 3                | H3    |                             |
| —                    | M1603                | —                          | M3603                      | 9/16 | 12              |     | 3                | H3    |                             |
| —                    | M1623                | —                          | M3623                      |      |                 | 18  | 3                | H3    |                             |
| —                    | M1643                | —                          | M3643                      | 5/8  | 11              |     | 3                | H3    |                             |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL POINTED TAPS PLUG STYLE*****Steels up to 38HRc***

HSSE-V3

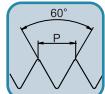
UNC  
UNF

J4/J8

ANSI

| EDP No.       |                  | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------------|------|-----------------|-----|---------------|-------|
| Bright Finish | Hardslick Coated |      | UNC             | UNF |               |       |
| J4082         | J8082            | 2    | 56              |     | 2             | H2    |
| J4162         | J8162            | 4    | 40              |     | 2             | H2    |
| J4202         | J8202            | 5    | 40              |     | 3             | H2    |
| J4243         | J8243            | 6    | 32              |     | 3             | H3    |
| J4283         | J8283            | 8    | 32              |     | 3             | H3    |
| J4323         | J8323            | 10   | 24              |     | 3             | H3    |
| J4343         | J8343            |      |                 | 32  | 3             | H3    |
| J4403         | J8403            | 1/4  | 20              |     | 3             | H3    |
| J4405         | J8405            |      |                 |     | 3             | H5    |
| J4423         | J8423            |      |                 | 28  | 3             | H3    |
| J4425         | J8425            |      |                 |     | 3             | H5    |
| J4443         | J8443            | 5/16 | 18              |     | 3             | H3    |
| J4445         | J8445            |      |                 |     | 3             | H5    |
| J4463         | J8463            |      |                 | 24  | 3             | H3    |
| J4465         | J8465            |      |                 |     | 3             | H5    |
| J4483         | J8483            | 3/8  | 16              |     | 3             | H3    |
| J4485         | J8485            |      |                 |     | 3             | H5    |
| J4503         | J8503            |      |                 | 24  | 3             | H3    |
| J4505         | J8505            |      |                 |     | 3             | H5    |
| J4523         | J8523            | 7/16 | 14              |     | 3             | H3    |
| J4525         | J8525            |      |                 |     | 3             | H5    |
| J4543         | J8543            |      |                 | 20  | 3             | H3    |
| J4545         | J8545            |      |                 |     | 3             | H5    |
| J4563         | J8563            | 1/2  | 13              |     | 3             | H3    |
| J4565         | J8565            |      |                 |     | 3             | H5    |
| J4583         | J8583            |      |                 | 20  | 3             | H3    |
| J4585         | J8585            |      |                 |     | 3             | H5    |
| J4605         | J8605            | 9/16 | 12              |     | 3             | H5    |
| J4625         | J8625            |      |                 | 18  | 3             | H5    |
| J4643         | J8643            | 5/8  | 11              |     | 3             | H3    |
| J4645         | J8645            |      |                 |     | 3             | H5    |
| J4663         | J8663            |      |                 | 18  | 3             | H3    |
| J4665         | J8665            |      |                 |     | 3             | H5    |
| J4703         | J8703            | 3/4  | 10              |     | 3             | H3    |
| J4705         | J8705            |      |                 |     | 3             | H5    |
| J4723         | J8723            |      |                 | 16  | 3             | H3    |
| J4725         | J8725            |      |                 |     | 3             | H5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

**TAPS****SPIRAL POINTED TAPS PLUG STYLE****for Multi Purpose****HSS-V****UNC  
UNF**

K9/L0/L1

ANSI

| Bright Finish | TiN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------|------------------|------|-----------------|-----|---------------|-------|
|               |            |                  |      | UNC             | UNF |               |       |
| K9082         | L0082      | L1082            | 2    | 56              |     | 2             | H2    |
| K9162         | L0162      | L1162            | 4    | 40              |     | 2             | H2    |
| K9202         | L0202      | L1202            | 5    | 40              |     | 2             | H2    |
| K9243         | L0243      | L1243            | 6    | 32              |     | 2             | H3    |
| K9283         | L0283      | L1283            | 8    | 32              |     | 2             | H3    |
| K9323         | L0323      | L1323            | 10   | 24              |     | 2             | H3    |
| K9343         | L0343      | L1343            |      |                 | 32  | 2             | H3    |
| K9403         | L0403      | L1403            | 1/4  | 20              |     | 2             | H3    |
| K9405         | L0405      | L1405            |      |                 |     | 2             | H5    |
| K9423         | L0423      | L1423            |      |                 | 28  | 3             | H3    |
| K9443         | L0443      | L1443            | 5/16 | 18              |     | 2             | H3    |
| K9445         | L0445      | L1445            |      |                 |     | 3             | H5    |
| K9463         | L0463      | L1463            |      |                 | 24  | 3             | H3    |
| K9483         | L0483      | L1483            | 3/8  | 16              |     | 3             | H3    |
| K9485         | L0485      | L1485            |      |                 |     | 3             | H5    |
| K9503         | L0503      | L1503            |      |                 | 24  | 3             | H3    |
| K9523         | L0523      | L1523            | 7/16 | 14              |     | 3             | H3    |
| K9525         | L0525      | L1525            |      |                 |     | 3             | H5    |
| K9543         | L0543      | L1543            |      |                 | 20  | 3             | H3    |
| K9545         | L0545      | L1545            |      |                 |     | 3             | H5    |
| K9563         | L0563      | L1563            | 1/2  | 13              |     | 3             | H3    |
| K9565         | L0565      | L1565            |      |                 |     | 3             | H5    |
| K9583         | L0583      | L1583            |      |                 | 20  | 3             | H3    |
| K9585         | L0585      | L1585            |      |                 |     | 3             | H5    |
| K9603         | L0603      | L1603            | 9/16 | 12              |     | 3             | H3    |
| K9623         | L0623      | L1623            |      |                 | 18  | 3             | H3    |
| K9625         | L0625      | L1625            |      |                 |     | 3             | H5    |
| K9643         | L0643      | L1643            | 5/8  | 11              |     | 3             | H3    |
| K9645         | L0645      | L1645            |      |                 |     | 3             | H5    |
| K9663         | L0663      | L1663            |      |                 | 18  | 3             | H3    |
| K9665         | L0665      | L1665            |      |                 |     | 3             | H5    |
| K9703         | L0703      | L1703            | 3/4  | 10              |     | 3             | H3    |
| K9705         | L0705      | L1705            |      |                 |     | 3             | H5    |
| K9723         | L0723      | L1723            |      |                 | 16  | 3             | H3    |
| K9725         | L0725      | L1725            |      |                 |     | 3             | H5    |
| K9746         | L0746      | L1746            | 7/8  | 9               |     | 3             | H6    |
| K9764         | L0764      | L1764            |      |                 | 14  | 3             | H4    |
| K9766         | L0766      | L1766            |      |                 |     | 3             | H6    |
| K9786         | L0786      | L1786            | 1    | 8               |     | 3             | H6    |
| K9806         | L0806      | L1806            |      |                 | 12  | 3             | H6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****SPIRAL POINTED TAPS PLUG STYLE****for Multi Purpose****HSS-V****UNC  
UNF**

L3/L4/L5

DIN Length  
ANSI Shank

| Bright Finish | TiN Coated | Hardslick Coated | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------|------------|------------------|------|-----------------|-----|---------------|-------|
|               |            |                  |      | UNC             | UNF |               |       |
| L3082         | L4082      | L5082            | 2    | 56              |     | 2             | H2    |
| L3162         | L4162      | L5162            | 4    | 40              |     | 2             | H2    |
| L3202         | L4202      | L5202            | 5    | 40              |     | 3             | H2    |
| L3243         | L4243      | L5243            | 6    | 32              |     | 3             | H3    |
| L3283         | L4283      | L5283            | 8    | 32              |     | 3             | H3    |
| L3323         | L4323      | L5323            | 10   | 24              |     | 3             | H3    |
| L3343         | L4343      | L5343            |      |                 | 32  | 3             | H3    |
| L3403         | L4403      | L5403            | 1/4  | 20              |     | 3             | H3    |
| L3405         | L4405      | L5405            |      |                 |     | 3             | H5    |
| L3423         | L4423      | L5423            |      |                 | 28  | 3             | H3    |
| L3443         | L4443      | L5443            | 5/16 | 18              |     | 3             | H3    |
| L3445         | L4445      | L5445            |      |                 |     | 3             | H5    |
| L3463         | L4463      | L5463            |      |                 | 24  | 3             | H3    |
| L3483         | L4483      | L5483            | 3/8  | 16              |     | 3             | H3    |
| L3485         | L4485      | L5485            |      |                 |     | 3             | H5    |
| L3503         | L4503      | L5503            |      |                 | 24  | 3             | H3    |
| L3523         | L4523      | L5523            | 7/16 | 14              |     | 3             | H3    |
| L3525         | L4525      | L5525            |      |                 |     | 3             | H5    |
| L3543         | L4543      | L5543            |      |                 | 20  | 3             | H3    |
| L3545         | L4545      | L5545            |      |                 |     | 3             | H5    |
| L3563         | L4563      | L5563            | 1/2  | 13              |     | 3             | H3    |
| L3565         | L4565      | L5565            |      |                 |     | 3             | H5    |
| L3583         | L4583      | L5583            |      |                 | 20  | 3             | H3    |
| L3585         | L4585      | L5585            |      |                 |     | 3             | H5    |
| L3605         | L4605      | L5605            | 9/16 | 12              |     | 3             | H5    |
| L3625         | L4625      | L5625            |      |                 | 18  | 3             | H5    |
| L3643         | L4643      | L5643            | 5/8  | 11              |     | 3             | H3    |
| L3645         | L4645      | L5645            |      |                 |     | 3             | H5    |
| L3703         | L4703      | L5703            | 3/4  | 10              |     | 3             | H3    |
| L3705         | L4705      | L5705            |      |                 |     | 3             | H5    |
| L3746         | L4746      | L5746            | 7/8  | 9               |     | 3             | H6    |
| L3766         | L4766      | L5766            |      |                 | 14  | 3             | H6    |
| L3786         | L4786      | L5786            | 1    | 8               |     | 3             | H6    |
| L3806         | L4806      | L5806            |      |                 | 12  | 3             | H6    |

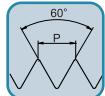
\* For tapping depth on DIN / ANSI shank Taps, refer to DIN Table on page 355 &amp; 356.

TAPS

**TAPS****TAPER PIPE TAPS : SPIRAL FLUTED****for Steels & Stainless Steels**

Q0/Q1/Q6

ANSI

**HSSE-V3****NPT/F**

| EDP No.          |                    |                       | Size    | Thread Per Inch | No. of Flutes |
|------------------|--------------------|-----------------------|---------|-----------------|---------------|
| Steam Oxide NPTF | Bright Finish NPTF | Hardslick Coated NPTF |         |                 |               |
| Q0020            | Q1020              | Q6020                 | 1/16    | 27              | 4             |
| Q0200            | Q1200              | Q6200                 | 1/8(Lg) | 27              | 4             |
| Q0210            | Q1210              | Q6210                 | 1/8(Sm) | 27              | 4             |
| Q0400            | Q1400              | Q6400                 | 1/4     | 18              | 4             |
| Q0480            | Q1480              | Q6480                 | 3/8     | 18              | 4             |
| Q0560            | Q1560              | Q6560                 | 1/2     | 14              | 4             |
| Q0700            | Q1700              | Q6700                 | 3/4     | 14              | 4             |
| Q0780            | Q1780              | Q6780                 | 1       | 11 1/2          | 4             |
| Q0860            | Q1860              | Q6860                 | 1 1/4   | 11 1/2          | 5             |
| Q0960            | Q1960              | Q6960                 | 1 1/2   | 11 1/2          | 7             |
| Q0D20            | Q1D20              | Q6D20                 | 2       | 11 1/2          | 7             |

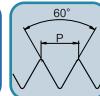
※ These Taps meet both NPT and NPTF Standards.

**TAPS**

**TAPS****TAPER PIPE TAPS : SPIRAL FLUTED****for Cast Irons & Steels**

HSSE-V3

NPT/F



Q9/R0/R1 / ANSI

| EDP No.       |            |                  | Size    | Thread Per Inch | No. of Flutes |
|---------------|------------|------------------|---------|-----------------|---------------|
| Bright Finish | TiN Coated | Hardslick Coated |         |                 |               |
| Q9020         | R0020      | R1020            | 1/16    | 27              | 4             |
| Q9200         | R0200      | R1200            | 1/8(Lg) | 27              | 4             |
| Q9210         | R0210      | R1210            | 1/8(Sm) | 27              | 4             |
| Q9400         | R0400      | R1400            | 1/4     | 18              | 4             |
| Q9480         | R0480      | R1480            | 3/8     | 18              | 4             |
| Q9560         | R0560      | R1560            | 1/2     | 14              | 4             |
| Q9700         | R0700      | R1700            | 3/4     | 14              | 4             |
| Q9780         | R0780      | R1780            | 1       | 11 1/2          | 4             |
| Q9860         | R0860      | R1860            | 1 1/4   | 11 1/2          | 5             |
| Q9960         | R0960      | R1960            | 1 1/2   | 11 1/2          | 7             |
| Q9D20         | R0D20      | R1D20            | 2       | 11 1/2          | 7             |

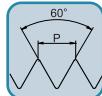
※ These Taps meet both NPT and NPTF Standards.

TAPS

**TAPS****TAPER PIPE TAPS : STRAIGHT FLUTED****for Cast Irons & Steels**

HSSE-V3

NPT/F



R7/R8/R9/S0

ANSI

| EDP No.       |            |                  |                      | Size    | Thread Per Inch | No. of Flutes |
|---------------|------------|------------------|----------------------|---------|-----------------|---------------|
| Bright Finish | TiN Coated | Hardslick Coated | Nitrided Steam Oxide |         |                 |               |
| R7020         | R8020      | R9020            | S0020                | 1/16    | 27              | 4             |
| R7200         | R8200      | R9200            | S0200                | 1/8(Lg) | 27              | 4             |
| R7210         | R8210      | R9210            | S0210                | 1/8(Sm) | 27              | 4             |
| R7400         | R8400      | R9400            | S0400                | 1/4     | 18              | 4             |
| R7480         | R8480      | R9480            | S0480                | 3/8     | 18              | 4             |
| R7560         | R8560      | R9560            | S0560                | 1/2     | 14              | 4             |
| R7700         | R8700      | R9700            | S0700                | 3/4     | 14              | 5             |
| R7780         | R8780      | R9780            | S0780                | 1       | 11*1/2          | 5             |
| R7860         | R8860      | R9860            | S0860                | 1*1/4   | 11*1/2          | 5             |
| R7960         | R8960      | R9960            | S0960                | 1*1/2   | 11*1/2          | 7             |
| R7D20         | R8D20      | R9D20            | S0D20                | 2       | 11*1/2          | 7             |

※ These Taps meet both NPT and NPTF Standards.

TAPS

**TAPS****TAPER PIPE TAPS : INTTERUPTED NPT/F****for Cast Irons & Steels**

HSSE-V3

NPTF



S10/S27

ANSI

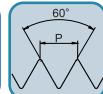
| EDP No.       |             | Size    | Thread Per Inch | No. of Flutes |
|---------------|-------------|---------|-----------------|---------------|
| Bright Finish | TiCN Coated |         |                 |               |
| S1020         | S2020       | 1/16    | 27              | 5             |
| S1200         | S2200       | 1/8(Lg) | 27              | 5             |
| S1210         | S2210       | 1/8(Sm) | 27              | 5             |
| S1400         | S2400       | 1/4     | 18              | 5             |
| S1480         | S2480       | 3/8     | 18              | 5             |
| S1560         | S2560       | 1/2     | 14              | 5             |
| S1700         | S2700       | 3/4     | 14              | 5             |
| S1780         | S2780       | 1"      | 11*1/2          | 5             |

※ These Taps meet NPTF Standards.

TAPS

**TAPS****FORMING TAPS PLUG & BOTTOMING STYLE****for Multi Purpose**

HSSE-V3

UNC  
UNF

Z0/Z1/Z2/Z3

ANSI

| Bright Finish Plug | TiN Coated Plug | EDP No.                 |                      | Size | Thread Per Inch |     | No. of Flutes | Limit |
|--------------------|-----------------|-------------------------|----------------------|------|-----------------|-----|---------------|-------|
|                    |                 | Bright Finish Bottoming | TiN Coated Bottoming |      | UNC             | UNF |               |       |
| Z0163              | Z1163           | Z2163                   | Z3163                | 4    | 40              |     | 4             | H3    |
| Z0165              | Z1165           | Z2165                   | Z3165                |      |                 |     | 4             | H5    |
| Z0185              | Z1185           | Z2185                   | Z3185                |      |                 | 48  | 4             | H5    |
| Z0203              | Z1203           | Z2203                   | Z3203                | 5    | 40              |     | 4             | H3    |
| Z0205              | Z1205           | Z2205                   | Z3205                |      |                 |     | 4             | H5    |
| Z0225              | Z1225           | Z2225                   | Z3225                |      |                 | 44  | 4             | H5    |
| Z0243              | Z1243           | Z2243                   | Z3243                | 6    | 32              |     | 4             | H3    |
| Z0245              | Z1245           | Z2245                   | Z3245                |      |                 |     | 4             | H5    |
| Z0265              | Z1265           | Z2265                   | Z3265                |      |                 | 40  | 4             | H5    |
| Z0283              | Z1283           | Z2283                   | Z3283                | 8    | 32              |     | 4             | H3    |
| Z0285              | Z1285           | Z2285                   | Z3285                |      |                 |     | 4             | H5    |
| Z0305              | Z1305           | Z2305                   | Z3305                |      |                 | 36  | 4             | H5    |
| Z0324              | Z1324           | Z2324                   | Z3324                | 10   | 24              |     | 4             | H4    |
| Z0326              | Z1326           | Z2326                   | Z3326                |      |                 |     | 4             | H6    |
| Z0344              | Z1344           | Z2344                   | Z3344                |      |                 | 32  | 4             | H4    |
| Z0346              | Z1346           | Z2346                   | Z3346                |      |                 |     | 4             | H6    |
| Z0404              | Z1404           | Z2404                   | Z3404                | 1/4  | 20              |     | 4             | H4    |
| Z0406              | Z1406           | Z2406                   | Z3406                |      |                 |     | 4             | H6    |
| Z0424              | Z1424           | Z2424                   | Z3424                |      |                 | 28  | 4             | H4    |
| Z0426              | Z1426           | Z2426                   | Z3426                |      |                 |     | 4             | H6    |
| Z0445              | Z1445           | Z2445                   | Z3445                | 5/16 | 18              |     | 4             | H5    |
| Z0447              | Z1447           | Z2447                   | Z3447                |      |                 |     | 4             | H7    |
| Z0465              | Z1465           | Z2465                   | Z3465                |      |                 | 24  | 4             | H5    |
| Z0467              | Z1467           | Z2467                   | Z3467                |      |                 |     | 4             | H7    |
| Z0485              | Z1485           | Z2485                   | Z3485                | 3/8  | 16              |     | 4             | H5    |
| Z0487              | Z1487           | Z2487                   | Z3487                |      |                 |     | 4             | H7    |
| Z0505              | Z1505           | Z2505                   | Z3505                |      |                 | 24  | 4             | H5    |
| Z0507              | Z1507           | Z2507                   | Z3507                |      |                 |     | 4             | H7    |
| Z0528              | Z1528           | Z2528                   | Z3528                | 7/16 | 14              |     | 4             | H8    |
| Z0548              | Z1548           | Z2548                   | Z3548                |      |                 | 20  | 4             | H8    |
| Z0568              | Z1568           | Z2568                   | Z3568                | 1/2  | 13              |     | 4             | H8    |
| Z0588              | Z1588           | Z2588                   | Z3588                |      |                 | 20  | 4             | H8    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS**

# FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE

**for Multi Purpose**

HSSE-V3

UNC  
UNF

Z4/Z5/Z6/Z7

ANSI

| Bright Finish Plug | TiN Coated Plug | EDP No.                 |                      | Size | Thread Per Inch |     | No. of Flutes | Limit |
|--------------------|-----------------|-------------------------|----------------------|------|-----------------|-----|---------------|-------|
|                    |                 | Bright Finish Bottoming | TiN Coated Bottoming |      | UNC             | UNF |               |       |
| Z4163              | Z5163           | Z6163                   | Z7163                | 4    | 40              |     | 4             | H3    |
| Z4165              | Z5165           | Z6165                   | Z7165                |      |                 |     | 4             | H5    |
| Z4185              | Z5185           | Z6185                   | Z7185                |      |                 | 48  | 4             | H5    |
| Z4203              | Z5203           | Z6203                   | Z7203                | 5    | 40              |     | 4             | H3    |
| Z4205              | Z5205           | Z6205                   | Z7205                |      |                 |     | 4             | H5    |
| Z4225              | Z5225           | Z6225                   | Z7225                |      |                 | 44  | 4             | H5    |
| Z4243              | Z5243           | Z6243                   | Z7243                | 6    | 32              |     | 4             | H3    |
| Z4245              | Z5245           | Z6245                   | Z7245                |      |                 |     | 4             | H5    |
| Z4265              | Z5265           | Z6265                   | Z7265                |      |                 | 40  | 4             | H5    |
| Z4283              | Z5283           | Z6283                   | Z7283                | 8    | 32              |     | 4             | H3    |
| Z4285              | Z5285           | Z6285                   | Z7285                |      |                 |     | 4             | H5    |
| Z4305              | Z5305           | Z6305                   | Z7305                |      |                 | 36  | 4             | H5    |
| Z4324              | Z5324           | Z6324                   | Z7324                | 10   | 24              |     | 4             | H4    |
| Z4326              | Z5326           | Z6326                   | Z7326                |      |                 |     | 4             | H6    |
| Z4344              | Z5344           | Z6344                   | Z7344                |      |                 | 32  | 4             | H4    |
| Z4346              | Z5346           | Z6346                   | Z7346                |      |                 |     | 4             | H6    |
| Z4404              | Z5404           | Z6404                   | Z7404                | 1/4  | 20              |     | 4             | H4    |
| Z4406              | Z5406           | Z6406                   | Z7406                |      |                 |     | 4             | H6    |
| Z4424              | Z5424           | Z6424                   | Z7424                |      |                 | 28  | 4             | H4    |
| Z4426              | Z5426           | Z6426                   | Z7426                |      |                 |     | 4             | H6    |
| Z4445              | Z5445           | Z6445                   | Z7445                | 5/16 | 18              |     | 4             | H5    |
| Z4447              | Z5447           | Z6447                   | Z7447                |      |                 |     | 4             | H7    |
| Z4465              | Z5465           | Z6465                   | Z7465                |      |                 | 24  | 4             | H5    |
| Z4467              | Z5467           | Z6467                   | Z7467                |      |                 |     | 4             | H7    |
| Z4485              | Z5485           | Z6485                   | Z7485                | 3/8  | 16              |     | 4             | H5    |
| Z4487              | Z5487           | Z6487                   | Z7487                |      |                 |     | 4             | H7    |
| Z4505              | Z5505           | Z6505                   | Z7505                |      |                 | 24  | 4             | H5    |
| Z4507              | Z5507           | Z6507                   | Z7507                |      |                 |     | 4             | H7    |
| Z4528              | Z5528           | Z6528                   | Z7528                | 7/16 | 14              |     | 4             | H8    |
| Z4548              | Z5548           | Z6548                   | Z7548                |      |                 | 20  | 4             | H8    |
| Z4568              | Z5568           | Z6568                   | Z7568                | 1/2  | 13              |     | 4             | H8    |
| Z4588              | Z5588           | Z6588                   | Z7588                |      |                 | 20  | 4             | H8    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

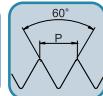
**TAPS**

# FORMING TAPS WITH OIL GROOVE PLUG & BOTTOMING STYLE

**for Multi Purpose**

HSSE-V3

M/MF



Z8/ZA/ZC

ANSI

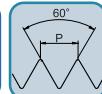
| EDP No.            |                         |                 |                      |                  |                       | Size | Pitch | No. of Flutes | Limit |
|--------------------|-------------------------|-----------------|----------------------|------------------|-----------------------|------|-------|---------------|-------|
| Bright Finish Plug | Bright Finish Bottoming | TiN Coated Plug | TiN Coated Bottoming | TiCN Coated Plug | TiCN Coated Bottoming |      |       |               |       |
| Z8205              | Z9205                   | ZA205           | ZB205                | ZC205            | ZD205                 | M3   | 0.5   | 4             | D5    |
| Z8246              | Z9246                   | ZA246           | ZB246                | ZC246            | ZD246                 | M4   | 0.7   | 4             | D6    |
| Z8287              | Z9287                   | ZA287           | ZB287                | ZC287            | ZD287                 | M5   | 0.8   | 4             | D7    |
| Z8318              | Z9318                   | ZA318           | ZB318                | ZC318            | ZD318                 | M6   | 1.0   | 4             | D8    |
| Z8369              | Z9369                   | ZA369           | ZB369                | ZC369            | ZD369                 | M8   | 1.25  | 4             | D9    |
| Z8420              | Z9420                   | ZA420           | ZB420                | ZC420            | ZD420                 | M10  | 1.5   | 4             | D10   |
| Z850A              | Z950A                   | ZA50A           | ZB50A                | ZC50A            | ZD50A                 | M12  | 1.75  | 4             | D11   |

※ For tapping depth on ANSI length taps, refer to MCTI 302 on page357

TAPS

**TAPS****STANDARD TAPS : SPIRAL FLUTED BOTTOMING STYLE****for Multi Purpose**

HSSE-V3

UNC  
UNF

C2/C3/C4/D9 ANSI

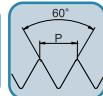
| Steam Oxide | EDP No.       |            |                  | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|---------------|------------|------------------|------|-----------------|-----|---------------|-------|
|             | Bright Finish | TiN Coated | Hardslick Coated |      | UNC             | UNF |               |       |
| C2162       | C3162         | C4162      | D9162            | 4    | 40              |     | 3             | H2    |
| C2202       | C3202         | C4202      | D9202            | 5    | 40              |     | 3             | H2    |
| C2243       | C3243         | C4243      | D9243            | 6    | 32              |     | 3             | H3    |
| C2283       | C3283         | C4283      | D9283            | 8    | 32              |     | 3             | H3    |
| C2323       | C3323         | C4323      | D9323            | 10   | 24              |     | 3             | H3    |
| C2343       | C3343         | C4343      | D9343            |      |                 | 32  | 3             | H3    |
| C2403       | C3403         | C4403      | D9403            | 1/4  | 20              |     | 3             | H3    |
| C2405       | C3405         | C4405      | D9405            |      |                 |     | 3             | H5    |
| C2423       | C3423         | C4423      | D9423            |      |                 | 28  | 3             | H3    |
| C2443       | C3443         | C4443      | D9443            | 5/16 | 18              |     | 3             | H3    |
| C2445       | C3445         | C4445      | D9445            |      |                 |     | 3             | H5    |
| C2463       | C3463         | C4463      | D9463            |      |                 | 24  | 3             | H3    |
| C2483       | C3483         | C4483      | D9483            | 3/8  | 16              |     | 3             | H3    |
| C2485       | C3485         | C4485      | D9485            |      |                 |     | 3             | H5    |
| C2503       | C3503         | C4503      | D9503            |      |                 | 24  | 3             | H3    |
| C2523       | C3523         | C4523      | D9523            | 7/16 | 14              |     | 3             | H3    |
| C2525       | C3525         | C4525      | D9525            |      |                 |     | 3             | H5    |
| C2543       | C3543         | C4543      | D9543            |      |                 | 20  | 3             | H3    |
| C2545       | C3545         | C4545      | D9545            |      |                 |     | 3             | H5    |
| C2563       | C3563         | C4563      | D9563            | 1/2  | 13              |     | 3             | H3    |
| C2565       | C3565         | C4565      | D9565            |      |                 |     | 3             | H5    |
| C2583       | C3583         | C4583      | D9583            |      |                 | 20  | 3             | H3    |
| C2585       | C3585         | C4585      | D9585            |      |                 |     | 3             | H5    |
| C2605       | C3605         | C4605      | D9605            | 9/16 | 12              |     | 3             | H5    |
| C2625       | C3625         | C4625      | D9625            |      |                 | 18  | 3             | H5    |
| C2643       | C3643         | C4643      | D9643            | 5/8  | 11              |     | 4             | H3    |
| C2645       | C3645         | C4645      | D9645            |      |                 |     | 4             | H5    |
| C2663       | C3663         | C4663      | D9663            |      |                 | 18  | 4             | H3    |
| C2703       | C3703         | C4703      | D9703            | 3/4  | 10              |     | 4             | H3    |
| C2705       | C3705         | C4705      | D9705            |      |                 |     | 4             | H5    |
| C2723       | C3723         | C4723      | D9723            |      |                 | 16  | 4             | H3    |
| C2744       | C3744         | C4744      | D9744            | 7/8  | 9               |     | 4             | H4    |
| C2766       | C3766         | C4766      | D9766            |      |                 | 14  | 4             | H6    |
| C2784       | C3784         | C4784      | D9784            | 1    | 8               |     | 4             | H4    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****STANDARD TAPS : SPIRAL POINTED PLUG STYLE****for Multi Purpose**

HSSE-V3

UNC  
UNF

I9/J0/J1

ANSI

| Steam Oxide | Bright Finish | EDP No.    |                  | Size | Thread Per Inch |     | No. of Flutes | Limit |
|-------------|---------------|------------|------------------|------|-----------------|-----|---------------|-------|
|             |               | TiN Coated | Hardslick Coated |      | UNC             | UNF |               |       |
| I9082       | J0082         | J1082      | J7082            | 2    | 56              |     | 2             | H2    |
| I9162       | J0162         | J1162      | J7162            | 4    | 40              |     | 2             | H2    |
| I9202       | J0202         | J1202      | J7202            | 5    | 40              |     | 2             | H2    |
| I9243       | J0243         | J1243      | J7243            | 6    | 32              |     | 2             | H3    |
| I9283       | J0283         | J1283      | J7283            | 8    | 32              |     | 2             | H3    |
| I9323       | J0323         | J1323      | J7323            | 10   | 24              |     | 2             | H3    |
| I9343       | J0343         | J1343      | J7343            |      |                 | 32  | 2             | H3    |
| I9403       | J0403         | J1403      | J7403            | 1/4  | 20              |     | 2             | H3    |
| I9405       | J0405         | J1405      | J7405            |      |                 |     | 2             | H5    |
| I9423       | J0423         | J1423      | J7423            |      |                 | 28  | 2             | H3    |
| I9443       | J0443         | J1443      | J7443            | 5/16 | 18              |     | 2             | H3    |
| I9445       | J0445         | J1445      | J7445            |      |                 |     | 2             | H5    |
| I9463       | J0463         | J1463      | J7463            |      |                 | 24  | 2             | H3    |
| I9483       | J0483         | J1483      | J7483            | 3/8  | 16              |     | 3             | H3    |
| I9485       | J0485         | J1485      | J7485            |      |                 |     | 3             | H5    |
| I9503       | J0503         | J1503      | J7503            |      |                 | 24  | 3             | H3    |
| I9523       | J0523         | J1523      | J7523            | 7/16 | 14              |     | 3             | H3    |
| I9525       | J0525         | J1525      | J7525            |      |                 |     | 3             | H5    |
| I9543       | J0543         | J1543      | J7543            |      |                 | 20  | 3             | H3    |
| I9545       | J0545         | J1545      | J7545            |      |                 |     | 3             | H5    |
| I9563       | J0563         | J1563      | J7563            | 1/2  | 13              |     | 3             | H3    |
| I9565       | J0565         | J1565      | J7565            |      |                 |     | 3             | H5    |
| I9583       | J0583         | J1583      | J7583            |      |                 | 20  | 3             | H3    |
| I9585       | J0585         | J1585      | J7585            |      |                 |     | 3             | H5    |
| I9603       | J0603         | J1603      | J7603            | 9/16 | 12              |     | 3             | H3    |
| I9625       | J0625         | J1625      | J7625            |      |                 | 18  | 3             | H5    |
| I9643       | J0643         | J1643      | J7643            | 5/8  | 11              |     | 3             | H3    |
| I9645       | J0645         | J1645      | J7645            |      |                 |     | 3             | H5    |
| I9665       | J0665         | J1665      | J7665            |      |                 | 18  | 3             | H5    |
| I9703       | J0703         | J1703      | J7703            | 3/4  | 10              |     | 3             | H3    |
| I9705       | J0705         | J1705      | J7705            |      |                 |     | 3             | H5    |
| I9725       | J0725         | J1725      | J7725            |      |                 | 16  | 3             | H5    |
| I9744       | J0744         | J1744      | J7744            | 7/8  | 9               |     | 3             | H4    |
| I9766       | J0766         | J1766      | J7766            |      |                 | 14  | 3             | H6    |
| I9784       | J0784         | J1784      | J7784            | 1    | 8               |     | 3             | H4    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****HAND TAPS TAPER, PLUG & BOTTOMING STYLE****for Multi Purpose****HSS-V****UNC  
UNF**

A3/A5/A7 / ANSI

| Bright Finish Taper | Bright Finish Plug | Bright Finish Bottoming | Size | Thread Per Inch |     | No. of Flutes | Limit |
|---------------------|--------------------|-------------------------|------|-----------------|-----|---------------|-------|
|                     |                    |                         |      | UNC             | UNF |               |       |
| A3082               | A5082              | A7082                   | 2    | 56              |     | 3             | H2    |
| A3162               | A5162              | A7162                   | 4    | 40              |     | 3             | H2    |
| A3202               | A5202              | A7202                   | 5    | 40              |     | 3             | H2    |
| A3243               | A5243              | A7243                   | 6    | 32              |     | 3             | H3    |
| A3262               | A5262              | A7262                   |      |                 | 40  | 3             | H2    |
| A3283               | A5283              | A7283                   | 8    | 32              |     | 4             | H3    |
| A3323               | A5323              | A7323                   | 10   | 24              |     | 4             | H3    |
| A3343               | A5343              | A7343                   |      |                 | 32  | 4             | H3    |
| A3403               | A5403              | A7403                   | 1/4  | 20              |     | 4             | H3    |
| A3423               | A5423              | A7423                   |      |                 | 28  | 4             | H3    |
| A3443               | A5443              | A7443                   | 5/16 | 18              |     | 4             | H3    |
| A3463               | A5463              | A7463                   |      |                 | 24  | 4             | H3    |
| A3483               | A5483              | A7483                   | 3/8  | 16              |     | 4             | H3    |
| A3503               | A5503              | A7503                   |      |                 | 24  | 4             | H3    |
| A3523               | A5523              | A7523                   | 7/16 | 14              |     | 4             | H3    |
| A3543               | A5543              | A7543                   |      |                 | 20  | 4             | H3    |
| A3563               | A5563              | A7563                   | 1/2  | 13              |     | 4             | H3    |
| A3583               | A5583              | A7583                   |      |                 | 20  | 4             | H3    |
| A3603               | A5603              | A7603                   | 9/16 | 12              |     | 4             | H3    |
| A3623               | A5623              | A7623                   |      |                 | 18  | 4             | H3    |
| A3643               | A5643              | A7643                   | 5/8  | 11              |     | 4             | H3    |
| A3663               | A5663              | A7663                   |      |                 | 18  | 4             | H3    |
| A3703               | A5703              | A7703                   | 3/4  | 10              |     | 4             | H3    |
| A3723               | A5723              | A7723                   |      |                 | 16  | 4             | H3    |
| A3744               | A5744              | A7744                   | 7/8  | 9               |     | 4             | H4    |
| A3764               | A5764              | A7764                   |      |                 | 14  | 4             | H4    |
| A3784               | A5784              | A7784                   | 1    | 8               |     | 4             | H4    |
| A3804               | A5804              | A7804                   |      |                 | 12  | 4             | H4    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

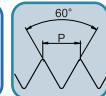
**TAPS**

# METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**for Steels & Stainless Steels up to 35HRC**

Super HSS

M MF



BH/BM

ANSI



BD/BO

DIN Length  
ANSI Shank

| EDP No.     |                  |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated |      |       |               |       |
| BH203       | BM203            | BD203       | BO203            | M3   | 0.5   | 3             | D3    |
| BH224       | BM224            | BD224       | BO224            | M3.5 | 0.6   | 3             | D4    |
| BH244       | BM244            | BD244       | BO244            | M4   | 0.7   | 3             | D4    |
| BH284       | BM284            | BD284       | BO284            | M5   | 0.8   | 3             | D4    |
| BH315       | BM315            | BD315       | BO315            | M6   | 1.0   | 3             | D5    |
| BH345       | BM345            | BD345       | BO345            | M7   | 1.0   | 3             | D5    |
| BH365       | BM365            | BD365       | BO365            | M8   | 1.25  | 3             | D5    |
| BH375       | BM375            | BD375       | BO375            | M8   | 1.0   | 3             | D5    |
| BH426       | BM426            | BD426       | BO426            | M10  | 1.5   | 3             | D6    |
| BH435       | BM435            | BD435       | BO435            | M10  | 1.25  | 3             | D5    |
| BH506       | BM506            | BD506       | BO506            | M12  | 1.75  | 3             | D6    |
| BH525       | BM525            | BD525       | BO525            | M12  | 1.25  | 3             | D5    |
| BH547       | BM547            | BD547       | BO547            | M14  | 2.0   | 3             | D7    |
| BH556       | BM556            | BD556       | BO556            | M14  | 1.5   | 3             | D6    |
| BH607       | BM607            | BD607       | BO607            | M16  | 2.0   | 3             | D7    |
| BH616       | BM616            | BD616       | BO616            | M16  | 1.5   | 3             | D6    |
| BH657       | BM657            | BD657       | BO657            | M18  | 2.5   | 4             | D7    |
| BH676       | BM676            | BD676       | BO676            | M18  | 1.5   | 4             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

**TAPS**

# METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**for Stainless Steels up to 28HRc**

HSSE-V3

M  
MF

BS/BT

ANSI



E6/E8/E9

DIN Length  
ANSI Shank

| EDP No.     |                  |             |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated |      |       |               |       |
| BS203       | BT203            | E6203       | E8203       | E9203            | M3   | 0.5   | 3             | D3    |
| BS224       | BT224            | E6224       | E8224       | E9224            | M3.5 | 0.6   | 3             | D4    |
| BS244       | BT244            | E6244       | E8244       | E9244            | M4   | 0.7   | 3             | D4    |
| BS284       | BT284            | E6284       | E8284       | E9284            | M5   | 0.8   | 3             | D4    |
| BS315       | BT315            | E6315       | E8315       | E9315            | M6   | 1.0   | 3             | D5    |
| BS345       | BT345            | E6345       | E8345       | E9345            | M7   | 1.0   | 3             | D5    |
| BS365       | BT365            | E6365       | E8365       | E9365            | M8   | 1.25  | 3             | D5    |
| BS375       | BT375            | E6375       | E8375       | E9375            | M8   | 1.0   | 3             | D5    |
| BS426       | BT426            | E6426       | E8426       | E9426            | M10  | 1.5   | 3             | D6    |
| BS435       | BT435            | E6435       | E8435       | E9435            | M10  | 1.25  | 3             | D5    |
| BS506       | BT506            | E6506       | E8506       | E9506            | M12  | 1.75  | 3             | D6    |
| BS525       | BT525            | E6525       | E8525       | E9525            | M12  | 1.25  | 3             | D5    |
| BS547       | BT547            | E6547       | E8547       | E9547            | M14  | 2.0   | 3             | D7    |
| BS556       | BT556            | E6556       | E8556       | E9556            | M14  | 1.5   | 3             | D6    |
| BS607       | BT607            | E6607       | E8607       | E9607            | M16  | 2.0   | 3             | D7    |
| BS616       | BT616            | E6616       | E8616       | E9616            | M16  | 1.5   | 3             | D6    |
| BS657       | BT657            | E6657       | E8657       | E9657            | M18  | 2.5   | 4             | D7    |
| BS676       | BT676            | E6676       | E8676       | E9676            | M18  | 1.5   | 4             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

※ Tapping depth for DIN and ANSI style are the same, refer to MCTI table 302

TAPS

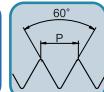


# METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**Steels up to 35HRC**

HSSE-V3

M  
MF



BU/BV    ANSI



E2/E4/E5    DIN Length  
ANSI Shank

| EDP No.     |                  |             |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated |      |       |               |       |
| BU203       | BV203            | E2203       | E4203       | E5203            | M3   | 0.5   | 3             | D3    |
| BU224       | BV224            | E2224       | E4224       | E5224            | M3.5 | 0.6   | 3             | D4    |
| BU244       | BV244            | E2244       | E4244       | E5244            | M4   | 0.7   | 3             | D4    |
| BU284       | BV284            | E2284       | E4284       | E5284            | M5   | 0.8   | 3             | D4    |
| BU315       | BV315            | E2315       | E4315       | E5315            | M6   | 1.0   | 3             | D5    |
| BU345       | BV345            | E2345       | E4345       | E5345            | M7   | 1.0   | 3             | D5    |
| BU365       | BV365            | E2365       | E4365       | E5365            | M8   | 1.25  | 3             | D5    |
| BU375       | BV375            | E2375       | E4375       | E5375            | M8   | 1.0   | 3             | D5    |
| BU426       | BV426            | E2426       | E4426       | E5426            | M10  | 1.5   | 3             | D6    |
| BU435       | BV435            | E2435       | E4435       | E5435            | M10  | 1.25  | 3             | D5    |
| BU506       | BV506            | E2506       | E4506       | E5506            | M12  | 1.75  | 3             | D6    |
| BU525       | BV525            | E2525       | E4525       | E5525            | M12  | 1.25  | 3             | D5    |
| BU547       | BV547            | E2547       | E4547       | E5547            | M14  | 2.0   | 3             | D7    |
| BU556       | BV556            | E2556       | E4556       | E5556            | M14  | 1.5   | 3             | D6    |
| BU607       | BV607            | E2607       | E4607       | E5607            | M16  | 2.0   | 3             | D7    |
| BU616       | BV616            | E2616       | E4616       | E5616            | M16  | 1.5   | 3             | D6    |
| BU657       | BV657            | E2657       | E4657       | E5657            | M18  | 2.5   | 4             | D7    |
| BU676       | BV676            | E2676       | E4676       | E5676            | M18  | 1.5   | 4             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

**TAPS**

# METRIC SPIRAL FLUTED TAPS MODIFIED BOTTOMING STYLE

**for Aluminium Alloys or Die Cast Aluminium**

HSSE-V3

M  
MF

BW/BX / ANSI

F1/F3 / DIN Length  
ANSI Shank

| EDP No.       |                  |               |                  | Size | Pitch | No. of Flutes | Limit |
|---------------|------------------|---------------|------------------|------|-------|---------------|-------|
| Bright Finish | Hardslick Coated | Bright Finish | Hardslick Coated |      |       |               |       |
| BW203         | BX203            | F1203         | F3203            | M3   | 0.5   | 2             | D3    |
| BW244         | BX244            | F1244         | F3244            | M4   | 0.7   | 2             | D4    |
| BW285         | BX285            | F1285         | F3285            | M5   | 0.8   | 2             | D5    |
| BW315         | BX315            | F1315         | F3315            | M6   | 1.0   | 2             | D5    |
| BW365         | BX365            | F1365         | F3365            | M8   | 1.25  | 2             | D5    |
| BW426         | BX426            | F1426         | F3426            | M10  | 1.5   | 2             | D6    |
| BW435         | BX435            | F1435         | F3435            | M10  | 1.25  | 2             | D5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS



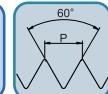
# METRIC SPIRAL FLUTED TAPS BOTTOMING STYLE

**for Multi Purpose**



HSS-V

M  
MF



G4/G5/G6

ANSI

| EDP No.       |             |                  | Size | Pitch | No. of Flutes | Limit |
|---------------|-------------|------------------|------|-------|---------------|-------|
| Bright Finish | TiCN Coated | Hardslick Coated |      |       |               |       |
| G4203         | G5203       | G6203            | M3   | 0.5   | 2             | D3    |
| G4224         | G5224       | G6224            | M3.5 | 0.6   | 2             | D4    |
| G4244         | G5244       | G6244            | M4   | 0.7   | 3             | D4    |
| G4284         | G5284       | G6284            | M5   | 0.8   | 3             | D4    |
| G4315         | G5315       | G6315            | M6   | 1.0   | 3             | D5    |
| G4345         | G5345       | G6345            | M7   | 1.0   | 3             | D5    |
| G4365         | G5365       | G6365            | M8   | 1.25  | 3             | D5    |
| G4375         | G5375       | G6375            | M8   | 1.0   | 3             | D5    |
| G4426         | G5426       | G6426            | M10  | 1.5   | 3             | D6    |
| G4435         | G5435       | G6435            | M10  | 1.25  | 3             | D5    |
| G4506         | G5506       | G6506            | M12  | 1.75  | 3             | D6    |
| G4525         | G5525       | G6525            | M12  | 1.25  | 3             | D5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

**TAPS****METRIC SPIRAL POINTED TAPS PLUG STYLE****for Steels & Stainless Steels up to 35HRc**

Super HSS

M  
MF

N7/N8

ANSI



N3/O3

DIN Length  
ANSI Shank

| EDP No.     |                  |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | Hardslick Coated |      |       |               |       |
| N7203       | N8203            | N3203       | O3203            | M3   | 0.5   | 3             | D3    |
| N7224       | N8224            | N3224       | O3224            | M3.5 | 0.6   | 3             | D4    |
| N7244       | N8244            | N3244       | O3244            | M4   | 0.7   | 3             | D4    |
| N7284       | N8284            | N3284       | O3284            | M5   | 0.8   | 3             | D4    |
| N7315       | N8315            | N3315       | O3315            | M6   | 1.0   | 3             | D5    |
| N7345       | N8345            | N3345       | O3345            | M7   | 1.0   | 3             | D5    |
| N7365       | N8365            | N3365       | O3365            | M8   | 1.25  | 3             | D5    |
| N7375       | N8375            | N3375       | O3375            | M8   | 1.0   | 3             | D5    |
| N7426       | N8426            | N3426       | O3426            | M10  | 1.5   | 3             | D6    |
| N7435       | N8435            | N3435       | O3435            | M10  | 1.25  | 3             | D5    |
| N7506       | N8506            | N3506       | O3506            | M12  | 1.75  | 3             | D6    |
| N7525       | N8525            | N3525       | O3525            | M12  | 1.25  | 3             | D5    |
| N7547       | N8547            | N3547       | O3547            | M14  | 2.0   | 3             | D7    |
| N7556       | N8556            | N3556       | O3556            | M14  | 1.5   | 3             | D6    |
| N7607       | N8607            | N3607       | O3607            | M16  | 2.0   | 3             | D7    |
| N7616       | N8616            | N3616       | O3616            | M16  | 1.5   | 3             | D6    |
| N7657       | N8657            | N3657       | O3657            | M18  | 2.5   | 3             | D7    |
| N7676       | N8676            | N3676       | O3676            | M18  | 1.5   | 3             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 &amp; 356.

TAPS

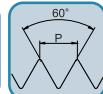


# METRIC SPIRAL POINTED TAPS PLUG STYLE

**for Stainless Steels up to 28HRC**

HSSE-V3

M  
MF



O9/IA    ANSI



K3/K5/K6    DIN Length  
ANSI Shank

| EDP No.     |                  |             |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated |      |       |               |       |
| O9203       | IA203            | K3203       | K5203       | K6203            | M3   | 0.5   | 3             | D3    |
| O9224       | IA224            | K3224       | K5224       | K6224            | M3.5 | 0.6   | 3             | D4    |
| O9244       | IA244            | K3244       | K5244       | K6244            | M4   | 0.7   | 3             | D4    |
| O9284       | IA284            | K3284       | K5284       | K6284            | M5   | 0.8   | 3             | D4    |
| O9315       | IA315            | K3315       | K5315       | K6315            | M6   | 1.0   | 3             | D5    |
| O9345       | IA345            | K3345       | K5345       | K6345            | M7   | 1.0   | 3             | D5    |
| O9365       | IA365            | K3365       | K5365       | K6365            | M8   | 1.25  | 3             | D5    |
| O9375       | IA375            | K3375       | K5375       | K6375            | M8   | 1.0   | 3             | D5    |
| O9426       | IA426            | K3426       | K5426       | K6426            | M10  | 1.5   | 3             | D6    |
| O9435       | IA435            | K3435       | K5435       | K6435            | M10  | 1.25  | 3             | D5    |
| O9506       | IA506            | K3506       | K5506       | K6506            | M12  | 1.75  | 3             | D6    |
| O9525       | IA525            | K3525       | K5525       | K6525            | M12  | 1.25  | 3             | D5    |
| O9547       | IA547            | K3547       | K5547       | K6547            | M14  | 2.0   | 3             | D7    |
| O9556       | IA556            | K3556       | K5556       | K6556            | M14  | 1.5   | 3             | D6    |
| O9607       | IA607            | K3607       | K5607       | K6607            | M16  | 2.0   | 3             | D7    |
| O9616       | IA616            | K3616       | K5616       | K6616            | M16  | 1.5   | 3             | D6    |
| O9657       | IA657            | K3657       | K5657       | K6657            | M18  | 2.5   | 3             | D7    |
| O9676       | IA676            | K3676       | K5676       | K6676            | M18  | 1.5   | 3             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 & 356.

TAPS

**TAPS****METRIC SPIRAL POINTED TAPS PLUG STYLE****Steels up to 35HRc**

HSSE-V3

M  
MF

IB/IC

ANSI



J9/K7/K2

DIN Length  
ANSI Shank

| EDP No.     |                  |             |             |                  | Size | Pitch | No. of Flutes | Limit |
|-------------|------------------|-------------|-------------|------------------|------|-------|---------------|-------|
| Steam Oxide | Hardslick Coated | Steam Oxide | TiCN Coated | Hardslick Coated |      |       |               |       |
| IB203       | IC203            | J9203       | K7203       | K2203            | M3   | 0.5   | 3             | D3    |
| IB224       | IC224            | J9224       | K7224       | K2224            | M3.5 | 0.6   | 3             | D4    |
| IB244       | IC244            | J9244       | K7244       | K2244            | M4   | 0.7   | 3             | D4    |
| IB284       | IC284            | J9284       | K7284       | K2284            | M5   | 0.8   | 3             | D4    |
| IB315       | IC315            | J9315       | K7315       | K2315            | M6   | 1.0   | 3             | D5    |
| IB345       | IC345            | J9345       | K7345       | K2345            | M7   | 1.0   | 3             | D5    |
| IB365       | IC365            | J9365       | K7365       | K2365            | M8   | 1.25  | 3             | D5    |
| IB375       | IC375            | J9375       | K7375       | K2375            | M8   | 1.0   | 3             | D5    |
| IB426       | IC426            | J9426       | K7426       | K2426            | M10  | 1.5   | 3             | D6    |
| IB435       | IC435            | J9435       | K7435       | K2435            | M10  | 1.25  | 3             | D5    |
| IB506       | IC506            | J9506       | K7506       | K2506            | M12  | 1.75  | 3             | D6    |
| IB525       | IC525            | J9525       | K7525       | K2525            | M12  | 1.25  | 3             | D5    |
| IB547       | IC547            | J9547       | K7547       | K2547            | M14  | 2.0   | 3             | D7    |
| IB556       | IC556            | J9556       | K7556       | K2556            | M14  | 1.5   | 3             | D6    |
| IB607       | IC607            | J9607       | K7607       | K2607            | M16  | 2.0   | 3             | D7    |
| IB616       | IC616            | J9616       | K7616       | K2616            | M16  | 1.5   | 3             | D6    |
| IB657       | IC657            | J9657       | K7657       | K2657            | M18  | 2.5   | 4             | D7    |
| IB676       | IC676            | J9676       | K7676       | K2676            | M18  | 1.5   | 4             | D6    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

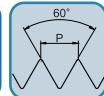
\* For tapping depth on DIN / ANSI Shank Taps, refer to DIN Table on page 355 &amp; 356.

TAPS

**TAPS****METRIC SPIRAL POINTED TAPS PLUG STYLE****for Multi Purpose**

L7/L8/L9

ANSI

**HSS-V****M  
MF**

| EDP No.       |             |                  | Size | Pitch | No. of Flutes | Limit |
|---------------|-------------|------------------|------|-------|---------------|-------|
| Bright Finish | TiCN Coated | Hardslick Coated |      |       |               |       |
| L7203         | L8203       | L9203            | M3   | 0.5   | 2             | D3    |
| L7224         | L8224       | L9224            | M3.5 | 0.6   | 2             | D4    |
| L7244         | L8244       | L9244            | M4   | 0.7   | 2             | D4    |
| L7284         | L8284       | L9284            | M5   | 0.8   | 2             | D4    |
| L7315         | L8315       | L9315            | M6   | 1.0   | 3             | D5    |
| L7345         | L8345       | L9345            | M7   | 1.0   | 3             | D5    |
| L7365         | L8365       | L9365            | M8   | 1.25  | 3             | D5    |
| L7375         | L8375       | L9375            | M8   | 1.0   | 3             | D5    |
| L7426         | L8426       | L9426            | M10  | 1.5   | 3             | D6    |
| L7435         | L8435       | L9435            | M10  | 1.25  | 3             | D5    |
| L7506         | L8506       | L9506            | M12  | 1.75  | 3             | D6    |
| L7525         | L8525       | L9525            | M12  | 1.25  | 3             | D5    |

\* For tapping depth on ANSI Length Taps, refer to MCTI 302 on page 357.

TAPS

# TECHNICAL INFORMATION

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## DIMENSIONS

HIGH PERFORMANCE TAPS  
DIN LENGTH ANSI SHANK TAPS  
MCTI TABLE 302

## TAP RECOMMENDATION

## THREAD LIMITS

## TAP DRILL SIZES

## CONVERSION TABLE

## TROUBLE SHOOTING GUIDE



| Size    | Metric Size | Overall Length | Thread Length |      |       |      | Square Length | Shank Diameter | Size of Square |
|---------|-------------|----------------|---------------|------|-------|------|---------------|----------------|----------------|
|         |             |                | SP            | SF   | M-SP  | M-SF |               |                |                |
| 4       | —           | 1*7/8          | .335          | .236 | —     | —    | 3/16          | .141           | .110           |
| 5       | M3          | 1*15/16        | .374          | .236 | .374  | .197 | 3/16          | .141           | .110           |
| 6       | M3.5        | 2              | .413          | .276 | .413  | .276 | 3/16          | .141           | .110           |
| 8       | M4          | 2*1/8          | .453          | .276 | .453  | .276 | 1/4           | .168           | .131           |
| 10-24   | M5          | 2*3/8          | .531          | .354 | .531  | .354 | 1/4           | .194           | .152           |
| 10-32   | —           | 2*3/8          | .531          | .276 | —     | —    | 1/4           | .194           | .152           |
| 12-24   | —           | 2*3/8          | .571          | .354 | —     | —    | 9/32          | .220           | .165           |
| 12-28   | —           | 2*3/8          | .571          | .276 | —     | —    | 9/32          | .220           | .165           |
| 1/4-20  | M6          | 2*1/2          | .591          | .433 | .591  | .433 | 5/16          | .255           | .191           |
| 1/4-28  | —           | 2*1/2          | .591          | .354 | —     | —    | 5/16          | .255           | .191           |
| 5/16-18 | M7          | 2*23/32        | .669          | .472 | .669  | .433 | 3/8           | .318           | .238           |
| 5/16-24 | M8          | 2*23/32        | .669          | .394 | .669  | .472 | 3/8           | .318           | .238           |
| 3/8-16  | M10×1.5     | 2*15/16        | .748          | .551 | .748  | .512 | 7/16          | .381           | .286           |
| 3/8-24  | M10×1.25    | 2*15/16        | .748          | .394 | .748  | .472 | 7/16          | .381           | .286           |
| 7/16-14 | —           | 3*5/32         | .866          | .591 | —     | —    | 13/32         | .323           | .242           |
| 7/16-20 | —           | 3*5/32         | .866          | .472 | —     | —    | 13/32         | .323           | .242           |
| 1/2-13  | M12×1.75    | 3*3/8          | .984          | .630 | .984  | .591 | 7/16          | .367           | .275           |
| 1/2-20  | M12×1.25    | 3*3/8          | .984          | .472 | .984  | .551 | 7/16          | .367           | .275           |
| 9/16-12 | M14×2.0     | 3*19/32        | .984          | .709 | .984  | .709 | 1/2           | .429           | .322           |
| 9/16-18 | M14×1.5     | 3*19/32        | .984          | .512 | .984  | .551 | 1/2           | .429           | .322           |
| 5/8-11  | M16×2.0     | 3*13/16        | 1.083         | .748 | 1.083 | .709 | 9/16          | .480           | .360           |
| 5/8-18  | M16×1.5     | 3*13/16        | 1.083         | .512 | 1.083 | .551 | 9/16          | .480           | .360           |
| —       | M18×2.5     | 4*1/32         | —             | —    | 1.083 | .787 | 5/8           | .542           | .406           |
| —       | M18×1.5     | 4*1/32         | —             | —    | 1.083 | .551 | 5/8           | .542           | .406           |
| 3/4-10  | —           | 4*1/4          | 1.201         | .827 | —     | —    | 11/16         | .590           | .442           |
| 3/4-16  | —           | 4*1/4          | 1.201         | .591 | —     | —    | 11/16         | .590           | .442           |
| 7/8-9   | —           | 4*11/16        | 1.339         | .827 | —     | —    | 3/4           | .697           | .523           |
| 7/8-14  | —           | 4*11/16        | 1.339         | .709 | —     | —    | 3/4           | .697           | .523           |
| 1-8     | —           | 5*1/8          | 1.496         | .984 | —     | —    | 13/16         | .800           | .600           |
| 1-12    | —           | 5*1/8          | 1.496         | .709 | —     | —    | 13/16         | .800           | .600           |

\* SP : Spiral Pointed Taps

\* SF : Spiral Fluted Taps

\* M-SP: Metric Spiral Pointed Taps

\* M-SF: Metric Spiral Fluted Taps

# HIGH PERFORMANCE TAPS (HSS-V)

## GENERAL DIMENSIONS

| Size    | Metric Size | Overall Length | Thread Length |         |        |        | Square Length | Shank Diameter | Size of Square |
|---------|-------------|----------------|---------------|---------|--------|--------|---------------|----------------|----------------|
|         |             |                | SP            | SF      | M-SP   | M-SF   |               |                |                |
| 4       | —           | 1*7/8          | 5/16          | 5/16    | —      | —      | 3/16          | .141           | .110           |
| 5       | M3          | 1*15/16        | 5/16          | 5/16    | 5/16   | 5/16   | 3/16          | .141           | .110           |
| 6       | M3.5        | 2              | 3/8           | 3/8     | 3/8    | 3/8    | 3/16          | .141           | .110           |
| 8       | M4          | 2*1/8          | 3/8           | 3/8     | 3/8    | 3/8    | 1/4           | .168           | .131           |
| 10-24   | M5          | 2*3/8          | 1/2           | 1/2     | 1/2    | 1/2    | 1/4           | .194           | .152           |
| 10-32   | —           | 2*3/8          | 1/2           | 1/2     | —      | —      | 1/4           | .194           | .152           |
| 12-24   | —           | 2*3/8          | 1/2           | 1/2     | —      | —      | 9/32          | .220           | .165           |
| 12-28   | —           | 2*3/8          | 1/2           | 1/2     | —      | —      | 9/32          | .220           | .165           |
| 1/4-20  | M6          | 2*1/2          | 5/8           | 5/8     | 5/8    | 5/8    | 5/16          | .255           | .191           |
| 1/4-28  | —           | 2*1/2          | 5/8           | 5/8     | —      | —      | 5/16          | .255           | .191           |
| 5/16-18 | M7          | 2*23/32        | 11/16         | 11/16   | 11/16  | 11/16  | 3/8           | .318           | .238           |
| 5/16-24 | M8          | 2*23/32        | 11/16         | 11/16   | 11/16  | 11/16  | 3/8           | .318           | .238           |
| 3/8-16  | M10×1.5     | 2*15/16        | 3/4           | 3/4     | 3/4    | 3/4    | 7/16          | .381           | .286           |
| 3/8-24  | M10×1.25    | 2*15/16        | 3/4           | 3/4     | 3/4    | 3/4    | 7/16          | .381           | .286           |
| 7/16-14 | —           | 3*5/32         | 7/8           | 7/8     | —      | —      | 13/32         | .323           | .242           |
| 7/16-20 | —           | 3*5/32         | 7/8           | 7/8     | —      | —      | 13/32         | .323           | .242           |
| 1/2-13  | M12×1.75    | 3*3/8          | 15/16         | 15/16   | 15/16  | 15/16  | 7/16          | .367           | .275           |
| 1/2-20  | M12×1.25    | 3*3/8          | 15/16         | 15/16   | 15/16  | 15/16  | 7/16          | .367           | .275           |
| 9/16-12 | M14×2.0     | 3*19/32        | 1             | 1       | 1      | 1      | 1/2           | .429           | .322           |
| 9/16-18 | M14×1.5     | 3*19/32        | 1             | 1       | 1      | 1      | 1/2           | .429           | .322           |
| 5/8-11  | M16×2.0     | 3*13/16        | 1*3/32        | 1*3/32  | 1*3/32 | 1*3/32 | 9/16          | .480           | .360           |
| 5/8-18  | M16×1.5     | 3*13/16        | 1*3/32        | 1*3/32  | 1*3/32 | 1*3/32 | 9/16          | .480           | .360           |
| —       | M18×2.5     | 4*1/32         | —             | —       | 1*3/32 | 1*3/32 | 5/8           | .542           | .406           |
| —       | M18×1.5     | 4*1/32         | —             | —       | 1*3/32 | 1*3/32 | 5/8           | .542           | .406           |
| 3/4-10  | —           | 4*1/4          | 1*7/32        | 1*7/32  | —      | —      | 11/16         | .590           | .442           |
| 3/4-16  | —           | 4*1/4          | 1*7/32        | 1*7/32  | —      | —      | 11/16         | .590           | .442           |
| 7/8-9   | —           | 4*11/16        | 1*11/32       | 1*11/32 | —      | —      | 3/4           | .697           | .523           |
| 7/8-14  | —           | 4*11/16        | 1*11/32       | 1*11/32 | —      | —      | 3/4           | .697           | .523           |
| 1-8     | —           | 5*1/8          | 1*1/2         | 1*1/2   | —      | —      | 13/16         | .800           | .600           |
| 1-12    | —           | 5*1/8          | 1*1/2         | 1*1/2   | —      | —      | 13/16         | .800           | .600           |

\* SP : Spiral Pointed Taps

\* SF : Spiral Fluted Taps

\* M-SP: Metric Spiral Pointed Taps

\* M-SF: Metric Spiral Fluted Taps



## HIGH PERFORMANCE DIN LENGTH ANSI SHANK TAPS (HSSE-V3) DIMENSIONS

| Size    | Metric Size | Overall Length | Thread Length |      |       |      | Square Length | Shank Diameter | Size of Square |
|---------|-------------|----------------|---------------|------|-------|------|---------------|----------------|----------------|
|         |             |                | SP            | SF   | M-SP  | M-SF |               |                |                |
| 4       | —           | 2.205          | .335          | .236 | —     | —    | 3/16          | .141           | .110           |
| 5       | M3          | 2.205          | .374          | .236 | .374  | .197 | 3/16          | .141           | .110           |
| 6       | M3.5        | 2.205          | .413          | .276 | .413  | .276 | 3/16          | .141           | .110           |
| 8       | M4          | 2.480          | .453          | .276 | .453  | .276 | 1/4           | .168           | .131           |
| 10-24   | M5          | 2.756          | .531          | .354 | .531  | .354 | 1/4           | .194           | .152           |
| 10-32   | —           | 2.756          | .531          | .276 | —     | —    | 1/4           | .194           | .152           |
| 12-24   | —           | 3.150          | .571          | .354 | —     | —    | 9/32          | .220           | .165           |
| 12-28   | —           | 3.150          | .571          | .276 | —     | —    | 9/32          | .220           | .165           |
| 1/4-20  | M6          | 3.150          | .591          | .433 | .591  | .433 | 5/16          | .255           | .191           |
| 1/4-28  | —           | 3.150          | .591          | .354 | —     | —    | 5/16          | .255           | .191           |
| 5/16-18 | —           | 3.543          | .669          | .472 | —     | —    | 3/8           | .318           | .238           |
| 5/16-24 | M8          | 3.543          | .669          | .394 | .669  | .472 | 3/8           | .318           | .238           |
| 3/8-16  | M10×1.5     | 3.937          | .748          | .551 | .748  | .512 | 7/16          | .381           | .286           |
| 3/8-24  | M10×1.25    | 3.937          | .748          | .394 | .748  | .472 | 7/16          | .381           | .286           |
| 7/16-14 | —           | 3.937          | .866          | .591 | —     | —    | 13/32         | .323           | .242           |
| 7/16-20 | —           | 3.937          | .866          | .472 | —     | —    | 13/32         | .323           | .242           |
| 1/2-13  | M12×1.75    | 4.331          | .984          | .630 | .984  | .591 | 7/16          | .367           | .275           |
| 1/2-20  | M12×1.25    | 3.937          | .984          | .472 | .984  | .551 | 7/16          | .367           | .275           |
| 9/16-12 | M14×2.0     | 4.331          | .984          | .709 | .984  | .709 | 1/2           | .429           | .322           |
| 9/16-18 | M14×1.5     | 3.937          | .984          | .512 | .984  | .551 | 1/2           | .429           | .322           |
| 5/8-11  | M16×2.0     | 4.331          | 1.083         | .748 | 1.083 | .709 | 9/16          | .480           | .360           |
| 5/8-18  | M16×1.5     | 3.937          | 1.083         | .512 | 1.083 | .551 | 9/16          | .480           | .360           |
| —       | M18×2.5     | 4.921          | —             | —    | 1.083 | .787 | 5/8           | .542           | .406           |
| —       | M18×1.5     | 4.331          | —             | —    | 1.083 | .551 | 5/8           | .542           | .406           |
| 3/4-10  | —           | 4.921          | 1.201         | .827 | —     | —    | 11/16         | .590           | .442           |
| 3/4-16  | —           | 4.331          | 1.201         | .591 | —     | —    | 11/16         | .590           | .442           |
| 7/8-9   | —           | 5.512          | 1.339         | .827 | —     | —    | 3/4           | .697           | .523           |
| 7/8-14  | —           | 4.921          | 1.339         | .709 | —     | —    | 3/4           | .697           | .523           |
| 1-8     | —           | 6.299          | 1.496         | .984 | —     | —    | 13/16         | .800           | .600           |
| 1-12    | —           | 5.512          | 1.496         | .709 | —     | —    | 13/16         | .800           | .600           |

\* Maximum tapping depth = Thread length unless shank diameter is smaller than minor diameter

\* SP : Spiral Pointed Taps

\* SF : Spiral Fluted Taps

\* M-SP: Metric Spiral Pointed Taps

\* M-SF: Metric Spiral Fluted Taps

TAPS

**TAPS**

# HIGH PERFORMANCE DIN LENGTH ANSI SHANK TAPS (HSS-V) DIMENSIONS

| Size    | Metric Size | Overall Length | Thread Length |         |        |        | Square Length | Shank Diameter | Size of Square |
|---------|-------------|----------------|---------------|---------|--------|--------|---------------|----------------|----------------|
|         |             |                | SP            | SF      | M-SP   | M-SF   |               |                |                |
| 4       | —           | 2.205          | 5/16          | 5/16    | —      | —      | 3/16          | .141           | .110           |
| 5       | M3          | 2.205          | 5/16          | 5/16    | 5/16   | 5/16   | 3/16          | .141           | .110           |
| 6       | M3.5        | 2.205          | 3/8           | 3/8     | 3/8    | 3/8    | 3/16          | .141           | .110           |
| 8       | M4          | 2.480          | 3/8           | 3/8     | 3/8    | 3/8    | 1/4           | .168           | .131           |
| 10-24   | M5          | 2.756          | 1/2           | 1/2     | 1/2    | 1/2    | 1/4           | .194           | .152           |
| 10-32   | —           | 2.756          | 1/2           | 1/2     | —      | —      | 1/4           | .194           | .152           |
| 12-24   | —           | 3.150          | 1/2           | 1/2     | —      | —      | 9/32          | .220           | .165           |
| 12-28   | —           | 3.150          | 1/2           | 1/2     | —      | —      | 9/32          | .220           | .165           |
| 1/4-20  | M6          | 3.150          | 5/8           | 5/8     | 5/8    | 5/8    | 5/16          | .255           | .191           |
| 1/4-28  | —           | 3.150          | 5/8           | 5/8     | —      | —      | 5/16          | .255           | .191           |
| 5/16-18 | —           | 3.543          | 11/16         | 11/16   | —      | —      | 3/8           | .318           | .238           |
| 5/16-24 | M8          | 3.543          | 11/16         | 11/16   | 11/16  | 11/16  | 3/8           | .318           | .238           |
| 3/8-16  | M10×1.5     | 3.937          | 3/4           | 3/4     | 3/4    | 3/4    | 7/16          | .381           | .286           |
| 3/8-24  | M10×1.25    | 3.937          | 3/4           | 3/4     | 3/4    | 3/4    | 7/16          | .381           | .286           |
| 7/16-14 | —           | 3.937          | 7/8           | 7/8     | —      | —      | 13/32         | .323           | .242           |
| 7/16-20 | —           | 3.937          | 7/8           | 7/8     | —      | —      | 13/32         | .323           | .242           |
| 1/2-13  | M12×1.75    | 4.331          | 15/16         | 15/16   | 15/16  | 15/16  | 7/16          | .367           | .275           |
| 1/2-20  | M12×1.25    | 3.937          | 15/16         | 15/16   | 15/16  | 15/16  | 7/16          | .367           | .275           |
| 9/16-12 | M14×2.0     | 4.331          | 1             | 1       | 1      | 1      | 1/2           | .429           | .322           |
| 9/16-18 | M14×1.5     | 3.937          | 1             | 1       | 1      | 1      | 1/2           | .429           | .322           |
| 5/8-11  | M16×2.0     | 4.331          | 1*3/32        | 1*3/32  | 1*3/32 | 1*3/32 | 9/16          | .480           | .360           |
| 5/8-18  | M16×1.5     | 3.937          | 1*3/32        | 1*3/32  | 1*3/32 | 1*3/32 | 9/16          | .480           | .360           |
| —       | M18×2.5     | 4.921          | —             | —       | 1*3/32 | 1*3/32 | 5/8           | .542           | .406           |
| —       | M18×1.5     | 4.331          | —             | —       | 1*3/32 | 1*3/32 | 5/8           | .542           | .406           |
| 3/4-10  | —           | 4.921          | 1*7/32        | 1*7/32  | —      | —      | 11/16         | .590           | .442           |
| 3/4-16  | —           | 4.331          | 1*7/32        | 1*7/32  | —      | —      | 11/16         | .590           | .442           |
| 7/8-9   | —           | 5.512          | 1*11/32       | 1*11/32 | —      | —      | 3/4           | .697           | .523           |
| 7/8-14  | —           | 4.921          | 1*11/32       | 1*11/32 | —      | —      | 3/4           | .697           | .523           |
| 1-8     | —           | 6.299          | 1*1/2         | 1*1/2   | —      | —      | 13/16         | .800           | .600           |
| 1-12    | —           | 5.512          | 1*1/2         | 1*1/2   | —      | —      | 13/16         | .800           | .600           |

\* Maximum tapping depth = Thread length unless shank diameter is smaller than minor diameter

\* SP : Spiral Pointed Taps

\* SF : Spiral Fluted Taps

\* M-SP: Metric Spiral Pointed Taps

\* M-SF: Metric Spiral Fluted Taps

TAPS

**TAPS**

## MCTI TABLE 302 GENERAL DIMENSIONS

| Size   | Metric Size | Overall Length | Thread Length | Square Length | Shank Diameter | Size of Square |
|--------|-------------|----------------|---------------|---------------|----------------|----------------|
| 4      | —           | 1*7/8          | 9/16          | 3/16          | .141           | .110           |
| 5      | M3          | 1*15/16        | 5/8           | 3/16          | .141           | .110           |
| 6      | M3.5        | 2              | 11/16         | 3/16          | .141           | .110           |
| 8      | M4          | 2*1/8          | 3/4           | 1/4           | .168           | .131           |
| 10     | M5          | 2*3/8          | 7/8           | 1/4           | .194           | .152           |
| 12     | —           | 2*3/8          | 15/16         | 9/32          | .220           | .165           |
| 1/4    | M6          | 2*1/2          | 1             | 5/16          | .255           | .191           |
| 5/16   | M7          | 2*23/32        | 1*1/8         | 3/8           | .318           | .238           |
| 3/8    | M10         | 2*15/16        | 1*1/4         | 7/16          | .381           | .286           |
| 7/16   | —           | 3*5/32         | 1*7/16        | 13/32         | .323           | .242           |
| 1/2    | M12         | 3*3/8          | 1*21/32       | 7/16          | .367           | .275           |
| 9/16   | M14         | 3*19/32        | 1*21/32       | 1/2           | .429           | .322           |
| 5/8    | M16         | 3*13/16        | 1*13/16       | 9/16          | .480           | .360           |
| 11/16  | M18         | 4*1/32         | 1*13/16       | 5/8           | .542           | .406           |
| 3/4    | —           | 4*1/4          | 2             | 11/16         | .590           | .442           |
| 13/16  | M20         | 4*15/32        | 2             | 11/16         | .652           | .489           |
| 7/8    | M22         | 4*11/16        | 2*7/32        | 3/4           | .697           | .523           |
| 15/16  | M24         | 4*29/32        | 2*7/32        | 3/4           | .760           | .570           |
| 1      | M25         | 5*1/8          | 2*1/2         | 13/16         | .800           | .600           |
| 1*1/16 | M27         | 5*1/8          | 2*1/2         | 7/8           | .896           | .672           |
| 1*1/8  | —           | 5*7/16         | 2*9/16        | 7/8           | .896           | .672           |
| 1*3/16 | M30         | 5*7/16         | 2*9/16        | 1             | 1.021          | .766           |
| 1*1/4  | —           | 5*3/4          | 2*9/16        | 1             | 1.021          | .766           |
| 1*5/16 | M33         | 5*3/4          | 2*9/16        | 1*1/16        | 1.108          | .831           |
| 1*3/8  | —           | 6*1/16         | 3             | 1*1/16        | 1.108          | .831           |
| 1*7/16 | M36         | 6*1/16         | 3             | 1*1/8         | 1.233          | .925           |
| 1*1/2  | —           | 6*3/8          | 3             | 1*1/8         | 1.233          | .925           |

\* Maximum tapping depth = Thread length unless shank diameter is smaller than minor diameter

**TAPS**

## TAPER PIPE TAPS GENERAL DIMENSIONS

| Size    | Overall Length | Thread Length | Square Length | Shank Diameter | Size of Square |
|---------|----------------|---------------|---------------|----------------|----------------|
| 1/16    | 2*1/8          | 11/16         | 3/8           | .3125          | .234           |
| 1/8(sm) | 2*1/8          | 3/4           | 3/8           | .3125          | .234           |
| 1/8(Lg) | 2*1/8          | 3/4           | 3/8           | .4375          | .328           |
| 1/4     | 2*7/16         | 1*1/16        | 7/16          | .5625          | .421           |
| 3/8     | 2*9/16         | 1*1/16        | 1/2           | .7000          | .531           |
| 1/2     | 3*1/8          | 1*3/8         | 5/8           | .6875          | .515           |
| 3/4     | 3*1/4          | 1*3/8         | 11/16         | .9063          | .679           |
| 1       | 3*3/4          | 1*3/4         | 13/16         | 1.1250         | .843           |
| 1*1/4   | 4              | 1*3/4         | 15/16         | 1.3125         | .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          |

TAPS



## TAP RECOMMENDATIONS

### Unified Thread, Machine Screw Size

| Size | Threads per Inch |     | Recommended Tap for Class of Thread |         |          |          | Pitch Diameter Limits for Class of Thread |            |            |             |             |
|------|------------------|-----|-------------------------------------|---------|----------|----------|---|------------|------------|-------------|-------------|
|      | UNC              | UNF | Class 2                             | Class 3 | Class 2B | Class 3B | Min. All Class(Basic)                     | Max Class2 | Max Class3 | Max Class2B | Max Class3B |
| 0    |                  | 80  | GH1                                 | GH1     | GH2      | GH1      | .0519                                     | .0536      | .0532      | .0542       | .0536       |
| 1    | 64               | 72  | GH1                                 | GH1     | GH2      | GH1      | .0629                                     | .0648      | .0643      | .0655       | .0648       |
|      |                  |     | GH1                                 | GH1     | GH2      | GH1      | .0640                                     | .0658      | .0653      | .0665       | .0659       |
| 2    | 56               | 64  | GH1                                 | GH1     | GH2      | GH1      | .0744                                     | .0764      | .0759      | .0772       | .0765       |
|      |                  |     | GH1                                 | GH1     | GH2      | GH1      | .0759                                     | .0778      | .0773      | .0786       | .0779       |
| 3    | 48               | 56  | GH1                                 | GH1     | GH2      | GH1      | .0855                                     | .0877      | .0871      | .0885       | .0877       |
|      |                  |     | GH1                                 | GH1     | GH2      | GH1      | .0874                                     | .0894      | .8890      | .0902       | .0895       |
| 4    | 40               | 48  | GH2                                 | GH1     | GH2      | GH2      | .0958                                     | .0982      | .0975      | .0991       | .0982       |
|      |                  |     | GH1                                 | GH1     | GH2      | GH1      | .0985                                     | .1007      | .1001      | .1016       | .1008       |
| 5    | 40               | 44  | GH2                                 | GH1     | GH2      | GH2      | .1088                                     | .1112      | .1105      | .1121       | .1113       |
|      |                  |     | GH1                                 | GH1     | GH2      | GH1      | .1102                                     | .1125      | .1118      | .1134       | .1126       |
| 6    | 32               | 40  | GH2                                 | GH1     | GH3      | GH2      | .1177                                     | .1204      | .1196      | .1214       | .1204       |
|      |                  |     | GH2                                 | GH1     | GH2      | GH2      | .1218                                     | .1242      | .1235      | .1252       | .1243       |
| 8    | 32               | 36  | GH2                                 | GH1     | GH3      | GH2      | .1437                                     | .1464      | .1456      | .1475       | .1465       |
|      |                  |     | GH2                                 | GH1     | GH2      | GH2      | .1460                                     | .1485      | .1478      | .1496       | .1487       |
| 10   | 24               | 32  | GH3                                 | GH1     | GH3      | GH3      | .1629                                     | .1662      | .1653      | .1672       | .1661       |
|      |                  |     | GH2                                 | GH1     | GH3      | GH2      | .1697                                     | .1724      | .1716      | .1736       | .1726       |
| 12   | 24               | 28  | GH3                                 | GH1     | GH3      | GH3      | .1889                                     | .1922      | .1913      | .1933       | .1922       |
|      |                  |     | GH3                                 | GH1     | GH3      | GH3      | .1928                                     | .1959      | .1950      | .1970       | .1959       |

### Unified Thread, Fractional Size

| Size | Threads per Inch |     | Recommended Tap for Class of Thread |         |          |          | Pitch Diameter Limits for Class of Thread |            |            |             |             |
|------|------------------|-----|-------------------------------------|---------|----------|----------|---|------------|------------|-------------|-------------|
|      | UNC              | UNF | Class 2                             | Class 3 | Class 2B | Class 3B | Min. All Class(Basic)                     | Max Class2 | Max Class3 | Max Class2B | Max Class3B |
| 1/4  | 20               | 28  | GH3                                 | GH2     | GH5      | GH3      | .2175                                     | .2211      | .2201      | .2223       | .2211       |
|      |                  |     | GH3                                 | GH1     | GH4      | GH3      | .2268                                     | .2299      | .2290      | .2311       | .2300       |
| 5/16 | 18               | 24  | GH3                                 | GH2     | GH5      | GH3      | .2764                                     | .2805      | .2794      | .2817       | .2803       |
|      |                  |     | GH3                                 | GH1     | GH4      | GH3      | .2854                                     | .2887      | .2878      | .2902       | .2890       |
| 3/8  | 16               | 24  | GH3                                 | GH2     | GH5      | GH3      | .3344                                     | .3389      | .3376      | .3401       | .3387       |
|      |                  |     | GH3                                 | GH1     | GH4      | GH3      | .3479                                     | .3512      | .3503      | .3528       | .3516       |
| 7/16 | 14               | 20  | GH5                                 | GH3     | GH5      | GH3      | .3911                                     | .3960      | .3947      | .3972       | .3957       |
|      |                  |     | GH3                                 | GH1     | GH5      | GH3      | .4050                                     | .4086      | .4076      | .4104       | .4091       |
| 1/2  | 13               | 20  | GH5                                 | GH3     | GH5      | GH3      | .4500                                     | .4552      | .4537      | .4565       | .4548       |
|      |                  |     | GH3                                 | GH1     | GH5      | GH3      | .4675                                     | .4711      | .4701      | .4731       | .4717       |
| 9/16 | 12               | 18  | GH5                                 | GH3     | GH5      | GH3      | .5084                                     | .5140      | .5124      | .5152       | .5135       |
|      |                  |     | GH3                                 | GH2     | GH5      | GH3      | .5264                                     | .5305      | .5294      | .5323       | .5308       |
| 5/8  | 11               | 18  | GH5                                 | GH3     | GH5      | GH3      | .5660                                     | .5719      | .5702      | .5732       | .5714       |
|      |                  |     | GH3                                 | GH2     | GH5      | GH3      | .5889                                     | .5930      | .5919      | .5949       | .5934       |
| 3/4  | 10               | 16  | GH5                                 | GH3     | GH5      | GH3      | .6850                                     | .6914      | .6895      | .6927       | .6907       |
|      |                  |     | GH3                                 | GH2     | GH5      | GH3      | .7094                                     | .7139      | .7126      | .7159       | .7143       |
| 7/8  | 9                | 14  | GH6                                 | GH4     | GH6      | GH4      | .8028                                     | .8098      | .8077      | .8110       | .8089       |
|      |                  |     | GH4                                 | GH2     | GH6      | GH4      | .8286                                     | .8335      | .8322      | .8356       | .8339       |
| 1    | 8                | 12  | GH6                                 | GH4     | GH6      | GH4      | .9188                                     | .9264      | .9242      | .9276       | .9254       |
|      |                  |     | GH4                                 | GH2     | GH6      | GH4      | .9459                                     | .9515      | .9499      | .9535       | .9516       |

The above recommended taps normally produce the class of thread indicated in average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gage fit in the work, a choice of some other limit tap will be necessary.

**Unified Thread, Machine Screw Size - Ground Thread**

| Size | Thread per Inch |     |     | Major Diameter(Inches) |       |       | Basic Pitch Dia. | Pitch Diameter Limits(Inches) |       |       |          |       |       |          |       |      |
|------|-----------------|-----|-----|------------------------|-------|-------|------------------|-------------------------------|-------|-------|----------|-------|-------|----------|-------|------|
|      | UNC             | UNF | UNS | Basic                  | Min.  | Max.  |                  | H1 Limit                      | Min.  | Max.  | H2 Limit | Min.  | Max.  | H3 Limit | Min.  | Max. |
| 0    | —               | 80  | —   | .0600                  | .0605 | .0615 | .0519            | .0519                         | .0524 | .0524 | .0529    | —     | —     | —        | —     | —    |
| 1    | 64              | —   | —   | .0730                  | .0735 | .0745 | .0629            | .0629                         | .0634 | .0634 | .0639    | —     | —     | —        | —     | —    |
|      | —               | 72  | —   | .0730                  | .0735 | .0745 | .0640            | .0640                         | .0645 | .0645 | .0650    | —     | —     | —        | —     | —    |
| 2    | 56              | —   | —   | .0860                  | .0865 | .0875 | .0744            | .0744                         | .0749 | .0749 | .0754    | —     | —     | —        | —     | —    |
|      | —               | 64  | —   | .0860                  | .0865 | .0875 | .0759            | —                             | —     | .0764 | .0769    | —     | —     | —        | —     | —    |
| 3    | 48              | —   | —   | .0990                  | .0100 | .1010 | .0855            | .0855                         | .0860 | .0860 | .0865    | —     | —     | —        | —     | —    |
|      | —               | 56  | —   | .0990                  | .0995 | .1005 | .0874            | .0874                         | .0879 | .0879 | .0884    | —     | —     | —        | —     | —    |
| 4    | —               | —   | 36  | .1120                  | .1135 | .1145 | .0940            | —                             | —     | .0945 | .0950    | —     | —     | —        | —     | —    |
|      | 40              | —   | —   | .1120                  | .1135 | .1145 | .0958            | .0958                         | .0963 | .0963 | .0968    | —     | —     | —        | —     | —    |
|      | —               | 48  | —   | .1120                  | .1130 | .1140 | .0985            | .0985                         | .0990 | .0990 | .0995    | —     | —     | —        | —     | —    |
| 5    | 40              | —   | —   | .1250                  | .1265 | .1275 | .1088            | .1088                         | .1093 | .1093 | .1098    | —     | —     | —        | —     | —    |
|      | —               | 44  | —   | .1250                  | .1260 | .1270 | .1102            | —                             | —     | .1107 | .1112    | —     | —     | —        | —     | —    |
| 6    | 32              | —   | —   | .1380                  | .1400 | .1410 | .1177            | .1177                         | .1182 | .1182 | .1187    | .1187 | .1192 | .1207    | .1212 | —    |
|      | —               | 40  | —   | .1380                  | .1395 | .1405 | .1218            | .1218                         | .1223 | .1223 | .1228    | —     | —     | —        | —     | —    |
| 8    | 32              | —   | —   | .1640                  | .1660 | .1670 | .1437            | .1437                         | .1442 | .1442 | .1447    | .1447 | .1452 | .1467    | .1472 | —    |
|      | —               | 36  | —   | .1640                  | .1655 | .1665 | .1460            | —                             | —     | .1465 | .1470    | —     | —     | —        | —     | —    |
| 10   | 24              | —   | —   | .1900                  | .1930 | .1940 | .1629            | .1629                         | .1634 | .1634 | .1639    | .1639 | .1644 | .1659    | .1664 | —    |
|      | —               | 32  | —   | .1900                  | .1920 | .1930 | .1697            | .1697                         | .1702 | .1702 | .1707    | .1707 | .1712 | .1727    | .1732 | —    |
| 12   | 24              | —   | —   | .2160                  | .2190 | .2200 | .1889            | —                             | —     | —     | —        | .1899 | .1904 | —        | —     | —    |
|      | —               | 28  | —   | .2160                  | .2185 | .2195 | .1928            | —                             | —     | —     | —        | .1938 | .1943 | —        | —     | —    |

**Lead Tolerance**

A maximum lead error of plus or minus .0005" in one inch of thread is permitted

**Pitch Diameter Limits**

H1 = Basic to basic plus .0005"

H2 = Basic plus .0005" to basic plus .001"

H3 = Basic plus .001" to basic plus .0015"

H7 = Basic plus .003" to basic plus .0035"

**Angle Tolerance**

20 to 80 threads per inch incl. = 30' plus or minus in 1/2 angle.

**Unified Thread, Fractional Size - Ground Thread**

| Size  | Thread per Inch |     |     | Major Diameter (Inches) |        |        | Pitch Diameter Limits(Inches) |          |       |          |       |          |       |          |       |          |       |          |       |   |
|-------|-----------------|-----|-----|-------------------------|--------|--------|-------------------------------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|---|
|       | UNC             | UNF | UNS | Basic                   | Min.   | Max.   | Basic Pitch Dia.              | H1 Limit |       | H2 Limit |       | H3 Limit |       | H4 Limit |       | H5 Limit |       | H6 Limit |       |   |
|       |                 |     |     |                         |        |        |                               | Min.     | Max.  |   |
| 1/4   | 20              | —   | —   | .2500                   | .2540  | .2550  | .2175                         | .2175    | .2180 | .2180    | .2185 | .2185    | .2190 | —        | —     | .2195    | .2200 | —        | —     |   |
| 5/16  | —               | 28  | —   | .2500                   | .2525  | .2535  | .2268                         | .2268    | .2273 | .2273    | .2278 | .2278    | .2283 | .2283    | .2288 | —        | —     | —        | —     |   |
|       | 18              | —   | —   | .3125                   | .3170  | .3180  | .2764                         | .2764    | .2769 | .2769    | .2774 | .2774    | .2779 | —        | —     | .2784    | .2789 | —        | —     |   |
| 3/8   | —               | 24  | —   | .3125                   | .3155  | .3165  | .2854                         | .2854    | .2859 | .2859    | .2864 | .2864    | .2869 | .2869    | .2874 | —        | —     | —        | —     |   |
|       | 16              | —   | —   | .3750                   | .3800  | .3810  | .3344                         | .3344    | .3349 | .3349    | .3354 | .3354    | .3359 | —        | —     | .3364    | .3369 | —        | —     |   |
| 7/16  | —               | 24  | —   | .3750                   | .3780  | .3790  | .3479                         | .3479    | .3484 | .3484    | .3489 | .3489    | .3494 | .3494    | .3499 | —        | —     | —        | —     |   |
|       | 14              | —   | —   | .4375                   | .4435  | .4445  | .3911                         | —        | —     | .3916    | .3921 | .3921    | .3926 | —        | —     | .3931    | .3936 | —        | —     |   |
| 1/2   | —               | 20  | —   | .4375                   | .4415  | .4425  | .4050                         | —        | —     | —        | —     | .4060    | .4060 | .4065    | —     | —        | .4070 | .4075    | —     | — |
|       | 13              | —   | —   | .5000                   | .5065  | .5075  | .4500                         | .4500    | .4505 | .4505    | .4510 | .4510    | .4515 | —        | —     | .4520    | .4525 | —        | —     |   |
| 9/16  | —               | 20  | —   | .5000                   | .5040  | .5050  | .4675                         | .4675    | .4680 | .4680    | .4685 | .4685    | .4690 | —        | —     | .4695    | .4700 | —        | —     |   |
|       | 12              | —   | —   | .5625                   | .5690  | .5700  | .5084                         | —        | —     | .5089    | .5094 | .5094    | .5099 | —        | —     | .5104    | .5109 | —        | —     |   |
| 5/8   | —               | 18  | —   | .5625                   | .5670  | .5680  | .5264                         | —        | —     | .5269    | .5274 | .5274    | .5279 | —        | —     | .5284    | .5289 | —        | —     |   |
|       | 11              | —   | —   | .6250                   | .6320  | .6330  | .5660                         | —        | —     | .5665    | .5670 | .5670    | .5675 | —        | —     | .5680    | .5685 | —        | —     |   |
| 11/16 | —               | —   | 11  | .6250                   | .6295  | .6305  | .5889                         | —        | —     | .5894    | .5899 | .5899    | .5904 | —        | —     | .5909    | .5914 | —        | —     |   |
|       | —               | —   | 16  | .6875                   | .6925  | .6935  | .6469                         | —        | —     | —        | —     | .6479    | .6484 | —        | —     | —        | —     | —        | —     |   |
| 3/4   | 10              | —   | —   | .7500                   | .7525  | .7590  | .6850                         | .6850    | .6855 | .6855    | .6860 | .6860    | .6865 | —        | —     | .6870    | .6875 | —        | —     |   |
|       | —               | 16  | —   | .7500                   | .7550  | .7560  | .7094                         | .7094    | .7099 | .7099    | .7104 | .7104    | .7109 | —        | —     | .7114    | .7119 | —        | —     |   |
| 7/8   | 9               | —   | —   | .8750                   | .8835  | .8850  | .8028                         | —        | —     | —        | —     | —        | —     | .8043    | .8048 | —        | —     | .8053    | .8058 |   |
|       | —               | 14  | —   | .8750                   | .8810  | .8820  | .8286                         | —        | —     | .8291    | .8296 | —        | —     | .8301    | .8306 | —        | —     | .8311    | .8318 |   |
| 1     | 8               | —   | —   | 1.0000                  | 1.0095 | 1.0110 | .9188                         | —        | —     | .9193    | .9198 | —        | —     | .9203    | .9208 | —        | —     | .9213    | .9218 |   |
|       | —               | 12  | —   | 1.0000                  | 1.0065 | 1.0075 | .9459                         | —        | —     | —        | —     | —        | —     | .9474    | .9479 | —        | —     | —        | —     |   |
|       | —               | —   | 14  | 1.0000                  | 1.0060 | 1.0070 | .9536                         | —        | —     | —        | —     | —        | —     | .9551    | .9556 | —        | —     | —        | —     |   |

**Lead Tolerance**

A maximum lead error of plus or minus .0005" in one inch of thread is permitted

**Pitch Diameter Limits**

H1 = Basic to basic plus .0005"

H2 = Basic plus .0005" to basic plus .001"

H3 = Basic plus .001" to basic plus .0015"

H4 = Basic plus .0015" to basic plus .0020"

H5 = Basic plus .0020" to basic plus .0025"

H6 = Basic plus .0025" to basic plus .0030"

**Angle Tolerance**

| Threads per Inch | Error in Half Angle |
|------------------|---------------------|
| 6 to 9 Incl.     | 25' Plus or Minus   |
| 10 to 28 Incl.   | 30' Plus or Minus   |

**Metric Thread - Ground Thread**

| Size | Pitch  |      | Major Diameter(Inches) |       |       | Basic Pitch Dia. | Pitch Diameter Limits(Inches) |       |          |       |          |       |          |       |  |
|------|--------|------|------------------------|-------|-------|------------------|-------------------------------|-------|----------|-------|----------|-------|----------|-------|--|
|      | Coarse | Fine | Basic                  | Min.  | Max.  |                  | D2 Limit                      |       | D3 Limit |       | D4 Limit |       | D5 Limit |       |  |
|      |        |      |                        |       |       |                  | Min.                          | Max.  | Min.     | Max.  | Min.     | Max.  | Min.     | Max.  |  |
| M2   | 0.4    | —    | .078740                | .0801 | .0811 | .068511          | .0690                         | .0696 | .0695    | .0701 | .0700    | .0706 | —        | —     |  |
| M2.2 | 0.45   | —    | .086614                | .0881 | .0891 | .075107          | .0756                         | .0762 | .0761    | .0767 | .0766    | .0772 | —        | —     |  |
| M2.3 | 0.4    | —    | .090551                | .0919 | .0929 | .080322          | .0808                         | .0814 | .0813    | .0819 | .0818    | .0824 | —        | —     |  |
| M2.6 | 0.45   | —    | .102362                | .1038 | .1048 | .090855          | .0913                         | .0919 | .0918    | .0924 | .0923    | .0929 | —        | —     |  |
| M3   | 0.5    | —    | .118110                | .1198 | .1208 | .105324          | .1058                         | .1064 | .1063    | .1069 | .1068    | .1074 | .1073    | .1079 |  |
|      | —      | 0.35 | .118110                | .1193 | .1203 | .109160          | .1096                         | .1102 | .1101    | .1107 | .1106    | .1112 | .1111    | .1117 |  |
| M3.5 | 0.6    | —    | .137795                | .1397 | .1407 | .122452          | .1227                         | .1235 | .1232    | .1240 | .1237    | .1245 | .1242    | .1250 |  |
|      | —      | 0.35 | .137795                | .1389 | .1399 | .128845          | .1293                         | .1299 | .1298    | .1304 | .1303    | .1309 | .1308    | .1314 |  |
| M4   | 0.7    | —    | .157480                | .1597 | .1613 | .139580          | .1398                         | .1406 | .1403    | .1411 | .1408    | .1416 | .1413    | .1421 |  |
|      | —      | 0.5  | .157480                | .1591 | .1601 | .144694          | .1451                         | .1457 | .1456    | .1462 | .1461    | .1467 | .1466    | .1472 |  |
| M5   | 0.8    | —    | .196850                | .1994 | .2010 | .176393          | .1766                         | .1774 | .1771    | .1779 | .1776    | .1784 | .1781    | .1789 |  |
|      | —      | 0.5  | .196850                | .1985 | .1995 | .184064          | .1845                         | .1851 | .1850    | .1856 | .1855    | .1861 | .1861    | .1866 |  |
| M6   | 1      | —    | .236220                | .2395 | .2411 | .210648          | .2107                         | .2117 | .2112    | .2122 | .2117    | .2127 | .2122    | .2132 |  |
|      | —      | 0.75 | .236220                | .2387 | .2403 | .217041          | .2173                         | .2181 | .2178    | .2186 | .2183    | .2191 | .2188    | .2196 |  |
| M7   | 1      | —    | .275590                | .2788 | .2804 | .250018          | .2501                         | .2511 | .2506    | .2516 | .2511    | .2521 | .2516    | .2526 |  |
|      | —      | 0.75 | .275590                | .2780 | .2796 | .256411          | .2565                         | .2575 | .2570    | .2580 | .2575    | .2585 | .2580    | .2590 |  |
| M8   | 1.25   | —    | .314960                | .3189 | .3214 | .282995          | .2828                         | .2840 | .2833    | .2845 | .2838    | .2850 | .2843    | .2855 |  |
|      | —      | 1    | .314960                | .3182 | .3198 | .289388          | .2894                         | .2904 | .2899    | .2909 | .2904    | .2914 | .2909    | .2919 |  |
| M10  | 1.5    | —    | .393700                | .3984 | .4009 | .355343          | .3552                         | .3564 | .3557    | .3569 | .3562    | .3574 | .3567    | .3579 |  |
|      | —      | 1.25 | .393700                | .3976 | .4001 | .361735          | .3616                         | .3628 | .3621    | .3633 | .3626    | .3638 | .3631    | .3643 |  |
|      | —      | 1    | .393700                | .3969 | .3985 | .368128          | .3682                         | .3692 | .3687    | .3697 | .3692    | .3702 | .3697    | .3707 |  |
| M12  | 1.75   | —    | .472440                | .4780 | .4805 | .427690          | .4275                         | .4287 | .4280    | .4292 | .4285    | .4297 | .4290    | .4302 |  |
|      | —      | 1.5  | .472440                | .4772 | .4797 | .434083          | .4339                         | .4351 | .4344    | .4356 | .4349    | .4361 | .4354    | .4366 |  |
|      | —      | 1.25 | .472440                | .4764 | .4789 | .440475          | .4403                         | .4415 | .4408    | .4420 | .4413    | .4425 | .4418    | .4423 |  |
|      |        |      |                        |       |       |                  |                               |       |          |       |          |       |          | .4435 |  |

**Lead Tolerance**

The tap major and pitch diameter conversions have been rounded upward.

A maximum lead deviation of  $\pm 0.013\text{mm}$  within any two threads not further apart than 25mm is permitted.

**Angle Tolerance**

| Pitch(mm)              | Deviation in Half Angle |
|------------------------|-------------------------|
| Over 0.25 to 2.5 Incl. | 30' Plus or Minus       |
| Over 2.5 to 4.0 Incl.  | 25' Plus or Minus       |

## Metric Thread - Ground Thread

| Size | Pitch  |      | Major Diameter(Inches) |        |        | Basic Pitch Dia. | Pitch Diameter Limits(Inches) |        |          |        |          |        |          |        |  |
|------|--------|------|------------------------|--------|--------|------------------|-------------------------------|--------|----------|--------|----------|--------|----------|--------|--|
|      | Coarse | Fine | Basic                  | Min.   | Max.   |                  | D6 Limit                      |        | D7 Limit |        | D8 Limit |        | D9 Limit |        |  |
|      |        |      |                        |        |        |                  | Min.                          | Max.   | Min.     | Max.   | Min.     | Max.   | Min.     | Max.   |  |
| M14  | 2      | —    | .551180                | .5575  | .5600  | .500037          | .5015                         | .5031  | .5020    | .5036  | .5025    | .5041  | —        | —      |  |
|      | —      | 1.5  | .551180                | .5559  | .5584  | .512823          | .5147                         | .5159  | .5152    | .5164  | .5157    | .5169  | —        | —      |  |
|      | —      | 1.25 | .551180                | .5551  | .5576  | .519215          | .5211                         | .5223  | .5216    | .5228  | .5221    | .5233  | —        | —      |  |
| M16  | 2      | —    | .629920                | .6363  | .6388  | .578777          | .5802                         | .5818  | .5807    | .5823  | .5812    | .5828  | —        | —      |  |
|      | —      | 1.5  | .629920                | .6347  | .6372  | .591563          | .5934                         | .5946  | .5939    | .5951  | .5944    | .5956  | —        | —      |  |
| M18  | 2.5    | —    | .708660                | .7166  | .7191  | .644731          | .6462                         | .6478  | .6467    | .6483  | .6472    | .6488  | —        | —      |  |
|      | —      | 2    | .708660                | .7150  | .7175  | .657517          | .6590                         | .6606  | .6595    | .6611  | .6600    | .6616  | —        | —      |  |
|      | —      | 1.5  | .708660                | .7134  | .7159  | .670303          | .6722                         | .6734  | .6727    | .6739  | .6732    | .6744  | —        | —      |  |
| M20  | 2.5    | —    | .787400                | .7953  | .7976  | .723471          | .7249                         | .7265  | .7254    | .7270  | .7259    | .7275  | —        | —      |  |
|      | —      | 2    | .787400                | .7937  | .7962  | .736257          | .7377                         | .7393  | .7382    | .7398  | .7387    | .7403  | —        | —      |  |
|      | —      | 1.5  | .787400                | .7921  | .7946  | .749043          | .7509                         | .7521  | .7514    | .7526  | .7519    | .7531  | —        | —      |  |
|      | —      | 1    | .787400                | .7906  | .7922  | .761828          | .7639                         | .7649  | .7644    | .7654  | .7649    | .7659  | —        | —      |  |
| M22  | 2.5    | —    | .866140                | .8741  | .8766  | .802211          | .8037                         | .8053  | .8042    | .8058  | .8047    | .8063  | —        | —      |  |
|      | —      | 2    | .866140                | .8725  | .8750  | .814997          | .8164                         | .8180  | .8169    | .8185  | .8174    | .8190  | —        | —      |  |
|      | —      | 1.5  | .866140                | .8709  | .8734  | .827783          | .8296                         | .8308  | .8301    | .8313  | .8306    | .8318  | —        | —      |  |
|      | —      | 1    | .866140                | .8694  | .8710  | .840568          | .8426                         | .8436  | .8431    | .8441  | .8436    | .8446  | —        | —      |  |
| M24  | 3      | —    | .944880                | .9544  | .9583  | .868165          | .8696                         | .8712  | .8701    | .8717  | .8706    | .8722  | .8711    | .8727  |  |
|      | —      | 2    | .944880                | .9512  | .9537  | .893737          | .8952                         | .8968  | .8957    | .8973  | .8962    | .8978  | —        | —      |  |
|      | —      | 1.5  | .944880                | .9496  | .9521  | .906523          | .9084                         | .9096  | .9089    | .9101  | .9094    | .9106  | —        | —      |  |
|      | —      | 1    | .944880                | .9481  | .9497  | .919308          | .9214                         | .9224  | .9219    | .9229  | .9224    | .9234  | —        | —      |  |
| M27  | 3      | —    | 1.062990               | 1.0725 | 1.0764 | .986275          | .9873                         | .9893  | .9878    | .9898  | .9883    | .9903  | .9888    | .9908  |  |
|      | —      | 2    | 1.062990               | 1.0693 | 1.0718 | 1.011847         | 1.0133                        | 1.0149 | 1.0138   | 1.0154 | 1.0143   | 1.0159 | —        | —      |  |
|      | —      | 1.5  | 1.062990               | 1.0677 | 1.0702 | 1.024633         | 1.0265                        | 1.0277 | 1.0270   | 1.0282 | 1.0275   | 1.0287 | —        | —      |  |
|      | —      | 1    | 1.062990               | 1.0662 | 1.0678 | 1.037418         | 1.0393                        | 1.0405 | 1.0398   | 1.0410 | 1.0403   | 1.0415 | —        | —      |  |
| M28  | —      | 2    | 1.102360               | 1.1087 | 1.1112 | 1.051217         | 1.0527                        | 1.0543 | 1.0532   | 1.0548 | 1.0537   | 1.0553 | —        | —      |  |
|      | —      | 1.5  | 1.102360               | 1.1071 | 1.1096 | 1.064003         | 1.0659                        | 1.0671 | 1.0664   | 1.0676 | 1.0669   | 1.0681 | —        | —      |  |
|      | —      | 1    | 1.102360               | 1.1056 | 1.1072 | 1.076788         | 1.0786                        | 1.0798 | 1.0791   | 1.0803 | 1.0796   | 1.0808 | —        | —      |  |
| M30  | 3.5    | —    | 1.181100               | 1.1921 | 1.1961 | 1.091599         | 1.0926                        | 1.0946 | 1.0931   | 1.0951 | 1.0936   | 1.0956 | 1.0941   | 1.0961 |  |
|      | —      | 3    | 1.181100               | 1.1906 | 1.1945 | 1.104385         | 1.1054                        | 1.1074 | 1.1059   | 1.1079 | 1.1064   | 1.1084 | 1.1069   | 1.1089 |  |
|      | —      | 2    | 1.181100               | 1.1874 | 1.1899 | 1.129957         | 1.1314                        | 1.1330 | 1.1319   | 1.1335 | 1.1324   | 1.1340 | —        | —      |  |
|      | —      | 1.5  | 1.181100               | 1.1858 | 1.1883 | 1.142743         | 1.1446                        | 1.1458 | 1.1451   | 1.1463 | 1.1456   | 1.1468 | —        | —      |  |
| M33  | 3.5    | —    | 1.299210               | 1.3103 | 1.3142 | 1.209709         | 1.2108                        | 1.2128 | 1.2113   | 1.2133 | 1.2118   | 1.2138 | 1.2123   | 1.2143 |  |
|      | —      | 3    | 1.299210               | 1.3088 | 1.3127 | 1.222495         | 1.2235                        | 1.2255 | 1.2240   | 1.2260 | 1.2245   | 1.2265 | 1.2250   | 1.2270 |  |
|      | —      | 2    | 1.299210               | 1.3056 | 1.3081 | 1.248067         | 1.2495                        | 1.2511 | 1.2500   | 1.2516 | 1.2505   | 1.2521 | —        | —      |  |
|      | —      | 1.5  | 1.299210               | 1.3040 | 1.3065 | 1.260853         | 1.2627                        | 1.2639 | 1.2632   | 1.2644 | 1.2637   | 1.2649 | —        | —      |  |

| Size  | Threads Per Inch |     | Drills for Regular Taps |             |                           |                            | Drill for Forming Taps |
|-------|------------------|-----|-------------------------|-------------|---------------------------|----------------------------|------------------------|
|       | UNC              | UNF | Tap Drill               | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread | Drill for 65%          |
| 0     |                  | 80  | .3/64                   | .0469       | .0484                     | 71                         | 54 or 1.4mm            |
| 1     | 64               | 72  | .53                     | .0595       | .0610                     | 59                         | 51 or 1.7mm            |
| 2     | 56               | 64  | .50                     | .0700       | .0717                     | 62                         | 47 or 2.0mm            |
| 3     | 48               | 56  | .47                     | .0785       | .0804                     | 69                         | 2.3mm                  |
| 4     | 40               | 48  | .43                     | .0890       | .0910                     | 65                         | 39                     |
| 5     | 40               | 44  | .38                     | .1015       | .1038                     | 65                         | 33 or 2.9mm            |
| 6     | 32               | 40  | .36                     | .1065       | .1088                     | 72                         | 3.1mm                  |
| 8     | 32               | 36  | .29                     | .1360       | .1389                     | 62                         | 25 or 3.8mm            |
| 10    | 24               | 32  | .25                     | .1495       | .1527                     | 69                         | 11/64                  |
| 12    | 24               | 28  | .16                     | .1770       | .1805                     | 66                         | 9 or 5.0mm             |
| 1/4   | 20               | 28  | .07                     | .2010       | .2048                     | 70                         | 5.75mm                 |
| 5/16  | 18               | 24  | F                       | .2570       | .2608                     | 72                         | A                      |
| 3/8   | 16               | 24  | 1                       | .2720       | .2761                     | 67                         | .293                   |
| 7/16  | 14               | 20  | 5/16                    | .3125       | .3169                     | 72                         | S or 11/32mm           |
| 1/2   | 13               | 20  | Q                       | .3320       | .3364                     | 71                         | 9.0mm                  |
| 1/2   | 13               | 20  | U                       | .3680       | .3726                     | 70                         | Y                      |
| 9/16  | 12               | 18  | 25/64                   | .3906       | .3952                     | 65                         | Z or 10.5mm            |
| 5/8   | 11               | 18  | 27/64                   | .4219       | .4266                     | 73                         | .463                   |
| 3/4   | 10               | 16  | 29/64                   | .4531       | .4578                     | 65                         | .476                   |
| 7/8   | 9                | 14  | 31/64                   | .4844       | .4892                     | 68                         | .521                   |
| 7/8   | 9                | 14  | 33/64                   | .5156       | .5204                     | 58                         | .536                   |
| 5/8   | 11               | 18  | 17/32                   | .5312       | .5362                     | 75                         | 37/64                  |
| 3/4   | 10               | 16  | 37/64                   | .5781       | .5831                     | 58                         | .598                   |
| 3/4   | 10               | 16  | 21/32                   | .6562       | .6613                     | 68                         | 45/64                  |
| 7/8   | 9                | 14  | 11/16                   | .6875       | .6925                     | 71                         | 23/32                  |
| 1     | 8                | 12  | 49/64                   | .7656       | .7708                     | 72                         | .823                   |
| 1     | 8                | 12  | 13/16                   | .8125       | .8177                     | 62                         | 27/32                  |
| 1 1/8 | 7                | 12  | 7/8                     | .8750       | .8809                     | 73                         | 15/16                  |
| 1 1/8 | 7                | 12  | 59/64                   | .9219       | .9279                     | 67                         | .963                   |
| 1 1/4 | 7                | 12  | 63/64                   | .9844       | .9911                     | 72                         |                        |
| 1 1/4 | 7                | 12  | 1*3/64                  | 1.0469      | 1.0541                    | 65                         |                        |
| 1 3/8 | 6                | 16  | 1*7/64                  | 1.1094      | —                         | —                          |                        |
| 1 3/8 | 6                | 16  | 1*11/64                 | 1.1719      | —                         | —                          |                        |
| 1 1/2 | 6                | 12  | 1*7/32                  | 1.2187      | —                         | —                          |                        |
| 1 1/2 | 6                | 12  | 1*19/64                 | 1.2969      | —                         | —                          |                        |
| 1 1/2 | 6                | 12  | 1*11/32                 | 1.3437      | —                         | —                          |                        |
| 1 1/2 | 6                | 12  | 1*27/64                 | 1.4219      | —                         | —                          |                        |

| Size | Pitch | Recommended Metric Drill |             |                           |                            | Closest Recommended Inch Drill |             |                           |                            |
|------|-------|--------------------------|-------------|---------------------------|----------------------------|--------------------------------|-------------|---------------------------|----------------------------|
|      |       | Tap Drill (mm)           | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread | Tap Drill                      | Inch Equiv. | Probable Hole Size (Inch) | Probable Percent of Thread |
| M1.6 | 0.35  | 1.25                     | .0492       | .0507                     | 69                         | —                              | —           | —                         | —                          |
| M1.8 | 0.35  | 1.45                     | .0571       | .0586                     | 69                         | —                              | —           | —                         | —                          |
| M2   | 0.40  | 1.6                      | .0630       | .0647                     | 69                         | 52                             | .0635       | .0652                     | 66                         |
| M2.2 | 0.45  | 1.75                     | .0689       | .0706                     | 70                         | —                              | —           | —                         | —                          |
| M2.5 | 0.45  | 2.05                     | .0807       | .0826                     | 69                         | 46                             | .0810       | .0829                     | 67                         |
| M3   | 0.50  | 2.5                      | .0984       | .1007                     | 68                         | 40                             | .0980       | .1003                     | 70                         |
| M3.5 | 0.60  | 2.9                      | .1142       | .1168                     | 68                         | 33                             | .1130       | .1156                     | 72                         |
| M4   | 0.70  | 3.3                      | .1299       | .1328                     | 69                         | 30                             | .1285       | .1314                     | 73                         |
| M4.5 | 0.75  | 3.7                      | .1457       | .1486                     | 74                         | 26                             | .1470       | .1502                     | 70                         |
| M5   | 0.80  | 4.2                      | .1654       | .1686                     | 69                         | 19                             | .1660       | .1692                     | 68                         |
| M6   | 1.00  | 5.0                      | .1968       | .2006                     | 70                         | 9                              | .1960       | .1998                     | 71                         |
| M7   | 1.00  | 6.0                      | .2362       | .2400                     | 70                         | 15/64                          | .2344       | .2382                     | 73                         |
| M8   | 1.25  | 6.7                      | .2638       | .2679                     | 74                         | 17/64                          | .2656       | .2697                     | 71                         |
|      |       | 1.00                     | .2756       | .2797                     | 69                         | J                              | .2770       | .2811                     | 66                         |
| M10  | 1.50  | 8.5                      | .3346       | .3390                     | 71                         | Q                              | .3320       | .3364                     | 75                         |
|      | 1.25  | 8.7                      | .3425       | .3471                     | 73                         | 11/32                          | .3438       | .3483                     | 71                         |
| M12  | 1.75  | 10.2                     | .4016       | .4063                     | 74                         | Y                              | .4040       | .4087                     | 71                         |
|      | 1.25  | 10.8                     | .4252       | .4299                     | 67                         | 27/64                          | .4219       | .4266                     | 72                         |
| M14  | 2.00  | 12.0                     | .4724       | .4772                     | 72                         | 15/32                          | .4688       | .4736                     | 76                         |
|      | 1.50  | 12.5                     | .4921       | .4969                     | 71                         | —                              | —           | —                         | —                          |
| M16  | 2.00  | 14.0                     | .5512       | .5561                     | 72                         | 35/64                          | .5469       | .5518                     | 76                         |
|      | 1.50  | 14.5                     | .5709       | .5758                     | 71                         | —                              | —           | —                         | —                          |
| M18  | 2.50  | 15.5                     | .6102       | .6152                     | 73                         | 39/64                          | .6094       | .6144                     | 74                         |
|      | 1.50  | 16.5                     | .6496       | .6546                     | 70                         | —                              | —           | —                         | —                          |
| M20  | 2.50  | 17.5                     | .6890       | .6942                     | 73                         | 11/16                          | .6875       | .6925                     | 74                         |
|      | 1.50  | 18.5                     | .7283       | .7335                     | 70                         | —                              | —           | —                         | —                          |
| M22  | 2.50  | 19.5                     | .7677       | .7729                     | 73                         | 49/64                          | .7656       | .7708                     | 75                         |
|      | 1.50  | 20.5                     | .8071       | .8123                     | 70                         | —                              | —           | —                         | —                          |
| M24  | 3.00  | 21.0                     | .8268       | .8327                     | 73                         | 53/64                          | .8281       | .8340                     | 72                         |
|      | 2.00  | 22.0                     | .8661       | .8720                     | 71                         | —                              | —           | —                         | —                          |
| M27  | 3.00  | 24.0                     | .9449       | .9511                     | 73                         | 15/16                          | .9375       | .9435                     | 78                         |
|      | 2.00  | 25.0                     | .9843       | .9913                     | 70                         | 63/64                          | .9844       | .9914                     | 70                         |
| M30  | 3.00  | 26.5                     | 1.0433      |                           |                            |                                |             |                           |                            |
|      | 2.00  | 28.0                     | 1.1024      |                           |                            |                                |             |                           |                            |
| M33  | 3.50  | 29.5                     | 1.1614      |                           |                            |                                |             |                           |                            |
|      | 2.00  | 31.0                     | 1.2205      |                           |                            |                                |             |                           |                            |
| M36  | 4.00  | 32.0                     | 1.2598      |                           |                            |                                |             |                           |                            |
|      | 3.00  | 33.0                     | 1.2992      |                           |                            |                                |             |                           |                            |
| M39  | 4.00  | 35.0                     | 1.3780      |                           |                            |                                |             |                           |                            |
|      | 3.00  | 36.0                     | 1.4173      |                           |                            |                                |             |                           |                            |

Reaming Recommended to the Drill Size Shown

## SURFACE FEET PER MINUTE TO REVOLUTIONS PER MINUTE

| Surface<br>Feet Per<br>Minute | 20                     | 25   | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100  | 110  | 120  | 130  | 140  | 150  |
|-------------------------------|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Tap Size                      | Revolutions Per Minute |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 0                             | 1273                   | 1592 | 1910 | 2546 | 3183 | 3820 | 4456 | 5093 | 5730 | 6366 | 7003 | 7639 | 8276 | 8913 | 9549 |
| 1                             | 1047                   | 1308 | 1570 | 2093 | 2617 | 3140 | 3663 | 4186 | 4710 | 5233 | 5756 | 6279 | 6808 | 7326 | 7849 |
| 2                             | 888                    | 1110 | 1333 | 1777 | 2221 | 2665 | 3109 | 3554 | 3999 | 4222 | 4886 | 5330 | 5774 | 6218 | 6662 |
| 3                             | 772                    | 964  | 1157 | 1543 | 1929 | 2315 | 2701 | 3086 | 3472 | 3858 | 4244 | 4629 | 5015 | 5401 | 5787 |
| 4                             | 682                    | 853  | 1023 | 1364 | 1705 | 2046 | 2387 | 2728 | 3069 | 3411 | 3751 | 4092 | 4434 | 4775 | 5116 |
| 5                             | 611                    | 764  | 917  | 1222 | 1528 | 1833 | 2139 | 2445 | 2750 | 3056 | 3361 | 3367 | 3973 | 4278 | 4584 |
| 6                             | 553                    | 691  | 829  | 1106 | 1382 | 1658 | 1934 | 2211 | 2487 | 2764 | 3040 | 3316 | 3592 | 3869 | 4145 |
| 8                             | 466                    | 583  | 699  | 932  | 1165 | 1398 | 1631 | 1864 | 2097 | 2330 | 2563 | 2796 | 3029 | 3262 | 3495 |
| 10                            | 402                    | 502  | 603  | 804  | 1005 | 1205 | 1406 | 1607 | 1808 | 2009 | 2210 | 2411 | 2612 | 2813 | 3014 |
| 12                            | 354                    | 442  | 531  | 707  | 884  | 1061 | 1238 | 1415 | 1592 | 1769 | 1945 | 2122 | 2300 | 2476 | 2653 |
| 1/4                           | 306                    | 382  | 458  | 611  | 764  | 917  | 1070 | 1222 | 1375 | 1528 | 1681 | 1833 | 1986 | 2139 | 2292 |
| 5/16                          | 245                    | 306  | 367  | 486  | 611  | 733  | 856  | 978  | 1100 | 1222 | 1345 | 1467 | 1589 | 1711 | 1833 |
| 3/8                           | 204                    | 255  | 306  | 407  | 509  | 611  | 713  | 815  | 917  | 1019 | 1120 | 1222 | 1324 | 1426 | 1528 |
| 7/16                          | 175                    | 219  | 262  | 349  | 437  | 524  | 611  | 698  | 786  | 873  | 960  | 1048 | 1135 | 1222 | 1310 |
| 1/2                           | 153                    | 191  | 229  | 306  | 382  | 458  | 535  | 611  | 688  | 764  | 840  | 917  | 993  | 1070 | 1146 |
| 9/16                          | 137                    | 172  | 206  | 275  | 344  | 412  | 481  | 550  | 619  | 687  | 756  | 825  | 893  | 963  | 1031 |
| 5/8                           | 122                    | 153  | 183  | 244  | 306  | 367  | 428  | 489  | 550  | 611  | 672  | 733  | 794  | 856  | 917  |
| 3/4                           | 102                    | 128  | 153  | 203  | 255  | 306  | 357  | 407  | 458  | 509  | 560  | 611  | 662  | 713  | 764  |
| 7/8                           | 87                     | 109  | 131  | 175  | 218  | 252  | 306  | 350  | 392  | 437  | 480  | 524  | 568  | 611  | 655  |
| 1                             | 76                     | 96   | 115  | 153  | 191  | 230  | 268  | 306  | 344  | 382  | 420  | 458  | 497  | 535  | 573  |

| Specific Problem            | Cause                | Solution   |
|-----------------------------|----------------------|--|
| <b>Dimensional Accuracy</b> |                      |  |
| Oversize Pitch Diameter     | Incorrect Tap        | <ul style="list-style-type: none"> <li>1. Use proper GH limits of taps</li> <li>2. Use longer chamfered taps</li> </ul>  |
|                             | Chip Packing         | <ul style="list-style-type: none"> <li>1. Use spiral point or spiral fluted taps</li> <li>2. Reduce number of flutes to provide extra chip room</li> <li>3. Use larger hole size</li> <li>4. If tapping a hole, allow deeper hole where applicable or shorten the thread length of the parts</li> <li>5. Use proper lubricant</li> </ul>   |
|                             | Galling              | <ul style="list-style-type: none"> <li>1. Apply proper surface treatment such as Hardslick or chrome</li> <li>2. Use proper cutting lubricant</li> <li>3. Reduce tapping speed</li> <li>4. Use proper cutting angle in accordance with material being tapped</li> <li>5. Use large hole size</li> </ul>  |
|                             | Operating Conditions | <ul style="list-style-type: none"> <li>1. Apply proper tapping speed</li> <li>2. Correct alignment of tap and drill hole</li> <li>3. Free cutting either tap or workpiece</li> <li>4. Use proper tapping speed to avoid torn or rough threads</li> <li>5. Use lead screw tapper</li> <li>6. Use proper tapping machine with suitable power</li> <li>7. Avoid misalignment of the tap and drill hole from loose spindle or worn holder</li> </ul> |
|                             | Tool Condition       | <ul style="list-style-type: none"> <li>1. Obtain proper indexing angle for the flutes at the cutting edge</li> <li>2. Grind proper cutting angle and chamfer angle</li> <li>3. Avoid too narrow a land width</li> <li>4. Remove burrs from regrinding</li> </ul>   |
| Oversize Internal Diameter  | Hole Size            | <ul style="list-style-type: none"> <li>1. Use minimum hole size</li> <li>2. Avoid tapered hole</li> <li>3. Use proper chamfered taps</li> </ul>  |
|                             | Galling              | <ul style="list-style-type: none"> <li>1. Galling solutions 1 through 4 above can be applied to this specific problem</li> </ul>   |
| Undersize Pitch Diameter    | Incorrect Tap        | <ul style="list-style-type: none"> <li>1. Use oversize taps</li> <li>2. Apply proper chamfer angle</li> <li>3. Increase cutting angle</li> </ul>   |
|                             | Damaged Thread       | <ul style="list-style-type: none"> <li>1. Use proper reversing speed to avoid damaging tapped thread on the way out of the hole</li> </ul>   |
|                             | Left-over Chips      | <ul style="list-style-type: none"> <li>1. Increase cutting performance to avoid any left over chips in the hole</li> <li>2. Remove left over chips from the hole for gage checking</li> </ul>  |
| Undersize Internal Diameter | Hole Size            | <ul style="list-style-type: none"> <li>1. Use maximum drill size</li> </ul>  |

| Specific Problem | Cause                    | Solution  |
|------------------|--------------------------|---|
| Tool Life        |                          |   |
| Breakage         | Incorrect Tap Selection  | <ol style="list-style-type: none"> <li>1. Avoid chip packing in the flutes or the bottom of the hole.<br/>Use spiral pointed or spiral fluted taps or fluteless taps.</li> <li>2. Apply correct surface treatment such as Hardslick or bright</li> </ol>  |
|                  | Excessive Tapping Torque | <ol style="list-style-type: none"> <li>1. Use larger drill size</li> <li>2. Try to shorten thread length</li> <li>3. Increase cutting angle</li> <li>4. Apply a tap with more thread relief and reduced land width</li> <li>5. Apply correct surface treatment such as Hardslick</li> </ol>   |
|                  | Operating Conditions     | <ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Avoid misalignment between tap and the hole and tapered hole</li> <li>3. Use floating type of tapping holder</li> <li>4. Use tapping holder with torque adjustment</li> <li>5. Avoid hitting bottom of the hole with tap</li> </ol>                        |
|                  | Tool Condition           | <ol style="list-style-type: none"> <li>1. Do not grind the bottom of the flute</li> <li>2. Avoid too narrow a land width</li> <li>3. Remove all worn sections when regrindig the flutes</li> <li>4. Regrind tool more frequently</li> </ol>   |
| Chipping         | Incorrect Tap Selection  | <ol style="list-style-type: none"> <li>1. Reduce cutting angle</li> <li>2. Use a different kind of high-speed steel tap</li> <li>3. Reduce hardness of the tap</li> <li>4. Increase chamfer length</li> <li>5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps</li> </ol> |
|                  | Operating Conditions     | <ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Avoid misalignment between tap and hole</li> <li>3. Avoid sudden return of reverse in blind hole tapping</li> <li>4. Avoid galling</li> <li>5. Use larger hole size</li> </ol>   |
| Wear             | Incorrect Tap Selection  | <ol style="list-style-type: none"> <li>1. Apply specially designed tap for tapping heat treated material</li> <li>2. Change to a type of high-speed steel tap that contains vanadium</li> <li>3. Apply special surface treatment such as TiCN or Hardslick</li> <li>4. Increase chamfer length</li> </ol>                             |
|                  | Operating Conditions     | <ol style="list-style-type: none"> <li>1. Reduce tapping speed</li> <li>2. Apply proper cutting lubricants</li> <li>3. Avoid work hardened hole</li> <li>4. Use larger hole size</li> </ol>   |
|                  | Tool Condition           | <ol style="list-style-type: none"> <li>1. Grind proper cutting angle</li> <li>2. Avoid hardness reduction from grinding process</li> </ol>  |

| Specific Problem            | Cause               | Solution  |
|-----------------------------|---------------------|---|
| Surface Finish              |                     |   |
| Torn or Rough Thread        | Chamfer Too Short   | 1. Increase chamfer length  |
|                             | Wrong Cutting Angle | 1. Apply proper cutting angle   |
|                             | Galling             | 1. Use thread relieved taps<br>2. Reduce land width<br>3. Apply surface treatment such as Hardslick or chrome<br>4. Use proper cutting lubricant<br>5. Reduce tapping speed<br>6. Use larger hole size<br>7. Obtain proper alignment between tap and work |
|                             | Chip Packing        | 1. Use spiral pointed or spiral fluted taps<br>2. Use larger drill size   |
| Chattering on Tapped Thread | Tool Free Cutting   | 1. Reduce cutting angle<br>2. Reduce amount of thread relief  |
|                             | Tool Condition      | 1. Avoid too narrow a land width<br>2. Do not grind the bottom of the flute   |

# CARBIDE AND COBALT / HSS DRILLS





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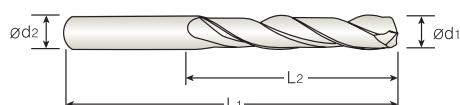
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## NC SPOTTING DRILLS

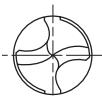
421



# CARBIDE without COOLANT HOLES, SHORT LENGTH, TiAIN-COATED



3 x D



P.414,415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Tolerance :** Dia. Tolerance ød1: See page 385 Shank Tolerance ød2: -.0001 -.0005

## DH414 Series

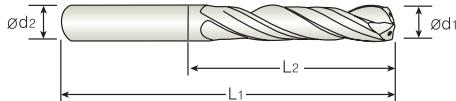
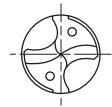
Unit : inch

| EDP No. | Diameter ( $\varnothing d_1=\varnothing d_2$ ) |         | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|---------|--------------------------------|----------------------------------|
|         | Fractional                                     | Decimal |                                |                                  |
| 0081ATF | 1/8  | .1250   | 45/64                          | 1-59/64                          |
| 0091ATF | 9/64   | .1406   | 25/32                          | 2-3/64                           |
| 0101ATF | 5/32   | .1562   | 7/8                            | 2-3/16                           |
| 0111ATF | 11/64  | .1719   | 15/16                          | 2-9/32                           |
| 0121ATF | 3/16   | .1875   | 1                              | 2-7/16                           |
| 0131ATF | 13/64  | .2031   | 1                              | 2-7/16                           |
| 0141ATF | 7/32   | .2188   | 1-1/8                          | 2-5/8                            |
| 0151ATF | 15/64  | .2344   | 1-1/8                          | 2-5/8                            |
| 0161ATF | 1/4  | .2500   | 1-5/8                          | 3-3/16                           |
| 2061ATF | F  | .2570   | 1-11/16                        | 3-17/64                          |
| 0171ATF | 17/64  | .2656   | 1-11/16                        | 3-17/64                          |
| 2091ATF | I  | .2720   | 1-11/16                        | 3-17/64                          |
| 0181ATF | 9/32   | .2812   | 1-3/4                          | 3-7/16                           |
| 0191ATF | 19/64  | .2969   | 1-7/8                          | 3-9/16                           |
| 0201ATF | 5/16   | .3125   | 1-7/8                          | 3-9/16                           |
| 0211ATF | 21/64  | .3281   | 2-1/16                         | 3-3/4                            |
| 2171ATF | Q  | .3320   | 2-1/16                         | 3-3/4                            |

| EDP No. | Diameter ( $\varnothing d_1=\varnothing d_2$ ) |         | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|---------|--------------------------------|----------------------------------|
|         | Fractional                                     | Decimal |                                |                                  |
| 0221ATF | 11/32  | .3438   | 2-3/16                         | 3-7/8                            |
| 0231ATF | 23/64  | .3594   | 2-9/32                         | 4                                |
| 2211ATF | U  | .3680   | 2-9/32                         | 4                                |
| 0241ATF | 3/8  | .3750   | 2-3/8                          | 4-1/8                            |
| 0251ATF | 25/64  | .3906   | 2-3/8                          | 4-1/8                            |
| 0261ATF | 13/32  | .4062   | 2-5/8                          | 4-13/32                          |
| 0271ATF | 27/64  | .4219   | 2-11/16                        | 4-1/2                            |
| 0281ATF | 7/16   | .4375   | 2-13/16                        | 4-5/8                            |
| 0291ATF | 29/64  | .4531   | 2-7/8                          | 4-3/4                            |
| 0301ATF | 15/32  | .4688   | 2-7/8                          | 4-3/4                            |
| 0311ATF | 31/64  | .4844   | 3                              | 5-5/16                           |
| 0321ATF | 1/2  | .5000   | 3-1/16                         | 5-3/8                            |
| 0331ATF | 33/64  | .5156   | 3-11/32                        | 5-11/16                          |
| 0341ATF | 17/32  | .5312   | 3-11/32                        | 5-11/16                          |
| 0361ATF | 9/16   | .5625   | 3-1/2                          | 5-15/16                          |
| 0371ATF | 37/64  | .5781   | 3-37/64                        | 6                                |
| 0401ATF | 5/8  | .6250   | 3-25/3                         | 6-19/64                          |



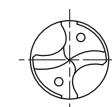
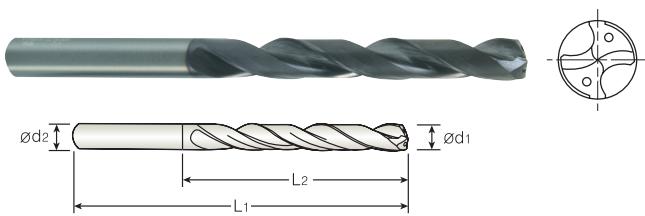
# CARBIDE with COOLANT HOLES, SHORT & LONG LENGTH, TiAIN-COATED



3 x D

## DH416 Series

| EDP No. | Diameter ( $\varnothing d_1$ ) |         | Shank Diameter ( $\varnothing d_2$ ) | Flute Length ( $L_2$ ) | Overall Length ( $L_1$ ) |
|---------|--------------------------------|---------|--------------------------------------|------------------------|--------------------------|
|         | Fractional                     | Decimal |                                      |                        |                          |
| 0081BTF | 1/8                            | .1250   | 15/64                                | 1.102                  | 2.992                    |
| 0111BTF | 11/64                          | .1719   | 15/64                                | 1.417                  | 3.386                    |
| 0121BTF | 3/16                           | .1875   | 15/64                                | 1.575                  | 3.543                    |
| 0131BTF | 13/64                          | .2031   | 15/64                                | 1.082                  | 3.228                    |
| 0141BTF | 7/32                           | .2188   | 15/64                                | 1.181                  | 3.228                    |
| 0151BTF | 15/64                          | .2344   | 15/64                                | 1.181                  | 3.228                    |
| 0161BTF | 1/4                            | .2500   | 17/64                                | 1.279                  | 3.465                    |
| 2061BTF | F                              | .2570   | 17/64                                | 1.279                  | 3.465                    |
| 0171BTF | 17/64                          | .2656   | 17/64                                | 1.378                  | 3.465                    |
| 2091BTF | I                              | .2720   | .2720                                | 1.378                  | 3.465                    |
| 0181BTF | 9/32                           | .2812   | 5/16                                 | 1.476                  | 3.701                    |
| 0191BTF | 19/64                          | .2969   | 5/16                                 | 1.476                  | 3.701                    |
| 0201BTF | 5/16                           | .3125   | 5/16                                 | 1.575                  | 3.701                    |
| 0211BTF | 21/64                          | .3281   | 11/32                                | 1.673                  | 3.937                    |
| 2171BTF | Q                              | .3320   | 11/32                                | 1.673                  | 3.937                    |
| 0221BTF | 11/32                          | .3438   | 11/32                                | 1.772                  | 3.937                    |
| 0231BTF | 23/64                          | .3594   | 25/64                                | 1.870                  | 4.174                    |
| 2211BTF | U                              | .3680   | 25/64                                | 1.870                  | 4.174                    |



5 x D

## DH418 Series

| EDP No. | Diameter ( $\varnothing d_1$ ) |         | Shank Diameter ( $\varnothing d_2$ ) | Flute Length ( $L_2$ ) | Overall Length ( $L_1$ ) |
|---------|--------------------------------|---------|--------------------------------------|------------------------|--------------------------|
|         | Fractional                     | Decimal |                                      |                        |                          |
| 0131CTF | 13/64                          | .2031   | 15/64                                | 1-3/4                  | 3-15/16                  |
| 0141CTF | 7/32                           | .2188   | 15/64                                | 1-57/64                | 3-15/16                  |
| 0151CTF | 15/64                          | .2344   | 15/64                                | 1-57/64                | 3-15/16                  |
| 0161CTF | 1/4                            | .2500   | 17/64                                | 2-3/64                 | 4-19/64                  |
| 2061CTF | F                              | .2570   | 17/64                                | 2-13/64                | 4-19/64                  |
| 0171CTF | 17/64                          | .2656   | 17/64                                | 2-13/64                | 4-19/64                  |
| 2091CTF | I                              | .2720   | .2720                                | 2-13/64                | 4-19/64                  |
| 0181CTF | 9/32                           | .2812   | 5/16                                 | 2-23/64                | 4-41/64                  |
| 0191CTF | 19/64                          | .2969   | 5/16                                 | 2-33/64                | 4-41/64                  |
| 0201CTF | 5/16                           | .3125   | 5/16                                 | 2-33/64                | 4-41/64                  |
| 0211CTF | 21/64                          | .3281   | 11/32                                | 2-43/64                | 5                        |
| 2171CTF | Q                              | .3320   | 11/32                                | 2-43/64                | 5                        |



P.414,415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Tolerance :** Dia. Tolerance  $\varnothing d_1$ : See page 385  
Shank Tolerance  $\varnothing d_2$ : -.0001 -.0005  
Plain Shank: DIN6535-HA

Unit : inch

| EDP No. | Diameter ( $\varnothing d_1$ ) |         | Shank Diameter ( $\varnothing d_2$ ) | Flute Length ( $L_2$ ) | Overall Length ( $L_1$ ) |
|---------|--------------------------------|---------|--------------------------------------|------------------------|--------------------------|
|         | Fractional                     | Decimal |                                      |                        |                          |
| 0241BTF | 3/8                            | .3705   | 25/64                                | 1.969                  | 4.174                    |
| 0251BTF | 25/64                          | .3906   | 25/64                                | 1.969                  | 4.174                    |
| 0261BTF | 13/32                          | .4062   | 27/64                                | 2.067                  | 4.567                    |
| 0271BTF | 27/64                          | .4219   | 27/64                                | 2.165                  | 4.567                    |
| 0281BTF | 7/16                           | .4375   | 15/32                                | 2.264                  | 4.803                    |
| 0291BTF | 29/64                          | .4531   | 15/32                                | 2.264                  | 4.803                    |
| 0301BTF | 15/32                          | .4688   | 15/32                                | 2.362                  | 4.803                    |
| 0311BTF | 31/64                          | .4844   | 1/2                                  | 2.461                  | 5.039                    |
| 0321BTF | 1/2                            | .5000   | 1/2                                  | 2.559                  | 5.039                    |
| 0331BTF | 33/64                          | .5156   | 35/64                                | 2.657                  | 5.276                    |
| 0341BTF | 17/32                          | .5312   | 35/64                                | 2.756                  | 5.276                    |
| 0351BTF | 35/64                          | .5469   | 35/64                                | 2.756                  | 5.276                    |
| 0361BTF | 9/16                           | .5625   | 37/64                                | 2.854                  | 5.512                    |
| 0371BTF | 37/64                          | .5781   | 37/64                                | 2.953                  | 5.512                    |
| 0381BTF | 19/32                          | .5937   | 5/8                                  | 3.051                  | 5.709                    |
| 0391BTF | 39/64                          | .6094   | 5/8                                  | 3.051                  | 5.709                    |
| 0401BTF | 5/8                            | .6250   | 5/8                                  | 3.150                  | 5.709                    |



P.414,415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

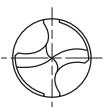
► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Tolerance :** Dia. Tolerance  $\varnothing d_1$ : See page 385  
Shank Tolerance  $\varnothing d_2$ : -.0001 -.0005  
Plain Shank: DIN6535-HA

Unit : inch

| EDP No. | Diameter ( $\varnothing d_1$ ) |         | Shank Diameter ( $\varnothing d_2$ ) | Flute Length ( $L_2$ ) | Overall Length ( $L_1$ ) |
|---------|--------------------------------|---------|--------------------------------------|------------------------|--------------------------|
|         | Fractional                     | Decimal |                                      |                        |                          |
| 0221CTF | 11/32                          | .3438   | 11/32                                | 2-27/32                | 5                        |
| 0231CTF | 23/64                          | .3594   | 25/64                                | 3                      | 5-23/64                  |
| 2211CTF | U                              | .3680   | 25/64                                | 3                      | 5-23/64                  |
| 0241CTF | 3/8                            | .3750   | 25/64                                | 3-5/32                 | 5-23/64                  |
| 0251CTF | 25/64                          | .3906   | 25/64                                | 3-5/32                 | 5-23/64                  |
| 0261CTF | 13/32                          | .4062   | 27/64                                | 3-5/16                 | 5-7/8                    |
| 0271CTF | 27/64                          | .4219   | 27/64                                | 3-15/32                | 5-7/8                    |
| 0281CTF | 7/16                           | .4375   | 15/32                                | 3-5/8                  | 6-7/32                   |
| 0291CTF | 29/64                          | .4531   | 15/32                                | 3-25/32                | 6-7/32                   |
| 0301CTF | 15/32                          | .4688   | 15/32                                | 3-25/32                | 6-7/32                   |
| 0311CTF | 31/64                          | .4844   | 1/2                                  | 3-15/16                | 6-37/64                  |
| 0321CTF | 1/2                            | .5000   | 1/2                                  | 4-3/32                 | 6-37/64                  |

\* See Coolant Recommendations on Page 415


**DIN  
6539**
**CARBIDE**
**h6**
**140°**

P.414,415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

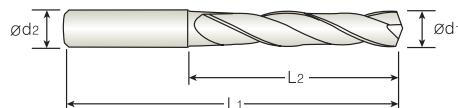
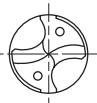
► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

**3 x D**
**DH404 Series**

Unit : mm

| EDP No.  | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length<br>(L <sub>2</sub> ) | Overall Length<br>(L <sub>1</sub> ) |
|----------|--|-------|-----------------------------------|-------------------------------------|
|          | Metric   | Inch  |                                   |                                     |
| DH404030 | 3.0  | .1181 | 16                                | 46                                  |
| DH404031 | 3.1  | .1220 | 18                                | 49                                  |
| DH404032 | 3.2  | .1260 | 18                                | 49                                  |
| DH404033 | 3.3  | .1299 | 18                                | 49                                  |
| DH404034 | 3.4  | .1339 | 20                                | 52                                  |
| DH404035 | 3.5  | .1378 | 20                                | 52                                  |
| DH404036 | 3.6  | .1417 | 20                                | 52                                  |
| DH404037 | 3.7  | .1457 | 20                                | 52                                  |
| DH404038 | 3.8  | .1496 | 22                                | 55                                  |
| DH404039 | 3.9  | .1535 | 22                                | 55                                  |
| DH404040 | 4.0  | .1575 | 22                                | 55                                  |
| DH404041 | 4.1  | .1614 | 22                                | 55                                  |
| DH404042 | 4.2  | .1654 | 22                                | 55                                  |
| DH404043 | 4.3  | .1693 | 24                                | 58                                  |
| DH404044 | 4.4  | .1732 | 24                                | 58                                  |
| DH404045 | 4.5  | .1772 | 24                                | 58                                  |
| DH404046 | 4.6  | .1811 | 24                                | 58                                  |
| DH404047 | 4.7  | .1850 | 24                                | 58                                  |
| DH404048 | 4.8  | .1890 | 26                                | 62                                  |
| DH404049 | 4.9  | .1929 | 26                                | 62                                  |
| DH404050 | 5.0  | .1969 | 26                                | 62                                  |
| DH404051 | 5.1  | .2008 | 26                                | 62                                  |
| DH404052 | 5.2  | .2047 | 26                                | 62                                  |
| DH404053 | 5.3  | .2087 | 26                                | 62                                  |
| DH404054 | 5.4  | .2126 | 28                                | 66                                  |
| DH404055 | 5.5  | .2165 | 28                                | 66                                  |
| DH404056 | 5.6  | .2205 | 28                                | 66                                  |
| DH404057 | 5.7  | .2244 | 28                                | 66                                  |
| DH404058 | 5.8  | .2283 | 28                                | 66                                  |
| DH404059 | 5.9  | .2323 | 28                                | 66                                  |
| DH404060 | 6.0  | .2362 | 28                                | 66                                  |
| DH404061 | 6.1  | .2402 | 31                                | 70                                  |
| DH404062 | 6.2  | .2441 | 31                                | 70                                  |
| DH404063 | 6.3  | .2480 | 31                                | 70                                  |
| DH404064 | 6.4  | .2520 | 31                                | 70                                  |
| DH404065 | 6.5  | .2559 | 31                                | 70                                  |
| DH404066 | 6.6  | .2598 | 31                                | 70                                  |
| DH404067 | 6.7  | .2638 | 31                                | 70                                  |
| DH404068 | 6.8  | .2677 | 34                                | 74                                  |
| DH404069 | 6.9  | .2717 | 34                                | 74                                  |
| DH404070 | 7.0  | .2756 | 34                                | 74                                  |
| DH404071 | 7.1  | .2795 | 34                                | 74                                  |
| DH404072 | 7.2  | .2835 | 34                                | 74                                  |
| DH404073 | 7.3  | .2874 | 34                                | 74                                  |
| DH404074 | 7.4  | .2913 | 34                                | 74                                  |
| DH404075 | 7.5  | .2953 | 34                                | 74                                  |

| EDP No.  | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length<br>(L <sub>2</sub> ) | Overall Length<br>(L <sub>1</sub> ) |
|----------|--|-------|-----------------------------------|-------------------------------------|
|          | Metric   | Inch  |                                   |                                     |
| DH404076 | 7.6  | .2992 | 37                                | 79                                  |
| DH404077 | 7.7  | .3031 | 37                                | 79                                  |
| DH404078 | 7.8  | .3071 | 37                                | 79                                  |
| DH404079 | 7.9  | .3110 | 37                                | 79                                  |
| DH404080 | 8.0  | .3150 | 37                                | 79                                  |
| DH404081 | 8.1  | .3189 | 37                                | 79                                  |
| DH404082 | 8.2  | .3228 | 37                                | 79                                  |
| DH404083 | 8.3  | .3268 | 37                                | 79                                  |
| DH404084 | 8.4  | .3307 | 37                                | 79                                  |
| DH404085 | 8.5  | .3346 | 37                                | 79                                  |
| DH404086 | 8.6  | .3386 | 40                                | 84                                  |
| DH404087 | 8.7  | .3425 | 40                                | 84                                  |
| DH404088 | 8.8  | .3465 | 40                                | 84                                  |
| DH404089 | 8.9  | .3504 | 40                                | 84                                  |
| DH404090 | 9.0  | .3543 | 40                                | 84                                  |
| DH404091 | 9.1  | .3583 | 40                                | 84                                  |
| DH404092 | 9.2  | .3622 | 40                                | 84                                  |
| DH404093 | 9.3  | .3661 | 40                                | 84                                  |
| DH404094 | 9.4  | .3701 | 40                                | 84                                  |
| DH404095 | 9.5  | .3740 | 40                                | 84                                  |
| DH404096 | 9.6  | .3780 | 43                                | 89                                  |
| DH404097 | 9.7  | .3819 | 43                                | 89                                  |
| DH404098 | 9.8  | .3858 | 43                                | 89                                  |
| DH404099 | 9.9  | .3898 | 43                                | 89                                  |
| DH404100 | 10.0   | .3937 | 43                                | 89                                  |
| DH404102 | 10.2   | .4016 | 43                                | 89                                  |
| DH404105 | 10.5   | .4134 | 43                                | 89                                  |
| DH404110 | 11.0   | .4331 | 47                                | 95                                  |
| DH404115 | 11.5   | .4528 | 47                                | 95                                  |
| DH404120 | 12.0   | .4724 | 51                                | 102                                 |
| DH404130 | 13.0   | .5118 | 51                                | 102                                 |
| DH404135 | 13.5   | .5314 | 54                                | 107                                 |
| DH404140 | 14.0   | .5511 | 54                                | 107                                 |
| DH404145 | 14.5   | .5708 | 56                                | 111                                 |
| DH404150 | 15.0   | .5905 | 56                                | 111                                 |
| DH404155 | 15.5   | .6102 | 58                                | 115                                 |
| DH404160 | 16.0   | .6299 | 58                                | 115                                 |
| DH404165 | 16.5   | .6495 | 60                                | 119                                 |
| DH404170 | 17.0   | .6692 | 60                                | 119                                 |
| DH404175 | 17.5   | .6889 | 62                                | 123                                 |
| DH404180 | 18.0   | .7086 | 62                                | 123                                 |
| DH404185 | 18.5   | .7283 | 64                                | 127                                 |
| DH404190 | 19.0   | .7480 | 64                                | 127                                 |
| DH404195 | 19.5   | .7676 | 66                                | 131                                 |
| DH404200 | 20.0   | .7873 | 66                                | 131                                 |



3 x D

DIN  
6537

CARBIDE

N  
30°

h6

m7

140°

DATA

P.414,415

► **Application** : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

► **Advantage** : Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Plain Shank** : DIN6535-HA

Unit : mm

**DH406 Series**

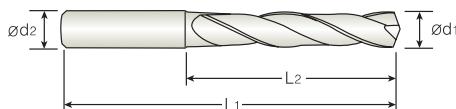
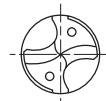
| EDP No.  | Diameter     |            | Shank Diameter<br>(ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (ød1) | Inch (ød1) |                         |                      |                        |
| DH406030 | 3.0          | .1181      | 6.0                     | 20                   | 62                     |
| DH406031 | 3.1          | .1220      | 6.0                     | 20                   | 62                     |
| DH406032 | 3.2          | .1260      | 6.0                     | 20                   | 62                     |
| DH406033 | 3.3          | .1299      | 6.0                     | 20                   | 62                     |
| DH406034 | 3.4          | .1339      | 6.0                     | 20                   | 62                     |
| DH406035 | 3.5          | .1378      | 6.0                     | 20                   | 62                     |
| DH406036 | 3.6          | .1417      | 6.0                     | 20                   | 62                     |
| DH406037 | 3.7          | .1457      | 6.0                     | 20                   | 62                     |
| DH406038 | 3.8          | .1496      | 6.0                     | 24                   | 66                     |
| DH406039 | 3.9          | .1535      | 6.0                     | 24                   | 66                     |
| DH406040 | 4.0          | .1575      | 6.0                     | 24                   | 66                     |
| DH406041 | 4.1          | .1614      | 6.0                     | 24                   | 66                     |
| DH406042 | 4.2          | .1654      | 6.0                     | 24                   | 66                     |
| DH406043 | 4.3          | .1693      | 6.0                     | 24                   | 66                     |
| DH406044 | 4.4          | .1732      | 6.0                     | 24                   | 66                     |
| DH406045 | 4.5          | .1772      | 6.0                     | 24                   | 66                     |
| DH406046 | 4.6          | .1811      | 6.0                     | 24                   | 66                     |
| DH406047 | 4.7          | .1850      | 6.0                     | 24                   | 66                     |
| DH406048 | 4.8          | .1890      | 6.0                     | 28                   | 66                     |
| DH406049 | 4.9          | .1929      | 6.0                     | 28                   | 66                     |
| DH406050 | 5.0          | .1969      | 6.0                     | 28                   | 66                     |
| DH406051 | 5.1          | .2008      | 6.0                     | 28                   | 66                     |
| DH406052 | 5.2          | .2047      | 6.0                     | 28                   | 66                     |
| DH406053 | 5.3          | .2087      | 6.0                     | 28                   | 66                     |
| DH406054 | 5.4          | .2126      | 6.0                     | 28                   | 66                     |
| DH406055 | 5.5          | .2165      | 6.0                     | 28                   | 66                     |
| DH406056 | 5.6          | .2205      | 6.0                     | 28                   | 66                     |
| DH406057 | 5.7          | .2244      | 6.0                     | 28                   | 66                     |
| DH406058 | 5.8          | .2283      | 6.0                     | 28                   | 66                     |

| EDP No.  | Diameter     |            | Shank Diameter<br>(ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (ød1) | Inch (ød1) |                         |                      |                        |
| DH406059 | 5.9          | .2323      | 6.0                     | 28                   | 66                     |
| DH406060 | 6.0          | .2362      | 6.0                     | 28                   | 66                     |
| DH406061 | 6.1          | .2402      | 8.0                     | 34                   | 79                     |
| DH406062 | 6.2          | .2441      | 8.0                     | 34                   | 79                     |
| DH406063 | 6.3          | .2480      | 8.0                     | 34                   | 79                     |
| DH406064 | 6.4          | .2520      | 8.0                     | 34                   | 79                     |
| DH406065 | 6.5          | .2559      | 8.0                     | 34                   | 79                     |
| DH406066 | 6.6          | .2598      | 8.0                     | 34                   | 79                     |
| DH406067 | 6.7          | .2638      | 8.0                     | 34                   | 79                     |
| DH406068 | 6.8          | .2677      | 8.0                     | 34                   | 79                     |
| DH406069 | 6.9          | .2717      | 8.0                     | 34                   | 79                     |
| DH406070 | 7.0          | .2756      | 8.0                     | 34                   | 79                     |
| DH406071 | 7.1          | .2795      | 8.0                     | 41                   | 79                     |
| DH406072 | 7.2          | .2835      | 8.0                     | 41                   | 79                     |
| DH406073 | 7.3          | .2874      | 8.0                     | 41                   | 79                     |
| DH406074 | 7.4          | .2913      | 8.0                     | 41                   | 79                     |
| DH406075 | 7.5          | .2953      | 8.0                     | 41                   | 79                     |
| DH406076 | 7.6          | .2992      | 8.0                     | 41                   | 79                     |
| DH406077 | 7.7          | .3031      | 8.0                     | 41                   | 79                     |
| DH406078 | 7.8          | .3071      | 8.0                     | 41                   | 79                     |
| DH406079 | 7.9          | .3110      | 8.0                     | 41                   | 79                     |
| DH406080 | 8.0          | .3150      | 8.0                     | 41                   | 79                     |
| DH406081 | 8.1          | .3189      | 10.0                    | 47                   | 89                     |
| DH406082 | 8.2          | .3228      | 10.0                    | 47                   | 89                     |
| DH406083 | 8.3          | .3268      | 10.0                    | 47                   | 89                     |
| DH406084 | 8.4          | .3307      | 10.0                    | 47                   | 89                     |
| DH406085 | 8.5          | .3346      | 10.0                    | 47                   | 89                     |
| DH406086 | 8.6          | .3386      | 10.0                    | 47                   | 89                     |
| DH406087 | 8.7          | .3425      | 10.0                    | 47                   | 89                     |

\* See Coolant Recommendations on Page 415



# CARBIDE with COOLANT HOLES, SHORT LENGTH, TiAIN COATED



3 x D

DIN  
6537

CARBIDE



N

30°

h6

m7

140°



DATA

P.414,415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Plain Shank :** DIN6535-HA

Unit : mm

## DH406 Series

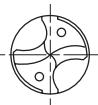
| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH406088 | 8.8          | .3465      | 10.0                    | 47                   | 89                     |
| DH406089 | 8.9          | .3504      | 10.0                    | 47                   | 89                     |
| DH406090 | 9.0          | .3543      | 10.0                    | 47                   | 89                     |
| DH406091 | 9.1          | .3583      | 10.0                    | 47                   | 89                     |
| DH406092 | 9.2          | .3622      | 10.0                    | 47                   | 89                     |
| DH406093 | 9.3          | .3661      | 10.0                    | 47                   | 89                     |
| DH406094 | 9.4          | .3701      | 10.0                    | 47                   | 89                     |
| DH406095 | 9.5          | .3740      | 10.0                    | 47                   | 89                     |
| DH406096 | 9.6          | .3780      | 10.0                    | 47                   | 89                     |
| DH406097 | 9.7          | .3819      | 10.0                    | 47                   | 89                     |
| DH406098 | 9.8          | .3858      | 10.0                    | 47                   | 89                     |
| DH406099 | 9.9          | .3898      | 10.0                    | 47                   | 89                     |
| DH406100 | 10.0         | .3937      | 10.0                    | 47                   | 89                     |
| DH406101 | 10.1         | .3976      | 12.0                    | 55                   | 102                    |
| DH406102 | 10.2         | .4016      | 12.0                    | 55                   | 102                    |
| DH406103 | 10.3         | .4055      | 12.0                    | 55                   | 102                    |
| DH406104 | 10.4         | .4094      | 12.0                    | 55                   | 102                    |
| DH406105 | 10.5         | .4134      | 12.0                    | 55                   | 102                    |
| DH406106 | 10.6         | .4173      | 12.0                    | 55                   | 102                    |
| DH406107 | 10.7         | .4212      | 12.0                    | 55                   | 102                    |
| DH406108 | 10.8         | .4252      | 12.0                    | 55                   | 102                    |
| DH406109 | 10.9         | .4291      | 12.0                    | 55                   | 102                    |
| DH406110 | 11.0         | .4330      | 12.0                    | 55                   | 102                    |
| DH406111 | 11.1         | .4370      | 12.0                    | 55                   | 102                    |
| DH406112 | 11.2         | .4409      | 12.0                    | 55                   | 102                    |

| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH406113 | 11.3         | .4448      | 12.0                    | 102                  | 55                     |
| DH406114 | 11.4         | .4488      | 12.0                    | 102                  | 55                     |
| DH406115 | 11.5         | .4527      | 12.0                    | 102                  | 55                     |
| DH406116 | 11.6         | .4566      | 12.0                    | 102                  | 55                     |
| DH406117 | 11.7         | .4606      | 12.0                    | 102                  | 55                     |
| DH406118 | 11.8         | .4645      | 12.0                    | 102                  | 55                     |
| DH406119 | 11.9         | .4685      | 12.0                    | 102                  | 55                     |
| DH406120 | 12.0         | .4724      | 12.0                    | 102                  | 55                     |
| DH406125 | 12.5         | .4921      | 14.0                    | 107                  | 60                     |
| DH406130 | 13.0         | .5118      | 14.0                    | 107                  | 60                     |
| DH406135 | 13.5         | .5314      | 14.0                    | 107                  | 60                     |
| DH406140 | 14.0         | .5511      | 14.0                    | 107                  | 60                     |
| DH406145 | 14.5         | .5708      | 16.0                    | 115                  | 65                     |
| DH406150 | 15.0         | .5905      | 16.0                    | 115                  | 65                     |
| DH406155 | 15.5         | .6102      | 16.0                    | 115                  | 65                     |
| DH406160 | 16.0         | .6299      | 16.0                    | 115                  | 65                     |
| DH406165 | 16.5         | .6495      | 18.0                    | 123                  | 73                     |
| DH406170 | 17.0         | .6692      | 18.0                    | 123                  | 73                     |
| DH406175 | 17.5         | .6889      | 18.0                    | 123                  | 73                     |
| DH406180 | 18.0         | .7086      | 18.0                    | 123                  | 73                     |
| DH406185 | 18.5         | .7283      | 20.0                    | 131                  | 79                     |
| DH406190 | 19.0         | .7480      | 20.0                    | 131                  | 79                     |
| DH406195 | 19.5         | .7676      | 20.0                    | 131                  | 79                     |
| DH406200 | 20.0         | .7873      | 20.0                    | 131                  | 79                     |

\* See Coolant Recommendations on Page 415



# CARBIDE with COOLANT HOLES, LONG LENGTH, TiAIN COATED

DIN  
6537

CARBIDE



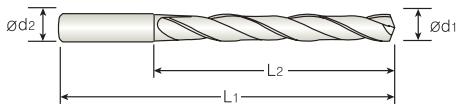
h6



140°



P.414,415



5 x D

## DH408 Series

Unit : mm

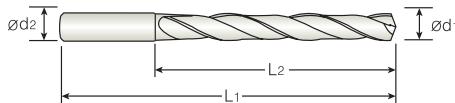
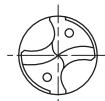
| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH408030 | 3.0          | .1181      | 6.0                     | 28                   | 66                     |
| DH408031 | 3.1          | .1220      | 6.0                     | 28                   | 66                     |
| DH408032 | 3.2          | .1260      | 6.0                     | 28                   | 66                     |
| DH408033 | 3.3          | .1299      | 6.0                     | 28                   | 66                     |
| DH408034 | 3.4          | .1339      | 6.0                     | 28                   | 66                     |
| DH408035 | 3.5          | .1378      | 6.0                     | 28                   | 66                     |
| DH408036 | 3.6          | .1417      | 6.0                     | 28                   | 66                     |
| DH408037 | 3.7          | .1457      | 6.0                     | 28                   | 66                     |
| DH408038 | 3.8          | .1496      | 6.0                     | 36                   | 74                     |
| DH408039 | 3.9          | .1535      | 6.0                     | 36                   | 74                     |
| DH408040 | 4.0          | .1575      | 6.0                     | 36                   | 74                     |
| DH408041 | 4.1          | .1614      | 6.0                     | 36                   | 74                     |
| DH408042 | 4.2          | .1654      | 6.0                     | 36                   | 74                     |
| DH408043 | 4.3          | .1693      | 6.0                     | 36                   | 74                     |
| DH408044 | 4.4          | .1732      | 6.0                     | 36                   | 74                     |
| DH408045 | 4.5          | .1772      | 6.0                     | 36                   | 74                     |
| DH408046 | 4.6          | .1811      | 6.0                     | 36                   | 74                     |
| DH408047 | 4.7          | .1850      | 6.0                     | 36                   | 74                     |
| DH408048 | 4.8          | .1890      | 6.0                     | 44                   | 82                     |
| DH408049 | 4.9          | .1929      | 6.0                     | 44                   | 82                     |
| DH408050 | 5.0          | .1969      | 6.0                     | 44                   | 82                     |
| DH408051 | 5.1          | .2008      | 6.0                     | 44                   | 82                     |
| DH408052 | 5.2          | .2047      | 6.0                     | 44                   | 82                     |
| DH408053 | 5.3          | .2087      | 6.0                     | 44                   | 82                     |
| DH408054 | 5.4          | .2126      | 6.0                     | 44                   | 82                     |
| DH408055 | 5.5          | .2165      | 6.0                     | 44                   | 82                     |
| DH408056 | 5.6          | .2205      | 6.0                     | 44                   | 82                     |
| DH408057 | 5.7          | .2244      | 6.0                     | 44                   | 82                     |
| DH408058 | 5.8          | .2283      | 6.0                     | 44                   | 82                     |
| DH408059 | 5.9          | .2323      | 6.0                     | 44                   | 82                     |

| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH408060 | 6.0          | .2362      | 6.0                     | 44                   | 82                     |
| DH408061 | 6.1          | .2402      | 8.0                     | 53                   | 91                     |
| DH408062 | 6.2          | .2441      | 8.0                     | 53                   | 91                     |
| DH408063 | 6.3          | .2480      | 8.0                     | 53                   | 91                     |
| DH408064 | 6.4          | .2520      | 8.0                     | 53                   | 91                     |
| DH408065 | 6.5          | .2559      | 8.0                     | 53                   | 91                     |
| DH408066 | 6.6          | .2598      | 8.0                     | 53                   | 91                     |
| DH408067 | 6.7          | .2638      | 8.0                     | 53                   | 91                     |
| DH408068 | 6.8          | .2677      | 8.0                     | 53                   | 91                     |
| DH408069 | 6.9          | .2717      | 8.0                     | 53                   | 91                     |
| DH408070 | 7.0          | .2756      | 8.0                     | 53                   | 91                     |
| DH408071 | 7.1          | .2795      | 8.0                     | 53                   | 91                     |
| DH408072 | 7.2          | .2835      | 8.0                     | 53                   | 91                     |
| DH408073 | 7.3          | .2874      | 8.0                     | 53                   | 91                     |
| DH408074 | 7.4          | .2913      | 8.0                     | 53                   | 91                     |
| DH408075 | 7.5          | .2953      | 8.0                     | 53                   | 91                     |
| DH408076 | 7.6          | .2992      | 8.0                     | 53                   | 91                     |
| DH408077 | 7.7          | .3031      | 8.0                     | 53                   | 91                     |
| DH408078 | 7.8          | .3071      | 8.0                     | 53                   | 91                     |
| DH408079 | 7.9          | .3110      | 8.0                     | 53                   | 91                     |
| DH408080 | 8.0          | .3150      | 8.0                     | 53                   | 91                     |
| DH408081 | 8.1          | .3189      | 10.0                    | 61                   | 103                    |
| DH408082 | 8.2          | .3228      | 10.0                    | 61                   | 103                    |
| DH408083 | 8.3          | .3268      | 10.0                    | 61                   | 103                    |
| DH408084 | 8.4          | .3307      | 10.0                    | 61                   | 103                    |
| DH408085 | 8.5          | .3346      | 10.0                    | 61                   | 103                    |
| DH408086 | 8.6          | .3386      | 10.0                    | 61                   | 103                    |
| DH408087 | 8.7          | .3425      | 10.0                    | 61                   | 103                    |
| DH408088 | 8.8          | .3465      | 10.0                    | 61                   | 103                    |
| DH408089 | 8.9          | .3504      | 10.0                    | 61                   | 103                    |

\* See Coolant Recommendations on Page 415



# CARBIDE with COOLANT HOLES, LONG LENGTH, TiAIN COATED



5 x D

## DH408 Series

Unit : mm

| EDP No.  | Diameter     |            | Shank Diameter<br>(ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (ød1) | Inch (ød1) |                         |                      |                        |
| DH408090 | 9.0          | .3543      | 10.0                    | 61                   | 103                    |
| DH408091 | 9.1          | .3583      | 10.0                    | 61                   | 103                    |
| DH408092 | 9.2          | .3622      | 10.0                    | 61                   | 103                    |
| DH408093 | 9.3          | .3661      | 10.0                    | 61                   | 103                    |
| DH408094 | 9.4          | .3701      | 10.0                    | 61                   | 103                    |
| DH408095 | 9.5          | .3740      | 10.0                    | 61                   | 103                    |
| DH408096 | 9.6          | .3780      | 10.0                    | 61                   | 103                    |
| DH408097 | 9.7          | .3819      | 10.0                    | 61                   | 103                    |
| DH408098 | 9.8          | .3858      | 10.0                    | 61                   | 103                    |
| DH408099 | 9.9          | .3898      | 10.0                    | 61                   | 103                    |
| DH408100 | 10.0         | .3937      | 10.0                    | 61                   | 103                    |
| DH408101 | 10.1         | .3976      | 12.0                    | 71                   | 118                    |
| DH408102 | 10.2         | .4016      | 12.0                    | 71                   | 118                    |
| DH408103 | 10.3         | .4055      | 12.0                    | 71                   | 118                    |
| DH408104 | 10.4         | .4094      | 12.0                    | 71                   | 118                    |
| DH408105 | 10.5         | .4134      | 12.0                    | 71                   | 118                    |
| DH408106 | 10.6         | .4173      | 12.0                    | 71                   | 118                    |
| DH408107 | 10.7         | .4212      | 12.0                    | 71                   | 118                    |
| DH408108 | 10.8         | .4252      | 12.0                    | 71                   | 118                    |
| DH408109 | 10.9         | .4291      | 12.0                    | 71                   | 118                    |
| DH408110 | 11.0         | .4330      | 12.0                    | 71                   | 118                    |
| DH408111 | 11.1         | .4370      | 12.0                    | 71                   | 118                    |
| DH408112 | 11.2         | .4409      | 12.0                    | 71                   | 118                    |
| DH408113 | 11.3         | .4448      | 12.0                    | 71                   | 118                    |

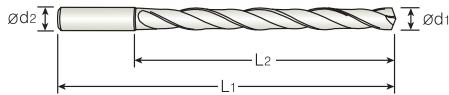


P.414,415

- **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required
  - good chip removal
  - powerful drilling
- **Plain Shank :** DIN6535-HA

| EDP No.  | Diameter     |            | Shank Diameter<br>(ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (ød1) | Inch (ød1) |                         |                      |                        |
| DH408114 | 11.4         | .4488      | 12.0                    | 71                   | 118                    |
| DH408115 | 11.5         | .4527      | 12.0                    | 71                   | 118                    |
| DH408116 | 11.6         | .4566      | 12.0                    | 71                   | 118                    |
| DH408117 | 11.7         | .4606      | 12.0                    | 71                   | 118                    |
| DH408118 | 11.8         | .4645      | 12.0                    | 71                   | 118                    |
| DH408119 | 11.9         | .4685      | 12.0                    | 71                   | 118                    |
| DH408120 | 12.0         | .4724      | 12.0                    | 71                   | 118                    |
| DH408125 | 12.5         | .4921      | 14.0                    | 77                   | 124                    |
| DH408130 | 13.0         | .5118      | 14.0                    | 77                   | 124                    |
| DH408135 | 13.5         | .5314      | 14.0                    | 77                   | 124                    |
| DH408140 | 14.0         | .5511      | 14.0                    | 77                   | 124                    |
| DH408145 | 14.5         | .5708      | 16.0                    | 83                   | 133                    |
| DH408150 | 15.0         | .5905      | 16.0                    | 83                   | 133                    |
| DH408155 | 15.5         | .6102      | 16.0                    | 83                   | 133                    |
| DH408160 | 16.0         | .6299      | 16.0                    | 83                   | 133                    |
| DH408165 | 16.5         | .6495      | 18.0                    | 93                   | 143                    |
| DH408170 | 17.0         | .6692      | 18.0                    | 93                   | 143                    |
| DH408175 | 17.5         | .6889      | 18.0                    | 93                   | 143                    |
| DH408180 | 18.0         | .7086      | 18.0                    | 93                   | 143                    |
| DH408185 | 18.5         | .7283      | 20.0                    | 101                  | 153                    |
| DH408190 | 19.0         | .7480      | 20.0                    | 101                  | 153                    |
| DH408195 | 19.5         | .7676      | 20.0                    | 101                  | 153                    |
| DH408200 | 20.0         | .7873      | 20.0                    | 101                  | 153                    |

\* See Coolant Recommendations on Page 415



8 x D

## DH421 Series

| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH421030 | 3.0          | .1181      | 6.0                     | 34                   | 72                     |
| DH421031 | 3.1          | .1220      | 6.0                     | 34                   | 72                     |
| DH421032 | 3.2          | .1260      | 6.0                     | 34                   | 72                     |
| DH421033 | 3.3          | .1299      | 6.0                     | 34                   | 72                     |
| DH421034 | 3.4          | .1339      | 6.0                     | 34                   | 72                     |
| DH421035 | 3.5          | .1378      | 6.0                     | 34                   | 72                     |
| DH421036 | 3.6          | .1417      | 6.0                     | 34                   | 72                     |
| DH421037 | 3.7          | .1457      | 6.0                     | 34                   | 72                     |
| DH421038 | 3.8          | .1496      | 6.0                     | 43                   | 81                     |
| DH421039 | 3.9          | .1535      | 6.0                     | 43                   | 81                     |
| DH421040 | 4.0          | .1575      | 6.0                     | 43                   | 81                     |
| DH421041 | 4.1          | .1614      | 6.0                     | 43                   | 81                     |
| DH421042 | 4.2          | .1654      | 6.0                     | 43                   | 81                     |
| DH421043 | 4.3          | .1693      | 6.0                     | 43                   | 81                     |
| DH421044 | 4.4          | .1732      | 6.0                     | 43                   | 81                     |
| DH421045 | 4.5          | .1772      | 6.0                     | 43                   | 81                     |
| DH421046 | 4.6          | .1811      | 6.0                     | 43                   | 81                     |
| DH421047 | 4.7          | .1850      | 6.0                     | 43                   | 81                     |
| DH421048 | 4.8          | .1890      | 6.0                     | 57                   | 95                     |
| DH421049 | 4.9          | .1929      | 6.0                     | 57                   | 95                     |
| DH421050 | 5.0          | .1969      | 6.0                     | 57                   | 95                     |
| DH421051 | 5.1          | .2008      | 6.0                     | 57                   | 95                     |
| DH421052 | 5.2          | .2047      | 6.0                     | 57                   | 95                     |
| DH421053 | 5.3          | .2087      | 6.0                     | 57                   | 95                     |
| DH421054 | 5.4          | .2126      | 6.0                     | 57                   | 95                     |
| DH421055 | 5.5          | .2165      | 6.0                     | 57                   | 95                     |
| DH421056 | 5.6          | .2205      | 6.0                     | 57                   | 95                     |
| DH421057 | 5.7          | .2244      | 6.0                     | 57                   | 95                     |
| DH421058 | 5.8          | .2283      | 6.0                     | 57                   | 95                     |
| DH421059 | 5.9          | .2323      | 6.0                     | 57                   | 95                     |
| DH421060 | 6.0          | .2362      | 6.0                     | 57                   | 95                     |
| DH421061 | 6.1          | .2402      | 8.0                     | 76                   | 114                    |
| DH421062 | 6.2          | .2441      | 8.0                     | 76                   | 114                    |
| DH421063 | 6.3          | .2480      | 8.0                     | 76                   | 114                    |
| DH421064 | 6.4          | .2520      | 8.0                     | 76                   | 114                    |
| DH421065 | 6.5          | .2559      | 8.0                     | 76                   | 114                    |
| DH421066 | 6.6          | .2598      | 8.0                     | 76                   | 114                    |
| DH421067 | 6.7          | .2638      | 8.0                     | 76                   | 114                    |
| DH421068 | 6.8          | .2677      | 8.0                     | 76                   | 114                    |
| DH421069 | 6.9          | .2717      | 8.0                     | 76                   | 114                    |
| DH421070 | 7.0          | .2756      | 8.0                     | 76                   | 114                    |
| DH421071 | 7.1          | .2795      | 8.0                     | 76                   | 114                    |
| DH421072 | 7.2          | .2835      | 8.0                     | 76                   | 114                    |
| DH421073 | 7.3          | .2874      | 8.0                     | 76                   | 114                    |
| DH421074 | 7.4          | .2913      | 8.0                     | 76                   | 114                    |
| DH421075 | 7.5          | .2953      | 8.0                     | 76                   | 114                    |

DIN  
6537

CARBIDE



N  
30°



h6



m7



140°



DATA

P.414,415

► Application : Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

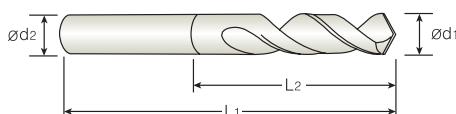
► Advantage : Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► Plain Shank : DIN6535-HA

Unit : mm

| EDP No.  | Diameter     |            | Shank Diameter<br>(Ød2) | Flute Length<br>(L2) | Overall Length<br>(L1) |
|----------|--------------|------------|-------------------------|----------------------|------------------------|
|          | Metric (Ød1) | Inch (Ød1) |                         |                      |                        |
| DH421076 | 7.6          | .2992      | 8.0                     | 76                   | 114                    |
| DH421077 | 7.7          | .3031      | 8.0                     | 76                   | 114                    |
| DH421078 | 7.8          | .3071      | 8.0                     | 76                   | 114                    |
| DH421079 | 7.9          | .3110      | 8.0                     | 76                   | 114                    |
| DH421080 | 8.0          | .3150      | 8.0                     | 76                   | 114                    |
| DH421081 | 8.1          | .3189      | 10.0                    | 95                   | 142                    |
| DH421082 | 8.2          | .3228      | 10.0                    | 95                   | 142                    |
| DH421083 | 8.3          | .3268      | 10.0                    | 95                   | 142                    |
| DH421084 | 8.4          | .3307      | 10.0                    | 95                   | 142                    |
| DH421085 | 8.5          | .3346      | 10.0                    | 95                   | 142                    |
| DH421086 | 8.6          | .3386      | 10.0                    | 95                   | 142                    |
| DH421087 | 8.7          | .3425      | 10.0                    | 95                   | 142                    |
| DH421088 | 8.8          | .3465      | 10.0                    | 95                   | 142                    |
| DH421089 | 8.9          | .3504      | 10.0                    | 95                   | 142                    |
| DH421090 | 9.0          | .3543      | 10.0                    | 95                   | 142                    |
| DH421091 | 9.1          | .3583      | 10.0                    | 95                   | 142                    |
| DH421092 | 9.2          | .3622      | 10.0                    | 95                   | 142                    |
| DH421093 | 9.3          | .3661      | 10.0                    | 95                   | 142                    |
| DH421094 | 9.4          | .3701      | 10.0                    | 95                   | 142                    |
| DH421095 | 9.5          | .3740      | 10.0                    | 95                   | 142                    |
| DH421096 | 9.6          | .3780      | 10.0                    | 95                   | 142                    |
| DH421097 | 9.7          | .3819      | 10.0                    | 95                   | 142                    |
| DH421098 | 9.8          | .3858      | 10.0                    | 95                   | 142                    |
| DH421099 | 9.9          | .3898      | 10.0                    | 95                   | 142                    |
| DH421100 | 10.0         | .3937      | 10.0                    | 95                   | 142                    |
| DH421101 | 10.1         | .3976      | 12.0                    | 114                  | 162                    |
| DH421102 | 10.2         | .4016      | 12.0                    | 114                  | 162                    |
| DH421103 | 10.3         | .4055      | 12.0                    | 114                  | 162                    |
| DH421104 | 10.4         | .4094      | 12.0                    | 114                  | 162                    |
| DH421105 | 10.5         | .4134      | 12.0                    | 114                  | 162                    |
| DH421106 | 10.6         | .4173      | 12.0                    | 114                  | 162                    |
| DH421107 | 10.7         | .4212      | 12.0                    | 114                  | 162                    |
| DH421108 | 10.8         | .4252      | 12.0                    | 114                  | 162                    |
| DH421109 | 10.9         | .4291      | 12.0                    | 114                  | 162                    |
| DH421110 | 11.0         | .4330      | 12.0                    | 114                  | 162                    |
| DH421111 | 11.1         | .4370      | 12.0                    | 114                  | 162                    |
| DH421112 | 11.2         | .4409      | 12.0                    | 114                  | 162                    |
| DH421113 | 11.3         | .4448      | 12.0                    | 114                  | 162                    |
| DH421114 | 11.4         | .4488      | 12.0                    | 114                  | 162                    |
| DH421115 | 11.5         | .4527      | 12.0                    | 114                  | 162                    |
| DH421116 | 11.6         | .4566      | 12.0                    | 114                  | 162                    |
| DH421117 | 11.7         | .4606      | 12.0                    | 114                  | 162                    |
| DH421118 | 11.8         | .4645      | 12.0                    | 114                  | 162                    |
| DH421119 | 11.9         | .4685      | 12.0                    | 114                  | 162                    |
| DH421120 | 12.0         | .4724      | 12.0                    | 114                  | 162                    |

\* See Coolant Recommendations on Page 415

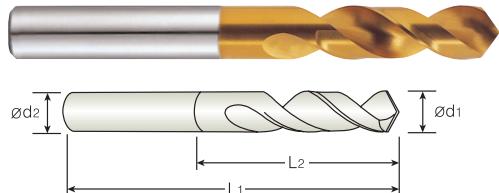


P.415

- **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.
- **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required
  - good chip removal
  - powerful drilling
- **Plain Shank :** DIN6535-HA

Unit : mm

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|-------|--------------------------------|----------------------------------|
|         | Metric   | Inch  |                                |                                  |
| 0201JCN | 2.0  | .0787 | 12                             | 44                               |
| 0211JCN | 2.1  | .0827 | 12                             | 44                               |
| 0221JCN | 2.2  | .0866 | 13                             | 45                               |
| 0231JCN | 2.3  | .0906 | 13                             | 45                               |
| 0241JCN | 2.4  | .0945 | 14                             | 46                               |
| 0251JCN | 2.5  | .0984 | 14                             | 46                               |
| 0261JCN | 2.6  | .1024 | 14                             | 46                               |
| 0271JCN | 2.7  | .1063 | 16                             | 48                               |
| 0281JCN | 2.8  | .1102 | 16                             | 48                               |
| 0291JCN | 2.9  | .1142 | 16                             | 48                               |
| 0301JCN | 3.0  | .1181 | 16                             | 48                               |
| 0311JCN | 3.1  | .1220 | 18                             | 50                               |
| 0321JCN | 3.2  | .1260 | 18                             | 50                               |
| 0331JCN | 3.3  | .1299 | 18                             | 50                               |
| 0341JCN | 3.4  | .1339 | 20                             | 52                               |
| 0351JCN | 3.5  | .1378 | 20                             | 52                               |
| 0361JCN | 3.6  | .1417 | 20                             | 52                               |
| 0371JCN | 3.7  | .1457 | 20                             | 52                               |
| 0381JCN | 3.8  | .1496 | 22                             | 54                               |
| 0391JCN | 3.9  | .1535 | 22                             | 54                               |
| 0401JCN | 4.0  | .1575 | 22                             | 54                               |
| 0411JCN | 4.1  | .1614 | 22                             | 66                               |
| 0421JCN | 4.2  | .1654 | 22                             | 66                               |
| 0431JCN | 4.3  | .1693 | 24                             | 68                               |
| 0441JCN | 4.4  | .1732 | 24                             | 68                               |
| 0451JCN | 4.5  | .1772 | 24                             | 68                               |
| 0461JCN | 4.6  | .1811 | 24                             | 68                               |
| 0471JCN | 4.7  | .1850 | 24                             | 68                               |
| 0481JCN | 4.8  | .1890 | 26                             | 70                               |
| 0491JCN | 4.9  | .1929 | 26                             | 70                               |
| 0501JCN | 5.0  | .1969 | 26                             | 70                               |
| 0511JCN | 5.1  | .2008 | 26                             | 70                               |
| 0521JCN | 5.2  | .2047 | 26                             | 70                               |
| 0531JCN | 5.3  | .2087 | 26                             | 70                               |
| 0541JCN | 5.4  | .2126 | 28                             | 72                               |
| 0551JCN | 5.5  | .2165 | 28                             | 72                               |
| 0561JCN | 5.6  | .2205 | 28                             | 72                               |
| 0571JCN | 5.7  | .2244 | 28                             | 72                               |
| 0581JCN | 5.8  | .2283 | 28                             | 72                               |
| 0591JCN | 5.9  | .2323 | 28                             | 72                               |
| 0601JCN | 6.0  | .2362 | 28                             | 72                               |
| 0611JCN | 6.1  | .2402 | 31                             | 75                               |
| 0621JCN | 6.2  | .2441 | 31                             | 75                               |
| 0631JCN | 6.3  | .2480 | 31                             | 75                               |
| 0641JCN | 6.4  | .2520 | 31                             | 75                               |
| 0651JCN | 6.5  | .2559 | 31                             | 75                               |
| 0661JCN | 6.6  | .2598 | 31                             | 75                               |
| 0671JCN | 6.7  | .2638 | 31                             | 75                               |
| 0681JCN | 6.8  | .2677 | 34                             | 78                               |
| 0691JCN | 6.9  | .2717 | 34                             | 78                               |
| 0701JCN | 7.0  | .2756 | 34                             | 78                               |
| 0711JCN | 7.1  | .2795 | 34                             | 78                               |
| 0721JCN | 7.2  | .2835 | 34                             | 78                               |
| 0731JCN | 7.3  | .2874 | 34                             | 78                               |
| 0741JCN | 7.4  | .2913 | 34                             | 78                               |
| 0751JCN | 7.5  | .2953 | 34                             | 78                               |
| 0761JCN | 7.6  | .2992 | 37                             | 81                               |
| 0771JCN | 7.7  | .3031 | 37                             | 81                               |
| 0781JCN | 7.8  | .3071 | 37                             | 81                               |
| 0791JCN | 7.9  | .3110 | 37                             | 81                               |
| 0801JCN | 8.0  | .3150 | 37                             | 81                               |
| 0811JCN | 8.1  | .3189 | 37                             | 87                               |
| 0821JCN | 8.2  | .3228 | 37                             | 87                               |
| 0831JCN | 8.3  | .3268 | 37                             | 87                               |
| 0841JCN | 8.4  | .3307 | 37                             | 87                               |
| 0851JCN | 8.5  | .3346 | 37                             | 87                               |
| 0861JCN | 8.6  | .3386 | 40                             | 90                               |
| 0871JCN | 8.7  | .3425 | 40                             | 90                               |
| 0881JCN | 8.8  | .3465 | 40                             | 90                               |
| 0891JCN | 8.9  | .3504 | 40                             | 90                               |
| 0901JCN | 9.0  | .3543 | 40                             | 90                               |
| 0911JCN | 9.1  | .3583 | 40                             | 90                               |
| 0921JCN | 9.2  | .3622 | 40                             | 90                               |
| 0931JCN | 9.3  | .3661 | 40                             | 90                               |
| 0941JCN | 9.4  | .3701 | 40                             | 90                               |
| 0951JCN | 9.5  | .3740 | 40                             | 90                               |
| 0961JCN | 9.6  | .3780 | 43                             | 93                               |
| 0971JCN | 9.7  | .3819 | 43                             | 93                               |
| 0981JCN | 9.8  | .3858 | 43                             | 93                               |
| 0991JCN | 9.9  | .3898 | 43                             | 93                               |
| 1001JCN | 10.0   | .3937 | 43                             | 93                               |
| 1011JCN | 10.1   | .3976 | 43                             | 100                              |
| 1021JCN | 10.2   | .4016 | 43                             | 100                              |
| 1031JCN | 10.3   | .4055 | 43                             | 100                              |



up to 4mm  
bis 4mm

over 4mm  
über 4mm

P.415

► **Application :** Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

► **Advantage :** Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special Design - reaming is not required  
- good chip removal  
- powerful drilling

► **Plain Shank :** DIN6535-HA

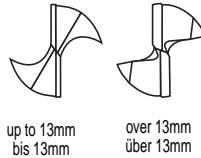
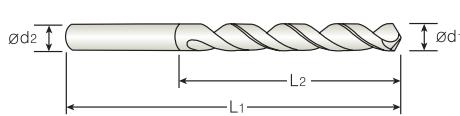
Unit : mm

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|-------|--------------------------------|----------------------------------|
|         | Metric   | Inch  |                                |                                  |
| 1041JCN | 10.4   | .4094 | 43                             | 100                              |
| 1051JCN | 10.5   | .4134 | 43                             | 100                              |
| 1061JCN | 10.6   | .4173 | 43                             | 100                              |
| 1071JCN | 10.7   | .4213 | 47                             | 104                              |
| 1081JCN | 10.8   | .4252 | 47                             | 104                              |
| 1091JCN | 10.9   | .4291 | 47                             | 104                              |
| 1101JCN | 11.0   | .4331 | 47                             | 104                              |
| 1111JCN | 11.1   | .4370 | 47                             | 104                              |
| 1121JCN | 11.2   | .4409 | 47                             | 104                              |
| 1131JCN | 11.3   | .4449 | 47                             | 104                              |
| 1141JCN | 11.4   | .4488 | 47                             | 104                              |
| 1151JCN | 11.5   | .4528 | 47                             | 104                              |
| 1161JCN | 11.6   | .4567 | 47                             | 104                              |
| 1171JCN | 11.7   | .4606 | 47                             | 104                              |

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|-------|--------------------------------|----------------------------------|
|         | Metric   | Inch  |                                |                                  |
| 1181JCN | 11.8   | .4646 | 47                             | 104                              |
| 1191JCN | 11.9   | .4685 | 51                             | 108                              |
| 1201JCN | 12.0   | .4724 | 51                             | 108                              |
| 1211JCN | 12.1   | .4764 | 51                             | 108                              |
| 1221JCN | 12.2   | .4803 | 51                             | 108                              |
| 1231JCN | 12.3   | .4843 | 51                             | 108                              |
| 1241JCN | 12.4   | .4882 | 51                             | 108                              |
| 1251JCN | 12.5   | .4921 | 51                             | 108                              |
| 1261JCN | 12.6   | .4961 | 51                             | 108                              |
| 1271JCN | 12.7   | .5000 | 51                             | 108                              |
| 1281JCN | 12.8   | .5039 | 51                             | 108                              |
| 1291JCN | 12.9   | .5079 | 51                             | 108                              |
| 1301JCN | 13.0   | .5118 | 51                             | 108                              |



P.415

up to 4mm  
bis 4mmover 4mm  
über 4mm

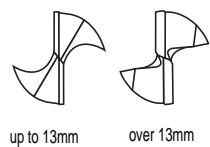
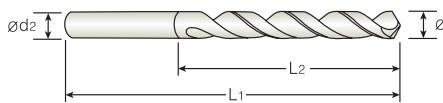
- **Application** : Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
- **Advantage** : High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling  
Wide flute and stub length-increasing chip removal and reducing vibration and deflecton.  
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life  
High quality-good surface finishes, high productivity.

## Jobber series

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) | Unit : mm |        |       |                                |
|---------|--|-------|--------------------------------|----------------------------------|-----------|--------|-------|--------------------------------|
|         | Metric   | Inch  |                                |                                  | EDP No.   | Metric | Inch  | Flute Length (L <sub>2</sub> ) |
| 0201KCN | 2.0  | .0787 | 24                             | 56                               | 0621KCN   | 6.2    | .2441 | 63                             |
| 0211KCN | 2.1  | .0827 | 24                             | 56                               | 0631KCN   | 6.3    | .2480 | 63                             |
| 0221KCN | 2.2  | .0866 | 27                             | 59                               | 0641KCN   | 6.4    | .2520 | 63                             |
| 0231KCN | 2.3  | .0906 | 27                             | 59                               | 0651KCN   | 6.5    | .2559 | 63                             |
| 0241KCN | 2.4  | .0945 | 30                             | 62                               | 0661KCN   | 6.6    | .2598 | 63                             |
| 0251KCN | 2.5  | .0984 | 30                             | 62                               | 0671KCN   | 6.7    | .2638 | 63                             |
| 0261KCN | 2.6  | .1024 | 30                             | 62                               | 0681KCN   | 6.8    | .2677 | 69                             |
| 0271KCN | 2.7  | .1063 | 33                             | 65                               | 0691KCN   | 6.9    | .2717 | 69                             |
| 0281KCN | 2.8  | .1102 | 33                             | 65                               | 0701KCN   | 7.0    | .2756 | 69                             |
| 0291KCN | 2.9  | .1142 | 33                             | 65                               | 0711KCN   | 7.1    | .2795 | 69                             |
| 0301KCN | 3.0  | .1181 | 33                             | 65                               | 0721KCN   | 7.2    | .2835 | 69                             |
| 0311KCN | 3.1  | .1220 | 36                             | 68                               | 0731KCN   | 7.3    | .2874 | 69                             |
| 0321KCN | 3.2  | .1260 | 36                             | 68                               | 0741KCN   | 7.4    | .2913 | 69                             |
| 0331KCN | 3.3  | .1299 | 36                             | 68                               | 0751KCN   | 7.5    | .2953 | 69                             |
| 0341KCN | 3.4  | .1339 | 39                             | 71                               | 0761KCN   | 7.6    | .2992 | 75                             |
| 0351KCN | 3.5  | .1378 | 39                             | 71                               | 0771KCN   | 7.7    | .3031 | 75                             |
| 0361KCN | 3.6  | .1417 | 39                             | 71                               | 0781KCN   | 7.8    | .3071 | 75                             |
| 0371KCN | 3.7  | .1457 | 39                             | 71                               | 0791KCN   | 7.9    | .3110 | 75                             |
| 0381KCN | 3.8  | .1496 | 43                             | 75                               | 0801KCN   | 8.0    | .3150 | 75                             |
| 0391KCN | 3.9  | .1535 | 43                             | 75                               | 0811KCN   | 8.1    | .3189 | 75                             |
| 0401KCN | 4.0  | .1575 | 43                             | 75                               | 0821KCN   | 8.2    | .3228 | 75                             |
| 0411KCN | 4.1  | .1614 | 43                             | 87                               | 0831KCN   | 8.3    | .3268 | 75                             |
| 0421KCN | 4.2  | .1654 | 43                             | 87                               | 0841KCN   | 8.4    | .3307 | 75                             |
| 0431KCN | 4.3  | .1693 | 47                             | 91                               | 0851KCN   | 8.5    | .3346 | 75                             |
| 0441KCN | 4.4  | .1732 | 47                             | 91                               | 0861KCN   | 8.6    | .3386 | 81                             |
| 0451KCN | 4.5  | .1772 | 47                             | 91                               | 0871KCN   | 8.7    | .3425 | 81                             |
| 0461KCN | 4.6  | .1811 | 47                             | 91                               | 0881KCN   | 8.8    | .3465 | 81                             |
| 0471KCN | 4.7  | .1850 | 47                             | 91                               | 0891KCN   | 8.9    | .3504 | 81                             |
| 0481KCN | 4.8  | .1890 | 52                             | 96                               | 0901KCN   | 9.0    | .3543 | 81                             |
| 0491KCN | 4.9  | .1929 | 52                             | 96                               | 0911KCN   | 9.1    | .3583 | 81                             |
| 0501KCN | 5.0  | .1969 | 52                             | 96                               | 0921KCN   | 9.2    | .3622 | 81                             |
| 0511KCN | 5.1  | .2008 | 52                             | 96                               | 0931KCN   | 9.3    | .3661 | 81                             |
| 0521KCN | 5.2  | .2047 | 52                             | 96                               | 0941KCN   | 9.4    | .3701 | 81                             |
| 0531KCN | 5.3  | .2087 | 52                             | 96                               | 0951KCN   | 9.5    | .3740 | 81                             |
| 0541KCN | 5.4  | .2126 | 57                             | 101                              | 0961KCN   | 9.6    | .3780 | 87                             |
| 0551KCN | 5.5  | .2165 | 57                             | 101                              | 0971KCN   | 9.7    | .3819 | 87                             |
| 0561KCN | 5.6  | .2205 | 57                             | 101                              | 0981KCN   | 9.8    | .3858 | 87                             |
| 0571KCN | 5.7  | .2244 | 57                             | 101                              | 0991KCN   | 9.9    | .3898 | 87                             |
| 0581KCN | 5.8  | .2283 | 57                             | 101                              | 1001KCN   | 10.0   | .3937 | 87                             |
| 0591KCN | 5.9  | .2323 | 57                             | 101                              | 1011KCN   | 10.1   | .3976 | 87                             |
| 0601KCN | 6.0  | .2362 | 57                             | 101                              | 1021KCN   | 10.2   | .4016 | 87                             |
| 0611KCN | 6.1  | .2402 | 63                             | 107                              | 1031KCN   | 10.3   | .4055 | 87                             |

up to 4mm  
bis 4mm  
über 4mm

P.415



## Jobber series

- Application :** Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.
- Advantage :** High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling  
Wide flute and stub length-increasing chip removal and reducing vibration and deflection.  
High vanadium HSS-EX material with superior TiN coating  
- higher speed and feed, longer service life  
High quality-good surface finishes, high productivity.

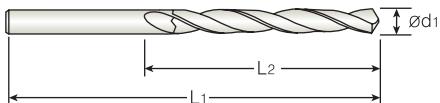
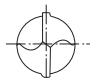
Unit : mm

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|-------|--------------------------------|----------------------------------|
|         | Metric   | Inch  |                                |                                  |
| 1041KCN | 10.4   | .4094 | 87                             | 144                              |
| 1051KCN | 10.5   | .4134 | 87                             | 144                              |
| 1061KCN | 10.6   | .4173 | 87                             | 144                              |
| 1071KCN | 10.7   | .4213 | 94                             | 151                              |
| 1081KCN | 10.8   | .4252 | 94                             | 151                              |
| 1091KCN | 10.9   | .4291 | 94                             | 151                              |
| 1101KCN | 11.0   | .4331 | 94                             | 151                              |
| 1111KCN | 11.1   | .4370 | 94                             | 151                              |
| 1121KCN | 11.2   | .4409 | 94                             | 151                              |
| 1131KCN | 11.3   | .4449 | 94                             | 151                              |
| 1141KCN | 11.4   | .4488 | 94                             | 151                              |
| 1151KCN | 11.5   | .4528 | 94                             | 151                              |
| 1161KCN | 11.6   | .4567 | 94                             | 151                              |
| 1171KCN | 11.7   | .4606 | 94                             | 151                              |
| 1181KCN | 11.8   | .4646 | 94                             | 151                              |
| 1191KCN | 11.9   | .4685 | 101                            | 158                              |
| 1201KCN | 12.0   | .4724 | 101                            | 158                              |
| 1211KCN | 12.1   | .4764 | 101                            | 158                              |
| 1221KCN | 12.2   | .4803 | 101                            | 158                              |
| 1231KCN | 12.3   | .4843 | 101                            | 158                              |
| 1241KCN | 12.4   | .4882 | 101                            | 158                              |
| 1251KCN | 12.5   | .4921 | 101                            | 158                              |
| 1261KCN | 12.6   | .4961 | 101                            | 158                              |

| EDP No. | Diameter ( $\varnothing d_1 = \varnothing d_2$ ) |       | Flute Length (L <sub>2</sub> ) | Overall Length (L <sub>1</sub> ) |
|---------|--|-------|--------------------------------|----------------------------------|
|         | Metric   | Inch  |                                |                                  |
| 1271KCN | 12.7   | .5000 | 101                            | 158                              |
| 1281KCN | 12.8   | .5039 | 101                            | 158                              |
| 1291KCN | 12.9   | .5079 | 101                            | 158                              |
| 1301KCN | 13.0   | .5118 | 101                            | 158                              |
| 1351KCN | 13.5   | .5315 | 106                            | 166                              |
| 1401KCN | 14.0   | .5512 | 106                            | 166                              |
| 1411KCN | 14.1   | .5551 | 109                            | 169                              |
| 1451KCN | 14.5   | .5709 | 109                            | 169                              |
| 1501KCN | 15.0   | .5906 | 109                            | 169                              |
| 1551KCN | 15.5   | .6102 | 112                            | 172                              |
| 1561KCN | 15.6   | .6141 | 112                            | 172                              |
| 1601KCN | 16.0   | .6299 | 112                            | 172                              |
| 1651KCN | 16.5   | .6496 | 115                            | 181                              |
| 1701KCN | 17.0   | .6693 | 115                            | 181                              |
| 1751KCN | 17.5   | .6890 | 118                            | 184                              |
| 1761KCN | 17.6   | .6929 | 118                            | 184                              |
| 1801KCN | 18.0   | .7087 | 118                            | 184                              |
| 1851KCN | 18.5   | .7283 | 122                            | 188                              |
| 1901KCN | 19.0   | .7480 | 122                            | 188                              |
| 1951KCN | 19.5   | .7677 | 125                            | 191                              |
| 1961KCN | 19.6   | .7716 | 125                            | 191                              |
| 2001KCN | 20.0   | .7874 | 125                            | 191                              |

**GOLD-P  
DRILLS**

# HSS, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



**HSS**



*N*  
30°



*h8*



135°



P.416

► Flute Geometry

: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Surface treatment

: Bright body TiN coating on working part

► Application

: Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

## ► Fractional sizes

Unit:inch

| EDP No.       | SIZE  | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|-------|-------|----------------|----------------|
| ** D1GP113003 | 3/64  | .0469 | 3/4            | 1-3/4          |
| ** D1GP182004 | 1/16  | .0625 | 7/8            | 1-7/8          |
| ** D1GP182005 | 5/64  | .0781 | 1              | 2              |
| ** D1GP182006 | 3/32  | .0938 | 1-1/4          | 2-1/4          |
| ** D1GP182007 | 7/64  | .1094 | 1-1/2          | 2-5/8          |
| ** D1GP182008 | 1/8   | .1250 | 1-5/8          | 2-3/4          |
| ** D1GP182009 | 9/64  | .1406 | 1-3/4          | 2-7/8          |
| ** D1GP182010 | 5/32  | .1563 | 2              | 3-1/8          |
| ** D1GP182011 | 11/64 | .1719 | 2-1/8          | 3-1/4          |
| ** D1GP182012 | 3/16  | .1875 | 2-5/16         | 3-1/2          |
| ** D1GP182013 | 13/64 | .2031 | 2-7/16         | 3-5/8          |
| ** D1GP182014 | 7/32  | .2188 | 2-1/2          | 3-3/4          |
| ** D1GP182015 | 15/64 | .2344 | 2-5/8          | 3-7/8          |
| ** D1GP182016 | 1/4   | .2500 | 2-3/4          | 4              |
| ** D1GP182017 | 17/64 | .2656 | 2-7/8          | 4-1/8          |
| ** D1GP182018 | 9/32  | .2813 | 2-15/16        | 4-1/4          |
| ** D1GP182019 | 19/64 | .2969 | 3-1/16         | 4-3/8          |
| ** D1GP182020 | 5/16  | .3125 | 3-3/16         | 4-1/2          |
| * D1GP182021  | 21/64 | .3281 | 3-5/16         | 4-5/8          |
| * D1GP182022  | 11/32 | .3438 | 3-7/16         | 4-3/4          |
| * D1GP182023  | 23/64 | .3594 | 3-1/2          | 4-7/8          |
| * D1GP182024  | 3/8   | .3750 | 3-5/8          | 5              |
| * D1GP182025  | 25/64 | .3906 | 3-3/4          | 5-1/8          |
| * D1GP182026  | 13/32 | .4063 | 3-7/8          | 5-1/4          |
| * D1GP182027  | 27/64 | .4219 | 3-15/16        | 5-3/8          |
| * D1GP182028  | 7/16  | .4375 | 4-1/16         | 5-1/2          |
| * D1GP182029  | 29/64 | .4531 | 4-3/16         | 5-5/8          |

## ► Letter sizes

Unit:inch

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** D1GP139101 | A    | .2340 | 2-5/8          | 3-7/8          |
| ** D1GP139102 | B    | .2380 | 2-3/4          | 4              |
| ** D1GP139103 | C    | .2420 | 2-3/4          | 4              |
| ** D1GP139104 | D    | .2460 | 2-3/4          | 4              |
| ** D1GP139105 | E    | .2500 | 2-3/4          | 4              |
| ** D1GP139106 | F    | .2570 | 2-7/8          | 4-1/8          |
| ** D1GP139107 | G    | .2610 | 2-7/8          | 4-1/8          |
| ** D1GP139108 | H    | .2660 | 2-7/8          | 4-1/8          |
| ** D1GP139109 | I    | .2720 | 2-7/8          | 4-1/8          |
| ** D1GP139110 | J    | .2770 | 2-7/8          | 4-1/8          |
| ** D1GP139111 | K    | .2810 | 2-15/16        | 4-1/4          |
| ** D1GP139112 | L    | .2900 | 2-15/16        | 4-1/4          |
| ** D1GP139113 | M    | .2950 | 3-1/16         | 4-3/8          |
| ** D1GP139114 | N    | .3020 | 3-1/16         | 4-3/8          |
| ** D1GP139115 | O    | .3160 | 3-3/16         | 4-1/2          |
| ** D1GP139116 | P    | .3230 | 3-5/16         | 4-5/8          |
| * D1GP139117  | Q    | .3320 | 3-7/16         | 4-3/4          |
| * D1GP139118  | R    | .3390 | 3-7/16         | 4-3/4          |
| * D1GP139119  | S    | .3480 | 3-1/2          | 4-7/8          |
| * D1GP139120  | T    | .3580 | 3-1/2          | 4-7/8          |
| * D1GP139121  | U    | .3680 | 3-5/8          | 5              |
| * D1GP139122  | V    | .3770 | 3-5/8          | 5              |
| * D1GP139123  | W    | .3860 | 3-3/4          | 5-1/8          |
| * D1GP139124  | X    | .3970 | 3-3/4          | 5-1/8          |
| * D1GP139125  | Y    | .4040 | 3-7/8          | 5-1/4          |
| * D1GP139126  | Z    | .4130 | 3-7/8          | 5-1/4          |

\* 5per package

\*\* 10per package

Tolerance of D

upto 1/8(.1250)

0~ -.0005

/ over 1/8(.1250) ~ upto 1/4(.2500)

0~ -.0007

/ over 1/4(.2500) ~ upto 1/2(.5000)

0~ -.0010

**GOLD-P  
DRILLS**

**HSS, STRAIGHT SHANK, JOBBER LENGTH,  
GOLD-P COATED**



P.416

- Flute Geometry : Right hand spiral, wider flutes
- Point Angle : 135°:Split point... .059 diameter and over.
- Surface treatment : Bright body TiN coating on working part
- Application : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

### ► Wire gauge sizes

Unit:inch

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** D1GP138256 | 1    | .2280 | 2-5/8          | 3-7/8          |
| ** D1GP138255 | 2    | .2210 | 2-5/8          | 3-7/8          |
| ** D1GP138254 | 3    | .2130 | 2-1/2          | 3-3/4          |
| ** D1GP138253 | 4    | .2090 | 2-1/2          | 3-3/4          |
| ** D1GP138252 | 5    | .2055 | 2-1/2          | 3-3/4          |
| ** D1GP138251 | 6    | .2040 | 2-1/2          | 3-3/4          |
| ** D1GP138250 | 7    | .2010 | 2-7/16         | 3-5/8          |
| ** D1GP138249 | 8    | .1990 | 2-7/16         | 3-5/8          |
| ** D1GP138248 | 9    | .1960 | 2-7/16         | 3-5/8          |
| ** D1GP138247 | 10   | .1935 | 2-7/16         | 3-5/8          |
| ** D1GP138246 | 11   | .1910 | 2-5/16         | 3-1/2          |
| ** D1GP138245 | 12   | .1890 | 2-5/16         | 3-1/2          |
| ** D1GP138244 | 13   | .1850 | 2-5/16         | 3-1/2          |
| ** D1GP138243 | 14   | .1820 | 2-3/16         | 3-3/8          |
| ** D1GP138242 | 15   | .1800 | 2-3/16         | 3-3/8          |
| ** D1GP138241 | 16   | .1770 | 2-3/16         | 3-3/8          |
| ** D1GP138240 | 17   | .1730 | 2-3/16         | 3-3/8          |
| ** D1GP138239 | 18   | .1695 | 2-1/8          | 3-1/4          |
| ** D1GP138238 | 19   | .1660 | 2-1/8          | 3-1/4          |
| ** D1GP138237 | 20   | .1610 | 2-1/8          | 3-1/4          |
| ** D1GP138236 | 21   | .1590 | 2-1/8          | 3-1/4          |
| ** D1GP138235 | 22   | .1570 | 2              | 3-1/8          |
| ** D1GP138234 | 23   | .1540 | 2              | 3-1/8          |
| ** D1GP138233 | 24   | .1520 | 2              | 3-1/8          |
| ** D1GP138232 | 25   | .1495 | 1-7/8          | 3              |
| ** D1GP138231 | 26   | .1470 | 1-7/8          | 3              |
| ** D1GP138230 | 27   | .1440 | 1-7/8          | 3              |
| ** D1GP138229 | 28   | .1405 | 1-3/4          | 2-7/8          |

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** D1GP138228 | 29   | .1360 | 1-3/4          | 2-7/8          |
| ** D1GP138227 | 30   | .1285 | 1-5/8          | 2-3/4          |
| ** D1GP138226 | 31   | .1200 | 1-5/8          | 2-3/4          |
| ** D1GP138225 | 32   | .1160 | 1-5/8          | 2-3/4          |
| ** D1GP138224 | 33   | .1130 | 1-1/2          | 2-5/8          |
| ** D1GP138223 | 34   | .1110 | 1-1/2          | 2-5/8          |
| ** D1GP138222 | 35   | .1100 | 1-1/2          | 2-5/8          |
| ** D1GP138221 | 36   | .1065 | 1-7/16         | 2-1/2          |
| ** D1GP138220 | 37   | .1040 | 1-7/16         | 2-1/2          |
| ** D1GP138219 | 38   | .1015 | 1-7/16         | 2-1/2          |
| ** D1GP138218 | 39   | .0995 | 1-3/8          | 2-3/8          |
| ** D1GP138217 | 40   | .0980 | 1-3/8          | 2-3/8          |
| ** D1GP138216 | 41   | .0960 | 1-3/8          | 2-3/8          |
| ** D1GP138215 | 42   | .0935 | 1-1/4          | 2-1/4          |
| ** D1GP138214 | 43   | .0890 | 1-1/4          | 2-1/4          |
| ** D1GP138213 | 44   | .0860 | 1-1/8          | 2-1/8          |
| ** D1GP138212 | 45   | .0820 | 1-1/8          | 2-1/8          |
| ** D1GP138211 | 46   | .0810 | 1-1/8          | 2-1/8          |
| ** D1GP138210 | 47   | .0785 | 1              | 2              |
| ** D1GP138209 | 48   | .0760 | 1              | 2              |
| ** D1GP138208 | 49   | .0730 | 1              | 2              |
| ** D1GP138207 | 50   | .0700 | 1              | 2              |
| ** D1GP138206 | 51   | .0670 | 1              | 2              |
| ** D1GP138205 | 52   | .0635 | 7/8            | 1-7/8          |
| ** D1GP134204 | 53   | .0595 | 7/8            | 1-7/8          |
| ** D1GP134203 | 54   | .0550 | 7/8            | 1-7/8          |
| ** D1GP134202 | 55   | .0520 | 7/8            | 1-7/8          |
| ** D1GP134201 | 56   | .0465 | 3/4            | 1-3/4          |

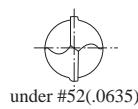
\* 5per package

\*\* 10per package

|                |                                   |
|----------------|-----------------------------------|
| Tolerance of D | upto 1/8(.1250)                   |
|                | 0~ -.0005                         |
|                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                | 0~ -.0007                         |
|                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                | 0~ -.0010                         |

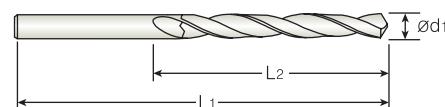


# HSSCo8, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED



P.416

- Flute Geometry : Right hand spiral, wider flutes
- Point Angle : 135°:Split point... .059 diameter and over.
- Surface treatment : Bright body TiN coating on working part
- Application : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron



## ► Fractional sizes

Unit:inch

| EDP No.       | SIZE  | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|-------|-------|----------------|----------------|
| ** D2GP185003 | 3/64  | .0469 | 3/4            | 1-3/4          |
| ** D2GP185004 | 1/16  | .0625 | 7/8            | 1-7/8          |
| ** D2GP185005 | 5/64  | .0781 | 1              | 2              |
| ** D2GP185006 | 3/32  | .0938 | 1-1/4          | 2-1/4          |
| ** D2GP185007 | 7/64  | .1094 | 1-1/2          | 2-5/8          |
| ** D2GP185008 | 1/8   | .1250 | 1-5/8          | 2-3/4          |
| ** D2GP185009 | 9/64  | .1406 | 1-3/4          | 2-7/8          |
| ** D2GP185010 | 5/32  | .1563 | 2              | 3-1/8          |
| ** D2GP185011 | 11/64 | .1719 | 2-1/8          | 3-1/4          |
| ** D2GP185012 | 3/16  | .1875 | 2-5/16         | 3-1/2          |
| ** D2GP185013 | 13/64 | .2031 | 2-7/16         | 3-5/8          |
| ** D2GP185014 | 7/32  | .2188 | 2-1/2          | 3-3/4          |
| ** D2GP185015 | 15/64 | .2344 | 2-5/8          | 3-7/8          |
| ** D2GP185016 | 1/4   | .2500 | 2-3/4          | 4              |
| ** D2GP185017 | 17/64 | .2656 | 2-7/8          | 4-1/8          |
| ** D2GP185018 | 9/32  | .2813 | 2-15/16        | 4-1/4          |
| ** D2GP185019 | 19/64 | .2969 | 3-1/16         | 4-3/8          |
| ** D2GP185020 | 5/16  | .3125 | 3-3/16         | 4-1/2          |
| * D2GP185021  | 21/64 | .3281 | 3-5/16         | 4-5/8          |
| * D2GP185022  | 11/32 | .3438 | 3-7/16         | 4-3/4          |
| * D2GP185023  | 23/64 | .3594 | 3-1/2          | 4-7/8          |
| * D2GP185024  | 3/8   | .3750 | 3-5/8          | 5              |
| * D2GP185025  | 25/64 | .3906 | 3-3/4          | 5-1/8          |
| * D2GP185026  | 13/32 | .4063 | 3-7/8          | 5-1/4          |
| * D2GP185027  | 27/64 | .4219 | 3-15/16        | 5-3/8          |
| * D2GP185028  | 7/16  | .4375 | 4-1/16         | 5-1/2          |
| * D2GP185029  | 29/64 | .4531 | 4-3/16         | 5-5/8          |
| * D2GP185030  | 15/32 | .4688 | 4-5/16         | 5-3/4          |
| * D2GP185031  | 31/64 | .4844 | 4-3/8          | 5-7/8          |
| * D2GP185032  | 1/2   | .5000 | 4-1/2          | 6              |

## ► Letter sizes

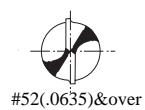
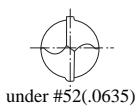
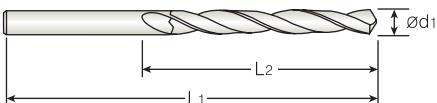
Unit:inch

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| D2GP186101 | A    | .2340 | 2-5/8          | 3-7/8          |
| D2GP186102 | B    | .2380 | 2-3/4          | 4              |
| D2GP186103 | C    | .2420 | 2-3/4          | 4              |
| D2GP186104 | D    | .2460 | 2-3/4          | 4              |
| D2GP186016 | E    | .2500 | 2-3/4          | 4              |
| D2GP186106 | F    | .2570 | 2-7/8          | 4-1/8          |
| D2GP186107 | G    | .2610 | 2-7/8          | 4-1/8          |
| D2GP186108 | H    | .2660 | 2-7/8          | 4-1/8          |
| D2GP186109 | I    | .2720 | 2-7/8          | 4-1/8          |
| D2GP186110 | J    | .2770 | 2-7/8          | 4-1/8          |
| D2GP186111 | K    | .2810 | 2-15/16        | 4-1/4          |
| D2GP186112 | L    | .2900 | 2-15/16        | 4-1/4          |
| D2GP186113 | M    | .2950 | 3-1/16         | 4-3/8          |
| D2GP186114 | N    | .3020 | 3-1/16         | 4-3/8          |
| D2GP186115 | O    | .3160 | 3-3/16         | 4-1/2          |
| D2GP186116 | P    | .3230 | 3-5/16         | 4-5/8          |
| D2GP186117 | Q    | .3320 | 3-7/16         | 4-3/4          |
| D2GP186118 | R    | .3390 | 3-7/16         | 4-3/4          |
| D2GP186119 | S    | .3480 | 3-1/2          | 4-7/8          |
| D2GP186120 | T    | .3580 | 3-1/2          | 4-7/8          |
| D2GP186121 | U    | .3680 | 3-5/8          | 5              |
| D2GP186122 | V    | .3770 | 3-5/8          | 5              |
| D2GP186123 | W    | .3860 | 3-3/4          | 5-1/8          |
| D2GP186124 | X    | .3970 | 3-3/4          | 5-1/8          |
| D2GP186125 | Y    | .4040 | 3-7/8          | 5-1/4          |
| D2GP186126 | Z    | .4130 | 3-7/8          | 5-1/4          |

\* 5per package

\*\* 10per package

|                |                                     |
|----------------|-------------------------------------|
| Tolerance of D | upto 1/8(.1250)                     |
|                | 0~-.0005                            |
|                | / over 1/8(.1250) ~ upto 1/4(.2500) |
|                | 0~ -.0007                           |
|                | / over 1/4(.2500) ~ upto 1/2(.5000) |
|                | 0~ -.0010                           |


**ANSI**
**HSS  
Co8**

P.416

- Flute Geometry
- Point Angle
- Surface treatment
- Application

: Right hand spiral, wider flutes  
 : 135°:Split point... .059 diameter and over.  
 : Bright body TiN coating on working part  
 : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

### ► Wire gauge sizes

Unit:inch

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** D2GP187256 | 1    | .2280 | 2-5/8          | 3-7/8          |
| ** D2GP187255 | 2    | .2210 | 2-5/8          | 3-7/8          |
| ** D2GP187254 | 3    | .2130 | 2-1/2          | 3-3/4          |
| ** D2GP187253 | 4    | .2090 | 2-1/2          | 3-3/4          |
| ** D2GP187252 | 5    | .2055 | 2-1/2          | 3-3/4          |
| ** D2GP187251 | 6    | .2040 | 2-1/2          | 3-3/4          |
| ** D2GP187250 | 7    | .2010 | 2-7/16         | 3-5/8          |
| ** D2GP187249 | 8    | .1990 | 2-7/16         | 3-5/8          |
| ** D2GP187248 | 9    | .1960 | 2-7/16         | 3-5/8          |
| ** D2GP187247 | 10   | .1935 | 2-7/16         | 3-5/8          |
| ** D2GP187246 | 11   | .1910 | 2-5/16         | 3-1/2          |
| ** D2GP187245 | 12   | .1890 | 2-5/16         | 3-1/2          |
| ** D2GP187244 | 13   | .1850 | 2-5/16         | 3-1/2          |
| ** D2GP187243 | 14   | .1820 | 2-3/16         | 3-3/8          |
| ** D2GP187242 | 15   | .1800 | 2-3/16         | 3-3/8          |
| ** D2GP187241 | 16   | .1770 | 2-3/16         | 3-3/8          |
| ** D2GP187240 | 17   | .1730 | 2-3/16         | 3-3/8          |
| ** D2GP187239 | 18   | .1695 | 2-1/8          | 3-1/4          |
| ** D2GP187238 | 19   | .1660 | 2-1/8          | 3-1/4          |
| ** D2GP187237 | 20   | .1610 | 2-1/8          | 3-1/4          |
| ** D2GP187236 | 21   | .1590 | 2-1/8          | 3-1/4          |
| ** D2GP187235 | 22   | .1570 | 2              | 3-1/8          |
| ** D2GP187234 | 23   | .1540 | 2              | 3-1/8          |
| ** D2GP187233 | 24   | .1520 | 2              | 3-1/8          |
| ** D2GP187232 | 25   | .1495 | 1-7/8          | 3              |
| ** D2GP187231 | 26   | .1470 | 1-7/8          | 3              |
| ** D2GP187230 | 27   | .1440 | 1-7/8          | 3              |
| ** D2GP187229 | 28   | .1405 | 1-3/4          | 2-7/8          |

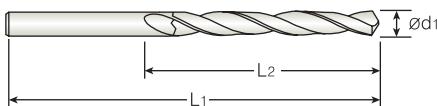
| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** D2GP187228 | 29   | .1360 | 1-3/4          | 2-7/8          |
| ** D2GP187227 | 30   | .1285 | 1-5/8          | 2-3/4          |
| ** D2GP187226 | 31   | .1200 | 1-5/8          | 2-3/4          |
| ** D2GP187225 | 32   | .1160 | 1-5/8          | 2-3/4          |
| ** D2GP187224 | 33   | .1130 | 1-1/2          | 2-5/8          |
| ** D2GP187223 | 34   | .1110 | 1-1/2          | 2-5/8          |
| ** D2GP187222 | 35   | .1100 | 1-1/2          | 2-5/8          |
| ** D2GP187221 | 36   | .1065 | 1-7/16         | 2-1/2          |
| ** D2GP187220 | 37   | .1040 | 1-7/16         | 2-1/2          |
| ** D2GP187219 | 38   | .1015 | 1-7/16         | 2-1/2          |
| ** D2GP187218 | 39   | .0995 | 1-3/8          | 2-3/8          |
| ** D2GP187217 | 40   | .0980 | 1-3/8          | 2-3/8          |
| ** D2GP187216 | 41   | .0960 | 1-3/8          | 2-3/8          |
| ** D2GP187215 | 42   | .0935 | 1-1/4          | 2-1/4          |
| ** D2GP187214 | 43   | .0890 | 1-1/4          | 2-1/4          |
| ** D2GP187213 | 44   | .0860 | 1-1/8          | 2-1/8          |
| ** D2GP187212 | 45   | .0820 | 1-1/8          | 2-1/8          |
| ** D2GP187211 | 46   | .0810 | 1-1/8          | 2-1/8          |
| ** D2GP187210 | 47   | .0785 | 1              | 2              |
| ** D2GP187209 | 48   | .0760 | 1              | 2              |
| ** D2GP187208 | 49   | .0730 | 1              | 2              |
| ** D2GP187207 | 50   | .0700 | 1              | 2              |
| ** D2GP187206 | 51   | .0670 | 1              | 2              |
| ** D2GP187205 | 52   | .0635 | 7/8            | 1-7/8          |
| ** D2GP187204 | 53   | .0595 | 7/8            | 1-7/8          |
| ** D2GP187203 | 54   | .0550 | 7/8            | 1-7/8          |
| ** D2GP187202 | 55   | .0520 | 7/8            | 1-7/8          |
| ** D2GP187201 | 56   | .0465 | 3/4            | 1-3/4          |

\*\* 10per package

|                  |                                   |
|------------------|-----------------------------------|
| Tolerance of D / | upto 1/8(.1250)                   |
|                  | 0~ -.0005                         |
| /                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                  | 0~ -.0007                         |
| /                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                  | 0~ -.0010                         |



# HSSCo5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE, GOLD-P COATED



P.417

► Flute Geometry

: Right hand spiral, 38° helix, parabolic flute.

► Point Angle

: 130°:Split point... .059 diameter and over.

► Surface treatment

: Bright body TiN coating on working part

► Application

: Improved chip removal in most materials, especially in deep drilling applications.

## ► Fractional sizes

Unit:inch

| EDP No.       | SIZE  | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|-------|-------|----------------|----------------|
| ** DLGP511005 | 5/64  | .0781 | 1              | 2              |
| ** DLGP511006 | 3/32  | .0938 | 1-1/4          | 2-1/4          |
| ** DLGP511007 | 7/64  | .1094 | 1-1/2          | 2-5/8          |
| ** DLGP511008 | 1/8   | .1250 | 1-5/8          | 2-3/4          |
| ** DLGP511009 | 9/64  | .1406 | 1-3/4          | 2-7/8          |
| ** DLGP511010 | 5/32  | .1563 | 2              | 3-1/8          |
| ** DLGP511011 | 11/64 | .1719 | 2-1/8          | 3-1/4          |
| ** DLGP511012 | 3/16  | .1875 | 2-5/16         | 3-1/2          |
| ** DLGP511013 | 13/64 | .2031 | 2-7/16         | 3-5/8          |
| ** DLGP511014 | 7/32  | .2188 | 2-1/2          | 3-3/4          |
| ** DLGP511015 | 15/64 | .2344 | 2-5/8          | 3-7/8          |
| ** DLGP511016 | 1/4   | .2500 | 2-3/4          | 4              |
| ** DLGP511017 | 17/64 | .2656 | 2-7/8          | 4-1/8          |
| ** DLGP511018 | 9/32  | .2813 | 2-15/16        | 4-1/4          |
| ** DLGP511019 | 19/64 | .2969 | 3-1/16         | 4-3/8          |
| ** DLGP511020 | 5/16  | .3125 | 3-3/16         | 4-1/2          |
| * DLGP511021  | 21/64 | .3281 | 3-5/16         | 4-5/8          |
| * DLGP511022  | 11/32 | .3438 | 3-7/16         | 4-3/4          |
| * DLGP511023  | 23/64 | .3594 | 3-1/2          | 4-7/8          |
| * DLGP511024  | 3/8   | .3750 | 3-5/8          | 5              |
| * DLGP511025  | 25/64 | .3906 | 3-3/4          | 5-1/8          |
| * DLGP511026  | 13/32 | .4063 | 3-7/8          | 5-1/4          |
| * DLGP511027  | 27/64 | .4219 | 3-15/16        | 5-3/8          |
| * DLGP511028  | 7/16  | .4375 | 4-1/16         | 5-1/2          |
| * DLGP511029  | 29/64 | .4531 | 4-3/16         | 5-5/8          |
| * DLGP511030  | 15/32 | .4688 | 4-5/16         | 5-3/4          |
| * DLGP511031  | 31/64 | .4844 | 4-3/8          | 5-7/8          |
| * DLGP511032  | 1/2   | .5000 | 4-1/2          | 6              |

## ► Letter sizes

Unit:inch

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** DLGP513101 | A    | .2340 | 2-5/8          | 3-7/8          |
| ** DLGP513102 | B    | .2380 | 2-3/4          | 4              |
| ** DLGP513103 | C    | .2420 | 2-3/4          | 4              |
| ** DLGP513104 | D    | .2460 | 2-3/4          | 4              |
| ** DLGP511016 | E    | .2500 | 2-3/4          | 4              |
| ** DLGP513106 | F    | .2570 | 2-7/8          | 4-1/8          |
| ** DLGP513107 | G    | .2610 | 2-7/8          | 4-1/8          |
| ** DLGP513108 | H    | .2660 | 2-7/8          | 4-1/8          |
| ** DLGP513109 | I    | .2720 | 2-7/8          | 4-1/8          |
| ** DLGP513110 | J    | .2770 | 2-7/8          | 4-1/8          |
| ** DLGP513111 | K    | .2810 | 2-15/16        | 4-1/4          |
| ** DLGP513112 | L    | .2900 | 2-15/16        | 4-1/4          |
| ** DLGP513113 | M    | .2950 | 3-1/16         | 4-3/8          |
| ** DLGP513114 | N    | .3020 | 3-1/16         | 4-3/8          |
| ** DLGP513115 | O    | .3160 | 3-3/16         | 4-1/2          |
| ** DLGP513116 | P    | .3230 | 3-5/16         | 4-5/8          |
| * DLGP513117  | Q    | .3320 | 3-7/16         | 4-3/4          |
| * DLGP513118  | R    | .3390 | 3-7/16         | 4-3/4          |
| * DLGP513119  | S    | .3480 | 3-1/2          | 4-7/8          |
| * DLGP513120  | T    | .3580 | 3-1/2          | 4-7/8          |
| * DLGP513121  | U    | .3680 | 3-5/8          | 5              |
| * DLGP513122  | V    | .3770 | 3-5/8          | 5              |
| * DLGP513123  | W    | .3860 | 3-3/4          | 5-1/8          |
| * DLGP513124  | X    | .3970 | 3-3/4          | 5-1/8          |
| * DLGP513125  | Y    | .4040 | 3-7/8          | 5-1/4          |
| * DLGP513126  | Z    | .4130 | 3-7/8          | 5-1/4          |

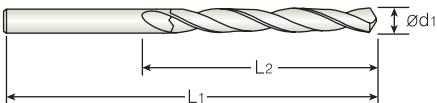
\* 5per package

\*\* 10per package

|                  |                                   |
|------------------|-----------------------------------|
| Tolerance of D / | upto 1/8(.1250)                   |
|                  | 0~ -.0005                         |
| /                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                  | 0~ -.0007                         |
| /                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                  | 0~ -.0010                         |

**GOLD-P  
DRILLS**

# HSSCo5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE, GOLD-P COATED



ANSI

HSS  
Co5

N  
38°

h8

130°

DATA

P.417

- Flute Geometry : Right hand spiral, 38° helix, parabolic flute.
- Point Angle : 130°:Split point... .059 diameter and over.
- Surface treatment : Bright body TiN coating on working part
- Application : Improved chip removal in most materials, especially in deep drilling applications.

## ► Wire gauge sizes

Unit:inch

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** DLGP512247 | 1    | .2280 | 2-5/8          | 3-7/8          |
| ** DLGP512246 | 2    | .2210 | 2-5/8          | 3-7/8          |
| ** DLGP512245 | 3    | .2130 | 2-1/2          | 3-3/4          |
| ** DLGP512244 | 4    | .2090 | 2-1/2          | 3-3/4          |
| ** DLGP512243 | 5    | .2055 | 2-1/2          | 3-3/4          |
| ** DLGP512242 | 6    | .2040 | 2-1/2          | 3-3/4          |
| ** DLGP512241 | 7    | .2010 | 2-7/16         | 3-5/8          |
| ** DLGP512240 | 8    | .1990 | 2-7/16         | 3-5/8          |
| ** DLGP512239 | 9    | .1960 | 2-7/16         | 3-5/8          |
| ** DLGP512238 | 10   | .1935 | 2-7/16         | 3-5/8          |
| ** DLGP512237 | 11   | .1910 | 2-5/16         | 3-1/2          |
| ** DLGP512236 | 12   | .1890 | 2-5/16         | 3-1/2          |
| ** DLGP512235 | 13   | .1850 | 2-5/16         | 3-1/2          |
| ** DLGP512234 | 14   | .1820 | 2-3/16         | 3-3/8          |
| ** DLGP512233 | 15   | .1800 | 2-3/16         | 3-3/8          |
| ** DLGP512232 | 16   | .1770 | 2-3/16         | 3-3/8          |
| ** DLGP512231 | 17   | .1730 | 2-3/16         | 3-3/8          |
| ** DLGP512230 | 18   | .1695 | 2-1/8          | 3-1/4          |
| ** DLGP512229 | 19   | .1660 | 2-1/8          | 3-1/4          |
| ** DLGP512228 | 20   | .1610 | 2-1/8          | 3-1/4          |
| ** DLGP512227 | 21   | .1590 | 2-1/8          | 3-1/4          |
| ** DLGP512226 | 22   | .1570 | 2              | 3-1/8          |
| ** DLGP512225 | 23   | .1540 | 2              | 3-1/8          |
| ** DLGP512224 | 24   | .1520 | 2              | 3-1/8          |

| EDP No.       | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|---------------|------|-------|----------------|----------------|
| ** DLGP512223 | 25   | .1495 | 1-7/8          | 3              |
| ** DLGP512222 | 26   | .1470 | 1-7/8          | 3              |
| ** DLGP512221 | 27   | .1440 | 1-7/8          | 3              |
| ** DLGP512220 | 28   | .1405 | 1-3/4          | 2-7/8          |
| ** DLGP512219 | 29   | .1360 | 1-3/4          | 2-7/8          |
| ** DLGP512218 | 30   | .1285 | 1-5/8          | 2-3/4          |
| ** DLGP512217 | 31   | .1200 | 1-5/8          | 2-3/4          |
| ** DLGP512216 | 32   | .1160 | 1-5/8          | 2-3/4          |
| ** DLGP512215 | 33   | .1130 | 1-1/2          | 2-5/8          |
| ** DLGP512214 | 34   | .1110 | 1-1/2          | 2-5/8          |
| ** DLGP512213 | 35   | .1100 | 1-1/2          | 2-5/8          |
| ** DLGP512212 | 36   | .1065 | 1-7/16         | 2-1/2          |
| ** DLGP512211 | 37   | .1040 | 1-7/16         | 2-1/2          |
| ** DLGP512210 | 38   | .1015 | 1-7/16         | 2-1/2          |
| ** DLGP512209 | 39   | .0995 | 1-3/8          | 2-3/8          |
| ** DLGP512208 | 40   | .0980 | 1-3/8          | 2-3/8          |
| ** DLGP512207 | 41   | .0960 | 1-3/8          | 2-3/8          |
| ** DLGP512206 | 42   | .0935 | 1-1/4          | 2-1/4          |
| ** DLGP512205 | 43   | .0890 | 1-1/4          | 2-1/4          |
| ** DLGP512204 | 44   | .0860 | 1-1/8          | 2-1/8          |
| ** DLGP512203 | 45   | .0820 | 1-1/8          | 2-1/8          |
| ** DLGP512202 | 46   | .0810 | 1-1/8          | 2-1/8          |
| ** DLGP512201 | 47   | .0785 | 1              | 2              |

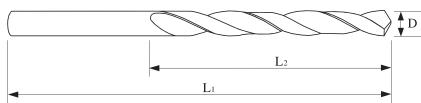
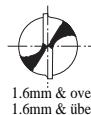
\* 5per package

\*\* 10per package

|                  |                                   |
|------------------|-----------------------------------|
| Tolerance of D / | upto 1/8(.1250)                   |
|                  | 0~ -.0005                         |
| /                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                  | 0~ -.0007                         |
| /                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                  | 0~ -.0010                         |



# HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, GOLD-P COATED HSS DRILLS-METRIC

under 1.6mm  
under 1.6mm1.6mm & over  
1.6mm & überDIN  
338HSS  
Co5N  
33°

h8



133°



DATA

## ► Flute Geometry

## ► Point Angle

## ► Surface treatment

## ► Application

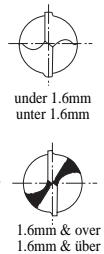
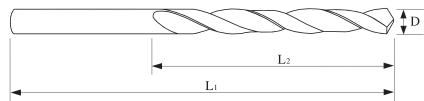
: Right hand spiral, wider flutes.

: 130°:under 1.6mm-Normal point.  
form 1.6mm-Split point.: Bright body TiN coating on working part  
: Drilling in steel, cast steel, alloyed and  
non-alloyed, gray cast iron, graphite,  
malleable cast iron.

Unit:mm

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP195010 | 1    | .0394 | 12             | 34             |
| DLGP195011 | 1.1  | .0433 | 14             | 36             |
| DLGP195012 | 1.2  | .0472 | 16             | 38             |
| DLGP195013 | 1.3  | .0512 | 16             | 38             |
| DLGP195014 | 1.4  | .0551 | 18             | 40             |
| DLGP195015 | 1.5  | .0591 | 18             | 40             |
| DLGP195016 | 1.6  | .0630 | 20             | 43             |
| DLGP195017 | 1.7  | .0669 | 20             | 43             |
| DLGP195018 | 1.8  | .0709 | 22             | 46             |
| DLGP195019 | 1.9  | .0748 | 22             | 46             |
| DLGP195020 | 2    | .0787 | 24             | 49             |
| DLGP195021 | 2.1  | .0827 | 24             | 49             |
| DLGP195022 | 2.2  | .0866 | 27             | 53             |
| DLGP195023 | 2.3  | .0906 | 27             | 53             |
| DLGP195024 | 2.4  | .0945 | 30             | 57             |
| DLGP195025 | 2.5  | .0984 | 30             | 57             |
| DLGP195026 | 2.6  | .1024 | 30             | 57             |
| DLGP195027 | 2.7  | .1063 | 33             | 61             |
| DLGP195028 | 2.8  | .1102 | 33             | 61             |
| DLGP195029 | 2.9  | .1142 | 33             | 61             |
| DLGP195030 | 3    | .1181 | 33             | 61             |
| DLGP195031 | 3.1  | .1220 | 36             | 65             |
| DLGP195032 | 3.2  | .1260 | 36             | 65             |
| DLGP195033 | 3.3  | .1299 | 36             | 65             |
| DLGP195034 | 3.4  | .1339 | 39             | 70             |
| DLGP195035 | 3.5  | .1378 | 39             | 70             |
| DLGP195036 | 3.6  | .1417 | 39             | 70             |
| DLGP195037 | 3.7  | .1457 | 39             | 70             |
| DLGP195038 | 3.8  | .1496 | 43             | 75             |
| DLGP195039 | 3.9  | .1535 | 43             | 75             |
| DLGP195040 | 4    | .1575 | 43             | 75             |
| DLGP195041 | 4.1  | .1614 | 43             | 75             |
| DLGP195042 | 4.2  | .1654 | 43             | 75             |
| DLGP195043 | 4.3  | .1693 | 37             | 80             |
| DLGP195044 | 4.4  | .1732 | 37             | 80             |
| DLGP195045 | 4.5  | .1772 | 37             | 80             |

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP195046 | 4.6  | .1811 | 37             | 80             |
| DLGP195047 | 4.7  | .1850 | 37             | 80             |
| DLGP195048 | 4.8  | .1890 | 52             | 86             |
| DLGP195049 | 4.9  | .1929 | 52             | 86             |
| DLGP195050 | 5    | .1969 | 52             | 86             |
| DLGP195051 | 5.1  | .2008 | 52             | 86             |
| DLGP195052 | 5.2  | .2047 | 52             | 86             |
| DLGP195053 | 5.3  | .2087 | 52             | 86             |
| DLGP195054 | 5.4  | .2126 | 57             | 93             |
| DLGP195055 | 5.5  | .2165 | 57             | 93             |
| DLGP195056 | 5.6  | .2205 | 57             | 93             |
| DLGP195057 | 5.7  | .2244 | 57             | 93             |
| DLGP195058 | 5.8  | .2283 | 57             | 93             |
| DLGP195059 | 5.9  | .2323 | 57             | 93             |
| DLGP195060 | 6    | .2362 | 57             | 93             |
| DLGP195061 | 6.1  | .2402 | 63             | 101            |
| DLGP195062 | 6.2  | .2441 | 63             | 101            |
| DLGP195063 | 6.3  | .2480 | 63             | 101            |
| DLGP195064 | 6.4  | .2520 | 63             | 101            |
| DLGP195065 | 6.5  | .2559 | 63             | 101            |
| DLGP195066 | 6.6  | .2598 | 63             | 101            |
| DLGP195067 | 6.7  | .2638 | 63             | 101            |
| DLGP195068 | 6.8  | .2677 | 69             | 109            |
| DLGP195069 | 6.9  | .2717 | 69             | 109            |
| DLGP195070 | 7    | .2756 | 69             | 109            |
| DLGP195071 | 7.1  | .2795 | 69             | 109            |
| DLGP195072 | 7.2  | .2835 | 69             | 109            |
| DLGP195073 | 7.3  | .2874 | 69             | 109            |
| DLGP195074 | 7.4  | .2913 | 69             | 109            |
| DLGP195075 | 7.5  | .2953 | 69             | 109            |
| DLGP195076 | 7.6  | .2992 | 75             | 117            |
| DLGP195077 | 7.7  | .3031 | 75             | 117            |
| DLGP195078 | 7.8  | .3071 | 75             | 117            |
| DLGP195079 | 7.9  | .3110 | 75             | 117            |
| DLGP195080 | 8    | .3150 | 75             | 117            |
| DLGP195081 | 8.1  | .3189 | 75             | 117            |


**DIN  
338**
**HSS  
Co5**

**► Flute Geometry**

: Right hand spiral, wider flutes.

**► Point Angle**

 : 130° : under 1.6mm-Normal point.  
form 1.6mm-Split point.

**► Surface treatment**

: Bright body TiN coating on working part

**► Application**

 : Drilling in steel, cast steel, alloyed and  
non-alloyed, gray cast iron, graphite,  
malleable cast iron.

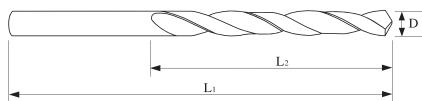
Unit:mm

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP195082 | 8.2  | .3228 | 75             | 117            |
| DLGP195083 | 8.3  | .3268 | 75             | 117            |
| DLGP195084 | 8.4  | .3307 | 75             | 117            |
| DLGP195085 | 8.5  | .3346 | 75             | 117            |
| DLGP195086 | 8.6  | .3386 | 81             | 125            |
| DLGP195087 | 8.7  | .3425 | 81             | 125            |
| DLGP195088 | 8.8  | .3465 | 81             | 125            |
| DLGP195089 | 8.9  | .3504 | 81             | 125            |
| DLGP195090 | 9    | .3543 | 81             | 125            |
| DLGP195091 | 9.1  | .3583 | 81             | 125            |
| DLGP195092 | 9.2  | .3622 | 81             | 125            |
| DLGP195093 | 9.3  | .3661 | 81             | 125            |
| DLGP195094 | 9.4  | .3701 | 81             | 125            |
| DLGP195095 | 9.5  | .3740 | 81             | 125            |
| DLGP195096 | 9.6  | .3780 | 87             | 133            |
| DLGP195097 | 9.7  | .3819 | 87             | 133            |
| DLGP195098 | 9.8  | .3858 | 87             | 133            |
| DLGP195099 | 9.9  | .3898 | 87             | 133            |
| DLGP195100 | 10   | .3937 | 87             | 133            |
| DLGP195101 | 10.1 | .3976 | 87             | 133            |
| DLGP195102 | 10.2 | .4016 | 87             | 133            |
| DLGP195103 | 10.3 | .4055 | 87             | 133            |
| DLGP195104 | 10.4 | .4094 | 87             | 133            |
| DLGP195105 | 10.5 | .4134 | 87             | 133            |
| DLGP195106 | 10.6 | .4173 | 87             | 133            |

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP195107 | 10.7 | .4213 | 94             | 142            |
| DLGP195108 | 10.8 | .4252 | 94             | 142            |
| DLGP195109 | 10.9 | .4291 | 94             | 142            |
| DLGP195110 | 11   | .4331 | 94             | 142            |
| DLGP195111 | 11.1 | .4370 | 94             | 142            |
| DLGP195112 | 11.2 | .4409 | 94             | 142            |
| DLGP195113 | 11.3 | .4449 | 94             | 142            |
| DLGP195114 | 11.4 | .4488 | 94             | 142            |
| DLGP195115 | 11.5 | .4528 | 94             | 142            |
| DLGP195116 | 11.6 | .4567 | 94             | 142            |
| DLGP195117 | 11.7 | .4606 | 94             | 142            |
| DLGP195118 | 11.8 | .4646 | 94             | 142            |
| DLGP195119 | 11.9 | .4685 | 101            | 151            |
| DLGP195120 | 12   | .4724 | 101            | 151            |
| DLGP195121 | 12.1 | .4764 | 101            | 151            |
| DLGP195122 | 12.2 | .4803 | 101            | 151            |
| DLGP195123 | 12.3 | .4843 | 101            | 151            |
| DLGP195124 | 12.4 | .4882 | 101            | 151            |
| DLGP195125 | 12.5 | .4921 | 101            | 151            |
| DLGP195126 | 12.6 | .4961 | 101            | 151            |
| DLGP195127 | 12.7 | .5000 | 101            | 151            |
| DLGP195128 | 12.8 | .5039 | 101            | 151            |
| DLGP195129 | 12.9 | .5079 | 101            | 151            |
| DLGP195130 | 13   | .5118 | 101            | 151            |



# HSS Co5, STRAIGHT SHANK, JOBBER LENGTH, PARABOLIC FLUTE FOR DEEP HOLES, GOLD-P COATED HSS DRILLS-METRIC

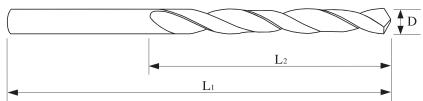


- Flute Geometry : Right hand spiral, 38helix, Parabolic flutes.
- Point Angle : 130°:Split point.  
form 1.6mm-Split point.
- Surface treatment : Bright body TiN coating on working part
- Application : Improved chip removal in most materials,  
especially in deep drilling applications.

Unit:mm

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP506020 | 2    | .0787 | 24             | 49             |
| DLGP506021 | 2.1  | .0827 | 24             | 49             |
| DLGP506022 | 2.2  | .0866 | 27             | 53             |
| DLGP506023 | 2.3  | .0906 | 27             | 53             |
| DLGP506024 | 2.4  | .0945 | 30             | 57             |
| DLGP506025 | 2.5  | .0984 | 30             | 57             |
| DLGP506026 | 2.6  | .1024 | 30             | 57             |
| DLGP506027 | 2.7  | .1063 | 33             | 61             |
| DLGP506028 | 2.8  | .1102 | 33             | 61             |
| DLGP506029 | 2.9  | .1142 | 33             | 61             |
| DLGP506030 | 3    | .1181 | 33             | 61             |
| DLGP506031 | 3.1  | .1220 | 36             | 65             |
| DLGP506032 | 3.2  | .1260 | 36             | 65             |
| DLGP506033 | 3.3  | .1299 | 36             | 65             |
| DLGP506034 | 3.4  | .1339 | 39             | 70             |
| DLGP506035 | 3.5  | .1378 | 39             | 70             |
| DLGP506036 | 3.6  | .1417 | 39             | 70             |
| DLGP506037 | 3.7  | .1457 | 39             | 70             |
| DLGP506038 | 3.8  | .1496 | 43             | 75             |
| DLGP506039 | 3.9  | .1535 | 43             | 75             |
| DLGP506040 | 4    | .1575 | 43             | 75             |
| DLGP506041 | 4.1  | .1614 | 43             | 75             |
| DLGP506042 | 4.2  | .1654 | 43             | 75             |
| DLGP506043 | 4.3  | .1693 | 47             | 80             |
| DLGP506044 | 4.4  | .1732 | 47             | 80             |
| DLGP506045 | 4.5  | .1772 | 47             | 80             |
| DLGP506046 | 4.6  | .1811 | 47             | 80             |
| DLGP506047 | 4.7  | .1850 | 47             | 80             |
| DLGP506048 | 4.8  | .1890 | 52             | 86             |
| DLGP506049 | 4.9  | .1929 | 52             | 86             |
| DLGP506050 | 5    | .1969 | 52             | 86             |
| DLGP506051 | 5.1  | .2008 | 52             | 86             |
| DLGP506052 | 5.2  | .2047 | 52             | 86             |
| DLGP506053 | 5.3  | .2087 | 52             | 86             |
| DLGP506054 | 5.4  | .2126 | 57             | 93             |
| DLGP506055 | 5.5  | .2165 | 57             | 93             |

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP506056 | 5.6  | .2205 | 57             | 93             |
| DLGP506057 | 5.7  | .2244 | 57             | 93             |
| DLGP506058 | 5.8  | .2283 | 57             | 93             |
| DLGP506059 | 5.9  | .2323 | 57             | 93             |
| DLGP506060 | 6    | .2362 | 57             | 93             |
| DLGP506061 | 6.1  | .2402 | 63             | 101            |
| DLGP506062 | 6.2  | .2441 | 63             | 101            |
| DLGP506063 | 6.3  | .2480 | 63             | 101            |
| DLGP506064 | 6.4  | .2520 | 63             | 101            |
| DLGP506065 | 6.5  | .2559 | 63             | 101            |
| DLGP506066 | 6.6  | .2598 | 63             | 101            |
| DLGP506067 | 6.7  | .2638 | 63             | 101            |
| DLGP506068 | 6.8  | .2677 | 69             | 109            |
| DLGP506069 | 6.9  | .2717 | 69             | 109            |
| DLGP506070 | 7    | .2756 | 69             | 109            |
| DLGP506071 | 7.1  | .2795 | 69             | 109            |
| DLGP506072 | 7.2  | .2835 | 69             | 109            |
| DLGP506073 | 7.3  | .2874 | 69             | 109            |
| DLGP506074 | 7.4  | .2913 | 69             | 109            |
| DLGP506075 | 7.5  | .2953 | 69             | 109            |
| DLGP506076 | 7.6  | .2992 | 75             | 117            |
| DLGP506077 | 7.7  | .3031 | 75             | 117            |
| DLGP506078 | 7.8  | .3071 | 75             | 117            |
| DLGP506079 | 7.9  | .3110 | 75             | 117            |
| DLGP506080 | 8    | .3150 | 75             | 117            |
| DLGP506081 | 8.1  | .3189 | 75             | 117            |
| DLGP506082 | 8.2  | .3228 | 75             | 117            |
| DLGP506083 | 8.3  | .3268 | 75             | 117            |
| DLGP506084 | 8.4  | .3307 | 75             | 117            |
| DLGP506085 | 8.5  | .3346 | 75             | 117            |
| DLGP506086 | 8.6  | .3386 | 81             | 125            |
| DLGP506087 | 8.7  | .3425 | 81             | 125            |
| DLGP506088 | 8.8  | .3465 | 81             | 125            |
| DLGP506089 | 8.9  | .3504 | 81             | 125            |
| DLGP506090 | 9    | .3543 | 81             | 125            |
| DLGP506091 | 9.1  | .3583 | 81             | 125            |



► **Flute Geometry** : Right hand spiral, 38helix, Parabolic flutes.

► **Point Angle** : 130°:Split point.  
form 1.6mm-Split point.

► **Surface treatment** : Bright body TiN coating on working part

► **Application** : Improved chip removal in most materials,  
especially in deep drilling applications.

Unit:mm

| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP506092 | 9.2  | .3622 | 81             | 125            |
| DLGP506093 | 9.3  | .3661 | 81             | 125            |
| DLGP506094 | 9.4  | .3701 | 81             | 125            |
| DLGP506095 | 9.5  | .3740 | 81             | 125            |
| DLGP506096 | 9.6  | .3780 | 87             | 133            |
| DLGP506097 | 9.7  | .3919 | 87             | 133            |
| DLGP506098 | 9.8  | .3858 | 87             | 133            |
| DLGP506099 | 9.9  | .3898 | 87             | 133            |
| DLGP506100 | 10   | .3937 | 87             | 133            |
| DLGP506101 | 10.1 | .3936 | 87             | 133            |
| DLGP506102 | 10.2 | .4016 | 87             | 133            |
| DLGP506103 | 10.3 | .4055 | 87             | 133            |
| DLGP506104 | 10.4 | .4094 | 87             | 133            |
| DLGP506105 | 10.5 | .4134 | 87             | 133            |
| DLGP506106 | 10.6 | .4173 | 87             | 133            |
| DLGP506107 | 10.7 | .4213 | 94             | 142            |
| DLGP506108 | 10.8 | .4252 | 94             | 142            |
| DLGP506109 | 10.9 | .4291 | 94             | 142            |
| DLGP506110 | 11   | .4331 | 94             | 142            |
| DLGP506111 | 11.1 | .4370 | 94             | 142            |

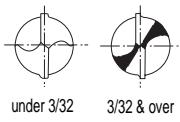
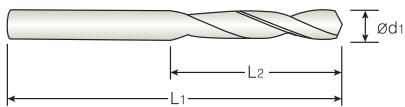
| EDP No.    | SIZE | D     | L <sub>2</sub> | L <sub>1</sub> |
|------------|------|-------|----------------|----------------|
| DLGP506112 | 11.2 | .4409 | 94             | 142            |
| DLGP506113 | 11.3 | .4449 | 94             | 142            |
| DLGP506114 | 11.4 | .4488 | 94             | 142            |
| DLGP506115 | 11.5 | .4528 | 94             | 142            |
| DLGP506116 | 11.6 | .4567 | 94             | 142            |
| DLGP506117 | 11.7 | .4606 | 94             | 142            |
| DLGP506118 | 11.8 | .4646 | 94             | 142            |
| DLGP506119 | 11.9 | .4685 | 101            | 151            |
| DLGP506120 | 12   | .4724 | 101            | 151            |
| DLGP506121 | 12.1 | .4764 | 101            | 151            |
| DLGP506122 | 12.2 | .4803 | 101            | 151            |
| DLGP506123 | 12.3 | .4843 | 101            | 151            |
| DLGP506124 | 12.4 | .4882 | 101            | 151            |
| DLGP506125 | 12.5 | .4921 | 101            | 151            |
| DLGP506126 | 12.6 | .4961 | 101            | 151            |
| DLGP506127 | 12.7 | .5000 | 101            | 151            |
| DLGP506128 | 12.8 | .5039 | 101            | 151            |
| DLGP506129 | 12.9 | .5079 | 101            | 151            |
| DLGP506130 | 13   | .5118 | 101            | 151            |



## GOLD-P COATED DRILLS SET



| SET NO.     | Series NO.     | DESCRIPTION   | SIZE                       | Q'TY   |
|-------------|----------------|---|----------------------------|--------|
| D1GP SET924 | D1GP138 Series | HSS Straight Shank, Split Point (# 53 ~ # 56 : NORMAL point)    | # 1 ~ # 56(Wire gauge)     | 56 pcs |
| D1GP SET925 | D1GP139 Series | HSS Straight Shank, Split Point                                 | A-Z(Letter)                | 26 pcs |
| D1GP SET926 | DLGP182 Series | HSS Straight Shank, Split Point (3/64 : NORMAL point)           | Ø 1/16 ~ Ø 1/2(Fractional) | 30 pcs |
| D2GP SET927 | D2GP185 Series | HSSCo8 Straight Shank, Split Point (3/64 : NORMAL point)        | Ø 1/16 ~ Ø 1/2(Fractional) | 29 pcs |
| D1GP SET928 | D2GP186 Series | HSSCo8 Straight Shank, Split Point                              | A-Z(Letter)                | 26 pcs |
| D1GP SET930 | D2GP187 Series | HSSCo8 Straight Shank, Split Point (# 53 ~ # 56 : NORMAL point) | # 1 ~ # 56(Wire gauge)     | 56 pcs |
| DLGP SET931 | DLGP511 Series | HSSCo5 Straight Shank, Split Point                              | Ø 5/64 ~ Ø 1/2(Fractional) | 28 pcs |
| DLGP SET932 | DLGP512 Series | HSSCo5 Straight Shank, Split Point                              | # 1 ~ # 47(Wire gauge)     | 47 pcs |
| DLGP SET933 | DLGP513 Series | HSSCo5 Straight Shank, Split Point                              | A-Z(Letter)                | 26 pcs |



**HSS**



**N  
20°~30°**



**ANSI  
135°**



**DATA**

P.418

► Flute Geometry

: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

D1118 Series

► Fractional sizes

Unit:inch

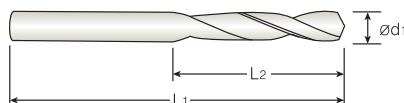
| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| ** D1118003 | 3/64              | 1/2                  | 1-3/8                  |
| ** D1118004 | 1/16              | 5/8                  | 1-5/8                  |
| ** D1118005 | 5/64              | 11/16                | 1-11/16                |
| ** D1118006 | 3/32              | 3/4                  | 1-3/4                  |
| ** D1118007 | 7/64              | 13/16                | 1-13/16                |
| ** D1118008 | 1/8               | 7/8                  | 1-7/8                  |
| ** D1118009 | 9/64              | 15/16                | 1-15/16                |
| ** D1118010 | 5/32              | 1                    | 2-1/16                 |
| ** D1118011 | 11/64             | 1-1/16               | 2-1/8                  |
| ** D1118012 | 3/16              | 1-1/8                | 2-3/16                 |
| ** D1118013 | 13/64             | 1-3/16               | 2-1/4                  |
| ** D1118014 | 7/32              | 1-1/4                | 2-3/8                  |
| ** D1118015 | 15/64             | 1-5/16               | 2-7/16                 |
| ** D1118016 | 1/4               | 1-3/8                | 2-1/2                  |
| ** D1118017 | 17/64             | 1-7/16               | 2-5/8                  |

| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| ** D1118018 | 9/32              | 1-1/2                | 2-11/16                |
| ** D1118019 | 19/64             | 1-9/16               | 2-3/4                  |
| ** D1118020 | 5/16              | 1-5/8                | 2-13/16                |
| ** D1118021 | 21/64             | 1-11/16              | 2-15/16                |
| * D1118022  | 11/32             | 1-11/16              | 3                      |
| * D1118023  | 23/64             | 1-3/4                | 3-1/16                 |
| * D1118024  | 3/8               | 1-13/16              | 3-1/8                  |
| * D1118025  | 25/64             | 1-7/8                | 3-1/4                  |
| * D1118026  | 13/32             | 1-15/16              | 3-5/16                 |
| * D1118027  | 27/64             | 2                    | 3-3/8                  |
| * D1118028  | 7/16              | 2-1/16               | 3-7/16                 |
| * D1118029  | 29/64             | 2-1/8                | 3-9/16                 |
| * D1118030  | 15/32             | 2-1/8                | 3-5/8                  |
| * D1118031  | 31/64             | 2-3/16               | 3-11/16                |
| * D1118032  | 1/2               | 2-1/4                | 3-3/4                  |

\* 5per package

\*\* 10per package

|                  |  |
|------------------|--|
| Tolerance of D / | upto 1/8(.1250)<br>0~ -.0005                   |
| /                | over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
| /                | over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.418

- **Flute Geometry** : Right hand spiral, wider flutes
- **Point Angle** : 135°:Split point... .059 diameter and over.
- **Application** : Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

**D1115 Series**

► **Letter sizes**

Unit : inch

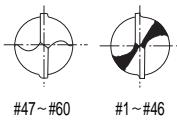
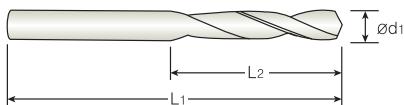
| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1115201 | A    | .2340             | 1-5/16               | 2-7/16                 |
| ** D1115202 | B    | .2380             | 1-3/8                | 2-1/2                  |
| ** D1115203 | C    | .2420             | 1-3/8                | 2-1/2                  |
| ** D1115204 | D    | .2460             | 1-3/8                | 2-1/2                  |
| ** D1115205 | E    | .2500             | 1-3/8                | 2-1/2                  |
| ** D1115206 | F    | .2570             | 1-7/16               | 2-5/8                  |
| ** D1115207 | G    | .2610             | 1-7/16               | 2-5/8                  |
| ** D1115208 | H    | .2660             | 1-1/2                | 2-11/16                |
| ** D1115209 | I    | .2720             | 1-1/2                | 2-11/16                |
| ** D1115210 | J    | .2770             | 1-1/2                | 2-11/16                |
| ** D1115211 | K    | .2810             | 1-1/2                | 2-11/16                |
| ** D1115212 | L    | .2900             | 1-9/16               | 2-3/4                  |
| ** D1115213 | M    | .2950             | 1-9/16               | 2-3/4                  |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1115214 | N    | .3020             | 1-5/8                | 2-13/16                |
| ** D1115215 | O    | .3160             | 1-11/16              | 2-15/16                |
| ** D1115216 | P    | .3230             | 1-11/16              | 2-15/16                |
| * D1115217  | Q    | .3320             | 1-11/16              | 3                      |
| * D1115218  | R    | .3390             | 1-11/16              | 3                      |
| * D1115219  | S    | .3480             | 1-3/4                | 3-1/16                 |
| * D1115220  | T    | .3580             | 1-3/4                | 3-1/16                 |
| * D1115221  | U    | .3680             | 1-13/16              | 3-1/8                  |
| * D1115222  | V    | .3770             | 1-7/8                | 3-1/4                  |
| * D1115223  | W    | .3860             | 1-7/8                | 3-1/4                  |
| * D1115224  | X    | .3970             | 1-15/16              | 3-5/16                 |
| * D1115225  | Y    | .4040             | 1-15/16              | 3-5/16                 |
| * D1115226  | Z    | .4130             | 2                    | 3-3/8                  |

\* 5per package

\*\* 10per package

|                       |   |
|-----------------------|---|
| <b>Tolerance of D</b> | upto 1/8(.1250)<br>0~ -.0005                    |
|                       | /over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                       | /over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.418

► Flute Geometry

: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Drilling in steel, cast steel alloyed and

Non-alloyed, grey cast iron, graphite, malleable cast iron

D1119 Series

► Wire gauge sizes

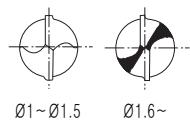
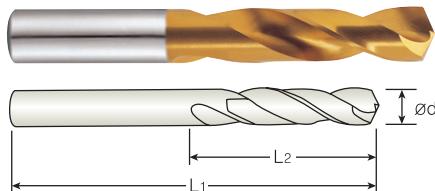
Unit : inch

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1119201 | 1    | .2280             | 1-5/16               | 2-7/16                 |
| ** D1119202 | 2    | .2210             | 1-5/16               | 2-7/16                 |
| ** D1119203 | 3    | .2130             | 1-1/4                | 2-3/8                  |
| ** D1119204 | 4    | .2090             | 1-1/4                | 2-3/8                  |
| ** D1119205 | 5    | .2055             | 1-1/4                | 2-3/8                  |
| ** D1119206 | 6    | .2040             | 1-1/4                | 2-3/8                  |
| ** D1119207 | 7    | .2010             | 1-3/16               | 2-1/4                  |
| ** D1119208 | 8    | .1990             | 1-3/16               | 2-1/4                  |
| ** D1119209 | 9    | .1960             | 1-3/16               | 2-1/4                  |
| ** D1119210 | 10   | .1935             | 1-3/16               | 2-1/4                  |
| ** D1119211 | 11   | .1910             | 1-3/16               | 2-1/4                  |
| ** D1119212 | 12   | .1890             | 1-3/16               | 2-1/4                  |
| ** D1119213 | 13   | .1850             | 1-1/8                | 2-3/16                 |
| ** D1119214 | 14   | .1820             | 1-1/8                | 2-3/16                 |
| ** D1119215 | 15   | .1800             | 1-1/8                | 2-3/16                 |
| ** D1119216 | 16   | .1770             | 1-1/8                | 2-3/16                 |
| ** D1119217 | 17   | .1730             | 1-1/8                | 2-3/16                 |
| ** D1119218 | 18   | .1695             | 1-1/16               | 2-1/8                  |
| ** D1119219 | 19   | .1660             | 1-1/16               | 2-1/8                  |
| ** D1119220 | 20   | .1610             | 1-1/16               | 2-1/8                  |
| ** D1119221 | 21   | .1590             | 1-1/16               | 2-1/8                  |
| ** D1119222 | 22   | .1570             | 1-1/16               | 2-1/8                  |
| ** D1119223 | 23   | .1540             | 1                    | 2-1/16                 |
| ** D1119224 | 24   | .1520             | 1                    | 2-1/16                 |
| ** D1119225 | 25   | .1495             | 1                    | 2-1/16                 |
| ** D1119226 | 26   | .1470             | 1                    | 2-1/16                 |
| ** D1119227 | 27   | .1440             | 1                    | 2-1/16                 |
| ** D1119228 | 28   | .1405             | 15/16                | 1-15/16                |
| ** D1119229 | 29   | .1360             | 15/16                | 1-15/16                |
| ** D1119230 | 30   | .1285             | 15/16                | 1-15/16                |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1119231 | 31   | .1200             | 7/8                  | 1-7/8                  |
| ** D1119232 | 32   | .1160             | 7/8                  | 1-7/8                  |
| ** D1119233 | 33   | .1130             | 7/8                  | 1-7/8                  |
| ** D1119234 | 34   | .1110             | 7/8                  | 1-7/8                  |
| ** D1119235 | 35   | .1100             | 7/8                  | 1-7/8                  |
| ** D1119236 | 36   | .1065             | 13/16                | 1-13/16                |
| ** D1119237 | 37   | .1040             | 13/16                | 1-13/16                |
| ** D1119238 | 38   | .1015             | 13/16                | 1-13/16                |
| ** D1119239 | 39   | .0995             | 13/16                | 1-13/16                |
| ** D1119240 | 40   | .0980             | 13/16                | 1-13/16                |
| ** D1119241 | 41   | .0960             | 13/16                | 1-13/16                |
| ** D1119242 | 42   | .0935             | 3/4                  | 1-3/4                  |
| ** D1119243 | 43   | .0890             | 3/4                  | 1-3/4                  |
| ** D1119244 | 44   | .0860             | 3/4                  | 1-3/4                  |
| ** D1119245 | 45   | .0820             | 3/4                  | 1-3/4                  |
| ** D1119246 | 46   | .0810             | 3/4                  | 1-3/4                  |
| ** D1119247 | 47   | .0785             | 11/16                | 1-11/16                |
| ** D1119248 | 48   | .0760             | 11/16                | 1-11/16                |
| ** D1119249 | 49   | .0730             | 11/16                | 1-11/16                |
| ** D1119250 | 50   | .0700             | 11/16                | 1-11/16                |
| ** D1119251 | 51   | .0670             | 11/16                | 1-11/16                |
| ** D1119252 | 52   | .0635             | 11/16                | 1-11/16                |
| ** D1119253 | 53   | .0595             | 5/8                  | 1-5/8                  |
| ** D1119254 | 54   | .0550             | 5/8                  | 1-5/8                  |
| ** D1119255 | 55   | .0520             | 5/8                  | 1-5/8                  |
| ** D1119256 | 56   | .0465             | 1/2                  | 1-3/8                  |
| ** D1119257 | 57   | .0430             | 1/2                  | 1-3/8                  |
| ** D1119258 | 58   | .0420             | 1/2                  | 1-3/8                  |
| ** D1119259 | 59   | .0410             | 1/2                  | 1-3/8                  |
| ** D1119260 | 60   | .0400             | 1/2                  | 1-3/8                  |

|                  |  |
|------------------|--|
| Tolerance of D / | upto 1/8(.1250)<br>0~ -.0005                   |
| /                | over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
| /                | over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |

\*\* 10per package



**ANSI**

**HSS  
Co8**

N  
33°

h8

135°

DATA

► Flute Geometry

► Application

: Coloring(Gold color)

: Drills suitable for drilling in thin materials with portable drills.

Special twist drills for automatic and turret lathes.

**D4107 Series**

Unit : inch

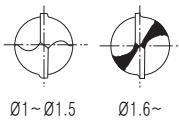
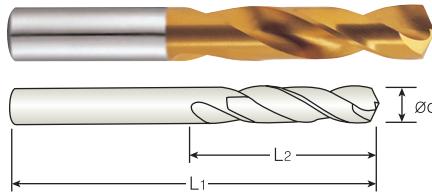
| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) | EDP No.    | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|------------|-------------------|----------------------|------------------------|
| ** D4107010 | 1.0               | 6                    | 26                     | * D4107937 | 3.75              | 20                   | 52                     |
| ** D4107011 | 1.1               | 7                    | 28                     | * D4107038 | 3.8               | 22                   | 55                     |
| ** D4107012 | 1.2               | 8                    | 30                     | * D4107039 | 3.9               | 22                   | 55                     |
| ** D4107912 | 1.25              | 8                    | 30                     | * D4107040 | 4.0               | 22                   | 55                     |
| ** D4107013 | 1.3               | 8                    | 30                     | * D4107041 | 4.1               | 22                   | 55                     |
| ** D4107014 | 1.4               | 9                    | 32                     | * D4107042 | 4.2               | 22                   | 55                     |
| ** D4107015 | 1.5               | 9                    | 32                     | * D4107942 | 4.25              | 22                   | 55                     |
| ** D4107016 | 1.6               | 10                   | 34                     | * D4107043 | 4.3               | 24                   | 58                     |
| ** D4107017 | 1.7               | 10                   | 34                     | * D4107044 | 4.4               | 24                   | 58                     |
| ** D4107917 | 1.75              | 11                   | 36                     | * D4107045 | 4.5               | 24                   | 58                     |
| ** D4107018 | 1.8               | 11                   | 36                     | * D4107046 | 4.6               | 24                   | 58                     |
| ** D4107019 | 1.9               | 11                   | 36                     | * D4107946 | 4.65              | 24                   | 58                     |
| ** D4107020 | 2.0               | 12                   | 38                     | * D4107047 | 4.7               | 24                   | 58                     |
| ** D4107021 | 2.1               | 12                   | 38                     | * D4107947 | 4.75              | 24                   | 58                     |
| ** D4107022 | 2.2               | 13                   | 40                     | * D4107048 | 4.8               | 26                   | 62                     |
| ** D4107925 | 2.25              | 13                   | 40                     | * D4107049 | 4.9               | 26                   | 62                     |
| ** D4107023 | 2.3               | 13                   | 40                     | * D4107050 | 5.0               | 26                   | 62                     |
| ** D4107024 | 2.4               | 14                   | 43                     | * D4107051 | 5.1               | 26                   | 62                     |
| ** D4107025 | 2.5               | 14                   | 43                     | * D4107052 | 5.2               | 26                   | 62                     |
| ** D4107026 | 2.6               | 14                   | 43                     | * D4107952 | 5.25              | 26                   | 62                     |
| * D4107027  | 2.7               | 16                   | 46                     | * D4107053 | 5.3               | 26                   | 62                     |
| * D4107927  | 2.75              | 16                   | 46                     | * D4107054 | 5.4               | 28                   | 66                     |
| * D4107028  | 2.8               | 16                   | 46                     | * D4107055 | 5.5               | 28                   | 66                     |
| * D4107029  | 2.9               | 16                   | 46                     | * D4107955 | 5.55              | 28                   | 66                     |
| * D4107030  | 3.0               | 16                   | 46                     | * D4107056 | 5.6               | 28                   | 66                     |
| * D4107031  | 3.1               | 18                   | 49                     | * D4107057 | 5.7               | 28                   | 66                     |
| * D4107032  | 3.2               | 18                   | 49                     | * D4107957 | 5.75              | 28                   | 66                     |
| * D4107932  | 3.25              | 18                   | 49                     | * D4107058 | 5.8               | 28                   | 66                     |
| * D4107033  | 3.3               | 18                   | 49                     | * D4107059 | 5.9               | 28                   | 66                     |
| * D4107034  | 3.4               | 20                   | 52                     | * D4107060 | 6.0               | 28                   | 66                     |
| * D4107035  | 3.5               | 20                   | 52                     | * D4107061 | 6.1               | 31                   | 70                     |
| * D4107036  | 3.6               | 20                   | 52                     | * D4107062 | 6.2               | 31                   | 70                     |
| * D4107037  | 3.7               | 20                   | 52                     | * D4107962 | 6.25              | 31                   | 70                     |

► The HSSCo5(DL107) is available when you need.

\* 5per package

► The TiN(D4107), TiCN(D7107) and TiAlN(DQ107) are available on your request.

\*\* 10per package



► Flute Geometry

► Application

: Coloring(Gold color)

: Drills suitable for drilling in thin materials with portable drills.

Special twist drills for automatic and turret lathes.

**D4107 Series**

Unit : inch

| EDP No.    | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|-------------------|----------------------|------------------------|
| * D4107063 | 6.3               | 31                   | 70                     |
| * D4107064 | 6.4               | 31                   | 70                     |
| * D4107065 | 6.5               | 31                   | 70                     |
| * D4107066 | 6.6               | 31                   | 70                     |
| * D4107067 | 6.7               | 31                   | 70                     |
| * D4107967 | 6.75              | 34                   | 74                     |
| * D4107068 | 6.8               | 34                   | 74                     |
| * D4107069 | 6.9               | 34                   | 74                     |
| * D4107070 | 7.0               | 34                   | 74                     |
| * D4107071 | 7.1               | 34                   | 74                     |
| * D4107072 | 7.2               | 34                   | 74                     |
| * D4107972 | 7.25              | 34                   | 74                     |
| * D4107073 | 7.3               | 34                   | 74                     |
| * D4107074 | 7.4               | 34                   | 74                     |
| * D4107974 | 7.45              | 34                   | 74                     |
| * D4107075 | 7.5               | 34                   | 74                     |
| * D4107076 | 7.6               | 37                   | 79                     |
| * D4107077 | 7.7               | 37                   | 79                     |
| * D4107977 | 7.75              | 37                   | 79                     |
| * D4107078 | 7.8               | 37                   | 79                     |
| * D4107079 | 7.9               | 37                   | 79                     |
| * D4107080 | 8.0               | 37                   | 79                     |
| * D4107081 | 8.1               | 37                   | 79                     |
| * D4107082 | 8.2               | 37                   | 79                     |
| * D4107982 | 8.25              | 37                   | 79                     |
| * D4107083 | 8.3               | 37                   | 79                     |
| * D4107084 | 8.4               | 37                   | 79                     |
| * D4107085 | 8.5               | 37                   | 79                     |
| * D4107086 | 8.6               | 40                   | 84                     |
| * D4107087 | 8.7               | 40                   | 84                     |
| * D4107987 | 8.75              | 40                   | 84                     |
| * D4107088 | 8.8               | 40                   | 84                     |
| * D4107089 | 8.9               | 40                   | 84                     |

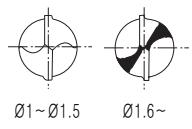
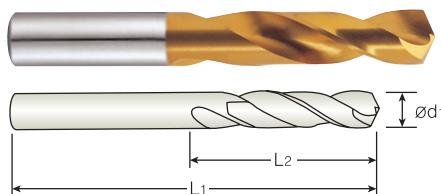
| EDP No.    | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|-------------------|----------------------|------------------------|
| * D4107090 | 9.0               | 40                   | 84                     |
| * D4107091 | 9.1               | 40                   | 84                     |
| * D4107092 | 9.2               | 40                   | 84                     |
| * D4107992 | 9.25              | 40                   | 84                     |
| * D4107093 | 9.3               | 40                   | 84                     |
| * D4107993 | 9.35              | 40                   | 84                     |
| * D4107094 | 9.4               | 40                   | 84                     |
| * D4107095 | 9.5               | 40                   | 84                     |
| * D4107096 | 9.6               | 43                   | 89                     |
| * D4107097 | 9.7               | 43                   | 89                     |
| * D4107997 | 9.75              | 43                   | 89                     |
| * D4107098 | 9.8               | 43                   | 89                     |
| * D4107099 | 9.9               | 43                   | 89                     |
| * D4107100 | 10.0              | 43                   | 89                     |
| * D4107102 | 10.2              | 43                   | 89                     |
| * D4107802 | 10.25             | 43                   | 89                     |
| * D4107105 | 10.5              | 43                   | 89                     |
| * D4107807 | 10.75             | 47                   | 95                     |
| * D4107110 | 11.0              | 47                   | 95                     |
| * D4107812 | 11.25             | 47                   | 95                     |
| * D4107115 | 11.5              | 47                   | 95                     |
| * D4107817 | 11.75             | 47                   | 95                     |
| * D4107118 | 11.8              | 47                   | 95                     |
| * D4107120 | 12.0              | 51                   | 102                    |
| * D4107822 | 12.25             | 51                   | 102                    |
| * D4107125 | 12.5              | 51                   | 102                    |
| * D4107827 | 12.75             | 51                   | 102                    |
| - D4107130 | 13.0              | 51                   | 102                    |
| - D4107832 | 13.25             | 54                   | 107                    |
| - D4107135 | 13.5              | 54                   | 107                    |
| - D4107837 | 13.75             | 54                   | 107                    |
| - D4107138 | 13.8              | 54                   | 107                    |
| - D4107140 | 14.0              | 54                   | 107                    |

\*The HSSCo5(DL107) is available when you need.

\*The TiN(D4107), TiCN(D7107) and TiAlN(DQ107) are available on your request.

\* 5per package

- 1per package



**ANSI**

**HSS  
Co8**

N  
33°

h8

135°

DATA

► Flute Geometry  
► Application

: Coloring(Gold color)  
: Drills suitable for drilling in thin materials with portable drills.  
Special twist drills for automatic and turret lathes.

**D4107 Series**

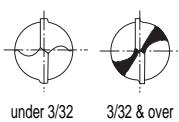
Unit : inch

| EDP No.    | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) | EDP No.    | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|-------------------|----------------------|------------------------|------------|-------------------|----------------------|------------------------|
| — D4107842 | 14.25             | 56                   | 111                    | — D4107892 | 19.25             | 66                   | 131                    |
| — D4107145 | 14.5              | 56                   | 111                    | — D4107195 | 19.5              | 66                   | 131                    |
| — D4107847 | 14.75             | 56                   | 111                    | — D4107897 | 19.75             | 66                   | 131                    |
| — D4107150 | 15.0              | 56                   | 111                    | — D4107200 | 20.0              | 66                   | 131                    |
| — D4107852 | 15.25             | 58                   | 115                    | — D4107205 | 20.5              | 68                   | 136                    |
| — D4107155 | 15.5              | 58                   | 115                    | — D4107210 | 21.0              | 68                   | 136                    |
| — D4107857 | 15.75             | 58                   | 115                    | — D4107215 | 21.5              | 70                   | 141                    |
| — D4107160 | 16.0              | 58                   | 115                    | — D4107220 | 22.0              | 70                   | 141                    |
| — D4107862 | 16.25             | 60                   | 119                    | — D4107225 | 22.5              | 72                   | 146                    |
| — D4107165 | 16.5              | 60                   | 119                    | — D4107230 | 23.0              | 72                   | 146                    |
| — D4107867 | 16.75             | 60                   | 119                    | — D4107235 | 23.5              | 72                   | 146                    |
| — D4107170 | 17.0              | 60                   | 119                    | — D4107240 | 24.0              | 75                   | 151                    |
| — D4107872 | 17.25             | 62                   | 123                    | — D4107245 | 24.5              | 75                   | 151                    |
| — D4107175 | 17.5              | 62                   | 123                    | — D4107250 | 25.0              | 75                   | 151                    |
| — D4107877 | 17.75             | 62                   | 123                    | — D4107260 | 26.0              | 78                   | 156                    |
| — D4107180 | 18.0              | 62                   | 123                    | — D4107270 | 27.0              | 81                   | 162                    |
| — D4107882 | 18.25             | 64                   | 127                    | — D4107280 | 28.0              | 81                   | 162                    |
| — D4107185 | 18.5              | 64                   | 127                    | — D4107290 | 29.0              | 84                   | 168                    |
| — D4107887 | 18.75             | 64                   | 127                    | — D4107300 | 30.0              | 84                   | 168                    |
| — D4107190 | 19.0              | 64                   | 127                    | — D4107310 | 31.0              | 87                   | 174                    |

► The HSSCo5(DL107) is available when you need.

— 1per package

► The TiN(D4107), TiCN(D7107) and TiAlN(DQ107) are available on your request.



P.418

► Flute Geometry

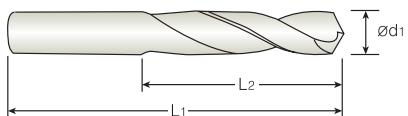
: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron



D2146 Series

► Fractional sizes

Unit : inch

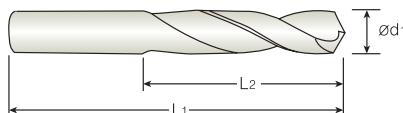
| EDP No.     |            | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------------|-------------------|----------------------|------------------------|
| UN-COATED   | TiN-COATED |                   |                      |                        |
| * D2146003  | D4146003   | 3/64              | 1/2                  | 1-3/8                  |
| ** D2146004 | D4146004   | 1/16              | 5/8                  | 1-5/8                  |
| ** D2146005 | D4146005   | 5/64              | 11/16                | 1-11/16                |
| ** D2146006 | D4146006   | 3/32              | 3/4                  | 1-3/4                  |
| * D2146007  | D4146007   | 7/64              | 13/16                | 1-13/16                |
| * D2146008  | D4146008   | 1/8               | 7/8                  | 1-7/8                  |
| * D2146009  | D4146009   | 9/64              | 15/16                | 1-15/16                |
| * D2146010  | D4146010   | 5/32              | 1                    | 2-1/16                 |
| * D2146011  | D4146011   | 11/64             | 1-1/16               | 2-1/8                  |
| * D2146012  | D4146012   | 3/16              | 1-1/8                | 2-3/16                 |
| * D2146013  | D4146013   | 13/64             | 1-3/16               | 2-1/4                  |
| * D2146014  | D4146014   | 7/32              | 1-1/4                | 2-3/8                  |
| * D2146015  | D4146015   | 15/64             | 1-5/16               | 2-7/16                 |
| * D2146016  | D4146016   | 1/4               | 1-3/8                | 2-1/2                  |
| * D2146017  | D4146017   | 17/64             | 1-7/16               | 2-5/8                  |

| EDP No.    |            | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|------------|-------------------|----------------------|------------------------|
| UN-COATED  | TiN-COATED |                   |                      |                        |
| * D2146018 | D4146018   | 9/32              | 1-1/2                | 2-11/16                |
| * D2146019 | D4146019   | 19/64             | 1-9/16               | 2-3/4                  |
| * D2146020 | D4146020   | 5/16              | 1-5/8                | 2-13/16                |
| * D2146021 | D4146021   | 21/64             | 1-11/16              | 2-15/16                |
| * D2146022 | D4146022   | 11/32             | 1-11/16              | 3                      |
| * D2146023 | D4146023   | 23/64             | 1-3/4                | 3-1/16                 |
| * D2146024 | D4146024   | 3/8               | 1-13/16              | 3-1/8                  |
| * D2146025 | D4146025   | 25/64             | 1-7/8                | 3-1/4                  |
| * D2146026 | D4146026   | 13/32             | 1-15/16              | 3-5/16                 |
| * D2146027 | D4146027   | 27/64             | 2                    | 3-3/8                  |
| * D2146028 | D4146028   | 7/16              | 2-1/16               | 3-7/16                 |
| * D2146029 | D4146029   | 29/64             | 2-1/8                | 3-9/16                 |
| * D2146030 | D4146030   | 15/32             | 2-1/8                | 3-5/8                  |
| * D2146031 | D4146031   | 31/64             | 2-3/16               | 3-11/16                |
| * D2146032 | D4146032   | 1/2               | 2-1/4                | 3-3/4                  |

\* 5per package

\*\* 10per package

|                       |   |
|-----------------------|---|
| <b>Tolerance of D</b> | upto 1/8(.1250)<br>0~ -.0005                    |
|                       | /over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                       | /over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.418

► Flute Geometry

: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

## D2147 Series

## ► Letter sizes

Unit : inch

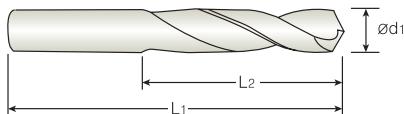
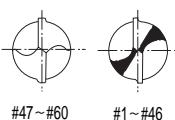
| EDP No.    |            | SIZE | Diameter<br>(Ød1) | Flute<br>Length(L2) | Overall<br>Length(L1) |
|------------|------------|------|-------------------|---------------------|-----------------------|
| UN-COATED  | TiN-COATED |      |                   |                     |                       |
| * D2147201 | D4147201   | A    | .2340             | 1-5/16              | 2-7/16                |
| * D2147202 | D4147202   | B    | .2380             | 1-3/8               | 2-1/2                 |
| * D2147203 | D4147203   | C    | .2420             | 1-3/8               | 2-1/2                 |
| * D2147204 | D4147204   | D    | .2460             | 1-3/8               | 2-1/2                 |
| * D2147205 | D4147205   | E    | .2500             | 1-3/8               | 2-1/2                 |
| * D2147206 | D4147206   | F    | .2570             | 1-7/16              | 2-5/8                 |
| * D2147207 | D4147207   | G    | .2610             | 1-7/16              | 2-5/8                 |
| * D2147208 | D4147208   | H    | .2660             | 1-1/2               | 2-11/16               |
| * D2147209 | D4147209   | I    | .2720             | 1-1/2               | 2-11/16               |
| * D2147210 | D4147210   | J    | .2770             | 1-1/2               | 2-11/16               |
| * D2147211 | D4147211   | K    | .2810             | 1-1/2               | 2-11/16               |
| * D2147212 | D4147212   | L    | .2900             | 1-9/16              | 2-3/4                 |
| * D2147213 | D4147213   | M    | .2950             | 1-9/16              | 2-3/4                 |

| EDP No.    |            | SIZE | Diameter<br>(Ød1) | Flute<br>Length(L2) | Overall<br>Length(L1) |
|------------|------------|------|-------------------|---------------------|-----------------------|
| UN-COATED  | TiN-COATED |      |                   |                     |                       |
| * D2147214 | D4147214   | N    | .3020             | 1-5/8               | 2-13/16               |
| * D2147215 | D4147215   | O    | .3160             | 1-11/16             | 2-15/16               |
| * D2147216 | D4147216   | P    | .3230             | 1-11/16             | 2-15/16               |
| * D2147217 | D4147217   | Q    | .3320             | 1-11/16             | 3                     |
| * D2147218 | D4147218   | R    | .3390             | 1-11/16             | 3                     |
| * D2147219 | D4147219   | S    | .3480             | 1-3/4               | 3-1/16                |
| * D2147220 | D4147220   | T    | .3580             | 1-3/4               | 3-1/16                |
| * D2147221 | D4147221   | U    | .3680             | 1-13/16             | 3-1/8                 |
| * D2147222 | D4147222   | V    | .3770             | 1-7/8               | 3-1/4                 |
| * D2147223 | D4147223   | W    | .3860             | 1-7/8               | 3-1/4                 |
| * D2147224 | D4147224   | X    | .3970             | 1-15/16             | 3-5/16                |
| * D2147225 | D4147225   | Y    | .4040             | 1-15/16             | 3-5/16                |
| * D2147226 | D4147226   | Z    | .4130             | 2                   | 3-3/8                 |

\* 5per package

\*\* 10per package

|                       |  |
|-----------------------|--|
| <b>Tolerance of D</b> | <u>upto 1/8(.1250)</u>                     |
|                       | <u>0~ -.0005</u>                           |
|                       | <u>/ over 1/8(.1250) ~ upto 1/4(.2500)</u> |
|                       | <u>0~ -.0007</u>                           |
|                       | <u>/ over 1/4(.2500) ~ upto 1/2(.5000)</u> |
|                       | <u>0~ -.0010</u>                           |



P.419

► Flute Geometry

: Right hand spiral, wider flutes

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Drilling in steel, cast steel alloyed and Non-alloyed, grey cast iron, graphite, malleable cast iron

D2148 Series

► Wire gauge sizes

Unit : inch

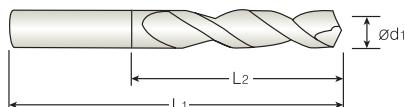
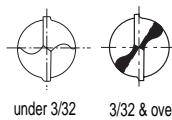
| EDP No.    |            | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|------------|------|-------------------|----------------------|------------------------|
| UN-COATED  | TiN-COATED |      |                   |                      |                        |
| * D2148101 | D4148101   | 1    | .2280             | 1-5/16               | 2-7/16                 |
| * D2148102 | D4148102   | 2    | .2210             | 1-5/16               | 2-7/16                 |
| * D2148103 | D4148103   | 3    | .2130             | 1-1/4                | 2-3/8                  |
| * D2148104 | D4148104   | 4    | .2090             | 1-1/4                | 2-3/8                  |
| * D2148105 | D4148105   | 5    | .2055             | 1-1/4                | 2-3/8                  |
| * D2148106 | D4148106   | 6    | .2040             | 1-1/4                | 2-3/8                  |
| * D2148107 | D4148107   | 7    | .2010             | 1-3/16               | 2-1/4                  |
| * D2148108 | D4148108   | 8    | .1990             | 1-3/16               | 2-1/4                  |
| * D2148109 | D4148109   | 9    | .1960             | 1-3/16               | 2-1/4                  |
| * D2148110 | D4148110   | 10   | .1935             | 1-3/16               | 2-1/4                  |
| * D2148111 | D4148111   | 11   | .1910             | 1-3/16               | 2-1/4                  |
| * D2148112 | D4148112   | 12   | .1890             | 1-3/16               | 2-1/4                  |
| * D2148113 | D4148113   | 13   | .1850             | 1-1/8                | 2-3/16                 |
| * D2148114 | D4148114   | 14   | .1820             | 1-1/8                | 2-3/16                 |
| * D2148115 | D4148115   | 15   | .1800             | 1-1/8                | 2-3/16                 |
| * D2148116 | D4148116   | 16   | .1770             | 1-1/8                | 2-3/16                 |
| * D2148117 | D4148117   | 17   | .1730             | 1-1/8                | 2-3/16                 |
| * D2148118 | D4148118   | 18   | .1695             | 1-1/16               | 2-1/8                  |
| * D2148119 | D4148119   | 19   | .1660             | 1-1/16               | 2-1/8                  |
| * D2148120 | D4148120   | 20   | .1610             | 1-1/16               | 2-1/8                  |
| * D2148121 | D4148121   | 21   | .1590             | 1-1/16               | 2-1/8                  |
| * D2148122 | D4148122   | 22   | .1570             | 1-1/16               | 2-1/8                  |
| * D2148123 | D4148123   | 23   | .1540             | 1                    | 2-1/16                 |
| * D2148124 | D4148124   | 24   | .1520             | 1                    | 2-1/16                 |
| * D2148125 | D4148125   | 25   | .1495             | 1                    | 2-1/16                 |
| * D2148126 | D4148126   | 26   | .1470             | 1                    | 2-1/16                 |
| * D2148127 | D4148127   | 27   | .1440             | 1                    | 2-1/16                 |
| * D2148128 | D4148128   | 28   | .1405             | 15/16                | 1-15/16                |
| * D2148129 | D4148129   | 29   | .1360             | 15/16                | 1-15/16                |
| * D2148130 | D4148130   | 30   | .1285             | 15/16                | 1-15/16                |

| EDP No.    |            | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------|------------|------|-------------------|----------------------|------------------------|
| UN-COATED  | TiN-COATED |      |                   |                      |                        |
| * D2148131 | D4148131   | 31   | .1200             | 7/8                  | 1-7/8                  |
| * D2148132 | D4148132   | 32   | .1160             | 7/8                  | 1-7/8                  |
| * D2148133 | D4148133   | 33   | .1130             | 7/8                  | 1-7/8                  |
| * D2148134 | D4148134   | 34   | .1110             | 7/8                  | 1-7/8                  |
| * D2148135 | D4148135   | 35   | .1100             | 7/8                  | 1-7/8                  |
| * D2148136 | D4148136   | 36   | .1065             | 13/16                | 1-13/16                |
| * D2148137 | D4148137   | 37   | .1040             | 13/16                | 1-13/16                |
| * D2148138 | D4148138   | 38   | .1015             | 13/16                | 1-13/16                |
| * D2148139 | D4148139   | 39   | .0995             | 13/16                | 1-13/16                |
| * D2148140 | D4148140   | 40   | .0980             | 13/16                | 1-13/16                |
| * D2148141 | D4148141   | 41   | .0960             | 13/16                | 1-13/16                |
| * D2148142 | D4148142   | 42   | .0935             | 3/4                  | 1-3/4                  |
| * D2148143 | D4148143   | 43   | .0890             | 3/4                  | 1-3/4                  |
| * D2148144 | D4148144   | 44   | .0860             | 3/4                  | 1-3/4                  |
| * D2148145 | D4148145   | 45   | .0820             | 3/4                  | 1-3/4                  |
| * D2148146 | D4148146   | 46   | .0810             | 3/4                  | 1-3/4                  |
| * D2148147 | D4148147   | 47   | .0785             | 11/16                | 1-11/16                |
| * D2148148 | D4148148   | 48   | .0760             | 11/16                | 1-11/16                |
| * D2148149 | D4148149   | 49   | .0730             | 11/16                | 1-11/16                |
| * D2148150 | D4148150   | 50   | .0700             | 11/16                | 1-11/16                |
| * D2148151 | D4148151   | 51   | .0670             | 11/16                | 1-11/16                |
| * D2148152 | D4148152   | 52   | .0635             | 11/16                | 1-11/16                |
| * D2148153 | D4148153   | 53   | .0595             | 5/8                  | 1-5/8                  |
| * D2148154 | D4148154   | 54   | .0550             | 5/8                  | 1-5/8                  |
| * D2148155 | D4148155   | 55   | .0520             | 5/8                  | 1-5/8                  |
| * D2148156 | D4148156   | 56   | .0465             | 1/2                  | 1-3/8                  |
| * D2148157 | D4148157   | 57   | .0430             | 1/2                  | 1-3/8                  |
| * D2148158 | D4148158   | 58   | .0420             | 1/2                  | 1-3/8                  |
| * D2148159 | D4148159   | 59   | .0410             | 1/2                  | 1-3/8                  |
| * D2148160 | D4148160   | 60   | .0400             | 1/2                  | 1-3/8                  |

|                       |   |
|-----------------------|---|
| <b>Tolerance of D</b> | upto 1/8(.1250)<br>0~-.0005                   |
|                       | over 1/8(.1250) ~ upto 1/4(.2500)<br>0~-.0007 |
|                       | over 1/4(.2500) ~ upto 1/2(.5000)<br>0~-.0010 |

\* 5per package

\*\* 10per package



**ANSI**

**HSS  
Co5**

**38°**

**ANSI**

**130°**

**DATA**

P.419

► **Flute Geometry** : Right hand spiral, **PARABOLIC FLUTE**

38° helix

► **Point Angle** : 130°:Split point... .059 diameter and over.

► **Application** : Improved chip removal in most materials, especially in deep drilling applications.

Unit:inch

**DN514 Series**

► **Fractional sizes**

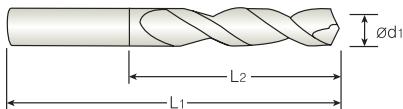
| TiN-COATED<br>EDP No. | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|-------------------|----------------------|------------------------|
| ** DN514006           | 3/32              | 3/4                  | 1-3/4                  |
| * DN514007            | 7/64              | 13/16                | 1-13/16                |
| * DN514008            | 1/8               | 7/8                  | 1-7/8                  |
| * DN514009            | 9/64              | 15/16                | 1-15/16                |
| * DN514010            | 5/32              | 1                    | 2-1/16                 |
| * DN514011            | 11/64             | 1-1/16               | 2-1/8                  |
| * DN514012            | 3/16              | 1-1/8                | 2-3/16                 |
| * DN514013            | 13/64             | 1-3/16               | 2-1/4                  |
| * DN514014            | 7/32              | 1-1/4                | 2-3/8                  |
| * DN514015            | 15/64             | 1-5/16               | 2-7/16                 |
| * DN514016            | 1/4               | 1-3/8                | 2-1/2                  |
| * DN514017            | 17/64             | 1-7/16               | 2-5/8                  |
| * DN514018            | 9/32              | 1-1/2                | 2-11/16                |
| * DN514019            | 19/64             | 1-9/16               | 2-3/4                  |

| TiN-COATED<br>EDP No. | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|-------------------|----------------------|------------------------|
| * DN514020            | 5/16              | 1-5/8                | 2-13/16                |
| * DN514021            | 21/64             | 1-11/16              | 2-15/16                |
| * DN514022            | 11/32             | 1-11/16              | 3                      |
| * DN514023            | 23/64             | 1-3/4                | 3-1/16                 |
| * DN514024            | 3/8               | 1-13/16              | 3-1/8                  |
| * DN514025            | 25/64             | 1-7/8                | 3-1/4                  |
| * DN514026            | 13/32             | 1-15/16              | 3-5/16                 |
| * DN514027            | 27/64             | 2                    | 3-3/8                  |
| * DN514028            | 7/16              | 2-1/16               | 3-7/16                 |
| * DN514029            | 29/64             | 2-1/8                | 3-9/16                 |
| * DN514030            | 15/32             | 2-1/8                | 3-5/8                  |
| * DN514031            | 31/64             | 2-3/16               | 3-11/16                |
| * DN514032            | 1/2               | 2-1/4                | 3-3/4                  |

\* 5per package

\*\* 10per package

|                       |                                   |
|-----------------------|-----------------------------------|
| <b>Tolerance of D</b> | upto 1/8(.1250)                   |
|                       | 0~ -.0005                         |
|                       | over 1/8(.1250) ~ upto 1/4(.2500) |
|                       | 0~ -.0007                         |
|                       | over 1/4(.2500) ~ upto 1/2(.5000) |
|                       | 0~ -.0010                         |



P.419

► Flute Geometry

: Right hand spiral, **PARABOLIC FLUTE**  
38° helix

► Point Angle

: 130°:Split point... .059 diameter and over.

► Application

: Improved chip removal in most materials,  
especially in deep drilling applications.

**DN516 Series**

► Letter sizes

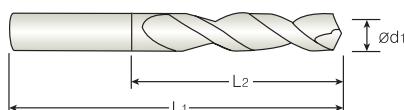
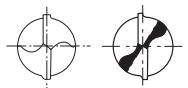
Unit:inch

| EDP No.<br>TiN-COATED | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|------|-------------------|----------------------|------------------------|
| * DN516101            | A    | .2340             | 1-5/16               | 2-7/16                 |
| * DN516102            | B    | .2380             | 1-3/8                | 2-1/2                  |
| * DN516103            | C    | .2420             | 1-3/8                | 2-1/2                  |
| * DN516104            | D    | .2460             | 1-3/8                | 2-1/2                  |
| * DN516105            | E    | .2500             | 1-3/8                | 2-1/2                  |
| * DN516106            | F    | .2570             | 1-7/16               | 2-5/8                  |
| * DN516107            | G    | .2610             | 1-7/16               | 2-5/8                  |
| * DN516108            | H    | .2660             | 1-1/2                | 2-11/16                |
| * DN516109            | I    | .2720             | 1-1/2                | 2-11/16                |
| * DN516110            | J    | .2770             | 1-1/2                | 2-11/16                |
| * DN516111            | K    | .2810             | 1-1/2                | 2-11/16                |
| * DN516112            | L    | .2900             | 1-9/16               | 2-3/4                  |
| * DN516113            | M    | .2950             | 1-9/16               | 2-3/4                  |

| EDP No.<br>TiN-COATED | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|------|-------------------|----------------------|------------------------|
| * DN516114            | N    | .3020             | 1-5/8                | 2-13/16                |
| * DN516115            | O    | .3160             | 1-11/16              | 2-15/16                |
| * DN516116            | P    | .3230             | 1-11/16              | 2-15/16                |
| * DN516117            | Q    | .3320             | 1-11/16              | 3                      |
| * DN516118            | R    | .3390             | 1-11/16              | 3                      |
| * DN516119            | S    | .3480             | 1-3/4                | 3-1/16                 |
| * DN516120            | T    | .3580             | 1-3/4                | 3-1/16                 |
| * DN516121            | U    | .3680             | 1-13/16              | 3-1/8                  |
| * DN516122            | V    | .3770             | 1-7/8                | 3-1/4                  |
| * DN516123            | W    | .3860             | 1-7/8                | 3-1/4                  |
| * DN516124            | X    | .3970             | 1-15/16              | 3-5/16                 |
| * DN516125            | Y    | .4040             | 1-15/16              | 3-5/16                 |
| * DN516126            | Z    | .4130             | 2                    | 3-3/8                  |

\* 5per package

|                |  |
|----------------|--|
| Tolerance of D | / upto 1/8(.1250)<br>0~ -.0005                   |
|                | / over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                | / over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



ANSI

HSS  
Co5

38°

ANSI

130°

DATA

P.419

►Flute Geometry : Right hand spiral, PARABOLIC FLUTE

38° helix

►Point Angle : 130°:Split point... .059 diameter and over.

►Application : Improved chip removal in most materials, especially in deep drilling applications.

**DN515 Series**

**► Wire gauge sizes**

Unit:inch

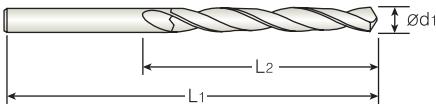
| EDP No.<br>TiN-COATED | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|------|-------------------|----------------------|------------------------|
| * DN515201            | 1    | .2280             | 1-5/16               | 2-7/16                 |
| * DN515202            | 2    | .2210             | 1-5/16               | 2-7/16                 |
| * DN515203            | 3    | .2130             | 1-1/4                | 2-3/8                  |
| * DN515204            | 4    | .2090             | 1-1/4                | 2-3/8                  |
| * DN515205            | 5    | .2055             | 1-1/4                | 2-3/8                  |
| * DN515206            | 6    | .2040             | 1-1/4                | 2-3/8                  |
| * DN515207            | 7    | .2010             | 1-3/16               | 2-1/4                  |
| * DN515208            | 8    | .1990             | 1-3/16               | 2-1/4                  |
| * DN515209            | 9    | .1960             | 1-3/16               | 2-1/4                  |
| * DN515210            | 10   | .1935             | 1-3/16               | 2-1/4                  |
| * DN515211            | 11   | .1910             | 1-3/16               | 2-1/4                  |
| * DN515212            | 12   | .1890             | 1-3/16               | 2-1/4                  |
| * DN515213            | 13   | .1850             | 1-1/8                | 2-3/16                 |
| * DN515214            | 14   | .1820             | 1-1/8                | 2-3/16                 |
| * DN515215            | 15   | .1800             | 1-1/8                | 2-3/16                 |
| * DN515216            | 16   | .1770             | 1-1/8                | 2-3/16                 |
| * DN515217            | 17   | .1730             | 1-1/8                | 2-3/16                 |
| * DN515218            | 18   | .1695             | 1-1/16               | 2-1/8                  |
| * DN515219            | 19   | .1660             | 1-1/16               | 2-1/8                  |
| * DN515220            | 20   | .1610             | 1-1/16               | 2-1/8                  |
| * DN515221            | 21   | .1590             | 1-1/16               | 2-1/8                  |
| * DN515222            | 22   | .1570             | 1-1/16               | 2-1/8                  |
| * DN515223            | 23   | .1540             | 1                    | 2-1/16                 |
| * DN515224            | 24   | .1520             | 1                    | 2-1/16                 |

| EDP No.<br>TiN-COATED | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------|------|-------------------|----------------------|------------------------|
| * DN515225            | 25   | .1495             | 1                    | 2-1/16                 |
| * DN515226            | 26   | .1470             | 1                    | 2-1/16                 |
| * DN515227            | 27   | .1440             | 1                    | 2-1/16                 |
| * DN515228            | 28   | .1405             | 15/16                | 1-15/16                |
| * DN515229            | 29   | .1360             | 15/16                | 1-15/16                |
| * DN515230            | 30   | .1285             | 15/16                | 1-15/16                |
| * DN515231            | 31   | .1200             | 7/8                  | 1-7/8                  |
| * DN515232            | 32   | .1160             | 7/8                  | 1-7/8                  |
| * DN515233            | 33   | .1130             | 7/8                  | 1-7/8                  |
| * DN515234            | 34   | .1110             | 7/8                  | 1-7/8                  |
| * DN515235            | 35   | .1100             | 7/8                  | 1-7/8                  |
| * DN515236            | 36   | .1065             | 13/16                | 1-13/16                |
| ** DN515237           | 37   | .1040             | 13/16                | 1-13/16                |
| ** DN515238           | 38   | .1015             | 13/16                | 1-13/16                |
| ** DN515239           | 39   | .0995             | 13/16                | 1-13/16                |
| ** DN515240           | 40   | .0980             | 13/16                | 1-13/16                |
| ** DN515241           | 41   | .0960             | 13/16                | 1-13/16                |
| ** DN515242           | 42   | .0935             | 3/4                  | 1-3/4                  |
| ** DN515243           | 43   | .0890             | 3/4                  | 1-3/4                  |
| ** DN515244           | 44   | .0860             | 3/4                  | 1-3/4                  |
| ** DN515245           | 45   | .0820             | 3/4                  | 1-3/4                  |
| ** DN515246           | 46   | .0810             | 3/4                  | 1-3/4                  |
| ** DN515247           | 47   | .0785             | 11/16                | 1-11/16                |

\* 5per package

\*\* 10per package

|                |  |
|----------------|--|
| Tolerance of D | upto 1/8(.1250)<br>0~ -.0005                     |
|                | / over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                | / over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.420

► Flute Geometry

: Right hand spiral, **PARABOLIC FLUTE**  
38° helix

► Point Angle

: 130°:Split point... .059 diameter and over.  
: Improved chip removal in most materials,  
especially in deep drilling applications.

**DX517 Series**

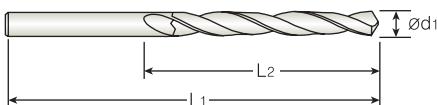
► Fractional sizes

Unit:inch

| EDP No.<br>TiCN-COATED | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------------------|-------------------|----------------------|------------------------|
| DX517005               | 5/64              | 2"                   | 3-3/4                  |
| DX517006               | 3/32              | 2-1/4                | 4-1/4                  |
| DX517007               | 7/64              | 2-1/2                | 4-5/8                  |
| DX517008               | 1/8               | 2-3/4                | 5-1/8                  |
| DX517009               | 9/64              | 3"                   | 5-3/8                  |
| DX517010               | 5/32              | 3"                   | 5-3/8                  |
| DX517011               | 11/64             | 3-3/8                | 5-3/4                  |
| DX517012               | 3/16              | 3-3/8                | 5-3/4                  |
| DX517013               | 13/64             | 3-5/8                | 6"                     |
| DX517014               | 7/32              | 3-5/8                | 6"                     |
| DX517015               | 15/64             | 3-3/4                | 6-1/8                  |
| DX517016               | 1/4               | 3-3/4                | 6-1/8                  |
| DX517017               | 17/64             | 3-7/8                | 6-1/4                  |
| DX517018               | 9/32              | 3-7/8                | 6-1/4                  |

| EDP No.<br>TiCN-COATED | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|------------------------|-------------------|----------------------|------------------------|
| DX517019               | 19/64             | 4"                   | 6-3/8                  |
| DX517020               | 5/16              | 4"                   | 6-3/8                  |
| DX517021               | 21/64             | 4-1/8                | 6-1/2                  |
| DX517022               | 11/32             | 4-1/8                | 6-3/4                  |
| DX517023               | 23/64             | 4-1/4                | 6-3/4                  |
| DX517024               | 3/8               | 4-1/4                | 6-3/4                  |
| DX517025               | 25/64             | 4-3/8                | 7"                     |
| DX517026               | 13/32             | 4-3/8                | 7"                     |
| DX517027               | 27/64             | 4-5/8                | 7-1/4                  |
| DX517028               | 7/16              | 4-5/8                | 7-1/4                  |
| DX517029               | 29/64             | 4-3/4                | 7-1/2                  |
| DX517030               | 15/32             | 4-3/4                | 7-1/2                  |
| DX517031               | 31/64             | 4-3/4                | 7-3/4                  |
| DX517032               | 1/2               | 4-3/4                | 7-3/4                  |

|                |  |
|----------------|--|
| Tolerance of D | / upto 1/8(.1250)<br>0~ -.0005                   |
|                | / over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                | / over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.420

►Flute Geometry : Right hand spiral, **PARABOLIC FLUTE**

38° helix

►Point Angle : 130°:Split point... .059 diameter and over.

►Application : Improved chip removal in most materials, especially in deep drilling applications.

**DL517 Series**

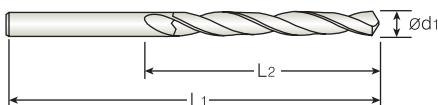
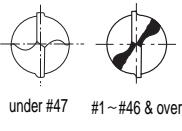
► **Fractional sizes**

Unit:inch

| EDP No.<br><b>UN-COATED</b> | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------------|-------------------|----------------------|------------------------|
| DL517005                    | 5/64              | 2"                   | 3-3/4                  |
| DL517006                    | 3/32              | 2-1/4                | 4-1/4                  |
| DL517007                    | 7/64              | 2-1/2                | 4-5/8                  |
| DL517008                    | 1/8               | 2-3/4                | 5-1/8                  |
| DL517009                    | 9/64              | 3"                   | 5-3/8                  |
| DL517010                    | 5/32              | 3"                   | 5-3/8                  |
| DL517011                    | 11/64             | 3-3/8                | 5-3/4                  |
| DL517012                    | 3/16              | 3-3/8                | 5-3/4                  |
| DL517013                    | 13/64             | 3-5/8                | 6"                     |
| DL517014                    | 7/32              | 3-5/8                | 6"                     |
| DL517015                    | 15/64             | 3-3/4                | 6-1/8                  |
| DL517016                    | 1/4               | 3-3/4                | 6-1/8                  |
| DL517017                    | 17/64             | 3-7/8                | 6-1/4                  |
| DL517018                    | 9/32              | 3-7/8                | 6-1/4                  |

| EDP No.<br><b>UN-COATED</b> | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-----------------------------|-------------------|----------------------|------------------------|
| DL517019                    | 19/64             | 4"                   | 6-3/8                  |
| DL517020                    | 5/16              | 4"                   | 6-3/8                  |
| DL517021                    | 21/64             | 4-1/8                | 6-1/2                  |
| DL517022                    | 11/32             | 4-1/8                | 6-3/4                  |
| DL517023                    | 23/64             | 4-1/4                | 6-3/4                  |
| DL517024                    | 3/8               | 4-1/4                | 6-3/4                  |
| DL517025                    | 25/64             | 4-3/8                | 7"                     |
| DL517026                    | 13/32             | 4-3/8                | 7"                     |
| DL517027                    | 27/64             | 4-5/8                | 7-1/4                  |
| DL517028                    | 7/16              | 4-5/8                | 7-1/4                  |
| DL517029                    | 29/64             | 4-3/4                | 7-1/2                  |
| DL517030                    | 15/32             | 4-3/4                | 7-1/2                  |
| DL517031                    | 31/64             | 4-3/4                | 7-3/4                  |
| DL517032                    | 1/2               | 4-3/4                | 7-3/4                  |

|                       |                                   |
|-----------------------|-----------------------------------|
| <b>Tolerance of D</b> | upto 1/8(.1250)                   |
|                       | 0~ -.0005                         |
| ✓                     | over 1/8(.1250) ~ upto 1/4(.2500) |
|                       | 0~ -.0007                         |
| ✓                     | over 1/4(.2500) ~ upto 1/2(.5000) |
|                       | 0~ -.0010                         |



P.418

► Flute Geometry

: Right hand spiral, 30° helix

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Improved chip removal in most materials, especially in deep drilling applications.

► Fractional sizes

Unit:inch

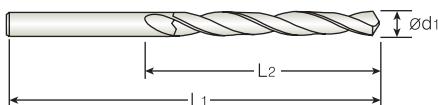
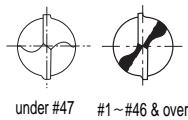
| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| ** DL601005 | 5/64              | 1"                   | 6                      |
| ** DL601006 | 3/32              | 1*1/4                | 6                      |
| ** DL601007 | 7/64              | 1*1/4                | 6                      |
| ** DL601008 | 1/8               | 1*5/8                | 6                      |
| ** DL601009 | 9/64              | 1*3/4                | 6                      |
| ** DL601010 | 5/32              | 2"                   | 6                      |
| ** DL601011 | 11/64             | 2*1/8                | 6                      |
| ** DL601012 | 3/16              | 2*5/16               | 6                      |
| ** DL601013 | 13/64             | 2*7/16               | 6                      |
| ** DL601014 | 7/32              | 2*1/2                | 6                      |
| ** DL601015 | 15/64             | 2*5/8                | 6                      |
| * DL601016  | 1/4 6             | 2*3/4                | 6                      |
| * DL601017  | 17/64             | 2*7/8                | 6                      |
| * DL601018  | 9/32              | 2*15/16              | 6                      |
| * DL601019  | 19/64             | 3*1/16               | 6                      |
| * DL601020  | 5/16              | 3*3/16               | 6                      |
| * DL601021  | 21/64             | 3*5/16               | 6                      |
| * DL601022  | 11/32             | 3*7/16               | 6                      |
| * DL601023  | 23/64             | 3*1/2                | 6                      |
| * DL601024  | 3/8               | 3*5/8                | 6                      |
| * DL601025  | 25/64             | 3*3/4                | 6                      |
| * DL601026  | 13/32             | 3*7/8                | 6                      |
| * DL601027  | 27/64             | 3*15/16              | 6                      |
| * DL601028  | 7/16              | 4*1/16               | 6                      |

| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| * DL601029  | 29/64             | 4*3/16               | 6                      |
| * DL601030  | 15/32             | 4*5/16               | 6                      |
| * DL601031  | 31/64             | 4*3/8                | 6                      |
| * DL601032  | 1/2               | 4*1/2                | 6                      |
| ** DL604014 | 7/32              | 2*1/2                | 12                     |
| ** DL604015 | 15/64             | 2*5/8                | 12                     |
| * DL604016  | 1/4               | 2*3/4                | 12                     |
| * DL604017  | 17/64             | 2*7/8                | 12                     |
| * DL604018  | 9/32              | 2*15/16              | 12                     |
| * DL604019  | 19/64             | 3*1/16               | 12                     |
| * DL604020  | 5/16              | 3*3/16               | 12                     |
| * DL604021  | 21/64             | 3*5/16               | 12                     |
| * DL604022  | 11/32             | 3*7/16               | 12                     |
| * DL604023  | 23/64             | 3*1/2                | 12                     |
| * DL604024  | 3/8               | 3*5/8                | 12                     |
| * DL604025  | 25/64             | 3*3/4                | 12                     |
| * DL604026  | 13/32             | 3*7/8                | 12                     |
| * DL604027  | 27/64             | 3*15/16              | 12                     |
| * DL604028  | 7/16              | 4*1/16               | 12                     |
| * DL604029  | 29/64             | 4*3/16               | 12                     |
| * DL604030  | 15/32             | 4*5/16               | 12                     |
| * DL604031  | 31/64             | 4*3/8                | 12                     |
| * DL604032  | 1/2               | 4*1/2                | 12                     |

\* 5per package

\*\* 10per package

|                |  |
|----------------|--|
| Tolerance of D | / upto 1/8(.1250)<br>0~ -.0005                   |
|                | / over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                | / over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.418

► Flute Geometry

: Right hand spiral, 30° helix

► Point Angle

: 135° Split point... .059 diameter and over.

► Application

: Improved chip removal in most materials, especially in deep drilling applications.

► Letter sizes

Unit:inch

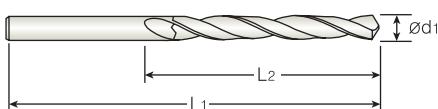
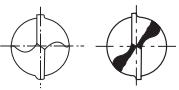
| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** DL602101 | A    | .2340             | 2*5/8                | 6                      |
| * DL602102  | B    | .2380             | 2*3/4                | 6                      |
| * DL602103  | C    | .2420             | 2*3/4                | 6                      |
| * DL602104  | D    | .2460             | 2*3/4                | 6                      |
| * DL602105  | E    | .2500             | 2*3/4                | 6                      |
| * DL602106  | F    | .2570             | 2*7/8                | 6                      |
| * DL602107  | G    | .2610             | 2*7/8                | 6                      |
| * DL602108  | H    | .2660             | 2*7/8                | 6                      |
| * DL602109  | I    | .2720             | 2*7/8                | 6                      |
| * DL602110  | J    | .2770             | 2*7/8                | 6                      |
| * DL602111  | K    | .2810             | 2*15/16              | 6                      |
| * DL602112  | L    | .2900             | 2*15/16              | 6                      |
| * DL602113  | M    | .2950             | 3*1/16               | 6                      |
| * DL602114  | N    | .3020             | 3*1/16               | 6                      |
| * DL602115  | O    | .3160             | 3*3/16               | 6                      |
| * DL602116  | P    | .3230             | 3*5/16               | 6                      |
| * DL602117  | Q    | .3320             | 3*7/16               | 6                      |
| * DL602118  | R    | .3390             | 3*7/16               | 6                      |
| * DL602119  | S    | .3480             | 3*1/2                | 6                      |
| * DL602120  | T    | .3580             | 3*1/2                | 6                      |
| * DL602121  | U    | .3680             | 3*5/8                | 6                      |
| * DL602122  | V    | .3770             | 3*5/8                | 6                      |
| * DL602123  | W    | .3860             | 3*3/4                | 6                      |
| * DL602124  | X    | .3970             | 3*3/4                | 6                      |
| * DL602125  | Y    | .4040             | 3*7/8                | 6                      |
| * DL602126  | Z    | .4130             | 3*7/8                | 6                      |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** DL605101 | A    | .2340             | 2*5/8                | 12                     |
| * DL605102  | B    | .2380             | 2*3/4                | 12                     |
| * DL605103  | C    | .2420             | 2*3/4                | 12                     |
| * DL605104  | D    | .2460             | 2*3/4                | 12                     |
| * DL605105  | E    | .2500             | 2*3/4                | 12                     |
| * DL605106  | F    | .2570             | 2*7/8                | 12                     |
| * DL605107  | G    | .2610             | 2*7/8                | 12                     |
| * DL605108  | H    | .2660             | 2*7/8                | 12                     |
| * DL605109  | I    | .2720             | 2*7/8                | 12                     |
| * DL605110  | J    | .2770             | 2*7/8                | 12                     |
| * DL605111  | K    | .2810             | 2*15/16              | 12                     |
| * DL605112  | L    | .2900             | 2*15/16              | 12                     |
| * DL605113  | M    | .2950             | 3*1/16               | 12                     |
| * DL605114  | N    | .3020             | 3*1/16               | 12                     |
| * DL605115  | O    | .3160             | 3*3/16               | 12                     |
| * DL605116  | P    | .3230             | 3*5/16               | 12                     |
| * DL605117  | Q    | .3320             | 3*7/16               | 12                     |
| * DL605118  | R    | .3390             | 3*7/16               | 12                     |
| * DL605119  | S    | .3480             | 3*1/2                | 12                     |
| * DL605120  | T    | .3580             | 3*1/2                | 12                     |
| * DL605121  | U    | .3680             | 3*5/8                | 12                     |
| * DL605122  | V    | .3770             | 3*5/8                | 12                     |
| * DL605123  | W    | .3860             | 3*3/4                | 12                     |
| * DL605124  | X    | .3970             | 3*3/4                | 12                     |
| * DL605125  | Y    | .4040             | 3*7/8                | 12                     |
| * DL605126  | Z    | .4130             | 3*7/8                | 12                     |

\* 5per package

\*\* 10per package

|                       |                                   |
|-----------------------|-----------------------------------|
| <b>Tolerance of D</b> | upto 1/8(.1250)                   |
|                       | 0~ -.0005                         |
|                       | over 1/8(.1250) ~ upto 1/4(.2500) |
|                       | 0~ -.0007                         |
|                       | over 1/4(.2500) ~ upto 1/2(.5000) |
|                       | 0~ -.0010                         |



**HSS  
Co5**

**30°**

**135°**

**DATA**

P.418

► Flute Geometry

: Right hand spiral, **PARABOLIC FLUTE**  
30° helix

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application  
: Improved chip removal in most materials,  
especially in deep drilling applications.

► Number sizes

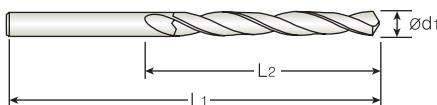
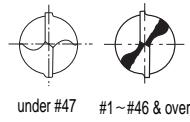
Unit:inch

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** DL603256 | #1   | .2280             | 2*5/8                | 6                      |
| ** DL603255 | #2   | .2210             | 2*5/8                | 6                      |
| ** DL603254 | #3   | .2130             | 2*1/2                | 6                      |
| ** DL603253 | #4   | .2090             | 2*1/2                | 6                      |
| ** DL603252 | #5   | .2055             | 2*1/2                | 6                      |
| ** DL603251 | #6   | .2040             | 2*1/2                | 6                      |
| ** DL603250 | #7   | .2010             | 2*7/16               | 6                      |
| ** DL603249 | #8   | .1990             | 2*7/16               | 6                      |
| ** DL603248 | #9   | .1960             | 2*7/16               | 6                      |
| ** DL603247 | #10  | .1935             | 2*7/16               | 6                      |
| ** DL603246 | #11  | .1910             | 2*5/16               | 6                      |
| ** DL603245 | #12  | .1890             | 2*5/16               | 6                      |
| ** DL603244 | #13  | .1850             | 2*5/16               | 6                      |
| ** DL603243 | #14  | .1820             | 2*3/16               | 6                      |
| ** DL603242 | #15  | .1800             | 2*3/16               | 6                      |
| ** DL603241 | #16  | .1770             | 2*3/16               | 6                      |
| ** DL603240 | #17  | .1730             | 2*3/16               | 6                      |
| ** DL603239 | #18  | .1695             | 2*1/8                | 6                      |
| ** DL603238 | #19  | .1660             | 2*1/8                | 6                      |
| ** DL603237 | #20  | .1610             | 2*1/8                | 6                      |
| ** DL603236 | #21  | .1590             | 2*1/8                | 6                      |
| ** DL603235 | #22  | .1570             | 2"                   | 6                      |
| ** DL603234 | #23  | .1540             | 2"                   | 6                      |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** DL603233 | #24  | .1520             | 2"                   | 6                      |
| ** DL603232 | #25  | .1495             | 1*7/8                | 6                      |
| ** DL603231 | #26  | .1470             | 1*7/8                | 6                      |
| ** DL603230 | #27  | .1440             | 1*7/8                | 6                      |
| ** DL603229 | #28  | .1405             | 1*3/4                | 6                      |
| ** DL603228 | #29  | .1360             | 1*3/4                | 6                      |
| ** DL603227 | #30  | .1280             | 1*5/8                | 6                      |
| ** DL603226 | #31  | .1200             | 1*5/8                | 6                      |
| ** DL603225 | #32  | .1160             | 1*5/8                | 6                      |
| ** DL603224 | #33  | .1130             | 1*1/2                | 6                      |
| ** DL603223 | #34  | .1110             | 1*1/2                | 6                      |
| ** DL603222 | #35  | .1100             | 1*1/2                | 6                      |
| ** DL603221 | #36  | .1065             | 1*7/16               | 6                      |
| ** DL603220 | #37  | .1040             | 1*7/16               | 6                      |
| ** DL603219 | #38  | .1015             | 1*7/16               | 6                      |
| ** DL603218 | #39  | .0995             | 1*3/8                | 6                      |
| ** DL603217 | #40  | .0980             | 1*3/8                | 6                      |
| ** DL603216 | #41  | .0960             | 1*3/8                | 6                      |
| ** DL603215 | #42  | .0935             | 1*1/4                | 6                      |
| ** DL603214 | #43  | .0890             | 1*1/4                | 6                      |
| ** DL606256 | #1   | .2280             | 2*5/8                | 12                     |
| ** DL606254 | #3   | .2130             | 2*1/2                | 12                     |

\*\* 10per package

|                |  |
|----------------|--|
| Tolerance of D | / upto 1/8(.1250)<br>0~ -.0005                   |
|                | / over 1/8(.1250) ~ upto 1/4(.2500)<br>0~ -.0007 |
|                | / over 1/4(.2500) ~ upto 1/2(.5000)<br>0~ -.0010 |



P.418

► Flute Geometry : Right hand spiral, 30° helix

► Point Angle : 135°-Split point... .059 diameter and over.

► Application : Improved chip removal in most materials, especially in deep drilling applications.

## ► Fractional sizes

Unit:inch

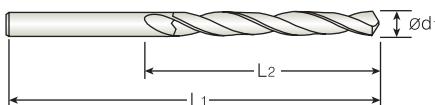
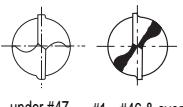
| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| ** D1631005 | 5/64              | 1"                   | 6                      |
| ** D1631006 | 3/32              | 1*1/4                | 6                      |
| ** D1631007 | 7/64              | 1*1/4                | 6                      |
| ** D1631008 | 1/8               | 1*5/8                | 6                      |
| ** D1631009 | 9/64              | 1*3/4                | 6                      |
| ** D1631010 | 5/32              | 2"                   | 6                      |
| ** D1631011 | 11/64             | 2*1/8                | 6                      |
| ** D1631012 | 3/16              | 2*5/16               | 6                      |
| ** D1631013 | 13/64             | 2*7/16               | 6                      |
| ** D1631014 | 7/32              | 2*1/2                | 6                      |
| ** D1631015 | 15/64             | 2*5/8                | 6                      |
| * D1631016  | 1/4               | 2*3/4                | 6                      |
| * D1631017  | 17/64             | 2*7/8                | 6                      |
| * D1631018  | 9/32              | 2*15/16              | 6                      |
| * D1631019  | 19/64             | 3*1/16               | 6                      |
| * D1631020  | 5/16              | 3*3/16               | 6                      |
| * D1631021  | 21/64             | 3*5/16               | 6                      |
| * D1631022  | 11/32             | 3*7/16               | 6                      |
| * D1631023  | 23/64             | 3*1/2                | 6                      |
| * D1631024  | 3/8               | 3*5/8                | 6                      |
| * D1631025  | 25/64             | 3*3/4                | 6                      |
| * D1631026  | 13/32             | 3*7/8                | 6                      |
| * D1631027  | 27/64             | 3*15/16              | 6                      |
| * D1631028  | 7/16              | 4*1/16               | 6                      |

| EDP No.     | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|-------------------|----------------------|------------------------|
| * D1631029  | 29/64             | 4*3/16               | 6                      |
| * D1631030  | 15/32             | 4*5/16               | 6                      |
| * D1631031  | 31/64             | 4*3/8                | 6                      |
| * D1631032  | 1/2               | 4*1/2                | 6                      |
| ** D1634014 | 7/32              | 2*1/2                | 12                     |
| * D1634015  | 15/64             | 2*5/8                | 12                     |
| * D1634016  | 1/4               | 2*3/4                | 12                     |
| * D1634017  | 17/64             | 2*7/8                | 12                     |
| * D1634018  | 9/32              | 2*15/16              | 12                     |
| * D1634019  | 19/64             | 3*1/16               | 12                     |
| * D1634020  | 5/16              | 3*3/16               | 12                     |
| * D1634021  | 21/64             | 3*5/16               | 12                     |
| * D1634022  | 11/32             | 3*7/16               | 12                     |
| * D1634023  | 23/64             | 3*1/2                | 12                     |
| * D1634024  | 3/8               | 3*5/8                | 12                     |
| * D1634025  | 25/64             | 3*3/4                | 12                     |
| * D1634026  | 13/32             | 3*7/8                | 12                     |
| * D1634027  | 27/64             | 3*15/16              | 12                     |
| * D1634028  | 7/16              | 4*1/16               | 12                     |
| * D1634029  | 29/64             | 4*3/16               | 12                     |
| * D1634030  | 15/32             | 4*5/16               | 12                     |
| * D1634031  | 31/64             | 4*3/8                | 12                     |
| * D1634032  | 1/2               | 4*1/2                | 12                     |

\* 5 per package

\*\* 10 per package

|                |                                   |
|----------------|-----------------------------------|
| Tolerance of D | upto 1/8(.1250)                   |
|                | 0~ -.0005                         |
|                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                | 0~ -.0007                         |
|                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                | 0~ -.0010                         |



P.418

► Flute Geometry

: Right hand spiral, 30° helix

► Point Angle

: 135°:Split point... .059 diameter and over.

► Application

: Improved chip removal in most materials, especially in deep drilling applications.

► Letter sizes

Unit:inch

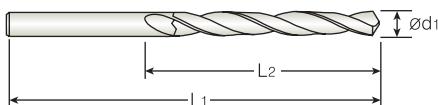
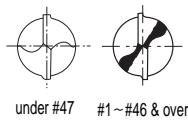
| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1632101 | A    | .2340             | 2*5/8                | 6                      |
| * D1632102  | B    | .2380             | 2*3/4                | 6                      |
| * D1632103  | C    | .2420             | 2*3/4                | 6                      |
| * D1632104  | D    | .2460             | 2*3/4                | 6                      |
| * D1632105  | E    | .2500             | 2*3/4                | 6                      |
| * D1632106  | F    | .2570             | 2*7/8                | 6                      |
| * D1632107  | G    | .2610             | 2*7/8                | 6                      |
| * D1632108  | H    | .2660             | 2*7/8                | 6                      |
| * D1632109  | I    | .2720             | 2*7/8                | 6                      |
| * D1632110  | J    | .2770             | 2*7/8                | 6                      |
| * D1632111  | K    | .2810             | 2*15/16              | 6                      |
| * D1632112  | L    | .2900             | 2*15/16              | 6                      |
| * D1632113  | M    | .2950             | 3*1/16               | 6                      |
| * D1632114  | N    | .3020             | 3*1/16               | 6                      |
| * D1632115  | O    | .3160             | 3*3/16               | 6                      |
| * D1632116  | P    | .3230             | 3*5/16               | 6                      |
| * D1632117  | Q    | .3320             | 3*7/16               | 6                      |
| * D1632118  | R    | .3390             | 3*7/16               | 6                      |
| * D1632119  | S    | .3480             | 3*1/2                | 6                      |
| * D1632120  | T    | .3580             | 3*1/2                | 6                      |
| * D1632121  | U    | .3680             | 3*5/8                | 6                      |
| * D1632122  | V    | .3770             | 3*5/8                | 6                      |
| * D1632123  | W    | .3860             | 3*3/4                | 6                      |
| * D1632124  | X    | .3970             | 3*3/4                | 6                      |
| * D1632125  | Y    | .4040             | 3*7/8                | 6                      |
| * D1632126  | Z    | .4130             | 3*7/8                | 6                      |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1635101 | A    | .2340             | 2*5/8                | 12                     |
| * D1635102  | B    | .2380             | 2*3/4                | 12                     |
| * D1635103  | C    | .2420             | 2*3/4                | 12                     |
| * D1635104  | D    | .2460             | 2*3/4                | 12                     |
| * D1635105  | E    | .2500             | 2*3/4                | 12                     |
| * D1635106  | F    | .2570             | 2*7/8                | 12                     |
| * D1635107  | G    | .2610             | 2*7/8                | 12                     |
| * D1635108  | H    | .2660             | 2*7/8                | 12                     |
| * D1635109  | I    | .2720             | 2*7/8                | 12                     |
| * D1635110  | J    | .2770             | 2*7/8                | 12                     |
| * D1635111  | K    | .2810             | 2*15/16              | 12                     |
| * D1635112  | L    | .2900             | 2*15/16              | 12                     |
| * D1635113  | M    | .2950             | 3*1/16               | 12                     |
| * D1635114  | N    | .3020             | 3*1/16               | 12                     |
| * D1635115  | O    | .3160             | 3*3/16               | 12                     |
| * D1635116  | P    | .3230             | 3*5/16               | 12                     |
| * D1635117  | Q    | .3320             | 3*7/16               | 12                     |
| * D1635118  | R    | .3390             | 3*7/16               | 12                     |
| * D1635119  | S    | .3480             | 3*1/2                | 12                     |
| * D1635120  | T    | .3580             | 3*1/2                | 12                     |
| * D1635121  | U    | .3680             | 3*5/8                | 12                     |
| * D1635122  | V    | .3770             | 3*5/8                | 12                     |
| * D1635123  | W    | .3860             | 3*3/4                | 12                     |
| * D1635124  | X    | .3970             | 3*3/4                | 12                     |
| * D1635125  | Y    | .4040             | 3*7/8                | 12                     |
| * D1635126  | Z    | .4130             | 3*7/8                | 12                     |

\* 5per package

\*\* 10per package

|                |                                   |
|----------------|-----------------------------------|
| Tolerance of D | upto 1/8(.1250)                   |
|                | 0~ -.0005                         |
|                | over 1/8(.1250) ~ upto 1/4(.2500) |
|                | 0~ -.0007                         |
|                | over 1/4(.2500) ~ upto 1/2(.5000) |
|                | 0~ -.0010                         |



P.418

► Flute Geometry

: Right hand spiral, 30° helix

► Point Angle

: 135° Split point... .059 diameter and over.

► Application

: Improved chip removal in most materials,

, especially in deep drilling applications.

## ► Number sizes

Unit:inch

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1633256 | #1   | .2280             | 2 <sup>*</sup> 5/8   | 6                      |
| ** D1633255 | #2   | .2210             | 2 <sup>*</sup> 5/8   | 6                      |
| ** D1633254 | #3   | .2130             | 2 <sup>*</sup> 1/2   | 6                      |
| ** D1633253 | #4   | .2090             | 2 <sup>*</sup> 1/2   | 6                      |
| ** D1633252 | #5   | .2055             | 2 <sup>*</sup> 1/2   | 6                      |
| ** D1633251 | #6   | .2040             | 2 <sup>*</sup> 1/2   | 6                      |
| ** D1633250 | #7   | .2010             | 2 <sup>*</sup> 7/16  | 6                      |
| ** D1633249 | #8   | .1990             | 2 <sup>*</sup> 7/16  | 6                      |
| ** D1633248 | #9   | .1960             | 2 <sup>*</sup> 7/16  | 6                      |
| ** D1633247 | #10  | .1935             | 2 <sup>*</sup> 7/16  | 6                      |
| ** D1633246 | #11  | .1910             | 2 <sup>*</sup> 5/16  | 6                      |
| ** D1633245 | #12  | .1890             | 2 <sup>*</sup> 5/16  | 6                      |
| ** D1633244 | #13  | .1850             | 2 <sup>*</sup> 5/16  | 6                      |
| ** D1633243 | #14  | .1820             | 2 <sup>*</sup> 3/16  | 6                      |
| ** D1633242 | #15  | .1800             | 2 <sup>*</sup> 3/16  | 6                      |
| ** D1633241 | #16  | .1770             | 2 <sup>*</sup> 3/16  | 6                      |
| ** D1633240 | #17  | .1730             | 2 <sup>*</sup> 3/16  | 6                      |
| ** D1633239 | #18  | .1695             | 2 <sup>*</sup> 1/8   | 6                      |
| ** D1633238 | #19  | .1660             | 2 <sup>*</sup> 1/8   | 6                      |
| ** D1633237 | #20  | .1610             | 2 <sup>*</sup> 1/8   | 6                      |
| ** D1633236 | #21  | .1590             | 2 <sup>*</sup> 1/8   | 6                      |
| ** D1633235 | #22  | .1570             | 2"                   | 6                      |
| ** D1633234 | #23  | .1540             | 2"                   | 6                      |

| EDP No.     | SIZE | Diameter<br>(Ød1) | Flute<br>Length (L2) | Overall<br>Length (L1) |
|-------------|------|-------------------|----------------------|------------------------|
| ** D1633233 | #24  | .1520             | 2"                   | 6                      |
| ** D1633232 | #25  | .1495             | 1 <sup>*</sup> 7/8   | 6                      |
| ** D1633231 | #26  | .1470             | 1 <sup>*</sup> 7/8   | 6                      |
| ** D1633230 | #27  | .1440             | 1 <sup>*</sup> 7/8   | 6                      |
| ** D1633229 | #28  | .1405             | 1 <sup>*</sup> 3/4   | 6                      |
| ** D1633228 | #29  | .1360             | 1 <sup>*</sup> 3/4   | 6                      |
| ** D1633227 | #30  | .1280             | 1 <sup>*</sup> 5/8   | 6                      |
| ** D1633226 | #31  | .1200             | 1 <sup>*</sup> 5/8   | 6                      |
| ** D1633225 | #32  | .1160             | 1 <sup>*</sup> 5/8   | 6                      |
| ** D1633224 | #33  | .1130             | 1 <sup>*</sup> 1/2   | 6                      |
| ** D1633223 | #34  | .1110             | 1 <sup>*</sup> 1/2   | 6                      |
| ** D1633222 | #35  | .1100             | 1 <sup>*</sup> 1/2   | 6                      |
| ** D1633221 | #36  | .1065             | 1 <sup>*</sup> 7/16  | 6                      |
| ** D1633220 | #37  | .1040             | 1 <sup>*</sup> 7/16  | 6                      |
| ** D1633219 | #38  | .1015             | 1 <sup>*</sup> 7/16  | 6                      |
| ** D1633218 | #39  | .0995             | 1 <sup>*</sup> 3/8   | 6                      |
| ** D1633217 | #40  | .0980             | 1 <sup>*</sup> 3/8   | 6                      |
| ** D1633216 | #41  | .0960             | 1 <sup>*</sup> 3/8   | 6                      |
| ** D1633215 | #42  | .0935             | 1 <sup>*</sup> 1/4   | 6                      |
| ** D1633214 | #43  | .0890             | 1 <sup>*</sup> 1/4   | 6                      |
| ** D1636256 | #1   | .2280             | 2 <sup>*</sup> 5/8   | 12                     |
| ** D1636254 | #3   | .2130             | 2 <sup>*</sup> 1/2   | 12                     |

\* 5per package

\*\* 10per package

### Application:

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

### Advantage:

Self centering - center drilling is not required  
Excellent positioning - bush is not necessary  
Special design - reaming is not required  
- good chip removal  
- powerful drilling

### 3XD TiAIN Coated Without coolant holes

30° Helix  
140° Point

| Material                   | Non Coolant Fed Drills / Inch Diameter |       |           |       |          |       |         |       |          |       |            |       |
|----------------------------|--|-------|-----------|-------|----------|-------|---------|-------|----------|-------|------------|-------|
|                            | 1/8~3/16                               |       | 3/16~5/16 |       | 5/16~3/8 |       | 3/8~1/2 |       | 1/2~9/16 |       | 9/16~13/16 |       |
|                            | N                                      | S     | N         | S     | N        | S     | N       | S     | N        | S     | N          | S     |
| Cast Iron <240 BHN         | 13120                                  | 0.006 | 8200      | 0.008 | 5970     | 0.011 | 4690    | 0.014 | 3860     | 0.016 | 2980       | 0.018 |
| Cast Iron >240 BHN         | 8750                                   | 0.005 | 5470      | 0.006 | 3980     | 0.009 | 3120    | 0.011 | 2570     | 0.012 | 1990       | 0.014 |
| Carbon Steels <300 BHN     | 7880                                   | 0.005 | 4920      | 0.006 | 3560     | 0.009 | 2810    | 0.011 | 2310     | 0.012 | 1790       | 0.014 |
| Alloy Steels 300 – 400 BHN | 7000                                   | 0.005 | 4370      | 0.006 | 3190     | 0.009 | 2500    | 0.011 | 2060     | 0.012 | 1590       | 0.014 |
| Aluminum, Si <10%          | 13530                                  | 0.008 | 8450      | 0.010 | 6140     | 0.014 | 4830    | 0.017 | 3960     | 0.020 | 3080       | 0.022 |
| Aluminum, Si >10%          | 11140                                  | 0.006 | 6960      | 0.008 | 5060     | 0.011 | 3980    | 0.014 | 3270     | 0.016 | 2530       | 0.018 |
| Stainless Steels           | 3070                                   | 0.002 | 1910      | 0.003 | 1400     | 0.004 | 1090    | 0.005 | 910      | 0.006 | 700        | 0.007 |

### 3XD & 5XD & 8XD TiAIN Coated With coolant holes

30° Helix  
140° Point

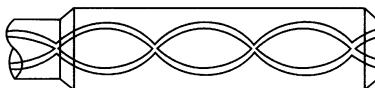
| Material                   | Coolant Fed Drills / Inch Diameter |       |           |       |          |       |         |       |          |       |            |       |
|----------------------------|------------------------------------|-------|-----------|-------|----------|-------|---------|-------|----------|-------|------------|-------|
|                            | 1/8~3/16                           |       | 3/16~5/16 |       | 5/16~3/8 |       | 3/8~1/2 |       | 1/2~9/16 |       | 9/16~13/16 |       |
|                            | N                                  | S     | N         | S     | N        | S     | N       | S     | N        | S     | N          | S     |
| Cast Iron <240 BHN         | 14870                              | 0.006 | 8200      | 0.008 | 6760     | 0.011 | 5310    | 0.014 | 4370     | 0.016 | 3380       | 0.018 |
| Cast Iron >240 BHN         | 9620                               | 0.006 | 6010      | 0.008 | 4370     | 0.011 | 3440    | 0.014 | 2830     | 0.016 | 2190       | 0.018 |
| Carbon Steels <300 BHN     | 8750                               | 0.006 | 5470      | 0.008 | 3980     | 0.011 | 3120    | 0.014 | 2570     | 0.016 | 1990       | 0.018 |
| Alloy Steels 300 – 400 BHN | 7880                               | 0.005 | 4920      | 0.006 | 3580     | 0.009 | 2810    | 0.011 | 2310     | 0.012 | 1790       | 0.014 |
| Aluminum, Si <10%          | 15910                              | 0.008 | 9940      | 0.010 | 7230     | 0.014 | 5680    | 0.017 | 4680     | 0.020 | 3610       | 0.022 |
| Aluminum, Si >10%          | 13530                              | 0.008 | 8450      | 0.010 | 6140     | 0.014 | 4830    | 0.017 | 3980     | 0.020 | 3080       | 0.022 |
| Stainless Steels           | 3500                               | 0.002 | 2190      | 0.003 | 1590     | 0.004 | 1250    | 0.005 | 1030     | 0.006 | 800        | 0.007 |

| up to .118 | over .118 up to .236 | over .236 up to .394 | over .394 up to .709 |
|------------|----------------------|----------------------|----------------------|
| +0         | +0                   | +0                   | +0                   |
| -.00055    | -.00071              | -.00087              | -.00106              |

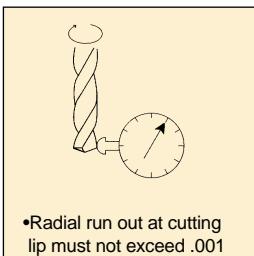
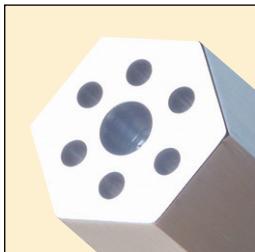
| DRILL DIAMETER TOLERANCE METRIC (ød.) |                    |                    |                    |                    |                    | mm = 1/1000 mm |
|---------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------------|
| Diameter Tolerance                    | 1-3 mm             | 3-6 mm             | 6-10 mm            | 10-18 mm           | 18-30 mm           |                |
| <b>h6</b>                             | 0<br>-.00024       | 0<br>-.00032       | 0<br>-.00036       | 0<br>-.00044       | 0<br>-.00052       |                |
| <b>h7</b>                             | 0<br>-.0004        | 0<br>-.00048       | 0<br>-.00059       | 0<br>-.00071       | 0<br>-.00083       |                |
| <b>h8</b>                             | 0<br>-.00056       | 0<br>-.00071       | 0<br>-.00087       | 0<br>-.00107       | 0<br>-.00130       |                |
| <b>m7</b>                             | +.00048<br>+.00007 | +.00063<br>+.00015 | +.00083<br>+.00023 | +.00099<br>+.00027 | +.00114<br>+.00031 |                |

We recommend you to reduce the feed rate to Kf when you use 5xD drills.  
Note for 8xD Drills reduce speeds & Feeds by 15-20%

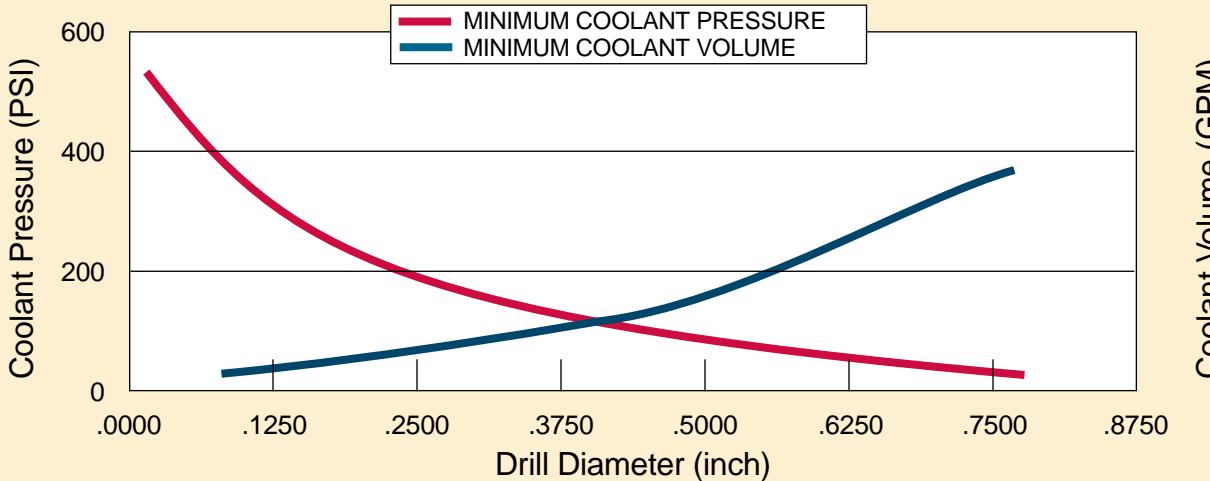
### SHANK TYPE – Form HA



## Drilling Parameters



Required Pressure and Volume for Coolant Fed Carbide Drills



## HSS-EX, HPD-SUS TWIST DRILLS SPEED and FEED DATA

### TiN Coated Cobalt Metric

#### Application:

Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.

**Approx. 60 SFM Stainless**

**300 SFM Aluminum**

**130 SFM Mild Steel**

**30° Helix**

**130° Point – up to 4mm**

**120° Point – over 4mm**

| Material | Stainless Steels (SUS304, 200) |             |                | Stainless Steels (SUS420, 440) |                |             | Aluminum & Aluminum Alloy |             | Plastics, Copper, Copper Alloys |             | Mild Steels, Low Carbon Steels |  |
|----------|--------------------------------|-------------|----------------|--------------------------------|----------------|-------------|---------------------------|-------------|---------------------------------|-------------|--------------------------------|--|
|          | R.P.M.<br>(mm)                 | N<br>R.P.M. | S<br>Inch/Rev. | N<br>R.P.M.                    | S<br>Inch/Rev. | N<br>R.P.M. | S<br>Inch/Rev.            | N<br>R.P.M. | S<br>Inch/Rev.                  | N<br>R.P.M. | S<br>Inch/Rev.                 |  |
| 2        | 2600                           | 0.003       | 3100           | 0.003                          | 11000          | 0.004       | 5600                      | 0.002       | 6300                            | 0.003       |                                |  |
| 3        | 1800                           | 0.003       | 2100           | 0.003                          | 7350           | 0.005       | 3750                      | 0.003       | 4200                            | 0.005       |                                |  |
| 4        | 1300                           | 0.004       | 1600           | 0.004                          | 7050           | 0.007       | 2800                      | 0.004       | 3200                            | 0.006       |                                |  |
| 5        | 1050                           | 0.006       | 1250           | 0.006                          | 5500           | 0.009       | 2250                      | 0.005       | 2500                            | 0.006       |                                |  |
| 6        | 900                            | 0.007       | 1050           | 0.007                          | 4600           | 0.010       | 1850                      | 0.006       | 2100                            | 0.007       |                                |  |
| 8        | 650                            | 0.009       | 800            | 0.009                          | 3500           | 0.013       | 1350                      | 0.008       | 1550                            | 0.009       |                                |  |
| 10       | 550                            | 0.010       | 630            | 0.012                          | 2800           | 0.016       | 1100                      | 0.010       | 1250                            | 0.010       |                                |  |
| 12       | 450                            | 0.013       | 530            | 0.014                          | 2300           | 0.020       | 950                       | 0.012       | 1050                            | 0.013       |                                |  |
| 14       | 400                            | 0.014       | 450            | 0.017                          | 2050           | 0.022       | 800                       | 0.013       | 900                             | 0.014       |                                |  |
| 16       | 350                            | 0.016       | 390            | 0.019                          | 1750           | 0.024       | 700                       | 0.014       | 790                             | 0.016       |                                |  |
| 18       | 300                            | 0.017       | 350            | 0.020                          | 1600           | 0.028       | 620                       | 0.016       | 700                             | 0.018       |                                |  |
| 20       | 260                            | 0.018       | 320            | 0.021                          | 1450           | 0.030       | 560                       | 0.016       | 620                             | 0.019       |                                |  |

Please decrease the feed rate 15% in JOBBERS SERIES.  
Please decrease the feed and speed 20% for cast surface.



## JOBBER LENGTH

### D1GP113, D1GP182, D1GP138, D1GP139, D1GP134, D1GP136, D2GP185, D2GP186, D2GP187 Series

| Work Material  | Carbon Steels |        | Carbon Steels |        | Alloy Steels  |        | Stainless Steels |        |
|----------------|---------------|--------|---------------|--------|---------------|--------|------------------|--------|
| Hardness       |               |        | ~ HRc23       |        | HRc23 ~ 34    |        | ~ HRc23          |        |
| Strength       | ~ 570N/mm²    |        | ~ 830N/mm²    |        | 830~1110N/mm² |        | ~ 830N/mm²       |        |
| Diameter(inch) | N             | S      | N             | S      | N             | S      | N                | S      |
| 3/64(.0469)    | 14000         | 0.0008 | 12500         | 0.0008 | 7700          | 0.0008 | 7000             | 0.0008 |
| #47(.0785)     | 7000          | 0.0023 | 6100          | 0.0024 | 3850          | 0.0024 | 3500             | 0.0024 |
| #32(.1160)     | 4650          | 0.0038 | 4100          | 0.0031 | 2550          | 0.0031 | 2350             | 0.0031 |
| #22(.1570)     | 3500          | 0.0044 | 3050          | 0.0043 | 1950          | 0.0039 | 1750             | 0.0039 |
| #9(.1960)      | 2800          | 0.0049 | 2450          | 0.0043 | 1550          | 0.0039 | 1400             | 0.0039 |
| B(.2380)       | 2350          | 0.0056 | 2050          | 0.0051 | 1300          | 0.0047 | 1150             | 0.0047 |
| J(.2770)       | 2000          | 0.0064 | 1750          | 0.0059 | 1100          | 0.0055 | 1000             | 0.0055 |
| O(.3160)       | 1750          | 0.0072 | 1550          | 0.0071 | 960           | 0.0059 | 875              | 0.0059 |
| T(.3580)       | 1550          | 0.0077 | 1350          | 0.0087 | 855           | 0.0071 | 780              | 0.0071 |
| X(.3970)       | 1400          | 0.0084 | 1250          | 0.0087 | 770           | 0.0071 | 700              | 0.0071 |
| 7/16(.4375)    | 1250          | 0.0087 | 1100          | 0.0087 | 700           | 0.0071 | 650              | 0.0071 |
| 15/32(.4688)   | 1150          | 0.0090 | 1000          | 0.0087 | 650           | 0.0079 | 585              | 0.0079 |
| 1/2(.5000)     | 1050          | 0.0090 | 950           | 0.0087 | 595           | 0.0079 | 540              | 0.0079 |

### D1GP113, D1GP182, D1GP138, D1GP139, D1GP134, D1GP136, D2GP185, D2GP186, D2GP187 Series

| Work Material  | Titanium Alloys |        | Aluminum Alloys, Zinc Alloys |        | Magnesium Alloys |        |
|----------------|-----------------|--------|------------------------------|--------|------------------|--------|
| Hardness       |                 |        |                              |        |                  |        |
| Strength       | ~410N/mm²       |        |                              |        |                  |        |
| Diameter(inch) | N               | S      | N                            | S      | N                | S      |
| 3/64(.0469)    | 8050            | 0.0008 | 30000                        | 0.0008 | 11500            | 0.0012 |
| #47(.0785)     | 4050            | 0.0024 | 15000                        | 0.0023 | 5800             | 0.0035 |
| #32(.1160)     | 2700            | 0.0031 | 9900                         | 0.0038 | 3850             | 0.0051 |
| #22(.1570)     | 2000            | 0.0035 | 7450                         | 0.0044 | 2900             | 0.0059 |
| #9(.1960)      | 1600            | 0.0039 | 5950                         | 0.0049 | 2300             | 0.0067 |
| B(.2380)       | 1350            | 0.0047 | 4950                         | 0.0056 | 1950             | 0.0075 |
| J(.2770)       | 1150            | 0.0055 | 4250                         | 0.0064 | 1650             | 0.0087 |
| O(.3160)       | 1000            | 0.0059 | 3700                         | 0.0072 | 1450             | 0.0094 |
| T(.3580)       | 895             | 0.0067 | 3300                         | 0.0079 | 1280             | 0.0106 |
| X(.3970)       | 805             | 0.0071 | 3000                         | 0.0090 | 1150             | 0.0114 |
| 7/16(.4375)    | 730             | 0.0071 | 2700                         | 0.0090 | 1050             | 0.0118 |
| 15/32(.4688)   | 670             | 0.0079 | 2480                         | 0.0090 | 960              | 0.0122 |
| 1/2(.5000)     | 620             | 0.0079 | 2300                         | 0.0090 | 890              | 0.0122 |

N=rev/min

S=inch/rev



## JOBBER LENGTH, PARABOLIC FLUTE

### DLGP511, DLGP512, DLGP513 Series

| Work Material  | Carbon Steels<br>Alloy Steels |        | Tool Steels<br>Hardened Steels |        | Soft Grey Cast Iron |        | Hard Grey Cast Iron |        |
|----------------|-------------------------------|--------|--------------------------------|--------|---------------------|--------|---------------------|--------|
| Hardness       | HRc15 ~ 30                    |        | HRc20 ~ 40                     |        |                     |        |                     |        |
| Strength       | 700 ~ 1000N/mm <sup>2</sup>   |        | 800~1200N/mm <sup>2</sup>      |        |                     |        |                     |        |
| Diameter(inch) | N                             | S      | N                              | S      | N                   | S      | N                   | S      |
| 3/64 (.0469)   | 8750                          | 0.0008 | 6300                           | 0.0008 | 16000               | 0.0008 | 9800                | 0.0008 |
| #47 (.0785)    | 4400                          | 0.0022 | 3150                           | 0.0022 | 7900                | 0.0027 | 4900                | 0.0027 |
| #32 (.1160)    | 2900                          | 0.0032 | 2100                           | 0.0032 | 5250                | 0.0043 | 3250                | 0.0043 |
| #22 (.1570)    | 2200                          | 0.0036 | 1600                           | 0.0036 | 3950                | 0.0054 | 2450                | 0.0054 |
| #9 (.1960)     | 1750                          | 0.0041 | 1250                           | 0.0041 | 3150                | 0.0054 | 1950                | 0.0054 |
| B (.2380)      | 1450                          | 0.0047 | 1050                           | 0.0047 | 2650                | 0.0069 | 1650                | 0.0069 |
| J (.2770)      | 1250                          | 0.0054 | 900                            | 0.0054 | 2250                | 0.0078 | 1400                | 0.0078 |
| O (.3160)      | 1100                          | 0.0060 | 790                            | 0.0060 | 1950                | 0.0087 | 1250                | 0.0087 |
| T (.3580)      | 975                           | 0.0066 | 700                            | 0.0066 | 1750                | 0.0095 | 1100                | 0.0095 |
| X (.3970)      | 875                           | 0.0071 | 630                            | 0.0071 | 1600                | 0.0108 | 980                 | 0.0108 |
| 7/16 (.4375)   | 800                           | 0.0077 | 575                            | 0.0077 | 1450                | 0.0108 | 890                 | 0.0108 |
| 15/32 (.4688)  | 730                           | 0.0077 | 525                            | 0.0077 | 1300                | 0.0108 | 815                 | 0.0108 |
| 1/2 (.5000)    | 675                           | 0.0077 | 485                            | 0.0077 | 1200                | 0.0108 | 755                 | 0.0108 |

N=rev/min

S=inch/rev

**HSS & HSSCo8 STRAIGHT SHANK SCREW MACHINE DRILLS**

**D1118, D1119, D1115, D2146, D2147, D2148 Series**

| WORK MATERIAL    | HARDNESS    | STRENGTH                     | DIAMETER |        |             |        |             |        |               |        |             |        |             |        |     |        |
|------------------|-------------|------------------------------|----------|--------|-------------|--------|-------------|--------|---------------|--------|-------------|--------|-------------|--------|-----|--------|
|                  |             |                              | ~ 3/32   |        | 3/32 ~ 5/32 |        | 11/64 ~ 1/4 |        | 17/64 ~ 23/64 |        | 3/8 ~ 37/64 |        | 19/32 ~ 1 " |        |     |        |
|                  |             |                              | N        | S      | N           | S      | N           | S      | N             | S      | N           | S      | N           | S      |     |        |
| CARBON STEELS    |             | ~ 570N/mm <sup>2</sup>       | 3380     | 0.0010 | 2700        | 0.0020 | 1700        | 0.0025 | 1050          | 0.0051 | 750         | 0.0059 | 440         | 0.0090 | 260 | 0.0110 |
| CARBON STEELS    | ~ HRc 23    | ~ 830N/mm <sup>2</sup>       | 2550     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| CARBON STEELS    | HRc 23 ~ 28 | 830 ~ 950N/mm <sup>2</sup>   | 1900     | 0.0006 | 1500        | 0.0010 | 960         | 0.0015 | 590           | 0.0030 | 425         | 0.0030 | 255         | 0.0051 | 145 | 0.0070 |
| ALLOY STEELS     | HRc 23 ~ 34 | 830 ~ 1110N/mm <sup>2</sup>  | 2380     | 0.0008 | 1880        | 0.0020 | 1190        | 0.0025 | 730           | 0.0051 | 520         | 0.0070 | 300         | 0.0090 | 180 | 0.0070 |
| ALLOY STEELS     | HRc 34 ~ 38 | 1110 ~ 1260N/mm <sup>2</sup> | 1400     | 0.0006 | 1100        | 0.0008 | 700         | 0.0010 | 430           | 0.0015 | 310         | 0.0020 | 180         | 0.0020 | 107 | 0.0030 |
| STAINLESS STEELS | HRc 23      | 830N/mm <sup>2</sup>         | 2550     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| TITANIUM ALLOYS  |             | 410N/mm <sup>2</sup>         | 1400     | 0.0008 | 1100        | 0.0010 | 700         | 0.0015 | 430           | 0.0030 | 430         | 0.0030 | 180         | 0.0051 | 107 | 0.0070 |
| TOOL STEELS      |             | 270N/mm <sup>2</sup>         | 3180     | 0.0016 | 2500        | 0.0020 | 1590        | 0.0025 | 970           | 0.0051 | 700         | 0.0070 | 440         | 0.0090 | 240 | 0.1180 |
| CAST IRON        | HRc 21      | 800N/mm <sup>2</sup>         | 2250     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| ALUMINUM ALLOYS  |             |                              | 6400     | 0.0015 | 5000        | 0.0025 | 3200        | 0.0030 | 2000          | 0.0070 | 1400        | 0.0078 | 820         | 0.0118 | 490 | 0.0150 |
| MAGNESIUM ALLOYS |             |                              | 8600     | 0.0015 | 6800        | 0.0025 | 4300        | 0.0030 | 2600          | 0.0070 | 1900        | 0.0078 | 1100        | 0.0118 | 660 | 0.0150 |
| ZINC ALLOYS      |             |                              | 6400     | 0.0015 | 5000        | 0.0025 | 3200        | 0.0030 | 2000          | 0.0070 | 1400        | 0.0078 | 820         | 0.0118 | 490 | 0.0150 |
| PLASTIC          |             |                              | 3380     | 0.0010 | 2700        | 0.0020 | 1700        | 0.0025 | 1050          | 0.0051 | 750         | 0.0060 | 440         | 0.0090 | 260 | 0.0110 |

N=R.P.M.  
S=inch/rev.

**HSS AIRCRAFT EXTENSION DRILL, 135° SPLIT POINT, STEAM HOMO**

**DL601, D1631 Series**

| WORK MATERIAL    | HARDNESS    | STRENGTH                     | DIAMETER |        |             |        |             |        |               |        |             |        |             |        |     |        |
|------------------|-------------|------------------------------|----------|--------|-------------|--------|-------------|--------|---------------|--------|-------------|--------|-------------|--------|-----|--------|
|                  |             |                              | ~ 3/32   |        | 3/32 ~ 5/32 |        | 11/64 ~ 1/4 |        | 17/64 ~ 23/64 |        | 3/8 ~ 37/64 |        | 19/32 ~ 1 " |        |     |        |
|                  |             |                              | N        | S      | N           | S      | N           | S      | N             | S      | N           | S      | N           | S      |     |        |
| CARBON STEELS    |             | ~ 570N/mm <sup>2</sup>       | 3380     | 0.0010 | 2700        | 0.0020 | 1700        | 0.0025 | 1050          | 0.0051 | 750         | 0.0059 | 440         | 0.0090 | 260 | 0.0110 |
| CARBON STEELS    | ~ HRc 23    | ~ 830N/mm <sup>2</sup>       | 2550     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| CARBON STEELS    | HRc 23 ~ 28 | 830 ~ 950N/mm <sup>2</sup>   | 1900     | 0.0006 | 1500        | 0.0010 | 960         | 0.0015 | 590           | 0.0030 | 425         | 0.0030 | 255         | 0.0051 | 145 | 0.0070 |
| ALLOY STEELS     | HRc 23 ~ 34 | 830 ~ 1110N/mm <sup>2</sup>  | 2380     | 0.0008 | 1880        | 0.0020 | 1190        | 0.0025 | 730           | 0.0051 | 520         | 0.0070 | 300         | 0.0090 | 180 | 0.0070 |
| ALLOY STEELS     | HRc 34 ~ 38 | 1110 ~ 1260N/mm <sup>2</sup> | 1400     | 0.0006 | 1100        | 0.0008 | 700         | 0.0010 | 430           | 0.0015 | 310         | 0.0020 | 180         | 0.0020 | 107 | 0.0030 |
| STAINLESS STEELS | HRc 23      | 830N/mm <sup>2</sup>         | 2550     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| TITANIUM ALLOYS  |             | 410N/mm <sup>2</sup>         | 1400     | 0.0008 | 1100        | 0.0010 | 700         | 0.0015 | 430           | 0.0030 | 430         | 0.0030 | 180         | 0.0051 | 107 | 0.0070 |
| TOOL STEELS      |             | 270N/mm <sup>2</sup>         | 3180     | 0.0016 | 2500        | 0.0020 | 1590        | 0.0025 | 970           | 0.0051 | 700         | 0.0070 | 440         | 0.0090 | 240 | 0.1180 |
| CAST IRON        | HRc 21      | 800N/mm <sup>2</sup>         | 2250     | 0.0010 | 2000        | 0.0020 | 1280        | 0.0025 | 780           | 0.0051 | 560         | 0.0060 | 330         | 0.0090 | 195 | 0.0110 |
| ALUMINUM ALLOYS  |             |                              | 6400     | 0.0015 | 5000        | 0.0025 | 3200        | 0.0030 | 2000          | 0.0070 | 1400        | 0.0078 | 820         | 0.0118 | 490 | 0.0150 |
| MAGNESIUM ALLOYS |             |                              | 8600     | 0.0015 | 6800        | 0.0025 | 4300        | 0.0030 | 2600          | 0.0070 | 1900        | 0.0078 | 1100        | 0.0118 | 660 | 0.0150 |
| ZINC ALLOYS      |             |                              | 6400     | 0.0015 | 5000        | 0.0025 | 3200        | 0.0030 | 2000          | 0.0070 | 1400        | 0.0078 | 820         | 0.0118 | 490 | 0.0150 |
| PLASTIC          |             |                              | 3380     | 0.0010 | 2700        | 0.0020 | 1700        | 0.0025 | 1050          | 0.0051 | 750         | 0.0060 | 440         | 0.0090 | 260 | 0.0110 |

N=R.P.M.  
S=inch/rev.

### HSSCo5, PARABOLIC, SCREW MACHINE TiN COATED DRILLS

#### DN514, DN515, DN516 Series

| WORK MATERIAL       | CARBON STEELS<br>ALLOY STEELS     |          | TOOL STEELS<br>HARDENED STEELS    |          | SOFT GREY CAST IRON |          | HARD GREY CAST IRON |          |
|---------------------|-----------------------------------|----------|-----------------------------------|----------|---------------------|----------|---------------------|----------|
|                     | N                                 | S        | N                                 | S        | N                   | S        | N                   | S        |
| <b>HARDNESS</b>     | <b>HRc15 ~ HRc30</b>              |          | <b>HRc20 ~ HRc40</b>              |          |                     |          |                     |          |
| <b>STRENGTH</b>     | <b>700 ~ 1000N/mm<sup>2</sup></b> |          | <b>800 ~ 1200N/mm<sup>2</sup></b> |          |                     |          |                     |          |
| <b>DIAMETER(mm)</b> | <b>N</b>                          | <b>S</b> | <b>N</b>                          | <b>S</b> | <b>N</b>            | <b>S</b> | <b>N</b>            | <b>S</b> |
| ~ 5/64              | 2630                              | 0.0012   | 2100                              | 0.0010   | 4200                | 0.0023   | 1680                | 0.0500   |
| 3/32 ~ 7/64         | 2100                              | 0.0015   | 1680                              | 0.0012   | 3300                | 0.0031   | 1310                | 0.0023   |
| 1/8 ~ 5/32          | 1680                              | 0.0020   | 1310                              | 0.0015   | 2630                | 0.0039   | 1050                | 0.0031   |
| 11/64 ~ 3/16        | 1310                              | 0.0023   | 1050                              | 0.0019   | 2100                | 0.0051   | 840                 | 0.0039   |
| 13/64 ~ 15/64       | 1050                              | 0.0023   | 840                               | 0.0019   | 1680                | 0.0051   | 660                 | 0.0039   |
| 1/4 ~ 9/32          | 840                               | 0.0031   | 660                               | 0.0023   | 1310                | 0.0063   | 530                 | 0.0051   |
| 19/64 ~ 11/32       | 660                               | 0.0039   | 530                               | 0.0031   | 1050                | 0.0078   | 420                 | 0.0067   |
| 23/64 ~ 7/16        | 530                               | 0.0051   | 420                               | 0.0039   | 840                 | 0.0098   | 330                 | 0.0082   |
| 29/64 ~ 9/16        | 420                               | 0.0051   | 330                               | 0.0039   | 660                 | 0.0098   | 260                 | 0.0082   |
| 37/64 ~ 45/64       | 330                               | 0.0059   | 260                               | 0.0051   | 530                 | 0.0118   | 210                 | 0.0098   |
| 23/32 ~ 7/8         | 260                               | 0.0078   | 210                               | 0.0059   | 420                 | 0.0157   | 170                 | 0.0118   |
| 57/64 ~ 1-1/8       | 210                               | 0.0098   | 170                               | 0.0078   | 330                 | 0.0196   | 130                 | 0.0196   |
| 1-9/64 ~            | 170                               | 0.0098   | 130                               | 0.0078   | 260                 | 0.0196   | 110                 | 0.0196   |

N=R.P.M  
S=inch/rev.

## HSSCo5, TAPER LENGTH STRAIGHT SHANK DRILL

### DX517 Series

| WORK MATERIAL | CARBON STEELS<br>ALLOY STEELS |        | TOOL STEELS<br>HARDENED STEELS |        | SOFT GREY CAST IRON |        | HARD GREY CAST IRON |        |
|---------------|-------------------------------|--------|--------------------------------|--------|---------------------|--------|---------------------|--------|
| HARDNESS      | HRc15 ~ HRc30                 |        | HRc20 ~ HRc40                  |        |                     |        |                     |        |
| STRENGTH      | 700 ~ 1000N/mm <sup>2</sup>   |        | 800 ~ 1200N/mm <sup>2</sup>    |        |                     |        |                     |        |
| DIAMETER(mm)  | N                             | S      | N                              | S      | N                   | S      | N                   | S      |
| ~ 5/64        | 4900                          | 0.0023 | 3400                           | 0.0023 | 8500                | 0.0027 | 5400                | 0.0027 |
| 3/32 ~ 7/64   | 3000                          | 0.0031 | 2350                           | 0.0031 | 5700                | 0.0043 | 3500                | 0.0043 |
| 1/8 ~ 5/32    | 2440                          | 0.0035 | 1800                           | 0.0035 | 4300                | 0.0055 | 2700                | 0.0055 |
| 11/64 ~ 15/64 | 1950                          | 0.0039 | 1400                           | 0.0039 | 3450                | 0.0055 | 2150                | 0.0055 |
| 1/4 ~ 9/32    | 1400                          | 0.0055 | 1000                           | 0.0055 | 2450                | 0.0078 | 1550                | 0.0078 |
| 19/64 ~ 5/16  | 1200                          | 0.0059 | 850                            | 0.0059 | 2100                | 0.0086 | 1350                | 0.0086 |
| 21/64 ~ 23/64 | 1100                          | 0.0066 | 800                            | 0.0066 | 1950                | 0.0094 | 1200                | 0.0094 |
| 3/8 ~ 25/64   | 950                           | 0.0071 | 660                            | 0.0071 | 1750                | 0.0110 | 1050                | 0.0110 |
| 13/32 ~ 7/16  | 900                           | 0.0078 | 630                            | 0.0078 | 1600                | 0.0110 | 960                 | 0.0110 |
| 29/64 ~ 15/32 | 800                           | 0.0078 | 575                            | 0.0078 | 1450                | 0.0110 | 900                 | 0.0110 |
| 31/64 ~ 1/2   | 720                           | 0.0078 | 500                            | 0.0078 | 1300                | 0.0110 | 830                 | 0.0110 |

N=R.P.M

S=inch/rev.

### DN514, DN515, DN516 Series

| WORK MATERIAL | CARBON STEELS<br>ALLOY STEELS |        | TOOL STEELS<br>HARDENED STEELS |        | SOFT GREY CAST IRON |        | HARD GREY CAST IRON |        |
|---------------|-------------------------------|--------|--------------------------------|--------|---------------------|--------|---------------------|--------|
| HARDNESS      | HRc15 ~ HRc30                 |        | HRc20 ~ HRc40                  |        |                     |        |                     |        |
| STRENGTH      | 700 ~ 1000N/mm <sup>2</sup>   |        | 800 ~ 1200N/mm <sup>2</sup>    |        |                     |        |                     |        |
| DIAMETER(mm)  | N                             | S      | N                              | S      | N                   | S      | N                   | S      |
| ~ 5/64        | 3990                          | 0.0023 | 2770                           | 0.0023 | 6920                | 0.0027 | 4400                | 0.0027 |
| 3/32 ~ 7/64   | 2440                          | 0.0031 | 1910                           | 0.0031 | 4640                | 0.0043 | 2850                | 0.0043 |
| 1/8 ~ 5/32    | 1990                          | 0.0035 | 1470                           | 0.0035 | 3500                | 0.0055 | 2200                | 0.0055 |
| 11/64 ~ 15/64 | 1590                          | 0.0039 | 1140                           | 0.0039 | 2810                | 0.0055 | 1750                | 0.0055 |
| 1/4 ~ 9/32    | 1140                          | 0.0055 | 810                            | 0.0055 | 1990                | 0.0078 | 1260                | 0.0078 |
| 19/64 ~ 5/16  | 980                           | 0.0059 | 690                            | 0.0059 | 1710                | 0.0086 | 1100                | 0.0086 |
| 21/64 ~ 23/64 | 900                           | 0.0066 | 650                            | 0.0066 | 1590                | 0.0094 | 980                 | 0.0094 |
| 3/8 ~ 25/64   | 770                           | 0.0071 | 540                            | 0.0071 | 1420                | 0.0110 | 850                 | 0.0110 |
| 13/32 ~ 7/16  | 730                           | 0.0078 | 510                            | 0.0078 | 1300                | 0.0110 | 780                 | 0.0110 |
| 29/64 ~ 15/32 | 650                           | 0.0078 | 470                            | 0.0078 | 1180                | 0.0110 | 730                 | 0.0110 |
| 31/64 ~ 1/2   | 590                           | 0.0078 | 410                            | 0.0078 | 1060                | 0.0110 | 680                 | 0.0110 |

N=R.P.M

S=inch/rev.



## COBALT 8% HSS, NC SPOTTING DRILLS

**Application:** For more precise centering work on NC/CNC machine. A larger diameter in respect to the subsequent drilling tool permit to obtain the centering and chamfering simultaneously.



NC-Spotting drills 90°



NC-Spotting drills 120°

Unit:inch

| EDP No. | Diameter Inch | Flute Length Inch | Overall Length Inch |
|---------|---------------|-------------------|---------------------|
| 0081L   | 1/8           | 0.472             | 1.93                |
| 0121L   | 3/16          | 0.590             | 2.44                |
| 0161L   | 1/4           | 0.669             | 2.76                |
| 0201L   | 5/16          | 0.984             | 3.11                |
| 0241L   | 3/8           | 0.827             | 3.50                |
| 0321L   | 1/2           | 0.984             | 4.02                |
| 0401L   | 5/8           | 1.575             | 4.53                |
| 0481L   | 3/4           | 1.968             | 5.16                |
| 0641L   | 1             | 1.968             | 6.14                |

| EDP No. | Diameter Inch | Flute Length Inch | Overall Length Inch |
|---------|---------------|-------------------|---------------------|
| 2081L   | 1/8           | 0.472             | 1.93                |
| 2121L   | 3/16          | 0.590             | 2.44                |
| 2161L   | 1/4           | 0.669             | 2.76                |
| 2201L   | 5/16          | 0.984             | 3.11                |
| 2241L   | 3/8           | 0.827             | 3.50                |
| 2321L   | 1/2           | 0.984             | 4.02                |
| 2401L   | 5/8           | 1.575             | 4.53                |
| 2481L   | 3/4           | 1.968             | 5.16                |
| 2641L   | 1             | 1.968             | 6.14                |



### 90°, 120° HSSCo8 NC-SPOTTING DRILL RECOMMENDED CUTTING CONDITIONS

| WORK MATERIAL | CARBON STEELS |       | ALLOY STEELS |      | ALLOY STEELS,<br>TOOL STEELS,<br>HARDENED STEELS |      | CARBON STEELS |     | CARBON STEELS |      |       |
|---------------|---------------|-------|--------------|------|--|------|---------------|-----|---------------|------|-------|
|               | DIAMETER      | N     | S            | N    | S  | N    | S             | N   | S             | N    | S     |
| 1/8~5/32      | 2460          | 0.002 |              | 2110 | 0.002  | 1080 | 0.002         | 940 | 0.002         | 7040 | 0.005 |
| 11/64~3/16    | 1850          | 0.002 |              | 1580 | 0.002  | 800  | 0.002         | 700 | 0.002         | 5280 | 0.006 |
| 13/64~15/64   | 1510          | 0.003 |              | 1300 | 0.003  | 670  | 0.003         | 580 | 0.003         | 4400 | 0.006 |
| 1/4~5/16      | 1170          | 0.003 |              | 1030 | 0.003  | 540  | 0.003         | 460 | 0.003         | 3520 | 0.007 |
| 21/64~25/64   | 880           | 0.004 |              | 790  | 0.004  | 400  | 0.004         | 350 | 0.004         | 2640 | 0.008 |
| 13/32~15/32   | 700           | 0.004 |              | 630  | 0.004  | 320  | 0.004         | 290 | 0.004         | 2110 | 0.009 |
| 31/64~5/8     | 590           | 0.005 |              | 530  | 0.005  | 260  | 0.005         | 240 | 0.005         | 1760 | 0.011 |
| 41/64~47/64   | 460           | 0.007 |              | 400  | 0.007  | 200  | 0.007         | 180 | 0.007         | 1320 | 0.012 |
| 3/4~1         | 350           | 0.009 |              | 320  | 0.009  | 150  | 0.009         | 140 | 0.009         | 1060 | 0.017 |

N=R.P.M  
S=inch/rev.



## Technology and Quality

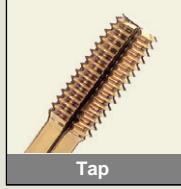
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



End Mill



Drill



Tap

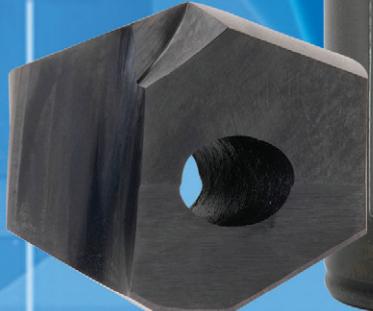


Special products

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X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING

# *i*-DREAM DRILL INSERTS & HOLDERS



## **Feature of *i*-Dream Drill**

### ***i*-Dream Drill :**

- By using advanced drill point technology, centering and reaming are eliminated, and accurate, consistent hole size is easily attainable.
- The newest coatings combined with tough long lasting carbide substrates, allow high penetration rates and long tool life.
- The strong and accurate insert locking system allows easy access and quick insert replacement while the drill is mounted in the machine.

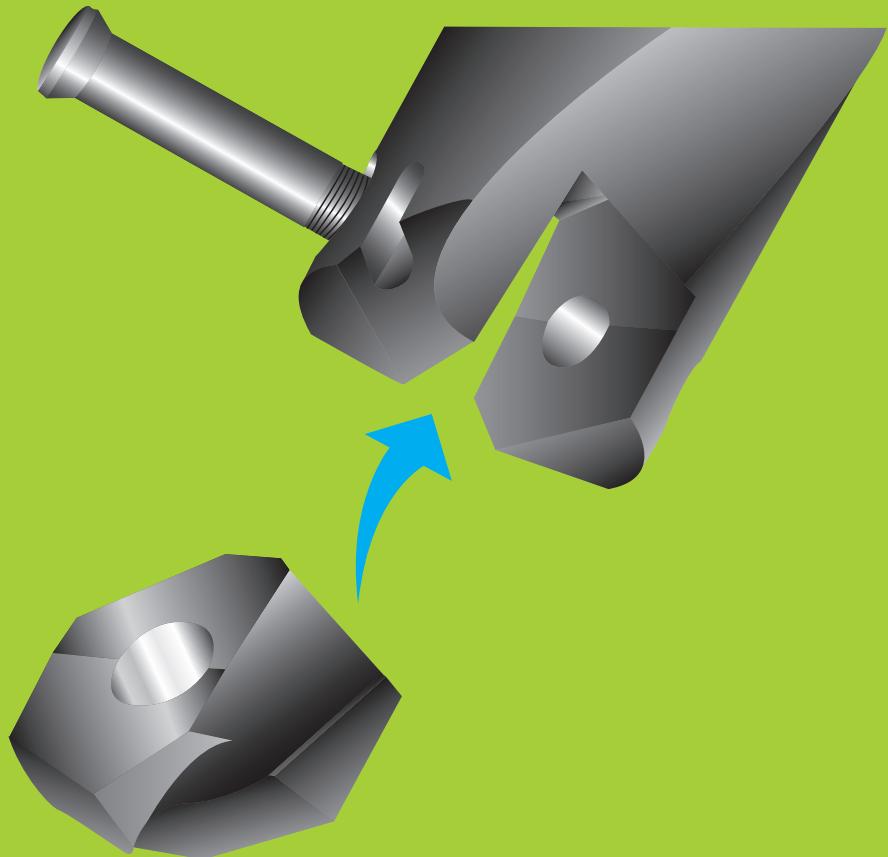
### ***i*-Dream Drill Holder :**

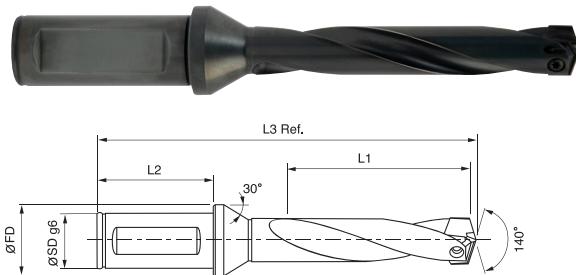
- The holder, made of a highly wear resistant Steel alloy, is designed to allow maximum coolant flow and unrestricted chip removal during the drilling cycle.

### **Speed and Feed :**

- The speeds and feeds recommended as shown are for ideal working conditions with adequate coolant pressure.
- It recommended to consider on new jobs 10 ~ 20% lower speeds and feeds as a starting point.

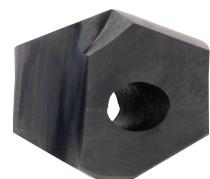
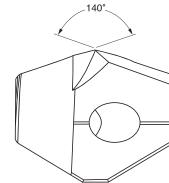
# **HIGH PERFORMANCE & OPTIMAL COST**





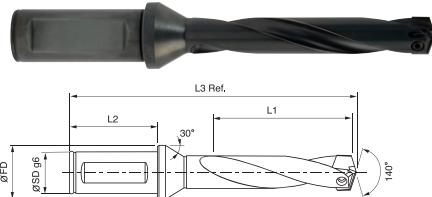
### -Feature of i-Dream Drill Holder-

- Special Alloy Steel that maintains its hardness and toughness under high temperatures.
- Innovative surface treatment that improves wear resistance and reduces corrosion.
- High Performance flute design allowing maximum chip evacuation and minimum interference.



Unit : inch

| Series Range (mm)                | Insert EDP No. (TAIN) | Insert O.D. (h7) |       |       | Drilling Depth | Holder EDP No. | Shank Dia. SD g6 | Shank Length L2 | Flange Dia. FD | Flute Length(L1) |          |          | Overall Length (L3) Ref. |          |          | Torx No. |
|----------------------------------|-----------------------|------------------|-------|-------|----------------|----------------|------------------|-----------------|----------------|------------------|----------|----------|--------------------------|----------|----------|----------|
|                                  |                       | dec.             | frac. | mm    |                |                |                  |                 |                | 3xD              | 5xD      | 7xD      | 3xD                      | 5xD      | 7xD      |          |
| <b>A</b><br><br>Ø12.00 to Ø13.99 | Y03A01                | 0.4724           |       | 12.00 | 3D             | ZA0301         | 3/4"             | 2"              | 1"             | 1-13/16"         | 2-25/32" | 3-3/4"   | 4-3/4"                   | 5-3/4"   | 6-11/16" | TA1213   |
|                                  | Y03A02                | 0.4764           |       | 12.10 | 5D             | ZA0501         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A03                | 0.4803           |       | 12.20 | 7D             | ZA0701         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A04                | 0.4844           | 31/64 | 12.30 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A05                | 0.4921           |       | 12.50 | 3D             | ZA0302         | 3/4"             | 2"              | 1"             | 1-7/8"           | 2-29/32" | 3-15/16" | 4-13/16"                 | 5-13/16" | 6-27/32" |          |
|                                  | Y03A06                | 0.4961           |       | 12.60 | 5D             | ZA0502         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A07                | 0.5000           | 1/2   | 12.70 | 7D             | ZA0702         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A08                | 0.5039           |       | 12.80 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A09                | 0.5079           |       | 12.90 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A10                | 0.5118           |       | 13.00 | 3D             | ZA0303         | 3/4"             | 2"              | 1"             | 1-31/32"         | 3-1/32"  | 4-3/32"  | 4-7/8"                   | 5-15/16" | 7"       |          |
|                                  | Y03A11                | 0.5156           | 33/64 | 13.10 | 5D             | ZA0503         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A12                | 0.5197           |       | 13.20 | 7D             | ZA0703         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A13                | 0.5312           | 17/32 | 13.49 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A14                | 0.5315           |       | 13.50 | 3D             | ZA0304         | 3/4"             | 2"              | 1"             | 2"               | 3-1/8"   | 4-7/32"  | 4-31/32"                 | 6-3/32"  | 7-1/4"   |          |
|                                  | Y03A15                | 0.5354           |       | 13.60 | 5D             | ZA0504         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A16                | 0.5394           |       | 13.70 | 7D             | ZA0704         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A17                | 0.5433           |       | 13.80 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03A18                | 0.5469           | 35/64 | 13.89 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
| <b>B</b><br><br>Ø14.00 to Ø15.99 | Y03B01                | 0.5512           |       | 14.00 | 3D             | ZB0301         | 3/4"             | 2               | 1"             | 2-3/32"          | 3-7/32"  | 4-3/8"   | 4-31/32"                 | 6-3/32"  | 7-1/4"   | TB1415   |
|                                  | Y03B02                | 0.5551           |       | 14.10 | 5D             | ZB0501         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B03                | 0.5591           |       | 14.20 | 7D             | ZB0701         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B04                | 0.5625           | 9/16  | 14.29 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B05                | 0.5630           |       | 14.30 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B06                | 0.5669           |       | 14.40 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B07                | 0.5709           |       | 14.50 | 3D             | ZB0302         | 3/4"             | 2"              | 1"             | 2-5/32"          | 3-11/32" | 4-17/32" | 5-1/32"                  | 6-7/32"  | 7-13/32" |          |
|                                  | Y03B08                | 0.5748           |       | 14.60 | 5D             | ZB0502         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B09                | 0.5781           | 37/64 | 14.68 | 7D             | ZB0702         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B10                | 0.5827           |       | 14.80 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B11                | 0.5906           |       | 15.00 | 3D             | ZB0303         | 3/4"             | 2"              | 1"             | 2-1/4"           | 3-15/32" | 4-11/16" | 5-1/8"                   | 6-11/32" | 7-9/16"  |          |
|                                  | Y03B12                | 0.5938           | 19/32 | 15.08 | 5D             | ZB0503         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B13                | 0.5945           |       | 15.10 | 7D             | ZB0703         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B14                | 0.5984           |       | 15.20 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
| <b>C</b><br><br>Ø16.00 to Ø17.99 | Y03B15                | 0.6024           |       | 15.30 |                |                |                  |                 |                |                  |          |          |                          |          |          | TC1616   |
|                                  | Y03B16                | 0.6094           | 39/64 | 15.48 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B17                | 0.6102           |       | 15.50 | 3D             | ZB0304         | 3/4"             | 2"              | 1"             | 2-5/16"          | 3-19/32" | 4-13/16" | 5-5/32"                  | 6-13/32" | 7-5/8"   |          |
|                                  | Y03B18                | 0.6142           |       | 15.60 | 5D             | ZB0504         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B19                | 0.6181           |       | 15.70 | 7D             | ZB0704         |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B20                | 0.6220           |       | 15.80 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |
|                                  | Y03B21                | 0.6250           | 5/8   | 15.87 |                |                |                  |                 |                |                  |          |          |                          |          |          |          |

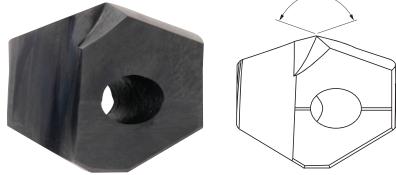


**-Feature of *i*-Dream Drill Holder-**

- Special Alloy Steel that maintains its hardness and toughness under high temperatures.
- Innovative surface treatment that improves wear resistance and reduces corrosion.
- High Performance flute design allowing maximum chip evacuation and minimum interference.

Unit : inch

| Series<br>Range<br>(mm)                | Insert<br>EDP No.<br>(TiAlN) | Insert O.D.<br>(h7) |       |       | Drilling<br>Depth | Holder<br>EDP No.          | Shank<br>Dia. | Shank<br>Length<br>L2 | Flange<br>Dia.<br>FD             | Flute Length(L1)                 |     |     | Overall Length<br>(L3) Ref. |        |     | Torx<br>No. |
|--|------------------------------|---------------------|-------|-------|-------------------|----------------------------|---------------|-----------------------|----------------------------------|----------------------------------|-----|-----|-----------------------------|--------|-----|-------------|
|  |                              | dec.                | frac. | mm    |                   |                            |               |                       |                                  | 3xD                              | 5xD | 7xD | 3xD                         | 5xD    | 7xD |             |
| <b>C</b><br><br>Ø16.00<br>to<br>Ø17.99 | Y03C01                       | 0.6299              |       | 16.00 | 3D<br>5D<br>7D    | ZC0301<br>ZC0501<br>ZC0701 | 3/4"<br>2"    | 1"                    | 2-5/16"<br>3-5/8"<br>4-29/32"    | 5-5/32"<br>6-15/32"<br>7-3/4"    | 3xD | 5xD | 7xD                         | TC1617 |     |             |
|  | Y03C02                       | 0.6335              |       | 16.09 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C03                       | 0.6378              |       | 16.20 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C04                       | 0.6406              | 41/64 | 16.27 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C05                       | 0.6417              |       | 16.30 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C06                       | 0.6496              |       | 16.50 | 3D<br>5D<br>7D    | ZC0302<br>ZC0502<br>ZC0702 | 3/4"<br>2"    | 1"                    | 2-13/32"<br>3-3/4"<br>5-1/32"    | 5-1/4"<br>6-9/16"<br>7-7/8"      | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03C07                       | 0.6562              | 21/32 | 16.67 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C08                       | 0.6614              |       | 16.80 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C09                       | 0.6693              |       | 17.00 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C10                       | 0.6919              | 43/64 | 17.07 | 3D<br>5D<br>7D    | ZC0303<br>ZC0503<br>ZC0703 | 3/4"<br>2"    | 1"                    | 2-15/32"<br>3-27/32"<br>5-1/4"   | 5-9/32"<br>6-21/32"<br>8-1/32"   | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03C11                       | 0.6875              | 11/16 | 17.46 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C12                       | 0.6890              |       | 17.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C13                       | 0.7008              |       | 17.80 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03C14                       | 0.7031              | 45/64 | 17.86 | 3D<br>5D<br>7D    | ZC0304<br>ZC0504<br>ZC0704 | 3/4"<br>2"    | 1"                    | 2-17/32"<br>3-15/16"<br>5-11/32" | 5-5/16"<br>6-23/32"<br>8-5/32"   | 3xD | 5xD | 7xD                         |        |     |             |
| <b>D</b><br><br>Ø18.00<br>to<br>Ø19.99 | Y03D01                       | 0.7087              |       | 18.00 | 3D<br>5D<br>7D    | ZD0301<br>ZD0501<br>ZD0701 | 1"            | 2-3/16"<br>1-1/4"     | 2-19/32"<br>4-1/16"<br>5-8/16"   | 5-7/8"<br>7-5/16"<br>8-25/32"    | 3xD | 5xD | 7xD                         | TD1819 |     |             |
|  | Y03D02                       | 0.7188              | 23/32 | 18.26 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D03                       | 0.7283              |       | 18.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D04                       | 0.7344              | 47/64 | 18.65 | 3D<br>5D<br>7D    | ZD0302<br>ZD0502<br>ZD0702 | 1"            | 2-3/16"<br>1-1/4"     | 2-11/16"<br>4-3/16"<br>5-21/32"  | 5-29/32"<br>7-13/32"<br>8-29/32" | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03D05                       | 0.7402              |       | 18.80 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D06                       | 0.7480              |       | 19.00 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D07                       | 0.7500              | 3/4   | 19.05 | 3D<br>5D<br>7D    | ZD0303<br>ZD0503<br>ZD0703 | 1"            | 2-3/16"<br>1-1/4"     | 2-3/4"<br>4-9/32"<br>5-13/16"    | 5-31/32"<br>7-17/32"<br>9-1/16"  | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03D08                       | 0.7587              |       | 19.27 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D09                       | 0.7656              | 49/64 | 19.45 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D10                       | 0.7677              |       | 19.50 | 3D<br>5D<br>7D    | ZD0304<br>ZD0504<br>ZD0704 | 1"            | 2-3/16"<br>1-1/4"     | 2-25/32"<br>4-3/8"<br>5-15/16"   | 6-1/32"<br>7-19/32"<br>9-3/16"   | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03D11                       | 0.7795              |       | 19.80 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03D12                       | 0.7812              | 25/32 | 19.84 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
| <b>E</b><br><br>Ø20.00<br>to<br>Ø21.99 | Y03E01                       | 0.7874              |       | 20.00 | 3D<br>5D<br>7D    | ZE0301<br>ZE0501<br>ZE0701 | 1"            | 2-3/16"<br>1-1/4"     | 2-25/32"<br>4-13/32"<br>6-1/32"  | 5-31/32"<br>7-19/32"<br>9-7/32"  | 3xD | 5xD | 7xD                         | TE2021 |     |             |
|  | Y03E02                       | 0.7969              | 51/64 | 20.24 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E03                       | 0.8071              |       | 20.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E04                       | 0.8125              | 13/16 | 20.64 | 3D<br>5D<br>7D    | ZE0302<br>ZE0502<br>ZE0702 | 1"            | 2-3/16"<br>1-1/4"     | 2-7/8"<br>4-17/32"<br>6-3/16"    | 6-1/16"<br>7-23/32"<br>9-3/8"    | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03E05                       | 0.8150              |       | 20.70 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E06                       | 0.8268              |       | 21.00 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E07                       | 0.8281              | 53/64 | 21.03 | 3D<br>5D<br>7D    | ZE0303<br>ZE0503<br>ZE0703 | 1"            | 2-3/16"<br>1-1/4"     | 2-15/16"<br>4-21/32"<br>6-11/32" | 6-5/32"<br>7-27/32"<br>9-17/32"  | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03E08                       | 0.8438              | 27/32 | 21.43 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E09                       | 0.8465              |       | 21.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03E10                       | 0.8543              |       | 21.70 | 3D<br>5D<br>7D    | ZE0304<br>ZE0504<br>ZE0704 | 1"            | 2-3/16"<br>1-1/4"     | 3-1/32"<br>4-23/32"<br>6-15/32"  | 6-3/16"<br>7-7/8"<br>9-19/32"    | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03E11                       | 0.8594              | 55/64 | 21.83 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F01                       | 0.8661              |       | 22.00 | 3D<br>5D<br>7D    | ZF0301<br>ZF0501<br>ZF0701 | 1"            | 2-3/16"<br>1-1/4"     | 3-1/8"<br>4-27/32"<br>6-5/8"     | 6-1/4"<br>8"<br>9-3/4"           | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03F02                       | 0.8750              | 7/8   | 22.22 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F03                       | 0.8858              |       | 22.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
| <b>F</b><br><br>Ø22.00<br>to<br>Ø23.99 | Y03F04                       | 0.8906              | 57/64 | 22.62 | 3D<br>5D<br>7D    | ZF0302<br>ZF0502<br>ZF0702 | 1"            | 2-3/16"<br>1-1/4"     | 3-5/32"<br>4-31/32"<br>6-25/32"  | 6-1/4"<br>8-1/16"<br>9-7/8"      | 3xD | 5xD | 7xD                         | TF2223 |     |             |
|  | Y03F05                       | 0.8937              |       | 22.70 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F06                       | 0.9055              |       | 23.00 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F07                       | 0.9062              | 29/32 | 23.02 | 3D<br>5D<br>7D    | ZF0303<br>ZF0503<br>ZF0703 | 1"            | 2-3/16"<br>1-1/4"     | 3-7/32"<br>5-3/32"<br>6-15/16"   | 6-11/32"<br>8-3/16"<br>10-1/32"  | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03F08                       | 0.9219              | 59/64 | 23.42 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F09                       | 0.9252              |       | 23.50 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |
|  | Y03F10                       | 0.9331              |       | 23.70 | 3D<br>5D<br>7D    | ZF0304<br>ZF0504<br>ZF0704 | 1"            | 2-3/16"<br>1-1/4"     | 3-5/16"<br>5-5/32"<br>7-1/16"    | 6-13/32"<br>8-9/32"<br>10-5/32"  | 3xD | 5xD | 7xD                         |        |     |             |
|  | Y03F11                       | 0.9375              | 15/16 | 23.81 |                   |                            |               |                       |                                  |                                  |     |     |                             |        |     |             |



**-Feature of i-Dream Drill Insert-**

► Secure and accurate seating resulting in accurate repeatability and concentricity.

Unit : inch

| Series<br>Range<br>(mm)                | Insert<br>EDP No.<br>(TiAIN) | Insert O.D.<br>(h7) |         |       | Drilling<br>Depth | Holder                     | Shank<br>Dia. | Shank<br>Length | Flange<br>Dia. | Flute Length(L1) |          |          | Overall Length<br>(L3) Ref. |          |           | Torx<br>No. |
|--|------------------------------|---------------------|---------|-------|-------------------|----------------------------|---------------|-----------------|----------------|------------------|----------|----------|-----------------------------|----------|-----------|-------------|
|  |                              | dec.                | frac.   | mm    |                   |                            |               |                 |                | EDP No.          | SD g6    | L2       | FD                          | 3xD      | 5xD       | 7xD         |
| <b>G</b><br><br>Ø24.00<br>to<br>Ø25.99 | Y03G01                       | 0.9449              |         | 24.00 | 3D<br>5D<br>7D    | ZG0301<br>ZG0501<br>ZG0701 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-11/32"         | 5-9/32"  | 7-7/32"  | 6-25/32"                    | 8-11/16" | 10-5/8"   | TG2425      |
|  | Y03G02                       | 0.9531              | 61/64   | 24.21 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G03                       | 0.9646              |         | 24.50 | 3D<br>5D<br>7D    | ZG0302<br>ZG0502<br>ZG0702 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-7/16"          | 5-13/32" | 7-3/8"   | 6-13/16"                    | 8-25/32" | 10-3/4"   |             |
|  | Y03G04                       | 0.9688              | 31/32   | 24.61 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G05                       | 0.9724              |         | 24.70 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G06                       | 0.9843              |         | 25.00 | 3D<br>5D<br>7D    | ZG0303<br>ZG0503<br>ZG0703 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-1/2"           | 5-1/2"   | 7-17/32" | 6-7/8"                      | 8-29/32" | 10-29/32" |             |
|  | Y03G07                       | 1.0000              | 1       | 25.40 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G08                       | 1.0039              |         | 25.50 | 3D<br>5D<br>7D    | ZG0304<br>ZG0504<br>ZG0704 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-19/32"         | 5-19/32" | 7-5/8"   | 6-31/32"                    | 8-31/32" | 11-1/32"  |             |
|  | Y03G09                       | 1.0106              |         | 25.67 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G10                       | 1.0118              |         | 25.70 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03G11                       | 1.0156              | 1*1/64  | 25.80 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
| <b>H</b><br><br>Ø26.00<br>to<br>Ø27.99 | Y03H01                       | 1.0236              |         | 26.00 | 3D<br>5D<br>7D    | ZH0301<br>ZH0501<br>ZH0701 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-5/8"           | 5-21/32" | 7-23/32" | 6-31/32"                    | 9-1/32"  | 11-1/16"  | TH2627      |
|  | Y03H02                       | 1.0312              | 1*1/32  | 26.19 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03H03                       | 1.0433              |         | 26.50 | 3D<br>5D<br>7D    | ZH0302<br>ZH0502<br>ZH0702 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-21/32"         | 5-3/4"   | 7-27/32" | 7"                          | 9-3/32"  | 11-3/16"  |             |
|  | Y03H04                       | 1.0469              | 1*3/64  | 26.59 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03H05                       | 1.0625              | 1*1/16  | 26.99 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03H06                       | 1.0630              |         | 27.00 | 3D<br>5D<br>7D    | ZH0303<br>ZH0503<br>ZH0703 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-3/4"           | 5-7/8"   | 8"       | 7-3/32"                     | 9-7/32"  | 11-11/32" |             |
|  | Y03H07                       | 1.0827              |         | 27.50 | 3D<br>5D<br>7D    | ZH0304<br>ZH0504<br>ZH0704 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-13/16"         | 6-1/32"  | 8-3/16"  | 7-1/8"                      | 9-11/32" | 11-1/2"   |             |
|  | Y03H08                       | 1.0938              | 1*3/32  | 27.78 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
| <b>I</b><br><br>Ø28.00<br>to<br>Ø29.99 | Y03I01                       | 1.1024              |         | 28.00 | 3D<br>5D<br>7D    | ZI0301<br>ZI0501<br>ZI0701 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-29/32"         | 6-3/32"  | 8-5/16"  | 7-7/32"                     | 9-13/32" | 11-5/8"   | TI2829      |
|  | Y03I02                       | 1.1094              | 1*7/64  | 28.18 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03I03                       | 1.1220              |         | 28.50 | 3D<br>5D<br>7D    | ZI0302<br>ZI0502<br>ZI0702 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 3-15/16"         | 6-3/16"  | 8-7/16"  | 7-1/4"                      | 9-1/2"   | 11-23/32" |             |
|  | Y03I04                       | 1.1250              | 1*1/8   | 28.58 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03I05                       | 1.1417              |         | 29.00 | 3D<br>5D<br>7D    | ZI0303<br>ZI0503<br>ZI0703 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-1/16"          | 6-3/8"   | 8-21/32" | 7-5/16"                     | 9-21/32" | 11-15/16" |             |
|  | Y03I06                       | 1.1562              | 1*5/32  | 29.37 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03I07                       | 1.1614              |         | 29.50 | 3D<br>5D<br>7D    | ZI0304<br>ZI0504<br>ZI0704 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-3/32"          | 6-15/32" | 8-25/32" | 7-3/8"                      | 9-23/32" | 12-1/16"  |             |
|  | Y03I08                       | 1.1719              | 1*11/64 | 29.77 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03J01                       | 1.1811              |         | 30.00 | 3D<br>5D<br>7D    | ZJ0301<br>ZJ0501<br>ZJ0701 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-3/16"          | 6-17/32" | 8-29/32" | 7-7/16"                     | 9-13/16" | 12-5/32"  | TJ2831      |
|  | Y03J02                       | 1.1875              | 1*3/16  | 30.16 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
| <b>J</b><br><br>Ø30.00<br>to<br>Ø31.99 | Y03J03                       | 1.2008              |         | 30.50 | 3D<br>5D<br>7D    | ZJ0302<br>ZJ0502<br>ZJ0702 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-1/4"           | 6-11/16" | 9-1/8"   | 7-15/32"                    | 9-29/32" | 12-3/8"   |             |
|  | Y03J04                       | 1.2031              | 1*13/64 | 30.56 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03J05                       | 1.2188              | 1*7/32  | 30.96 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |
|  | Y03J06                       | 1.2205              |         | 31.00 | 3D<br>5D          | ZJ0303<br>ZJ0503           | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-9/32"          | 6-23/32" | 9-3/16"  | 7-17/32"                    | 9-31/32" | 12-13/32" |             |
|  | Y03J07                       | 1.2402              |         | 31.50 | 3D<br>5D<br>7D    | ZJ0304<br>ZJ0504<br>ZJ0704 | 1-1/4"        | 2-3/8"          | 1-15/32"       | 4-13/32"         | 6-15/16" | 9-7/16"  | 7-5/8"                      | 10-5/32" | 12-11/16" |             |
|  | Y03J08                       | 1.2500              | 1*1/4   | 31.75 |                   |                            |               |                 |                |                  |          |          |                             |          |           |             |

Coating : TiN, TiCN & Hardslick is available on your request.

## METRIC

| Material  |   | Tensile Strength<br>[N/mm <sup>2</sup> ]                     | Hardness  |  | Cutting Speed<br>Vc [M/min]                | Feed [mm/rev]   |   |   |   |   |
|---|---|--|---|--|--|---|---|---|---|---|
|   |   |  | HB  | HRc  |  | Ø12.0<br>~Ø14.9   | Ø15.0<br>~Ø17.9   | Ø18.0<br>~Ø21.9   | Ø22.0<br>~Ø26.9   | Ø27.0<br>~Ø31.9   |
| Non-alloyed steel, Cast steel<br>Free-machining steel | 1213, 13L13, 1215, 12L14,<br>1118 etc                 | ~ 500<br>500 ~ 850   | 100 ~ 150<br>150 ~ 250  | ~ 24   | 95~120<br>80~105                           | 0.16~0.28<br>0.14~0.24  | 0.21~0.35<br>0.21~0.35  | 0.27~0.40<br>0.27~0.40  | 0.34~0.52<br>0.34~0.52  | 0.37~0.55<br>0.37~0.55  |
| Low-alloyed steel,<br>Cast steel(<5%)<br>Carbon steel | 1015, 1020, 1140, 1025,<br>1035, 1050, 1045, 1055 etc | ~ 450<br>450 ~ 755<br>755 ~ 900<br>900 ~ 1200                | 85 ~ 125<br>125 ~ 225<br>225 ~ 265<br>265 ~ 350               | ~ 19<br>19 ~ 27<br>27 ~ 37                     | 90~115<br>70~90<br>60~80<br>55~70          | 0.14~0.25<br>0.12~0.20<br>0.12~0.20<br>0.10~0.16              | 0.20~0.33<br>0.17~0.28<br>0.17~0.28<br>0.15~0.25              | 0.25~0.39<br>0.22~0.32<br>0.22~0.32<br>0.21~0.30              | 0.31~0.47<br>0.30~0.46<br>0.30~0.46<br>0.25~0.38              | 0.34~0.50<br>0.33~0.49<br>0.33~0.49<br>0.29~0.43              |
| Alloyed steel   | 8620, 4130, 4137, 4140,<br>6150 etc                   | ~ 600<br>600 ~ 800<br>800 ~ 950<br>950 ~ 1110<br>1110 ~ 1230 | 125 ~ 175<br>175 ~ 235<br>235 ~ 280<br>280 ~ 330<br>330 ~ 360 | ~ 7<br>7 ~ 22<br>22 ~ 29<br>29 ~ 35<br>35 ~ 39 | 80~100<br>70~90<br>60~80<br>55~70<br>45~60 | 0.14~0.24<br>0.12~0.20<br>0.12~0.20<br>0.10~0.16<br>0.08~0.12 | 0.17~0.28<br>0.17~0.28<br>0.15~0.25<br>0.13~0.21<br>0.13~0.21 | 0.22~0.32<br>0.22~0.32<br>0.22~0.32<br>0.21~0.30<br>0.21~0.30 | 0.30~0.46<br>0.30~0.46<br>0.30~0.46<br>0.25~0.38<br>0.25~0.38 | 0.34~0.50<br>0.34~0.50<br>0.34~0.50<br>0.29~0.43<br>0.29~0.43 |
| High-alloyed steel                                    | A355, 9840, 4340 etc                                  | 600 ~ 1020<br>1020 ~ 1200<br>1200 ~ 1330                     | 225 ~ 300<br>300 ~ 355<br>355 ~ 390                           | 19 ~ 32<br>32 ~ 38<br>38 ~ 42                  | 45~60<br>40~55<br>40~50                    | 0.12~0.20<br>0.10~0.16<br>0.08~0.12                           | 0.15~0.25<br>0.11~0.18<br>0.09~0.14                           | 0.21~0.30<br>0.21~0.30<br>0.18~0.26                           | 0.20~0.31<br>0.20~0.31<br>0.19~0.29                           | 0.24~0.35<br>0.24~0.35<br>0.23~0.34                           |
| Structural steel                                      | A36, A516, A182 etc                                   | 350 ~ 500<br>500 ~ 850<br>850 ~ 1200                         | 100 ~ 150<br>150 ~ 250<br>250 ~ 355                           | ~ 24<br>~ 24<br>24 ~ 38                        | 75~95<br>60~75<br>50~65                    | 0.14~0.24<br>0.12~0.20<br>0.10~0.16                           | 0.21~0.35<br>0.20~0.33<br>0.17~0.28                           | 0.27~0.39<br>0.22~0.32<br>0.21~0.30                           | 0.29~0.44<br>0.25~0.38<br>0.21~0.32                           | 0.32~0.47<br>0.29~0.43<br>0.26~0.38                           |
| Tool steel  | H13, H21, A2, S1 etc                                  | 500 ~ 705<br>705 ~ 950                                       | 150 ~ 210<br>210 ~ 280  | ~ 16<br>16 ~ 29                                | 50~65<br>40~50                             | 0.10~0.16<br>0.10~0.16  | 0.13~0.21<br>0.13~0.21  | 0.18~0.26<br>0.18~0.26  | 0.20~0.31<br>0.20~0.31  | 0.24~0.35<br>0.24~0.35  |
| Grey cast iron  | Pearlitic, Ferritic                                   | 500 ~ 700  | 150 ~ 210   | ~ 16   | 100~125                                    | 0.15~0.26   | 0.20~0.37   | 0.27~0.42   | 0.36~0.51   | 0.40~0.55   |
|   | Pearlitic   | 700 ~ 850  | 210 ~ 250   | 16 ~ 24  | 75~95                                      | 0.11~0.20   | 0.16~0.29   | 0.20~0.30   | 0.25~0.35   | 0.29~0.40   |
| Cast iron nodular                                     | Ferritic  | 540  | 165   | 4  | 95~120                                     | 0.13~0.22   | 0.17~0.31   | 0.21~0.32   | 0.28~0.40   | 0.32~0.44   |
|   | Pearlitic   | 850  | 250   | 24   | 75~95                                      | 0.11~0.20   | 0.14~0.26   | 0.19~0.29   | 0.25~0.35   | 0.29~0.40   |
| Malleable cast iron                                   | Ferritic  | 450  | 125   |  | 100~125                                    | 0.13~0.22   | 0.17~0.31   | 0.21~0.32   | 0.28~0.40   | 0.32~0.44   |
|   | Pearlitic   | 780  | 230   | 21   | 75~95                                      | 0.11~0.18   | 0.14~0.26   | 0.19~0.29   | 0.25~0.35   | 0.29~0.40   |
| Aluminum alloy(Wrought)                               | not heat treatable                                    | 200  | 60  |  | 335~420                                    | 0.11~0.18   | 0.17~0.26   | 0.28~0.35   | 0.32~0.39   | 0.36~0.42   |
|   | hardened  | 335  | 100   |  | 230~290                                    | 0.13~0.22   | 0.29~0.45   | 0.38~0.48   | 0.51~0.61   | 0.56~0.66   |
| Aluminum alloy(Cast)                                  | ≤12% Si , not heat treatable                          | 250  | 75  |  | 335~420                                    | 0.21~0.37   | 0.31~0.49   | 0.41~0.52   | 0.47~0.57   | 0.50~0.59   |
|   | ≤12% Si , hardened                                    | 300  | 90  |  | 285~360                                    | 0.21~0.37   | 0.30~0.47   | 0.41~0.52   | 0.47~0.57   | 0.50~0.59   |
|   | >12% Si , not heat treatable                          | 450  | 130   |  | 205~260                                    | 0.19~0.33   | 0.28~0.44   | 0.37~0.47   | 0.45~0.54   | 0.48~0.57   |
| Copper alloys   | Free machining(Pb>1%)                                 | 370  | 110   |  | 115~145                                    | 0.16~0.28   | 0.23~0.36   | 0.29~0.36   | 0.37~0.45   | 0.41~0.48   |
|   | Brass   | 300  | 90  |  | 145~185                                    | 0.17~0.29   | 0.24~0.37   | 0.30~0.38   | 0.38~0.46   | 0.42~0.49   |
|   | Electrolytic copper                                   | 200  | 100   |  | 95~120                                     | 0.06~0.09   | 0.09~0.13   | 0.11~0.13   | 0.15~0.18   | 0.19~0.22   |
| Non ferrous materials                                 | Duroplastics  |  |   |  |  |   |   |   |   |   |
|   | Fiber plastics  |  |   |  |  |   |   |   |   |   |
|   | Hard rubber   |  |   |  |  |   |   |   |   |   |

\* Recommend Uncoated Inserts for Aluminum and Non-ferrous Materials.

RPM = revolution per minute (rev/min)

M/min = surface meter per minute(M/min)

DIA = diameter of drill (mm)

mm/rev = feed rate(mm/rev)

\* Formulas :

$$\text{M/min} = \frac{(\text{RPM}) \cdot \pi \cdot (\text{DIA.})}{1000}$$

$$\text{mm/min} = (\text{RPM}) \cdot (\text{mm/rev})$$

$$\text{RPM} = \frac{(\text{M/min}) \cdot 1000}{\pi \cdot (\text{DIA.})}$$

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

► Recommend you to reduce the feed rate to 85%,70% when you use 5xD,7xD holders.

## INCH

| Material  |   | Tensile Strength<br>[N/mm <sup>2</sup> ] | Hardness  |         | Cutting Speed<br>Vc [SFM] | Feed [IPR]        |                   |                   |                  |                    |
|---|---|--|-----------|---------|---------------------------|-------------------|-------------------|-------------------|------------------|--------------------|
|   |   |  | HB        | HRC     |                           | Ø31/64<br>~Ø37/64 | Ø19/32<br>~Ø45/64 | Ø23/32<br>~Ø55/64 | Ø7/8<br>~Ø1-1/16 | Ø1-3/32<br>~Ø1-1/4 |
| Non-alloyed steel, Cast steel<br>Free-machining steel | 1213, 13L13, 1215, 12L14,<br>1118 etc                 | ~ 500                                    | 100 ~ 150 |         | 312-394                   | 0.006-0.011       | 0.008-0.014       | 0.011-0.016       | 0.013-0.020      | 0.015-0.022        |
|   |   | 500 ~ 850                                | 150 ~ 250 | ~ 24    | 262-344                   | 0.006-0.009       | 0.008-0.014       | 0.011-0.016       | 0.013-0.020      | 0.015-0.022        |
| Low-alloyed steel,<br>Cast steel(<5%)<br>Carbon steel | 1015, 1020, 1140, 1025,<br>1035, 1050, 1045, 1055 etc | ~ 450                                    | 85 ~ 125  |         | 295-377                   | 0.006-0.010       | 0.008-0.013       | 0.010-0.015       | 0.012-0.019      | 0.013-0.020        |
|   |   | 450 ~ 755                                | 125 ~ 225 | ~ 19    | 230-295                   | 0.005-0.008       | 0.007-0.011       | 0.009-0.013       | 0.012-0.018      | 0.013-0.019        |
|   |   | 755 ~ 900                                | 225 ~ 265 | 19 ~ 27 | 197-262                   | 0.005-0.008       | 0.007-0.011       | 0.009-0.013       | 0.012-0.018      | 0.013-0.019        |
|   |   | 900 ~ 1200                               | 265 ~ 350 | 27 ~ 37 | 180-230                   | 0.004-0.006       | 0.006-0.010       | 0.008-0.012       | 0.010-0.015      | 0.011-0.017        |
| Alloyed steel   | 8620, 4130, 4137, 4140,<br>6150 etc                   | ~ 600                                    | 125 ~ 175 | ~ 7     | 262-328                   | 0.006-0.009       | 0.007-0.011       | 0.009-0.013       | 0.012-0.018      | 0.013-0.020        |
|   |   | 600 ~ 800                                | 175 ~ 235 | 7 ~ 22  | 230-295                   | 0.005-0.008       | 0.007-0.011       | 0.009-0.013       | 0.012-0.018      | 0.013-0.020        |
|   |   | 800 ~ 950                                | 235 ~ 280 | 22 ~ 29 | 197-262                   | 0.005-0.008       | 0.006-0.010       | 0.009-0.013       | 0.012-0.018      | 0.013-0.020        |
|   |   | 950 ~ 1110                               | 280 ~ 330 | 29 ~ 35 | 180-230                   | 0.004-0.006       | 0.005-0.008       | 0.008-0.012       | 0.010-0.015      | 0.011-0.017        |
| High-alloyed steel                                    | A355, 9840, 4340 etc                                  | 600 ~ 1020                               | 225 ~ 300 | 19 ~ 32 | 148-197                   | 0.005-0.008       | 0.006-0.010       | 0.008-0.012       | 0.008-0.012      | 0.009-0.014        |
|   |   | 1020 ~ 1200                              | 300 ~ 355 | 32 ~ 38 | 131-180                   | 0.004-0.006       | 0.004-0.007       | 0.008-0.012       | 0.008-0.012      | 0.009-0.014        |
|   |   | 1200 ~ 1330                              | 355 ~ 390 | 38 ~ 42 | 131-164                   | 0.003-0.005       | 0.004-0.006       | 0.007-0.010       | 0.007-0.011      | 0.009-0.013        |
| Structural steel                                      | A36, A516, A182 etc                                   | 350 ~ 500                                | 100 ~ 150 |         | 246-312                   | 0.006-0.009       | 0.008-0.014       | 0.011-0.015       | 0.011-0.017      | 0.013-0.019        |
|   |   | 500 ~ 850                                | 150 ~ 250 | ~ 24    | 197-246                   | 0.005-0.008       | 0.008-0.013       | 0.009-0.013       | 0.010-0.015      | 0.011-0.017        |
|   |   | 850 ~ 1200                               | 250 ~ 355 | 24 ~ 38 | 164-213                   | 0.004-0.006       | 0.007-0.011       | 0.008-0.012       | 0.008-0.013      | 0.010-0.015        |
| Tool steel  | H13, H21, A2, S1 etc                                  | 500 ~ 705                                | 150 ~ 210 | ~ 16    | 164-213                   | 0.004-0.006       | 0.005-0.008       | 0.007-0.010       | 0.008-0.012      | 0.009-0.014        |
|   |   | 705 ~ 950                                | 210 ~ 280 | 16 ~ 29 | 131-164                   | 0.004-0.006       | 0.005-0.008       | 0.007-0.010       | 0.008-0.012      | 0.009-0.014        |
| Grey cast iron  | Pearlitic, Ferritic                                   | 500 ~ 700                                | 150 ~ 210 | ~ 16    | 328-410                   | 0.006-0.010       | 0.008-0.015       | 0.011-0.017       | 0.014-0.020      | 0.016-0.022        |
|   | Pearlitic   | 700 ~ 850                                | 210 ~ 250 | 16 ~ 24 | 246-312                   | 0.004-0.008       | 0.006-0.011       | 0.008-0.012       | 0.010-0.014      | 0.011-0.016        |
| Cast iron nodular                                     | Ferritic  | 540                                      | 165       | 4       | 312-394                   | 0.005-0.009       | 0.007-0.012       | 0.008-0.013       | 0.011-0.016      | 0.013-0.017        |
|   | Pearlitic   | 850                                      | 250       | 24      | 246-312                   | 0.004-0.008       | 0.006-0.010       | 0.007-0.011       | 0.010-0.014      | 0.011-0.016        |
| Malleable cast iron                                   | Ferritic  | 450                                      | 125       |         | 328-410                   | 0.005-0.009       | 0.007-0.012       | 0.008-0.013       | 0.011-0.016      | 0.013-0.017        |
|   | Pearlitic   | 780                                      | 230       | 21      | 246-312                   | 0.004-0.007       | 0.006-0.010       | 0.007-0.011       | 0.010-0.014      | 0.011-0.016        |
| Aluminum alloy(Wrought)                               | not heat treatable                                    | 200                                      | 60        |         | 1099-1378                 | 0.004-0.007       | 0.007-0.010       | 0.011-0.014       | 0.013-0.015      | 0.014-0.017        |
|   | hardened  | 335                                      | 100       |         | 755-951                   | 0.005-0.009       | 0.011-0.018       | 0.015-0.019       | 0.020-0.024      | 0.022-0.026        |
| Aluminum alloy(Cast)                                  | ≤12% Si , not heat treatable                          | 250                                      | 75        |         | 1099-1378                 | 0.008-0.015       | 0.012-0.019       | 0.016-0.020       | 0.019-0.022      | 0.020-0.023        |
|   | ≤12% Si , hardened                                    | 300                                      | 90        |         | 935-1181                  | 0.008-0.015       | 0.012-0.019       | 0.016-0.020       | 0.019-0.022      | 0.020-0.023        |
|   | >12% Si , not heat treatable                          | 450                                      | 130       |         | 673-853                   | 0.007-0.013       | 0.011-0.017       | 0.015-0.019       | 0.018-0.021      | 0.019-0.022        |
| Copper alloys   | Free machining(Pb>1%)                                 | 370                                      | 110       |         | 377-476                   | 0.006-0.011       | 0.009-0.014       | 0.011-0.014       | 0.015-0.018      | 0.016-0.019        |
|   | Brass   | 300                                      | 90        |         | 476-607                   | 0.007-0.011       | 0.009-0.015       | 0.012-0.015       | 0.015-0.018      | 0.017-0.019        |
|   | Electrolytic copper                                   | 200                                      | 100       |         | 312-394                   | 0.002-0.004       | 0.004-0.005       | 0.004-0.005       | 0.006-0.007      | 0.007-0.009        |
| Non ferrous materials                                 | Duroplastics  |  |           |         |                           |                   |                   |                   |                  |                    |
|   | Fiber plastics  |  |           |         |                           |                   |                   |                   |                  |                    |
|   | Hard rubber   |  |           |         |                           |                   |                   |                   |                  |                    |

\* Recommend Uncoated Inserts for Aluminum and Non-ferrous Materials.

\* Formulas :

$$\begin{aligned} \text{SFM} &= \frac{(\text{RPM}) \cdot \pi \cdot (\text{DIA.})}{12} \\ \text{IPM} &= (\text{RPM}) \cdot (\text{IPR}) \\ \text{RPM} &= \frac{(\text{SFM}) \cdot 12}{\pi \cdot (\text{DIA.})} \end{aligned}$$

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

► **Recommend you to reduce speeds and feeds by 15% for 5XD and 30% for 7XD Drills.**

**Heavy flank wear / Fast flank wear**

- Reduce cutting speed
- Increase feed

**Chipping on cutting edge**

- Reduce feed
- Check the rigidity of spindle and chuck
- Rigid clamping of workpiece

**Build up on cutting edge**

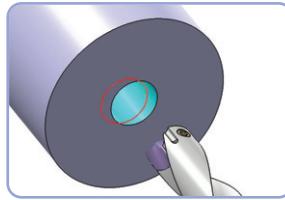
- Increase cutting speed
- Use a coated insert

**Chipping or break down on outer corner**

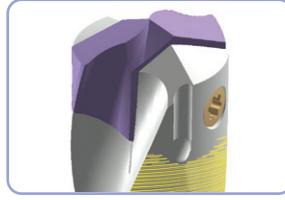
- Reduce feed
- Rigid clamping of workpiece

**Wear of land margin**

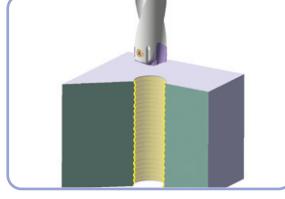
- Rigid clamping of workpiece
- Reduce cutting speed
- Increase coolant flow

**Unsatisfactory positioning of the hole**

- Rigid clamping of workpiece
- Reduce feed during entrance or exit

**Scratching on holder**

- Rigid clamping of workpiece
- Reduce feed
- Increase coolant flow

**Unsatisfactory surface finish**

- Rigid clamping of workpiece
- Increase coolant flow and pressure



**Make sure to clean the insert and insert seat.**



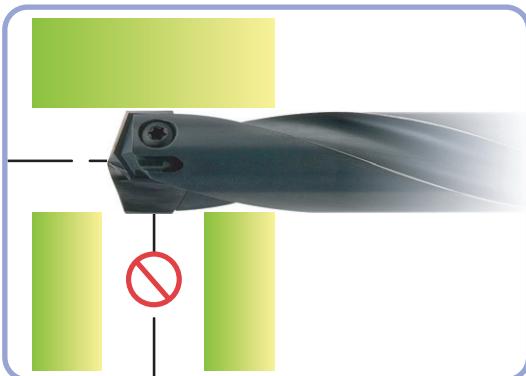
**Slide the drill insert into the slot of the holder and press down the insert to touch the bottom of the slot.**



**After confirming the insert is pressed down to the bottom of the slot, tighten the screw using anti-seize compound.**



**Use the wing type or T-type wrench.**



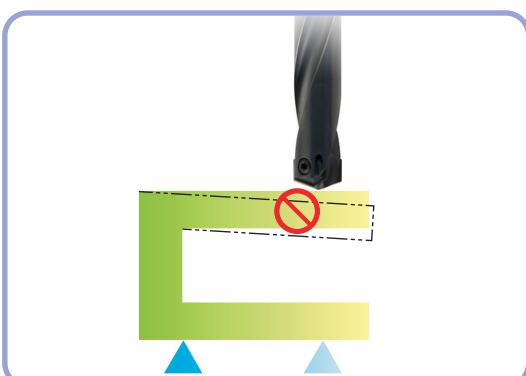
Intersecting cross hole is bigger than the drill insert's Margin Length.



Material with slanting entrance and exit over 7 degree. (If drilling 7 degree or under slanting surface, reduce the feed about 30-50 %)



For drilling stacked plates, minimize the space between the plates.  
The space stacked plates can cause insert breakage or poor chip control.



The material needs to be fixtured securely before drilling.

# THROW-AWAY DRILL INSERTS & HOLDERS

HOLDER & ACCESSORIES





# THROW-AWAY DRILL INSERTS & HOLDERS SELECTION GUIDE

## THROW-AWAY DRILL INSERT HOLDERS

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### HOLDER ACCESSORIES

Torx Screws and Drivers / 435  
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### STRAIGHT SHANK

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### TAPER SHANK

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## THROW-AWAY DRILL INSERTS

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Super Cobalt (T15) Spade Drill / 443~445

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## SPADE DRILL HOLDER ACCESSORIES

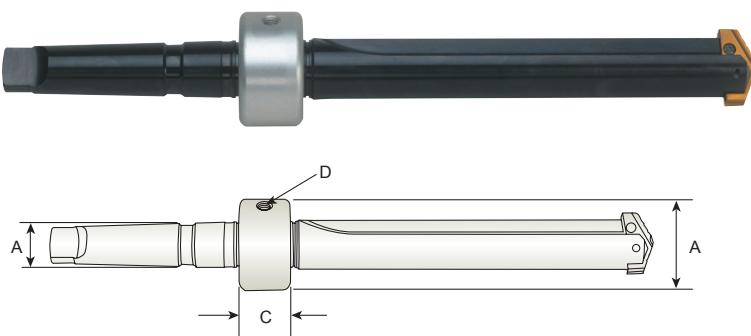
### TORX SCREWS AND PREMIUM TORX HAND DRIVERS

| Series | Torx Screws |                           | Torx Screws (Nylon Locking) |                           | Premium Torx Drivers<br>EDP No | Inch/Metric Drill Range |                  | Torque<br>in Lbs.<br>5.5 |
|--------|-------------|---------------------------|-----------------------------|---------------------------|--------------------------------|-------------------------|------------------|--------------------------|
|        | Item        | PKG EDP No<br>(10 Screws) | Item                        | PKG EDP No<br>(10 Screws) |                                | Inch/Metric Drill Range |                  |                          |
| Y      | 2XT7        | J7Y001                    | 2XT7N                       | J7Y006                    | J5Y007                         | 3/8" - 27/64"           | 9.5mm - 11.0mm   | 5.5                      |
| Z      | 2LXT7       | J7Z011                    | 2LXT7N                      | J7Z016                    | J5Y007                         | 7/16" - 1/2"            | 11.5mm - 12.5mm  | 5.5                      |
| 0      | 2.5XT8      | J80021                    | 2.5XT8N                     | J80026                    | J50008                         | 33/64" - 11/16"         | 13.0mm - 17.5mm  | 11.0                     |
| 0.5    | 2.5LXT8     | J80531                    | 2.5LXT8N                    | J80536                    | J50008                         | 39/64" - 11/16"         | 15.5mm - 17.5mm  | 11.0                     |
| 1      | 3XT9        | J91041                    | 3XT9N                       | J91046                    | J51009                         | 45/64" - 15/16"         | 18.0mm - 24.0mm  | 20.0                     |
| 1.5    | 3LXT9       | J91551                    | 3LXT9N                      | J91556                    | J51009                         | 55/64" - 15/16"         | 22.0mm - 24.0mm  | 20.0                     |
| 2      | 4XT15       | JB2061                    | 4XT15N                      | JB2066                    | J52015                         | 31/32" - 1-3/8"         | 25.0mm - 35.0mm  | 45.0                     |
| 2.5    | 4XT15       | JB2061                    | 4XT15N                      | JB2066                    | J52015                         | 31/32" - 1-3/8"         | 30.0mm - 35.0mm  | 45.0                     |
| 3-4    | 5XT20       | JC3081                    | 5XT20N                      | JC3086                    | J53020                         | 1-13/32" - 2-9/16"      | 36.0mm - 65.0mm  | 90.0                     |
| 5-8    | 6XT25       | JD5091                    | 6XT25N                      | JD5096                    | J55025                         | 2-1/2" - 4-1/2"         | 64.0mm - 114.0mm | 155.0                    |

NOTE: Replacement screws sold in packages (10 screws per package)



## SPADE DRILL HOLDER ACCESSORIES



### ROTARY COOLANT INDUCER (RCI) AND ACCESSORIES



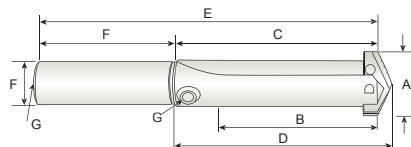
Complete with O'Rings, Flat Washers and Locking Clips.

| EDP No. | A      | B         | C      | D    | Thread for Driving Rod |
|---------|--------|-----------|--------|------|------------------------|
|         | I.D.   | Pipe O.D. | Length | Tap  |                        |
| PR1030  | 3/4"   | 1-3/4"    | 7/8"   | 1/8" | 5/16" - NC             |
| PR1031  | 1"     | 2-1/8"    | 1-1/8" | 1/8" | 5/16" - NC             |
| PR1042  | 1-1/4" | 2-1/2"    | 1-3/8" | 1/4" | 3/8" - NC              |
| PR1043  | 1-3/4" | 3"        | 1-3/8" | 1/4" | 3/8" - NC              |
| PR1054  | 2-1/4" | 3-3/4"    | 1-3/4" | 1/2" | 1/2" - NC              |

THROW-AWAY DRILL INSERT HOLDERS



## SHORT LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE

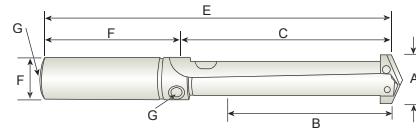


| EDP No. | Series | A                  | B                | C            | D           | E              | F      |          | G    |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|--------|----------|------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank  | Pipe Tap |      |
|         |        |                    |                  |              |             |                | Dia.   | Length   |      |
| P13Y01  | Y      | 3/8" – 27/64"      | 1-1/4"           | 2-1/32"      | 2-1/8"      | 4-13/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P13Z01  | Z      | 7/16" – 1/2"       | 1-1/4"           | 2-1/32"      | 2-1/8"      | 4-13/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P13001  | 0      | 33/64" – 11/16"    | 1-3/8"           | 2-3/16"      | 2-19/64"    | 4-9/16"        | 3/4"   | 2-3/8"   | 1/8" |
| P13051  | 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" |
| P13101  | 1      | 45/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"     | 6-7/8"         | 3/4"   | 3"       | 1/8" |
| P13102  |        | 45/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"     | 6-7/8"         | 1"     | 3"       | 1/8" |
| P13151  | 1.5    | 55/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"     | 6-7/8"         | 3/4"   | 3"       | 1/8" |
| P13152  |        | 55/64" – 15/16"    | 2-5/8"           | 3-7/8"       | 4-1/64"     | 6-7/8"         | 1"     | 3"       | 1/8" |
| P13202  | 2      | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 4-41/64"    | 8"             | 1"     | 3-1/2"   | 1/8" |
| P13203  |        | 31/32" – 1-3/8"    | 3-3/8"           | 4-1/2"       | 4-41/64"    | 8"             | 1-1/4" | 3-1/2"   | 1/8" |
| P13252  | 2.5    | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 4-41/64"    | 8"             | 1"     | 3-1/2"   | 1/8" |
| P13253  |        | 1-3/16" – 1-3/8"   | 3-3/8"           | 4-1/2"       | 4-41/64"    | 8"             | 1-1/4" | 3-1/2"   | 1/8" |
| P13303  | 3      | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 6-3/16"     | 10"            | 1-1/4" | 4"       | 1/4" |
| P13304  |        | 1-13/32" – 1-7/8"  | 4-3/4"           | 6"           | 6-3/16"     | 10"            | 1-1/2" | 4"       | 1/4" |
| P13404  | 4      | 1-29/32" – 2-9/16" | 5-1/8"           | 6-1/2"       | 6-11/16"    | 10-1/2"        | 1-1/2" | 4"       | 1/4" |
| P13405  |        | 1-29/32" – 2-9/16" | 5-1/8"           | 6-1/2"       | 6-11/16"    | 10-1/2"        | 1-3/4" | 4"       | 1/4" |
| P13506  | 5-6    | 2-1/2" – 3-1/2"    | 6-3/4"           | 8-1/2"       | 8-3/4"      | 12-1/2"        | 2"     | 4"       | 1/2" |
| P13708  | 7-8    | 3-17/32" – 4-1/2"  | 6-3/4"           | 8-7/8"       | 9-1/8"      | 13-7/8"        | 3"     | 5"       | 1/2" |

THROW-AWAY DRILL INSERT HOLDERS



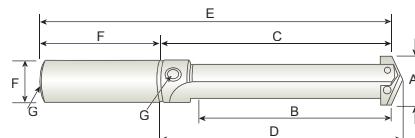
## INTERMEDIATE LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



| EDP No. | Series | A                  | B                | C            | E              | F      |          | G    |
|---------|--------|--------------------|------------------|--------------|----------------|--------|----------|------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Overall Length | Shank  | Pipe Tap |      |
|         |        |                    |                  |              |                | Dia.   | Length   |      |
| P14102  | 1      | 45/64" – 15/16"    | 4-5/8"           | 5-7/8"       | 8-7/8"         | 1"     | 3"       | 1/8" |
| P14152  | 1.5    | 55/64" – 15/16"    | 4-5/8"           | 5-7/8"       | 8-7/8"         | 1"     | 3"       | 1/8" |
| P14203  | 2      | 31/32" – 1-3/8"    | 5-3/8"           | 6-1/2"       | 10"            | 1-1/4" | 3-1/2"   | 1/8" |
| P14253  | 2.5    | 1-3/16" – 1-3/8"   | 5-3/8"           | 6-1/2"       | 10"            | 1-1/4" | 3-1/2"   | 1/8" |
| P14304  | 3      | 1-13/32" – 1-7/8"  | 6-1/2"           | 7-3/4"       | 11-3/4"        | 1-1/2" | 4"       | 1/4" |



# STANDARD LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE

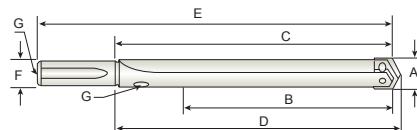


| EDP No. | Series | A                  | B                | C            | D           | E              | F      |          | G    |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|--------|----------|------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank  | Pipe Tap |      |
|         |        |                    |                  |              |             |                | Dia.   | Length   |      |
| P15Y01  | Y      | 3/8" - 27/64"      | 2-3/8"           | 3-5/32"      | 3-1/4"      | 5-17/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P15Z01  | Z      | 7/16" - 1/2"       | 2-3/8"           | 3-5/32"      | 3-1/4"      | 5-17/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P15001  | 0      | 33/64" - 11/16"    | 2-1/2"           | 3-5/16"      | 3-27/64"    | 5-11/16"       | 3/4"   | 2-3/8"   | 1/8" |
| P15051  | 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" |
| P15101  | 1      | 45/64" - 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"     | 10-7/8"        | 3/4"   | 3"       | 1/8" |
| P15102  |        | 45/64" - 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"     | 10-7/8"        | 1"     | 3"       | 1/8" |
| P15151  | 1.5    | 55/64" - 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"     | 10-7/8"        | 3/4"   | 3"       | 1/8" |
| P15152  |        | 55/64" - 15/16"    | 6-5/8"           | 7-7/8"       | 8-1/64"     | 10-7/8"        | 1"     | 3"       | 1/8" |
| P15202  | 2      | 31/32" - 1-3/8"    | 7-3/8"           | 8-1/2"       | 8-41/64"    | 12"            | 1"     | 3-1/2"   | 1/8" |
| P15203  |        | 31/32" - 1-3/8"    | 7-3/8"           | 8-1/2"       | 8-41/64"    | 12"            | 1-1/4" | 3-1/2"   | 1/8" |
| P15252  | 2.5    | 1-3/16" - 1-3/8"   | 7-3/8"           | 8-1/2"       | 8-41/64"    | 12"            | 1"     | 3-1/2"   | 1/8" |
| P15253  |        | 1-3/16" - 1-3/8"   | 7-3/8"           | 8-1/2"       | 8-41/64"    | 12"            | 1-1/4" | 3-1/2"   | 1/8" |
| P15303  | 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" |
| P15304  |        | 1-13/32" - 1-7/8"  | 8-1/4"           | 9-1/2"       | 9-11/16"    | 13-1/2"        | 1-1/2" | 4"       | 1/4" |
| P15404  | 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" |
| P15405  |        | 1-29/32" - 2-9/16" | 9-1/8"           | 10-1/2"      | 10-11/16"   | 14-1/2"        | 1-3/4" | 4"       | 1/4" |
| P15506  | 5-6    | 2-1/2" - 3-1/2"    | 10-3/4"          | 12-1/2"      | 12-3/4"     | 16-1/2         | 2"     | 4"       | 1/2" |
| P15708  | 7-8    | 3-17/32" - 4-1/2"  | 10-3/4"          | 12-7/8"      | 13-1/8"     | 17-7/8"        | 3"     | 5"       | 1/2" |

THROW-AWAY DRILL INSERT HOLDERS



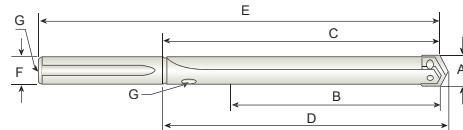
# EXTENDED LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



| EDP No. | Series | A                  | B                | C            | D           | E              | F      |          | G    |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|--------|----------|------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank  | Pipe Tap |      |
|         |        |                    |                  |              |             |                | Dia.   | Length   |      |
| P16Y01  | Y      | 3/8" – 27/64"      | 4-3/8"           | 5-5/32"      | 5-1/4"      | 7-17/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P16Z01  | Z      | 7/16" – 1/2"       | 4-3/8"           | 5-5/32"      | 5-1/4"      | 7-17/32"       | 3/4"   | 2-3/8"   | 1/8" |
| P16001  | 0      | 33/64" – 11/16"    | 4-1/2"           | 5-5/16"      | 5-27/64"    | 7-11/16"       | 3/4"   | 2-3/8"   | 1/8" |
| P16051  | 0.5    | 39/64" – 11/16"    | 4-1/2"           | 5-5/16"      | 5-27/64"    | 7-11/16"       | 3/4"   | 2-3/8"   | 1/8" |
| P16102  | 1      | 45/64" – 15/16"    | 10-5/8"          | 11-7/8"      | 12-1/64     | 14-7/8"        | 1"     | 3"       | 1/8" |
| P16152  | 1.5    | 55/64" – 15/16"    | 10-5/8"          | 11-7/8"      | 12-1/64     | 14-7/8"        | 1"     | 3"       | 1/8" |
| P16203  | 2      | 31/32" – 1-3/8"    | 11-3/8"          | 12-1/2"      | 12-41/64    | 16"            | 1-1/4" | 3-1/2"   | 1/8" |
| P16253  | 2.5    | 1-3/16" – 1-3/8"   | 11-3/8"          | 12-1/2"      | 12-41/64    | 16"            | 1-1/4" | 3-1/2"   | 1/8" |
| P16303  | 3      | 1-13/32" – 1-7/8"  | 13-3/4"          | 15"          | 15-3/16     | 19"            | 1-1/4" | 4"       | 1/4" |
| P16404  | 4      | 1-29/32" – 2-9/16" | 16-5/8"          | 18"          | 18-3/16     | 22"            | 1-1/2" | 4"       | 1/4" |
| P16506  | 5      | 2-1/2" – 3-1/2"    | 18-1/4"          | 20"          | 20-1/4      | 24"            | 2"     | 4"       | 1/2" |
| P16708  | 7      | 3-17/32" – 4-1/2"  | 21-7/8"          | 24"          | 24-1/4      | 29"            | 3"     | 5"       | 1/2" |



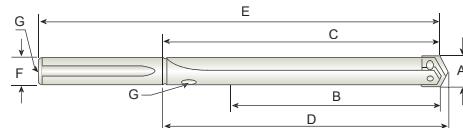
## LONG LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



| EDP No. | Series | A                  | B                | C            | D           | E              | F          |        | G        |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|------------|--------|----------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank Dia. | Length | Pipe Tap |
| P17001  | 0      | 33/64" – 11/16"    | 7"               | 7-13/16"     | 7-59/64"    | 10-3/16"       | 3/4"       | 2-3/8" | 1/8"     |
| P17051  | 0.5    | 39/64" – 11/16"    | 7"               | 7-13/16"     | 7-59/64"    | 10-3/16"       | 3/4"       | 2-3/8" | 1/8"     |



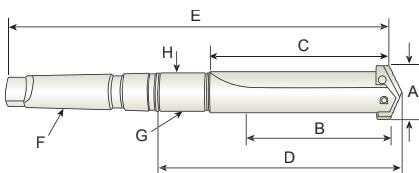
## XL LENGTH, STRAIGHT SHANK HOLDER, STRAIGHT FLUTE



| EDP No. | Series | A                  | B                | C            | D           | E              | F          |        | G        |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|------------|--------|----------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | Shank Dia. | Length | Pipe Tap |
| P17101  | 1      | 45/64" – 15/16"    | 18"              | 19-1/4"      | 19-25/64"   | 22-1/4"        | 1"         | 3"     | 1/8"     |
| P17202  | 2      | 31/32" – 1-3/8"    | 20-1/8"          | 21-1/4"      | 21-25/64"   | 24-3/4"        | 1-1/4"     | 3-1/2" | 1/8"     |
| P17303  | 3      | 1-13/32" – 1-7/8"  | 22"              | 23-1/4"      | 23-7/16"    | 27-1/4"        | 1-1/2"     | 4"     | 1/4"     |
| P17404  | 4      | 1-29/32" – 2-9/16" | 24-5/8"          | 26"          | 26-3/16"    | 30"            | 1-1/2"     | 4"     | 1/4"     |
| P17506  | 5      | 2-1/2" – 3-1/2"    | 26"              | 27-3/4"      | 28"         | 31-3/4"        | 2"         | 4"     | 1/2"     |
| P17708  | 7      | 3-17/32" – 4-1/2"  | 27"              | 29-1/8"      | 29-3/8"     | 34-1/8"        | 3"         | 5"     | 1/2"     |



## SHORT LENGTH, TAPER SHANK HOLDER, STRAIGHT FLUTE

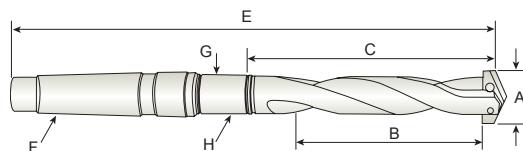


| EDP No. | Series | A                  | B                | C            | D           | E              | F  | G        | H      |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|----|----------|--------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | MT | Pipe Tap | RCI    |
| P01Y02  | Y      | 3/8" - 27/64"      | 1-1/4"           | 2-1/32"      | 3-15/32"    | 6-5/16"        | #2 | 1/16"    | PR1030 |
| P01Z02  | Z      | 7/16" - 1/2"       | 1-1/4"           | 2-1/32"      | 3-15/32"    | 6-5/16"        | #2 | 1/16"    | PR1030 |
| P01002  | 0      | 33/64" - 11/16"    | 1-3/8"           | 2-3/16"      | 3-41/64"    | 6-15/32"       | #2 | 1/16"    | PR1030 |
| P01052  | 0.5    | 39/64" - 11/16"    | 1-3/8"           | 2-3/16"      | 3-41/64"    | 6-15/32"       | #2 | 1/16"    | PR1030 |
| P01103  | 1      | 45/64" - 15/16"    | 2-3/4"           | 3-7/8"       | 5-39/64"    | 9-5/32"        | #3 | 1/8"     | PR1031 |
| P01104  |        | 45/64" - 15/16"    | 2-3/4"           | 3-7/8"       | 5-43/64"    | 10-5/32"       | #4 | 1/8"     | PR1031 |
| P01153  | 1.5    | 55/64" - 15/16"    | 2-3/4"           | 3-7/8"       | 5-39/64"    | 9-5/32"        | #3 | 1/8"     | PR1031 |
| P01154  |        | 55/64" - 15/16"    | 2-3/4"           | 3-7/8"       | 5-43/64"    | 10-5/32"       | #4 | 1/8"     | PR1031 |
| P01203  | 2      | 31/32" - 1-3/8"    | 3-3/8"           | 4-1/2"       | 6-15/64"    | 9-25/32"       | #3 | 1/8"     | PR1031 |
| P01204  |        | 31/32" - 1-3/8"    | 3-3/8"           | 4-1/2"       | 6-19/64"    | 10-25/32"      | #4 | 1/8"     | PR1031 |
| P01253  | 2.5    | 1-3/16" - 1-3/8"   | 3-3/8"           | 4-1/2"       | 6-15/64"    | 9-25/32"       | #3 | 1/8"     | PR1031 |
| P01254  |        | 1-3/16" - 1-3/8"   | 3-3/8"           | 4-1/2"       | 6-37/64"    | 11-1/16"       | #4 | 1/4"     | PR1042 |
| P01304  | 3      | 1-13/32" - 1-7/8"  | 4-3/4"           | 6"           | 8-1/8"      | 12-9/16"       | #4 | 1/4"     | PR1042 |
| P01305  |        | 1-13/32" - 1-7/8"  | 4-3/4"           | 6"           | 8-1/8"      | 13-13/16"      | #5 | 1/4"     | PR1043 |
| P01404  | 4      | 1-29/32" - 2-9/16" | 5-1/8"           | 6-1/2"       | 8-5/8"      | 13-1/16"       | #4 | 1/4"     | PR1042 |
| P01405  |        | 1-29/32" - 2-9/16" | 5-1/8"           | 6-1/2"       | 8-5/8"      | 14-5/16"       | #5 | 1/4"     | PR1043 |
| P01505  | 5-6    | 2-1/2" - 3-1/2"    | 6-3/4"           | 8-1/2"       | 11-5/16"    | 16-15/16"      | #5 | 1/2"     | PR1054 |
| P01705  | 7-8    | 3-17/32" - 4-1/2"  | 6-3/4"           | 8-7/8"       | 11-11/16"   | 17-5/16"       | #5 | 1/2"     | PR1054 |

THROW-AWAY DRILL INSERT HOLDERS



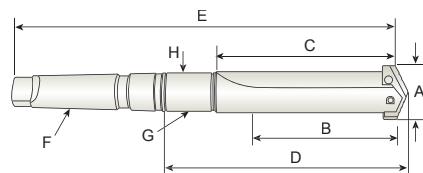
## INTERMEDIATE LENGTH, TAPER SHANK HOLDER, HELICAL FLUTE



| EDP No. | Series | A                  | B                | C            | E              | F  | G        | H      |
|---------|--------|--------------------|------------------|--------------|----------------|----|----------|--------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Overall Length | MT | Pipe Tap | RCI    |
| P08103  | 1      | 45/64" - 15/16"    | 4-3/4"           | 5-7/8"       | 11-5/32"       | #3 | 1/8"     | PR1031 |
| P08153  | 1.5    | 55/64" - 15/16"    | 4-3/4"           | 5-7/8"       | 11-5/32"       | #3 | 1/8"     | PR1031 |
| P08204  | 2      | 31/32" - 1-3/8"    | 5-3/8"           | 6-1/2"       | 12-25/32"      | #4 | 1/8"     | PR1031 |
| P08254  | 2.5    | 1-3/16" - 1-3/8"   | 5-3/8"           | 6-1/2"       | 13-1/16"       | #4 | 1/4"     | PR1042 |

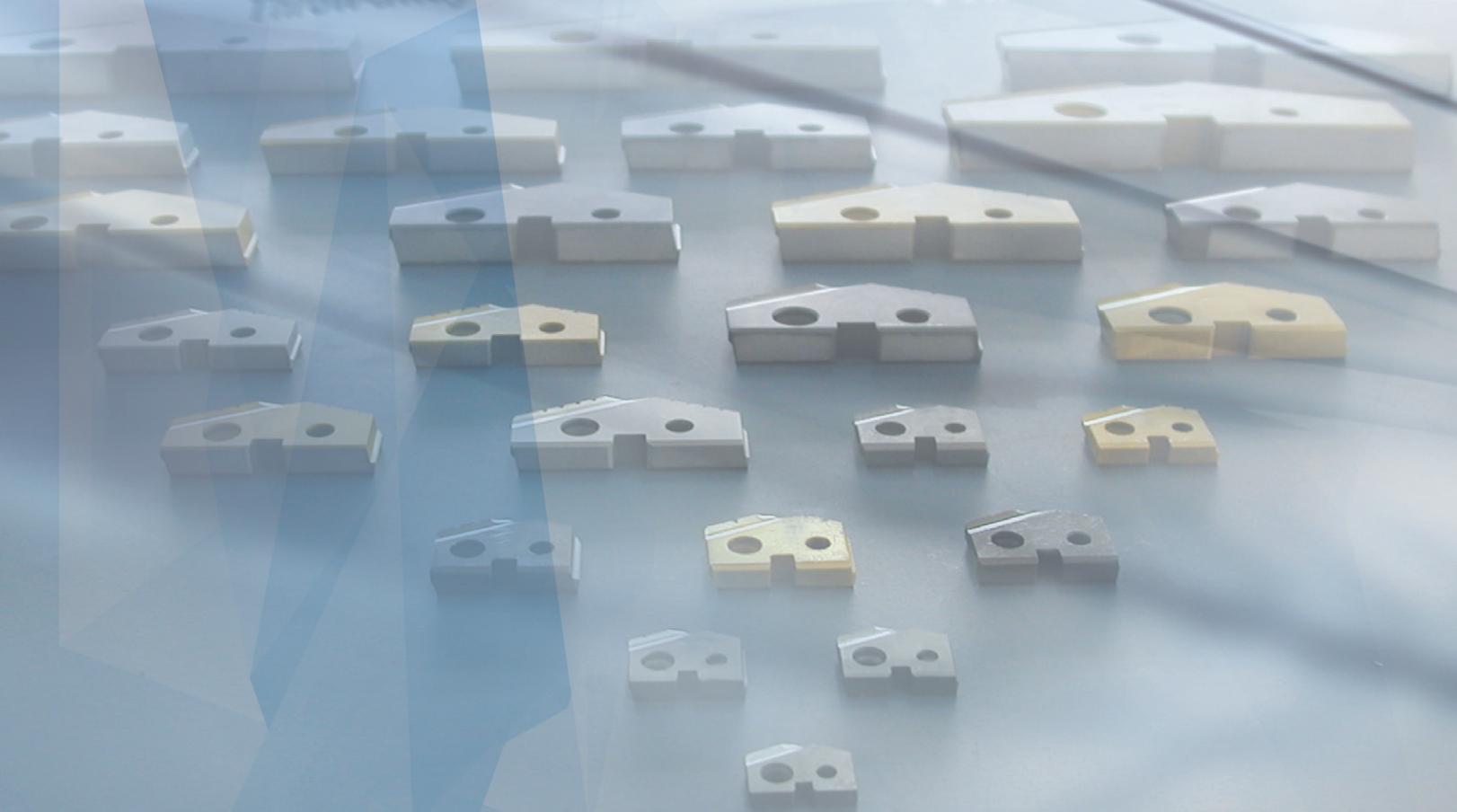


# STANDARD LENGTH, TAPER SHANK HOLDER, STRAIGHT FLUTE



| EDP No. | Series | A                  | B                | C            | D           | E              | F  | G        | H      |
|---------|--------|--------------------|------------------|--------------|-------------|----------------|----|----------|--------|
|         |        | Drill Insert Range | Max. Drill Depth | Flute Length | Ref. Length | Overall Length | MT | Pipe Tap | RCI    |
| P03Y02  | Y      | 3/8" - 27/64"      | 2-3/8"           | 3-5/32"      | 4-19/32"    | 7-7/16"        | #2 | 1/16"    | PR1030 |
| P03Z02  | Z      | 7/16" - 1/2"       | 2-3/8"           | 3-5/32"      | 4-19/32"    | 7-7/16"        | #2 | 1/16"    | PR1030 |
| P03002  | 0      | 33/64" - 11/16"    | 2-1/2"           | 3-5/16"      | 4-49/64"    | 7-19/32"       | #2 | 1/16"    | PR1030 |
| P03052  | 0.5    | 39/64" - 11/16"    | 2-1/2"           | 3-5/16"      | 4-49/64"    | 7-19/32"       | #2 | 1/16"    | PR1030 |
| P03103  | 1      | 45/64" - 15/16"    | 6-3/4"           | 7-7/8"       | 9-39/64"    | 13-5/32"       | #3 | 1/8"     | PR1031 |
| P03104  |        | 45/64" - 15/16"    | 6-3/4"           | 7-7/8"       | 9-43/64"    | 14-5/32"       | #4 | 1/8"     | PR1031 |
| P03153  | 1.5    | 55/64" - 15/16"    | 6-3/4"           | 7-7/8"       | 9-39/64"    | 13-5/32"       | #3 | 1/8"     | PR1031 |
| P03154  |        | 55/64" - 15/16"    | 6-3/4"           | 7-7/8"       | 9-43/64"    | 14-5/32"       | #4 | 1/8"     | PR1031 |
| P03203  | 2      | 31/32" - 1-3/8"    | 7-3/8"           | 8-1/2"       | 10-15/64"   | 13-25/32"      | #3 | 1/8"     | PR1031 |
| P03204  |        | 31/32" - 1-3/8"    | 7-3/8"           | 8-1/2"       | 10-19/64"   | 14-25/32"      | #4 | 1/8"     | PR1031 |
| P03253  | 2.5    | 1-3/16" - 1-3/8"   | 7-3/8"           | 8-1/2"       | 10-15/64"   | 13-25/32"      | #3 | 1/8"     | PR1031 |
| P03254  |        | 1-3/16" - 1-3/8"   | 7-3/8"           | 8-1/2"       | 10-37/64"   | 15-1/16"       | #4 | 1/4"     | PR1042 |
| P03304  | 3      | 1-13/32" - 1-7/8"  | 8-1/4"           | 9-1/2"       | 11-5/8"     | 16-1/16"       | #4 | 1/4"     | PR1042 |
| P03305  |        | 1-13/32" - 1-7/8"  | 8-1/4"           | 9-1/2"       | 11-5/8"     | 17-5/16"       | #5 | 1/4"     | PR1043 |
| P03404  | 4      | 1-29/32" - 2-9/16" | 9-1/8"           | 10-1/2"      | 12-5/8"     | 17-1/16"       | #4 | 1/4"     | PR1042 |
| P03405  |        | 1-29/32" - 2-9/16" | 9-1/8"           | 10-1/2"      | 12-5/8"     | 18-5/16"       | #5 | 1/4"     | PR1043 |
| P03505  | 5-6    | 2-1/2" - 3-1/2"    | 10-3/4"          | 12-1/2"      | 15-5/16"    | 20-15/16"      | #5 | 1/2"     | PR1054 |
| P03705  | 7-8    | 3-17/32" - 4-1/2"  | 10-3/4"          | 12-7/8"      | 15-11/16"   | 21-5/16"       | #5 | 1/2"     | PR1054 |

# THROW-AWAY DRILL INSERTS





# THROW-AWAY SUPER COBALT(T15) DRILL INSERTS



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- For use in high nickel alloys and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

| SUPER COBALT (T15) SPADE DRILL                        |                |                   |                          |                            |                                | SUPER COBALT (T15) SPADE DRILL                       |                |                   |                          |                            |                                |
|---|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)                  | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                 | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|   | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |
| <b>Y</b><br>.374"<br>to<br>.436"<br>(3/32")<br>Thick  | 9.50mm         | .3740"            | * S06Y01                 | * S08Y01                   | * S09Y01                       | <b>1</b><br>.690"<br>to<br>.960"<br>(5/32")<br>Thick | 45/64"         | .7031"            | S06101                   | S08101                     | S09101                         |
|   | 3/8"           | .3750"            | * S06Y02                 | * S08Y02                   | * S09Y02                       |  | 18mm           | .7087"            | S06102                   | S08102                     | S09102                         |
|   | 9.80mm         | .3858"            | * S06Y03                 | * S08Y03                   | * S09Y03                       |  | 23/32"         | .7188"            | S06103                   | S08103                     | S09103                         |
|   | 25/64"         | .3906"            | * S06Y04                 | * S08Y04                   | * S09Y04                       |  | 18.50mm        | .7283"            | S06104                   | S08104                     | S09104                         |
|   | 10mm           | .3937"            | * S06Y05                 | * S08Y05                   | * S09Y05                       |  | 47/64"         | .7344"            | S06105                   | S08105                     | S09105                         |
|   | 10.20mm        | .4016"            | * S06Y06                 | * S08Y06                   | * S09Y06                       |  | 19mm           | .7480"            | S06106                   | S08106                     | S09106                         |
|   | 13/32"         | .4062"            | * S06Y07                 | * S08Y07                   | * S09Y07                       |  | 3/4"           | .7500"            | S06107                   | S08107                     | S09107                         |
|   | 10.50mm        | .4134"            | * S06Y08                 | * S08Y08                   | * S09Y08                       |  | 49/64"         | .7656"            | S06108                   | S08108                     | S09108                         |
|   | 27/64"         | .4219"            | * S06Y09                 | * S08Y09                   | * S09Y09                       |  | 19.50mm        | .7677"            | S06109                   | S08109                     | S09109                         |
|   | 10.80mm        | .4252"            | * S06Y10                 | * S08Y10                   | * S09Y10                       |  | 25/32"         | .7812"            | S06110                   | S08110                     | S09110                         |
| <b>Z</b><br>.437"<br>to<br>.510"<br>(3/32")<br>Thick  | 11mm           | .4331"            | * S06Y11                 | * S08Y11                   | * S09Y11                       |  | 20mm           | .7874"            | S06111                   | S08111                     | S09111                         |
|   | 7/16"          | .4375"            | * S06Z01                 | * S08Z01                   | * S09Z01                       |  | 51/64"         | .7969"            | S06160                   | S08160                     | S09160                         |
|   | 11.50mm        | .4528"            | * S06Z02                 | * S08Z02                   | * S09Z02                       |  | 20.50mm        | .8071"            | S06112                   | S08112                     | S09112                         |
|   | 29/64"         | .4531"            | * S06Z03                 | * S08Z03                   | * S09Z03                       |  | 13/16"         | .8125"            | S06113                   | S08113                     | S09113                         |
|   | 15/32"         | .4688"            | * S06Z04                 | * S08Z04                   | * S09Z04                       |  | 21mm           | .8268"            | S06114                   | S08114                     | S09114                         |
|   | 12mm           | .4724"            | * S06Z05                 | * S08Z05                   | * S09Z05                       |  | 27/32"         | .8438"            | S06115                   | S08115                     | S09115                         |
|   | 31/64"         | .4844"            | * S06Z06                 | * S08Z06                   | * S09Z06                       |  | 55/64"         | .8594"            | S06161                   | S08161                     | S09161                         |
|   | 12.50mm        | .4921"            | * S06Z07                 | * S08Z07                   | * S09Z07                       |  | 22mm           | .8661"            | S06116                   | S08116                     | S09116                         |
|   | 1/2"           | .5000"            | * S06Z08                 | * S08Z08                   | * S09Z08                       |  | 7/8"           | .8750"            | S06117                   | S08117                     | S09117                         |
|   | 13mm           | .5118"            | * S06001                 | * S08001                   | * S09001                       |  | 57/64"         | .8906"            | S06162                   | S08162                     | S09162                         |
| <b>O</b><br>.511"<br>to<br>.695"<br>(1/8")<br>Thick   | 33/64"         | .5156"            | * S06002                 | * S08002                   | * S09002                       |  | 23mm           | .9055"            | S06118                   | S08118                     | S09118                         |
|   | 17/32"         | .5312"            | * S06003                 | * S08003                   | * S09003                       |  | 29/32"         | .9062"            | S06119                   | S08119                     | S09119                         |
|   | 13.50mm        | .5315"            | * S06004                 | * S08004                   | * S09004                       |  | 59/64"         | .9219"            | S06120                   | S08120                     | S09120                         |
|   | 35/64"         | .5469"            | * S06060                 | * S08060                   | * S09060                       |  | 15/16"         | .9375"            | S06121                   | S08121                     | S09121                         |
|   | 14mm           | .5512"            | * S06005                 | * S08005                   | * S09005                       |  | 24mm           | .9449"            | S06122                   | S08122                     | S09122                         |
|   | 9/16"          | .5625"            | * S06006                 | * S08006                   | * S09006                       |  | 31/32"         | .9688"            | S06201                   | S08201                     | S09201                         |
|   | 14.50mm        | .5709"            | * S06007                 | * S08007                   | * S09007                       |  | 63/64"         | .9843"            | S06202                   | S08202                     | S09202                         |
|   | 37/64"         | .5781"            | * S06008                 | * S08008                   | * S09008                       |  | 1"             | 1.0000"           | S06203                   | S08203                     | S09203                         |
|   | 15mm           | .5906"            | * S06009                 | * S08009                   | * S09009                       |  | 1-1/64"        | 1.0156"           | S06204                   | S08204                     | S09204                         |
|   | 19/32"         | .5938"            | * S06010                 | * S08010                   | * S09010                       |  | 26mm           | 1.0236"           | S06205                   | S08205                     | S09205                         |
| <b>2</b><br>.961"<br>to<br>1.380"<br>(3/16")<br>Thick | 39/64"         | .6094"            | * S06061                 | * S08061                   | * S09061                       |  | 1-1/32"        | 1.0312"           | S06206                   | S08206                     | S09206                         |
|   | 15.50mm        | .6102"            | * S06011                 | * S08011                   | * S09011                       |  | 1-3/64"        | 1.0469            | S06260                   | S08260                     | S09260                         |
|   | 5/8"           | .6250"            | * S06012                 | * S08012                   | * S09012                       |  | 1-1/16"        | 1.0625"           | S06207                   | S08207                     | S09207                         |
|   | 16mm           | .6299"            | * S06013                 | * S08013                   | * S09013                       |  | 27mm           | 1.0630"           | S06208                   | S08208                     | S09208                         |
|   | 41/64"         | .6406"            | * S06062                 | * S08062                   | * S09062                       |  | 1-3/32"        | 1.0938"           | S06209                   | S08209                     | S09209                         |
|   | 16.50mm        | .6496"            | * S06014                 | * S08014                   | * S09014                       |  | 28mm           | 1.1024"           | S06210                   | S08210                     | S09210                         |
|   | 21/32"         | .6562"            | * S06015                 | * S08015                   | * S09015                       |  | 1-7/64"        | 1.1094"           | S06261                   | S08261                     | S09261                         |
|   | 17mm           | .6693"            | * S06016                 | * S08016                   | * S09016                       |  | 1-1/8"         | 1.1250"           | S06211                   | S08211                     | S09211                         |
|   | 43/64"         | .6719"            | * S06063                 | * S08063                   | * S09063                       |  | 29mm           | 1.1417"           | S06212                   | S08212                     | S09212                         |
|   | 11/16"         | .6875"            | * S06017                 | * S08017                   | * S09017                       |  |                |                   |                          |                            |                                |
|   | 17.50mm        | .6890"            | * S06018                 | * S08018                   | * S09018                       |  |                |                   |                          |                            |                                |

\* 2pcs per package



# THROW-AWAY SUPER COBALT(T15) DRILL INSERTS



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- For use in high nickel alloys and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

| SUPER COBALT (T15) SPADE DRILL                           |                |                   |                          |                            |                                | SUPER COBALT (T15) SPADE DRILL                           |                |                |                   |                          |                            |                                |
|--|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)                     | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                     | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|  | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>Metric | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |
| <b>2</b><br>.961"<br>to<br>1.380"<br>(3/16")<br>Thick    | 1-5/32"        | 1.1562"           | S06213                   | S08213                     | S09213                         | <b>4</b><br>46.99<br>(1.850")<br>to<br>65.28<br>(2.570") | 1-29/32"       | 48.42          | 1.9062"           | S06402                   | S08402                     | S09402                         |
|  | 30mm           | 1.1811"           | S06214                   | S08214                     | S09214                         |  | 1-15/16"       | 49.21          | 1.9375"           | S06404                   | S08404                     | S09404                         |
|  | 1-3/16"        | 1.1875"           | S06215                   | S08215                     | S09215                         |  | 1-31/32"       | 50.01          | 1.9688"           | S06406                   | S08406                     | S09406                         |
|  | 1-7/32"        | 1.2188"           | S06216                   | S08216                     | S09216                         |  | 2"             | 50.80          | 2.0000"           | S06407                   | S08407                     | S09407                         |
|  | 31mm           | 1.2205"           | S06217                   | S08217                     | S09217                         |  | 2-1/32"        | 51.59          | 2.0312"           | S06409                   | S08409                     | S09409                         |
|  | 1-1/4"         | 1.2500"           | S06218                   | S08218                     | S09218                         |  | 2-3/64"        | 52.00          | 2.0472"           | S06410                   | S08410                     | S09410                         |
|  | 32mm           | 1.2598"           | S06219                   | S08219                     | S09219                         |  | 2-1/16"        | 52.39          | 2.0625"           | S06411                   | S08411                     | S09411                         |
|  | 1-9/32"        | 1.2812"           | S06220                   | S08220                     | S09220                         |  | 2-3/32"        | 53.18          | 2.0938"           | S06413                   | S08413                     | S09413                         |
|  | 33mm           | 1.2992"           | S06221                   | S08221                     | S09221                         |  | 2-1/8"         | 53.98          | 2.1250"           | S06414                   | S08414                     | S09414                         |
|  | 1-5/16"        | 1.3125"           | S06222                   | S08222                     | S09222                         |  | 2-5/32"        | 54.79          | 2.1562"           | S06416                   | S08416                     | S09416                         |
|  | 34mm           | 1.3386"           | S06223                   | S08223                     | S09223                         |  | 2-3/16"        | 55.56          | 2.1875"           | S06418                   | S08418                     | S09418                         |
|  | 1-11/32"       | 1.3438"           | S06224                   | S08224                     | S09224                         |  | 2-7/32"        | 56.36          | 2.2188"           | S06420                   | S08420                     | S09420                         |
|  | 1-3/8"         | 1.3750"           | S06225                   | S08225                     | S09225                         |  | 2-1/4"         | 57.15          | 2.2500"           | S06422                   | S08422                     | S09422                         |
|  | 35mm           | 1.3780"           | S06226                   | S08226                     | S09226                         |  | 2-9/32"        | 57.94          | 2.2812"           | S06423                   | S08423                     | S09423                         |
| <b>3</b><br>1.353"<br>to<br>1.882"<br>(1/4")<br>Thick    | 1-13/32"       | 1.4062"           | S06301                   | S08301                     | S09301                         |  | 2-5/16"        | 58.74          | 2.3125"           | S06425                   | S08425                     | S09425                         |
|  | 36mm           | 1.4173"           | S06302                   | S08302                     | S09302                         |  | 2-11/32"       | 59.53          | 2.3438"           | S06427                   | S08427                     | S09427                         |
|  | 1-7/16"        | 1.4375"           | S06303                   | S08303                     | S09303                         |  | 2-3/8"         | 60.33          | 2.3750"           | S06429                   | S08429                     | S09429                         |
|  | 37mm           | 1.4567"           | S06304                   | S08304                     | S09304                         |  | 2-13/32"       | 61.12          | 2.4062"           | S06431                   | S08431                     | S09431                         |
|  | 1-15/32"       | 1.4688"           | S06305                   | S08305                     | S09305                         |  | 2-7/16"        | 61.91          | 2.4375"           | S06432                   | S08432                     | S09432                         |
|  | 38mm           | 1.4961"           | S06306                   | S08306                     | S09306                         |  | 2-15/32"       | 62.71          | 2.4688"           | S06434                   | S08434                     | S09434                         |
|  | 1-1/2"         | 1.5000"           | S06307                   | S08307                     | S09307                         |  | 2-1/2"         | 63.50          | 2.5000"           | S06436                   | S08436                     | S09436                         |
|  | 1-17/32"       | 1.5312"           | S06308                   | S08308                     | S09308                         |  | 2-17/32"       | 64.29          | 2.5312"           | S06438                   | S08438                     | S09438                         |
|  | 39mm           | 1.5354"           | S06309                   | S08309                     | S09309                         |  | 2-9/16"        | 65.09          | 2.5625"           | S06440                   | S08440                     | S09440                         |
|  | 1-9/16"        | 1.5625"           | S06310                   | S08310                     | S09310                         |  | 2-1/2"         | 63.50          | 2.5000"           |                          |                            | S09501                         |
|  | 40mm           | 1.5748"           | S06311                   | S08311                     | S09311                         |  |                | 64.00          | 2.5197"           |                          |                            | S09502                         |
|  | 1-19/32"       | 1.5938"           | S06312                   | S08312                     | S09312                         |  | 2-17/32"       | 64.29          | 2.5312"           |                          |                            | S09503                         |
|  | 41mm           | 1.6142"           | S06313                   | S08313                     | S09313                         |  | 2-9/16"        | 65.09          | 2.5625"           |                          |                            | S09504                         |
|  | 1-5/8"         | 1.6250"           | S06314                   | S08314                     | S09314                         |  | 2-19/32"       | 65.88          | 2.5938"           |                          |                            | S09505                         |
|  | 42mm           | 1.6535"           | S06315                   | S08315                     | S09315                         |  |                | 66.00          | 2.5984"           |                          |                            | S09506                         |
|  | 1-21/32"       | 1.6562"           | S06316                   | S08316                     | S09316                         |  | 2-5/8"         | 66.68          | 2.6250"           |                          |                            | S09507                         |
|  | 43mm           | 1.6875"           | S06317                   | S08317                     | S09317                         |  | 2-21/32"       | 67.47          | 2.6562"           |                          |                            | S09508                         |
|  | 1-11/16"       | 1.6875"           | S06317                   | S08317                     | S09317                         |  |                | 68.00          | 2.6772"           |                          |                            | S09509                         |
| <b>5</b><br>62.38<br>(2.456")<br>to<br>76.20<br>(3.000") | 1-23/32"       | 1.7188"           | S06319                   | S08319                     | S09319                         |  | 2-11/16"       | 68.26          | 2.6875"           |                          |                            | S09510                         |
|  | 44mm           | 1.7323"           | S06320                   | S08320                     | S09320                         |  | 2-23/32"       | 69.09          | 2.7188"           |                          |                            | S09511                         |
|  | 1-3/4"         | 1.7500"           | S06321                   | S08321                     | S09321                         |  | 2-3/4"         | 69.85          | 2.7500"           |                          |                            | S09512                         |
|  | 45mm           | 1.7717"           | S06322                   | S08322                     | S09322                         |  |                | 70.00          | 2.7559"           |                          |                            | S09513                         |
|  | 1-25/32"       | 1.7812"           | S06323                   | S08323                     | S09323                         |  | 2-25/32"       | 70.64          | 2.7812"           |                          |                            | S09514                         |
|  | 46mm           | 1.8110"           | S06324                   | S08324                     | S09324                         |  | 2-13/16"       | 71.44          | 2.8125"           |                          |                            | S09515                         |
|  | 1-13/16"       | 1.8125"           | S06325                   | S08325                     | S09325                         |  |                | 72.00          | 2.8346"           |                          |                            | S09516                         |
|  | 1-27/32"       | 1.8438"           | S06326                   | S08326                     | S09326                         |  | 2-27/32"       | 72.23          | 2.8438"           |                          |                            | S09517                         |
|  | 47mm           | 1.8504"           | S06327                   | S08327                     | S09327                         |  | 2-7/8"         | 73.03          | 2.8750"           |                          |                            | S09518                         |
|  | 1-7/8"         | 1.8750"           | S06328                   | S08328                     | S09328                         |  | 2-29/32"       | 73.82          | 2.9062"           |                          |                            | S09519                         |



# THROW-AWAY SUPER COBALT(T15) DRILL INSERTS



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- For use in high nickel alloys and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

| SUPER COBALT (T15) SPADE DRILL                                |                |                |                   |                          |                            |                                | SUPER COBALT (T15) SPADE DRILL                                 |                |                |                   |                          |                            |                                |
|---|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)                          | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                           | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|   | Inch<br>Metric | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>Metric | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |
| <b>5</b><br><br>62.38<br>(2.456")<br>to<br>76.20<br>(3.000")  | 74.00          | 2.9134"        |                   |                          |                            | S09520                         | <b>7</b><br><br>87.76<br>(3.455")<br>to<br>101.60<br>(4.000")  | 98.00          | 3.8583"        |                   |                          |                            | S09716                         |
|   | 2-15/16"       | 74.61          | 2.9375"           |                          |                            | S09521                         |  | 3-7/8"         | 98.43          | 3.8750"           |                          |                            | S09717                         |
|   | 2-31/32"       | 75.41          | 2.8688"           |                          |                            | S09522                         |  | 3-29/32"       | 99.22          | 3.9062"           |                          |                            | S09718                         |
|   |                | 76.00          | 2.9921"           |                          |                            | S09523                         |  |                | 100.00         | 3.9370"           |                          |                            | S09719                         |
|   | 3"             | 76.20          | 3.0000"           |                          |                            | S09524                         |  | 3-15/16"       | 100.01         | 3.9375"           |                          |                            | S09720                         |
| <b>6</b><br><br>76.23<br>(3.001")<br>to<br>89.08<br>(3.507")  | 3-1/32"        | 76.99          | 3.0312"           |                          |                            | S09601                         | <b>8</b><br><br>101.63<br>(4.001")<br>to<br>114.48<br>(4.507") | 3-31/32"       | 100.81         | 3.9688"           |                          |                            | S09721                         |
|   | 3-1/16"        | 77.79          | 3.0625"           |                          |                            | S09602                         |  | 4"             | 101.60         | 4.0000"           |                          |                            | S09722                         |
|   |                | 78.00          | 3.0709"           |                          |                            | S09603                         |  | 4-1/64"        | 102.00         | 4.0156"           |                          |                            | S09801                         |
|   | 3-3/32"        | 78.58          | 3.0938"           |                          |                            | S09604                         |  | 4-1/16"        | 103.19         | 4.0625"           |                          |                            | S09802                         |
|   | 3-1/8"         | 79.38          | 3.1250"           |                          |                            | S09605                         |  | 4-3/32"        | 104.00         | 4.0945"           |                          |                            | S09803                         |
|   |                | 80.00          | 3.1496"           |                          |                            | S09606                         |  | 4-1/8"         | 104.78         | 4.1250"           |                          |                            | S09804                         |
|   | 3-5/32"        | 80.17          | 3.1562"           |                          |                            | S09607                         |  |                | 106.00         | 4.1732"           |                          |                            | S09805                         |
|   | 3-3/16"        | 80.96          | 3.1875"           |                          |                            | S09608                         |  | 4-3/16"        | 106.36         | 4.1875"           |                          |                            | S09806                         |
|   | 3-7/32"        | 81.76          | 3.2188"           |                          |                            | S09609                         |  | 4-1/4"         | 107.95         | 4.2500"           |                          |                            | S09807                         |
|   |                | 82.00          | 3.2283"           |                          |                            | S09610                         |  |                | 108.00         | 4.2520"           |                          |                            | S09808                         |
|   | 3-1/4"         | 82.55          | 3.2500"           |                          |                            | S09611                         |  | 4-5/16"        | 109.54         | 4.3125"           |                          |                            | S09809                         |
|   | 3-9/32"        | 83.34          | 3.2812"           |                          |                            | S09612                         |  |                | 110.00         | 4.3307"           |                          |                            | S09810                         |
|   |                | 84.00          | 3.3071"           |                          |                            | S09613                         |  | 4-3/8"         | 111.13         | 4.3750"           |                          |                            | S09811                         |
|   | 3-5/16"        | 84.14          | 3.3125"           |                          |                            | S09614                         |  |                | 112.00         | 4.4094"           |                          |                            | S09812                         |
|   | 3-11/32"       | 84.93          | 3.3438"           |                          |                            | S09615                         |  | 4-7/16"        | 112.71         | 4.4375"           |                          |                            | S09813                         |
|   | 3-3/8"         | 85.73          | 3.3750"           |                          |                            | S09616                         |  |                | 114.00         | 4.4882"           |                          |                            | S09814                         |
|   |                | 86.00          | 3.3858"           |                          |                            | S09617                         |  | 4-1/2"         | 114.30         | 4.5000"           |                          |                            | S09815                         |
| <b>7</b><br><br>87.76<br>(3.455")<br>to<br>101.60<br>(4.000") | 3-13/32"       | 86.52          | 3.3062"           |                          |                            | S09618                         |  |                |                |                   |                          |                            |                                |
|   | 3-7/16"        | 87.31          | 3.4375"           |                          |                            | S09619                         |  |                |                |                   |                          |                            |                                |
|   |                | 88.00          | 3.4646"           |                          |                            | S09620                         |  |                |                |                   |                          |                            |                                |
|   | 3-15/32"       | 88.11          | 3.4688"           |                          |                            | S09621                         |  |                |                |                   |                          |                            |                                |
|   | 3-1/2"         | 88.90          | 3.5000"           |                          |                            | S09622                         |  |                |                |                   |                          |                            |                                |
|   | 3-17/32"       | 89.69          | 3.5312"           |                          |                            | S09701                         |  |                |                |                   |                          |                            |                                |
|   |                | 90.00          | 3.5433"           |                          |                            | S09702                         |  |                |                |                   |                          |                            |                                |
|   | 3-9/16"        | 90.49          | 3.5625"           |                          |                            | S09703                         |  |                |                |                   |                          |                            |                                |
|   | 3-19/32"       | 91.28          | 3.5938"           |                          |                            | S09704                         |  |                |                |                   |                          |                            |                                |
|   |                | 92.00          | 3.6221"           |                          |                            | S09705                         |  |                |                |                   |                          |                            |                                |
|   | 3-5/8"         | 92.08          | 3.6250"           |                          |                            | S09706                         |  |                |                |                   |                          |                            |                                |
|   | 3-21/32"       | 92.87          | 3.6563"           |                          |                            | S09707                         |  |                |                |                   |                          |                            |                                |
|   | 3-11/16"       | 93.66          | 3.6875"           |                          |                            | S09708                         |  |                |                |                   |                          |                            |                                |
|   |                | 94.00          | 3.7008"           |                          |                            | S09709                         |  |                |                |                   |                          |                            |                                |
|   | 3-23/32"       | 94.46          | 3.7188"           |                          |                            | S09710                         |  |                |                |                   |                          |                            |                                |
|   | 3-3/4"         | 95.25          | 3.7500"           |                          |                            | S09711                         |  |                |                |                   |                          |                            |                                |
|   |                | 96.00          | 3.7795"           |                          |                            | S09712                         |  |                |                |                   |                          |                            |                                |
|   | 3-25/32"       | 96.04          | 3.7812"           |                          |                            | S09713                         |  |                |                |                   |                          |                            |                                |
|   | 3-13/16"       | 96.84          | 3.8125"           |                          |                            | S09714                         |  |                |                |                   |                          |                            |                                |
|   | 3-27/32"       | 97.63          | 3.8438"           |                          |                            | S09715                         |  |                |                |                   |                          |                            |                                |



# THROW-AWAY HSS(M4) DRILL INSERTS



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- For general use in steels and cast irons.

- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

| HSS (M4) SPADE DRILL                                   |                |                   |                          |                            | HSS (M4) SPADE DRILL           |  |                |                   |                          |                            |                                |
|--|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)                   | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                   | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|  | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |
| 1<br><br>.690"<br>to<br>.960"<br><br>(5/32")<br>Thick  | 45/64"         | .7031"            | S01101                   | S03101                     | S04101                         | 2<br><br>.961"<br>to<br>1.380"<br><br>(3/16")<br>Thick | 30mm           | 1.1811"           | S01214                   | S03214                     | S04214                         |
|  | 18mm           | .7087"            | S01102                   | S03102                     | S04102                         |  | 1-3/16"        | 1.1875"           | S01215                   | S03215                     | S04215                         |
|  | 23/32"         | .7188"            | S01103                   | S03103                     | S04103                         |  | 1-7/32"        | 1.2188"           | S01216                   | S03216                     | S04216                         |
|  | 18.50mm        | .7283"            | S01104                   | S03104                     | S04104                         |  | 31mm           | 1.2205"           | S01217                   | S03217                     | S04217                         |
|  | 47/64"         | .7344"            | S01105                   | S03105                     | S04105                         |  | 1-1/4"         | 1.2500"           | S01218                   | S03218                     | S04218                         |
|  | 19mm           | .7480"            | S01106                   | S03106                     | S04106                         |  | 32mm           | 1.2598"           | S01219                   | S03219                     | S04219                         |
|  | 3/4"           | .7500"            | S01107                   | S03107                     | S04107                         |  | 1-9/32"        | 1.2812"           | S01220                   | S03220                     | S04220                         |
|  | 49/64"         | .7656"            | S01108                   | S03108                     | S04108                         |  | 33mm           | 1.2992"           | S01221                   | S03221                     | S04221                         |
|  | 19.50mm        | .7677"            | S01109                   | S03109                     | S04109                         |  | 1-5/16"        | 1.3125"           | S01222                   | S03222                     | S04222                         |
|  | 25/32"         | .7812"            | S01110                   | S03110                     | S04110                         |  | 34mm           | 1.3386"           | S01223                   | S03223                     | S04223                         |
|  | 20.00mm        | .7874"            | S01111                   | S03111                     | S04111                         |  | 1-11/32"       | 1.3438"           | S01224                   | S03224                     | S04224                         |
|  | 51/64"         | .7969"            | S01160                   | S03160                     | S04160                         |  | 1-3/8"         | 1.3750"           | S01225                   | S03225                     | S04225                         |
|  | 20.50mm        | .8071"            | S01112                   | S03112                     | S04112                         |  | 35mm           | 1.3780"           | S01226                   | S03226                     | S04226                         |
|  | 13/16"         | .8125"            | S01113                   | S03113                     | S04113                         | 3<br><br>1.353"<br>to<br>1.882"<br><br>(1/4")<br>Thick | 1-13/32"       | 1.4062"           | S01301                   | S03301                     | S04301                         |
|  | 21mm           | .8268"            | S01114                   | S03114                     | S04114                         |  | 36mm           | 1.4173"           | S01302                   | S03302                     | S04302                         |
|  | 27/32"         | .8438"            | S01115                   | S03115                     | S04115                         |  | 1-7/16"        | 1.4375"           | S01303                   | S03303                     | S04303                         |
|  | 55/64"         | .8594"            | S01161                   | S03161                     | S04161                         |  | 37mm           | 1.4567"           | S01304                   | S03304                     | S04304                         |
|  | 22mm           | .8661"            | S01116                   | S03116                     | S04116                         |  | 1-15/32"       | 1.4688"           | S01305                   | S03305                     | S04305                         |
|  | 7/8"           | .8750"            | S01117                   | S03117                     | S04117                         |  | 38mm           | 1.4961"           | S01306                   | S03306                     | S04306                         |
|  | 57/64"         | .8906"            | S01162                   | S03162                     | S04162                         |  | 1-1/2"         | 1.5000"           | S01307                   | S03307                     | S04307                         |
|  | 23mm           | .9055"            | S01118                   | S03118                     | S04118                         |  | 1-17/32"       | 1.5312"           | S01308                   | S03308                     | S04308                         |
|  | 29/32"         | .9062"            | S01119                   | S03119                     | S04119                         |  | 39mm           | 1.5354"           | S01309                   | S03309                     | S04309                         |
|  | 59/64"         | .9219"            | S01120                   | S03120                     | S04120                         |  | 1-9/16"        | 1.5625"           | S01310                   | S03310                     | S04310                         |
|  | 15/16"         | .9375"            | S01121                   | S03121                     | S04121                         |  | 40mm           | 1.5748"           | S01311                   | S03311                     | S04311                         |
|  | 24mm           | .9449"            | S01122                   | S03122                     | S04122                         |  | 1-19/32"       | 1.5938"           | S01312                   | S03312                     | S04312                         |
| 2<br><br>.961"<br>to<br>1.380"<br><br>(3/16")<br>Thick | 31/32"         | .9688"            | S01201                   | S03201                     | S04201                         |  | 41mm           | 1.6142"           | S01313                   | S03313                     | S04313                         |
|  | 63/64"         | .9843"            | S01202                   | S03202                     | S04202                         |  | 1-5/8"         | 1.6250"           | S01314                   | S03314                     | S04314                         |
|  | 1"             | 1.0000"           | S01203                   | S03203                     | S04203                         |  | 42mm           | 1.6535"           | S01315                   | S03315                     | S04315                         |
|  | 1-1/64"        | 1.0156"           | S01204                   | S03204                     | S04204                         |  | 1-21/32"       | 1.6563"           | S01316                   | S03316                     | S04316                         |
|  | 26mm           | 1.0236"           | S01205                   | S03205                     | S04205                         |  | 1-11/16"       | 1.6875"           | S01317                   | S03317                     | S04317                         |
|  | 1-1/32"        | 1.0312"           | S01206                   | S03206                     | S04206                         |  | 43mm           | 1.6929"           | S01318                   | S03318                     | S04318                         |
|  | 1-3/64"        | 1.0469            | S01260                   | S03260                     | S04260                         |  | 1-23/32"       | 1.7188"           | S01319                   | S03319                     | S04319                         |
|  | 1-1/16"        | 1.0625"           | S01207                   | S03207                     | S04207                         |  | 44mm           | 1.7323"           | S01320                   | S03320                     | S04320                         |
|  | 27mm           | 1.0630"           | S01208                   | S03208                     | S04208                         |  | 1-3/4"         | 1.7500"           | S01321                   | S03321                     | S04321                         |
|  | 1-3/32"        | 1.0938"           | S01209                   | S03209                     | S04209                         |  | 45mm           | 1.7717"           | S01322                   | S03322                     | S04322                         |
|  | 28mm           | 1.1024"           | S01210                   | S03210                     | S04210                         |  | 1-25/32"       | 1.7812"           | S01323                   | S03323                     | S04323                         |
|  | 1-7/64"        | 1.1094"           | S01261                   | S03261                     | S04261                         |  | 46mm           | 1.8110"           | S01324                   | S03324                     | S04324                         |
|  | 1-1/8"         | 1.1250"           | S01211                   | S03211                     | S04211                         |  | 1-13/16"       | 1.8125"           | S01325                   | S03325                     | S04325                         |
|  | 29mm           | 1.1417"           | S01212                   | S03212                     | S04212                         |  | 1-27/32"       | 1.8438"           | S01326                   | S03326                     | S04326                         |
|  | 1-5/32"        | 1.1562"           | S01213                   | S03213                     | S04213                         |  | 47mm           | 1.8504"           | S01327                   | S03327                     | S04327                         |
|  |                |                   |                          |                            |                                |  | 1-7/8"         | 1.8750"           | S01328                   | S03328                     | S04328                         |



# THROW-AWAY HSS(M4) DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

| HSS (M4) SPADE DRILL  |                |                   |                          |                            | HSS (M4) SPADE DRILL           |   |                |                   |                          |  |                                |
|---|----------------|-------------------|--------------------------|----------------------------|--------------------------------|---|----------------|-------------------|--------------------------|--|--------------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)                              | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                              | Diameter       |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO.   | Hardslick<br>Coated<br>EDP NO. |
|   | Inch<br>Metric | Decimal<br>(inch) |                          |                            |                                |   | Inch<br>Metric | Decimal<br>(inch) |                          |  |                                |
| <b>4</b><br><b>1.850"<br/>to<br/>2.570"<br/>(5/16")<br/>Thick</b> | 1-29/32"       | 1.9063"           | S01402                   | S03402                     | S04402                         | <b>5</b><br><b>2.456"<br/>to<br/>3.000"<br/>(7/16")<br/>Thick</b> | 2-1/2"         | 2.5000"           | S01501                   | <b>TiAIN<br/>and<br/>Hardslick<br/>not stocked<br/>but<br/>available<br/>on request.</b> |                                |
|   | 1-15/16"       | 1.9375"           | S01404                   | S03404                     | S04404                         |   | 2-5/8"         | 2.6250"           | S01507                   |  |                                |
|   | 1-31/32"       | 1.9688"           | S01406                   | S03406                     | S04406                         |   | 2-3/4"         | 2.7500"           | S01512                   |  |                                |
|   | 2"             | 2.0000"           | S01407                   | S03407                     | S04407                         |   | 2-25/32"       | 2.7813"           | S01514                   |  |                                |
|   | 2-1/32"        | 2.0313"           | S01409                   | S03409                     | S04409                         |   | 2-13/16"       | 2.8125"           | S01515                   |  |                                |
|   | 2-3/64"        | 2.0472"           | S01410                   | S03410                     | S04410                         |   | 2-27/32"       | 2.8438"           | S01517                   |  |                                |
|   | 2-1/16"        | 2.0625"           | S01411                   | S03411                     | S04411                         |   | 2-7/8"         | 2.8750"           | S01518                   |  |                                |
|   | 2-3/32"        | 2.0938"           | S01413                   | S03413                     | S04413                         |   | 2-29/32        | 2.9063"           | S01519                   |  |                                |
|   | 2-1/8"         | 2.1250"           | S01414                   | S03414                     | S04414                         |   | 2-15/16"       | 2.9375"           | S01521                   |  |                                |
|   | 2-5/32"        | 2.1563"           | S01416                   | S03416                     | S04416                         |   | 2-31/32"       | 2.9688"           | S01522                   |  |                                |
|   | 2-3/16"        | 2.1875"           | S01418                   | S03418                     | S04418                         |   | 3"             | 3.0000"           | S01524                   |  |                                |
| <b>6</b><br><b>3.001"<br/>to<br/>3.507"<br/>(7/16")<br/>Thick</b> | 2-7/32"        | 2.2188"           | S01420                   | S03420                     | S04420                         | <b>6</b><br><b>3.001"<br/>to<br/>3.507"<br/>(7/16")<br/>Thick</b> | 3-1/16"        | 3.0625"           | S01602                   |  |                                |
|   | 2-1/4"         | 2.2500"           | S01422                   | S03422                     | S04422                         |   | 3-1/8"         | 3.1250"           | S01605                   |  |                                |
|   | 2-9/32"        | 2.2813"           | S01423                   | S03423                     | S04423                         |   | 3-1/4"         | 3.2500"           | S01611                   |  |                                |
|   | 2-5/16"        | 2.3125"           | S01425                   | S03425                     | S04425                         |   | 3-3/8"         | 3.3750"           | S01616                   |  |                                |
|   | 2-11/32"       | 2.3438"           | S01427                   | S03427                     | S04427                         |   | 3-7/16"        | 3.4375"           | S01619                   |  |                                |
|   | 2-3/8"         | 2.3750"           | S01429                   | S03429                     | S04429                         |   | 3-1/2"         | 3.5000"           | S01622                   |  |                                |
|   | 2-13/32"       | 2.4063"           | S01431                   | S03431                     | S04431                         | <b>7</b><br><b>3.455"<br/>to<br/>4.000"<br/>(7/16")<br/>Thick</b> | 3-9/16"        | 3.5625"           | S01703                   |  |                                |
|   | 2-7/16"        | 2.4375"           | S01432                   | S03432                     | S04432                         |   | 3-5/8"         | 3.6250"           | S01706                   |  |                                |
|   | 2-15/32"       | 2.4688"           | S01434                   | S03434                     | S04434                         |   | 3-3/4"         | 3.7500"           | S01711                   |  |                                |
|   | 2-1/2"         | 2.5000"           | S01436                   | S03436                     | S04436                         |   | 3-7/8"         | 3.8750"           | S01717                   |  |                                |
|   | 2-17/32"       | 2.5313"           | S01438                   | S03438                     | S04438                         |   | 4"             | 4.0000"           | S01722                   |  |                                |
| <b>8</b><br><b>4.001"<br/>to<br/>4.507"<br/>(7/16")<br/>Thick</b> | 2-9/16"        | 2.5625"           | S01440                   | S03440                     | S04440                         | <b>8</b><br><b>4.001"<br/>to<br/>4.507"<br/>(7/16")<br/>Thick</b> | 4-1/8"         | 4.1250"           | S01804                   |  |                                |
|   |                |                   |                          |                            |                                |   | 4-1/4"         | 4.2500"           | S01807                   |  |                                |
|   |                |                   |                          |                            |                                |   | 4-3/8"         | 4.3750"           | S01811                   |  |                                |
|   |                |                   |                          |                            |                                |   | 4-1/2"         | 4.5000"           | S01815                   |  |                                |

THROW-AWAY DRILL INSERT HOLDERS



# THROW-AWAY PREMIUM COBALT(M48) DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- For use in high temperature alloys and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

## PREMIUM COBALT (M48) SPADE DRILL

## PREMIUM COBALT (M48) SPADE DRILL

| Series<br>Min.to<br>Max<br>(mm/inch)                       | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                       | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|--|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
|  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |
| <b>Y</b><br><br>9.50<br>(.374")<br>to<br>11.07<br>(.436")  | 9.50           | .3740"         | *S11Y01           | *S13Y01                  | *S14Y01                    |                                | <b>0</b><br><br>12.98<br>(.511")<br>to<br>17.65<br>(.695") | 13.00          | .5118"         | *S11001           | *S13001                  | *S14001                    |                                |
|  | 3/8"           | 9.53           | .3750"            | *S11Y02                  | *S13Y02                    | *S14Y02                        |  | 33/64"         |                | .5156"            | *S11002                  | *S13002                    | *S14002                        |
|  |                | 9.80           | .3860"            | *S11Y03                  | *S13Y03                    | *S14Y03                        |  | 17/32"         |                | .5313"            | *S11003                  | *S13003                    | *S14003                        |
|  | 25/64"         | 9.92           | .3906"            | *S11Y04                  | *S13Y04                    | *S14Y04                        |  | 13.50          | .5315"         | *S11004           | *S13004                  | *S14004                    |                                |
|  |                | 10.00          | .3937"            | *S11Y05                  | *S13Y05                    | *S14Y05                        |  | 35/64"         |                | .5469"            | *S11060                  | *S13060                    | *S14060                        |
|  |                | 10.20          | .4016"            | *S11Y06                  | *S13Y06                    | *S14Y06                        |  | 14.00          | .5512"         | *S11005           | *S13005                  | *S14005                    |                                |
|  | 13/32"         | 10.32          | .4063"            | *S11Y07                  | *S13Y07                    | *S14Y07                        |  | 9/16"          |                | .5625"            | *S11006                  | *S13006                    | *S14006                        |
|  |                | 10.50          | .4134"            | *S11Y08                  | *S13Y08                    | *S14Y08                        |  | 14.50          | .5709"         | *S11007           | *S13007                  | *S14007                    |                                |
|  | 27/64"         | 10.72          | .4219"            | *S11Y09                  | *S13Y09                    | *S14Y09                        |  | 37/64"         |                | .5781"            | *S11008                  | *S13008                    | *S14008                        |
|  |                | 10.80          | .4252"            | *S11Y10                  | *S13Y10                    | *S14Y10                        |  | 15.00          | .5906"         | *S11009           | *S13009                  | *S14009                    |                                |
| <b>Z</b><br><br>11.11<br>(.437")<br>to<br>12.95<br>(.510") | 11.00          | .4331"         | *S11Y11           | *S13Y11                  | *S14Y11                    | 19/32"                         |  | .5938"         | *S11010        | *S13010           | *S14010                  |                            |                                |
|  | 7/16"          | 11.11          | .4375"            | *S11Z01                  | *S13Z01                    | *S14Z01                        | 39/64"   |                | .6094"         | *S11061           | *S13061                  | *S14061                    |                                |
|  |                | 11.50          | .4528"            | *S11Z02                  | *S13Z02                    | *S14Z02                        | 15.50  | .6102"         | *S11011        | *S13011           | *S14011                  |                            |                                |
|  | 29/64"         | 11.51          | .4531"            | *S11Z03                  | *S13Z03                    | *S14Z03                        | 5/8"   |                | .6250"         | *S11012           | *S13012                  | *S14012                    |                                |
|  | 15/32"         | 11.91          | .4688"            | *S11Z04                  | *S13Z04                    | *S14Z04                        | 16.00  | .6299"         | *S11013        | *S13013           | *S14013                  |                            |                                |
|  |                | 12.00          | .4724"            | *S11Z05                  | *S13Z05                    | *S14Z05                        | 41/64"   |                | .6406"         | *S11062           | *S13062                  | *S14062                    |                                |
|  | 31/64"         | 12.30          | .4844"            | *S11Z06                  | *S13Z06                    | *S14Z06                        | 16.50  | .6496"         | *S11014        | *S13014           | *S14014                  |                            |                                |
|  |                | 12.50          | .4921"            | *S11Z07                  | *S13Z07                    | *S14Z07                        | 21/32"   |                | .6563"         | *S11015           | *S13015                  | *S14015                    |                                |
|  | 1/2"           | 12.70          | .5000"            | *S11Z08                  | *S13Z08                    | *S14Z08                        | 17.00  | .6693"         | *S11016        | *S13016           | *S14016                  |                            |                                |
| * 2pcs per package   |                |                |                   |                          |                            |                                |  |                |                |                   |                          |                            |                                |

THROW-AWAY DRILL INSERT HOLDERS



# THROW-AWAY PREMIUM COBALT(M48) DRILL INSERTS



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- For use in high temperature alloys and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

## PREMIUM COBALT (M48) SPADE DRILL

## PREMIUM COBALT (M48) SPADE DRILL

| Series<br>Min.to<br>Max<br>(mm/inch)                | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAlN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. | Series<br>Min.to<br>Max<br>(mm/inch)                 | Diameter       |                |                   | TiN<br>Coated<br>EDP NO. | TiAlN<br>Coated<br>EDP NO. | Hardslick<br>Coated<br>EDP NO. |
|---|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|--|----------------|----------------|-------------------|--------------------------|----------------------------|--------------------------------|
|   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                          |                            |                                |
| 1<br><br>17.53<br>(.690")<br>to<br>24.38<br>(.960") | 45/64"         | 17.86          | .7031"            | S11101                   | S13101                     | S14101                         | 2<br><br>24.41<br>(.961")<br>to<br>35.05<br>(1.380") | 31/32"         | 24.61          | .9688"            | S11201                   | S13201                     | S14201                         |
|   |                | 18.00          | .7087"            | S11102                   | S13102                     | S14102                         |  | 63/64"         | 25.00          | .9843"            | S11202                   | S13202                     | S14202                         |
|   | 23/32"         | 18.26          | .7188"            | S11103                   | S13103                     | S14103                         |  | 1"             | 25.40          | 1.0000"           | S11203                   | S13203                     | S14203                         |
|   |                | 18.50          | .7283"            | S11104                   | S13104                     | S14104                         |  | 1-1/64"        | 25.80          | 1.0156"           | S11204                   | S13204                     | S14204                         |
|   | 47/64"         | 18.65          | .7344"            | S11105                   | S13105                     | S14105                         |  |                | 26.00          | 1.0236"           | S11205                   | S13205                     | S14205                         |
|   |                | 19.00          | .7480"            | S11106                   | S13106                     | S14106                         |  | 1-1/32"        | 26.19          | 1.0312"           | S11206                   | S13206                     | S14206                         |
|   | 3/4"           | 19.05          | .7500"            | S11107                   | S13107                     | S14107                         |  | 1-3/64"        | 26.59          | 1.0469"           | S11260                   | S13260                     | S14260                         |
|   | 49/64"         | 19.45          | .7656"            | S11108                   | S13108                     | S14108                         |  | 1-1/16"        | 26.99          | 1.0625"           | S11207                   | S13207                     | S14207                         |
|   |                | 19.50          | .7677"            | S11109                   | S13109                     | S14109                         |  |                | 27.00          | 1.0630"           | S11208                   | S13208                     | S14208                         |
|   | 25/32"         | 19.84          | .7812"            | S11110                   | S13110                     | S14110                         |  | 1-3/32"        | 27.78          | 1.0938"           | S11209                   | S13209                     | S14209                         |
|   |                | 20.00          | .7874"            | S11111                   | S13111                     | S14111                         |  |                | 28.00          | 1.1024"           | S11210                   | S13210                     | S14210                         |
|   | 51/64"         | 20.24          | .7969"            | S11160                   | S13160                     | S14160                         |  | 1-7/64"        | 28.18          | 1.1094"           | S11261                   | S13261                     | S14261                         |
|   |                | 20.50          | .8071"            | S11112                   | S13112                     | S14112                         |  | 1-1/8"         | 28.58          | 1.1250"           | S11211                   | S13211                     | S14211                         |
|   | 13/16"         | 20.64          | .8125"            | S11113                   | S13113                     | S14113                         |  |                | 29.00          | 1.1417"           | S11212                   | S13212                     | S14212                         |
|   |                | 21.00          | .8268"            | S11114                   | S13114                     | S14114                         |  | 1-5/32"        | 29.37          | 1.1562"           | S11213                   | S13213                     | S14213                         |
|   | 27/32"         | 21.43          | .8438"            | S11115                   | S13115                     | S14115                         |  |                | 30.00          | 1.1811"           | S11214                   | S13214                     | S14214                         |
|   | 55/64"         | 21.83          | .8594"            | S11161                   | S13161                     | S14161                         |  | 1-3/16"        | 30.16          | 1.1875"           | S11215                   | S13215                     | S14215                         |
|   |                | 22.00          | .8661"            | S11116                   | S13116                     | S14116                         |  | 1-7/32"        | 30.96          | 1.2188"           | S11216                   | S13216                     | S14216                         |
|   | 7/8"           | 22.23          | .8750"            | S11117                   | S13117                     | S14117                         |  |                | 31.00          | 1.2205"           | S11217                   | S13217                     | S14217                         |
|   | 57/64"         | 22.62          | .8906"            | S11162                   | S13162                     | S14162                         |  | 1-1/4"         | 31.75          | 1.2500"           | S11218                   | S13218                     | S14218                         |
|   |                | 23.00          | .9055"            | S11118                   | S13118                     | S14118                         |  |                | 32.00          | 1.2598"           | S11219                   | S13219                     | S14219                         |
|   | 29/32"         | 23.02          | .9062"            | S11119                   | S13119                     | S14119                         |  | 1-9/32"        | 32.54          | 1.2812"           | S11220                   | S13220                     | S14220                         |
|   | 59/64"         | 23.42          | .9219"            | S11120                   | S13120                     | S14120                         |  |                | 33.00          | 1.2992"           | S11221                   | S13221                     | S14221                         |
|   | 15/16"         | 23.81          | .9375"            | S11121                   | S13121                     | S14121                         |  | 1-5/16"        | 33.34          | 1.3125"           | S11222                   | S13222                     | S14222                         |
|   |                | 24.00          | .9449"            | S11122                   | S13122                     | S14122                         |  |                | 34.00          | 1.3386"           | S11223                   | S13223                     | S14223                         |

THROW-AWAY DRILL INSERT HOLDERS



# THROW-AWAY CARBIDE DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys.(C3)
- For general use in carbon steels and alloys steels.(C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals, copper, brass and aluminum.(C2)

| CARBIDE SPADE DRILL                           |                |                   |                          |                            |                          |                            |                          |                            |
|---|----------------|-------------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)          | Diameter       |                   | MULTI PURPOSE GEOMETRY   |                            |                          |                            | CAST IRON GEOMETRY       |                            |
|   |                |                   | C2                       |                            | C5                       |                            | C3                       |                            |
|   | Inch<br>Metric | Decimal<br>(inch) | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. |
| Y<br>.374"<br>to<br>.436"<br>(3/32")<br>Thick | 9.50mm         | .3740"            | * S21Y01                 | * S23Y01                   | * S26Y01                 | * S28Y01                   | * S16Y01                 | * S18Y01                   |
|   | 3/8"           | .3750"            | * S21Y02                 | * S23Y02                   | * S26Y02                 | * S28Y02                   | * S16Y02                 | * S18Y02                   |
|   | 9.80mm         | .3858"            | * S21Y03                 | * S23Y03                   | * S26Y03                 | * S28Y03                   | * S16Y03                 | * S18Y03                   |
|   | 25/64"         | .3906"            | * S21Y04                 | * S23Y04                   | * S26Y04                 | * S28Y04                   | * S16Y04                 | * S18Y04                   |
|   | 10mm           | .3937"            | * S21Y05                 | * S23Y05                   | * S26Y05                 | * S28Y05                   | * S16Y05                 | * S18Y05                   |
|   | 10.20mm        | .4016"            | * S21Y06                 | * S23Y06                   | * S26Y06                 | * S28Y06                   | * S16Y06                 | * S18Y06                   |
|   | 13/32"         | .4062"            | * S21Y07                 | * S23Y07                   | * S26Y07                 | * S28Y07                   | * S16Y07                 | * S18Y07                   |
|   | 10.50mm        | .4134"            | * S21Y08                 | * S23Y08                   | * S26Y08                 | * S28Y08                   | * S16Y08                 | * S18Y08                   |
|   | 27/64"         | .4219"            | * S21Y09                 | * S23Y09                   | * S26Y09                 | * S28Y09                   | * S16Y09                 | * S18Y09                   |
|   | 10.80mm        | .4252"            | * S21Y10                 | * S23Y10                   | * S26Y10                 | * S28Y10                   | * S16Y10                 | * S18Y10                   |
| Z<br>.437"<br>to<br>.510"<br>(3/32")<br>Thick | 11.00mm        | .4331"            | * S21Y11                 | * S23Y11                   | * S26Y11                 | * S28Y11                   | * S16Y11                 | * S18Y11                   |
|   | 7/16"          | .4375"            | * S21Z01                 | * S23Z01                   | * S26Z01                 | * S28Z01                   | * S16Z01                 | * S18Z01                   |
|   | 11.50mm        | .4528"            | * S21Z02                 | * S23Z02                   | * S26Z02                 | * S28Z02                   | * S16Z02                 | * S18Z02                   |
|   | 29/64"         | .4531"            | * S21Z03                 | * S23Z03                   | * S26Z03                 | * S28Z03                   | * S16Z03                 | * S18Z03                   |
|   | 15/32"         | .4688"            | * S21Z04                 | * S23Z04                   | * S26Z04                 | * S28Z04                   | * S16Z04                 | * S18Z04                   |
|   | 12mm           | .4724"            | * S21Z05                 | * S23Z05                   | * S26Z05                 | * S28Z05                   | * S16Z05                 | * S18Z05                   |
|   | 31/64"         | .4844"            | * S21Z06                 | * S23Z06                   | * S26Z06                 | * S28Z06                   | * S16Z06                 | * S18Z06                   |
|   | 12.50mm        | .4921"            | * S21Z07                 | * S23Z07                   | * S26Z07                 | * S28Z07                   | * S16Z07                 | * S18Z07                   |
| O<br>.511"<br>to<br>.695"<br>(1/8")<br>Thick  | 1/2"           | .5000"            | * S21Z08                 | * S23Z08                   | * S26Z08                 | * S28Z08                   | * S16Z08                 | * S18Z08                   |
|   | 13mm           | .5118"            | * S21001                 | * S23001                   | * S26001                 | * S28001                   | * S16001                 | * S18001                   |
|   | 33/64"         | .5156"            | * S21002                 | * S23002                   | * S26002                 | * S28002                   | * S16002                 | * S18002                   |
|   | 17/32"         | .5312"            | * S21003                 | * S23003                   | * S26003                 | * S28003                   | * S16003                 | * S18003                   |
|   | 13.50mm        | .5315"            | * S21004                 | * S23004                   | * S26004                 | * S28004                   | * S16004                 | * S18004                   |
|   | 35/64"         | .5469"            | * S21060                 | * S23060                   | * S26060                 | * S28060                   | * S16060                 | * S18060                   |
|   | 14mm           | .5512"            | * S21005                 | * S23005                   | * S26005                 | * S28005                   | * S16005                 | * S18005                   |
|   | 9/16"          | .5625"            | * S21006                 | * S23006                   | * S26006                 | * S28006                   | * S16006                 | * S18006                   |
|   | 14.50mm        | .5709"            | * S21007                 | * S23007                   | * S26007                 | * S28007                   | * S16007                 | * S18007                   |
|   | 37/64"         | .5781"            | * S21008                 | * S23008                   | * S26008                 | * S28008                   | * S16008                 | * S18008                   |
|   | 15mm           | .5906"            | * S21009                 | * S23009                   | * S26009                 | * S28009                   | * S16009                 | * S18009                   |
|   | 19/32"         | .5938"            | * S21010                 | * S23010                   | * S26010                 | * S28010                   | * S16010                 | * S18010                   |
|   | 39/64"         | .6094"            | * S21061                 | * S23061                   | * S26061                 | * S28061                   | * S16061                 | * S18061                   |
|   | 15.50mm        | .6102"            | * S21011                 | * S23011                   | * S26011                 | * S28011                   | * S16011                 | * S18011                   |
|   | 15.70mm        | .6181"            | * S21064                 | * S23064                   | * S26064                 | * S28064                   | * S16064                 | * S18064                   |
|   | 5/8"           | .6250"            | * S21012                 | * S23012                   | * S26012                 | * S28012                   | * S16012                 | * S18012                   |
|   | 16mm           | .6299"            | * S21013                 | * S23013                   | * S26013                 | * S28013                   | * S16013                 | * S18013                   |
|   | 41/64"         | .6406"            | * S21062                 | * S23062                   | * S26062                 | * S28062                   | * S16062                 | * S18062                   |
|   | 16.50mm        | .6496"            | * S21014                 | * S23014                   | * S26014                 | * S28014                   | * S16014                 | * S18014                   |
|   | 21/32"         | .6563"            | * S21015                 | * S23015                   | * S26015                 | * S28015                   | * S16015                 | * S18015                   |
|   | 17mm           | .6692"            | * S21016                 | * S23016                   | * S26016                 | * S28016                   | * S16016                 | * S18016                   |
|   | 43/64"         | .6719"            | * S21063                 | * S23063                   | * S26063                 | * S28063                   | * S16063                 | * S18063                   |
|   | 11/16"         | .6875"            | * S21017                 | * S23017                   | * S26017                 | * S28017                   | * S16017                 | * S18017                   |
|   | 17.50mm        | .6890"            | * S21018                 | * S23018                   | * S26018                 | * S28018                   | * S16018                 | * S18018                   |

\* 2pcs per package



● Point angle

- under 2 1/2 : 132 degree
- over 2 1/2 : 144 degree

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys.(C3)
- For general use in carbon steels and alloys steels.(C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals, copper, brass and aluminum.(C2)

## CARBIDE SPADE DRILL

| Series<br>Min.to<br>Max<br>(mm/inch)           | Diameter       |                   | MULTI PURPOSE GEOMETRY   |                            |                          |                            | CAST IRON GEOMETRY       |                            |
|--|----------------|-------------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|
|  |                |                   | C2                       |                            | C5                       |                            | C3                       |                            |
|  | Inch<br>Metric | Decimal<br>(inch) | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAIN<br>Coated<br>EDP NO. |
| 1<br>.690"<br>to<br>.960"<br>(5/32")<br>Thick  | 45/64"         | .7031"            | S21101                   | S23101                     | S26101                   | S28101                     | S16101                   | S18101                     |
|  | 18mm           | .7087"            | S21102                   | S23102                     | S26102                   | S28102                     | S16102                   | S18102                     |
|  | 23/32"         | .7188"            | S21103                   | S23103                     | S26103                   | S28103                     | S16103                   | S18103                     |
|  | 18.50mm        | .7283"            | S21104                   | S23104                     | S26104                   | S28104                     | S16104                   | S18104                     |
|  | 47/64"         | .7344"            | S21105                   | S23105                     | S26105                   | S28105                     | S16105                   | S18105                     |
|  | 19mm           | .7480"            | S21106                   | S23106                     | S26106                   | S28106                     | S16106                   | S18106                     |
|  | 3/4"           | .7500"            | S21107                   | S23107                     | S26107                   | S28107                     | S16107                   | S18107                     |
|  | 49/64"         | .7656"            | S21108                   | S23108                     | S26108                   | S28108                     | S16108                   | S18108                     |
|  | 19.50mm        | .7677"            | S21109                   | S23109                     | S26109                   | S28109                     | S16109                   | S18109                     |
|  | 25/32"         | .7812"            | S21110                   | S23110                     | S26110                   | S28110                     | S16110                   | S18110                     |
|  | 20mm           | .7874"            | S21111                   | S23111                     | S26111                   | S28111                     | S16111                   | S18111                     |
|  | 51/64"         | .7969"            | S21160                   | S23160                     | S26160                   | S28160                     | S16160                   | S18160                     |
|  | 20.50mm        | .8071"            | S21112                   | S23112                     | S26112                   | S28112                     | S16112                   | S18112                     |
|  | 13/16"         | .8125"            | S21113                   | S23113                     | S26113                   | S28113                     | S16113                   | S18113                     |
|  | 21mm           | .8268"            | S21114                   | S23114                     | S26114                   | S28114                     | S16114                   | S18114                     |
|  | 27/32"         | .8438"            | S21115                   | S23115                     | S26115                   | S28115                     | S16115                   | S18115                     |
|  | 55/64"         | .8594"            | S21161                   | S23161                     | S26161                   | S28161                     | S16161                   | S18161                     |
|  | 22mm           | .8661"            | S21116                   | S23116                     | S26116                   | S28116                     | S16116                   | S18116                     |
|  | 7/8"           | .8750"            | S21117                   | S23117                     | S26117                   | S28117                     | S16117                   | S18117                     |
|  | 57/64"         | .8906"            | S21162                   | S23162                     | S26162                   | S28162                     | S16162                   | S18162                     |
|  | 23mm           | .9055"            | S21118                   | S23118                     | S26118                   | S28118                     | S16118                   | S18118                     |
|  | 29/32"         | .9062"            | S21119                   | S23119                     | S26119                   | S28119                     | S16119                   | S18119                     |
|  | 59/64"         | .9219"            | S21120                   | S23120                     | S26120                   | S28120                     | S16120                   | S18120                     |
|  | 15/16"         | .9375"            | S21121                   | S23121                     | S26121                   | S28121                     | S16121                   | S18121                     |
|  | 24mm           | .9449"            | S21122                   | S23122                     | S26122                   | S28122                     | S16122                   | S18122                     |
| 2<br>.961"<br>to<br>1.380"<br>(3/16")<br>Thick | 31/32"         | .9688"            | S21201                   | S23201                     | S26201                   | S28201                     | S16201                   | S18201                     |
|  | 63/64"         | .9843"            | S21202                   | S23202                     | S26202                   | S28202                     | S16202                   | S18202                     |
|  | 1"             | 1.0000"           | S21203                   | S23203                     | S26203                   | S28203                     | S16203                   | S18203                     |
|  | 1-1/64"        | 1.0156"           | S21204                   | S23204                     | S26204                   | S28204                     | S16204                   | S18204                     |
|  | 26mm           | 1.0236"           | S21205                   | S23205                     | S26205                   | S28205                     | S16205                   | S18205                     |
|  | 1-1/32"        | 1.0312"           | S21206                   | S23206                     | S26206                   | S28206                     | S16206                   | S18206                     |
|  | 1-3/64"        | 1.0469"           | S21260                   | S23260                     | S26260                   | S28260                     | S16260                   | S18260                     |
|  | 1-1/16"        | 1.0625"           | S21207                   | S23207                     | S26207                   | S28207                     | S16207                   | S18207                     |
|  | 27mm           | 1.0630"           | S21208                   | S23208                     | S26208                   | S28208                     | S16208                   | S18208                     |
|  | 1-3/32"        | 1.0938"           | S21209                   | S23209                     | S26209                   | S28209                     | S16209                   | S18209                     |
|  | 28mm           | 1.1024"           | S21210                   | S23210                     | S26210                   | S28210                     | S16210                   | S18210                     |
|  | 1-7/64"        | 1.1094"           | S21261                   | S23261                     | S26261                   | S28261                     | S16261                   | S18261                     |
|  | 1-1/8"         | 1.1250"           | S21211                   | S23211                     | S26211                   | S28211                     | S16211                   | S18211                     |
|  | 29mm           | 1.1417"           | S21212                   | S23212                     | S26212                   | S28212                     | S16212                   | S18212                     |
|  | 1-5/32"        | 1.1562"           | S21213                   | S23213                     | S26213                   | S28213                     | S16213                   | S18213                     |
|  | 30mm           | 1.1811"           | S21214                   | S23214                     | S26214                   | S28214                     | S16214                   | S18214                     |
|  | 1-3/16"        | 1.1875"           | S21215                   | S23215                     | S26215                   | S28215                     | S16215                   | S18215                     |



# THROW-AWAY CARBIDE DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- High performance on Gray cast iron over 220 Brinell, malleable cast iron with short chips, silicon aluminum and copper alloys.(C3)
- For general use in carbon steels and alloys steels.(C5)
- For use in Gray cast iron up to 220 Brinell, nonferrous metals, copper, brass and aluminum.(C2)

| CARBIDE SPADE DRILL                            |                |                   |                          |                            |                          |                            |                          |                            |
|--|----------------|-------------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|
| Series<br>Min.to<br>Max<br>(mm/inch)           | Diameter       |                   | MULTI PURPOSE GEOMETRY   |                            |                          |                            | CAST IRON GEOMETRY       |                            |
|  |                |                   | C2                       |                            | C5                       |                            | C3                       |                            |
|  | Inch<br>Metric | Decimal<br>(inch) | TiN<br>Coated<br>EDP NO. | TiAlN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAlN<br>Coated<br>EDP NO. | TiN<br>Coated<br>EDP NO. | TiAlN<br>Coated<br>EDP NO. |
| 2<br>.961"<br>to<br>1.380"<br>(3/16")<br>Thick | 1-7/32"        | 1.2188"           | S21216                   | S23216                     | S26216                   | S28216                     | S16216                   | S18216                     |
|  | 31mm           | 1.2205"           | S21217                   | S23217                     | S26217                   | S28217                     | S16217                   | S18217                     |
|  | 1-1/4"         | 1.2500"           | S21218                   | S23218                     | S26218                   | S28218                     | S16218                   | S18218                     |
|  | 32mm           | 1.2598"           | S21219                   | S23219                     | S26219                   | S28219                     | S16219                   | S18219                     |
|  | 1-9/32"        | 1.2812"           | S21220                   | S23220                     | S26220                   | S28220                     | S16220                   | S18220                     |
|  | 33mm           | 1.2992"           | S21221                   | S23221                     | S26221                   | S28221                     | S16221                   | S18221                     |
|  | 1-5/16"        | 1.3125"           | S21222                   | S23222                     | S26222                   | S28222                     | S16222                   | S18222                     |
|  | 34mm           | 1.3386"           | S21223                   | S23223                     | S26223                   | S28223                     | S16223                   | S18223                     |
|  | 1-11/32"       | 1.3438"           | S21224                   | S23224                     | S26224                   | S28224                     | S16224                   | S18224                     |
|  | 1-3/8"         | 1.3750"           | S21225                   | S23225                     | S26225                   | S28225                     | S16225                   | S18225                     |
|  | 35mm           | 1.3780"           | S21226                   | S23226                     | S26226                   | S28226                     | S16226                   | S18226                     |
| 3<br>1.353"<br>to<br>1.882"<br>(1/4")<br>Thick | 1-13/32"       | 1.4062"           | S21301                   | S23301                     | S26301                   | S28301                     |                          |                            |
|  | 36mm           | 1.4173"           | S21302                   | S23302                     | S26302                   | S28302                     |                          |                            |
|  | 1-7/16"        | 1.4375"           | S21303                   | S23303                     | S26303                   | S28303                     |                          |                            |
|  | 37mm           | 1.4567"           | S21304                   | S23304                     | S26304                   | S28304                     |                          |                            |
|  | 1-15/32"       | 1.4688"           | S21305                   | S23305                     | S26305                   | S28305                     |                          |                            |
|  | 38mm           | 1.4961"           | S21306                   | S23306                     | S26306                   | S28306                     |                          |                            |
|  | 1-11/2"        | 1.5000"           | S21307                   | S23307                     | S26307                   | S28307                     |                          |                            |
|  | 1-17/32"       | 1.5312"           | S21308                   | S23308                     | S26308                   | S28308                     |                          |                            |
|  | 39mm           | 1.5354"           | S21309                   | S23309                     | S26309                   | S28309                     |                          |                            |
|  | 1-9/16"        | 1.5938"           | S21310                   | S23310                     | S26310                   | S28310                     |                          |                            |
|  | 40mm           | 1.5748"           | S21311                   | S23311                     | S26311                   | S28311                     |                          |                            |
|  | 1-19/32"       | 1.5938"           | S21312                   | S23312                     | S26312                   | S28312                     |                          |                            |
|  | 41mm           | 1.6142"           | S21313                   | S23313                     | S26313                   | S28313                     |                          |                            |
|  | 1-5/8"         | 1.6250"           | S21314                   | S23314                     | S26314                   | S28314                     |                          |                            |
|  | 42mm           | 1.6535"           | S21315                   | S23315                     | S26315                   | S28315                     |                          |                            |
|  | 1-21/32"       | 1.6562"           | S21316                   | S23316                     | S26316                   | S28316                     |                          |                            |
|  | 1-11/16"       | 1.6875"           | S21317                   | S23317                     | S26317                   | S28317                     |                          |                            |
|  | 43mm           | 1.6929"           | S21318                   | S23318                     | S26318                   | S28318                     |                          |                            |
|  | 1-23/32"       | 1.7188"           | S21319                   | S23319                     | S26319                   | S28319                     |                          |                            |
|  | 44mm           | 1.7323"           | S21320                   | S23320                     | S26320                   | S28320                     |                          |                            |
|  | 1-3/4"         | 1.7500"           | S21321                   | S23321                     | S26321                   | S28321                     |                          |                            |
|  | 45mm           | 1.7717"           | S21322                   | S23322                     | S26322                   | S28322                     |                          |                            |
|  | 1-25/32"       | 1.7812"           | S21323                   | S23323                     | S26323                   | S28323                     |                          |                            |
|  | 46mm           | 1.8110"           | S21324                   | S23324                     | S26324                   | S28324                     |                          |                            |
|  | 1-13/16"       | 1.8125"           | S21325                   | S23325                     | S26325                   | S28325                     |                          |                            |
|  | 1-27/32"       | 1.8438"           | S21326                   | S23326                     | S26326                   | S28326                     |                          |                            |
|  | 47mm           | 1.8504"           | S21327                   | S23327                     | S26327                   | S28327                     |                          |                            |
|  | 1-7/8"         | 1.8750"           | S21328                   | S23328                     | S26328                   | S28328                     |                          |                            |

SPECIAL  
 OR  
 NON-  
 STANDARD  
 DRILLS  
 AVAILABLE  
 ON  
 REQUEST





# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

| SUPER COBALT (T15) SM-Point DRILL                          |                |                |                   | SUPER COBALT (T15) SM-Point DRILL |   |                |                |                   |                            |
|--|----------------|----------------|-------------------|-----------------------------------|---|----------------|----------------|-------------------|----------------------------|
| Series<br>Min.to Max<br>(mm/inch)                          | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO.        | Series<br>Min.to Max<br>(mm/inch)                           | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO. |
|  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                                   |   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                            |
| <b>Y</b><br><br>9.50<br>(.374")<br>to<br>11.07<br>(.436")  |                | 9.50           | .3740"            | *SM08Y01                          | <b>1</b><br><br>17.53<br>(.690")<br>to<br>24.38<br>(.960")  | 45/64"         | 17.86          | .7031"            | SM08101                    |
|  | 3/8"           | 9.53           | .3750"            | *SM08Y02                          |   | 18.00          | .7087"         | SM08102           |                            |
|  |                | 9.80           | .3858"            | *SM08Y03                          |   | 23/32"         | 18.26          | .7188"            | SM08103                    |
|  | 25/64"         | 9.92           | .3906"            | *SM08Y04                          |   | 18.50          | .7283"         | SM08104           |                            |
|  |                | 10.00          | .3937"            | *SM08Y05                          |   | 47/64"         | 18.65          | .7344"            | SM08105                    |
|  |                | 10.20          | .4016"            | *SM08Y06                          |   | 19.00          | .7480"         | SM08106           |                            |
|  | 13/32"         | 10.32          | .4062"            | *SM08Y07                          |   | 3/4"           | 19.05          | .7500"            | SM08107                    |
|  |                | 10.50          | .4134"            | *SM08Y08                          |   | 49/64"         | 19.45          | .7656"            | SM08108                    |
|  | 27/64"         | 10.72          | .4219"            | *SM08Y09                          |   | 19.50          | .7677"         | SM08109           |                            |
|  |                | 10.80          | .4252"            | *SM08Y10                          |   | 25/32"         | 19.84          | .7812"            | SM08110                    |
|  |                | 11.00          | .4331"            | *SM08Y11                          |   | 20.00          | .7874"         | SM08111           |                            |
| <b>Z</b><br><br>11.11<br>(.437")<br>to<br>12.95<br>(.510") | 7/16"          | 11.11          | .4375"            | *SM08Z01                          | <b>1</b><br><br>17.53<br>(.690")<br>to<br>24.38<br>(.960")  | 51/64"         | 20.24          | .7969"            | SM08160                    |
|  |                | 11.50          | .4528"            | *SM08Z02                          |   | 20.50          | .8071"         | SM08112           |                            |
|  | 29/64"         | 11.51          | .4531"            | *SM08Z03                          |   | 13/16"         | 20.64          | .8125"            | SM08113                    |
|  | 15/32"         | 11.91          | .4688"            | *SM08Z04                          |   | 21.00          | .8268"         | SM08114           |                            |
|  |                | 12.00          | .4724"            | *SM08Z05                          |   | 27/32"         | 21.43          | .8438"            | SM08115                    |
|  | 31/64"         | 12.30          | .4844"            | *SM08Z06                          |   | 55/64"         | 21.83          | .8594"            | SM08161                    |
|  |                | 12.50          | .4921"            | *SM08Z07                          |   | 22.00          | .8661"         | SM08116           |                            |
|  | 1/2"           | 12.70          | .5000"            | *SM08Z08                          |   | 7/8"           | 22.23          | .8750"            | SM08117                    |
| <b>0</b><br><br>12.98<br>(.511")<br>to<br>17.65<br>(.695") |                | 13.00          | .5118"            | *SM08001                          | <b>2</b><br><br>24.41<br>(.961")<br>to<br>35.05<br>(1.380") | 57/64"         | 22.62          | .8906"            | SM08201                    |
|  | 33/64"         | 13.10          | .5156"            | *SM08002                          |   | 23.00          | .9055"         | SM08118           |                            |
|  | 17/32"         | 13.49          | .5312"            | *SM08003                          |   | 29/32"         | 23.02          | .9062"            | SM08119                    |
|  |                | 13.50          | .5315"            | *SM08004                          |   | 59/64"         | 23.42          | .9219"            | SM08120                    |
|  | 35/64"         | 13.89          | .5469"            | *SM08060                          |   | 15/16"         | 23.81          | .9375"            | SM08121                    |
|  |                | 14.00          | .5512"            | *SM08005                          |   | 24.00          | .9449"         | SM08122           |                            |
|  | 9/16"          | 14.29          | .5625"            | *SM08006                          |   | 31/32"         | 24.61          | .9688"            | SM08201                    |
|  |                | 14.50          | .5709"            | *SM08007                          |   | 63/64"         | 25.00          | .9843"            | SM08202                    |
|  | 37/64"         | 14.68          | .5781"            | *SM08008                          |   | 1"             | 25.40          | 1.0000"           | SM08203                    |
|  |                | 15.00          | .5906"            | *SM08009                          |   | 1-1/64"        | 25.80          | 1.0156"           | SM08204                    |
|  | 19/32"         | 15.08          | .5938"            | *SM08010                          |   | 26.00          | 1.0236"        | SM08205           |                            |
|  | 39/64"         | 15.48          | .6094"            | *SM08061                          |   | 1-1/32"        | 26.19          | 1.0312"           | SM08206                    |
|  |                | 15.50          | .6102"            | *SM08011                          |   | 1-3/64"        | 26.59          | 1.0469"           | SM08260                    |
|  | 5/8"           | 15.88          | .6250"            | *SM08012                          |   | 1-1/16"        | 26.99          | 1.0625"           | SM08207                    |
|  |                | 16.00          | .6299"            | *SM08013                          |   | 27.00          | 1.0630"        | SM08208           |                            |
|  | 41/64"         | 16.27          | .6406"            | *SM08062                          |   | 1-3/32"        | 27.78          | 1.0938"           | SM08209                    |
|  |                | 16.50          | .6496"            | *SM08014                          |   | 28.00          | 1.1024"        | SM08210           |                            |
|  | 21/32"         | 16.67          | .6562"            | *SM08015                          |   | 1-7/64"        | 28.18          | 1.1094"           | SM08261                    |
|  |                | 17.00          | .6693"            | *SM08016                          |   | 1-1/8"         | 28.58          | 1.1250"           | SM08211                    |
|  | 43/64"         | 17.07          | .6719"            | *SM08063                          |   | 29.00          | 1.1417"        | SM08212           |                            |
|  | 11/16"         | 17.46          | .6875"            | *SM08017                          |   | 1-5/32"        | 29.37          | 1.1562"           | SM08213                    |
|  |                | 17.50          | .6890"            | *SM08018                          |   | 30.00          | 1.1811"        | SM08214           |                            |

\* 2pcs per package



# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

| SUPER COBALT (T15) SM-Point DRILL                     |                |                |                   | SUPER COBALT (T15) SM-Point DRILL |  |                |                |                   |                            |
|---|----------------|----------------|-------------------|-----------------------------------|--|----------------|----------------|-------------------|----------------------------|
| Series<br>Min.to Max<br>(mm/inch)                     | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO.        | Series<br>Min.to Max<br>(mm/inch)            | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO. |
|   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                                   |  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                            |
| 2<br><br>24.41<br>(.961")<br>to<br>35.05<br>(1.380")  | 1-3/16"        | 30.16          | 1.1875"           | SM08215                           | 46.99<br>(1.850")<br>to<br>65.28<br>(2.570") |                | 48.00          | 1.8898"           | SM08401                    |
|   | 1-7/32"        | 30.96          | 1.2188"           | SM08216                           |  | 1-29/32"       | 48.42          | 1.9062"           | SM08402                    |
|   |                | 31.00          | 1.2205"           | SM08217                           |  |                | 49.00          | 1.9291"           | SM08403                    |
|   | 1-1/4"         | 31.75          | 1.2500"           | SM08218                           |  | 1-15/16"       | 49.21          | 1.9375"           | SM08404                    |
|   |                | 32.00          | 1.2598"           | SM08219                           |  |                | 50.00          | 1.9685"           | SM08405                    |
|   | 1-9/32"        | 32.54          | 1.2812"           | SM08220                           |  | 1-31/32"       | 50.01          | 1.9688"           | SM08406                    |
|   |                | 33.00          | 1.2992"           | SM08221                           |  | 2"             | 50.80          | 2.0000"           | SM08407                    |
|   | 1-5/16"        | 33.34          | 1.3125"           | SM08222                           |  |                | 51.00          | 2.0079"           | SM08408                    |
|   |                | 34.00          | 1.3386"           | SM08223                           |  | 2-1/32"        | 51.59          | 2.0312"           | SM08409                    |
|   | 1-11/32"       | 34.13          | 1.3438"           | SM08224                           |  | 2-3/64"        | 52.00          | 2.0472"           | SM08410                    |
|   | 1-3/8"         | 34.93          | 1.3750"           | SM08225                           |  | 2-1/16"        | 52.39          | 2.0625"           | SM08411                    |
|   |                | 35.00          | 1.3780"           | SM08226                           |  |                | 53.00          | 2.0866"           | SM08412                    |
|   | 1-13/32"       | 35.72          | 1.4062"           | SM08301                           |  | 2-3/32"        | 53.18          | 2.0938"           | SM08413                    |
|   |                | 36.00          | 1.4173"           | SM08302                           |  | 2-1/8"         | 53.98          | 2.1250"           | SM08414                    |
| 3<br><br>34.37<br>(1.353")<br>to<br>47.80<br>(1.882") | 1-7/16"        | 36.51          | 1.4375"           | SM08303                           |  |                | 54.00          | 2.1260"           | SM08415                    |
|   |                | 37.00          | 1.4567"           | SM08304                           |  | 2-5/32"        | 54.79          | 2.1562"           | SM08416                    |
|   | 1-15/32"       | 37.31          | 1.4688"           | SM08305                           |  |                | 55.00          | 2.1654"           | SM08417                    |
|   |                | 38.00          | 1.4961"           | SM08306                           |  | 2-3/16"        | 55.56          | 2.1875"           | SM08418                    |
|   | 1-1/2"         | 38.10          | 1.5000"           | SM08307                           |  |                | 56.00          | 2.2047"           | SM08419                    |
|   | 1-17/32"       | 38.89          | 1.5312"           | SM08308                           |  | 2-7/32"        | 56.36          | 2.2188"           | SM08420                    |
|   |                | 39.00          | 1.5354"           | SM08309                           |  |                | 57.00          | 2.2441"           | SM08421                    |
|   | 1-9/16"        | 39.69          | 1.5625"           | SM08310                           |  | 2-1/4"         | 57.15          | 2.2500"           | SM08422                    |
|   |                | 40.00          | 1.5748"           | SM08311                           |  | 2-9/32"        | 57.94          | 2.2812"           | SM08423                    |
|   | 1-19/32"       | 40.48          | 1.5938"           | SM08312                           |  |                | 58.00          | 2.2835"           | SM08424                    |
|   |                | 41.00          | 1.6142"           | SM08313                           |  | 2-5/16"        | 58.74          | 2.3125"           | SM08425                    |
|   | 1-5/8"         | 41.28          | 1.6250"           | SM08314                           |  |                | 59.00          | 2.3228"           | SM08426                    |
|   |                | 42.00          | 1.6535"           | SM08315                           |  | 2-11/32"       | 59.53          | 2.3438"           | SM08427                    |
|   | 1-21/32"       | 42.07          | 1.6562"           | SM08316                           |  |                | 60.00          | 2.3622"           | SM08428                    |
|   | 1-11/16"       | 42.86          | 1.6875"           | SM08317                           |  | 2-3/8"         | 60.33          | 2.3750"           | SM08429                    |
|   |                | 43.00          | 1.6929"           | SM08318                           |  |                | 61.00          | 2.4016"           | SM08430                    |
|   | 1-23/32"       | 43.66          | 1.7188"           | SM08319                           |  | 2-13/32"       | 61.12          | 2.4062"           | SM08431                    |
|   |                | 44.00          | 1.7323"           | SM08320                           |  | 2-7/16"        | 61.91          | 2.4375"           | SM08432                    |
|   | 1-3/4"         | 44.45          | 1.7500"           | SM08321                           |  |                | 62.00          | 2.4409"           | SM08433                    |
|   |                | 45.00          | 1.7717"           | SM08322                           |  | 2-15/32"       | 62.71          | 2.4688"           | SM08434                    |
|   | 1-25/32"       | 45.24          | 1.7812"           | SM08323                           |  |                | 63.00          | 2.4803"           | SM08435                    |
|   |                | 46.00          | 1.8110"           | SM08324                           |  | 2-1/2"         | 63.50          | 2.5000"           | SM08436                    |
|   | 1-13/16"       | 46.04          | 1.8125"           | SM08325                           |  |                | 64.00          | 2.5197"           | SM08437                    |
|   | 1-27/32"       | 46.83          | 1.8438"           | SM08326                           |  | 2-17/32"       | 64.29          | 2.5312"           | SM08438                    |
|   |                | 47.00          | 1.8504"           | SM08327                           |  |                | 65.00          | 2.5591"           | SM08439                    |
|   | 1-7/8"         | 47.63          | 1.8750"           | SM08328                           |  | 2-9/16"        | 65.09          | 2.5625"           | SM08440                    |

THROW-AWAY DRILL INSERT HOLDERS



# THROW-AWAY SUPER COBALT(T15) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

| SUPER COBALT (T15) SM-Point DRILL                     |                |                |                   | SUPER COBALT (T15) SM-Point DRILL |   |                |                |                   |                            |
|---|----------------|----------------|-------------------|-----------------------------------|---|----------------|----------------|-------------------|----------------------------|
| Series<br>Min.to Max<br>(mm/inch)                     | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO.        | Series<br>Min.to Max<br>(mm/inch)                       | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO. |
|   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                                   |   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                            |
| 5<br><br>62.38<br>(2.456")<br>to<br>76.20<br>(3.000") | 2-1/2"         | 63.50          | 2.5000"           | SM08501                           | 7<br><br>87.76<br>(3.455")<br>to<br>101.60<br>(4.000")  | 3-7/16"        | 87.31          | 3.4375"           | SM08619                    |
|   |                | 64.00          | 2.5197"           | SM08502                           |   |                | 88.00          | 3.4646"           | SM08620                    |
|   | 2-17/32"       | 64.29          | 2.5312"           | SM08503                           |   | 3-15/32"       | 88.11          | 3.4688"           | SM08621                    |
|   | 2-9/16"        | 65.09          | 2.5625"           | SM08504                           |   | 3-1/2"         | 88.90          | 3.5000"           | SM08622                    |
|   | 2-19/32"       | 65.88          | 2.5938"           | SM08505                           |   | 3-17/32"       | 89.69          | 3.5312"           | SM08701                    |
|   |                | 66.00          | 2.5984"           | SM08506                           |   |                | 90.00          | 3.5433"           | SM08702                    |
|   | 2-5/8"         | 66.68          | 2.6250"           | SM08507                           |   | 3-9/16"        | 90.49          | 3.5625"           | SM08703                    |
|   | 2-21/32"       | 67.47          | 2.6562"           | SM08508                           |   | 3-19/32"       | 91.28          | 3.5938"           | SM08704                    |
|   |                | 68.00          | 2.6772"           | SM08509                           |   |                | 92.00          | 3.6221"           | SM08705                    |
|   | 2-11/16"       | 68.26          | 2.6875"           | SM08510                           |   | 3-5/8"         | 92.08          | 3.6250"           | SM08706                    |
|   | 2-23/32"       | 69.05          | 2.7188"           | SM08511                           |   | 3-21/32"       | 92.87          | 3.6562"           | SM08707                    |
|   | 2-3/4"         | 69.85          | 2.7500"           | SM08512                           |   | 3-11/16"       | 93.66          | 3.6875"           | SM08708                    |
|   |                | 70.00          | 2.7559"           | SM08513                           |   |                | 94.00          | 3.7008"           | SM08709                    |
|   | 2-25/32"       | 70.64          | 2.7812"           | SM08514                           |   | 3-23/32"       | 94.46          | 3.7188"           | SM08710                    |
|   | 2-13/16"       | 71.44          | 2.8125"           | SM08515                           |   | 3-3/4"         | 95.25          | 3.7500"           | SM08711                    |
|   |                | 72.00          | 2.8346"           | SM08516                           |   |                | 96.00          | 3.7795"           | SM08712                    |
|   | 2-27/32"       | 72.23          | 2.8438"           | SM08517                           |   | 3-25/32"       | 96.04          | 3.7812"           | SM08713                    |
|   | 2-7/8"         | 73.03          | 2.8750"           | SM08518                           |   | 3-13/16"       | 96.84          | 3.8125"           | SM08714                    |
|   | 2-29/32"       | 73.82          | 2.9062"           | SM08519                           |   | 3-27/32"       | 97.63          | 3.8438"           | SM08715                    |
| 6<br><br>76.23<br>(3.001")<br>to<br>89.08<br>(3.507") |                | 74.00          | 2.9134"           | SM08520                           |   |                | 98.00          | 3.8583"           | SM08716                    |
|   | 2-15/16"       | 74.61          | 2.9375"           | SM08521                           |   | 3-7/8"         | 98.43          | 3.8750"           | SM08717                    |
|   | 2-31/32"       | 75.41          | 2.9688"           | SM08522                           |   | 3-29/32"       | 99.22          | 3.9062"           | SM08718                    |
|   |                | 76.00          | 2.9921"           | SM08523                           |   |                | 100.00         | 3.9370"           | SM08719                    |
|   | 3"             | 76.20          | 3.0000"           | SM08524                           |   | 3-15/16"       | 100.01         | 3.9375"           | SM08720                    |
|   | 3-1/32"        | 76.99          | 3.0312"           | SM08601                           | 8<br><br>101.63<br>(4.001")<br>to<br>114.48<br>(4.507") | 3-31/32"       | 100.81         | 3.9688"           | SM08721                    |
|   | 3-1/16"        | 77.79          | 3.0625"           | SM08602                           |   | 4"             | 101.60         | 4.0000"           | SM08722                    |
|   |                | 78.00          | 3.0709"           | SM08603                           |   | 4-1/64"        | 102.00         | 4.0156"           | SM08801                    |
|   | 3-3/32"        | 78.58          | 3.0938"           | SM08604                           |   | 4-1/16"        | 103.19         | 4.0625"           | SM08802                    |
|   | 3-1/8"         | 79.38          | 3.1250"           | SM08605                           |   | 4-3/32"        | 104.00         | 4.0945"           | SM08803                    |
|   |                | 80.00          | 3.1496"           | SM08606                           |   | 4-1/8"         | 104.78         | 4.1250"           | SM08804                    |
|   | 3-5/32"        | 80.17          | 3.1562"           | SM08607                           |   |                | 106.00         | 4.1732"           | SM08805                    |
|   | 3-3/16"        | 80.96          | 3.1875"           | SM08608                           |   | 4-3/16"        | 106.36         | 4.1875"           | SM08806                    |
|   | 3-7/32"        | 81.76          | 3.2188"           | SM08609                           |   | 4-1/4"         | 107.95         | 4.2500"           | SM08807                    |
|   |                | 82.00          | 3.2283"           | SM08610                           |   |                | 108.00         | 4.2520"           | SM08808                    |
|   | 3-1/4"         | 82.55          | 3.2500"           | SM08611                           |   | 4-5/16"        | 109.54         | 4.3125"           | SM08809                    |
|   | 3-9/32"        | 83.34          | 3.2812"           | SM08612                           |   |                | 110.00         | 4.3307"           | SM08810                    |
|   |                | 84.00          | 3.3071"           | SM08613                           |   | 4-3/8"         | 111.13         | 4.3750"           | SM08811                    |
|   | 3-5/16"        | 84.14          | 3.3125"           | SM08614                           |   |                | 112.00         | 4.4094"           | SM08812                    |
|   | 3-11/32"       | 84.93          | 3.3438"           | SM08615                           |   | 4-7/16"        | 112.71         | 4.4375"           | SM08813                    |
|   | 3-3/8"         | 85.73          | 3.3750"           | SM08616                           |   |                | 114.00         | 4.4882"           | SM08814                    |
|   |                | 86.00          | 3.3858"           | SM08617                           |   | 4-1/2"         | 114.30         | 4.5000"           | SM08815                    |
|   | 3-13/32"       | 86.52          | 3.4063"           | SM08618                           |   |                |                |                   |                            |

THROW-AWAY DRILL INSERT HOLDERS



# THROW-AWAY CARBIDE(C5) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

| CARBIDE (C5) SM-Point DRILL                         |                |                |                   | CARBIDE (C5) SM-Point DRILL |   |                |                |                   |                            |
|---|----------------|----------------|-------------------|-----------------------------|---|----------------|----------------|-------------------|----------------------------|
| Series<br>Min.to Max<br>(mm/inch)                   | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO.  | Series<br>Min.to Max<br>(mm/inch)                   | Diameter       |                |                   | TiAIN<br>Coated<br>EDP NO. |
|   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                             |   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                            |
| Y<br><br>9.50<br>(.374")<br>to<br>11.07<br>(.436")  |                | 9.50           | .3740"            | *SM28Y01                    | 0<br><br>12.98<br>(.511")<br>to<br>17.65<br>(.695") |                | 16.00          | .6299"            | *SM28013                   |
|   | 3/8"           | 9.53           | .3750"            | *SM28Y02                    |   | 41/64"         | 16.27          | .6406"            | *SM28062                   |
|   |                | 9.80           | .3858"            | *SM28Y03                    |   |                | 16.50          | .6496"            | *SM28014                   |
|   | 25/64"         | 9.92           | .3906"            | *SM28Y04                    |   | 21/32"         | 16.67          | .6562"            | *SM28015                   |
|   |                | 10.00          | .3937"            | *SM28Y05                    |   |                | 17.00          | .6693"            | *SM28016                   |
|   |                | 10.20          | .4016"            | *SM28Y06                    |   | 43/64"         | 17.07          | .6719"            | *SM28063                   |
|   | 13/32"         | 10.32          | .4062"            | *SM28Y07                    |   | 11/16"         | 17.46          | .6875"            | *SM28017                   |
|   |                | 10.50          | .4134"            | *SM28Y08                    |   |                | 17.50          | .6890"            | *SM28018                   |
|   | 27/64"         | 10.72          | .4219"            | *SM28Y09                    |   | 45/64"         | 17.86          | .7031"            | SM28101                    |
|   |                | 10.80          | .4252"            | *SM28Y10                    |   |                | 18.00          | .7087"            | SM28102                    |
|   |                | 11.00          | .4331"            | *SM28Y11                    |   | 23/32"         | 18.26          | .7188"            | SM28103                    |
| Z<br><br>11.11<br>(.437")<br>to<br>12.95<br>(.510") | 7/16"          | 11.11          | .4375"            | *SM28Z01                    | 1<br><br>17.53<br>(.690")<br>to<br>24.38<br>(.960") |                | 18.50          | .7283"            | SM28104                    |
|   |                | 11.50          | .4528"            | *SM28Z02                    |   | 47/64"         | 18.65          | .7344"            | SM28105                    |
|   | 29/64"         | 11.51          | .4531"            | *SM28Z03                    |   |                | 19.00          | .7480"            | SM28106                    |
|   | 15/32"         | 11.91          | .4688"            | *SM28Z04                    |   | 3/4"           | 19.05          | .7500"            | SM28107                    |
|   |                | 12.00          | .4724"            | *SM28Z05                    |   | 49/64"         | 19.45          | .7656"            | SM28108                    |
|   | 31/64"         | 12.30          | .4844"            | *SM28Z06                    |   |                | 19.50          | .7677"            | SM28109                    |
|   |                | 12.50          | .4921"            | *SM28Z07                    |   | 25/32"         | 19.84          | .7812"            | SM28110                    |
|   | 1/2"           | 12.70          | .5000"            | *SM28Z08                    |   |                | 20.00          | .7874"            | SM28111                    |
|   |                |                |                   |                             |   | 51/64"         | 20.24          | .7969"            | SM28160                    |
|   |                |                |                   |                             |   |                | 20.50          | .8071"            | SM28112                    |
| 0<br><br>12.98<br>(.511")<br>to<br>17.65<br>(.695") | 13.00          | .5118"         | *SM28001          |                             |   | 13/16"         | 20.64          | .8125"            | SM28113                    |
|   | 33/64"         | 13.10          | .5156"            | *SM28002                    |   |                | 21.00          | .8268"            | SM28114                    |
|   | 17/32"         | 13.49          | .5312"            | *SM28003                    |   | 27/32"         | 21.43          | .8438"            | SM28115                    |
|   |                | 13.50          | .5315"            | *SM28004                    |   | 55/64"         | 21.83          | .8594"            | SM28161                    |
|   | 35/64"         | 13.89          | .5469"            | *SM28060                    |   |                | 22.00          | .8661"            | SM28116                    |
|   |                | 14.00          | .5512"            | *SM28005                    |   | 7/8"           | 22.23          | .8750"            | SM28117                    |
|   | 9/16"          | 14.29          | .5625"            | *SM28006                    |   | 57/64"         | 22.62          | .8906"            | SM28162                    |
|   |                | 14.50          | .5709"            | *SM28007                    |   |                | 23.00          | .9055"            | SM28118                    |
|   | 37/64"         | 14.68          | .5781"            | *SM28008                    |   | 29/32"         | 23.02          | .9062"            | SM28119                    |
|   |                | 15.00          | .5906"            | *SM28009                    |   | 59/64"         | 23.42          | .9219"            | SM28120                    |
|   | 19/32"         | 15.08          | .5938"            | *SM28010                    |   | 15/16"         | 23.81          | .9375"            | SM28121                    |
|   | 39/64"         | 15.48          | .6094"            | *SM28061                    |   |                | 24.00          | .9449"            | SM28122                    |
|   |                | 15.50          | .6102"            | *SM28011                    |   |                |                |                   |                            |
|   | 5/8"           | 15.88          | .6250"            | *SM28012                    |   |                |                |                   |                            |

\* 2pcs per package



# THROW-AWAY CARBIDE(C5) SM-Point DRILL INSERTS



- Point angle
  - under 2 1/2 : 132 degree
  - over 2 1/2 : 144 degree

- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

| CARBIDE (C5) SM-Point DRILL                          |                |                |                   | CARBIDE (C5) SM-Point DRILL |   |                |                |                   |                            |
|--|----------------|----------------|-------------------|-----------------------------|---|----------------|----------------|-------------------|----------------------------|
| Series<br>Min.to Max<br>(mm/inch)                    | Diameter       |                |                   | TiAlN<br>Coated<br>EDP NO.  | Series<br>Min.to Max<br>(mm/inch)                     | Diameter       |                |                   | TiAlN<br>Coated<br>EDP NO. |
|  | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                             |   | Inch<br>(inch) | Metric<br>(mm) | Decimal<br>(inch) |                            |
| 2<br><br>24.41<br>(.961")<br>to<br>35.05<br>(1.380") | 31/32"         | 24.61          | .9688"            | SM28201                     | 3<br><br>34.37<br>(1.353")<br>to<br>47.80<br>(1.882") | 1-13/32"       | 35.72          | 1.4062"           | SM28301                    |
|  | 63/64"         | 25.00          | .9843"            | SM28202                     |   |                | 36.00          | 1.4173"           | SM28302                    |
|  | 1"             | 25.40          | 1.0000"           | SM28203                     |   | 1-7/16"        | 36.51          | 1.4375"           | SM28303                    |
|  | 1-1/64"        | 25.80          | 1.0156"           | SM28204                     |   |                | 37.00          | 1.4567"           | SM28304                    |
|  |                | 26.00          | 1.0236"           | SM28205                     |   | 1-15/32"       | 37.31          | 1.4688"           | SM28305                    |
|  | 1-1/32"        | 26.19          | 1.0312"           | SM28206                     |   |                | 38.00          | 1.4961"           | SM28306                    |
|  | 1-3/64"        | 26.59          | 1.0469"           | SM28260                     |   | 1-1/2"         | 38.10          | 1.5000"           | SM28307                    |
|  | 1-1/16"        | 26.99          | 1.0625"           | SM28207                     |   | 1-17/32"       | 38.89          | 1.5312"           | SM28308                    |
|  |                | 27.00          | 1.0630"           | SM28208                     |   |                | 39.00          | 1.5354"           | SM28309                    |
|  | 1-3/32"        | 27.78          | 1.0938"           | SM28209                     |   | 1-9/16"        | 39.69          | 1.5625"           | SM28310                    |
|  |                | 28.00          | 1.1024"           | SM28210                     |   |                | 40.00          | 1.5748"           | SM28311                    |
|  | 1-7/64"        | 28.18          | 1.1094"           | SM28261                     |   | 1-19/32"       | 40.48          | 1.5938"           | SM28312                    |
|  | 1-1/8"         | 28.58          | 1.1250"           | SM28211                     |   |                | 41.00          | 1.6142"           | SM28313                    |
|  |                | 29.00          | 1.1417"           | SM28212                     |   | 1-5/8"         | 41.28          | 1.6250"           | SM28314                    |
|  | 1-5/32"        | 29.37          | 1.1562"           | SM28213                     |   |                | 42.00          | 1.6535"           | SM28315                    |
|  |                | 30.00          | 1.1811"           | SM28214                     |   | 1-21/32"       | 42.07          | 1.6562"           | SM28316                    |
|  | 1-3/16"        | 30.16          | 1.1875"           | SM28215                     |   | 1-11/16"       | 42.86          | 1.6875"           | SM28317                    |
|  | 1-7/32"        | 30.96          | 1.2188"           | SM28216                     |   |                | 43.00          | 1.6929"           | SM28318                    |
|  |                | 31.00          | 1.2205"           | SM28217                     |   | 1-23/32"       | 43.66          | 1.7188"           | SM28319                    |
|  | 1-1/4"         | 31.75          | 1.2500"           | SM28218                     |   |                | 44.00          | 1.7323"           | SM28320                    |
|  |                | 32.00          | 1.2598"           | SM28219                     |   | 1-3/4"         | 44.45          | 1.7500"           | SM28321                    |
|  | 1-9/32"        | 32.54          | 1.2812"           | SM28220                     |   |                | 45.00          | 1.7717"           | SM28322                    |
|  |                | 33.00          | 1.2992"           | SM28221                     |   | 1-25/32"       | 45.24          | 1.7812"           | SM28323                    |
|  | 1-5/16"        | 33.34          | 1.3125"           | SM28222                     |   |                | 46.00          | 1.8110"           | SM28324                    |
|  |                | 34.00          | 1.3386"           | SM28223                     |   | 1-13/16"       | 46.04          | 1.8125"           | SM28325                    |
|  | 1-11/32"       | 34.13          | 1.3438"           | SM28224                     |   | 1-27/32"       | 46.83          | 1.8438"           | SM28326                    |
|  | 1-3/8"         | 34.93          | 1.3750"           | SM28225                     |   |                | 47.00          | 1.8504"           | SM28327                    |
|  |                | 35.00          | 1.3780"           | SM28226                     |   | 1-7/8"         | 47.63          | 1.8750"           | SM28328                    |

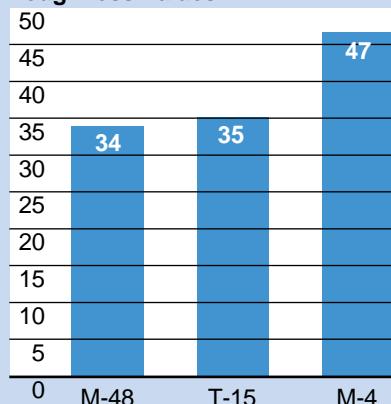
THROW-AWAY DRILL INSERT HOLDERS



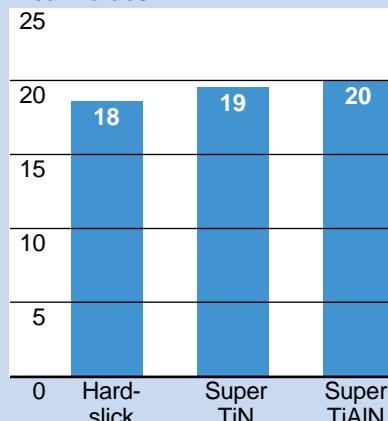
# TECHNICAL DATA

## SPADE DRILL SELECTION & APPLICATIONS HSS

### Toughness Values



### Wear Values



### WHEN TO USE M-4

- Loose or Manual Machines
- If T-15 Breaks

### WHEN TO USE T-15

- When M-4 Life needs to be Extended
- If M-48 Breaks

### WHEN TO USE M-48

- Extend Life T-15

### WHEN TO USE SM POINT

- Reduce Thrust
- Smoother Entry
- Improve Hole Quality
- Higher Speeds and Feeds

## SPEEDS – FEED RECOMMENDATIONS (STD POINT-SM POINT)

THROW-AWAY DRILL INSERT HOLDERS

| Material  | Material Hardness (BHN) | SFM Surface Footage | Feed (IPR)   |                  |                  |                  |                    |                     |                    |       |       |       |       |       |       |       |
|---|-------------------------|---------------------|--------------|------------------|------------------|------------------|--------------------|---------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
|   |                         |                     | 3/8" to 1/2" | 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" |       |       |       |       |       |       |       |
| Free Machining Steel<br>1118, 1215, 12L14, etc.       | 100 - 150               | 280                 | .007         | .008             | .010             | .012             | .013               | .016                | .016               | .019  | .020  | .020  | .023  | .023  | .028  | .028  |
|   | 150 - 200               | 260                 | .007         | .007             | .010             | .011             | .013               | .015                | .016               | .017  | .020  | .020  | .023  | .023  | .028  | .028  |
|   | 200 - 250               | 240                 | .007         | .006             | .010             | .010             | .013               | .014                | .016               | .016  | .020  | .020  | .023  | .023  | .028  | .028  |
| Low & Medium Carbon Steel<br>1018, 1040, 1140, etc.   | 125 - 175               | 240                 | .006         | .007             | .009             | .010             | .012               | .014                | .015               | .017  | .019  | .019  | .023  | .023  | .027  | .027  |
|   | 175 - 225               | 225                 | .005         | .006             | .008             | .009             | .010               | .013                | .014               | .016  | .018  | .018  | .021  | .021  | .024  | .024  |
|   | 225 - 275               | 210                 | .005         | .006             | .008             | .009             | .010               | .013                | .014               | .016  | .018  | .018  | .021  | .021  | .024  | .024  |
|   | 275 - 325               | 195                 | .004         | .005             | .007             | .008             | .009               | .012                | .012               | .015  | .016  | .016  | .019  | .019  | .022  | .022  |
| Alloy Steel<br>4140, 5140, 8640, etc.                 | 125 - 175               | 210                 | .006         | .007             | .008             | .010             | .010               | .014                | .014               | .017  | .017  | .017  | .019  | .019  | .022  | .022  |
|   | 175 - 225               | 195                 | .005         | .006             | .008             | .009             | .010               | .013                | .014               | .016  | .017  | .017  | .019  | .019  | .022  | .022  |
|   | 225 - 275               | 180                 | .005         | .006             | .007             | .009             | .010               | .013                | .014               | .016  | .017  | .017  | .019  | .019  | .022  | .022  |
|   | 275 - 325               | 170                 | .004         | .005             | .006             | .008             | .009               | .012                | .012               | .015  | .015  | .015  | .017  | .017  | .020  | .020  |
|   | 325 - 375               | 155                 | .003         | .004             | .006             | .007             | .009               | .011                | .012               | .014  | .015  | .015  | .017  | .017  | .020  | .020  |
| High Strength Alloy Steel<br>4340, 4330V, 300M, etc.I | 225 - 300               | 110                 | .005         | .006             | .007             | .009             | .009               | .011                | .010               | .013  | .014  | .014  | .017  | .017  | .020  | .020  |
|   | 300 - 350               | 85                  | .004         | .005             | .007             | .008             | .009               | .010                | .010               | .012  | .014  | .014  | .017  | .017  | .020  | .020  |
|   | 350 - 400               | 70                  | .003         | .004             | .006             | .007             | .008               | .009                | .009               | .011  | .012  | .012  | .015  | .015  | .018  | .018  |
| Structural Steel<br>A36, A285, A516, etc.             | 100 - 150               | 200                 | .006         | .008             | .010             | .011             | .012               | .015                | .014               | .017  | .018  | .018  | .021  | .021  | .026  | .026  |
|   | 150 - 250               | 170                 | .005         | .006             | .009             | .010             | .010               | .013                | .012               | .015  | .016  | .016  | .019  | .019  | .024  | .024  |
|   | 250 - 350               | 140                 | .004         | .005             | .008             | .009             | .009               | .012                | .010               | .013  | .014  | .014  | .017  | .017  | .020  | .020  |
| High Temp, Alloy<br>Hastelloy B, Inconel 600, etc.    | 140 - 220               | 40                  | .003         | .004             | .006             | .007             | .007               | .009                | .008               | .011  | .010  | .012  | .012  | .015  | .015  | .017  |
|   | 220 - 310               | 35                  | .003         | .004             | .006             | .006             | .007               | .008                | .008               | .010  | .010  | .010  | .012  | .012  | .015  | .014  |
| Stainless Steel<br>303, 416, 420, 17-4 PH, etc.       | 135 - 185               | 105                 | .006         | .007             | .008             | .009             | .009               | .012                | .011               | .014  | .014  | .014  | .016  | .016  | .020  | .020  |
|   | 185 - 275               | 90                  | .005         | .006             | .007             | .008             | .008               | .011                | .010               | .012  | .012  | .012  | .014  | .014  | .018  | .018  |
| Tool Steel<br>H-13, H021, A04, O-2, S-3, etc.         | 150 - 200               | 110                 | .004         | .004             | .006             | .007             | .008               | .010                | .010               | .012  | .012  | .012  | .015  | .015  | .017  | .017  |
|   | 200 - 250               | 90                  | .004         | .004             | .006             | .007             | .008               | .010                | .010               | .012  | .012  | .012  | .015  | .015  | .017  | .017  |
| Aluminum  | 30                      | 850                 | -.008        | -.013            | -.016            | -.020            | -.022              | -.022               | -.025              | -.025 | -.025 | -.025 | -.025 | -.025 | -.025 | -.025 |
|   | 180                     | 450                 | -.008        | -.013            | -.016            | -.018            | -.022              | -.022               | -.025              | -.025 | -.025 | -.025 | -.025 | -.025 | -.025 | -.025 |
| Cast Iron<br>Gray, Ductile, Nodular                   | 120 - 150               | 250                 | .007         | .008             | .012             | .012             | .016               | .016                | .020               | .020  | .024  | .024  | .027  | .027  | .030  | .030  |
|   | 150 - 200               | 225                 | .006         | .007             | .011             | .011             | .014               | .015                | .018               | .019  | .022  | .022  | .025  | .025  | .028  | .028  |
|   | 200 - 220               | 195                 | .006         | .006             | .009             | .009             | .012               | .013                | .016               | .017  | .018  | .018  | .021  | .021  | .024  | .024  |
|   | 220 - 260               | 165                 | .005         | .005             | .007             | .008             | .009               | .011                | .012               | .014  | .014  | .014  | .017  | .017  | .020  | .020  |
|   | 260 - 320               | 135                 | .004         | .005             | .006             | .007             | .010               | .009                | .011               | .012  | .012  | .014  | .014  | .016  | .016  | .016  |

STANDARD GEOMETRY

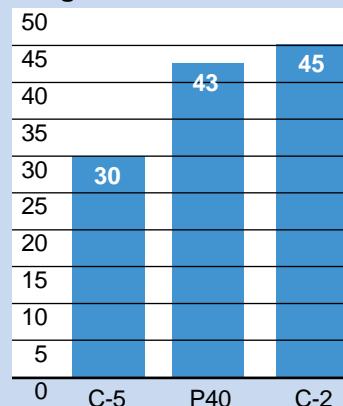
SM POINT



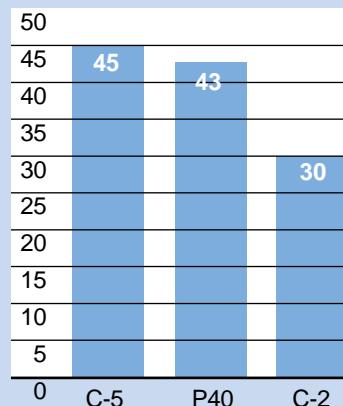
# TECHNICAL DATA

## SPADE DRILL SELECTION & APPLICATIONS CARBIDE

### Toughness Values



### Wear Values



If C-5 chips try C-2 at 10% – 20% lower S.F.M. than C-5 rating

| Grade     | Geometry and Application                                     | Stocked Coatings |
|-----------|--|------------------|
| P40 & C-5 | Steel Cutting  | Super TiN TiAIN  |
| C-3       | Cast Iron  | Super TiN TiAIN  |
| P40 & C-2 | Ductile Iron<br>Stainless Steel<br>Aluminum<br>Exotic Alloys | Super TiN TiAIN  |

**Note:** Carbide has a lower transverse rupture strength than HSS and is prone to chipping and breakage.

Recutting of chips or lack of rigidity can cause breakage.

Check Coolant Recommendations Chart on Page 461 for flow rates.

## SPEEDS – FEED RECOMMENDATIONS STANDARD GEOMETRY - SM POINT

| Material   | Material Hardness (BHN) | SFM Surface Footage |     | Feed (IPR)   |      |                  |      |                  |      |                  |      |      |   |
|--|-------------------------|---------------------|-----|--------------|------|------------------|------|------------------|------|------------------|------|------|---|
|  |                         |                     |     | 3/8" to 1/2" |      | 33/64" to 11/16" |      | 45/64" to 15/16" |      | 31/32" to 1-3/8" |      |      |   |
| Free Machining Steel<br>1118, 1215, 12L14, etc.      | 100 - 150               | 420                 | 485 | .006         | .008 | .009             | .012 | .012             | .016 | .015             | .019 | .019 | - |
|  | 150 - 200               | 360                 | 420 | .006         | .007 | .008             | .011 | .011             | .015 | .013             | .017 | .017 | - |
|  | 200 - 250               | 340                 | 395 | .005         | .006 | .008             | .010 | .010             | .014 | .012             | .016 | .015 | - |
| Medium Carbon Steel<br>1018, 1040, 1140, etc.        | 125 - 175               | 340                 | 395 | .005         | .007 | .008             | .010 | .010             | .014 | .014             | .017 | .017 | - |
|  | 175 - 225               | 310                 | 360 | .005         | .006 | .007             | .009 | .008             | .013 | .012             | .016 | .016 | - |
|  | 225 - 275               | 270                 | 315 | .004         | .006 | .007             | .009 | .008             | .013 | .012             | .016 | .015 | - |
|  | 275 - 325               | 230                 | 270 | .004         | .005 | .006             | .008 | .006             | .012 | .010             | .015 | .014 | - |
| Alloy Steel<br>4140, 5140, 8640, etc.                | 125 - 175               | 325                 | 380 | .005         | .007 | .008             | .010 | .010             | .014 | .013             | .017 | .016 | - |
|  | 175 - 225               | 300                 | 350 | .005         | .006 | .007             | .009 | .009             | .013 | .012             | .016 | .015 | - |
|  | 225 - 275               | 270                 | 315 | .004         | .006 | .007             | .009 | .009             | .013 | .012             | .016 | .015 | - |
|  | 275 - 325               | 250                 | 290 | .004         | .005 | .006             | .008 | .008             | .012 | .011             | .015 | .014 | - |
|  | 325 - 375               | 220                 | 260 | .003         | .004 | .005             | .007 | .008             | .011 | .010             | .014 | .013 | - |
| High Strength Alloy Steel<br>4340, 4330V, 300M, etc. | 225 - 300               | 200                 | 235 | .005         | .006 | .007             | .009 | .008             | .011 | .010             | .013 | .014 | - |
|  | 300 - 350               | 180                 | 210 | .004         | .005 | .006             | .008 | .007             | .010 | .009             | .012 | .012 | - |
|  | 350 - 400               | 160                 | 190 | .003         | .004 | .005             | .007 | .006             | .009 | .008             | .011 | .010 | - |
| Structural Steel<br>A36, A285, A516, etc.            | 100 - 150               | 310                 | 360 | .006         | .008 | .010             | .011 | .011             | .015 | .012             | .017 | .016 | - |
|  | 150 - 250               | 250                 | 290 | .005         | .006 | .008             | .010 | .009             | .013 | .011             | .015 | .015 | - |
|  | 250 - 350               | 230                 | 270 | .004         | .005 | .007             | .009 | .008             | .012 | .009             | .013 | .013 | - |
| High Temp, Alloy<br>Hastelloy B, Inconel 600, etc.   | 140 - 220               | 80                  | 125 | .003         | .004 | .006             | .007 | .007             | .009 | .009             | .011 | .011 | - |
|  | 220 - 310               | 60                  | 100 | .003         | .004 | .005             | .006 | .006             | .008 | .008             | .010 | .010 | - |
| Stainless Steel<br>303, 416, 420, 17-4 PH, etc.      | 135 - 185               | 210                 | 245 | .006         | .007 | .008             | .009 | .009             | .012 | .011             | .014 | .013 | - |
|  | 185 - 275               | 160                 | 190 | .005         | .006 | .007             | .008 | .008             | .011 | .010             | .012 | .011 | - |
| Tool Steel<br>H-13, H021, A04, O-2, S-3, etc.        | 150 - 200               | 220                 | 260 | .003         | .004 | .005             | .007 | .007             | .010 | .009             | .012 | .011 | - |
|  | 200 - 250               | 170                 | 200 | .003         | .004 | .005             | .007 | .007             | .010 | .009             | .012 | .011 | - |
| Aluminum   | 30                      | 1500                | -   | .008         | -    | .013             | -    | .016             | -    | .020             | -    | .022 | - |
|  | 180                     | 1000                | -   | .007         | -    | .011             | -    | .014             | -    | .018             | -    | .020 | - |
| Cast Iron<br>Gray Ductile Nodular                    | 120 - 150               | 460                 | 505 | .006         | .008 | .009             | .012 | .011             | .015 | .015             | .019 | .020 | - |
|  | 150 - 200               | 400                 | 485 | .005         | .007 | .008             | .011 | .010             | .013 | .014             | .017 | .018 | - |
|  | 200 - 220               | 360                 | 435 | .005         | .006 | .007             | .009 | .008             | .012 | .012             | .015 | .015 | - |
|  | 220 - 260               | 310                 | 375 | .004         | .005 | .006             | .008 | .007             | .011 | .010             | .013 | .013 | - |
|  | 260 - 320               | 270                 | 340 | .004         | .005 | .005             | .007 | .006             | .010 | .008             | .011 | .011 | - |

STANDARD GEOMETRY

SM POINT

## SPADE DRILL HORSEPOWER CONSUMPTION RATE

**Metal Removal Rates (MRR)**

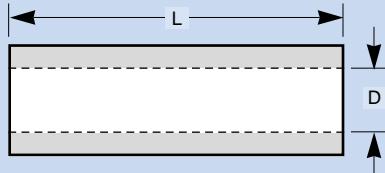
Example: 1.50 Dia. Drill @ 6.412 I.P.M.

**Volume of Cylinder Method:  $D^2 \times .785 \times L$** 

D = Hole Diameter

L = Length in I.P.M.

.785 is Constant



Material Drilled 4140 250 BHN:

Cutting Data: 180 S.F.M. (458 R.P.M.) x .014 Feed per Rev.

$$458 \text{ R.P.M.} \times .014 = 6.412 \text{ I.P.M. (L)}$$

$$D^2 (1.5)^2 \times .785 \times L (6.412) = 11.3 \text{ C.U.In./ Min (MRR)}$$

$$\text{MRR of } 11.3 \times 1.4 \text{ Energy Value} = 15.8\text{HP.}$$

## METAL REMOVAL RATES (MRR)

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

| Average Unit Horsepower Values of Energy Per Unit Volume |         |                                     |
|--|---------|-------------------------------------|
| Material   | BHN     | $HP_u$ (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                                 |



# TECHNICAL DATA

## COOLANT RECOMMENDATIONS (SPADE & I-DREAM DRILL)

| Material  | Material Hardness (BHN) | Coolant Pressure (PSI)            |                    |                    |                |                 |                |                |  |
|---|-------------------------|-----------------------------------|--------------------|--------------------|----------------|-----------------|----------------|----------------|--|
|   |                         | Coolant Volumetric Flowrate (GPM) |                    |                    |                |                 |                |                |  |
|   |                         | 3/8" - 1/2"                       | 33/64" - 11/16"    | 23/32" - 1"        | 1" - 1-1/4"    | 1-1/4" - 2"     | 2" - 3"        | 3" - 4"        |  |
| Free Machining Steel<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 |  |
| Low Carbon Steel<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 |  |
| Medium Carbon Steel<br>1030, 1040, 1050, 1527, 1140, 1151, etc. | 125 – 325               | 160-165<br>2.3-2.4                | 70-85<br>2.3-2.6   | 70-90<br>3.6-4.1   | 55-75<br>5-6   | 50-70<br>10-12  | 30-40<br>26-30 | 50-65<br>33-38 |  |
| Alloy Steel<br>4140, 5140, 8640, etc.                           | 125 – 375               | 160-165<br>2.3-2.4                | 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 |  |
| High Strength Alloy<br>4340, 4330V, 300M, etc.                  | 225 – 400               | 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 |  |
| Structural Steel<br>A36, A285, A516, etc.                       | 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>30-33 |  |
| High Temp. Alloy<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>-         |  |
| Stainless Steel<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 |  |
| Tool Steel<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 |  |
| Aluminum  | 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 |  |
| Cast Iron   | 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>4-5   | 30-35<br>8-9    | 25-30<br>23-26 | 30-35<br>26-28 |  |

THROW-AWAY DRILL INSERT HOLDERS



## Technology and Quality

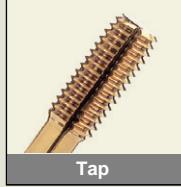
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



End Mill



Drill



Tap



Special products

---

X5070 / X-POWER / V7 MILL / JET-POWER / ALU-POWER / D-POWER / STANDARD & HIGH PERFORMANCE / CARBIDE END MILLS / TANK-POWER & ADDITIONAL POWDERED METAL / COBALT AND HSS END MILLS / TAPS / DRILLS, SPADE DRILL INSERTS HOLDERS AND ACCESSORIES / ROTARY TOOLING

# ROTARY TOOL HOLDERS





# TOOL HOLDERS SELECTION GUIDE

CAT / BT

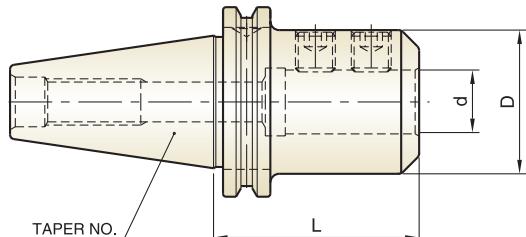
465~496

|   |         |
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| END MILL HOLDERS - CAT                                  | 465-466 |
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| TOOL CLAMP, END MILL HOLDER SCREWS                      | 496     |

TECHNICAL INFORMATION

493

## CAT



## STUB

| EDP NO | TYPE                | TAPER NO. | d     | L    | D    |
|--------|---------------------|-----------|-------|------|------|
| AK206  | CAT40-EMH1/2-1.75   | 40        | .500  | 1.75 | 1.25 |
| AK208  | CAT40-EMH5/8-1.75   | 40        | .625  | 1.75 | 1.50 |
| AK210  | CAT40-EMH3/4-1.75   | 40        | .750  | 1.75 | 1.75 |
| AK214  | CAT40-EMH1"-1.75    | 40        | 1.000 | 1.75 | 1.75 |
| AK217  | CAT40-EMH1 1/4-2.00 | 40        | 1.250 | 2.00 | 2.25 |

## STANDARD

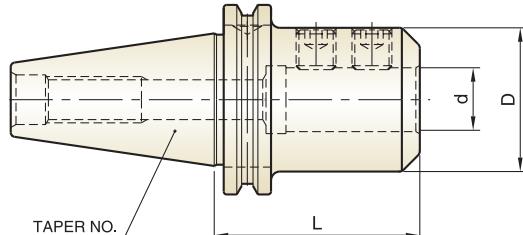
| EDP NO | TYPE                | TAPER NO. | d     | L    | D    |
|--------|---------------------|-----------|-------|------|------|
| AK000  | CAT40-EMH1/8-2.50   | 40        | .125  | 2.50 | .69  |
| AK001  | CAT40-EMH3/16-2.50  | 40        | .187  | 2.50 | .69  |
| AK002  | CAT40-EMH1/4-2.50   | 40        | .250  | 2.50 | .78  |
| AK003  | CAT40-EMH5/16-2.50  | 40        | .312  | 2.50 | .88  |
| AK004  | CAT40-EMH3/8-2.50   | 40        | .375  | 2.50 | 1.00 |
| AK005  | CAT40-EMH7/16-2.50  | 40        | .437  | 2.50 | 1.13 |
| AK006  | CAT40-EMH1/2-2.63   | 40        | .500  | 2.63 | 1.25 |
| AK008  | CAT40-EMH5/8-3.75   | 40        | .625  | 3.75 | 1.50 |
| AK010  | CAT40-EMH3/4-3.75   | 40        | .750  | 3.75 | 1.75 |
| AK012  | CAT40-EMH7/8-4.00   | 40        | .875  | 4.00 | 1.88 |
| AK014  | CAT40-EMH1"-4.00    | 40        | 1.000 | 4.00 | 2.00 |
| AK017  | CAT40-EMH1 1/4-4.25 | 40        | 1.250 | 4.25 | 2.50 |
| AK021  | CAT40-EMH1 1/2-4.63 | 40        | 1.500 | 4.63 | 2.50 |
| AL002  | CAT50-EMH1/4-2.50   | 50        | .250  | 2.50 | .78  |
| AL003  | CAT50-EMH5/16-2.50  | 50        | .312  | 2.50 | .88  |
| AL004  | CAT50-EMH3/8-2.50   | 50        | .375  | 2.50 | 1.00 |
| AL005  | CAT50-EMH7/16-2.63  | 50        | .437  | 2.63 | 1.13 |
| AL006  | CAT50-EMH1/2-2.63   | 50        | .500  | 2.63 | 1.25 |
| AL008  | CAT50-EMH5/8-3.75   | 50        | .625  | 3.75 | 1.50 |
| AL010  | CAT50-EMH3/4-3.75   | 50        | .750  | 3.75 | 1.75 |
| AL012  | CAT50-EMH7/8-3.75   | 50        | .875  | 3.75 | 1.88 |
| AL014  | CAT50-EMH1"-4.00    | 50        | 1.000 | 4.00 | 2.00 |
| AL017  | CAT50-EMH1 1/4-4.00 | 50        | 1.250 | 4.00 | 2.50 |
| AL021  | CAT50-EMH1 1/2-4.00 | 50        | 1.500 | 4.00 | 2.50 |
| AL029  | CAT50-EMH2"-5.63    | 50        | 2.000 | 5.63 | 3.75 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

CAT



## EXTENDED

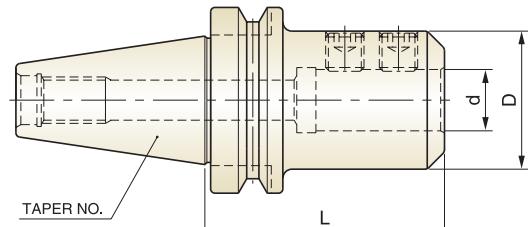
| EDP NO | TYPE                | TAPER NO. | d     | L    | D    |
|--------|---------------------|-----------|-------|------|------|
| AK104  | CAT40-EMH3/8-4.50   | 40        | .375  | 4.50 | 1.00 |
| AK106  | CAT40-EMH1/2-4.63   | 40        | .500  | 4.63 | 1.25 |
| AK108  | CAT40-EMH5/8-5.75   | 40        | .625  | 5.75 | 1.50 |
| AK110  | CAT40-EMH3/4-5.75   | 40        | .750  | 5.75 | 1.75 |
| AK112  | CAT40-EMH7/8-6.00   | 40        | .875  | 6.00 | 1.88 |
| AK114  | CAT40-EMH1"-6.00    | 40        | 1.000 | 6.00 | 2.00 |
| AK117  | CAT40-EMH1 1/4-6.25 | 40        | 1.250 | 6.25 | 2.50 |
| AK121  | CAT40-EMH1 1/2-6.63 | 40        | 1.500 | 6.63 | 2.50 |
| AL104  | CAT50-EMH3/8-4.50   | 50        | .375  | 4.50 | 1.00 |
| AL106  | CAT50-EMH1/2-4.63   | 50        | .500  | 4.63 | 1.25 |
| AL108  | CAT50-EMH5/8-5.75   | 50        | .625  | 5.75 | 1.50 |
| AL110  | CAT50-EMH3/4-5.75   | 50        | .750  | 5.75 | 1.75 |
| AL112  | CAT50-EMH7/8-5.75   | 50        | .875  | 5.75 | 1.88 |
| AL114  | CAT50-EMH1"-6.00    | 50        | 1.000 | 6.00 | 2.00 |
| AL117  | CAT50-EMH1 1/4-6.00 | 50        | 1.250 | 6.00 | 2.50 |
| AL121  | CAT50-EMH1 1/2-6.00 | 50        | 1.500 | 6.00 | 2.50 |
| AL129  | CAT50-EMH2"-7.63    | 50        | 2.000 | 7.63 | 3.75 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

BT



## STUB

| EDP NO | TYPE                    | TAPER NO. | d     | L    | D    |
|--------|-------------------------|-----------|-------|------|------|
| AH206  | BT40 - EMH 1/2 - 1.25   | 40        | .500  | 1.25 | 1.25 |
| AH208  | BT40 - EMH 5/8 - 1.38   | 40        | .625  | 1.38 | 1.50 |
| AH210  | BT40 - EMH 3/4 - 1.44   | 40        | .750  | 1.44 | 1.75 |
| AH214  | BT40 - EMH 1" - 2.50    | 40        | 1.000 | 2.50 | 2.00 |
| AH217  | BT40 - EMH 1 1/4 - 2.50 | 40        | 1.250 | 2.50 | 2.50 |

## STANDARD

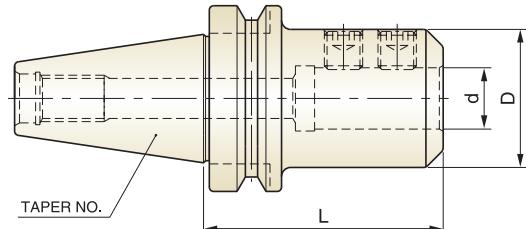
| EDP NO | TYPE                    | TAPER NO. | d     | L    | D    |
|--------|-------------------------|-----------|-------|------|------|
| AH000  | BT40 - EMH 1/8 - 2.50   | 40        | .125  | 2.50 | .69  |
| AH001  | BT40 - EMH 3/16 - 2.50  | 40        | .187  | 2.50 | .69  |
| AH002  | BT40 - EMH 1/4 - 2.50   | 40        | .250  | 2.50 | .78  |
| AH003  | BT40 - EMH 5/16 - 2.50  | 40        | .312  | 2.50 | .88  |
| AH004  | BT40 - EMH 3/8 - 2.50   | 40        | .375  | 2.50 | 1.00 |
| AH005  | BT40 - EMH 7/16 - 2.50  | 40        | .437  | 2.50 | 1.13 |
| AH006  | BT40 - EMH 1/2 - 2.50   | 40        | .500  | 2.50 | 1.25 |
| AH008  | BT40 - EMH 5/8 - 2.50   | 40        | .625  | 2.50 | 1.50 |
| AH010  | BT40 - EMH 3/4 - 2.50   | 40        | .750  | 2.50 | 1.75 |
| AH012  | BT40 - EMH 7/8 - 3.50   | 40        | .875  | 3.50 | 1.88 |
| AH014  | BT40 - EMH 1" - 3.75    | 40        | 1.000 | 3.75 | 2.00 |
| AH017  | BT40 - EMH 1 1/4 - 3.75 | 40        | 1.250 | 3.75 | 2.50 |
| AH021  | BT40 - EMH 1 1/2 - 4.25 | 40        | 1.500 | 4.25 | 2.50 |
| AI002  | BT50 - EMH 1/4 - 3.00   | 50        | .250  | 3.00 | .78  |
| AI004  | BT50 - EMH 3/8 - 3.00   | 50        | .375  | 3.00 | 1.00 |
| AI006  | BT50 - EMH 1/2 - 3.00   | 50        | .500  | 3.00 | 1.25 |
| AI008  | BT50 - EMH 5/8 - 3.00   | 50        | .625  | 3.00 | 1.50 |
| AI010  | BT50 - EMH 3/4 - 3.00   | 50        | .750  | 3.00 | 1.75 |
| AI012  | BT50 - EMH 7/8 - 4.00   | 50        | .875  | 4.00 | 1.88 |
| AI014  | BT50 - EMH 1" - 4.25    | 50        | 1.000 | 4.25 | 2.00 |
| AI017  | BT50 - EMH 1 1/4 - 4.25 | 50        | 1.250 | 4.25 | 2.50 |
| AI021  | BT50 - EMH 1 1/2 - 4.25 | 50        | 1.500 | 4.25 | 2.50 |
| AI029  | BT50 - EMH 2" - 5.00    | 50        | 2.000 | 5.00 | 3.75 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

BT



## EXTENDED

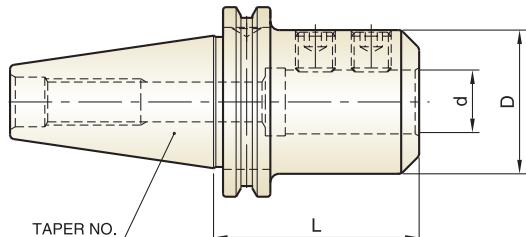
| EDP NO | TYPE                    | TAPER NO. | d     | L    | D    |
|--------|-------------------------|-----------|-------|------|------|
| AH104  | BT40 - EMH 3/8 - 4.00   | 40        | .375  | 4.00 | 1.00 |
| AH106  | BT40 - EMH 1/2 - 4.00   | 40        | .500  | 4.00 | 1.25 |
| AH108  | BT40 - EMH 5/8 - 4.00   | 40        | .625  | 4.00 | 1.50 |
| AH110  | BT40 - EMH 3/4 - 4.00   | 40        | .750  | 4.00 | 1.75 |
| AH114  | BT40 - EMH 1" - 5.00    | 40        | 1.000 | 5.00 | 2.00 |
| AH117  | BT40 - EMH 1 1/4 - 5.00 | 40        | 1.250 | 5.00 | 2.50 |
| AH121  | BT40 - EMH 1 1/2 - 6.00 | 40        | 1.500 | 6.00 | 2.50 |
| AI104  | BT50 - EMH 3/8 - 6.00   | 50        | .375  | 6.00 | 1.00 |
| AI106  | BT50 - EMH 1/2 - 6.00   | 50        | .500  | 6.00 | 1.25 |
| AI108  | BT50 - EMH 5/8 - 6.00   | 50        | .625  | 6.00 | 1.50 |
| AI110  | BT50 - EMH 3/4 - 6.00   | 50        | .750  | 6.00 | 1.75 |
| AI112  | BT50 - EMH 7/8 - 6.00   | 50        | .875  | 6.00 | 1.88 |
| AI114  | BT50 - EMH 1" - 6.00    | 50        | 1.000 | 6.00 | 2.00 |
| AI117  | BT50 - EMH 1 1/4 - 6.00 | 50        | 1.250 | 6.00 | 2.50 |
| AI121  | BT50 - EMH 1 1/2 - 6.00 | 50        | 1.500 | 6.00 | 2.50 |
| AI129  | BT50 - EMH 2" - 6.00    | 50        | 2.000 | 6.00 | 3.75 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

## CAT



## STUB

| EDP NO   | TYPE                     | TAPER NO. | d     | L    | D    |
|----------|--------------------------|-----------|-------|------|------|
| AK206B25 | CAT40 - EMH 1/2 - 1.75   | 40        | .500  | 1.75 | 1.25 |
| AK208B25 | CAT40 - EMH 5/8 - 1.75   | 40        | .625  | 1.75 | 1.50 |
| AK210B25 | CAT40 - EMH 3/4 - 1.75   | 40        | .750  | 1.75 | 1.75 |
| AK214B25 | CAT40 - EMH 1" - 1.75    | 40        | 1.000 | 1.75 | 1.75 |
| AK217B25 | CAT40 - EMH 1 1/4 - 2.00 | 40        | 1.250 | 2.00 | 2.25 |

## STANDARD

| EDP NO   | TYPE                     | TAPER NO. | d     | L    | D    |
|----------|--------------------------|-----------|-------|------|------|
| AK000B25 | CAT40 - EMH 1/8 - 2.50   | 40        | .125  | 2.50 | .69  |
| AK001B25 | CAT40 - EMH 3/16 - 2.50  | 40        | .187  | 2.50 | .69  |
| AK002B25 | CAT40 - EMH 1/4 - 2.50   | 40        | .250  | 2.50 | .78  |
| AK003B25 | CAT40 - EMH 5/16 - 2.50  | 40        | .312  | 2.50 | .88  |
| AK004B25 | CAT40 - EMH 3/8 - 2.50   | 40        | .375  | 2.50 | 1.00 |
| AK005B25 | CAT40 - EMH 7/16 - 2.50  | 40        | .437  | 2.50 | 1.13 |
| AK006B25 | CAT40 - EMH 1/2 - 2.63   | 40        | .500  | 2.63 | 1.25 |
| AK008B25 | CAT40 - EMH 5/8 - 3.75   | 40        | .625  | 3.75 | 1.50 |
| AK010B25 | CAT40 - EMH 3/4 - 3.75   | 40        | .750  | 3.75 | 1.75 |
| AK012B25 | CAT40 - EMH 7/8 - 4.00   | 40        | .875  | 4.00 | 1.88 |
| AK014B25 | CAT40 - EMH 1" - 4.00    | 40        | 1.000 | 4.00 | 2.00 |
| AK017B25 | CAT40 - EMH 1 1/4 - 4.25 | 40        | 1.250 | 4.25 | 2.50 |
| AK021B25 | CAT40 - EMH 1 1/2 - 4.63 | 40        | 1.500 | 4.63 | 2.50 |

\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

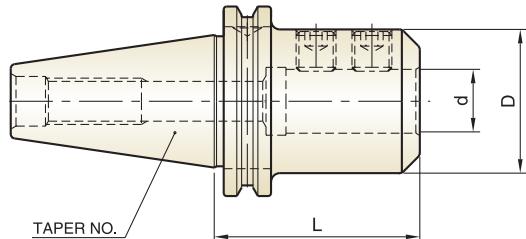
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

CAT



EXTENDED

| EDP NO   | TYPE                     | TAPER NO. | d     | L    | D    |
|----------|--------------------------|-----------|-------|------|------|
| AK104B25 | CAT40 - EMH 3/8 - 4.50   | 40        | .375  | 4.50 | 1.00 |
| AK106B25 | CAT40 - EMH 1/2 - 4.63   | 40        | .500  | 4.63 | 1.25 |
| AK108B25 | CAT40 - EMH 5/8 - 5.75   | 40        | .625  | 5.75 | 1.50 |
| AK110B25 | CAT40 - EMH 3/4 - 5.75   | 40        | .750  | 5.75 | 1.75 |
| AK112B25 | CAT40 - EMH 7/8 - 6.00   | 40        | .875  | 6.00 | 1.88 |
| AK114B25 | CAT40 - EMH 1" - 6.00    | 40        | 1.000 | 6.00 | 2.00 |
| AK117B25 | CAT40 - EMH 1 1/4 - 6.25 | 40        | 1.250 | 6.25 | 2.50 |
| AK121B25 | CAT40 - EMH 1 1/2 - 6.63 | 40        | 1.500 | 6.63 | 2.50 |

\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

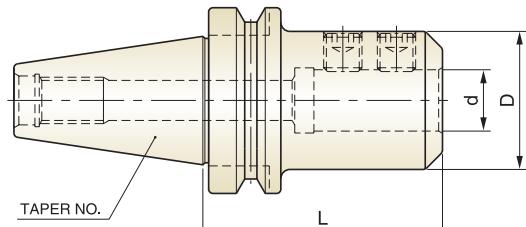
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

BT



## STUB

| EDP NO   | TYPE                    | TAPER NO. | d     | L    | D    |
|----------|-------------------------|-----------|-------|------|------|
| AH206B25 | BT40 - EMH 1/2 - 1.25   | 40        | .500  | 1.25 | 1.25 |
| AH208B25 | BT40 - EMH 5/8 - 1.38   | 40        | .625  | 1.38 | 1.50 |
| AH210B25 | BT40 - EMH 3/4 - 1.44   | 40        | .750  | 1.44 | 1.75 |
| AH214B25 | BT40 - EMH 1" - 2.50    | 40        | 1.000 | 2.50 | 2.00 |
| AH217B25 | BT40 - EMH 1 1/4 - 2.50 | 40        | 1.250 | 2.50 | 2.50 |

## STANDARD

| EDP NO   | TYPE                    | TAPER NO. | d     | L    | D    |
|----------|-------------------------|-----------|-------|------|------|
| AH000B25 | BT40 - EMH 1/8 - 2.50   | 40        | .125  | 2.50 | .69  |
| AH001B25 | BT40 - EMH 3/16 - 2.50  | 40        | .187  | 2.50 | .69  |
| AH002B25 | BT40 - EMH 1/4 - 2.50   | 40        | .250  | 2.50 | .78  |
| AH003B25 | BT40 - EMH 5/16 - 2.50  | 40        | .312  | 2.50 | .88  |
| AH004B25 | BT40 - EMH 3/8 - 2.50   | 40        | .375  | 2.50 | 1.00 |
| AH005B25 | BT40 - EMH 7/16 - 2.50  | 40        | .437  | 2.50 | 1.13 |
| AH006B25 | BT40 - EMH 1/2 - 2.50   | 40        | .500  | 2.50 | 1.25 |
| AH008B25 | BT40 - EMH 5/8 - 2.50   | 40        | .625  | 2.50 | 1.50 |
| AH010B25 | BT40 - EMH 3/4 - 2.50   | 40        | .750  | 2.50 | 1.75 |
| AH012B25 | BT40 - EMH 7/8 - 3.50   | 40        | .875  | 3.50 | 1.88 |
| AH014B25 | BT40 - EMH 1" - 3.75    | 40        | 1.000 | 3.75 | 2.00 |
| AH017B25 | BT40 - EMH 1 1/4 - 3.75 | 40        | 1.250 | 3.75 | 2.50 |
| AH021B25 | BT40 - EMH 1 1/2 - 4.25 | 40        | 1.500 | 4.25 | 2.50 |

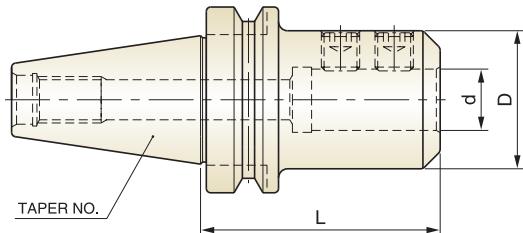
\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

**BT**

**EXTENDED**

| EDP NO   | TYPE                    | TAPER NO. | d     | L    | D    |
|----------|-------------------------|-----------|-------|------|------|
| AH104B25 | BT40 - EMH 3/8 - 4.00   | 40        | .375  | 4.00 | 1.00 |
| AH106B25 | BT40 - EMH 1/2 - 4.00   | 40        | .500  | 4.00 | 1.25 |
| AH108B25 | BT40 - EMH 5/8 - 4.00   | 40        | .625  | 4.00 | 1.50 |
| AH110B25 | BT40 - EMH 3/4 - 4.00   | 40        | .750  | 4.00 | 1.75 |
| AH114B25 | BT40 - EMH 1" - 5.00    | 40        | 1.000 | 5.00 | 2.00 |
| AH117B25 | BT40 - EMH 1 1/4 - 5.00 | 40        | 1.250 | 5.00 | 2.50 |
| AH121B25 | BT40 - EMH 1 1/2 - 6.00 | 40        | 1.500 | 6.00 | 2.50 |

\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

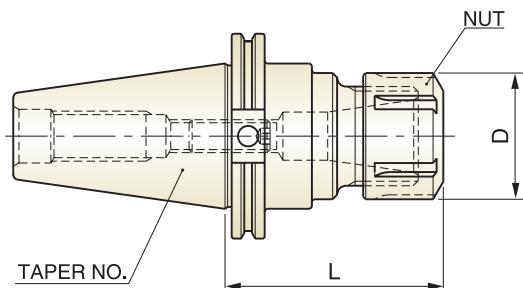
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* SET SCREWS FOR END MILL HOLDERS ON PAGE 496

**CAT**

**STUB**

**STANDARD**

| EDP NO       | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK232</b> | CAT40 - ER20 - 2.55 | 40        | .039-.511  | 2.55 | 1.26 | ER20          |
| <b>BK233</b> | CAT40 - ER25 - 2.50 | 40        | .039-.629  | 2.50 | 1.65 | ER25          |
| <b>BK234</b> | CAT40 - ER32 - 2.70 | 40        | .078-.787  | 2.70 | 1.88 | ER32          |

**EXTENDED**

| EDP NO       | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK331</b> | CAT40 - ER16 - 4.88 | 40        | 1/32-13/32 | 4.88 | 1.08 | ER16          |
| <b>BK332</b> | CAT40 - ER20 - 6.00 | 40        | .039-.511  | 6.00 | 1.26 | ER20          |
| <b>BK333</b> | CAT40 - ER25 - 6.00 | 40        | .039-.629  | 6.00 | 1.65 | ER25          |
| <b>BK334</b> | CAT40 - ER32 - 6.00 | 40        | .078-.787  | 6.00 | 1.88 | ER32          |
| <b>BL331</b> | CAT50 - ER16 - 6.88 | 50        | 1/32-13/32 | 6.88 | 1.08 | ER16          |
| <b>BL332</b> | CAT50 - ER20 - 6.00 | 50        | .039-.511  | 6.00 | 1.26 | ER20          |
| <b>BL333</b> | CAT50 - ER25 - 6.00 | 50        | .039-.629  | 6.00 | 1.65 | ER25          |
| <b>BL334</b> | CAT50 - ER32 - 6.00 | 50        | .078-.787  | 6.00 | 1.88 | ER32          |

**EXTRA EXTENDED**

| EDP NO       | TYPE            | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------------|-----------------|-----------|------------|------|------|---------------|
| <b>BK432</b> | CAT40-ER20-8.00 | 40        | .039-.511  | 8.00 | 1.26 | ER20          |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

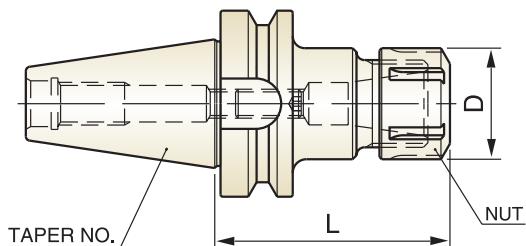
\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* ER NUT : SWISS MADE PRECISION ER NUT

\* SUPPLIED without WRENCH

\* WRENCHES ON PAGE 477

**BT**



### STUB

| EDP NO | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|--------------------|-----------|------------|------|------|---------------|
| BH232  | BT40 - ER20 - 2.20 | 40        | .039-.511  | 2.20 | 1.26 | ER20          |
| BH233  | BT40 - ER25 - 2.50 | 40        | .039-.629  | 2.50 | 1.65 | ER25          |
| BH234  | BT40 - ER32 - 2.40 | 40        | .078-.787  | 2.40 | 1.88 | ER32          |

### STANDARD

| EDP NO | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|--------------------|-----------|------------|------|------|---------------|
| BH030  | BT40 - ER11 - 3.00 | 40        | .019-2.75  | 3.00 | .63  | ER11          |
| BH031  | BT40 - ER16 - 2.88 | 40        | 1/32-13/32 | 2.88 | 1.08 | ER16          |
| BH032  | BT40 - ER20 - 4.00 | 40        | .039-.511  | 4.00 | 1.26 | ER20          |
| BH133  | BT40 - ER25 - 4.00 | 40        | .039-.629  | 4.00 | 1.65 | ER25          |
| BH134  | BT40 - ER32 - 4.00 | 40        | .078-.787  | 4.00 | 1.88 | ER32          |
| BI031  | BT50 - ER16 - 4.88 | 50        | 1/32-13/32 | 4.88 | 1.08 | ER16          |
| BI032  | BT50 - ER20 - 2.63 | 50        | .039-.511  | 2.63 | 1.26 | ER20          |
| BI033  | BT50 - ER25 - 2.63 | 50        | .039-.629  | 2.63 | 1.65 | ER25          |
| BI034  | BT50 - ER32 - 4.00 | 50        | .078-.787  | 4.00 | 1.88 | ER32          |

### EXTENDED

| EDP NO | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|--------------------|-----------|------------|------|------|---------------|
| BH331  | BT40 - ER16 - 4.88 | 40        | 1/32-13/32 | 4.88 | 1.08 | ER16          |
| BH332  | BT40 - ER20 - 6.00 | 40        | .039-.511  | 6.00 | 1.26 | ER20          |
| BH333  | BT40 - ER25 - 6.00 | 40        | .039-.629  | 6.00 | 1.65 | ER25          |
| BH334  | BT40 - ER32 - 6.00 | 40        | .078-.787  | 6.00 | 1.88 | ER32          |
| BI331  | BT50 - ER16 - 6.00 | 50        | 1/32-13/32 | 6.00 | 1.08 | ER16          |
| BI332  | BT50 - ER20 - 6.00 | 50        | .039-.511  | 6.00 | 1.26 | ER20          |
| BI333  | BT50 - ER25 - 6.00 | 50        | .039-.629  | 6.00 | 1.65 | ER25          |
| BI334  | BT50 - ER32 - 6.00 | 50        | .078-.787  | 6.00 | 1.88 | ER32          |

### EXTRA EXTENDED

| EDP NO | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|--------------------|-----------|------------|------|------|---------------|
| BH432  | BT40 - ER20 - 8.00 | 40        | .039-.511  | 8.00 | 1.26 | ER20          |

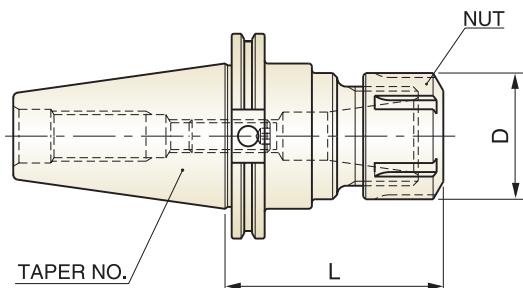
\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* ER NUT : SWISS MADE PRECISION ER NUT

\* SUPPLIED without WRENCH

\* WRENCHES ON PAGE 477

**CAT**

**STUB**

| EDP NO          | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK232B25</b> | CAT40 - ER20 - 2.55 | 40        | .039-.511  | 2.55 | 1.26 | ER20          |
| <b>BK233B25</b> | CAT40 - ER25 - 2.50 | 40        | .039-.629  | 2.50 | 1.65 | ER25          |
| <b>BK234B25</b> | CAT40 - ER32 - 2.70 | 40        | .078-.787  | 2.70 | 1.88 | ER32          |

**STANDARD**

| EDP NO          | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK030B25</b> | CAT40 - ER11 - 3.00 | 40        | .019-.275  | 3.00 | .63  | ER11          |
| <b>BK031B25</b> | CAT40 - ER16 - 2.88 | 40        | 1/32-13/32 | 2.88 | 1.08 | ER16          |
| <b>BK032B25</b> | CAT40 - ER20 - 4.00 | 40        | .039-.511  | 4.00 | 1.26 | ER20          |
| <b>BK133B25</b> | CAT40 - ER25 - 4.00 | 40        | .039-.629  | 4.00 | 1.65 | ER25          |
| <b>BK134B25</b> | CAT40 - ER32 - 4.00 | 40        | .078-.787  | 4.00 | 1.88 | ER32          |

**EXTENDED**

| EDP NO          | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK331B25</b> | CAT40 - ER16 - 4.88 | 40        | 1/32-13/32 | 4.88 | 1.08 | ER16          |
| <b>BK332B25</b> | CAT40 - ER20 - 6.00 | 40        | .039-.511  | 6.00 | 1.26 | ER20          |
| <b>BK333B25</b> | CAT40 - ER25 - 6.00 | 40        | .039-.629  | 6.00 | 1.65 | ER25          |
| <b>BK334B25</b> | CAT40 - ER32 - 6.00 | 40        | .078-.787  | 6.00 | 1.88 | ER32          |

**EXTRA EXTENDED**

| EDP NO          | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|---------------------|-----------|------------|------|------|---------------|
| <b>BK432B25</b> | CAT40 - ER20 - 8.00 | 40        | .039-.511  | 8.00 | 1.26 | ER20          |

\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

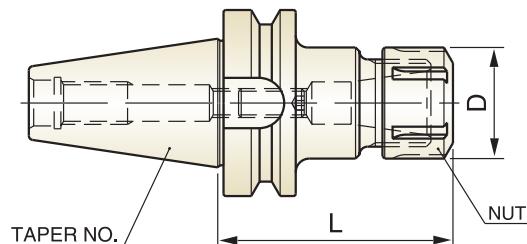
\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, SCREWS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* ER NUT : SWISS MADE PRECISION ER NUT

\* SUPPLIED without WRENCH

\* WRENCHES ON PAGE477

**BT**

**STUB**

| EDP NO          | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|--------------------|-----------|------------|------|------|---------------|
| <b>BH232B25</b> | BT40 - ER20 - 2.20 | 40        | .039-.511  | 2.20 | 1.26 | ER20          |
| <b>BH233B25</b> | BT40 - ER25 - 2.50 | 40        | .039-.629  | 2.50 | 1.65 | ER25          |
| <b>BH234B25</b> | BT40 - ER32 - 2.40 | 40        | .078-.787  | 2.40 | 1.88 | ER32          |

**STANDARD**

| EDP NO          | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|--------------------|-----------|------------|------|------|---------------|
| <b>BH030B25</b> | BT40 - ER11 - 3.00 | 40        | .019-2.75  | 3.00 | .63  | ER11          |
| <b>BH031B25</b> | BT40 - ER16 - 2.88 | 40        | 1/32-13/32 | 2.88 | 1.08 | ER16          |
| <b>BH032B25</b> | BT40 - ER20 - 4.00 | 40        | .039-.511  | 4.00 | 1.26 | ER20          |
| <b>BH133B25</b> | BT40 - ER25 - 4.00 | 40        | .039-.629  | 4.00 | 1.65 | ER25          |
| <b>BH134B25</b> | BT40 - ER32 - 4.00 | 40        | .078-.787  | 4.00 | 1.88 | ER32          |

**EXTENDED**

| EDP NO          | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|--------------------|-----------|------------|------|------|---------------|
| <b>BH331B25</b> | BT40 - ER16 - 4.88 | 40        | 1/32-13/32 | 4.88 | 1.08 | ER16          |
| <b>BH332B25</b> | BT40 - ER20 - 6.00 | 40        | .039-.511  | 6.00 | 1.26 | ER20          |
| <b>BH333B25</b> | BT40 - ER25 - 6.00 | 40        | .039-.629  | 6.00 | 1.65 | ER25          |
| <b>BH334B25</b> | BT40 - ER32 - 6.00 | 40        | .078-.787  | 6.00 | 1.88 | ER32          |

**EXTRA EXTENDED**

| EDP NO          | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|-----------------|--------------------|-----------|------------|------|------|---------------|
| <b>BH432B25</b> | BT40 - ER20 - 8.00 | 40        | .039-.511  | 8.00 | 1.26 | ER20          |

\* BALANCING GRADE : BASED ON G2.5 / 25,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* THESE TOOLS ARE BALANCED WITH NO HARDWARE, NUTS, SCREWS, COLLETS OR CUTTING TOOLS IN THEM

\* TO ACHIEVE TRUE G2.5 @ 25,000 rpm THE ENTIRE ROTARY TOOLING ASSEMBLY INCLUDING THE CUTTING TOOL NEEDS TO BE BALANCED

\* ER NUT : SWISS MADE PRECISION ER NUT

\* SUPPLIED without WRENCH

\* WRENCHES ON PAGE 477



## ER NUT

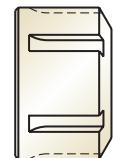
### CAT / BT

| EDP NO | SERIES     | TYPE  |
|--------|------------|-------|
| ZZ061  | ER11 - NUT | FIG.1 |
| ZZ063  | ER16 - NUT | FIG.1 |
| ZZ066  | ER20 - NUT | FIG.1 |
| ZZ069  | ER25 - NUT | FIG.2 |
| ZZ072  | ER32 - NUT | FIG.2 |

FIG.1



FIG.2



## ER WRENCH

### CAT / BT

| EDP NO | FOR USE WITH | TYPE  |
|--------|--------------|-------|
| ZZ062  | ER11         | FIG.1 |
| ZZ064  | ER16         | FIG.1 |
| ZZ067  | ER20         | FIG.1 |
| ZZ070  | ER25         | FIG.2 |
| ZZ073  | ER32         | FIG.2 |

FIG.1



FIG.2



## ER STOP SCREW

### CAT / BT

FIG.1

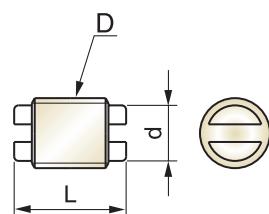
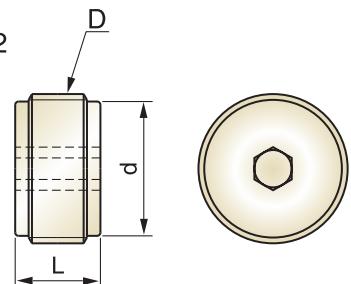
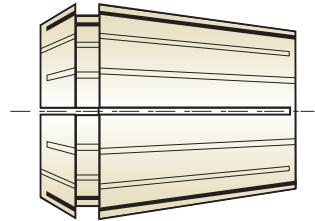


FIG.2



| EDP NO | SERIES | L    | d    | D            | TYPE  |
|--------|--------|------|------|--------------|-------|
| ZZ060  | ER11   | 0.50 | 0.25 | UN5/16 - 18  | FIG.1 |
| ZZ065  | ER16   | 0.50 | 0.35 | UN7/16 - 16  | FIG.2 |
| ZZ068  | ER20   | 0.50 | 0.48 | UN9/16 - 16  | FIG.2 |
| ZZ071  | ER25   | 0.50 | 0.60 | UN11/16 - 16 | FIG.2 |
| ZZ074  | ER32   | 0.50 | 0.79 | UN7/8 - 16   | FIG.2 |

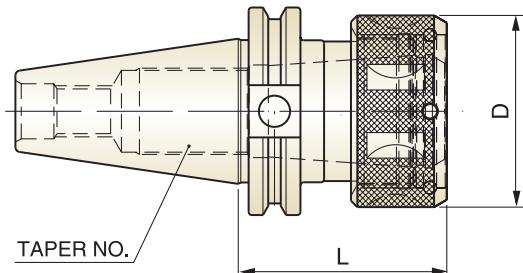


| TYPE ER11          |          | TYPE ER16            |          | TYPE ER20          |          | TYPE ER25          |          | TYPE ER32          |          |        |
|--------------------|----------|----------------------|----------|--------------------|----------|--------------------|----------|--------------------|----------|--------|
| CLAMPING CAPACITY  | ITEM NO. | CLAMPING CAPACITY    | ITEM NO. | CLAMPING CAPACITY  | ITEM NO. | CLAMPING CAPACITY  | ITEM NO. | CLAMPING CAPACITY  | ITEM NO. |        |
| 1/16               | 110116   | 1/16                 | 160116   | 1/16               | 200116   | 1/16               | 250116   | 3/32               | 320332   |        |
| 3/32               | 110332   | 3/32                 | 160332   | 3/32               | 200332   | 3/32               | 250332   | 1/8                | 320108   |        |
| 1/8                | 110108   | 1/8                  | 160108   | 1/8                | 200108   | 1/8                | 250108   | 5/32               | 320532   |        |
| 5/32               | 110532   | 5/32                 | 160532   | 5/32               | 200532   | 5/32               | 250532   | 3/16               | 320316   |        |
| 3/16               | 110316   | 3/16                 | 160316   | 3/16               | 200316   | 3/16               | 250316   | 7/32               | 320732   |        |
| 7/32               | 110732   | 7/32                 | 160732   | 7/32               | 200732   | 7/32               | 250732   | 1/4                | 320104   |        |
| 1/4                | 110104   | 1/4                  | 160104   | 1/4                | 200104   | 1/4                | 250104   | 9/32               | 320932   |        |
|                    |          | 9/32                 | 160932   | 9/32               | 200932   | 9/32               | 250932   | 5/16               | 320516   |        |
|                    |          | 5/16                 | 160516   | 5/16               | 200516   | 5/16               | 250516   | 11/32              | 321132   |        |
|                    |          | 11/32                | 161132   | 11/32              | 201132   | 11/32              | 251132   | 3/8                | 320308   |        |
|                    |          | 3/8                  | 160308   | 3/8                | 200308   | 3/8                | 250308   | 13/32              | 321332   |        |
|                    |          | 13/32                | 161332   | 13/32              | 201332   | 13/32              | 251332   | 7/16               | 320716   |        |
|                    |          |                      |          | 7/16               | 200716   | 7/16               | 250716   | 15/32              | 321532   |        |
|                    |          |                      |          |                    | 15/32    | 15/32              | 251532   | 1/2                | 320102   |        |
|                    |          |                      |          |                    | 1/2      | 200102             | 1/2      | 250102             | 17/32    | 321732 |
|                    |          |                      |          |                    |          | 17/32              | 251732   | 9/16               | 320916   |        |
|                    |          |                      |          |                    |          | 9/16               | 250916   | 19/32              | 321932   |        |
|                    |          |                      |          |                    |          | 19/32              | 251932   | 5/8                | 320508   |        |
|                    |          |                      |          |                    |          | 5/8                | 250508   | 21/32              | 322132   |        |
|                    |          |                      |          |                    |          |                    |          | 11/16              | 321116   |        |
|                    |          |                      |          |                    |          |                    |          | 23/32              | 322332   |        |
|                    |          |                      |          |                    |          |                    |          | 3/4                | 320304   |        |
| STANDARD SET       | ER11S07  | STANDARD SET         | ER16S12  | STANDARD SET       | ER20S15  | STANDARD SET       | ER25S19  | STANDARD SET       | ER32S22  |        |
| ®™ 1/16°» to 1/4°» |          | ®™ 1/16°» to 13/32°» |          | ®™ 1/16°» to 1/2°» |          | ®™ 1/16°» to 5/8°» |          | ®™ 3/32°» to 3/4°» |          |        |
| 7PCS               |          | 12PCS                |          | 15PCS              |          | 19PCS              |          | 22PCS              |          |        |

\* RUBBER SEALED ER COLLETS ARE AVAILABLE ON REQUEST

## CAT

## TG75



## STANDARD

| EDP NO | TYPE            | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|-----------------|-----------|------------|------|------|---------------|
| VK012  | CAT40-TG75-2.50 | 40        | 3/64-3/4   | 2.50 | 1.87 | 75TG          |

## EXTENDED

| EDP NO | TYPE            | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|-----------------|-----------|------------|------|------|---------------|
| VK312  | CAT40-TG75-3.00 | 40        | 3/64-3/4   | 3.00 | 1.87 | 75TG          |

## TG100

## STANDARD

| EDP NO | TYPE             | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|------------------|-----------|------------|------|------|---------------|
| OK014  | CAT40-TG100-3.25 | 40        | 1/16-1     | 3.25 | 2.50 | 100TG         |
| OL014  | CAT50-TG100-3.25 | 50        | 1/16-1     | 3.25 | 2.50 | 100TG         |

## EXTENDED

| EDP NO | TYPE             | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|------------------|-----------|------------|------|------|---------------|
| OK314  | CAT40-TG100-4.50 | 40        | 1/16-1     | 4.50 | 2.50 | 100TG         |
| OL314  | CAT50-TG100-5.50 | 50        | 1/16-1     | 5.50 | 2.50 | 100TG         |

## TG150

## STANDARD

| EDP NO | TYPE             | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|------------------|-----------|------------|------|------|---------------|
| UL052  | CAT50-TG150-3.50 | 50        | 1/2-1 1/2  | 3.50 | 3.50 | 150TG         |

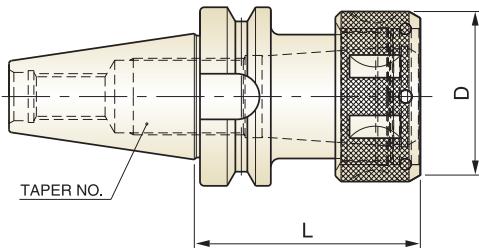
## EXTENDED

| EDP NO | TYPE                 | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|----------------------|-----------|------------|------|------|---------------|
| UL352  | CAT50 - TG150 - 6.00 | 50        | 1/2-1 1/2  | 6.00 | 3.50 | 150TG         |

\* WRENCH / NUTS / STOP SCREW FOR TG COLLET CHUCKS ON PAGE 481

BT

## TG75



## STANDARD

| EDP NO | TYPE               | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|--------------------|-----------|------------|------|------|---------------|
| VH012  | BT40 - TG75 - 3.00 | 40        | 3/64-3/4   | 3.00 | 1.87 | 75TG          |

## TG100

## STANDARD

| EDP NO | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|---------------------|-----------|------------|------|------|---------------|
| OH014  | BT40 - TG100 - 3.50 | 40        | 1/16-1     | 3.50 | 2.50 | 100TG         |
| OI014  | BT50 - TG100 - 3.50 | 50        | 1/16-1     | 3.50 | 2.50 | 100TG         |

## EXTENDED

| EDP NO | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|---------------------|-----------|------------|------|------|---------------|
| OH314  | BT40 - TG100 - 5.50 | 40        | 1/16-1     | 5.50 | 2.50 | 100TG         |
| OI314  | BT50 - TG100 - 6.00 | 50        | 1/16-1     | 6.00 | 2.50 | 100TG         |

## TG150

## STANDARD

| EDP NO | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|---------------------|-----------|------------|------|------|---------------|
| UI052  | BT50 - TG150 - 4.00 | 50        | 1/2-1 1/2  | 4.00 | 3.50 | 150TG         |

## EXTENDED

| EDP NO | TYPE                | TAPER NO. | SIZE RANGE | L    | D    | COLLET SERIES |
|--------|---------------------|-----------|------------|------|------|---------------|
| UI352  | BT50 - TG150 - 6.00 | 50        | 1/2-1 1/2  | 6.00 | 3.50 | 150TG         |

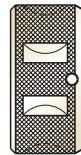
\* WRENCH / NUTS / STOP SCREW FOR TG COLLET CHUCKS ON PAGE 481



## TG NUT

### CAT / BT

| EDP NO | SERIES    |
|--------|-----------|
| ZZ084  | TG75-NUT  |
| ZZ081  | TG100-NUT |
| ZZ087  | TG150-NUT |



## TG WRENCH

### CAT / BT

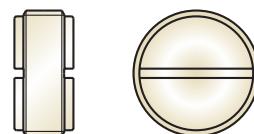
| EDP NO | FOR USE WITH |
|--------|--------------|
| ZZ085  | TG75         |
| ZZ082  | TG100        |
| ZZ088  | TG150        |



## TG STOP SCREW

### CAT / BT

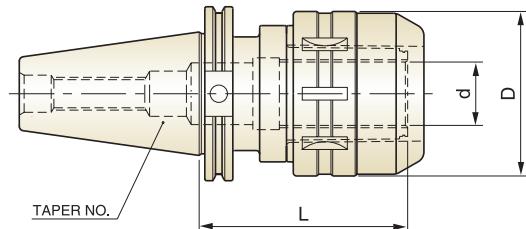
| EDP NO | SERIES |
|--------|--------|
| ZZ086  | TG75   |
| ZZ083  | TG100  |
| ZZ089  | TG150  |





## MILLING CHUCK

CAT



### STANDARD

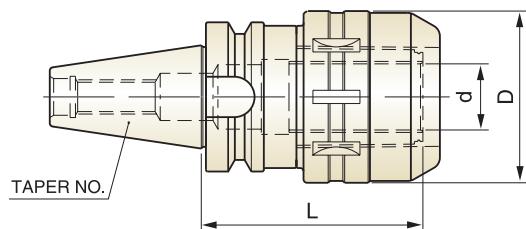
| EDP NO | TYPE                   | TAPER NO. | d     | L    | D    |
|--------|------------------------|-----------|-------|------|------|
| LK010  | CAT40 - C 3/4 - 4.13   | 40        | .750  | 4.13 | 2.13 |
| LK014  | CAT40 - C 1°» - 4.13   | 40        | 1.000 | 4.13 | 2.50 |
| LK017  | CAT40 - C 1 1/4 - 4.13 | 40        | 1.250 | 4.13 | 2.81 |
| LL010  | CAT50 - C 3/4 - 4.13   | 50        | .750  | 4.13 | 2.13 |
| LL014  | CAT50 - C 1°» - 4.13   | 50        | 1.000 | 4.13 | 2.50 |
| LL017  | CAT50 - C 1 1/4 - 4.13 | 50        | 1.250 | 4.13 | 2.81 |

\* COLLETS / WRENCHES FOR MILLING CHUCKS ON PAGE 477



## MILLING CHUCK

BT

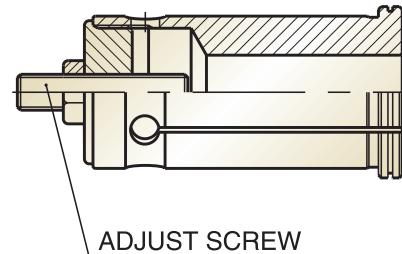


### STANDARD

| EDP NO | TYPE                  | TAPER NO. | d     | L    | D    |
|--------|-----------------------|-----------|-------|------|------|
| LH010  | BT40 - C 3/4 - 3.56   | 40        | .750  | 3.56 | 2.13 |
| LH014  | BT40 - C 1°» - 4.13   | 40        | 1.000 | 4.13 | 2.50 |
| LH017  | BT40 - C 1 1/4 - 4.13 | 40        | 1.250 | 4.13 | 2.81 |
| LI010  | BT50 - C 3/4 - 4.13   | 50        | .750  | 4.13 | 2.13 |
| LI014  | BT50 - C 1°» - 4.13   | 50        | 1.000 | 4.13 | 2.50 |
| LI017  | BT50 - C 1 1/4 - 4.13 | 50        | 1.250 | 4.13 | 2.81 |

\* COLLETS / WRENCHES FOR MILLING CHUCKS ON PAGE 483

## CAT / BAT



| EDP NO | TYPE | HOLE SIZE (D) | EDP NO | TYPE | HOLE SIZE (D) | EDP NO | TYPE   | HOLE SIZE (D) |
|--------|------|---------------|--------|------|---------------|--------|--------|---------------|
| MZ002  | C3/4 | 1/4           | MZ102  | C1"  | 1/4           | MZ302  | C1 1/4 | 1/4           |
| MZ003  | C3/4 | 5/16          | MZ103  | C1"  | 5/16          | MZ303  | C1 1/4 | 5/16          |
| MZ004  | C3/4 | 3/8           | MZ104  | C1"  | 3/8           | MZ304  | C1 1/4 | 3/8           |
| MZ006  | C3/4 | 1/2           | MZ106  | C1"  | 1/2           | MZ306  | C1 1/4 | 1/2           |
| MZ008  | C3/4 | 5/8           | MZ108  | C1"  | 5/8           | MZ308  | C1 1/4 | 5/8           |
|        |      |               | MZ110  | C1"  | 3/4           | MZ310  | C1 1/4 | 3/4           |
|        |      |               |        |      |               | MZ312  | C1 1/4 | 7/8           |
|        |      |               |        |      |               | MZ314  | C1 1/4 | 1"            |

## CAT / BAT

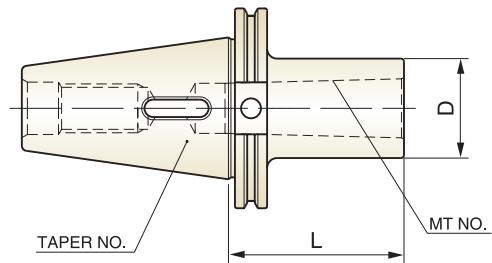


| EDP NO | FOR USE WITH |
|--------|--------------|
| ZZ056  | C3/4         |
| ZZ057  | C1"          |
| ZZ058  | C1 1/4       |



## MORSE TAPER ADAPTER

CAT

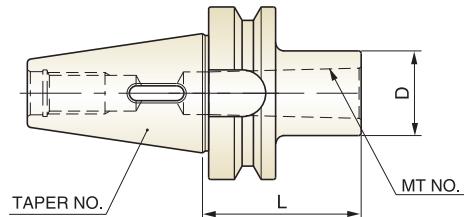


| EDP NO | TYPE            | TAPER NO. | MT NO. | L    | D    |
|--------|-----------------|-----------|--------|------|------|
| CK037  | CAT40-MTA1-1.75 | 40        | #1     | 1.75 | 1.00 |
| CK038  | CAT40-MTA2-2.00 | 40        | #2     | 2.00 | 1.26 |
| CK039  | CAT40-MTA3-2.75 | 40        | #3     | 2.75 | 1.58 |
| CK040  | CAT40-MTA4-3.63 | 40        | #4     | 3.63 | 1.97 |
| CL038  | CAT50-MTA2-1.38 | 50        | #2     | 1.38 | 1.26 |
| CL039  | CAT50-MTA3-1.88 | 50        | #3     | 1.88 | 1.58 |
| CL040  | CAT50-MTA4-2.75 | 50        | #4     | 2.75 | 1.97 |
| CL041  | CAT50-MTA5-4.06 | 50        | #5     | 4.06 | 2.55 |



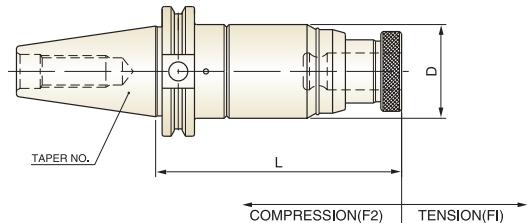
## MORSE TAPER ADAPTER

BT



| EDP NO | TYPE                | TAPER NO. | MT NO. | L    | D    |
|--------|---------------------|-----------|--------|------|------|
| CH037  | BT40 - MTA 1 - 1.75 | 40        | #1     | 1.75 | 1.00 |
| CH038  | BT40 - MTA 2 - 2.36 | 40        | #2     | 2.36 | 1.26 |
| CH039  | BT40 - MTA 3 - 2.95 | 40        | #3     | 2.95 | 1.58 |
| CH040  | BT40 - MTA 4 - 3.74 | 40        | #4     | 3.74 | 1.97 |
| CI038  | BT50 - MTA 2 - 2.36 | 50        | #2     | 2.36 | 1.26 |
| CI039  | BT50 - MTA 3 - 2.95 | 50        | #3     | 2.95 | 1.58 |
| CI040  | BT50 - MTA 4 - 3.74 | 50        | #4     | 3.74 | 1.97 |
| CI041  | BT50 - MTA 5 - 4.13 | 50        | #5     | 4.13 | 2.55 |

## CAT



These holders use Tap System #1 collets.

| EDP NO | TYPE            | TAPER NO. | D    | L    | F1    | F2    |
|--------|-----------------|-----------|------|------|-------|-------|
| JK048  | CAT40-TC#1-4.56 | 40        | 1.77 | 4.56 | 0.197 | 0.591 |
| JL048  | CAT50-TC#1-4.56 | 50        | 1.77 | 4.56 | 0.197 | 0.591 |

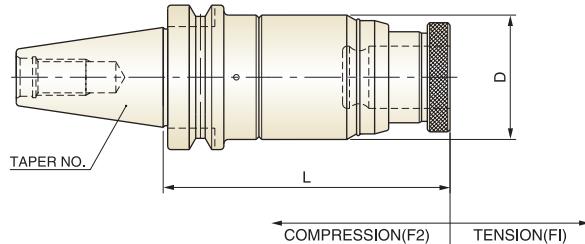
These holders use Tap System #2 collets.

| EDP NO | TYPE            | TAPER NO. | D    | L    | F1    | F2    |
|--------|-----------------|-----------|------|------|-------|-------|
| JK049  | CAT40-TC#2-6.47 | 40        | 2.48 | 6.47 | 0.197 | 0.787 |
| JL049  | CAT50-TC#2-5.82 | 50        | 2.48 | 5.82 | 0.197 | 0.787 |

These holders use Tap System #3 collets.

| EDP NO | TYPE            | TAPER NO. | D    | L    | F1    | F2    |
|--------|-----------------|-----------|------|------|-------|-------|
| JL050  | CAT50-TC#3-7.75 | 50        | 3.86 | 7.75 | 0.394 | 0.984 |

BT



These holders use Tap System #1 collets.

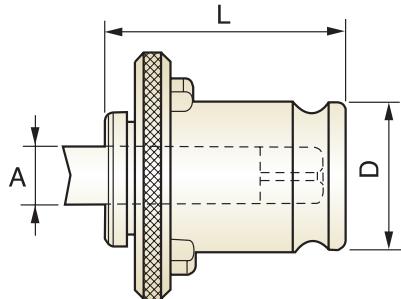
| EDP NO | TYPE                | TAPER NO. | D    | L    | F1    | F2    |
|--------|---------------------|-----------|------|------|-------|-------|
| JH048  | BT40 - TC #1 - 4.53 | 40        | 1.77 | 4.53 | 0.197 | 0.591 |
| JI048  | BT50 - TC #1 - 4.64 | 50        | 1.77 | 4.64 | 0.197 | 0.591 |

These holders use Tap System #2 collets.

| EDP NO | TYPE                | TAPER NO. | D    | L    | F1    | F2    |
|--------|---------------------|-----------|------|------|-------|-------|
| JH049  | BT40 - TC #2 - 6.72 | 40        | 2.48 | 6.72 | 0.197 | 0.787 |
| JI049  | BT50 - TC #2 - 6.72 | 50        | 2.48 | 6.72 | 0.197 | 0.787 |

These holders use Tap System #3 collets.

| EDP NO | TYPE                | TAPER NO. | D    | L    | F1    | F2    |
|--------|---------------------|-----------|------|------|-------|-------|
| JI050  | BT50 - TC #3 - 8.33 | 50        | 3.86 | 8.33 | 0.394 | 0.984 |



## Bilz Type Tap Chucks

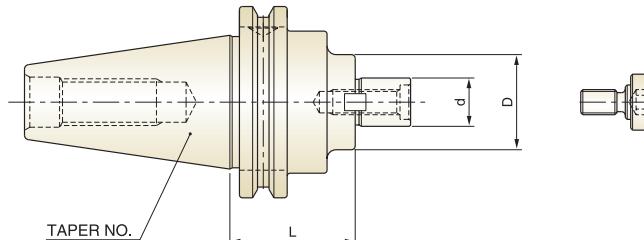
| Order no. | Adapter size                                       | Tap size range           | tap size | A shank dia | square AF |
|-----------|--|--------------------------|----------|-------------|-----------|
| QCT12001  | QCT 12<br><br>D = 19mm/0.748"<br>L = 28.5mm/1.122" | 0-9/16"                  | # 0-6    | 0.141       | 0.110     |
| QCT12002  |  |                          | # 8      | 0.168       | 0.131     |
| QCT12003  |  |                          | # 10     | 0.194       | 0.152     |
| QCT12004  |  |                          | # 12     | 0.220       | 0.165     |
| QCT12005  |  |                          | 1/4      | 0.255       | 0.191     |
| QCT12006  |  |                          | 5/16     | 0.318       | 0.238     |
| QCT12007  |  |                          | 3/8      | 0.381       | 0.286     |
| QCT12008  |  |                          | 7/16     | 0.323       | 0.242     |
| QCT12009  |  |                          | 1/2      | 0.367       | 0.275     |
| QCT12010  |  |                          | 9/16     | 0.429       | 0.322     |
| QCT12011  |  |                          | 1/8pss   | 0.3125      | 0.234     |
| QCT12012  |  |                          | 1/8pls   | 0.4370      | 0.328     |
| QCT24001  | QCT 24<br><br>D = 31mm/1.220"<br>L = 46mm/1.811"   | 5/16-7/8"                | 5/16     | 0.318       | 0.238     |
| QCT24002  |  |                          | 3/8      | 0.381       | 0.286     |
| QCT24003  |  |                          | 7/16     | 0.323       | 0.242     |
| QCT24004  |  |                          | 1/2      | 0.367       | 0.275     |
| QCT24005  |  |                          | 9/16     | 0.429       | 0.322     |
| QCT24006  |  |                          | 5/8      | 0.480       | 0.360     |
| QCT24007  |  |                          | 11/16    | 0.542       | 0.406     |
| QCT24008  |  |                          | 3/4      | 0.590       | 0.442     |
| QCT24009  |  |                          | 13/16    | 0.652       | 0.489     |
| QCT24010  |  |                          | 7/8      | 0.697       | 0.523     |
| QCT24011  |  | 1/4" - 3/8"<br>1/2" PIPE | 1/4p     | 0.5620      | 0.421     |
| QCT24012  |  |                          | 3/8p     | 0.7000      | 0.531     |
| QCT24013  |  |                          | 1/2p     | 0.6875      | 0.515     |
| QCT32001  | QCT 32<br><br>D = 48mm/1.890"<br>L = 69.5mm/2.736" | 13/16-1-3/8"             | 13/16    | 0.652       | 0.489     |
| QCT32002  |  |                          | 7/8      | 0.697       | 0.523     |
| QCT32003  |  |                          | 15/16    | 0.760       | 0.570     |
| QCT32004  |  |                          | 1        | 0.800       | 0.600     |
| QCT32005  |  |                          | 1-1/8    | 0.896       | 0.672     |
| QCT32006  |  |                          | 1-1/4    | 1.021       | 0.766     |
| QCT32007  |  |                          | 1-3/8    | 1.108       | 0.831     |
| QCT32008  |  |                          | 1/2p     | 0.6875      | 0.515     |
| QCT32009  |  |                          | 3/4p     | 0.9060      | 0.679     |
| QCT32010  |  |                          | 1p       | 1.1250      | 0.843     |

\* IMPROPER SELECTION OF PULL STUDS CAN CAUSE SERIOUS DAMAGE AND POSSIBLE INJURY.

PLEASE MAKE SURE THE MACHINE ACCEPTS THE PULL STUD YOU SELECT.

\*ADDITIONAL PULL STUDS AVAILABLE

## CAT



## STANDARD

| EDP NO | TYPE                | TAPER NO. | d     | L    | D    |
|--------|---------------------|-----------|-------|------|------|
| EK006  | CAT40-SMA1/2-1.50   | 40        | .500  | 1.50 | 1.44 |
| EK010  | CAT40-SMA3/4-1.50   | 40        | .750  | 1.50 | 1.69 |
| EK014  | CAT40-SMA1"-2.06    | 40        | 1.000 | 2.06 | 2.19 |
| EK017  | CAT40-SMA1 1/4-2.63 | 40        | 1.250 | 2.63 | 2.75 |
| EK021  | CAT40-SMA1 1/2-3.00 | 40        | 1.500 | 3.00 | 3.81 |
| EL010  | CAT50-SMA3/4-1.50   | 50        | .750  | 1.50 | 1.69 |
| EL014  | CAT50-SMA1"-2.00    | 50        | 1.000 | 2.00 | 2.19 |
| EL017  | CAT50-SMA1 1/4-1.50 | 50        | 1.250 | 1.50 | 2.75 |
| EL021  | CAT50-SMA1 1/2-2.50 | 50        | 1.500 | 2.50 | 3.81 |
| EL029  | CAT50-SMA2"-3.00    | 50        | 2.000 | 3.00 | 4.88 |

## EXTENDED

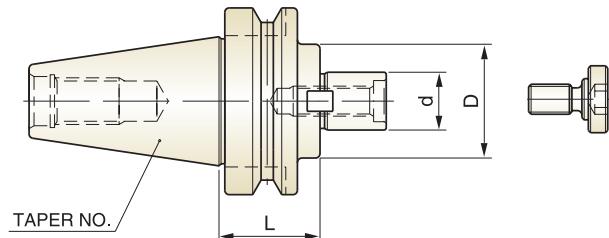
| EDP NO | TYPE                | TAPER NO. | d     | L    | D    |
|--------|---------------------|-----------|-------|------|------|
| EK306  | CAT40-SMA1/2-3.50   | 40        | .500  | 3.50 | 1.44 |
| EK310  | CAT40-SMA3/4-3.50   | 40        | .750  | 3.50 | 1.69 |
| EK314  | CAT40-SMA1"-4.00    | 40        | 1.000 | 4.00 | 2.19 |
| EK317  | CAT40-SMA1 1/4-4.00 | 40        | 1.250 | 4.00 | 2.75 |
| EK321  | CAT40-SMA1 1/2-4.00 | 40        | 1.500 | 4.00 | 3.81 |
| EL310  | CAT50-SMA3/4-3.50   | 50        | .750  | 3.50 | 1.69 |
| EL314  | CAT50-SMA1"-4.00    | 50        | 1.000 | 4.00 | 2.19 |
| EL317  | CAT50-SMA1 1/4-3.50 | 50        | 1.250 | 3.50 | 2.75 |
| EL321  | CAT50-SMA1 1/2-4.00 | 50        | 1.500 | 4.00 | 3.81 |
| EL329  | CAT50-SMA2"-4.00    | 50        | 2.000 | 4.00 | 4.88 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* DRIVE KEY / LOCK SCREW FOR SHELL MILL ARBORS ON PAGE 490

## BT



## STANDARD

| EDP NO       | TYPE                    | TAPER NO. | d     | L    | D    |
|--------------|-------------------------|-----------|-------|------|------|
| <b>EH006</b> | BT40 - SMA 1/2 - 1.75   | 40        | .500  | 1.75 | 1.44 |
| <b>EH010</b> | BT40 - SMA 3/4 - 1.77   | 40        | .750  | 1.77 | 1.69 |
| <b>EH014</b> | BT40 - SMA 1°» - 1.77   | 40        | 1.000 | 1.77 | 2.19 |
| <b>EH017</b> | BT40 - SMA 1 1/4 - 1.81 | 40        | 1.250 | 1.81 | 2.75 |
| <b>EH021</b> | BT40 - SMA 1 1/2 - 2.36 | 40        | 1.500 | 2.36 | 3.81 |
| <b>EI010</b> | BT50 - SMA 3/4 - 1.75   | 50        | .750  | 1.75 | 1.69 |
| <b>EI014</b> | BT50 - SMA 1°» - 1.75   | 50        | 1.000 | 1.75 | 2.19 |
| <b>EI017</b> | BT50 - SMA 1 1/4 - 1.75 | 50        | 1.250 | 1.75 | 2.75 |
| <b>EI021</b> | BT50 - SMA 1 1/2 - 1.75 | 50        | 1.500 | 1.75 | 3.81 |
| <b>EI029</b> | BT50 - SMA 2°» - 3.00   | 50        | 2.000 | 3.00 | 4.88 |

## EXTENDED

| EDP NO       | TYPE                    | TAPER NO. | d     | L    | D    |
|--------------|-------------------------|-----------|-------|------|------|
| <b>EH306</b> | BT40 - SMA 1/2 - 3.50   | 40        | .500  | 3.50 | 1.44 |
| <b>EH310</b> | BT40 - SMA 3/4 - 4.13   | 40        | .750  | 4.13 | 1.69 |
| <b>EH314</b> | BT40 - SMA 1°» - 4.13   | 40        | 1.000 | 4.13 | 2.19 |
| <b>EH317</b> | BT40 - SMA 1 1/4 - 4.13 | 40        | 1.250 | 4.13 | 2.75 |
| <b>EH321</b> | BT40 - SMA 1 1/2 - 4.72 | 40        | 1.500 | 4.72 | 3.81 |
| <b>EI310</b> | BT50 - SMA 3/4 - 3.50   | 50        | .750  | 3.50 | 1.69 |
| <b>EI314</b> | BT50 - SMA 1°» - 4.00   | 50        | 1.000 | 4.00 | 2.19 |
| <b>EI317</b> | BT50 - SMA 1 1/4 - 4.00 | 50        | 1.250 | 4.00 | 2.75 |
| <b>EI321</b> | BT50 - SMA 1 1/2 - 4.00 | 50        | 1.500 | 4.00 | 3.81 |
| <b>EI329</b> | BT50 - SMA 2°» - 4.00   | 50        | 2.000 | 4.00 | 4.88 |

\* BALANCING GRADE : BASED ON G6.3 / 15,000rpm

\* HIGH BALANCED END MILL HOLDERS ARE AVAILABLE ON REQUEST

\* DRIVE KEY / LOCK SCREW FOR SHELL MILL ARBORS ON PAGE 490



## SHELL MILL DRIVE KEY

CAT / BT

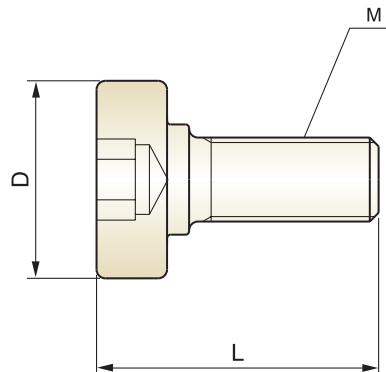
| EDP NO | SERIES        | B     |
|--------|---------------|-------|
| ZZ021  | SMA 1/2-KEY   | 0.25  |
| ZZ022  | SMA 3/4-KEY   | 0.312 |
| ZZ023  | SMA 1"-KEY    | 0.375 |
| ZZ024  | SMA 1 1/4-KEY | 0.5   |
| ZZ025  | SMA 1 1/2-KEY | 0.625 |
| ZZ026  | SMA 2"-KEY    | 0.75  |

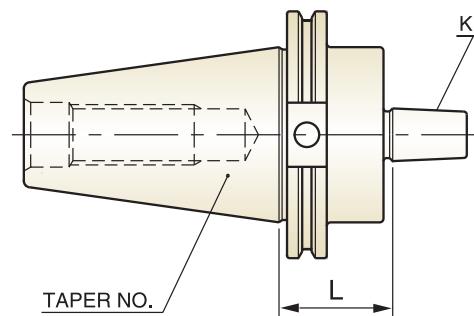


## SHELL MILL LOCK SCREW

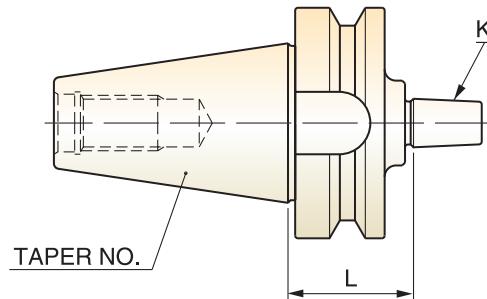
CAT / BT

| EDP NO | TYPE(M)      | L     | D     | SERIES            |
|--------|--------------|-------|-------|-------------------|
| ZZ031  | UNF 1/4 - 28 | 0.906 | 0.618 | SMA 1/2 - SCREW   |
| ZZ032  | UNF 3/8 - 24 | 1.26  | 0.882 | SMA 3/4 - SCREW   |
| ZZ033  | UNF 1/2 - 20 | 1.69  | 1.181 | SMA 1°» - SCREW   |
| ZZ034  | UNF 5/8 - 18 | 2.05  | 1.5   | SMA 1 1/4 - SCREW |
| ZZ035  | UNF 3/4 - 16 | 2.36  | 1.88  | SMA 1 1/2 - SCREW |
| ZZ036  | UNS 1°» - 14 | 2.52  | 2.5   | SMA 2°» - SCREW   |



**CAT**


| EDP NO | TYPE                  | TAPER NO. | K   | L    |
|--------|-----------------------|-----------|-----|------|
| GK042  | CAT40 - JTA 1 - 1.50  | 40        | #1  | 1.50 |
| GK043  | CAT40 - JTA 2 - 1.50  | 40        | #2  | 1.50 |
| GK044  | CAT40 - JTA 3 - 1.50  | 40        | #3  | 1.50 |
| GK045  | CAT40 - JTA 4 - 1.50  | 40        | #4  | 1.50 |
| GK046  | CAT40 - JTA 6 - 1.50  | 40        | #6  | 1.50 |
| GK047  | CAT40 - JTA 33 - 1.50 | 40        | #33 | 1.50 |
| GL042  | CAT50 - JTA 1 - 1.50  | 50        | #1  | 1.50 |
| GL043  | CAT50 - JTA 2 - 1.50  | 50        | #2  | 1.50 |
| GL044  | CAT50 - JTA 3 - 1.50  | 50        | #3  | 1.50 |
| GL045  | CAT50 - JTA 4 - 1.50  | 50        | #4  | 1.50 |
| GL046  | CAT50 - JTA 6 - 1.50  | 50        | #6  | 1.50 |
| GL047  | CAT50 - JTA 33 - 1.50 | 50        | #33 | 1.50 |

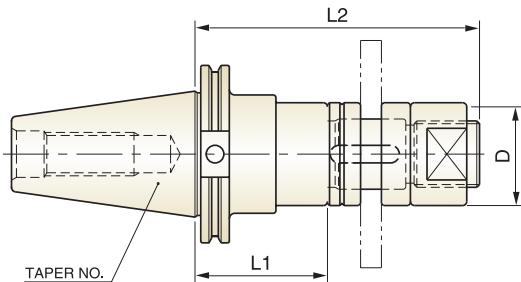
**BT**


| EDP NO | TYPE                 | TAPER NO. | K   | L    |
|--------|----------------------|-----------|-----|------|
| GH042  | BT40 - JTA 1 - 1.34  | 40        | #1  | 1.34 |
| GH043  | BT40 - JTA 2 - 1.77  | 40        | #2  | 1.77 |
| GH044  | BT40 - JTA 3 - 1.77  | 40        | #3  | 1.77 |
| GH045  | BT40 - JTA 4 - 1.77  | 40        | #4  | 1.77 |
| GH046  | BT40 - JTA 6 - 1.77  | 40        | #6  | 1.77 |
| GH047  | BT40 - JTA 33 - 1.77 | 40        | #33 | 1.77 |
| GI042  | BT50 - JTA 1 - 1.80  | 50        | #1  | 1.80 |
| GI043  | BT50 - JTA 2 - 1.77  | 50        | #2  | 1.77 |
| GI044  | BT50 - JTA 3 - 1.77  | 50        | #3  | 1.77 |
| GI045  | BT50 - JTA 4 - 1.77  | 50        | #4  | 1.77 |
| GI046  | BT50 - JTA 6 - 1.77  | 50        | #6  | 1.77 |
| GI047  | BT50 - JTA 33 - 1.77 | 50        | #33 | 1.77 |



## CAT STUB ARBOR

**CAT**



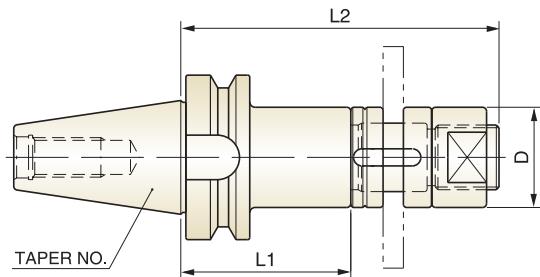
### STANDARD

| EDP NO | TYPE                 | TAPER NO. | CUTTER SIZE I.D | L1   | D    | L2   |
|--------|----------------------|-----------|-----------------|------|------|------|
| PK014  | CAT40-STUB1"-4.00    | 40        | 1.000           | 4.00 | 1.56 | 6.25 |
| PK017  | CAT40-STUB1 1/4-4.00 | 40        | 1.250           | 4.00 | 1.88 | 6.50 |
| PK021  | CAT40-STUB1 1/2-4.00 | 40        | 1.500           | 4.00 | 2.12 | 6.75 |
| PL014  | CAT50-STUB1"-4.00    | 50        | 1.000           | 4.00 | 1.56 | 6.25 |
| PL017  | CAT50-STUB1 1/4-4.00 | 50        | 1.250           | 4.00 | 1.88 | 6.50 |
| PL021  | CAT50-STUB1 1/2-4.00 | 50        | 1.500           | 4.00 | 2.12 | 6.75 |



## STUB ARBOR

**BT**



### STANDARD

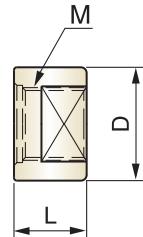
| EDP NO | TYPE                                | TAPER NO. | CUTTER SIZE I.D | L1   | D    | L2   |
|--------|-------------------------------------|-----------|-----------------|------|------|------|
| PH014  | BT40 - STUB 1 <sup>0</sup> " - 3.00 | 40        | 1.000           | 3.00 | 1.56 | 5.25 |
| PH017  | BT40 - STUB 1 1/4 - 3.00            | 40        | 1.250           | 3.00 | 1.88 | 5.50 |
| PH021  | BT40 - STUB 1 1/2 - 3.00            | 40        | 1.500           | 3.00 | 2.12 | 5.75 |
| PI014  | BT50 - STUB 1 <sup>0</sup> " - 4.00 | 50        | 1.000           | 4.00 | 1.56 | 6.25 |
| PI017  | BT50 - STUB 1 1/4 - 4.00            | 50        | 1.250           | 4.00 | 1.88 | 6.50 |
| PI021  | BT50 - STUB 1 1/2 - 4.00            | 50        | 1.500           | 4.00 | 2.12 | 6.75 |



## NUT

### CAT / BT

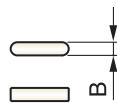
| EDP NO | TYPE(M) | L    | D    | SERIES     |
|--------|---------|------|------|------------|
| ZZ041  | 1.56    | 1.00 | 1.56 | STUB 1"    |
| ZZ046  | 1.87    | 1.25 | 1.87 | STUB 1 1/4 |
| ZZ052  | 2.12    | 1.50 | 2.12 | STUB 1 1/2 |



## KEY

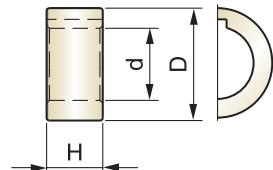
### CAT / BT

| EDP NO | SERIES     | B     |
|--------|------------|-------|
| ZZ042  | STUB 1"    | 0.25  |
| ZZ047  | STUB 1 1/4 | 0.312 |
| ZZ054  | STUB 1 1/2 | 0.375 |



## SPACER

### CAT / BT



| EDP NO | TYPE       | H     | D    | d    | SERIES    |
|--------|------------|-------|------|------|-----------|
| ZZ048  | 1/4-SPACER | 0.25  | 1.87 | 1.25 | STUB1 1/4 |
| ZZ049  | 3/8-SPACER | 0.375 | 1.87 | 1.25 | STUB1 1/4 |
| ZZ050  | 3/4-SPACER | 0.75  | 1.87 | 1.25 | STUB1 1/4 |

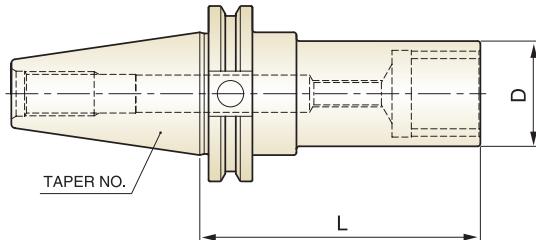
| EDP NO | TYPE       | H     | D    | d    | SERIES |
|--------|------------|-------|------|------|--------|
| ZZ043  | 1/4-SPACER | 0.25  | 1.56 | 1.00 | STUB1" |
| ZZ044  | 3/8-SPACER | 0.375 | 1.56 | 1.00 | STUB1" |
| ZZ045  | 3/4-SPACER | 0.75  | 1.56 | 1.00 | STUB1" |

| EDP NO | TYPE       | H     | D    | d    | SERIES    |
|--------|------------|-------|------|------|-----------|
| ZZ037  | 1/4-SPACER | 0.25  | 2.12 | 1.50 | STUB1 1/2 |
| ZZ038  | 3/8-SPACER | 0.375 | 2.12 | 1.50 | STUB1 1/2 |
| ZZ039  | 3/4-SPACER | 0.75  | 2.12 | 1.50 | STUB1 1/2 |



## SLITTING SAW ARBOR

CAT



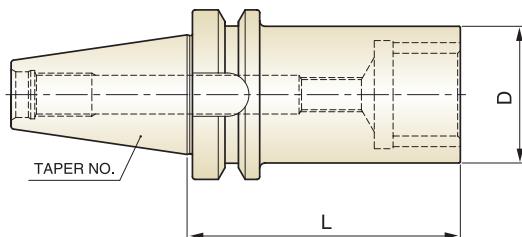
### STANDARD

| EDP NO | TYPE                | TAPER NO. | COLLET SERIES | L    | D    |
|--------|---------------------|-----------|---------------|------|------|
| QK014  | CAT40-SSA1"-4.00    | 40        | 1.000         | 4.00 | 1.50 |
| QK017  | CAT40-SSA1 1/4-4.00 | 40        | 1.250         | 4.00 | 2.00 |
| QL014  | CAT50-SSA1"-4.00    | 50        | 1.000         | 4.00 | 1.50 |
| QL017  | CAT50-SSA1 1/4-4.00 | 50        | 1.250         | 4.00 | 2.00 |



## SLITTING SAW ARBOR

BT



### STANDARD

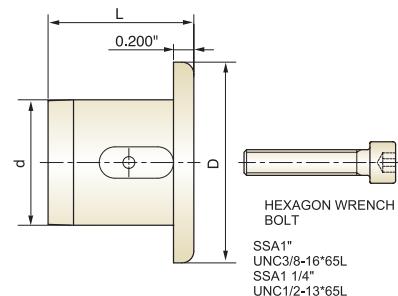
| EDP NO | TYPE                    | TAPER NO. | COLLET SERIES | L    | D    |
|--------|-------------------------|-----------|---------------|------|------|
| QH014  | BT40 - SSA 1°" - 4.00   | 40        | 1.000         | 4.00 | 1.50 |
| QH017  | BT40 - SSA 1 1/4 - 4.00 | 40        | 1.250         | 4.00 | 2.00 |



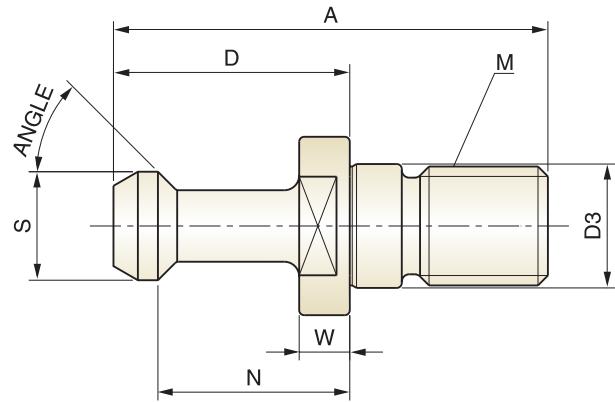
## CAP

CAT / BT

| EDP NO | TYPE       | L    | D    | d    |
|--------|------------|------|------|------|
| ZZ051  | SSA 1"     | 1.02 | 1.50 | 1.50 |
| ZZ053  | SSA 1 1/4" | 1.30 | 2.00 | 2.00 |



PS



| EDP NO | TYPE C=Coolant    | Angle | S     | P     | D3    | A     | N     | D     | W     | M      |
|--------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| SK661  | CAT-40 ANSI C     | 45°   | 0.740 | 0.490 | 0.490 | 1.500 | 0.440 | 0.640 | 0.120 | 5/8-11 |
| SL661  | CAT-50 ANSI C     | 45°   | 1.140 | 0.820 | 0.820 | 2.300 | 0.700 | 1.000 | 0.200 | 1-8    |
| SK561  | CAT-40 ANSI       | 45°   | 0.740 | 0.490 | 0.490 | 1.500 | 0.440 | 0.640 | 0.120 | 5/8-11 |
| SL561  | CAT-50 ANSI       | 45°   | 1.140 | 0.820 | 0.820 | 2.300 | 0.700 | 1.000 | 0.200 | 1-8    |
| SK761  | CAT-40 TYPE I     | 45°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK762  | CAT-40 TYPE II    | 60°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK763  | CAT-40 TYPE III   | 90°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK861  | CAT-40 TYPE I C   | 45°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK862  | CAT-40 TYPE II C  | 60°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SK863  | CAT-40 TYPE III C | 90°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.120 | 5/8-11 |
| SL761  | CAT-50 TYPE I     | 45°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SL762  | CAT-50 TYPE II    | 60°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SL763  | CAT-50 TYPE III   | 90°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SL861  | CAT-50 TYPE I C   | 45°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SL862  | CAT-50 TYPE II C  | 60°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SL863  | CAT-50 TYPE III C | 90°   | 0.906 | 0.669 | 0.827 | 3.346 | 1.377 | 1.772 | 0.390 | 1-8    |
| SH061  | BT-40 PS 1        | 45°   | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16    |
| SI061  | BT-50 PS 5        | 45°   | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24    |
| SH062  | BT-40 PS 2        | 60°   | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16    |
| SI062  | BT-50 PS 6        | 60°   | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24    |
| SH063  | BT-40 PS 8        | 90°   | 0.590 | 0.394 | 0.669 | 2.360 | 1.102 | 1.378 | 0.230 | M16    |
| SI063  | BT-50 PS 0        | 90°   | 0.905 | 0.669 | 0.984 | 3.346 | 1.377 | 1.772 | 0.390 | M24    |
| SK161  | CAT-40 TYPE I     | 45°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK162  | CAT-40 TYPE II    | 60°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK163  | CAT-40 TYPE III   | 90°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK261  | CAT-40 TYPE I C   | 45°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK262  | CAT-40 TYPE II C  | 60°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |
| SK263  | CAT-40 TYPE III C | 90°   | 0.590 | 0.394 | 0.512 | 2.250 | 0.990 | 1.266 | 0.236 | 5/8-11 |

\* IMPROPER SELECTION OF PULL STUDS CAN CAUSE SERIOUS DAMAGE AND POSSIBLE INJURY.

PLEASE MAKE SURE THE MACHINE ACCEPTS THE PULL STUD YOU SELECT.

## TBT,TCT

| EDP NO | TYPE   | SHANK FLANGE TYPE |
|--------|--------|-------------------|
| RK099  | TCT-40 | CAT-40            |
| RH099  | TBT-40 | BT-40             |
| RL099  | TCT-50 | CAT-50            |
| RM099  | TBT-50 | BT-50             |

\*AVAILABLE IN ALL TAPERS.

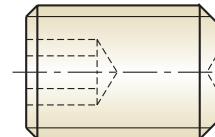


## FEATURES :

- \* ACCESS BOTH ENDS OF YOUR TOOL HOLDERS SIMULTANEOUSLY
- \* MINIMIZES TOOL HOLDERS HANDLING
- \* SPEEDS UP YOUR OPERATIONS
- \* CONVENIENT

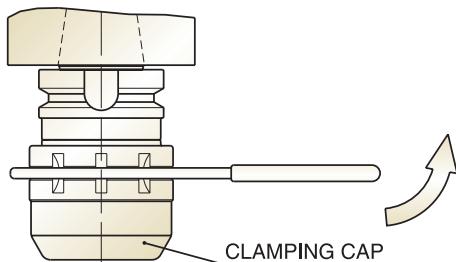
## HEXAGON SOCKET SET SCREW (FLAT TYPE)

| EDP NO | SCREW      | END MILL DIA. |
|--------|------------|---------------|
| ZZ000  | UNC#8-32   | 1/8           |
| ZZ001  | UNF#10-32  | 3/16          |
| ZZ002  | UNF1/4-28  | 1/4           |
| ZZ003  | UNF5/16-24 | 5/16          |
| ZZ004  | UNF3/8-24  | 3/8           |
| ZZ005  | UNF3/8-24  | 7/16          |
| ZZ006  | UNF7/16-20 | 1/2           |
| ZZ007  | UNF1/2-20  | 5/8           |
| ZZ008  | UNF5/8-18  | 3/4           |
| ZZ009  | UNF5/8-18  | 7/8           |
| ZZ010  | UNF3/4-16  | 1"            |
| ZZ011  | UNF3/4-16  | 1 1/4         |
| ZZ012  | UNF3/4-16  | 1 1/2         |
| ZZ013  | UN1"-14    | 2"            |

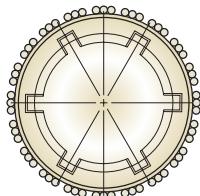


## MILLING CHUCK

## Grasping;



## Structure;



## SPECIAL FEATURES

**EASE OF USE**

BORE DIAMETER IS REDUCED BY .006 WITH ONLY TWO FULL TURNS OF THE CLAMPING CAP.

**HOLDING POWER**

THICKER BODY STRUCTURE OF CLAMPING CAP ASSURES STRONG HOLDING POWER MAXIMUM DURABILITY AND SMOOTH MOVEMENT OF NEEDLE BEARINGS 300 kgm HOLDING FORCE.

**ACCURACY**

SLOTS ON THE INSIDE OF BORE HELP PREVENT EXCESSIVE OIL AND GRIME FROM BUILDING UP BETWEEN SHANK OF END MILL AND INSIDE OF BORE WHICH INCREASES ACCURACY AND HOLDING POWER .0002 TIR AT 3940 FROM NOSE

**DURABILITY**

SPECIAL ENGINEERED STEELS AND ALLOYS ARE USED IN THE BEARING AND STOP SEAL TO INCREASE LIFE AND REDUCE MAINTENANCE.

## MILLING CHUCK

## T.I.R TOLERANCE

**ER CHUCK**

Concentric to 0.0002" T.I.R  
puts tool precisely on spindle centerline

**END MILL HOLDER**

Concentric to 0.0002" T.I.R  
puts tool precisely on spindle centerline

**MILLING CHUCK**

Concentric to 0.0002" T.I.R  
puts tool precisely on spindle centerline

**SLITTING SAW ARBOR**

Face perpendicular to taper within 0.0002" T.I.R

**STUB ARBOR**

Face perpendicular to taper within 0.0002" T.I.R

**SHELL MILL ARBOR**

Face perpendicular to taper within 0.0001" T.I.R  
Out diameter to taper within 0.0002" T.I.R

**MORSE TAPER ARBOR**

Concentric to 0.0003" T.I.R

**JACOBS TAPER ARBOR**

Concentric to 0.0002" T.I.R



## Technology and Quality

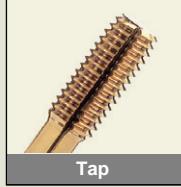
....**YG-1** Strives for technological advancements and superior quality 24 hours a day.



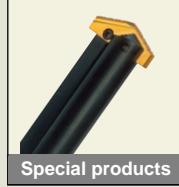
End Mill



Drill



Tap



Special products

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