



CATALOG &
TECHNICAL
GUIDE

SOLID ROUND TOOLING



Niagara Cutter
A SECO TOOLS COMPANY



YOUR SOLID TOOLING & TECHNOLOGY EXPERTS

A TEST FOR OURSELVES & A PROMISE TO OUR CUSTOMERS

Niagara Cutter understands product consistency, quality, and maximum levels of performance are paramount to our customers. These fundamentals begin in our dedicated R&D, Engineering, and test facilities. The knowledge gained through these resources serve as a framework to educate not only ourselves, but also allow us to assist our customers in becoming competent and practical experts. Extensive product development and educational initiatives support Niagara Cutter's continuous achievement in exceeding industry expectations. Always striving for excellence and embracing the needs of our customer guarantee that the promise we make is the promise we keep... to provide the highest value cutting tools in the world.

INNOVATION | TECHNOLOGY | QUALITY | SERVICE



Niagara Cutter
A SECO TOOLS COMPANY

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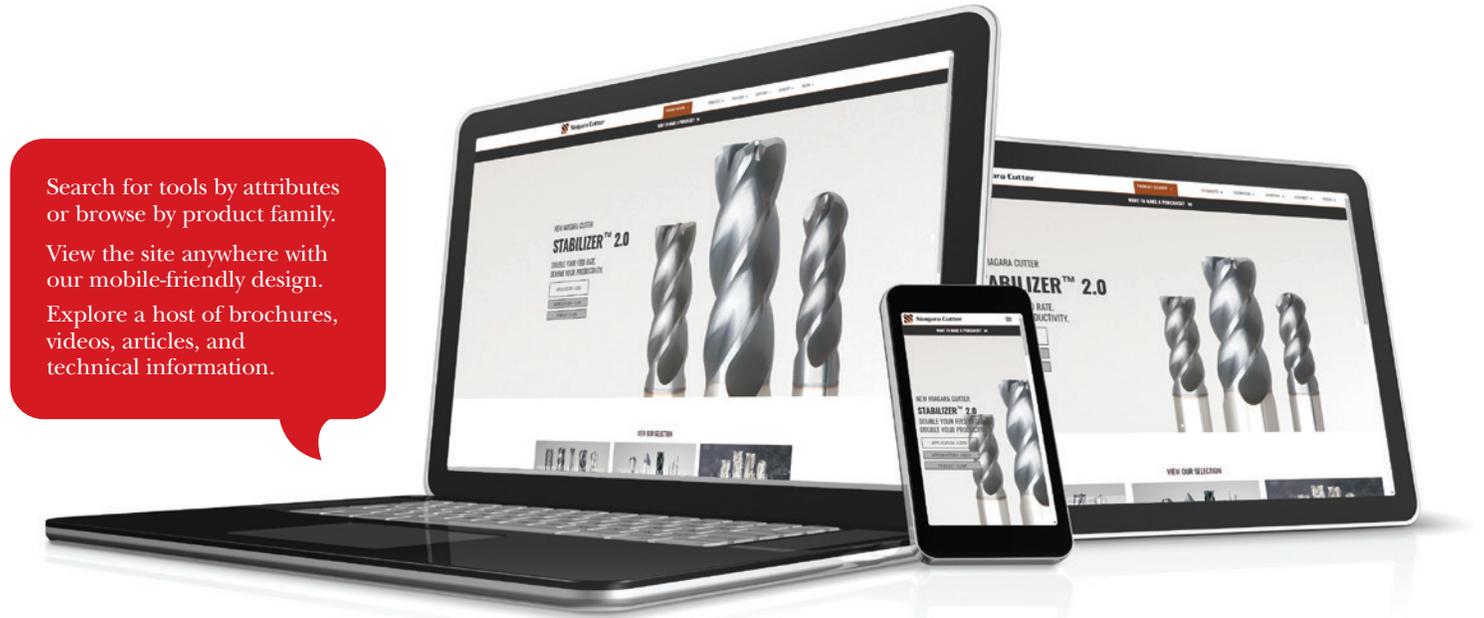
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APPLICATION ENGINEERING

At Niagara Cutter, we are dedicated to a process of constant improvement and take pride in our record of significant innovation and industry advancements.

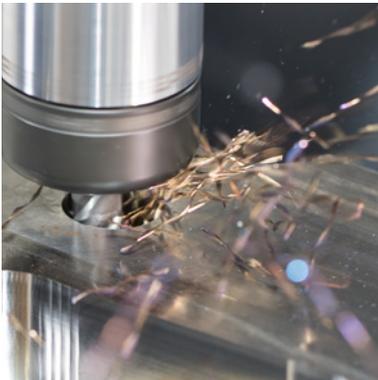
Our truly innovative and comprehensive systems approach to world-class products starts with listening and learning. Then, between initial concept and final product there is application engineering, prototype development, exhaustive product testing and critical analysis before culminating in a product that does not just perform, but outperforms that which previously existed.



MANUFACTURING TECHNOLOGY

Niagara Cutter continues to invest heavily in automated processes, but in the final analysis these machines are only as capable as their programming and maintenance allows. The final products are only as consistent as the parameters set by Niagara's machinists. It is in these areas where no machine can match the human contribution.

Niagara Cutter aggressively pursues continuous improvement in its automated operations and its people. Therefore, the perfect operation between man and machine at Niagara Cutter results in a company that is far greater than the sum of its parts in achieving consistency and accuracy.



PRODUCTS - HIGH PERFORMANCE CUTTING TOOL SOLUTIONS

Niagara Cutter offers many product styles, including end mills, thread mills, drills, and special cutting tools to customer blueprints. With multiple material substrates (cobalt, tungsten carbide), tool geometries and thin film coatings, we provide a complete product range to meet your cutting tool requirements.

Our job is not just to produce premium cutting tools, but to produce premium cutting tools specific to your application and for absolute optimum performance. We do this by asking the critical questions and quickly responding with the most effective solution.



HIGH PERFORMANCE STABILIZER™ 2.0 SERIES - Page 18

The Stabilizer 2.0 family of end mills raises the bar in high performance milling by incorporating a patented continuously varying asymmetrical geometry which helps create a smooth chatter free milling condition. This configuration, along with a specially engineered flute shape, allow for feed rates twice that of the previous Stabilizer.

The ST430.2 series of end mills are specifically designed for machining steels, alloy steels, copper alloys and cast iron. The ST440.2 HT series of end mills are specifically designed for machining ISO-S materials such as stainless steel, steels over 42 Rc, titanium and Inconel. These end mills also feature an AlTiN coating that offers high heat resistance and superior abrasion resistance to maximize tool life.



ELITE A & S SERIES - Page 43

Our Elite series of end mills feature specific geometries for ferrous or nonferrous materials, available in 0.125 - 1.25" diameters.

The new S638, S738 and S938 multi flute end mills are designed for Optimized and Peripheral Roughing and Finishing applications in Stainless Steel, Titanium and high temperature alloys.

The A series is designed for aluminum and non ferrous materials and is available with two or three flutes in a variety of configurations. The S series provides high performance machining in steel, stainless steel and high temperature alloys with three, five, six, seven and nine flutes.



HIGH FEED & MOLD & DIE - Page 110

The mold & die range offers geometries for hard milling of steels up to 62Rc.

The SN200R, SN400R and SN500R cover a broad range of applications and materials. These end mills direct radial cutting pressure up into spindle for increased metal removal rates in deep pockets and long reach applications.

The MZN410R and MZN510R are designed to maximize productivity in hardened steels and superalloys. These end mills feature optimized substrate, geometry and coating to offer superior performance and process reliability.



CVD DIAMOND - Page 128

Diamond is the material of choice for machining abrasive non-ferrous metals, ceramics, and composites. The unique hardness of the Diamond coating makes it more resistant to abrasive wear than any other cutting tool material. In addition, high chemical stability and the resulting low affinity to non-ferrous materials as well as the low coefficient of friction helps retard the formation of built-up edges.

CVD Diamond coating offers a new level of wear protection and performance. DiamondPlus™ coating combines micro and nano-crystalline diamond coatings into one super hard layer.



GENERAL PURPOSE C SERIES - Page 158

The C series end mills with two, three, or four flutes are available in square, corner radius or ball end, uncoated or with TiAlN as standard. This broad range of end mills is typical for job shop environments where one tool can handle a variety of applications.



MICRO - Page 215

For the manufacturing of small components, Niagara Cutter has developed a range of miniature end mills. The Micro range delivers precision technology and quality in micro decimal diameters. These miniature end mills are available in square end and ball end geometries with two and four flutes. All tools are 1/8" shank, 1-1/2" overall length.



CHAMFER MILLS - Page 226

Chamfer mills are available to produce either a 60° or 90° chamfer. Both styles are available with two or four flutes.



COBALT - Page 237

General purpose M42 cobalt roughers and finishers are available in a wide variety of sizes in both center cutting and non center cutting geometries.

The VFP geometry is designed specifically for high metal removal rates in stainless steel and titanium alloys.

Our EXCEL end mills are a revolutionary solution that combines superior geometry, high grade cobalt substrate and wear resistant PVD coatings to handle difficult milling applications.



THREAD MILLS - Page 291

Thread milling is a versatile and cost effective solution, especially if you are machining a variety of parts and materials on the same machine. Niagara Cutter offers a broad range of solid carbide thread mills to meet your requirements.

One thread mill can produce, regardless of diameter, thread forms of the same pitch. Thread forms produced can be internal or external, right-hand or left-hand. Plus, milled threads produce excellent form, finish, and dimensional accuracy, even in difficult to machine materials.

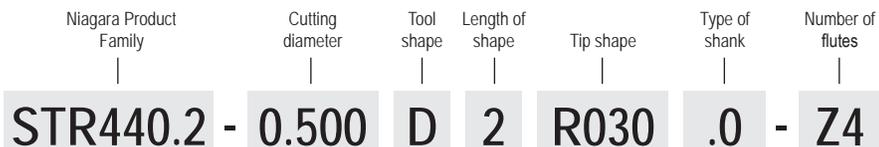


UNIVERSAL DRILL - Page 301

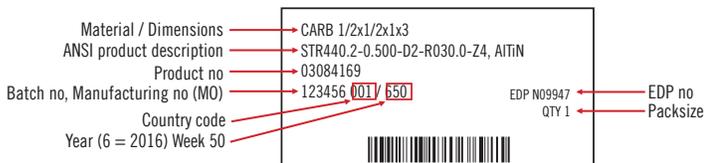
Niagara Universal solid carbide drills offer performance and value for holemaking applications across all industry segments.

Niagara Universal drills feature advanced coating technology and optimized geometries for specialized applications that focus on hole quality, high-volume production and achieving the lowest cost per hole. The new Universal Drill line adds to the Niagara Cutter family by bringing versatility and reduced inventory costs to low and medium batch production.

END MILL PRODUCT CODE KEY



PRODUCT LABEL



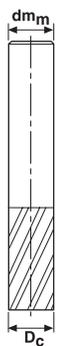
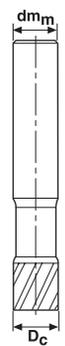
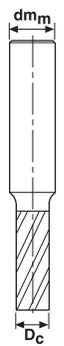
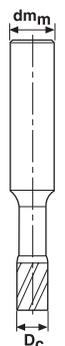
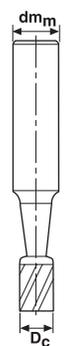
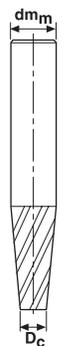
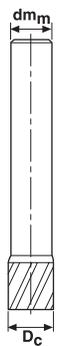
PRODUCT RANGE

Example:
 ST = STABILIZER
 For all products, see catalog.

CUTTING DIAMETER

Metric = 3 digit code (in case of 4 digit code: xx.xx mm)
 Imperial = a decimal followed by a 3 digit code
 For example: (050 = metric, 5 mm) (500 = imperial, 1/2 inch)

TOOL SHAPE

| $(D_c = D_M)$ | | $(D_c < D_M)$ | | | | $(D_c > D_M)$ |
|--|--|--|--|--|--|---|
|  |  |  |  |  |  |  |
| D Cylindrical | E Neck | F Step | G Step neck | J Taper neck | N Taper | P Step |

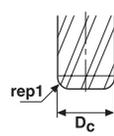
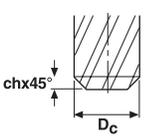
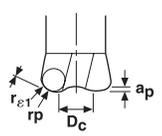
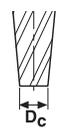
LENGTH OF SHAKE

- STUB = 1
- S = 2
- M = 3
- L = 4
- LR1 = 5
- LR2 = 6
- LR3 = 7
- LR4 = 8
- LR5 = 9

TYPE OF SHANK

Indicates the shank types that are available.
 .0 = Cylindrical
 .3 = Weldon
 .5 = Whistle Notch
 .9 = Safe-Lock

TIP SHAPE

| SQUARE END | BALL-NOSE | CORNER RADIUS | CHAMFER | HIGH-FEED | TAPER |
|---|---|---|---|---|--|
|  |  |  |  |  |  |
| S | B | R... | C | H | N |

Size of radius for convex and concave radius tipped products

.000 = For metric products the tip shape is shown by a three-digit figure.
 By dividing this figure by 100 you will get the actual corner radius size in millimeters.

.000 = For inch products the tip shape is shown by a dot, followed by a three-digit figure.
 This figure actually shows the size of the corner radius in inch (e.g. R.100 would indicate a radius of 0.100 Inch).

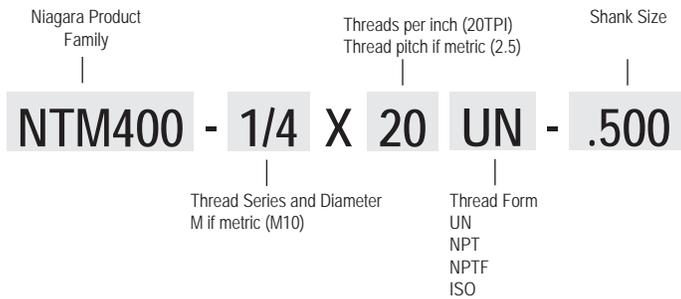
NUMBER OF FLUTES

This figure indicates the number of flutes in the cutter.
 For example:
 Z2 = 2 flutes, Z6 = 6 flutes

COATING DESCRIPTION

| | |
|--------|-------------|
| AICrN | AICrN |
| AITiN | AITiN |
| CVDDIA | Diamond CVD |
| TiAIN | TiAIN |
| TiCN | TiCN |
| TiN | TiN |
| | Uncoated |

THREAD MILLING PRODUCT CODE KEY



FORMULA

a_e = Width of cut/radial depth of cut
 a_p = Depth of cut/axial depth of cut
 f = Feed per revolution
 f_z = Feed per tooth
 n = Rev/min RPM
 v_c = Surface footage/min
 v_f = Table travel (in/min)
 z_n = Number of teeth

SYMBOL KEY

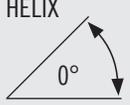
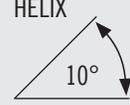
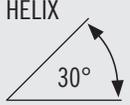
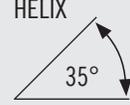
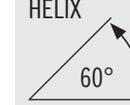
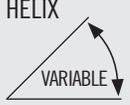
TOOL MATERIAL - SUBSTRATE

| | | |
|---------------|---------------------------------------|------------------|
| SOLID CARBIDE | PREMIUM PARTICLE METAL 8.5% COBALT | M42 8% COBALT |
|---------------|---------------------------------------|------------------|

TOOL END SHAPE

| | | | |
|--|--|---|---|
| SQUARE END  | BALL END  | CHAMFER  60° | CHAMFER  90° |
| CHAMFER  45° | RADIUS  | HIGH FEED  | |

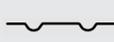
HELIX ANGLE

| | | | |
|--|--|--|--|
| HELIX  0° | HELIX  10° | HELIX  15° | HELIX  20° |
| HELIX  30° | HELIX  35° | HELIX  36° | HELIX  37° |
| HELIX  38° | HELIX  40° | HELIX  45° | HELIX  60° |
| HELIX  VARIABLE | | | |

END TEETH

| | |
|----------------|--------------------|
| CENTER CUTTING | NON CENTER CUTTING |
|----------------|--------------------|

ROUGHING PROFILES

| | | | |
|--|---|---|--|
| CHIPBREAKER  | COARSE PITCH  | FINE PITCH  | TRUNCATED  |
| CHIPSPLITTER  | | | |

SECO MATERIAL GROUP (SMG)

STEEL, FERRITIC AND MARTENSITIC STAINLESS STEEL

| ISO | SMG NO. | REPRESENTATIVE MATERIAL | DESCRIPTION | BHN | $k_c 1.1 \times 1000$ lbf/in ² | m_c |
|-----|---------|-------------------------|--|-----------|--|-------|
| P | 1 | 1010 | Very soft carbon steels Purely ferritic steels | < 135 | 196 | 0.21 |
| | 2 | 1140 | Free-cutting steels | 120 < 210 | 218 | 0.22 |
| | 3 | 1045 | Structural steels. Ordinary carbon steels with low to medium carbon content (<0,5%C) | 135 < 165 | 218 | 0.25 |
| | 4 | 4140 | Carbon steels with high carbon content (>0,5%C) Medium hard steels for toughening. Ordinary low-alloy steels Ferritic and martensitic stainless steels | 165 < 210 | 247 | 0.24 |
| | 5 | 4340 | Normal tool steels Harder steels for toughening Martensitic stainless steels | 210 < 270 | 276 | 0.24 |
| | 6 | D2 | Difficult tool steels High-alloy steels with high hardness Martensitic stainless steels | 270 < 360 | 290 | 0.24 |
| H | 7 | A128 Grade A | Difficult high-strength steels with 42 to 56 HRC hardness Hardened steels from material group 3-6 Martensitic stainless steels | > 360 | 421 | 0.22 |

FREE-CUTTING, AUSTENITIC AND DUPLEX STAINLESS STEEL

| | | | | | | |
|---|----|-----|--|--|-----|------|
| M | 8 | 304 | Easy-cutting stainless steels Free-cutting stainless steels Calcium-treated stainless steels | | 254 | 0.22 |
| | 9 | 316 | Moderately difficult stainless steels Austenitic and duplex stainless steels | | 276 | 0.2 |
| | 10 | 310 | Difficult stainless steels Austenitic and duplex stainless steels | | 297 | 0.2 |
| | 11 | 330 | Very difficult stainless steels Austenitic and duplex stainless steels | | 312 | 0.2 |

CAST IRON

| | | | | | | |
|---|----|----------------|---|--|-----|------|
| K | 12 | 60-40-18 | Medium hard cast iron Grey cast iron | | 167 | 0.22 |
| | 13 | A536 80-55-06 | Low-alloy cast iron Malleable cast iron Nodular cast iron | | 178 | 0.25 |
| | 14 | A536 100-70-03 | Moderately difficult alloy cast iron Moderately difficult malleable cast iron Nodular cast iron | | 196 | 0.28 |
| | 15 | A536 120-90-02 | Difficult high-alloy cast iron Difficult malleable cast iron Nodular cast iron | | 213 | 0.3 |

OTHER MATERIALS

| | | | | | | |
|---|----|-----------------------------------|--------------------------|--|-----|------|
| N | 16 | A380 | Aluminum alloys: Low Si | | 101 | 0.25 |
| | 17 | B390.0 | Aluminum alloys: High Si | | 101 | 0.27 |
| | 18 | CA937 | Copper alloys | | | |
| S | 19 | Disalloy | Fe-based superalloys | | | |
| | 20 | Stellite 21 | Co-based superalloys | | 377 | 0.24 |
| | 21 | Inconel 718 (bar, forge, ring) | Ni-based superalloys | | 479 | 0.24 |
| | 22 | Ti 6Al-4V (annealed) | Titanium alloys | | 210 | 0.23 |

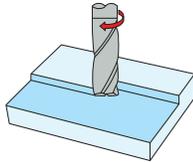
$k_c 1.1$ -values with 0 degree effective cutting rake angle. For other rake angles, reduce the $k_c 1.1$ -value by 1% for every degree increase in the cutting rake angle and vice versa. Keep in mind that the BHN-value is only an aid in the selection of the material group when the material has been worked by rolling, drawing, heat treatment or other methods that increase the strength of the material.

BASIC MILLING OPERATIONS

FACE MILLING

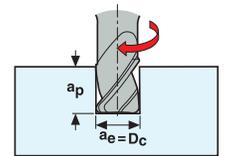
Operation where the tool is in engagement with less than 180° arc of contact.

Tool engagement:
Small a_p and large a_e .



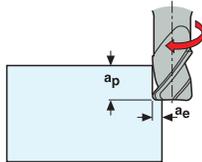
SLOT MILLING

Operation where the full diameter is in engagement, a_e is equal to D_c and a_p up to 1½ times D_c depending on the machining strategy in use.



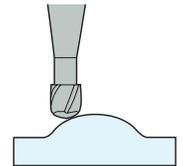
SIDE MILLING

Operation where the side of the tool is in engagement, a_p is large and a_e is small.



COPY MILLING

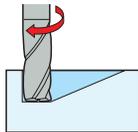
Operation where the radius is in engagement. a_p and a_e are both small.



ADVANCED MILLING OPERATIONS

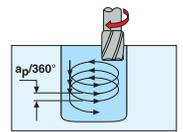
RAMPING

Opening up a pocket by making a Z axis at an angle.



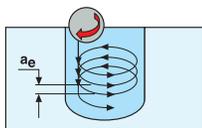
HELICAL INTERPOLATION RAMPING

Opening a pocket by making a circular movement with the tool slightly less than 2 x D while ramping in Z axis.



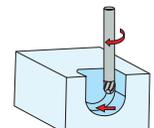
TROCHOIDAL

Opening a slot by using side milling, making a partial circular movement in X- or Y-axis. (changing slot milling into side milling).



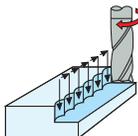
PUSH-PULL

Machining a 3D form by making a down and up copying movement following the profile of the form.



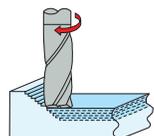
PLUNGE MILLING

Opening up a deep slot by using drilling (Z) axis.



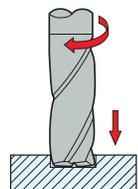
Z-LEVELING

Machining a surface by making a small drilling or ramping in Z axis then opening the pocket with X and Y movements.



DRILLING

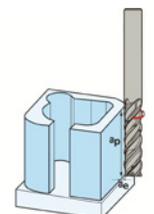
Making a hole with movement in Z axis.

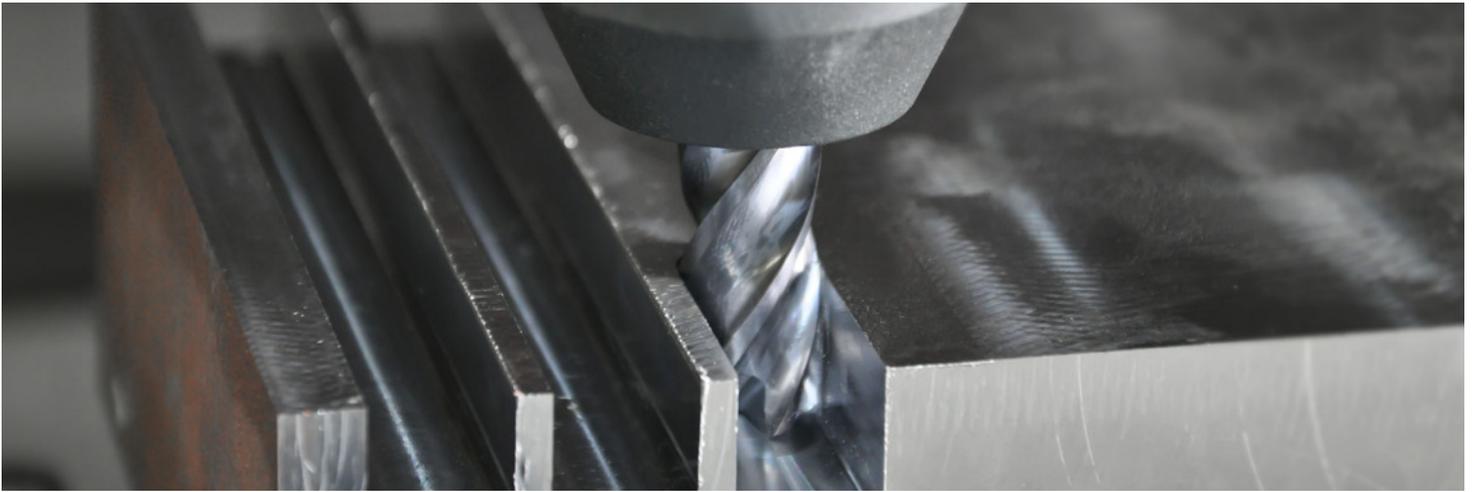


OPTIMIZED ROUGHING

Well defined tool paths with constant arc of contact for reliable roughing of simple & complex shapes.

The large axial depths (a_p) & small radial depths (a_e) of cut combined with high feeds per tooth (f_z) and cutting speeds (V_c) results in high productivity.





DOUBLE YOUR FEED RATE AND YOUR PRODUCTIVITY

STABILIZER™ 2.0

The Stabilizer 2.0 family of end mills raises the bar in high performance milling by incorporating a patented continuously varying asymmetrical geometry which helps create a smooth chatter free milling condition. This configuration, along with a specially engineered flute shape, allow for feed rates twice that of the previous Stabilizer.

PRODUCT OVERVIEW

- Solid carbide high performance tools excel in slot and side milling
- Double the feed rates compared to previous Stabilizer
- Longer tool life than previous tool types even when applied at 2x the feed rates
- Continuous variable asymmetrical geometry for smooth, chatter free cutting
- Wide application area covered, from steel to exotic materials

YOUR NIAGARA CUTTER BENEFIT

- Reduced cycle times with higher metal removal rates
- Minimized harmonics
- High heat and abrasion resistance
- Smooth chatter free cutting
- Long and predictable tool life
- Consistent performance in all applications
- AlTiN coating for high heat and abrasion resistance

RANGE OVERVIEW

- Diameters 1/8" - 1" and 3mm - 25mm
- 1 x D, 2 x D and 3 x D length versions available
- Corner radius and ball nose necked versions with 2 x D flute length and 3 x D reach

TECHNICAL SPECIFICATIONS

| | |
|-------------------|--|
| Diameter range: | ø1/8" - ø1", 3mm-25 mm |
| # flutes: | 4 |
| Helix angle: | Variable (offered in 430 and 440 series) |
| Rake angle: | Variable (based on series) |
| Relief: | Variable (based on series and diameter) |
| Flute Diameter | |
| Tolerance: | +0.000 / - .002" |
| Shank Diameter | |
| Tolerance: | -0.001 / -.0004 |
| Corner Radius | |
| Tolerance: | + / -.001 |
| Unequal Index: | Yes |
| Edge preparation: | Yes |
| Coating: | AlTiN |

PREFERRED MATERIAL GROUPS (430 SERIES)

| |
|-------------------------------|
| steel < 450 N/mm ² |
| 450 < 700 N/mm ² |
| 700 < 1200 N/mm ² |
| Cast Iron |
| Copper Alloys |

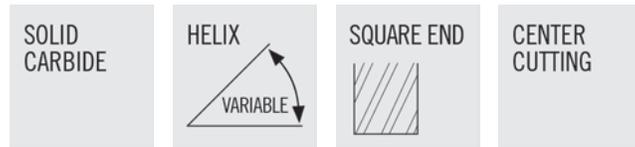
PREFERRED MATERIAL GROUPS (440 SERIES)

| |
|-----------------------|
| Stainless steel |
| Fe based super alloys |
| CO-based super alloys |
| Ni-based super alloys |
| Titanium alloys |

INDUSTRY TARGETS

- General Machining
- Aerospace
- Medical

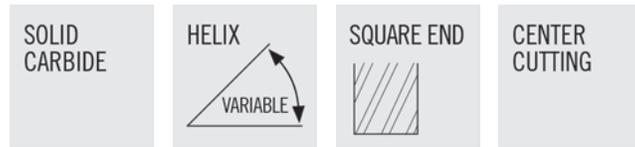
STABILIZER™ 2.0-ST5430.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Weldon flat on shank sizes 3/8" and larger (optional)
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 35
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N09696 | STS430.2-0.125-D1-S.0-Z4 | 1/8 | 1/8 | 1/8 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09697 | STS430.2-0.125-D2-S.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09698 | STS430.2-0.125-D3-S.0-Z4 | 1/8 | 1/8 | 3/8 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09699 | STS430.2-0.156-F1-S.0-Z4 | 5/32 | 3/16 | 5/32 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09702 | STS430.2-0.156-F2-S.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09703 | STS430.2-0.156-F3-S.0-Z4 | 5/32 | 3/16 | 15/32 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09704 | STS430.2-0.188-D1-S.0-Z4 | 3/16 | 3/16 | 3/16 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09705 | STS430.2-0.188-D2-S.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09706 | STS430.2-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 9/16 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09707 | STS430.2-0.219-F1-S.0-Z4 | 7/32 | 1/4 | 7/32 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09708 | STS430.2-0.219-F2-S.0-Z4 | 7/32 | 1/4 | 7/16 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09709 | STS430.2-0.219-F3-S.0-Z4 | 7/32 | 1/4 | 21/32 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09712 | STS430.2-0.250-D1-S.0-Z4 | 1/4 | 1/4 | 1/4 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09713 | STS430.2-0.250-D2-S.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09714 | STS430.2-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09715 | STS430.2-0.281-F1-S.0-Z4 | 9/32 | 5/16 | 9/32 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09716 | STS430.2-0.281-F2-S.0-Z4 | 9/32 | 5/16 | 9/16 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09717 | STS430.2-0.281-F3-S.0-Z4 | 9/32 | 5/16 | 27/32 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09718 | STS430.2-0.313-D1-S.0-Z4 | 5/16 | 5/16 | 5/16 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09719 | STS430.2-0.313-D2-S.0-Z4 | 5/16 | 5/16 | 5/8 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09722 | STS430.2-0.313-D3-S.0-Z4 | 5/16 | 5/16 | 15/16 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09723 | STS430.2-0.375-D1-S.0-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09724 | STS430.2-0.375-D1-S.3-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | WELDON |
| N09725 | STS430.2-0.375-D2-S.0-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09726 | STS430.2-0.375-D2-S.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | WELDON |
| N09727 | STS430.2-0.375-D3-S.0-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09728 | STS430.2-0.375-D3-S.3-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | WELDON |
| N09729 | STS430.2-0.438-D1-S.0-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | CYLINDRICAL |
| N09732 | STS430.2-0.438-D1-S.3-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | WELDON |
| N09733 | STS430.2-0.438-D2-S.0-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | CYLINDRICAL |
| N09734 | STS430.2-0.438-D2-S.3-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | WELDON |
| N09735 | STS430.2-0.438-D3-S.0-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09736 | STS430.2-0.438-D3-S.3-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | WELDON |

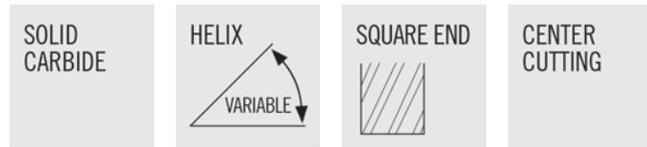
STABILIZER™ 2.0-STS430.2 (CON'T)



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 35
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N09737 | STS430.2-0.500-D1-S.0-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09738 | STS430.2-0.500-D1-S.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | WELDON |
| N09739 | STS430.2-0.500-D2-S.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09742 | STS430.2-0.500-D2-S.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | WELDON |
| N09743 | STS430.2-0.500-D3-S.0-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09744 | STS430.2-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | WELDON |
| N09745 | STS430.2-0.500-D4-S.0-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09746 | STS430.2-0.500-D4-S.3-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | WELDON |
| N09747 | STS430.2-0.625-D1-S.0-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09748 | STS430.2-0.625-D1-S.3-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | WELDON |
| N09749 | STS430.2-0.625-D2-S.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09752 | STS430.2-0.625-D2-S.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | WELDON |
| N09753 | STS430.2-0.625-D3-S.0-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09754 | STS430.2-0.625-D3-S.3-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | WELDON |
| N09755 | STS430.2-0.750-D1-S.0-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09756 | STS430.2-0.750-D1-S.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | WELDON |
| N09757 | STS430.2-0.750-D2-S.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09758 | STS430.2-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | WELDON |
| N09759 | STS430.2-0.750-D3-S.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | CYLINDRICAL |
| N09762 | STS430.2-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | WELDON |
| N09763 | STS430.2-0.875-D1-S.0-Z4 | 7/8 | 7/8 | 7/8 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09764 | STS430.2-0.875-D1-S.3-Z4 | 7/8 | 7/8 | 7/8 | 4 | 4 | ALTIN | WELDON |
| N09765 | STS430.2-0.875-D2-S.0-Z4 | 7/8 | 7/8 | 1-3/4 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09766 | STS430.2-0.875-D2-S.3-Z4 | 7/8 | 7/8 | 1-3/4 | 4 | 4 | ALTIN | WELDON |
| N09767 | STS430.2-0.875-D3-S.0-Z4 | 7/8 | 7/8 | 2-5/8 | 5 | 4 | ALTIN | CYLINDRICAL |
| N09768 | STS430.2-0.875-D3-S.3-Z4 | 7/8 | 7/8 | 2-5/8 | 5 | 4 | ALTIN | WELDON |
| N09769 | STS430.2-1.000-D1-S.0-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09772 | STS430.2-1.000-D1-S.3-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | WELDON |
| N09773 | STS430.2-1.000-D2-S.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | CYLINDRICAL |
| N09774 | STS430.2-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | WELDON |
| N09775 | STS430.2-1.000-D3-S.0-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | CYLINDRICAL |
| N09776 | STS430.2-1.000-D3-S.3-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | WELDON |

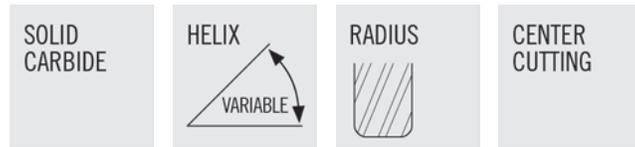
STABILIZER™ 2.0-STS430M.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 36
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N09538 | STS430M.2-030-F2-S.0-Z4 | 3MM | 6MM | 6MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09539 | STS430M.2-030-F3-S.0-Z4 | 3MM | 6MM | 9MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09542 | STS430M.2-040-F2-S.0-Z4 | 4MM | 6MM | 8MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09543 | STS430M.2-040-F3-S.0-Z4 | 4MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09544 | STS430M.2-050-F2-S.0-Z4 | 5MM | 6MM | 10MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09545 | STS430M.2-050-F3-S.0-Z4 | 5MM | 6MM | 15MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09546 | STS430M.2-060-D2-S.0-Z4 | 6MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09547 | STS430M.2-060-D3-S.0-Z4 | 6MM | 6MM | 18MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09548 | STS430M.2-080-D2-S.0-Z4 | 8MM | 8MM | 16MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09549 | STS430M.2-080-D3-S.0-Z4 | 8MM | 8MM | 24MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09552 | STS430M.2-100-D2-S.0-Z4 | 10MM | 10MM | 20MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09553 | STS430M.2-100-D3-S.0-Z4 | 10MM | 10MM | 30MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09554 | STS430M.2-120-D2-S.0-Z4 | 12MM | 12MM | 24MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09555 | STS430M.2-120-D3-S.0-Z4 | 12MM | 12MM | 36MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09556 | STS430M.2-160-D2-S.0-Z4 | 16MM | 16MM | 32MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09557 | STS430M.2-160-D3-S.0-Z4 | 16MM | 16MM | 48MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09558 | STS430M.2-200-D2-S.0-Z4 | 20MM | 20MM | 40MM | 105MM | 4 | ALTIN | CYLINDRICAL |
| N09559 | STS430M.2-200-D3-S.0-Z4 | 20MM | 20MM | 60MM | 125MM | 4 | ALTIN | CYLINDRICAL |
| N09562 | STS430M.2-250-D2-S.0-Z4 | 25MM | 25MM | 50MM | 115MM | 4 | ALTIN | CYLINDRICAL |
| N09563 | STS430M.2-250-D3-S.0-Z4 | 25MM | 25MM | 75MM | 147MM | 4 | ALTIN | CYLINDRICAL |

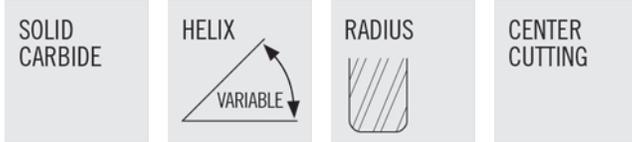
STABILIZER™ 2.0-STR430.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 35
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09777 | STR430.2-0.125-D1-R010.0-Z4 | 1/8 | 1/8 | 1/8 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09778 | STR430.2-0.125-D2-R010.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09779 | STR430.2-0.125-D3-R010.0-Z4 | 1/8 | 1/8 | 3/8 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09782 | STR430.2-0.156-F1-R010.0-Z4 | 5/32 | 3/16 | 5/32 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09783 | STR430.2-0.156-F2-R010.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09784 | STR430.2-0.156-F3-R010.0-Z4 | 5/32 | 3/16 | 15/32 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09785 | STR430.2-0.188-D1-R010.0-Z4 | 3/16 | 3/16 | 3/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09786 | STR430.2-0.188-D2-R010.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09787 | STR430.2-0.188-D3-R010.0-Z4 | 3/16 | 3/16 | 9/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09788 | STR430.2-0.219-F1-R020.0-Z4 | 7/32 | 1/4 | 7/32 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09789 | STR430.2-0.219-F2-R020.0-Z4 | 7/32 | 1/4 | 7/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09792 | STR430.2-0.219-F3-R020.0-Z4 | 7/32 | 1/4 | 21/32 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09793 | STR430.2-0.250-D1-R020.0-Z4 | 1/4 | 1/4 | 1/4 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09794 | STR430.2-0.250-D2-R020.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09795 | STR430.2-0.250-D3-R020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09796 | STR430.2-0.281-F1-R020.0-Z4 | 9/32 | 5/16 | 9/32 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09797 | STR430.2-0.281-F2-R020.0-Z4 | 9/32 | 5/16 | 9/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09798 | STR430.2-0.281-F3-R020.0-Z4 | 9/32 | 5/16 | 27/32 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09799 | STR430.2-0.313-D1-R020.0-Z4 | 5/16 | 5/16 | 5/16 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09802 | STR430.2-0.313-D2-R020.0-Z4 | 5/16 | 5/16 | 5/8 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09803 | STR430.2-0.313-D3-R020.0-Z4 | 5/16 | 5/16 | 15/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09804 | STR430.2-0.375-D1-R020.0-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09805 | STR430.2-0.375-D1-R020.3-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | 0.020 | WELDON |
| N09806 | STR430.2-0.375-D2-R020.0-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09807 | STR430.2-0.375-D2-R020.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | WELDON |
| N09808 | STR430.2-0.375-D3-R020.0-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09809 | STR430.2-0.375-D3-R020.3-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | 0.020 | WELDON |
| N09812 | STR430.2-0.438-F1-R020.0-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09813 | STR430.2-0.438-F1-R020.3-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | 0.020 | WELDON |
| N09814 | STR430.2-0.438-F2-R020.0-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09815 | STR430.2-0.438-F2-R020.3-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | 0.020 | WELDON |
| N09816 | STR430.2-0.438-F3-R020.0-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | 0.020 | CYLINDRICAL |

STABILIZER™ 2.0-STR430.2 (CON'T)



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 35
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09817 | STR430.2-0.438-F3-R020.3-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | 0.020 | WELDON |
| N09818 | STR430.2-0.500-D1-R030.0-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09819 | STR430.2-0.500-D1-R030.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09844 | STR430.2-0.500-D2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09845 | STR430.2-0.500-D2-R030.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09846 | STR430.2-0.500-D3-R030.0-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09847 | STR430.2-0.500-D3-R030.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09848 | STR430.2-0.500-D4-R030.0-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09849 | STR430.2-0.500-D4-R030.3-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09852 | STR430.2-0.625-D1-R030.0-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09853 | STR430.2-0.625-D1-R030.3-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09854 | STR430.2-0.625-D2-R030.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09855 | STR430.2-0.625-D2-R030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09856 | STR430.2-0.625-D3-R030.0-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09857 | STR430.2-0.625-D3-R030.3-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09858 | STR430.2-0.750-D1-R030.0-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09859 | STR430.2-0.750-D1-R030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09862 | STR430.2-0.750-D2-R030.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09863 | STR430.2-0.750-D2-R030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09864 | STR430.2-0.750-D3-R030.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09865 | STR430.2-0.750-D3-R030.3-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.030 | WELDON |
| N09866 | STR430.2-0.875-D1-R030.0-Z4 | 7/8 | 7/8 | 7/8 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09867 | STR430.2-0.875-D1-R030.3-Z4 | 7/8 | 7/8 | 7/8 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09868 | STR430.2-0.875-D2-R030.0-Z4 | 7/8 | 7/8 | 1-3/4 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09869 | STR430.2-0.875-D2-R030.3-Z4 | 7/8 | 7/8 | 1-3/4 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09872 | STR430.2-0.875-D3-R030.0-Z4 | 7/8 | 7/8 | 2-5/8 | 5 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09873 | STR430.2-0.875-D3-R030.3-Z4 | 7/8 | 7/8 | 2-5/8 | 5 | 4 | ALTIN | 0.030 | WELDON |
| N09874 | STR430.2-1.000-D1-R030.0-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09875 | STR430.2-1.000-D1-R030.3-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09876 | STR430.2-1.000-D2-R030.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09877 | STR430.2-1.000-D2-R030.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.030 | WELDON |
| N09878 | STR430.2-1.000-D3-R030.0-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09879 | STR430.2-1.000-D3-R030.3-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.030 | WELDON |

STABILIZER™ 2.0-STR430M.2

SOLID
CARBIDE



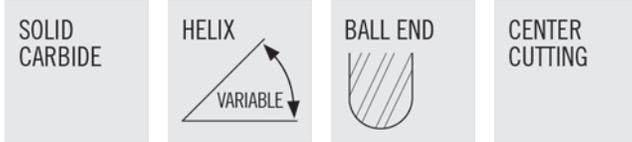
CENTER
CUTTING



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 36
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09564 | STR430M.2-030-F2-R025.0-Z4 | 3MM | 6MM | 6MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09565 | STR430M.2-030-F3-R025.0-Z4 | 3MM | 6MM | 9MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09566 | STR430M.2-040-F2-R025.0-Z4 | 4MM | 6MM | 8MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09567 | STR430M.2-040-F3-R025.0-Z4 | 4MM | 6MM | 12MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09568 | STR430M.2-050-F2-R025.0-Z4 | 5MM | 6MM | 10MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09569 | STR430M.2-050-F3-R025.0-Z4 | 5MM | 6MM | 15MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09582 | STR430M.2-060-D2-R050.0-Z4 | 6MM | 6MM | 12MM | 58MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09583 | STR430M.2-060-D3-R050.0-Z4 | 6MM | 6MM | 18MM | 58MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09584 | STR430M.2-080-D2-R050.0-Z4 | 8MM | 8MM | 16MM | 64MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09585 | STR430M.2-080-D3-R050.0-Z4 | 8MM | 8MM | 24MM | 64MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09586 | STR430M.2-100-D2-R050.0-Z4 | 10MM | 10MM | 20MM | 73MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09587 | STR430M.2-100-D3-R050.0-Z4 | 10MM | 10MM | 30MM | 73MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09588 | STR430M.2-120-D2-R075.0-Z4 | 12MM | 12MM | 24MM | 84MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09589 | STR430M.2-120-D3-R075.0-Z4 | 12MM | 12MM | 36MM | 84MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09602 | STR430M.2-160-D2-R075.0-Z4 | 16MM | 16MM | 32MM | 93MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09603 | STR430M.2-160-D3-R075.0-Z4 | 16MM | 16MM | 48MM | 93MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09604 | STR430M.2-200-D2-R075.0-Z4 | 20MM | 20MM | 40MM | 105MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09605 | STR430M.2-200-D3-R075.0-Z4 | 20MM | 20MM | 60MM | 125MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09606 | STR430M.2-250-D2-R075.0-Z4 | 25MM | 25MM | 50MM | 115MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09607 | STR430M.2-250-D3-R075.0-Z4 | 25MM | 25MM | 75MM | 147MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |

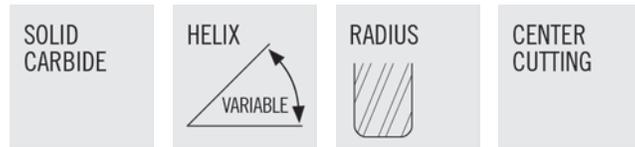
STABILIZER™ 2.0-STB430.2 & STB430M.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data STB430.2 - Page 35
- Tolerance Specs STB430.2- Page 335
- Cutting Data STB430M.2 - Page 36
- Tolerance Specs STB430M.2- Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|---------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| INCH - STB430.2 | | | | | | | | |
| N09369 | STB430.2-0.125-D2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09373 | STB430.2-0.188-D2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09383 | STB430.2-0.250-D2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09386 | STB430.2-0.313-D2-B.0-Z4 | 5/16 | 5/16 | 5/8 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09387 | STB430.2-0.375-D2-B.0-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09389 | STB430.2-0.375-D2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | WELDON |
| N09393 | STB430.2-0.438-D2-B.0-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | CYLINDRICAL |
| N09396 | STB430.2-0.438-D2-B.3-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | WELDON |
| N09397 | STB430.2-0.500-D2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09398 | STB430.2-0.500-D2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | WELDON |
| N09399 | STB430.2-0.625-D2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09402 | STB430.2-0.625-D2-B.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | WELDON |
| N09403 | STB430.2-0.750-D2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09404 | STB430.2-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | WELDON |
| N09405 | STB430.2-1.000-D2-B.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | CYLINDRICAL |
| N09406 | STB430.2-1.000-D2-B.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | WELDON |
| METRIC - STB430M.2 | | | | | | | | |
| N09608 | STB430M.2-030-F2-B.0-Z4 | 3MM | 6MM | 6MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09609 | STB430M.2-030-F3-B.0-Z4 | 3MM | 6MM | 9MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09612 | STB430M.2-040-F2-B.0-Z4 | 4MM | 6MM | 8MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09613 | STB430M.2-040-F3-B.0-Z4 | 4MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09614 | STB430M.2-050-F2-B.0-Z4 | 5MM | 6MM | 10MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09615 | STB430M.2-050-F3-B.0-Z4 | 5MM | 6MM | 15MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09616 | STB430M.2-060-D2-B.0-Z4 | 6MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09617 | STB430M.2-060-D3-B.0-Z4 | 6MM | 6MM | 18MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09618 | STB430M.2-080-D2-B.0-Z4 | 8MM | 8MM | 16MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09622 | STB430M.2-080-D3-B.0-Z4 | 8MM | 8MM | 24MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09623 | STB430M.2-100-D2-B.0-Z4 | 10MM | 10MM | 20MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09624 | STB430M.2-100-D3-B.0-Z4 | 10MM | 10MM | 30MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09626 | STB430M.2-120-D2-B.0-Z4 | 12MM | 12MM | 24MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09627 | STB430M.2-120-D3-B.0-Z4 | 12MM | 12MM | 36MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09628 | STB430M.2-160-D2-B.0-Z4 | 16MM | 16MM | 32MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09631 | STB430M.2-160-D3-B.0-Z4 | 16MM | 16MM | 48MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09632 | STB430M.2-200-D2-B.0-Z4 | 20MM | 20MM | 40MM | 105MM | 4 | ALTIN | CYLINDRICAL |
| N09633 | STB430M.2-200-D3-B.0-Z4 | 20MM | 20MM | 60MM | 125MM | 4 | ALTIN | CYLINDRICAL |
| N09634 | STB430M.2-250-D2-B.0-Z4 | 25MM | 25MM | 50MM | 115MM | 4 | ALTIN | CYLINDRICAL |
| N09635 | STB430M.2-250-D3-B.0-Z4 | 25MM | 25MM | 75MM | 147MM | 4 | ALTIN | CYLINDRICAL |

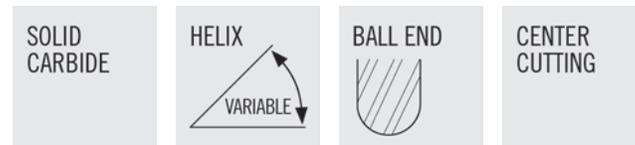
STABILIZER™ 2.0-STRN430.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in steels, alloy steels, copper alloys, and cast iron
- Cutting Data - Page 37
- Tolerance Specs - Page 335

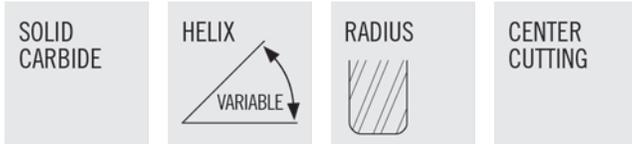
| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|------------------------------|-----------|-----------|---------------|----------------|----------|--------|--------|---------|--------|-------------|
| N09447 | STRN430.2-0.250-E2-R020.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | .240 | 3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09448 | STRN430.2-0.313-E2-R020.0-Z4 | 5/16 | 5/16 | 5/8 | 3 | .300 | 15/16 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09449 | STRN430.2-0.375-E2-R020.0-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09456 | STRN430.2-0.375-E2-R020.3-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | 0.020 | WELDON |
| N09457 | STRN430.2-0.438-E2-R020.0-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09462 | STRN430.2-0.438-E2-R020.3-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | 0.020 | WELDON |
| N09463 | STRN430.2-0.500-E2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09464 | STRN430.2-0.500-E2-R030.3-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09465 | STRN430.2-0.625-E2-R030.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09466 | STRN430.2-0.625-E2-R030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | 0.030 | WELDON |
| N09467 | STRN430.2-0.750-E2-R030.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09468 | STRN430.2-0.750-E2-R030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | 0.030 | WELDON |
| N09469 | STRN430.2-1.000-E2-R030.0-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09472 | STRN430.2-1.000-E2-R030.3-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | 0.030 | WELDON |

STABILIZER™ 2.0-STBN430.2



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|--------|--------|---------|-------------|
| N09473 | STBN430.2-0.250-E2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | .240 | 3/4 | 4 | ALTIN | CYLINDRICAL |
| N09474 | STBN430.2-0.313-E2-B.0-Z4 | 5/16 | 5/16 | 5/8 | 3 | .300 | 15/16 | 4 | ALTIN | CYLINDRICAL |
| N09475 | STBN430.2-0.375-E2-B.0-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | CYLINDRICAL |
| N09476 | STBN430.2-0.375-E2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | WELDON |
| N09477 | STBN430.2-0.438-E2-B.0-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | CYLINDRICAL |
| N09478 | STBN430.2-0.438-E2-B.3-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | WELDON |
| N09479 | STBN430.2-0.500-E2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09493 | STBN430.2-0.500-E2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | WELDON |
| N09494 | STBN430.2-0.625-E2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | CYLINDRICAL |
| N09495 | STBN430.2-0.625-E2-B.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | WELDON |
| N09496 | STBN430.2-0.750-E2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | CYLINDRICAL |
| N09497 | STBN430.2-0.750-E2-B.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | WELDON |
| N09499 | STBN430.2-1.000-E2-B.0-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09502 | STBN430.2-1.000-E2-B.3-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | WELDON |

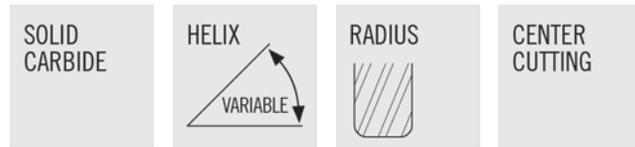
STABILIZER™ 2.0-STR440.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel
- Cutting Data - Page 38
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09882 | STR440.2-0.125-D1-R010.0-Z4 | 1/8 | 1/8 | 1/8 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09883 | STR440.2-0.125-D2-R010.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09884 | STR440.2-0.125-D3-R010.0-Z4 | 1/8 | 1/8 | 3/8 | 1-1/2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09885 | STR440.2-0.156-D1-R010.0-Z4 | 5/32 | 3/16 | 5/32 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09886 | STR440.2-0.156-F2-R010.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09887 | STR440.2-0.156-F3-R010.0-Z4 | 5/32 | 3/16 | 15/32 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09888 | STR440.2-0.188-D1-R010.0-Z4 | 3/16 | 3/16 | 3/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09889 | STR440.2-0.188-D2-R010.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09892 | STR440.2-0.188-D3-R010.0-Z4 | 3/16 | 3/16 | 9/16 | 2 | 4 | ALTIN | 0.010 | CYLINDRICAL |
| N09893 | STR440.2-0.219-F1-R020.0-Z4 | 7/32 | 1/4 | 7/32 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09894 | STR440.2-0.219-F2-R020.0-Z4 | 7/32 | 1/4 | 7/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09895 | STR440.2-0.219-F3-R020.0-Z4 | 7/32 | 1/4 | 21/32 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09896 | STR440.2-0.250-D1-R020.0-Z4 | 1/4 | 1/4 | 1/4 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09897 | STR440.2-0.250-D2-R020.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09898 | STR440.2-0.250-D3-R020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09899 | STR440.2-0.281-F1-R020.0-Z4 | 9/32 | 5/16 | 9/32 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09902 | STR440.2-0.281-F2-R020.0-Z4 | 9/32 | 5/16 | 9/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09903 | STR440.2-0.281-F3-R020.0-Z4 | 9/32 | 5/16 | 27/32 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09904 | STR440.2-0.313-D1-R020.0-Z4 | 5/16 | 5/16 | 5/16 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09905 | STR440.2-0.313-D2-R020.0-Z4 | 5/16 | 5/16 | 5/8 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09906 | STR440.2-0.313-D3-R020.0-Z4 | 5/16 | 5/16 | 15/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09907 | STR440.2-0.375-D1-R020.0-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09908 | STR440.2-0.375-D1-R020.3-Z4 | 3/8 | 3/8 | 3/8 | 2 | 4 | ALTIN | 0.020 | WELDON |
| N09909 | STR440.2-0.375-D2-R020.0-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09912 | STR440.2-0.375-D2-R020.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | WELDON |
| N09913 | STR440.2-0.375-D3-R020.0-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09914 | STR440.2-0.375-D3-R020.3-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | ALTIN | 0.020 | WELDON |
| N09915 | STR440.2-0.438-D1-R020.0-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09916 | STR440.2-0.438-D1-R020.3-Z4 | 7/16 | 7/16 | 7/16 | 2-3/4 | 4 | ALTIN | 0.020 | WELDON |
| N09917 | STR440.2-0.438-D2-R020.0-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09919 | STR440.2-0.438-D2-R020.3-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | 0.020 | WELDON |
| N09934 | STR440.2-0.438-D3-R020.0-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09935 | STR440.2-0.438-D3-R020.3-Z4 | 7/16 | 7/16 | 1-5/16 | 4 | 4 | ALTIN | 0.020 | WELDON |
| N09939 | STR440.2-0.500-D1-R030.0-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09942 | STR440.2-0.500-D1-R030.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09943 | STR440.2-0.500-D1-R060.0-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.060 | CYLINDRICAL |

STABILIZER™ 2.0-STR440.2 (CON'T)



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel

- Cutting Data - Page 38
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09944 | STR440.2-0.500-D1-R060.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.060 | WELDON |
| N09945 | STR440.2-0.500-D1-R120.0-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09946 | STR440.2-0.500-D1-R120.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | ALTIN | 0.120 | WELDON |
| N09947 | STR440.2-0.500-D2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09948 | STR440.2-0.500-D2-R030.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09949 | STR440.2-0.500-D3-R030.0-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09952 | STR440.2-0.500-D3-R030.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09953 | STR440.2-0.500-D2-R060.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09954 | STR440.2-0.500-D2-R060.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.060 | WELDON |
| N09955 | STR440.2-0.500-D2-R120.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09956 | STR440.2-0.500-D2-R120.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | 0.120 | WELDON |
| N09957 | STR440.2-0.500-D4-R030.0-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09958 | STR440.2-0.500-D4-R030.3-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09959 | STR440.2-0.500-D3-R060.0-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09962 | STR440.2-0.500-D3-R060.3-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.060 | WELDON |
| N09963 | STR440.2-0.500-D3-R120.0-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09964 | STR440.2-0.500-D3-R120.3-Z4 | 1/2 | 1/2 | 1-1/2 | 4 | 4 | ALTIN | 0.120 | WELDON |
| N09965 | STR440.2-0.625-D1-R030.0-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09966 | STR440.2-0.625-D1-R030.3-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N09967 | STR440.2-0.625-D1-R060.0-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09968 | STR440.2-0.625-D1-R060.3-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.060 | WELDON |
| N09969 | STR440.2-0.625-D1-R120.0-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09972 | STR440.2-0.625-D1-R120.3-Z4 | 5/8 | 5/8 | 5/8 | 3 | 4 | ALTIN | 0.120 | WELDON |
| N09973 | STR440.2-0.625-D2-R030.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09974 | STR440.2-0.625-D2-R030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09975 | STR440.2-0.625-D2-R060.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09976 | STR440.2-0.625-D2-R060.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.060 | WELDON |
| N09977 | STR440.2-0.625-D2-R120.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09978 | STR440.2-0.625-D2-R120.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | 0.120 | WELDON |
| N09979 | STR440.2-0.625-D3-R030.0-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09982 | STR440.2-0.625-D3-R030.3-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09983 | STR440.2-0.625-D3-R060.0-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09984 | STR440.2-0.625-D3-R060.3-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.060 | WELDON |
| N00328 | STR440.2-0.625-D3-R120.0-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N00329 | STR440.2-0.625-D3-R120.3-Z4 | 5/8 | 5/8 | 1-7/8 | 4 | 4 | ALTIN | 0.120 | WELDON |
| N00332 | STR440.2-0.750-D1-R030.0-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |

STABILIZER™ 2.0-STR440.2 (CON'T)

SOLID CARBIDE

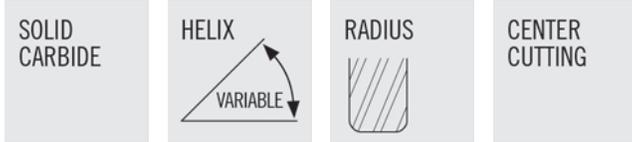
CENTER CUTTING



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel
- Cutting Data - Page 38
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N00333 | STR440.2-0.750-D1-R030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.030 | WELDON |
| N00334 | STR440.2-0.750-D1-R060.0-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N00335 | STR440.2-0.750-D1-R060.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.060 | WELDON |
| N00336 | STR440.2-0.750-D1-R120.0-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N00337 | STR440.2-0.750-D1-R120.3-Z4 | 3/4 | 3/4 | 3/4 | 4 | 4 | ALTIN | 0.120 | WELDON |
| N00338 | STR440.2-0.750-D2-R030.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N00339 | STR440.2-0.750-D2-R030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N00342 | STR440.2-0.750-D2-R060.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N00343 | STR440.2-0.750-D2-R060.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.060 | WELDON |
| N00344 | STR440.2-0.750-D2-R120.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N00345 | STR440.2-0.750-D2-R120.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | 0.120 | WELDON |
| N00346 | STR440.2-0.750-D3-R030.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N00347 | STR440.2-0.750-D3-R030.3-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.030 | WELDON |
| N00348 | STR440.2-0.750-D3-R060.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N00349 | STR440.2-0.750-D3-R060.3-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.060 | WELDON |
| N00352 | STR440.2-0.750-D3-R120.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N00353 | STR440.2-0.750-D3-R120.3-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | ALTIN | 0.120 | WELDON |
| N00354 | STR440.2-1.000-D1-R030.0-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N00355 | STR440.2-1.000-D1-R030.3-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.030 | WELDON |
| N09327 | STR440.2-1.000-D1-R060.0-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09329 | STR440.2-1.000-D1-R060.3-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.060 | WELDON |
| N09333 | STR440.2-1.000-D1-R120.0-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09336 | STR440.2-1.000-D1-R120.3-Z4 | 1 | 1 | 1 | 4 | 4 | ALTIN | 0.120 | WELDON |
| N09337 | STR440.2-1.000-D2-R030.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09339 | STR440.2-1.000-D2-R030.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.030 | WELDON |
| N09343 | STR440.2-1.000-D2-R060.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09346 | STR440.2-1.000-D2-R060.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.060 | WELDON |
| N09347 | STR440.2-1.000-D2-R120.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09349 | STR440.2-1.000-D2-R120.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | 0.120 | WELDON |
| N09356 | STR440.2-1.000-D3-R030.0-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09357 | STR440.2-1.000-D3-R030.3-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.030 | WELDON |
| N09359 | STR440.2-1.000-D3-R060.0-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N09363 | STR440.2-1.000-D3-R060.3-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.060 | WELDON |
| N09366 | STR440.2-1.000-D3-R120.0-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N09367 | STR440.2-1.000-D3-R120.3-Z4 | 1 | 1 | 3 | 6 | 4 | ALTIN | 0.120 | WELDON |

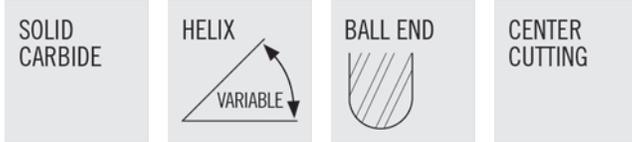
STABILIZER™ 2.0-STR440M.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel
- Cutting Data - Page 39
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N09636 | STR440M.2-030-F2-R025.0-Z4 | 3MM | 6MM | 6MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09637 | STR440M.2-030-F3-R025.0-Z4 | 3MM | 6MM | 9MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09645 | STR440M.2-040-F2-R025.0-Z4 | 4MM | 6MM | 8MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09646 | STR440M.2-040-F3-R025.0-Z4 | 4MM | 6MM | 12MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09647 | STR440M.2-050-F2-R025.0-Z4 | 5MM | 6MM | 10MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09648 | STR440M.2-050-F3-R025.0-Z4 | 5MM | 6MM | 15MM | 58MM | 4 | ALTIN | 0.25MM | CYLINDRICAL |
| N09649 | STR440M.2-060-D2-R050.0-Z4 | 6MM | 6MM | 12MM | 58MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09650 | STR440M.2-060-D3-R050.0-Z4 | 6MM | 6MM | 18MM | 58MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09651 | STR440M.2-080-D2-R050.0-Z4 | 8MM | 8MM | 16MM | 64MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09652 | STR440M.2-080-D3-R050.0-Z4 | 8MM | 8MM | 24MM | 64MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09653 | STR440M.2-100-D2-R050.0-Z4 | 10MM | 10MM | 20MM | 73MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09654 | STR440M.2-100-D3-R050.0-Z4 | 10MM | 10MM | 30MM | 73MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N09655 | STR440M.2-120-D2-R075.0-Z4 | 12MM | 12MM | 24MM | 84MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09665 | STR440M.2-120-D3-R075.0-Z4 | 12MM | 12MM | 36MM | 84MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09667 | STR440M.2-160-D2-R075.0-Z4 | 16MM | 16MM | 32MM | 93MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09668 | STR440M.2-160-D3-R075.0-Z4 | 16MM | 16MM | 48MM | 93MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09670 | STR440M.2-200-D2-R075.0-Z4 | 20MM | 20MM | 40MM | 105MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09671 | STR440M.2-200-D3-R075.0-Z4 | 20MM | 20MM | 60MM | 125MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09672 | STR440M.2-250-D2-R075.0-Z4 | 25MM | 25MM | 50MM | 115MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |
| N09673 | STR440M.2-250-D3-R075.0-Z4 | 25MM | 25MM | 75MM | 147MM | 4 | ALTIN | 0.75MM | CYLINDRICAL |

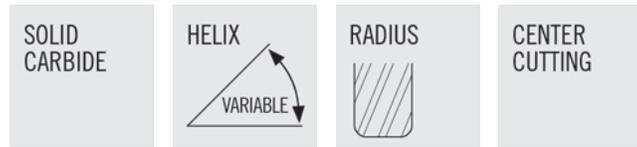
STABILIZER™ 2.0-STB440.2 & STB440M.2



- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel
- Cutting Data STB440.2 - Page 38
- Tolerance Specs STB440.2 - Page 335
- Cutting Data STB440M.2 - Page 39
- Tolerance Specs STB440M.2 - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|---------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| INCH - STB440.2 | | | | | | | | |
| N09407 | STB440.2-0.125-D2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09408 | STB440.2-0.188-D2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | ALTIN | CYLINDRICAL |
| N09409 | STB440.2-0.250-D2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09422 | STB440.2-0.313-D2-B.0-Z4 | 5/16 | 5/16 | 5/8 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09423 | STB440.2-0.375-D2-B.0-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09426 | STB440.2-0.375-D2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | ALTIN | WELDON |
| N09427 | STB440.2-0.438-D2-B.0-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | CYLINDRICAL |
| N09428 | STB440.2-0.438-D2-B.3-Z4 | 7/16 | 7/16 | 7/8 | 2-3/4 | 4 | ALTIN | WELDON |
| N09429 | STB440.2-0.500-D2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09432 | STB440.2-0.500-D2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | ALTIN | WELDON |
| N09433 | STB440.2-0.625-D2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09442 | STB440.2-0.625-D2-B.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | ALTIN | WELDON |
| N09443 | STB440.2-0.750-D2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | CYLINDRICAL |
| N09444 | STB440.2-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | ALTIN | WELDON |
| N09445 | STB440.2-1.000-D2-B.0-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | CYLINDRICAL |
| N09446 | STB440.2-1.000-D2-B.3-Z4 | 1 | 1 | 2 | 5 | 4 | ALTIN | WELDON |
| METRIC - STB440M.2 | | | | | | | | |
| N09674 | STB440M.2-030-F2-B.0-Z4 | 3MM | 6MM | 6MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09675 | STB440M.2-030-F3-B.0-Z4 | 3MM | 6MM | 9MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09676 | STB440M.2-040-F2-B.0-Z4 | 4MM | 6MM | 8MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09677 | STB440M.2-040-F3-B.0-Z4 | 4MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09679 | STB440M.2-050-F2-B.0-Z4 | 5MM | 6MM | 10MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09680 | STB440M.2-050-F3-B.0-Z4 | 5MM | 6MM | 15MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09682 | STB440M.2-060-D2-B.0-Z4 | 6MM | 6MM | 12MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09683 | STB440M.2-060-D3-B.0-Z4 | 6MM | 6MM | 18MM | 58MM | 4 | ALTIN | CYLINDRICAL |
| N09684 | STB440M.2-080-D2-B.0-Z4 | 8MM | 8MM | 16MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09685 | STB440M.2-080-D3-B.0-Z4 | 8MM | 8MM | 24MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N09686 | STB440M.2-100-D2-B.0-Z4 | 10MM | 10MM | 20MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09687 | STB440M.2-100-D3-B.0-Z4 | 10MM | 10MM | 30MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N09688 | STB440M.2-120-D2-B.0-Z4 | 12MM | 12MM | 24MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09689 | STB440M.2-120-D3-B.0-Z4 | 12MM | 12MM | 36MM | 84MM | 4 | ALTIN | CYLINDRICAL |
| N09690 | STB440M.2-160-D2-B.0-Z4 | 16MM | 16MM | 32MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09691 | STB440M.2-160-D3-B.0-Z4 | 16MM | 16MM | 48MM | 93MM | 4 | ALTIN | CYLINDRICAL |
| N09692 | STB440M.2-200-D2-B.0-Z4 | 20MM | 20MM | 40MM | 105MM | 4 | ALTIN | CYLINDRICAL |
| N09693 | STB440M.2-200-D3-B.0-Z4 | 20MM | 20MM | 60MM | 125MM | 4 | ALTIN | CYLINDRICAL |
| N09694 | STB440M.2-250-D2-B.0-Z4 | 25MM | 25MM | 50MM | 115MM | 4 | ALTIN | CYLINDRICAL |
| N09695 | STB440M.2-250-D3-B.0-Z4 | 25MM | 25MM | 75MM | 147MM | 4 | ALTIN | CYLINDRICAL |

STABILIZER™ 2.0-STRN440.2

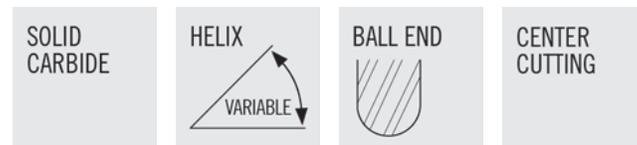


- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel

- Cutting Data STRN440.2 - Page 40
- Tolerance Specs STRN440.2 - Page 335
- Cutting Data STBN440.2 - Page 40
- Tolerance Specs STBN440.2 - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|------------------------------|-----------|-----------|---------------|----------------|----------|--------|--------|---------|--------|-------------|
| N09503 | STRN440.2-0.250-E2-R020.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | .240 | 3/4 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09504 | STRN440.2-0.313-E2-R020.0-Z4 | 5/16 | 5/16 | 5/8 | 3 | .300 | 15/16 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09505 | STRN440.2-0.375-E2-R020.0-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09506 | STRN440.2-0.375-E2-R020.3-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | 0.020 | WELDON |
| N09507 | STRN440.2-0.438-E2-R020.0-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N09508 | STRN440.2-0.438-E2-R020.3-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | 0.020 | WELDON |
| N09509 | STRN440.2-0.500-E2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09512 | STRN440.2-0.500-E2-R030.3-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | 0.030 | WELDON |
| N09513 | STRN440.2-0.625-E2-R030.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09515 | STRN440.2-0.625-E2-R030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | 0.030 | WELDON |
| N09516 | STRN440.2-0.750-E2-R030.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09517 | STRN440.2-0.750-E2-R030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | 0.030 | WELDON |
| N09518 | STRN440.2-1.000-E2-R030.0-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N09519 | STRN440.2-1.000-E2-R030.3-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | 0.030 | WELDON |

STABILIZER™ 2.0-STBN440.2



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIAM | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|---------------------------|-----------|------------|---------------|----------------|----------|--------|--------|---------|-------------|
| N09522 | STBN440.2-0.250-E2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | .240 | 3/4 | 4 | ALTIN | CYLINDRICAL |
| N09523 | STBN440.2-0.313-E2-B.0-Z4 | 5/16 | 5/16 | 5/8 | 3 | .300 | 15/16 | 4 | ALTIN | CYLINDRICAL |
| N09524 | STBN440.2-0.375-E2-B.0-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | CYLINDRICAL |
| N09525 | STBN440.2-0.375-E2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 3 | .360 | 1-1/8 | 4 | ALTIN | WELDON |
| N09526 | STBN440.2-0.438-E2-B.0-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | CYLINDRICAL |
| N09527 | STBN440.2-0.438-E2-B.3-Z4 | 7/16 | 7/16 | 7/8 | 4 | .420 | 1-5/16 | 4 | ALTIN | WELDON |
| N09528 | STBN440.2-0.500-E2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | CYLINDRICAL |
| N09529 | STBN440.2-0.500-E2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | .480 | 1-1/2 | 4 | ALTIN | WELDON |
| N09532 | STBN440.2-0.625-E2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | CYLINDRICAL |
| N09533 | STBN440.2-0.625-E2-B.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | .600 | 1-7/8 | 4 | ALTIN | WELDON |
| N09534 | STBN440.2-0.750-E2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | CYLINDRICAL |
| N09535 | STBN440.2-0.750-E2-B.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | .720 | 2-1/4 | 4 | ALTIN | WELDON |
| N09536 | STBN440.2-1.000-E2-B.0-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | CYLINDRICAL |
| N09537 | STBN440.2-1.000-E2-B.3-Z4 | 1 | 1 | 2 | 5 | .960 | 3 | 4 | ALTIN | WELDON |

STABILIZER™-STS540 & STS540M

SOLID
CARBIDE



CENTER
CUTTING

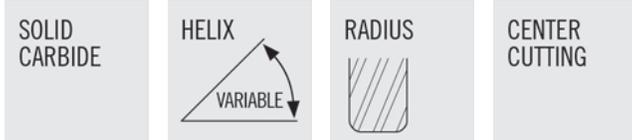


- Asymmetrical cutting edges
- US Patent # 6,991,409
- Ideal for profiling, high speed and trochoidal milling, stainless, titanium, high temperature alloys, carbon, alloy and tool steels
- Max RDOC 50%
- Full Eccentric Relief

- Cutting Data STS540 - Page 41
- Tolerance Specs STS540 - Page 335
- Cutting Data STS540M - Page 42
- Tolerance Specs STS540M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|-------------------------|------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| INCH - STS540 | | | | | | | | |
| N68625 | STS540-0.250-D3-S.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALCRN | CYLINDRICAL |
| N68626 | STS540-0.313-D2-S.0-Z5 | 5/16 | 5/16 | 3/4 | 2-1/2 | 5 | ALCRN | CYLINDRICAL |
| N68627 | STS540-0.375-D2-S.0-Z5 | 3/8 | 3/8 | 7/8 | 2-1/2 | 5 | ALCRN | CYLINDRICAL |
| N68628 | STS540-0.500-D3-S.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | CYLINDRICAL |
| N68629 | STS540-0.625-D2-S.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | CYLINDRICAL |
| N68630 | STS540-0.750-D2-S.0-Z5 | 3/4 | 3/4 | 1-1/2 | 4 | 5 | ALCRN | CYLINDRICAL |
| METRIC - STS540M | | | | | | | | |
| N68699 | STS540M-060-D2-S.0-Z5 | 6MM | 6MM | 12MM | 58MM | 5 | ALTIN | CYLINDRICAL |
| N68700 | STS540M-080-D2-S.0-Z5 | 8MM | 8MM | 16MM | 64MM | 5 | ALTIN | CYLINDRICAL |
| N68701 | STS540M-100-D2-S.0-Z5 | 10MM | 10MM | 20MM | 73MM | 5 | ALTIN | CYLINDRICAL |
| N68702 | STS540M-120-D2-S.0-Z5 | 12MM | 12MM | 24MM | 84MM | 5 | ALTIN | CYLINDRICAL |

STABILIZER™-STR540 & STR540M



- Asymmetrical flute geometry
- US Patent # 6,991,409
- Ideal for profiling, high speed and trochoidal milling, stainless, titanium, high temperature alloys, carbon, alloy and tool steels
- Max RDOC 50%
- Full Eccentric Relief

- Cutting Data STR540 - Page 41
- Tolerance Specs STR540 - Page 335
- Cutting Data STR540M - Page 42
- Tolerance Specs STR540M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|-------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| INCH - STR540 | | | | | | | | | |
| N68632 | STR540-0.250-D3-R015.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68639 | STR540-0.250-D3-R030.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68646 | STR540-0.250-D3-R045.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALCRN | 0.045 | CYLINDRICAL |
| N68633 | STR540-0.313-D2-R015.0-Z5 | 5/16 | 5/16 | 3/4 | 2-1/2 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68634 | STR540-0.375-D2-R015.0-Z5 | 3/8 | 3/8 | 7/8 | 2-1/2 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68641 | STR540-0.375-D2-R030.0-Z5 | 3/8 | 3/8 | 7/8 | 2-1/2 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68648 | STR540-0.375-D2-R045.0-Z5 | 3/8 | 3/8 | 7/8 | 2-1/2 | 5 | ALCRN | 0.045 | CYLINDRICAL |
| N68635 | STR540-0.500-D3-R015.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68642 | STR540-0.500-D3-R030.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68649 | STR540-0.500-D3-R045.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.045 | CYLINDRICAL |
| N68653 | STR540-0.500-D3-R060.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.060 | CYLINDRICAL |
| N68657 | STR540-0.500-D3-R090.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.090 | CYLINDRICAL |
| N68661 | STR540-0.500-D3-R125.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALCRN | 0.125 | CYLINDRICAL |
| N68636 | STR540-0.625-D2-R015.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68643 | STR540-0.625-D2-R030.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68650 | STR540-0.625-D2-R045.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.045 | CYLINDRICAL |
| N68654 | STR540-0.625-D2-R060.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.060 | CYLINDRICAL |
| N68658 | STR540-0.625-D2-R090.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.090 | CYLINDRICAL |
| N68662 | STR540-0.625-D2-R125.0-Z5 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 5 | ALCRN | 0.125 | CYLINDRICAL |
| N68644 | STR540-0.750-D2-R030.0-Z5 | 3/4 | 3/4 | 1-1/2 | 4 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68655 | STR540-0.750-D2-R060.0-Z5 | 3/4 | 3/4 | 1-1/2 | 4 | 5 | ALCRN | 0.060 | CYLINDRICAL |
| N68659 | STR540-0.750-D2-R090.0-Z5 | 3/4 | 3/4 | 1-1/2 | 4 | 5 | ALCRN | 0.090 | CYLINDRICAL |
| N68663 | STR540-0.750-D2-R125.0-Z5 | 3/4 | 3/4 | 1-1/2 | 4 | 5 | ALCRN | 0.125 | CYLINDRICAL |
| N68638 | STR540-1.000-D2-R015.0-Z5 | 1 | 1 | 1-3/4 | 4 | 5 | ALCRN | 0.015 | CYLINDRICAL |
| N68645 | STR540-1.000-D2-R030.0-Z5 | 1 | 1 | 1-3/4 | 4 | 5 | ALCRN | 0.030 | CYLINDRICAL |
| N68656 | STR540-1.000-D2-R060.0-Z5 | 1 | 1 | 1-3/4 | 4 | 5 | ALCRN | 0.060 | CYLINDRICAL |
| METRIC - STR540M | | | | | | | | | |
| N68717 | STR540M-060-D2-R050.0-Z5 | 6MM | 6MM | 12MM | 58MM | 5 | ALTIN | 0.50MM | CYLINDRICAL |
| N68718 | STR540M-080-D2-R050.0-Z5 | 8MM | 8MM | 16MM | 64MM | 5 | ALTIN | 0.50MM | CYLINDRICAL |
| N68719 | STR540M-100-D2-R050.0-Z5 | 10MM | 10MM | 20MM | 73MM | 5 | ALTIN | 0.50MM | CYLINDRICAL |
| N68720 | STR540M-120-D2-R075.0-Z5 | 12MM | 12MM | 24MM | 84MM | 5 | ALTIN | 0.75MM | CYLINDRICAL |
| N68722 | STR540M-160-D2-R075.0-Z5 | 16MM | 16MM | 32MM | 93MM | 5 | ALTIN | 0.75MM | CYLINDRICAL |

STS430.2, STR430.2, STB430.2 - SLOTTING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SLOTTING | | | | | | | | | | | | | | |
|-----------|---------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | | | | |
| | | | | | 1/8 | 5/32 | 3/16 | 7/32 | 1/4 | 9/32 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | |
| P | E 1-2 | 1.00 | 1.00 | 425 | n [min-1] | 12988 | 10390 | 8659 | 7422 | 6494 | 5772 | 5195 | 4329 | 3711 | 3247 | 2598 | 2165 | 1855 | 1624 |
| | | | | | fz [in] | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0018 | 0.0020 | 0.0024 | 0.0028 | 0.0032 | 0.0039 | 0.0047 | 0.0055 | 0.0063 |
| | E 3-4 | 1.00 | 1.00 | 400 | n [min-1] | 12224 | 9779 | 8149 | 6985 | 6112 | 5433 | 4890 | 4075 | 3493 | 3056 | 2445 | 2037 | 1746 | 1528 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0011 | 0.0012 | 0.0014 | 0.0016 | 0.0018 | 0.0021 | 0.0025 | 0.0029 | 0.0036 | 0.0043 | 0.0050 | 0.0057 |
| | E 5-6 | 1.00 | 1.00 | 350 | n [min-1] | 10696 | 8557 | 7131 | 6112 | 5348 | 4754 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1528 | 1337 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| K | E 12-13 | 1.00 | 1.00 | 350 | n [min-1] | 10696 | 8557 | 7131 | 6112 | 5348 | 4754 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1528 | 1337 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0015 | 0.0017 | 0.0021 | 0.0024 | 0.0028 | 0.0034 | 0.0041 | 0.0048 | 0.0055 |
| | E 14-15 | 1.00 | 1.00 | 325 | n [min-1] | 9932 | 7946 | 6621 | 5675 | 4966 | 4414 | 3973 | 3311 | 2838 | 2483 | 1986 | 1655 | 1419 | 1242 |
| | | | | | fz [in] | 0.0006 | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0013 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0028 | 0.0034 | 0.0039 | 0.0045 |
| | N 18 | 1.00 | 1.00 | 500 | n [min-1] | 15280 | 12224 | 10187 | 8731 | 7640 | 6791 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 2183 | 1910 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0035 | 0.0040 |
| N 18 | 1.00 | 1.00 | 400 | n [min-1] | 15280 | 12224 | 10187 | 8731 | 7640 | 6791 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 2183 | 1910 | |
| | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0035 | 0.0040 | |

STS430.2, STR430.2, STB430.2 - SIDE MILLING/ROUGHING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SIDE MILLING ROUGHING | | | | | | | | | | | | | | |
|-----------|---------|---------------------------------------|---------------------------------------|---------------------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | | | | |
| | | | | | 1/8 | 5/32 | 3/16 | 7/32 | 1/4 | 9/32 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | |
| P | E 1-2 | 1.50 | 0.25 | 425 | n [min-1] | 12988 | 10390 | 8659 | 7422 | 6494 | 5772 | 5195 | 4329 | 3711 | 3247 | 2598 | 2165 | 1855 | 1624 |
| | | | | | fz [in] | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0022 | 0.0026 | 0.0031 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | E 3-4 | 1.50 | 0.25 | 400 | n [min-1] | 12224 | 9779 | 8149 | 6985 | 6112 | 5433 | 4890 | 4075 | 3493 | 3056 | 2445 | 2037 | 1746 | 1528 |
| | | | | | fz [in] | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0018 | 0.0020 | 0.0024 | 0.0028 | 0.0032 | 0.0040 | 0.0048 | 0.0056 | 0.0064 |
| | E 5-6 | 1.00 | 0.25 | 350 | n [min-1] | 10696 | 8557 | 7131 | 6112 | 5348 | 4754 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1528 | 1337 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 |
| K | E 12-13 | 1.50 | 0.25 | 350 | n [min-1] | 10696 | 8557 | 7131 | 6112 | 5348 | 4754 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1528 | 1337 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 |
| | E 14-15 | 1.00 | 0.25 | 325 | n [min-1] | 9932 | 7946 | 6621 | 5675 | 4966 | 4414 | 3973 | 3311 | 2838 | 2483 | 1986 | 1655 | 1419 | 1242 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | N 18 | 1.50 | 0.25 | 500 | n [min-1] | 15280 | 12224 | 10187 | 8731 | 7640 | 6791 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 2183 | 1910 |
| | | | | | fz [in] | 0.0006 | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0012 | 0.0014 | 0.0017 | 0.0019 | 0.0022 | 0.0028 | 0.0033 | 0.0039 | 0.0044 |
| N 18 | 1.50 | 0.25 | 400 | n [min-1] | 15280 | 12224 | 10187 | 8731 | 7640 | 6791 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 2183 | 1910 | |
| | | | | fz [in] | 0.0006 | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0012 | 0.0014 | 0.0017 | 0.0019 | 0.0022 | 0.0028 | 0.0033 | 0.0039 | 0.0044 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STS430M.2, STR430M.2, STB430M.2 - SLOTING - METRIC - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SLOTING | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | |
| | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 | |
| P | E 1 - 2 | 1.00 | 1.00 | 425 | n [min-1] | 13790 | 10350 | 8280 | 6900 | 5170 | 4140 | 3450 | 2960 | 2590 | 2070 | 1660 |
| | | | | | fz [in] | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0035 | 0.0040 | 0.0050 | 0.0062 |
| | | | | | vf [in/min] | 41.0 | 41.1 | 41.1 | 41.1 | 41.0 | 41.1 | 41.1 | 41.1 | 41.1 | 41.1 | 41.1 |
| | E 3 - 4 | 1.00 | 1.00 | 400 | n [min-1] | 12940 | 9710 | 7770 | 6470 | 4850 | 3880 | 3240 | 2770 | 2430 | 1940 | 1550 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0027 | 0.0031 | 0.0036 | 0.0045 | 0.0056 |
| | | | | | vf [in/min] | 34.8 | 34.9 | 34.9 | 34.8 | 34.8 | 34.8 | 34.9 | 34.8 | 34.9 | 34.8 | 34.9 |
| | E 5 - 6 | 1.00 | 1.00 | 350 | n [min-1] | 11350 | 8510 | 6810 | 5680 | 4260 | 3410 | 2840 | 2430 | 2130 | 1700 | 1360 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0028 | 0.0031 | 0.0039 | 0.0049 |
| | | | | | vf [in/min] | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.9 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 |
| K | E 12 - 13 | 1.00 | 1.00 | 350 | n [min-1] | 11350 | 8510 | 6810 | 5680 | 4260 | 3410 | 2840 | 2430 | 2130 | 1700 | 1360 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0017 | 0.0022 | 0.0026 | 0.0030 | 0.0035 | 0.0043 | 0.0054 |
| | | | | | vf [in/min] | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.4 | 29.4 |
| | E 14 - 15 | 1.00 | 1.00 | 325 | n [min-1] | 10500 | 7880 | 6300 | 5250 | 3940 | 3150 | 2630 | 2250 | 1970 | 1580 | 1260 |
| | | | | | fz [in] | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 | 0.0044 |
| | | | | | vf [in/min] | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.4 | 22.3 | 22.3 | 22.4 | 22.3 | 22.4 |
| N | 18 | 1.00 | 1.00 | 500 | n [min-1] | 16130 | 12100 | 9680 | 8060 | 6050 | 4840 | 4030 | 3460 | 3020 | 2420 | 1940 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0039 |
| | | | | 400 - 600 | vf [in/min] | 30.5 | 30.5 | 30.5 | 30.5 | 30.5 | 30.5 | 30.5 | 30.5 | 30.4 | 30.5 | 30.6 |

STS430M.2, STR430M.2, STB430M.2 - SIDE MILLING/ROUGHING - METRIC - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SIDE MILLING ROUGHING | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | |
| | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 | |
| P | E 1 - 2 | 1.50 | 0.25 | 425 | n [min-1] | 13790 | 10350 | 8280 | 6900 | 5170 | 4140 | 3450 | 2960 | 2590 | 2070 | 1660 |
| | | | | | fz [in] | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 | 0.0028 | 0.0033 | 0.0039 | 0.0044 | 0.0055 | 0.0069 |
| | | | | | vf [in/min] | 45.6 | 45.6 | 45.6 | 45.6 | 45.6 | 45.6 | 45.6 | 45.7 | 45.7 | 45.6 | 45.7 |
| | E 3 - 4 | 1.50 | 0.25 | 400 | n [min-1] | 12940 | 9710 | 7770 | 6470 | 4850 | 3880 | 3240 | 2770 | 2430 | 1940 | 1550 |
| | | | | | fz [in] | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0035 | 0.0040 | 0.0050 | 0.0063 |
| | | | | | vf [in/min] | 39.1 | 39.1 | 39.2 | 39.1 | 39.1 | 39.1 | 39.2 | 39.1 | 39.2 | 39.1 | 39.1 |
| | E 5 - 6 | 1.00 | 0.25 | 350 | n [min-1] | 11350 | 8510 | 6810 | 5680 | 4260 | 3410 | 2840 | 2430 | 2130 | 1700 | 1360 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 |
| | | | | | vf [in/min] | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.1 | 32.2 | 32.1 | 32.1 |
| K | E 12 - 13 | 1.50 | 0.25 | 350 | n [min-1] | 11350 | 8510 | 6810 | 5680 | 4260 | 3410 | 2840 | 2430 | 2130 | 1700 | 1360 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 |
| | | | | | vf [in/min] | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.2 | 32.1 | 32.2 | 32.1 | 32.1 |
| | E 14 - 15 | 1.00 | 0.25 | 325 | n [min-1] | 10500 | 7880 | 6300 | 5250 | 3940 | 3150 | 2630 | 2250 | 1970 | 1580 | 1260 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0028 | 0.0031 | 0.0039 | 0.0049 |
| | | | | | vf [in/min] | 24.8 | 24.8 | 24.8 | 24.8 | 24.8 | 24.8 | 24.9 | 24.8 | 24.8 | 24.9 | 24.8 |
| N | 18 | 1.50 | 0.25 | 500 | n [min-1] | 16130 | 12100 | 9680 | 8060 | 6050 | 4840 | 4030 | 3460 | 3020 | 2420 | 1940 |
| | | | | | fz [in] | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0024 | 0.0028 | 0.0035 | 0.0043 |
| | | | | 400 - 600 | vf [in/min] | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.6 | 33.5 | 33.6 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STRN430.2, STBN430.2 - SLOTTING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | SLOTTING | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | v _c (sf / min) | Zn = 4 | | | | | | | | |
| | | | | | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| P | E 1 - 2 | 0.50 | 1.00 | 425 | n [min-1] | 6494 | 5195 | 4329 | 3711 | 3247 | 2598 | 2165 | 1624 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | E 3 - 4 | 0.50 | 1.00 | 400 | n [min-1] | 6112 | 4890 | 4075 | 3493 | 3056 | 2445 | 2037 | 1528 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0016 | 0.0019 | 0.0025 |
| | E 5 - 6 | 0.50 | 1.00 | 350 | n [min-1] | 5348 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1337 |
| | | | | | fz [in] | 0.0006 | 0.0007 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0017 | 0.0023 |
| K | E 12 - 13 | 0.50 | 1.00 | 350 | n [min-1] | 5348 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1337 |
| | | | | | fz [in] | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| E 14 - 15 | 0.50 | 1.00 | 325 | n [min-1] | 4966 | 3973 | 3311 | 2838 | 2483 | 1986 | 1655 | 1242 | |
| | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| N | 18 | 0.50 | 1.00 | 500 | n [min-1] | 7640 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 1910 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0016 | 0.0019 | 0.0025 |

STRN430.2, STBN430.2 - SIDE MILLING ROUGHING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | SIDE MILLING ROUGHING | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | v _c (sf / min) | Zn = 4 | | | | | | | | |
| | | | | | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| P | E 1 - 2 | 1.00 | 0.25 | 425 | n [min-1] | 6494 | 5195 | 4329 | 3711 | 3247 | 2598 | 2165 | 1624 |
| | | | | | fz [in] | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0022 | 0.0026 | 0.0035 |
| | E 3 - 4 | 1.00 | 0.25 | 400 | n [min-1] | 6112 | 4890 | 4075 | 3493 | 3056 | 2445 | 2037 | 1528 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | E 5 - 6 | 1.00 | 0.25 | 350 | n [min-1] | 5348 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1337 |
| | | | | | fz [in] | 0.0007 | 0.0009 | 0.0011 | 0.0012 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| K | E 12 - 13 | 1.00 | 0.25 | 350 | n [min-1] | 5348 | 4278 | 3565 | 3056 | 2674 | 2139 | 1783 | 1337 |
| | | | | | fz [in] | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| E 14 - 15 | 1.00 | 0.25 | 325 | n [min-1] | 4966 | 3973 | 3311 | 2838 | 2483 | 1986 | 1655 | 1242 | |
| | | | | fz [in] | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | |
| N | 18 | 1.00 | 0.25 | 500 | n [min-1] | 7640 | 6112 | 5093 | 4366 | 3820 | 3056 | 2547 | 1910 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STR440.2 - STB440.2 - SLOTTING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SLOTTING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | | | |
| | | | | | 1/8 | 5/32 | 3/16 | 7/32 | 1/4 | 9/32 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| M | E 8 - 9 | 1.00 | 1.00 | 370 | n [min-1] | 11307 | 9046 | 7538 | 6461 | 5654 | 5025 | 4523 | 3769 | 3231 | 2827 | 2261 | 1885 | 1413 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | | vf [in/min] | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 |
| | E 10 - 11 | 1.00 | 1.00 | 300 | n [min-1] | 9168 | 7334 | 6112 | 5239 | 4584 | 4075 | 3667 | 3056 | 2619 | 2292 | 1834 | 1528 | 1146 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | | vf [in/min] | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| S | E 19 | 1.00 | 1.00 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | E 20 | 1.00 | 1.00 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | E 21 | 1.00 | 1.00 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | E 22 | 1.00 | 1.00 | 185 | n [min-1] | 5654 | 4523 | 3769 | 3231 | 2827 | 2513 | 2261 | 1885 | 1615 | 1413 | 1131 | 942 | 707 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | | vf [in/min] | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |

STR440.2 - STB440.2 - SIDE MILLING/ROUGHING - INCH - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SIDE MILLING ROUGHING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | | | | | | |
| | | | | | 1/8 | 5/32 | 3/16 | 7/32 | 1/4 | 9/32 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| H | E 7 | 1.00 | 0.15 | 150 | n [min-1] | 4584 | 3667 | 3056 | 2619 | 2292 | 2037 | 1834 | 1528 | 1310 | 1146 | 917 | 764 | 573 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0004 | 0.0005 | 0.0006 | 0.0006 | 0.0007 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0017 | 0.0023 |
| | | | | | vf [in/min] | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 |
| M | E 8 - 9 | 1.00 | 0.25 | 370 | n [min-1] | 11307 | 9046 | 7538 | 6461 | 5654 | 5025 | 4523 | 3769 | 3231 | 2827 | 2261 | 1885 | 1413 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | | vf [in/min] | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 | 33.9 |
| | E 10 - 11 | 1.00 | 0.25 | 300 | n [min-1] | 9168 | 7334 | 6112 | 5239 | 4584 | 4075 | 3667 | 3056 | 2619 | 2292 | 1834 | 1528 | 1146 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | | vf [in/min] | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| S | E 19 | 1.00 | 0.15 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | E 20 | 1.00 | 0.15 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | E 21 | 1.00 | 0.15 | 90 | n [min-1] | 2750 | 2200 | 1834 | 1572 | 1375 | 1222 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | E 22 | 1.00 | 0.25 | 185 | n [min-1] | 5654 | 4523 | 3769 | 3231 | 2827 | 2513 | 2261 | 1885 | 1615 | 1413 | 1131 | 942 | 707 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | | | vf [in/min] | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STR440M.2 - STB440M.2 - SLOTTING - METRIC - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | | | | v _c (sf / min) | n [min-1] | Zn = 4 | | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 |
| M | E 8 - 9 | 1.00 | 1.00 | 370 | n [min-1] | 11990 | 8990 | 7190 | 5990 | 4500 | 3600 | 3000 | 2570 | 2250 | 1800 | 1440 |
| | | | | fz [in] | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 | |
| | 270 - 470 | vf [in/min] | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 |
| | E 10 - 11 | 1.00 | 1.00 | 300 | n [min-1] | 9660 | 7240 | 5790 | 4830 | 3620 | 2900 | 2410 | 2070 | 1810 | 1450 | 1160 |
| fz [in] | | | | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 | | |
| S | E 19 | 1.00 | 1.00 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0031 | |
| | 70 - 110 | vf [in/min] | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.4 | 4.3 | 4.4 | 4.3 | 4.3 | | |
| | E 20 | 1.00 | 1.00 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0031 | |
| | 70 - 110 | vf [in/min] | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.4 | 4.3 | 4.4 | 4.3 | 4.3 | | |
| | E 21 | 1.00 | 1.00 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0025 | 0.0031 | |
| | 70 - 110 | vf [in/min] | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.4 | 4.3 | 4.4 | 4.3 | 4.3 | | |
| | E 22 | 1.00 | 1.00 | 185 | n [min-1] | 5940 | 4460 | 3570 | 2970 | 2230 | 1780 | 1490 | 1270 | 1110 | 890 | 710 |
| | | | | fz [in] | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0028 | 0.0031 | 0.0039 | 0.0049 | |
| | 165 - 205 | vf [in/min] | 14.0 | 14.0 | 14.1 | 14.0 | 14.0 | 14.0 | 14.0 | 14.1 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | |

STR440M.2 - STB440M.2 - SIDE MILLING/ROUGHING - METRIC - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | SIDE MILLING ROUGHING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | | | | v _c (sf / min) | n [min-1] | Zn = 4 | | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 |
| H | E 7 | 1.00 | 0.15 | 150 | n [min-1] | 4880 | 3660 | 2930 | 2440 | 1830 | 1460 | 1220 | 1050 | 920 | 730 | 590 |
| | | | | fz [in] | 0.0003 | 0.0004 | 0.0005 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0018 | 0.0023 | |
| M | E 8 - 9 | 1.00 | 0.25 | 370 | n [min-1] | 11990 | 8990 | 7190 | 5990 | 4500 | 3600 | 3000 | 2570 | 2250 | 1800 | 1440 |
| | | | | fz [in] | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 | |
| | 270 - 470 | vf [in/min] | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | |
| | E 10 - 11 | 1.00 | 0.25 | 300 | n [min-1] | 9660 | 7240 | 5790 | 4830 | 3620 | 2900 | 2410 | 2070 | 1810 | 1450 | 1160 |
| fz [in] | | | | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 | | |
| S | E 19 | 1.00 | 0.15 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0039 | |
| | 70 - 110 | vf [in/min] | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | | |
| | E 20 | 1.00 | 0.15 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0039 | |
| | 70 - 110 | vf [in/min] | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | | |
| | E 21 | 1.00 | 0.15 | 90 | n [min-1] | 2860 | 2150 | 1720 | 1430 | 1070 | 860 | 720 | 610 | 540 | 430 | 340 |
| | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0031 | 0.0039 | |
| | 70 - 110 | vf [in/min] | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | | |
| | E 22 | 1.00 | 0.25 | 185 | n [min-1] | 5940 | 4460 | 3570 | 2970 | 2230 | 1780 | 1490 | 1270 | 1110 | 890 | 710 |
| | | | | fz [in] | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0033 | 0.0038 | 0.0047 | 0.0059 | |
| | 165 - 205 | vf [in/min] | 16.8 | 16.9 | 16.9 | 16.8 | 16.9 | 16.8 | 16.9 | 16.8 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STRN440.2 - STBN440.2 - SLOTTING - INCH - START VALUES

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | SLOTTING | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | |
| | | | | | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| M | E 8 - 9 | 0.50 | 1.00 | 370 | n [min-1] | 5654 | 4523 | 3769 | 3231 | 2827 | 2261 | 1885 | 1413 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 340 - 400 | vf [in/min] | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 |
| | E 10 - 11 | 0.50 | 1.00 | 300 | n [min-1] | 4584 | 3667 | 3056 | 2619 | 2292 | 1834 | 1528 | 1146 |
| | | | | | fz [in] | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 270 - 330 | vf [in/min] | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| S | E 19 | 0.50 | 1.00 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | E 20 | 0.50 | 1.00 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | E 21 | 0.50 | 1.00 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | E 22 | 0.50 | 1.00 | 185 | n [min-1] | 2827 | 2261 | 1885 | 1615 | 1413 | 1131 | 942 | 707 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 165 - 205 | vf [in/min] | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 |

STRN440.2 - STBN440.2 - SIDE MILLING/ROUGHING - INCH - START VALUES

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | SIDE MILLING ROUGHING | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | |
| | | | | | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 1 | |
| H | E 7 | 1.00 | 0.15 | 150 | n [min-1] | 2292 | 1834 | 1528 | 1310 | 1146 | 917 | 764 | 573 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0006 | 0.0008 | 0.0010 | 0.0013 |
| | | | | 120 - 180 | vf [in/min] | 2.93 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| M | E 8 - 9 | 1.00 | 0.25 | 370 | n [min-1] | 5654 | 4523 | 3769 | 3231 | 2827 | 2261 | 1885 | 1413 |
| | | | | | fz [in] | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | | | | 340 - 400 | vf [in/min] | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 |
| | E 10 - 11 | 1.00 | 0.25 | 300 | n [min-1] | 4584 | 3667 | 3056 | 2619 | 2292 | 1834 | 1528 | 1146 |
| | | | | | fz [in] | 0.0008 | 0.0010 | 0.0012 | 0.0014 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | | | | 270 - 330 | vf [in/min] | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 |
| S | E 19 | 1.00 | 0.15 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | E 20 | 1.00 | 0.15 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | E 21 | 1.00 | 0.15 | 90 | n [min-1] | 1375 | 1100 | 917 | 786 | 688 | 550 | 458 | 344 |
| | | | | | fz [in] | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | E 22 | 1.00 | 0.25 | 185 | n [min-1] | 2827 | 2261 | 1885 | 1615 | 1413 | 1131 | 942 | 707 |
| | | | | | fz [in] | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0013 | 0.0016 | 0.0020 | 0.0026 |
| | | | | 165 - 205 | vf [in/min] | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

STS540 / STR540 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | |
|-------------------------|-------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | V _c (sf / min) | | Z _n = 5 | | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| P | E 1 - 2 | 1.00 | 0.30 | 500 | n (rev/min) | 30560 | 15280 | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 | |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0018 | 0.0024 | 0.0030 | 0.0036 | 0.0048 | |
| | E 3 - 4 | 1.00 | 0.30 | 450 - 550 | 400 | v _f (mm/min) | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 |
| | | | | | | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | 350 - 450 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | | v _f (mm/min) | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 |
| E 5 - 6 | 1.00 | 0.20 | 200 | 150 - 250 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | |
| | | | | 80 | v _f (mm/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | |
| | | | | | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | |
| H | M / A / D 7a (48>52HRC) | 1.00 | 0.10 | 60 - 100 | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 | |
| | | | | | v _f (mm/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| M | E 8 - 9 | 1.00 | 0.20 | 380 | n (rev/min) | 23226 | 11613 | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 | |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | 330 - 430 | v _f (mm/min) | 23.2 | 21.8 | 21.8 | 21.8 | 21.8 | 21.8 | 21.8 | 21.8 | | | | |
| | | n (rev/min) | 16808 | 8404 | 4202 | 2801 | 2101 | 1681 | 1401 | 1051 | | | | |
| E 10 - 11 | 1.00 | 0.15 | 275 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| | | | | v _f (mm/min) | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | 15.8 | | |
| K | E 12 - 13 | 1.00 | 0.50 | 500 | n (rev/min) | 30560 | 15280 | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 | |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | |
| | E 12 - 13 | 1.00 | 0.30 | 450 - 550 | 215 | v _f (mm/min) | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 |
| | | | | | | n (rev/min) | 13141 | 6570 | 3285 | 2190 | 1643 | 1314 | 1095 | 821 |
| | | | | 165 - 265 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | | | v _f (mm/min) | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | |
| S | E 19 | 1.00 | 0.20 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 | |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | 80 - 120 | v _f (mm/min) | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | | | | |
| | | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 | | | | |
| | E 20 | 1.00 | 0.20 | 100 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | | | v _f (mm/min) | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | |
| | E 21 | 1.00 | 0.20 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 | |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | 80 - 120 | v _f (mm/min) | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | | | | |
| | | n (rev/min) | 10390 | 5195 | 2598 | 1732 | 1299 | 1039 | 866 | 649 | | | | |
| | E 22 | 1.00 | 0.20 | 170 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | | | v _f (mm/min) | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | |

SMG = Seco Material Group
 n [min-1] = RPM
 V_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

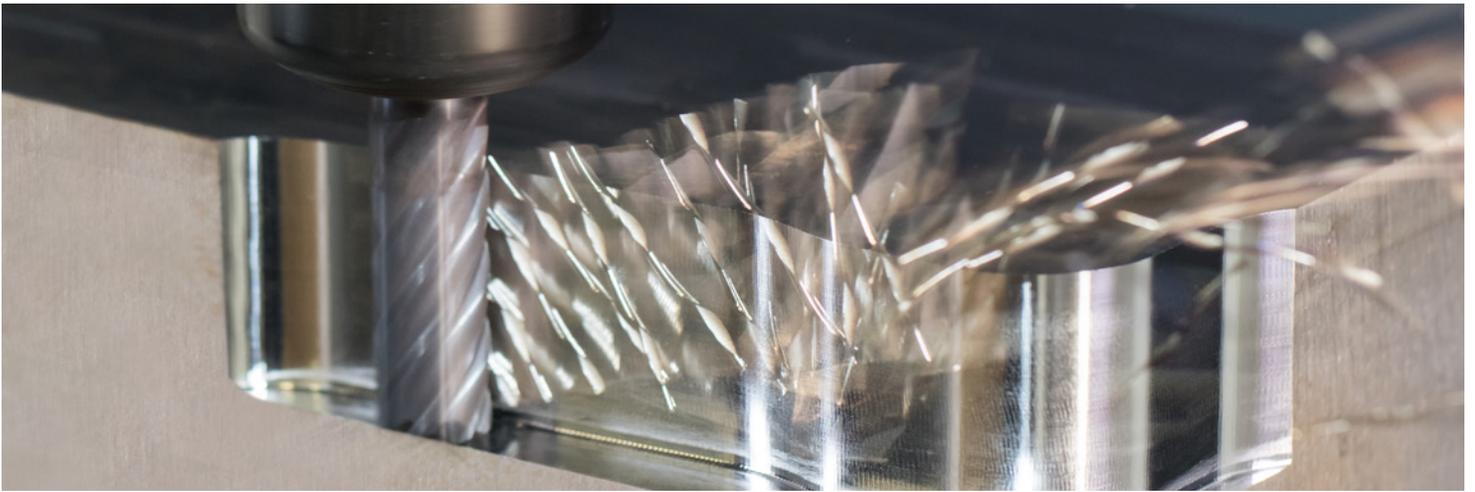
STS540M / STR540M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|--------------------------|-------------------------|--------------------|-------|-------|-------|-------|-------|-------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (m / min) | | Z _n = 5 | | | | | | |
| | | | | | | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| P | E 1 - 2 | 1.00 | 0.30 | 152 | n (rev/min) | 12100 | 8060 | 6050 | 4840 | 4030 | 3460 | 3020 |
| | | | | | f _z (mm) | 0.019 | 0.029 | 0.038 | 0.048 | 0.058 | 0.067 | 0.077 |
| | | | | | v _f (mm/min) | 1162 | 1161 | 1162 | 1162 | 1161 | 1163 | 1160 |
| | E 3 - 4 | 1.00 | 0.30 | 122 | n (rev/min) | 9710 | 6470 | 4850 | 3880 | 3240 | 2770 | 2430 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 583 | 582 | 582 | 582 | 583 | 582 | 583 |
| E 5 - 6 | 1.00 | 0.20 | 61 | n (rev/min) | 4850 | 3240 | 2430 | 1940 | 1620 | 1390 | 1210 | |
| | | | | f _z (mm) | 0.010 | 0.014 | 0.019 | 0.024 | 0.029 | 0.034 | 0.038 | |
| | | | | v _f (mm/min) | 233 | 233 | 233 | 233 | 233 | 234 | 232 | |
| H | M / A / D 7a (48>52Hrc) | 1.00 | 0.10 | 24 | n (rev/min) | 1910 | 1270 | 950 | 760 | 640 | 550 | 480 |
| | | | | | f _z (mm) | 0.006 | 0.010 | 0.013 | 0.016 | 0.019 | 0.022 | 0.026 |
| | | | | | v _f (mm/min) | 61 | 61 | 61 | 61 | 61 | 62 | 61 |
| M | E 8 - 9 | 1.00 | 0.20 | 116 | n (rev/min) | 9230 | 6150 | 4620 | 3690 | 3080 | 2640 | 2310 |
| | | | | | f _z (mm) | 0.013 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 591 | 554 | 554 | 554 | 554 | 554 | 554 |
| | E 10 - 11 | 1.00 | 0.15 | 84 | n (rev/min) | 6680 | 4460 | 3340 | 2670 | 2230 | 1910 | 1670 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 401 | 401 | 401 | 401 | 401 | 401 | 401 |
| K | E 12 - 13 | 1.00 | 0.50 | 152 | n (rev/min) | 12100 | 8060 | 6050 | 4840 | 4030 | 3460 | 3020 |
| | | | | | f _z (mm) | 0.022 | 0.034 | 0.045 | 0.056 | 0.067 | 0.078 | 0.090 |
| | | | | | v _f (mm/min) | 1355 | 1354 | 1355 | 1355 | 1354 | 1356 | 1353 |
| | E 12 - 13 | 1.00 | 0.30 | 66 | n (rev/min) | 5250 | 3500 | 2630 | 2100 | 1750 | 1500 | 1310 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 315 | 315 | 316 | 315 | 315 | 315 | 314 |
| S | E 19 | 1.00 | 0.10 | 30 | n (rev/min) | 2390 | 1590 | 1190 | 950 | 800 | 680 | 600 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 143 | 143 | 143 | 143 | 144 | 143 | 144 |
| | E 20 | 1.00 | 0.10 | 30 | n (rev/min) | 2390 | 1590 | 1190 | 950 | 800 | 680 | 600 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 143 | 143 | 143 | 143 | 144 | 143 | 144 |
| | E 21 | 1.00 | 0.10 | 30 | n (rev/min) | 2390 | 1590 | 1190 | 950 | 800 | 680 | 600 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 143 | 143 | 143 | 143 | 144 | 143 | 144 |
| | E 22 | 1.00 | 0.20 | 52 | n (rev/min) | 4140 | 2760 | 2070 | 1660 | 1380 | 1180 | 1030 |
| | | | | | f _z (mm) | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.042 | 0.048 |
| | | | | | v _f (mm/min) | 248 | 248 | 248 | 249 | 248 | 248 | 247 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



A NEW LEVEL OF PERFORMANCE

MULTI FLUTE

The Niagara Cutter™ Multi Flute family of products takes Optimized Roughing to a new level of performance. Reducing cycle times, increasing throughput and extending tool life has never been easier. This product series now offers smaller diameters down to 1/8", necked versions with extended reaches, and even a new ball nose option for those demanding 3D applications that require optimal performance and tool life. The most unique addition to the Multi Flute family of products is a new advanced chip splitter design which takes chip control to a whole new level. This advanced design allows for unsurpassed chip control in applications requiring depths of cut up to 3 times the diameter of the tool. Thanks to the introduction of over 80 new tools, this extensive product range is not only proving itself to the world of manufacturing it is also mastering its own game in the art of Optimized Roughing.

RANGE OVERVIEW

S638/S638R - Square & Radius

- 2 and 2.5 x D flute length (0.125" - 1.00")
- Cylindrical shank, dead sharp and radius (0.010", 0.015", 0.030", 0.060", 0.090", 0.120" & 0.190")

SN638/SN638R - Necked Series

- 2 x D flute length and 4 x D reach length (0.375" - 1.000")
- Cylindrical shank, standard aerospace radii (0.015", 0.030", 0.060", 0.120" & 0.250")

SB638/SBN638 - Ball Nose Series

- 1 and approx 2.5 x D flute length (0.250" - 1.000")
- Necked version - 1 x D flute length and 3 x D reach length
- Cylindrical shank

S738/S738R/S938/S938R - Chamfer & Radius

- 1.5, 2.5 and 4 x D flute length (0.250" - 0.500")
- Cylindrical shank, chamfer and radius (0.015", 0.030" & 0.060")

SCS638/SCS638R, SCS738R, SCS938R - Chipsplitter Design

- Approx. 3.2 x D flute length
- Cylindrical shank (0.250" - 1.000")

| MATERIAL GROUPS |
|-------------------------------|
| steel < 450 N/mm ² |
| 450 < 700 N/mm ² |
| 700 < 1200 N/mm ² |
| Stainless steel |
| Cast Iron |
| Fe based super alloys |
| CO-based super alloys |
| Ni-based super alloys |
| Titanium alloys |

KEY BENEFITS

- Increased chip evacuation in deep pocket applications
- AlTiN coating increases tool life
- Smoother cutting for an improved surface finish
- High heat abrasion resistance
- Stronger cutting edge

6 TIPS OPTIMIZED ROUGHING

Optimized Roughing can be highly effective for machining part features such as pockets with challenging corners as well as any straight walls two times the diameter of your end mill and require long axial depths of cuts. This strategy enables you to machine pockets three to four times faster than conventional methods while also dramatically extending the life of your tools. Achieving the best possible results with today's Optimized Roughing strategy does require adhering to a few specific guidelines.

1. CHOOSE AN APPROPRIATE STEPOVER

Optimized Roughing typically employs end mills with 5- to 9-flutes. End mills with fewer flutes have more space for chip formation, thus can utilize larger step-overs. Although the step-over of tools with fewer flutes can be higher, the traverse rate of the tool will decrease because of the fewer flutes. Therefore, a balance must be struck where the optimum step-over and feed rate are utilized for each type of tool. The cutting data in this brochure has been specified based on extensive testing and experience and should serve as a good starting point for your application.

2. USE STRONG, SECURE TOOLHOLDERS & FIXTURING

High-precision holders are crucial when Optimized Roughing to achieve maximum tool life. Run-out needs to be kept to less than 0.0004" to maximize tool life. This type of precision can be achieved by most shrink fit holders, milling chucks, high precision collet chucks and select manufacturer's end mill holders. A precise holder ensures the accuracy of the process, whereas a less secure holder will cause undesirable levels of vibration while Optimized Roughing at high feed rates.

3. MAKE SURE YOUR MACHINE IS CAPABLE OF PERFORMING

Machine tools used for Optimized Roughing not only need to be able to achieve extremely high feed rates, but also need to be able to process thousands of lines of code in a matter of seconds. This requires advanced look-ahead capabilities and processing systems found in newer machine tools. Rigidity throughout the machine tool from the spindle bearings all the way through to the ball screws ensures smooth cutting, consistent tool life and unsurpassed part quality.

4. CHOOSE A SUITABLE PROGRAMMING METHOD

It is nearly impossible to program an Optimized Roughing strategy manually. Many companies provide state-of-the-art programming software. Careful consideration must be made when choosing the right software or software add on. Not all software is created equal. For example, a programming software designed only for complex 3D high speed milling may not be able to perform the complex radial moves inside of tight corners to maintain a consistent angle of engagement. This is one of the many keys to successful Optimized Roughing strategies.

5. SELECT THE RIGHT DEPTH OF CUT

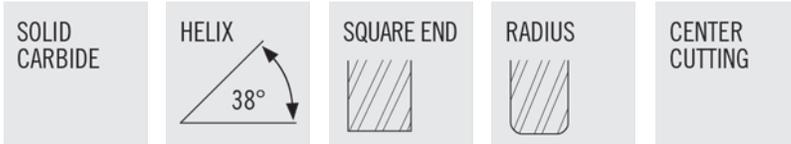
Take advantage of the full flute length of the tool selected for the specific application. Maximizing depth of cuts above 2 times the diameter of the tool is common when Optimized Roughing. Smaller radial step-overs make such depths of the cut possible. A larger step-over would increase the amount of heat in the cut, which in-turn will have a negative effect on tool life and performance. Therefore, rpm and feed rates must be reduced. A cut that is too deep, over 3 x D for instance, can create cutting pressures greater than what the tool can bear and possibly cause deflection. In this circumstance, chip splitters can minimize radial cutting pressure reducing deflection and aiding in chip control.

6. FOLLOW RECOMMENDED CUTTING PARAMETERS

After meticulous research and years of firsthand experience, we have developed specific recommended cutting parameters. Always to be used as a starting point, cutting data is optimized per tool design, specifications and material groups. Modifications can be made depending on the application.



MULTI FLUTE-S638 & S638R

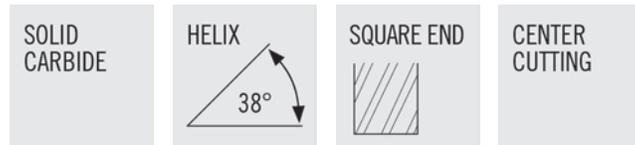


- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- Designed for increased radial depths as compared to the S738 and S938
- High performance with minimal deflection
- Cutting Data - Page 53-55
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N15378 | S638-0.125-F3-S.0-Z6 | 1/8 | 1/4 | 5/16 | 2 | 6 | ALTIN | - | CYLINDRICAL |
| N15379 | S638R-0.125-F3-R010.0-Z6 | 1/8 | 1/4 | 5/16 | 2 | 6 | ALTIN | 0.010 | CYLINDRICAL |
| N15380 | S638-0.188-F3-S.0-Z6 | 3/16 | 1/4 | 1/2 | 2 | 6 | ALTIN | - | CYLINDRICAL |
| N15381 | S638R-0.188-F3-R010.0-Z6 | 3/16 | 1/4 | 1/2 | 2 | 6 | ALTIN | 0.010 | CYLINDRICAL |
| N15382 | S638-0.250-D3-S.0-Z6 | 1/4 | 1/4 | 5/8 | 2 | 6 | ALTIN | - | CYLINDRICAL |
| N15383 | S638R-0.250-D3-R015.0-Z6 | 1/4 | 1/4 | 5/8 | 2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15384 | S638R-0.250-D3-R030.0-Z6 | 1/4 | 1/4 | 5/8 | 2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15388 | S638-0.313-D2-S.0-Z6 | 5/16 | 5/16 | 3/4 | 2 | 6 | ALTIN | - | CYLINDRICAL |
| N15389 | S638R-0.313-D2-R015.0-Z6 | 5/16 | 5/16 | 3/4 | 2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15390 | S638R-0.313-D2-R030.0-Z6 | 5/16 | 5/16 | 3/4 | 2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00524 | S638-0.375-D1-S.0-Z6 | 3/8 | 3/8 | 1 | 2-1/2 | 6 | ALTIN | - | CYLINDRICAL |
| N00455 | S638R-0.375-D1-R015.0-Z6 | 3/8 | 3/8 | 1 | 2-1/2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N00456 | S638R-0.375-D1-R030.0-Z6 | 3/8 | 3/8 | 1 | 2-1/2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00457 | S638-0.500-D1-S.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | - | CYLINDRICAL |
| N00458 | S638R-0.500-D1-R015.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N00459 | S638R-0.500-D1-R030.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00462 | S638R-0.500-D1-R060.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N00463 | S638R-0.500-D1-R090.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | 0.090 | CYLINDRICAL |
| N00464 | S638R-0.500-D1-R120.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N00465 | S638-0.625-D1-S.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | - | CYLINDRICAL |
| N00466 | S638R-0.625-D1-R015.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N00467 | S638R-0.625-D1-R030.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00468 | S638R-0.625-D1-R060.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N00469 | S638R-0.625-D1-R090.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | 0.090 | CYLINDRICAL |
| N00472 | S638R-0.625-D1-R120.0-Z6 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N00473 | S638-0.750-D1-S.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | - | CYLINDRICAL |
| N00474 | S638R-0.750-D1-R030.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00475 | S638R-0.750-D1-R060.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N00476 | S638R-0.750-D1-R090.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | 0.090 | CYLINDRICAL |
| N00477 | S638R-0.750-D1-R120.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N00478 | S638R-0.750-D1-R190.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | 0.190 | CYLINDRICAL |
| N00479 | S638-1.000-D1-S.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | - | CYLINDRICAL |
| N00482 | S638R-1.000-D1-R030.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N00483 | S638R-1.000-D1-R060.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N00484 | S638R-1.000-D1-R090.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.090 | CYLINDRICAL |
| N00485 | S638R-1.000-D1-R120.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N00486 | S638R-1.000-D1-R190.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.190 | CYLINDRICAL |
| N00487 | S638R-1.000-D1-R250.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | 0.250 | CYLINDRICAL |

DISCOUNT CODE D43

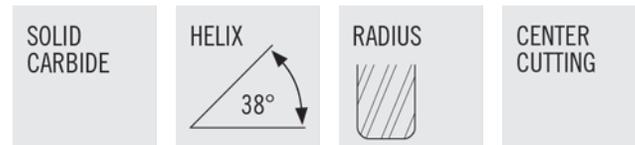
MULTI FLUTE-SN638



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 53-55
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|-------------|
| N15397 | SN638-0.375-E3-S.0-Z6 | 3/8 | 3/8 | 1 | 3 | .360 | 1-1/2 | 6 | ALTIN | CYLINDRICAL |
| N15406 | SN638-0.500-E2-S.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | .480 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15418 | SN638-0.625-E2-S.0-Z6 | 5/8 | 5/8 | 1-3/8 | 5 | .600 | 2-1/2 | 6 | ALTIN | CYLINDRICAL |
| N15430 | SN638-0.750-E2-S.0-Z6 | 3/4 | 3/4 | 1-3/4 | 6 | .720 | 3 | 6 | ALTIN | CYLINDRICAL |

MULTI FLUTE-SN638R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 53-55
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N15398 | SN638R-0.375-E3-R015.0-Z6 | 3/8 | 3/8 | 1 | 3 | .360 | 1-1/2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15399 | SN638R-0.375-E3-R030.0-Z6 | 3/8 | 3/8 | 1 | 3 | .360 | 1-1/2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15407 | SN638R-0.500-E2-R030.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | .480 | 2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15408 | SN638R-0.500-E2-R060.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | .480 | 2 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15409 | SN638R-0.500-E2-R120.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | .480 | 2 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15419 | SN638R-0.625-E2-R015.0-Z6 | 5/8 | 5/8 | 1-3/8 | 5 | .600 | 2-1/2 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15420 | SN638R-0.625-E2-R030.0-Z6 | 5/8 | 5/8 | 1-3/8 | 5 | .600 | 2-1/2 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15421 | SN638R-0.625-E2-R060.0-Z6 | 5/8 | 5/8 | 1-3/8 | 5 | .600 | 2-1/2 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15431 | SN638R-0.750-E2-R030.0-Z6 | 3/4 | 3/4 | 1-3/4 | 6 | .720 | 3 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15432 | SN638R-0.750-E2-R060.0-Z6 | 3/4 | 3/4 | 1-3/4 | 6 | .720 | 3 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15433 | SN638R-0.750-E2-R120.0-Z6 | 3/4 | 3/4 | 1-3/4 | 6 | .720 | 3 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15441 | SN638R-1.000-E2-R030.0-Z6 | 1 | 1 | 2-1/4 | 7 | .960 | 4-1/8 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15442 | SN638R-1.000-E2-R060.0-Z6 | 1 | 1 | 2-1/4 | 7 | .960 | 4-1/8 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15443 | SN638R-1.000-E2-R090.0-Z6 | 1 | 1 | 2-1/4 | 7 | .960 | 4-1/8 | 6 | ALTIN | 0.090 | CYLINDRICAL |
| N15444 | SN638R-1.000-E2-R120.0-Z6 | 1 | 1 | 2-1/4 | 7 | .960 | 4-1/8 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15445 | SN638R-1.000-E2-R250.0-Z6 | 1 | 1 | 2-1/4 | 7 | .960 | 4-1/8 | 6 | ALTIN | 0.250 | CYLINDRICAL |

DISCOUNT CODE D43

MULTI FLUTE-SB638

| | | | |
|---------------|--|---|----------------|
| SOLID CARBIDE |  <p>HELIX 38°</p> |  <p>BALL END</p> | CENTER CUTTING |
|---------------|--|---|----------------|



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 53-57
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N15385 | SB638-0.250-D1-B.0-Z6 | 1/4 | 1/4 | 1/4 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15386 | SB638-0.250-D3-B.0-Z6 | 1/4 | 1/4 | 5/8 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15391 | SB638-0.313-D1-B.0-Z6 | 5/16 | 5/16 | 5/16 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15392 | SB638-0.313-D2-B.0-Z6 | 5/16 | 5/16 | 3/4 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15394 | SB638-0.375-D1-B.0-Z6 | 3/8 | 3/8 | 3/8 | 2 | 6 | ALTIN | CYLINDRICAL |
| N15395 | SB638-0.375-D3-B.0-Z6 | 3/8 | 3/8 | 1 | 2-1/2 | 6 | ALTIN | CYLINDRICAL |
| N15403 | SB638-0.500-D1-B.0-Z6 | 1/2 | 1/2 | 1/2 | 2-1/2 | 6 | ALTIN | CYLINDRICAL |
| N15404 | SB638-0.500-D3-B.0-Z6 | 1/2 | 1/2 | 1-1/4 | 3 | 6 | ALTIN | CYLINDRICAL |
| N15415 | SB638-0.625-D1-B.0-Z6 | 5/8 | 5/8 | 5/8 | 3 | 6 | ALTIN | CYLINDRICAL |
| N15416 | SB638-0.625-D3-B.0-Z6 | 5/8 | 5/8 | 1-5/8 | 4 | 6 | ALTIN | CYLINDRICAL |
| N15427 | SB638-0.750-D1-B.0-Z6 | 3/4 | 3/4 | 3/4 | 3 | 6 | ALTIN | CYLINDRICAL |
| N15428 | SB638-0.750-D2-B.0-Z6 | 3/4 | 3/4 | 1-3/4 | 4 | 6 | ALTIN | CYLINDRICAL |
| N15438 | SB638-1.000-D1-B.0-Z6 | 1 | 1 | 1 | 4 | 6 | ALTIN | CYLINDRICAL |
| N15439 | SB638-1.000-D2-B.0-Z6 | 1 | 1 | 2 | 5 | 6 | ALTIN | CYLINDRICAL |

MULTI FLUTE-SBN638

| | | | |
|---------------|--|---|----------------|
| SOLID CARBIDE |  <p>HELIX 38°</p> |  <p>BALL END</p> | CENTER CUTTING |
|---------------|--|---|----------------|

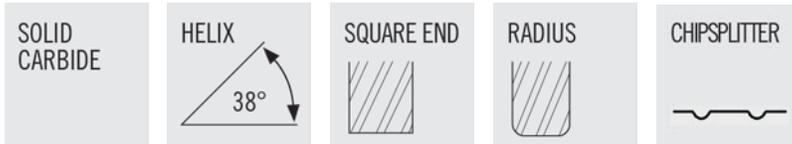


- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 53-57
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|-------------|
| N15387 | SBN638-0.250-E1-B.0-Z6 | 1/4 | 1/4 | 1/4 | 2 | .240 | 3/4 | 6 | ALTIN | CYLINDRICAL |
| N15393 | SBN638-0.313-E1-B.0-Z6 | 5/16 | 5/16 | 5/16 | 2-1/2 | .300 | 1 | 6 | ALTIN | CYLINDRICAL |
| N15396 | SBN638-0.375-E1-B.0-Z6 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/4 | 6 | ALTIN | CYLINDRICAL |
| N15405 | SBN638-0.500-E1-B.0-Z6 | 1/2 | 1/2 | 1/2 | 3 | .480 | 1-1/2 | 6 | ALTIN | CYLINDRICAL |
| N15417 | SBN638-0.625-E1-B.0-Z6 | 5/8 | 5/8 | 5/8 | 4 | .600 | 1-7/8 | 6 | ALTIN | CYLINDRICAL |
| N15429 | SBN638-0.750-E1-B.0-Z6 | 3/4 | 3/4 | 3/4 | 5 | .720 | 2-1/4 | 6 | ALTIN | CYLINDRICAL |
| N15440 | SBN638-1.000-E1-B.0-Z6 | 1 | 1 | 1 | 6 | .960 | 3 | 6 | ALTIN | CYLINDRICAL |

DISCOUNT CODE D43

MULTI FLUTE-SCS638 & SCS638R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- Designed for increased radial depths as compared to the SCS738 and SCS938
- High performance with minimal deflection
- Advanced chip splitter design for increased chip control and management

- Cutting Data - Page 58
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N15400 | SCS638-0.375-D3-S.0-Z6 | 3/8 | 3/8 | 1-1/4 | 3 | 6 | ALTIN | - | CYLINDRICAL |
| N15401 | SCS638R-0.375-D3-R015.0-Z6 | 3/8 | 3/8 | 1-1/4 | 3 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15402 | SCS638R-0.375-D3-R030.0-Z6 | 3/8 | 3/8 | 1-1/4 | 3 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15410 | SCS638-0.500-D3-S.0-Z6 | 1/2 | 1/2 | 1-5/8 | 4 | 6 | ALTIN | - | CYLINDRICAL |
| N15411 | SCS638R-0.500-D3-R015.0-Z6 | 1/2 | 1/2 | 1-5/8 | 4 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15412 | SCS638R-0.500-D3-R030.0-Z6 | 1/2 | 1/2 | 1-5/8 | 4 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15413 | SCS638R-0.500-D3-R060.0-Z6 | 1/2 | 1/2 | 1-5/8 | 4 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15414 | SCS638R-0.500-D3-R120.0-Z6 | 1/2 | 1/2 | 1-5/8 | 4 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15422 | SCS638-0.625-D3-S.0-Z6 | 5/8 | 5/8 | 2 | 4 | 6 | ALTIN | - | CYLINDRICAL |
| N15423 | SCS638R-0.625-D3-R015.0-Z6 | 5/8 | 5/8 | 2 | 4 | 6 | ALTIN | 0.015 | CYLINDRICAL |
| N15424 | SCS638R-0.625-D3-R030.0-Z6 | 5/8 | 5/8 | 2 | 4 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15425 | SCS638R-0.625-D3-R060.0-Z6 | 5/8 | 5/8 | 2 | 4 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15426 | SCS638R-0.625-D3-R120.0-Z6 | 5/8 | 5/8 | 2 | 4 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15434 | SCS638-0.750-D3-S.0-Z6 | 3/4 | 3/4 | 2-1/2 | 5 | 6 | ALTIN | - | CYLINDRICAL |
| N15435 | SCS638R-0.750-D3-R030.0-Z6 | 3/4 | 3/4 | 2-1/2 | 5 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15436 | SCS638R-0.750-D3-R060.0-Z6 | 3/4 | 3/4 | 2-1/2 | 5 | 6 | ALTIN | 0.060 | CYLINDRICAL |
| N15437 | SCS638R-0.750-D3-R120.0-Z6 | 3/4 | 3/4 | 2-1/2 | 5 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15446 | SCS638R-1.000-D3-R030.0-Z6 | 1 | 1 | 3-1/8 | 6 | 6 | ALTIN | 0.030 | CYLINDRICAL |
| N15447 | SCS638R-1.000-D3-R120.0-Z6 | 1 | 1 | 3-1/8 | 6 | 6 | ALTIN | 0.120 | CYLINDRICAL |
| N15448 | SCS638R-1.000-D3-R250.0-Z6 | 1 | 1 | 3-1/8 | 6 | 6 | ALTIN | 0.250 | CYLINDRICAL |

MULTI FLUTE-S738 & S738R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 59-60
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|---------|-------------|
| N58244 | S738-0.250-D2-C003.0-Z7 | 1/4 | 1/4 | 3/8 | 2 | 7 | ALTIN | - | 0.003 | CYLINDRICAL |
| N58245 | S738R-0.250-D2-R015.0-Z7 | 1/4 | 1/4 | 3/8 | 2 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58246 | S738R-0.250-D2-R030.0-Z7 | 1/4 | 1/4 | 3/8 | 2 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58247 | S738-0.250-D3-C003.0-Z7 | 1/4 | 1/4 | 3/4 | 2-1/2 | 7 | ALTIN | - | 0.003 | CYLINDRICAL |
| N58248 | S738R-0.250-D3-R015.0-Z7 | 1/4 | 1/4 | 3/4 | 2-1/2 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58249 | S738R-0.250-D3-R030.0-Z7 | 1/4 | 1/4 | 3/4 | 2-1/2 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58250 | S738-0.250-D5-C003.0-Z7 | 1/4 | 1/4 | 1-1/4 | 3 | 7 | ALTIN | - | 0.003 | CYLINDRICAL |
| N58251 | S738R-0.250-D5-R015.0-Z7 | 1/4 | 1/4 | 1-1/4 | 3 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58252 | S738R-0.250-D5-R030.0-Z7 | 1/4 | 1/4 | 1-1/4 | 3 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58253 | S738-0.375-D1-C005.0-Z7 | 3/8 | 3/8 | 1/2 | 2-1/2 | 7 | ALTIN | - | 0.005 | CYLINDRICAL |
| N58254 | S738R-0.375-D1-R015.0-Z7 | 3/8 | 3/8 | 1/2 | 2-1/2 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58255 | S738R-0.375-D1-R030.0-Z7 | 3/8 | 3/8 | 1/2 | 2-1/2 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58256 | S738-0.375-D3-C005.0-Z7 | 3/8 | 3/8 | 1 | 3 | 7 | ALTIN | - | 0.005 | CYLINDRICAL |
| N58257 | S738R-0.375-D3-R015.0-Z7 | 3/8 | 3/8 | 1 | 3 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58258 | S738R-0.375-D3-R030.0-Z7 | 3/8 | 3/8 | 1 | 3 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58259 | S738-0.375-D4-C005.0-Z7 | 3/8 | 3/8 | 1-1/2 | 3-1/2 | 7 | ALTIN | - | 0.005 | CYLINDRICAL |
| N58260 | S738R-0.375-D4-R015.0-Z7 | 3/8 | 3/8 | 1-1/2 | 3-1/2 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58261 | S738R-0.375-D4-R030.0-Z7 | 3/8 | 3/8 | 1-1/2 | 3-1/2 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58262 | S738-0.500-D2-C006.0-Z7 | 1/2 | 1/2 | 3/4 | 3 | 7 | ALTIN | - | 0.006 | CYLINDRICAL |
| N58263 | S738R-0.500-D2-R015.0-Z7 | 1/2 | 1/2 | 3/4 | 3 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58264 | S738R-0.500-D2-R030.0-Z7 | 1/2 | 1/2 | 3/4 | 3 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58265 | S738R-0.500-D2-R060.0-Z7 | 1/2 | 1/2 | 3/4 | 3 | 7 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58266 | S738-0.500-D3-C006.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | ALTIN | - | 0.006 | CYLINDRICAL |
| N58267 | S738R-0.500-D3-R015.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58268 | S738R-0.500-D3-R030.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58269 | S738R-0.500-D3-R060.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58270 | S738-0.500-D4-C006.0-Z7 | 1/2 | 1/2 | 2 | 4 | 7 | ALTIN | - | 0.006 | CYLINDRICAL |
| N58271 | S738R-0.500-D4-R015.0-Z7 | 1/2 | 1/2 | 2 | 4 | 7 | ALTIN | 0.015 | - | CYLINDRICAL |
| N58272 | S738R-0.500-D4-R030.0-Z7 | 1/2 | 1/2 | 2 | 4 | 7 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58273 | S738R-0.500-D4-R060.0-Z7 | 1/2 | 1/2 | 2 | 4 | 7 | ALTIN | 0.060 | - | CYLINDRICAL |

MULTI FLUTE-SCS738R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Advanced chip splitter design for increased chip control and management
- Cutting Data - Page 61
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N15449 | SCS738R-0.250-D3-R015.0-Z7 | 1/4 | 1/4 | 3/4 | 2-1/2 | 7 | ALTIN | 0.015 | CYLINDRICAL |
| N15450 | SCS738R-0.250-D5-R015.0-Z7 | 1/4 | 1/4 | 1-1/4 | 3 | 7 | ALTIN | 0.015 | CYLINDRICAL |
| N15451 | SCS738R-0.375-D3-R015.0-Z7 | 3/8 | 3/8 | 1 | 3 | 7 | ALTIN | 0.015 | CYLINDRICAL |
| N15452 | SCS738R-0.375-D4-R015.0-Z7 | 3/8 | 3/8 | 1-1/2 | 3-1/2 | 7 | ALTIN | 0.015 | CYLINDRICAL |
| N15453 | SCS738R-0.500-D3-R030.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | ALTIN | 0.030 | CYLINDRICAL |
| N15454 | SCS738R-0.500-D4-R030.0-Z7 | 1/2 | 1/2 | 2 | 4 | 7 | ALTIN | 0.030 | CYLINDRICAL |

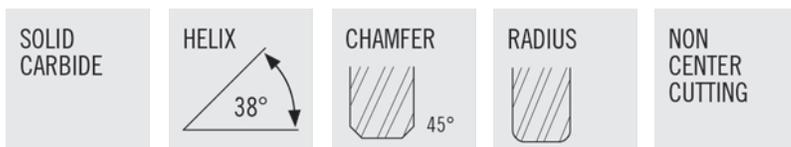
MULTI FLUTE-S938 & S938R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 59-60
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|---------|-------------|
| N58274 | S938-0.625-D1-C008.0-Z9 | 5/8 | 5/8 | 3/4 | 3 | 9 | ALTIN | - | 0.008 | CYLINDRICAL |
| N58275 | S938R-0.625-D1-R030.0-Z9 | 5/8 | 5/8 | 3/4 | 3 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58276 | S938R-0.625-D1-R060.0-Z9 | 5/8 | 5/8 | 3/4 | 3 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58277 | S938R-0.625-D1-R090.0-Z9 | 5/8 | 5/8 | 3/4 | 3 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58278 | S938R-0.625-D1-R120.0-Z9 | 5/8 | 5/8 | 3/4 | 3 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58279 | S938-0.625-D3-C008.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | - | 0.008 | CYLINDRICAL |
| N58280 | S938R-0.625-D3-R030.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58281 | S938R-0.625-D3-R060.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58282 | S938R-0.625-D3-R090.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58283 | S938R-0.625-D3-R120.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58284 | S938-0.625-D4-C008.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | - | 0.008 | CYLINDRICAL |
| N58285 | S938R-0.625-D4-R030.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58286 | S938R-0.625-D4-R060.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58287 | S938R-0.625-D4-R090.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58288 | S938R-0.625-D4-R120.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58289 | S938-0.750-D2-C010.0-Z9 | 3/4 | 3/4 | 1-5/8 | 4 | 9 | ALTIN | - | 0.010 | CYLINDRICAL |
| N58290 | S938R-0.750-D2-R030.0-Z9 | 3/4 | 3/4 | 1-5/8 | 4 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58291 | S938R-0.750-D2-R060.0-Z9 | 3/4 | 3/4 | 1-5/8 | 4 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58292 | S938R-0.750-D2-R090.0-Z9 | 3/4 | 3/4 | 1-5/8 | 4 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58293 | S938R-0.750-D2-R120.0-Z9 | 3/4 | 3/4 | 1-5/8 | 4 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58294 | S938-0.750-D3-C010.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | - | 0.010 | CYLINDRICAL |
| N58295 | S938R-0.750-D3-R030.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58296 | S938R-0.750-D3-R060.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58297 | S938R-0.750-D3-R090.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58298 | S938R-0.750-D3-R120.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58299 | S938-0.750-D4-C010.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | - | 0.010 | CYLINDRICAL |
| N58300 | S938R-0.750-D4-R030.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58301 | S938R-0.750-D4-R060.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58302 | S938R-0.750-D4-R090.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58303 | S938R-0.750-D4-R120.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58304 | S938-1.000-D2-C012.0-Z9 | 1 | 1 | 2 | 5 | 9 | ALTIN | - | 0.012 | CYLINDRICAL |
| N58305 | S938R-1.000-D2-R030.0-Z9 | 1 | 1 | 2 | 5 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58306 | S938R-1.000-D2-R060.0-Z9 | 1 | 1 | 2 | 5 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |

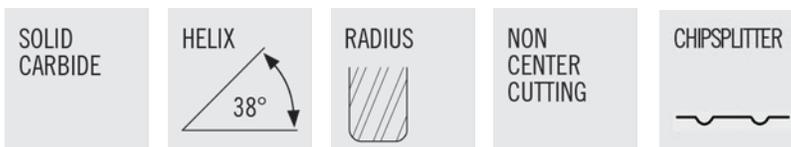
MULTI FLUTE-S938 & S938R (CONT'D)



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Cutting Data - Page 59-60
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|---------|-------------|
| N58307 | S938R-1.000-D2-R090.0-Z9 | 1 | 1 | 2 | 5 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58308 | S938R-1.000-D2-R120.0-Z9 | 1 | 1 | 2 | 5 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58309 | S938-1.000-D3-C012.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | - | 0.012 | CYLINDRICAL |
| N58310 | S938R-1.000-D3-R030.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58311 | S938R-1.000-D3-R060.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58312 | S938R-1.000-D3-R090.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58313 | S938R-1.000-D3-R120.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |
| N58314 | S938-1.000-D4-C012.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | - | 0.012 | CYLINDRICAL |
| N58315 | S938R-1.000-D4-R030.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | 0.030 | - | CYLINDRICAL |
| N58316 | S938R-1.000-D4-R060.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | 0.060 | - | CYLINDRICAL |
| N58317 | S938R-1.000-D4-R090.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | 0.090 | - | CYLINDRICAL |
| N58318 | S938R-1.000-D4-R120.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | 0.120 | - | CYLINDRICAL |

MULTI FLUTE-SCS938R



- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized roughing techniques
- High performance with minimal deflection
- Advanced chip splitter design for increased chip control and management
- Cutting Data - Page 61
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N15455 | SCS938R-0.625-D3-R030.0-Z9 | 5/8 | 5/8 | 1-5/8 | 4 | 9 | ALTIN | 0.030 | CYLINDRICAL |
| N15456 | SCS938R-0.625-D4-R030.0-Z9 | 5/8 | 5/8 | 2-1/2 | 5 | 9 | ALTIN | 0.030 | CYLINDRICAL |
| N15457 | SCS938R-0.750-D3-R030.0-Z9 | 3/4 | 3/4 | 2-1/4 | 5 | 9 | ALTIN | 0.030 | CYLINDRICAL |
| N15458 | SCS938R-0.750-D4-R030.0-Z9 | 3/4 | 3/4 | 3-1/4 | 6 | 9 | ALTIN | 0.030 | CYLINDRICAL |
| N15459 | SCS938R-1.000-D3-R030.0-Z9 | 1 | 1 | 3-1/4 | 6 | 9 | ALTIN | 0.030 | CYLINDRICAL |
| N15460 | SCS938R-1.000-D4-R030.0-Z9 | 1 | 1 | 4-1/8 | 7 | 9 | ALTIN | 0.030 | CYLINDRICAL |

S638 / S638R / SB638 / SBN638 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | |
|-------------------------|-------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | Z _n = 6 | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 2.00 | 0.12 | 700 | n [min-1] | 21392 | 14261 | 10696 | 8557 | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 525 - 875 | vf [in/min] | 128 | 128 | 128 | 128 | 128 | 128 | 128 | 128 | 128 |
| | E 3 - 4 | 2.00 | 0.12 | 645 | n [min-1] | 19711 | 13141 | 9856 | 7884 | 6570 | 4928 | 3942 | 3285 | 2464 |
| | | | | | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 484 - 806 | vf [in/min] | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | E 5 - 6 | 2.00 | 0.10 | 525 | n [min-1] | 16044 | 10696 | 8022 | 6418 | 5348 | 4011 | 3209 | 2674 | 2006 |
| | | | | | fz [in] | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 |
| | | | | 394 - 656 | vf [in/min] | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| M | E 8 - 9 | 2.00 | 0.12 | 600 | n [min-1] | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 | 3667 | 3056 | 2292 |
| | | | | | fz [in] | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 |
| | 450 - 750 | vf [in/min] | 103 | 103 | 103 | 103 | 103 | 103 | 103 | 103 | 103 | | | |
| | E 10 - 11 | 2.00 | 0.10 | 565 | n [min-1] | 17266 | 11511 | 8633 | 6907 | 5755 | 4317 | 3453 | 2878 | 2158 |
| fz [in] | | | | | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 | |
| 424 - 706 | vf [in/min] | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | | | | |
| K | E 12 - 13 | 2.00 | 0.10 | 495 | n [min-1] | 15127 | 10085 | 7564 | 6051 | 5042 | 3782 | 3025 | 2521 | 1891 |
| | | | | | fz [in] | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 |
| | 371 - 619 | vf [in/min] | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | | | |
| | E 14 - 15 | 2.00 | 0.10 | 430 | n [min-1] | 13141 | 8761 | 6570 | 5256 | 4380 | 3285 | 2628 | 2190 | 1643 |
| fz [in] | | | | | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | |
| 323 - 538 | vf [in/min] | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | | | | |
| S | E 19 | 2.00 | 0.07 | 150 | n [min-1] | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | 113 - 188 | vf [in/min] | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | E 20 | 2.00 | 0.06 | 120 | n [min-1] | 3667 | 2445 | 1834 | 1467 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | 90 - 150 | vf [in/min] | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| | E 21 | 2.00 | 0.06 | 100 | n [min-1] | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | fz [in] | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| 75 - 125 | vf [in/min] | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | |
| E 22 | 2.00 | 0.10 | 270 | n [min-1] | 8251 | 5501 | 4126 | 3300 | 2750 | 2063 | 1650 | 1375 | 1031 | |
| | | | | fz [in] | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 | |
| 203 - 338 | vf [in/min] | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |

NOTE: Optimized roughing is an excellent strategy for achieving quality parts and extending tool life, but requires use of the right equipment and cutting parameters. If you are having problems implementing the approach or want to learn more about how to use the strategy to process a part, contact the Technical Support Team at 1-800-TEC-TEAM (1-800-832-8326).

SMG = Seco Material Group
 n [min-1] = RPM
 V_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SN638 / SN638R - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | |
| | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 2.00 | 0.08 | 700 | n [min-1] | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | fz [in] | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 525 - 875 | vf [in/min] | 128 | 128 | 128 | 128 | 128 |
| | E 3 - 4 | 2.00 | 0.08 | 645 | n [min-1] | 6570 | 4928 | 3942 | 3285 | 2464 |
| | | | | | fz [in] | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 484 - 806 | vf [in/min] | 118 | 118 | 118 | 118 | 118 |
| | E 5 - 6 | 2.00 | 0.07 | 525 | n [min-1] | 5348 | 4011 | 3209 | 2674 | 2006 |
| | | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 |
| | | | | 394 - 656 | vf [in/min] | 78 | 78 | 78 | 78 | 78 |
| M | E 8 - 9 | 2.00 | 0.08 | 600 | n [min-1] | 6112 | 4584 | 3667 | 3056 | 2292 |
| | | | | | fz [in] | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 |
| | E 10 - 11 | 2.00 | 0.07 | 565 | n [min-1] | 5755 | 4317 | 3453 | 2878 | 2158 |
| | | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 |
| K | E 12 - 13 | 2.00 | 0.07 | 495 | n [min-1] | 5042 | 3782 | 3025 | 2521 | 1891 |
| | | | | | fz [in] | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 |
| | E 14 - 15 | 2.00 | 0.07 | 430 | n [min-1] | 4380 | 3285 | 2628 | 2190 | 1643 |
| | | | | | fz [in] | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| S | E 19 | 2.00 | 0.05 | 150 | n [min-1] | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | fz [in] | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | 113 - 188 | vf [in/min] | 17 | 17 | 17 | 17 | 17 |
| | E 20 | 2.00 | 0.04 | 120 | n [min-1] | 1222 | 917 | 733 | 611 | 458 |
| | | | | | fz [in] | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 90 - 150 | vf [in/min] | 13 | 13 | 13 | 13 | 13 |
| | E 21 | 2.00 | 0.04 | 100 | n [min-1] | 1019 | 764 | 611 | 509 | 382 |
| | | | | | fz [in] | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| E 22 | 2.00 | 0.07 | 270 | n [min-1] | 2750 | 2063 | 1650 | 1375 | 1031 | |
| | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 | |
| | | | 203 - 338 | vf [in/min] | 40 | 40 | 40 | 40 | 40 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

S638 / S638R / SN638 / SN638R / SB638 / SBN638 - START VALUES

| SIDE MILLING - FINISHING | | | | | | | | | | | | | | |
|--------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 2.00 | 0.02 | 805 | n [min-1] | 24601 | 16401 | 12300 | 9840 | 8200 | 6150 | 4920 | 4100 | 3075 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| | E 3 - 4 | 2.00 | 0.02 | 742 | n [min-1] | 22676 | 15117 | 11338 | 9070 | 7559 | 5669 | 4535 | 3779 | 2834 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| | E 5 - 6 | 2.00 | 0.02 | 604 | n [min-1] | 18458 | 12305 | 9229 | 7383 | 6153 | 4615 | 3692 | 3076 | 2307 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| M | E 8 - 9 | 2.00 | 0.02 | 690 | n [min-1] | 21086 | 14058 | 10543 | 8435 | 7029 | 5272 | 4217 | 3514 | 2636 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| | E 10 - 11 | 2.00 | 0.02 | 650 | n [min-1] | 19864 | 13243 | 9932 | 7946 | 6621 | 4966 | 3973 | 3311 | 2483 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 |
| K | E 12 - 13 | 2.00 | 0.02 | 569 | n [min-1] | 17389 | 11592 | 8694 | 6955 | 5796 | 4347 | 3478 | 2898 | 2174 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| | E 14 - 15 | 2.00 | 0.02 | 495 | n [min-1] | 15127 | 10085 | 7564 | 6051 | 5042 | 3782 | 3025 | 2521 | 1891 |
| | | | | | fz [in] | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| S | E 19 | 2.00 | 0.02 | 173 | n [min-1] | 5287 | 3525 | 2643 | 2115 | 1762 | 1322 | 1057 | 881 | 661 |
| | | | | | fz [in] | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | E 20 | 2.00 | 0.02 | 138 | n [min-1] | 4217 | 2812 | 2109 | 1687 | 1406 | 1054 | 843 | 703 | 527 |
| | | | | | fz [in] | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| | E 21 | 2.00 | 0.02 | 115 | n [min-1] | 3514 | 2343 | 1757 | 1406 | 1171 | 879 | 703 | 586 | 439 |
| | | | | | fz [in] | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | E 22 | 2.00 | 0.02 | 311 | n [min-1] | 9504 | 6336 | 4752 | 3802 | 3168 | 2376 | 1901 | 1584 | 1188 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SB638 / SBN638 - START VALUES

| COPY MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|------------|---------------------------------------|---------------------------------------|---------------------------|-----------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | |
| | | | | | | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| P | E 1 - 2 | 0.05 | 0.05 | 950 | | n [min-1] | 14516 | 11613 | 9677 | 7258 | 5806 | 4839 | 3629 |
| | | | | | | fz [in] | 0.0033 | 0.0041 | 0.0049 | 0.0065 | 0.0081 | 0.0098 | 0.0130 |
| | | | | 713 - 1188 | | vf [in/min] | 283 | 283 | 283 | 283 | 283 | 283 | 283 |
| | E 3 - 4 | 0.05 | 0.05 | 820 | | n [min-1] | 12530 | 10024 | 8353 | 6265 | 5012 | 4177 | 3132 |
| | | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | | | | 615 - 1025 | | vf [in/min] | 226 | 226 | 226 | 226 | 226 | 226 | 226 |
| | E 5 - 6 | 0.04 | 0.04 | 705 | | n [min-1] | 10772 | 8618 | 7182 | 5386 | 4309 | 3591 | 2693 |
| | | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | | | | 529 - 881 | | vf [in/min] | 194 | 194 | 194 | 194 | 194 | 194 | 194 |
| M | E 8 - 9 | 0.05 | 0.05 | 360 | | n [min-1] | 5501 | 4401 | 3667 | 2750 | 2200 | 1834 | 1375 |
| | | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | 270 - 450 | | vf [in/min] | 99 | 99 | 99 | 99 | 99 | 99 | 99 | | | |
| | E 10 - 11 | 0.04 | 0.04 | 230 | | n [min-1] | 3514 | 2812 | 2343 | 1757 | 1406 | 1171 | 879 |
| | | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| 173 - 288 | | vf [in/min] | 63 | 63 | 63 | 63 | 63 | 63 | 63 | | | | |
| K | E 12 - 13 | 0.05 | 0.05 | 900 | | n [min-1] | 13752 | 11002 | 9168 | 6876 | 5501 | 4584 | 3438 |
| | | | | | | fz [in] | 0.0028 | 0.0034 | 0.0041 | 0.0055 | 0.0069 | 0.0083 | 0.0110 |
| | 675 - 1125 | | vf [in/min] | 227 | 227 | 227 | 227 | 227 | 227 | 227 | | | |
| | E 14 - 15 | 0.05 | 0.05 | 740 | | n [min-1] | 11307 | 9046 | 7538 | 5654 | 4523 | 3769 | 2827 |
| fz [in] | | | | | | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | |
| 555 - 925 | | vf [in/min] | 170 | 170 | 170 | 170 | 170 | 170 | 170 | | | | |
| S | E 19 | 0.045 | 0.045 | 295 | | n [min-1] | 4508 | 3606 | 3005 | 2254 | 1803 | 1503 | 1127 |
| | | | | | | fz [in] | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 |
| | 221 - 369 | | vf [in/min] | 68 | 68 | 68 | 68 | 68 | 68 | 68 | | | |
| | E 20 | 0.04 | 0.04 | 295 | | n [min-1] | 4508 | 3606 | 3005 | 2254 | 1803 | 1503 | 1127 |
| | | | | | | fz [in] | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 |
| | 221 - 369 | | vf [in/min] | 68 | 68 | 68 | 68 | 68 | 68 | 68 | | | |
| | E 21 | 0.035 | 0.035 | 145 | | n [min-1] | 2216 | 1772 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | | fz [in] | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| 109 - 181 | | vf [in/min] | 27 | 27 | 27 | 27 | 27 | 27 | 27 | | | | |
| E 22 | 0.05 | 0.05 | 295 | | n [min-1] | 4508 | 3606 | 3005 | 2254 | 1803 | 1503 | 1127 | |
| | | | | | fz [in] | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | |
| 221 - 369 | | vf [in/min] | 68 | 68 | 68 | 68 | 68 | 68 | 68 | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SB638 / SBN638 - START VALUES

| COPY MILLING - FINISHING | | | | | | | | | | | | | |
|--------------------------|-------------|---------------------------------------|---------------------------------------|---------------------------|-------------|-----------|--------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 6 | | | | | | |
| | | | | | | | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 0.02 | 0.02 | 1045 | | n [min-1] | 15968 | 12774 | 10645 | 7984 | 6387 | 5323 | 3992 |
| | | | | | | fz [in] | 0.0026 | 0.0033 | 0.0039 | 0.0052 | 0.0065 | 0.0078 | 0.0104 |
| | | | | 784 - 1306 | vf [in/min] | 249 | 249 | 249 | 249 | 249 | 249 | 249 | |
| | E 3 - 4 | 0.02 | 0.02 | 900 | | n [min-1] | 13752 | 11002 | 9168 | 6876 | 5501 | 4584 | 3438 |
| | | | | | | fz [in] | 0.0024 | 0.0030 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 675 - 1125 | vf [in/min] | 198 | 198 | 198 | 198 | 198 | 198 | 198 | |
| | E 5 - 6 | 0.02 | 0.02 | 775 | | n [min-1] | 11842 | 9474 | 7895 | 5921 | 4737 | 3947 | 2961 |
| | | | | | | fz [in] | 0.0024 | 0.0030 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 581 - 969 | vf [in/min] | 171 | 171 | 171 | 171 | 171 | 171 | 171 | |
| M | E 8 - 9 | 0.02 | 0.02 | 395 | | n [min-1] | 6036 | 4828 | 4024 | 3018 | 2414 | 2012 | 1509 |
| | | | | | | fz [in] | 0.0024 | 0.0030 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | 296 - 494 | vf [in/min] | 87 | 87 | 87 | 87 | 87 | 87 | 87 | | | | |
| | E 10 - 11 | 0.02 | 0.02 | 250 | | n [min-1] | 3820 | 3056 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | | fz [in] | 0.0024 | 0.0030 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| 188 - 313 | vf [in/min] | 55 | 55 | 55 | 55 | 55 | 55 | 55 | | | | | |
| K | E 12 - 13 | 0.02 | 0.02 | 990 | | n [min-1] | 15127 | 12102 | 10085 | 7564 | 6051 | 5042 | 3782 |
| | | | | | | fz [in] | 0.0022 | 0.0028 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0088 |
| | 743 - 1238 | vf [in/min] | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | | |
| | E 14 - 15 | 0.02 | 0.02 | 815 | | n [min-1] | 12453 | 9963 | 8302 | 6227 | 4981 | 4151 | 3113 |
| fz [in] | | | | | | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 | |
| 611 - 1019 | vf [in/min] | 149 | 149 | 149 | 149 | 149 | 149 | 149 | | | | | |
| S | E 19 | 0.02 | 0.02 | 325 | | n [min-1] | 4966 | 3973 | 3311 | 2483 | 1986 | 1655 | 1242 |
| | | | | | | fz [in] | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 244 - 406 | vf [in/min] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | |
| | E 20 | 0.02 | 0.02 | 325 | | n [min-1] | 4966 | 3973 | 3311 | 2483 | 1986 | 1655 | 1242 |
| | | | | | | fz [in] | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 244 - 406 | vf [in/min] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | |
| | E 21 | 0.02 | 0.02 | 160 | | n [min-1] | 2445 | 1956 | 1630 | 1222 | 978 | 815 | 611 |
| | | | | | | fz [in] | 0.0016 | 0.0020 | 0.0024 | 0.0032 | 0.0040 | 0.0048 | 0.0064 |
| | 120 - 200 | vf [in/min] | 23 | 23 | 23 | 23 | 23 | 23 | 23 | | | | |
| | E 22 | 0.02 | 0.02 | 325 | | n [min-1] | 4966 | 3973 | 3311 | 2483 | 1986 | 1655 | 1242 |
| fz [in] | | | | | | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 | |
| 244 - 406 | vf [in/min] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SCS638 / SCS638R - CHIP SPLITTERS - START VALUES

| SIDE MILLING - SEMI ROUGHING | | | | | | | | | | | |
|------------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------|-------------|--------------------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 6 | | | | |
| | | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 3.00 | 0.08 | 700 | | n [min-1] | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | | fz [in] | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 525 - 875 | | vf [in/min] | 128 | 128 | 128 | 128 | 128 |
| | E 3 - 4 | 3.00 | 0.08 | 645 | | n [min-1] | 6570 | 4928 | 3942 | 3285 | 2464 |
| | | | | | | fz [in] | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 484 - 806 | | vf [in/min] | 118 | 118 | 118 | 118 | 118 |
| | E 5 - 6 | 3.00 | 0.07 | 525 | | n [min-1] | 5348 | 4011 | 3209 | 2674 | 2006 |
| | | | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 |
| | | | | 394 - 656 | | vf [in/min] | 78 | 78 | 78 | 78 | 78 |
| M | E 8 - 9 | 3.00 | 0.08 | 600 | | n [min-1] | 6112 | 4584 | 3667 | 3056 | 2292 |
| | | | | | | fz [in] | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 |
| | E 10 - 11 | 3.00 | 0.07 | 565 | | n [min-1] | 5755 | 4317 | 3453 | 2878 | 2158 |
| | | | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 |
| K | E 12 - 13 | 3.00 | 0.07 | 495 | | n [min-1] | 5042 | 3782 | 3025 | 2521 | 1891 |
| | | | | | | fz [in] | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 |
| | E 14 - 15 | 3.00 | 0.07 | 430 | | n [min-1] | 4380 | 3285 | 2628 | 2190 | 1643 |
| | | | | | | fz [in] | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| S | E 19 | 3.00 | 0.05 | 150 | | n [min-1] | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | | fz [in] | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | 113 - 188 | | vf [in/min] | 17 | 17 | 17 | 17 | 17 |
| | E 20 | 3.00 | 0.04 | 120 | | n [min-1] | 1222 | 917 | 733 | 611 | 458 |
| | | | | | | fz [in] | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 90 - 150 | | vf [in/min] | 13 | 13 | 13 | 13 | 13 |
| | E 21 | 3.00 | 0.04 | 100 | | n [min-1] | 1019 | 764 | 611 | 509 | 382 |
| | | | | | | fz [in] | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 75 - 125 | | vf [in/min] | 11 | 11 | 11 | 11 | 11 |
| E 22 | 3.00 | 0.07 | 270 | | n [min-1] | 2750 | 2063 | 1650 | 1375 | 1031 | |
| | | | | | fz [in] | 0.0024 | 0.0033 | 0.0041 | 0.0049 | 0.0065 | |
| | | | 203 - 338 | | vf [in/min] | 40 | 40 | 40 | 40 | 40 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

S738 / S738R / S938 / S938R - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | |
|-------------------------|-------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Zn=7 | | | Zn=9 | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 2.0 | 0.07 | 800 | n [rev/min] | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 |
| | | | | 600 - 1000 | vf [in/min] | 214 | 214 | 214 | 275 | 275 | 275 |
| | E 3 - 4 | 2.0 | 0.07 | 740 | n [rev/min] | 11307 | 7538 | 5654 | 4523 | 3769 | 2827 |
| | | | | | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 |
| | | | | 555 - 925 | vf [in/min] | 198 | 198 | 198 | 254 | 254 | 254 |
| | E 5 - 6 | 2.0 | 0.06 | 605 | n [rev/min] | 9244 | 6163 | 4622 | 3698 | 3081 | 2311 |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 454 - 756 | vf [in/min] | 129 | 129 | 129 | 166 | 166 | 166 |
| M | E 8 - 9 | 2.0 | 0.07 | 680 | n [rev/min] | 10390 | 6927 | 5195 | 4156 | 3463 | 2598 |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0056 | 0.0068 | 0.0090 |
| | 510 - 850 | vf [in/min] | 145 | 145 | 145 | 210 | 210 | 210 | | | |
| | E 10 - 11 | 2.0 | 0.06 | 630 | n [rev/min] | 9626 | 6418 | 4813 | 3851 | 3209 | 2407 |
| fz [in] | | | | | 0.0018 | 0.0026 | 0.0035 | 0.0050 | 0.0060 | 0.0080 | |
| K | E 12 - 13 | 2.0 | 0.07 | 550 | n [rev/min] | 8404 | 5603 | 4202 | 3362 | 2801 | 2101 |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | 413 - 688 | vf [in/min] | 118 | 118 | 118 | 151 | 151 | 151 |
| | E 14 - 15 | 2.0 | 0.06 | 490 | n [rev/min] | 7487 | 4991 | 3744 | 2995 | 2496 | 1872 |
| | | | | | fz [in] | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 |
| 368 - 613 | vf [in/min] | 92 | 92 | 92 | 118 | 118 | 118 | | | | |
| S | E 19 | 2.0 | 0.04 | 170 | n [rev/min] | 2598 | 1732 | 1299 | 1039 | 866 | 649 |
| | | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | 128 - 213 | vf [in/min] | 27 | 27 | 27 | 35 | 35 | 35 |
| | E 20 | 2.0 | 0.04 | 135 | n [rev/min] | 2063 | 1375 | 1031 | 825 | 688 | 516 |
| | | | | | fz [in] | 0.0014 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | 0.0055 |
| | | | | 101 - 169 | vf [in/min] | 20 | 20 | 20 | 26 | 26 | 26 |
| | E 21 | 2.0 | 0.04 | 115 | n [rev/min] | 1757 | 1171 | 879 | 703 | 586 | 439 |
| | | | | | fz [in] | 0.0014 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | 0.0055 |
| | | | | 86 - 144 | vf [in/min] | 17 | 17 | 17 | 22 | 22 | 22 |
| E 22 | 2.0 | 0.06 | 310 | n [rev/min] | 4737 | 3158 | 2368 | 1895 | 1579 | 1184 | |
| | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0041 | 0.0049 | 0.0065 | |
| 233 - 388 | vf [in/min] | 50 | 50 | 50 | 69 | 69 | 69 | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

S738 / S738R / S938 / S938R - START VALUES

| SIDE MILLING - FINISHING | | | | | | | | | | | |
|--------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Zn=7 | | | Zn=9 | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 2.00 | 0.02 | 920 | n [min-1] | 14058 | 9372 | 7029 | 5623 | 4686 | 3514 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 123 | 123 | 123 | 158 | 158 | 158 |
| | E 3 - 4 | 2.00 | 0.02 | 851 | n [min-1] | 13003 | 8669 | 6502 | 5201 | 4334 | 3251 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 114 | 114 | 114 | 146 | 146 | 146 |
| | E 5 - 6 | 2.00 | 0.02 | 696 | n [min-1] | 10635 | 7090 | 5317 | 4254 | 3545 | 2659 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 93 | 93 | 93 | 120 | 120 | 120 |
| M | E 8 - 9 | 2.00 | 0.02 | 782 | n [min-1] | 11949 | 7966 | 5974 | 4780 | 3983 | 2987 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | E 10 - 11 | 2.00 | 0.02 | 725 | vf [in/min] | 105 | 105 | 105 | 134 | 134 | 134 |
| | | | | | n [min-1] | 11078 | 7385 | 5539 | 4431 | 3693 | 2770 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | | vf [in/min] | 97 | 97 | 97 | 125 | 125 | 125 |
| K | E 12 - 13 | 2.00 | 0.02 | 633 | n [min-1] | 9672 | 6448 | 4836 | 3869 | 3224 | 2418 |
| | | | | | fz [in] | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | E 14 - 15 | 2.00 | 0.02 | 564 | vf [in/min] | 85 | 85 | 85 | 109 | 109 | 109 |
| | | | | | n [min-1] | 8618 | 5745 | 4309 | 3447 | 2873 | 2154 |
| | | | | | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 60 | 60 | 60 | 78 | 78 | 78 |
| S | E 19 | 2.00 | 0.02 | 196 | n [min-1] | 2995 | 1997 | 1497 | 1198 | 998 | 749 |
| | | | | | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | E 20 | 2.00 | 0.02 | 155 | vf [in/min] | 21 | 21 | 21 | 27 | 27 | 27 |
| | | | | | n [min-1] | 2368 | 1579 | 1184 | 947 | 789 | 592 |
| | E 21 | 2.00 | 0.02 | 132 | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 17 | 17 | 17 | 21 | 21 | 21 |
| | E 22 | 2.00 | 0.02 | 357 | n [min-1] | 2017 | 1345 | 1008 | 807 | 672 | 504 |
| | | | | | fz [in] | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | vf [in/min] | 14 | 14 | 14 | 18 | 18 | 18 |
| | | | | | n [min-1] | 5455 | 3637 | 2727 | 2182 | 1818 | 1364 |
| vf [in/min] | 48 | 48 | 48 | 61 | 61 | 61 | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SCS738R / SCS938R - CHIP SPLITTERS - START VALUES

| SIDE MILLING - SEMI ROUGHING | | | | | | | | | | | | |
|------------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|-------------|--------|--------|--------|--------|--------|----|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Zn=7 | | | Zn=9 | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| P | E 1 - 2 | 3.00 | 0.05 | 800 | n [min-1] | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 | |
| | | | | | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | |
| | | | | 600 - 1000 | vf [in/min] | 214 | 214 | 214 | 275 | 275 | 275 | |
| | E 3 - 4 | 3.00 | 0.05 | 740 | n [min-1] | 11307 | 7538 | 5654 | 4523 | 3769 | 2827 | |
| | | | | | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | |
| | | | | 555 - 925 | vf [in/min] | 198 | 198 | 198 | 254 | 254 | 254 | |
| | E 5 - 6 | 3.00 | 0.04 | 605 | n [min-1] | 9244 | 6163 | 4622 | 3698 | 3081 | 2311 | |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 | |
| | | | | 454 - 756 | vf [in/min] | 129 | 129 | 129 | 166 | 166 | 166 | |
| M | E 8 - 9 | 3.00 | 0.05 | 680 | n [min-1] | 10390 | 6927 | 5195 | 4156 | 3463 | 2598 | |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0056 | 0.0068 | 0.0090 | |
| | E 10 - 11 | 3.00 | 0.04 | 630 | n [min-1] | 9626 | 6418 | 4813 | 3851 | 3209 | 2407 | |
| | | | | | fz [in] | 0.0018 | 0.0026 | 0.0035 | 0.0050 | 0.0060 | 0.0080 | |
| K | E 12 - 13 | 3.00 | 0.05 | 550 | n [min-1] | 8404 | 5603 | 4202 | 3362 | 2801 | 2101 | |
| | | | | | fz [in] | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 | |
| | E 14 - 15 | 3.00 | 0.04 | 490 | n [min-1] | 7487 | 4991 | 3744 | 2995 | 2496 | 1872 | |
| | | | | | fz [in] | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | |
| S | E 19 | 3.00 | 0.03 | 170 | n [min-1] | 2598 | 1732 | 1299 | 1039 | 866 | 649 | |
| | | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | |
| | E 20 | 3.00 | 0.03 | 135 | n [min-1] | 2063 | 1375 | 1031 | 825 | 688 | 516 | |
| | | | | | fz [in] | 0.0014 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | 0.0055 | |
| | E 21 | 3.00 | 0.03 | 115 | n [min-1] | 1757 | 1171 | 879 | 703 | 586 | 439 | |
| | | | | | fz [in] | 0.0014 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | 0.0055 | |
| | E 22 | 3.00 | 0.04 | 310 | n [min-1] | 4737 | 3158 | 2368 | 1895 | 1579 | 1184 | |
| | | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0041 | 0.0049 | 0.0065 | |
| | | | | | 233 - 388 | vf [in/min] | 50 | 50 | 50 | 69 | 69 | 69 |

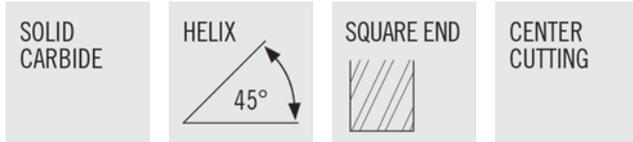
NOTE: Optimized roughing is an excellent strategy for achieving quality parts and extending tool life, but requires use of the right equipment and cutting parameters. If you are having problems implementing the approach or want to learn more about how to use the strategy to process a part, contact the Technical Support Team at 1-800-TEC-TEAM (1-800-832-8326).

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

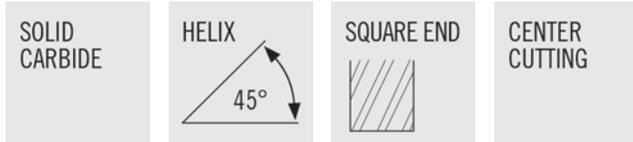
A245



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting in aluminum and non-ferrous materials
- Cutting Data - Page 79
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61350 | A245-0.125-D2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61442 | A245-0.125-D2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | TICN | CYLINDRICAL |
| N61351 | A245-0.125-D3-S.0-Z2 | 1/8 | 1/8 | 3/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61443 | A245-0.125-D3-S.0-Z2 | 1/8 | 1/8 | 3/8 | 1-1/2 | 2 | TICN | CYLINDRICAL |
| N61352 | A245-0.156-F2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N61444 | A245-0.156-F2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | TICN | CYLINDRICAL |
| N61353 | A245-0.156-F3-S.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N61445 | A245-0.156-F3-S.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | TICN | CYLINDRICAL |
| N61354 | A245-0.188-D2-S.0-Z2 | 3/16 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N61446 | A245-0.188-D2-S.0-Z2 | 3/16 | 3/16 | 5/16 | 2 | 2 | TICN | CYLINDRICAL |
| N61355 | A245-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 9/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N61447 | A245-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 9/16 | 2 | 2 | TICN | CYLINDRICAL |
| N61357 | A245-0.219-F3-S.0-Z2 | 7/32 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61449 | A245-0.219-F3-S.0-Z2 | 7/32 | 1/4 | 3/4 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61358 | A245-0.250-D2-S.0-Z2 | 1/4 | 1/4 | 3/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61450 | A245-0.250-D2-S.0-Z2 | 1/4 | 1/4 | 3/8 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61359 | A245-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61451 | A245-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61360 | A245-0.250-D5-S.0-Z2 | 1/4 | 1/4 | 1-1/4 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N61452 | A245-0.250-D5-S.0-Z2 | 1/4 | 1/4 | 1-1/4 | 4 | 2 | TICN | CYLINDRICAL |
| N61363 | A245-0.313-D1-S.0-Z2 | 5/16 | 5/16 | 7/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61455 | A245-0.313-D1-S.0-Z2 | 5/16 | 5/16 | 7/16 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61364 | A245-0.313-D3-S.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61456 | A245-0.313-D3-S.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61365 | A245-0.313-D4-S.0-Z2 | 5/16 | 5/16 | 1-1/4 | 3-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61457 | A245-0.313-D4-S.0-Z2 | 5/16 | 5/16 | 1-1/4 | 3-1/2 | 2 | TICN | CYLINDRICAL |
| N61369 | A245-0.375-D1-S.0-Z2 | 3/8 | 3/8 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61461 | A245-0.375-D1-S.0-Z2 | 3/8 | 3/8 | 1/2 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61370 | A245-0.375-D3-S.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61462 | A245-0.375-D3-S.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N61371 | A245-0.375-D4-S.0-Z2 | 3/8 | 3/8 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N61463 | A245-0.375-D4-S.0-Z2 | 3/8 | 3/8 | 1-1/2 | 4 | 2 | TICN | CYLINDRICAL |
| N61378 | A245-0.500-D1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | UNCOATED | CYLINDRICAL |

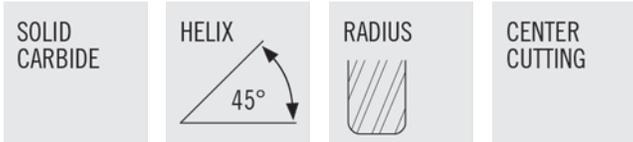
A245 (CON'T)



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting in aluminum and non-ferrous materials
- Cutting Data - Page 79
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61470 | A245-0.500-D1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | TICN | CYLINDRICAL |
| N61379 | A245-0.500-D3-S.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N61471 | A245-0.500-D3-S.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | CYLINDRICAL |
| N61380 | A245-0.500-D4-S.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N61472 | A245-0.500-D4-S.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | CYLINDRICAL |
| N61381 | A245-0.500-D6-S.0-Z2 | 1/2 | 1/2 | 3-1/8 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N61473 | A245-0.500-D6-S.0-Z2 | 1/2 | 1/2 | 3-1/8 | 6 | 2 | TICN | CYLINDRICAL |
| N61382 | A245-0.625-D1-S.0-Z2 | 5/8 | 5/8 | 3/4 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N61474 | A245-0.625-D1-S.0-Z2 | 5/8 | 5/8 | 3/4 | 3 | 2 | TICN | CYLINDRICAL |
| N61383 | A245-0.625-D3-S.0-Z2 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61475 | A245-0.625-D3-S.0-Z2 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 2 | TICN | CYLINDRICAL |
| N61384 | A245-0.625-D4-S.0-Z2 | 5/8 | 5/8 | 2-1/2 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N61476 | A245-0.625-D4-S.0-Z2 | 5/8 | 5/8 | 2-1/2 | 5 | 2 | TICN | CYLINDRICAL |
| N61385 | A245-0.625-D6-S.0-Z2 | 5/8 | 5/8 | 3-3/4 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N61477 | A245-0.625-D6-S.0-Z2 | 5/8 | 5/8 | 3-3/4 | 6 | 2 | TICN | CYLINDRICAL |
| N61386 | A245-0.750-D1-S.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N61478 | A245-0.750-D1-S.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | TICN | CYLINDRICAL |
| N61387 | A245-0.750-D2-S.0-Z2 | 3/4 | 3/4 | 1-5/8 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N61479 | A245-0.750-D2-S.0-Z2 | 3/4 | 3/4 | 1-5/8 | 4 | 2 | TICN | CYLINDRICAL |
| N61388 | A245-0.750-D3-S.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N61480 | A245-0.750-D3-S.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | CYLINDRICAL |
| N61389 | A245-0.750-D4-S.0-Z2 | 3/4 | 3/4 | 3-1/4 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N61481 | A245-0.750-D4-S.0-Z2 | 3/4 | 3/4 | 3-1/4 | 6 | 2 | TICN | CYLINDRICAL |
| N61390 | A245-0.750-D5-S.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N61482 | A245-0.750-D5-S.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | CYLINDRICAL |
| N61391 | A245-1.000-D1-S.0-Z2 | 1 | 1 | 1-1/4 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N61483 | A245-1.000-D1-S.0-Z2 | 1 | 1 | 1-1/4 | 4 | 2 | TICN | CYLINDRICAL |
| N61392 | A245-1.000-D2-S.0-Z2 | 1 | 1 | 2 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N61484 | A245-1.000-D2-S.0-Z2 | 1 | 1 | 2 | 5 | 2 | TICN | CYLINDRICAL |
| N61394 | A245-1.000-D4-S.0-Z2 | 1 | 1 | 3-1/4 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N61486 | A245-1.000-D4-S.0-Z2 | 1 | 1 | 3-1/4 | 6 | 2 | TICN | CYLINDRICAL |
| N61395 | A245-1.000-D5-S.0-Z2 | 1 | 1 | 4-1/8 | 7 | 2 | UNCOATED | CYLINDRICAL |
| N61487 | A245-1.000-D5-S.0-Z2 | 1 | 1 | 4-1/8 | 7 | 2 | TICN | CYLINDRICAL |

A245R



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Cutting Data - Page 79
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90645 | A245R-0.375-D3-R010.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | 0.010 | CYLINDRICAL |
| N90646 | A245R-0.375-D3-R020.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | 0.020 | CYLINDRICAL |
| N90648 | A245R-0.375-D3-R030.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | 0.030 | CYLINDRICAL |
| N90650 | A245R-0.375-D3-R060.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | 0.060 | CYLINDRICAL |
| N90678 | A245R-0.500-D3-R010.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.010 | CYLINDRICAL |
| N90679 | A245R-0.500-D3-R020.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.020 | CYLINDRICAL |
| N90680 | A245R-0.500-D3-R030.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.030 | CYLINDRICAL |
| N90682 | A245R-0.500-D3-R060.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.060 | CYLINDRICAL |
| N90683 | A245R-0.500-D3-R090.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.090 | CYLINDRICAL |
| N90684 | A245R-0.500-D3-R125.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | 0.125 | CYLINDRICAL |
| N90685 | A245R-0.500-D4-R010.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.010 | CYLINDRICAL |
| N90686 | A245R-0.500-D4-R020.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.020 | CYLINDRICAL |
| N90687 | A245R-0.500-D4-R030.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.030 | CYLINDRICAL |
| N90689 | A245R-0.500-D4-R060.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.060 | CYLINDRICAL |
| N90690 | A245R-0.500-D4-R090.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.090 | CYLINDRICAL |
| N90691 | A245R-0.500-D4-R125.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TICN | 0.125 | CYLINDRICAL |
| N90721 | A245R-0.750-D3-R010.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.010 | CYLINDRICAL |
| N90722 | A245R-0.750-D3-R020.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.020 | CYLINDRICAL |
| N90723 | A245R-0.750-D3-R030.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.030 | CYLINDRICAL |
| N90725 | A245R-0.750-D3-R060.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.060 | CYLINDRICAL |
| N90726 | A245R-0.750-D3-R090.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.090 | CYLINDRICAL |
| N90727 | A245R-0.750-D3-R125.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TICN | 0.125 | CYLINDRICAL |
| N90729 | A245R-0.750-D5-R010.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.010 | CYLINDRICAL |
| N90730 | A245R-0.750-D5-R020.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.020 | CYLINDRICAL |
| N90731 | A245R-0.750-D5-R030.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.030 | CYLINDRICAL |
| N90733 | A245R-0.750-D5-R060.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.060 | CYLINDRICAL |
| N90734 | A245R-0.750-D5-R090.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.090 | CYLINDRICAL |
| N90735 | A245R-0.750-D5-R125.0-Z2 | 3/4 | 3/4 | 4 | 6-1/2 | 2 | TICN | 0.125 | CYLINDRICAL |

AB245

SOLID CARBIDE

HELIX

BALL END

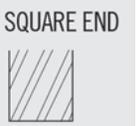
CENTER CUTTING



- Cylindrical land to eliminate chatter
 - Form ground flute shape
 - Eccentric primary relief
 - Ideal for aluminum and non-ferrous materials
- Cutting Data - Page 79
 - Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N66070 | AB245-0.250-D2-B.0-Z2 | 1/4 | 1/4 | 3/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N66102 | AB245-0.250-D2-B.0-Z2 | 1/4 | 1/4 | 3/8 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N66071 | AB245-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N66103 | AB245-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N66073 | AB245-0.313-D3-B.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N66105 | AB245-0.313-D3-B.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N66074 | AB245-0.375-D1-B.0-Z2 | 3/8 | 3/8 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N66106 | AB245-0.375-D1-B.0-Z2 | 3/8 | 3/8 | 1/2 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N66075 | AB245-0.375-D3-B.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N66107 | AB245-0.375-D3-B.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N66078 | AB245-0.500-D1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N66110 | AB245-0.500-D1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | TICN | CYLINDRICAL |
| N66079 | AB245-0.500-D3-B.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N66111 | AB245-0.500-D3-B.0-Z2 | 1/2 | 1/2 | 1-1/4 | 3 | 2 | TICN | CYLINDRICAL |
| N66083 | AB245-0.750-D2-B.0-Z2 | 3/4 | 3/4 | 1-5/8 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N66115 | AB245-0.750-D2-B.0-Z2 | 3/4 | 3/4 | 1-5/8 | 4 | 2 | TICN | CYLINDRICAL |
| N66084 | AB245-1.000-D1-B.0-Z2 | 1 | 1 | 1-1/4 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N66116 | AB245-1.000-D1-B.0-Z2 | 1 | 1 | 1-1/4 | 4 | 2 | TICN | CYLINDRICAL |
| N66085 | AB245-1.000-D2-B.0-Z2 | 1 | 1 | 2 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N66117 | AB245-1.000-D2-B.0-Z2 | 1 | 1 | 2 | 5 | 2 | TICN | CYLINDRICAL |

AN245

| | | | |
|---------------|--|---|----------------|
| SOLID CARBIDE |  <p>HELIX 45°</p> |  <p>SQUARE END</p> | CENTER CUTTING |
|---------------|--|---|----------------|



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Designed for aluminum and non-ferrous materials
- Cutting Data - Page 79
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|-------------|
| N57993 | AN245-0.375-E5-S.0-Z2 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 2 | TICN | CYLINDRICAL |
| N57996 | AN245-0.500-E7-S.0-Z2 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 2 | TICN | CYLINDRICAL |
| N57998 | AN245-0.500-E8-S.0-Z2 | 1/2 | 1/2 | 5/8 | 8 | .480 | 6 | 2 | TICN | CYLINDRICAL |
| N57999 | AN245-0.500-E10-S.0-Z2 | 1/2 | 1/2 | 3/4 | 6 | .480 | 4 | 2 | TICN | CYLINDRICAL |
| N57997 | AN245-0.500-E9-S.0-Z2 | 1/2 | 1/2 | 3/4 | 6 | .480 | 3-3/8 | 2 | TICN | CYLINDRICAL |
| N58001 | AN245-0.625-E7-S.0-Z2 | 5/8 | 5/8 | 3/4 | 5 | .600 | 2-3/8 | 2 | TICN | CYLINDRICAL |
| N58006 | AN245-0.750-E9-S.0-Z2 | 3/4 | 3/4 | 1 | 5 | .720 | 2-1/2 | 2 | TICN | CYLINDRICAL |
| N58009 | AN245-0.750-E11-S.0-Z2 | 3/4 | 3/4 | 1 | 6 | .720 | 4 | 2 | TICN | CYLINDRICAL |
| N58010 | AN245-0.750-E12-S.0-Z2 | 3/4 | 3/4 | 1 | 8 | .720 | 6 | 2 | TICN | CYLINDRICAL |

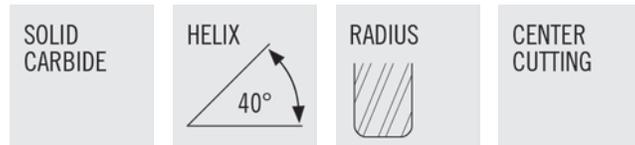
ANB245

| | | | |
|---------------|--|---|----------------|
| SOLID CARBIDE |  <p>HELIX 45°</p> |  <p>BALL END</p> | CENTER CUTTING |
|---------------|--|---|----------------|



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|----------|-------------|
| N58028 | ANB245-0.375-E2-B.0-Z2 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2-1/8 | 2 | UNCOATED | CYLINDRICAL |
| N58033 | ANB245-0.375-E2-B.0-Z2 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2-1/8 | 2 | TICN | CYLINDRICAL |
| N58029 | ANB245-0.500-E2-B.0-Z2 | 1/2 | 1/2 | 1 | 6 | .480 | 4-1/8 | 2 | UNCOATED | CYLINDRICAL |
| N58034 | ANB245-0.500-E2-B.0-Z2 | 1/2 | 1/2 | 1 | 6 | .480 | 4-1/8 | 2 | TICN | CYLINDRICAL |
| N58030 | ANB245-0.625-E2-B.0-Z2 | 5/8 | 5/8 | 1-1/4 | 6 | .600 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N58035 | ANB245-0.625-E2-B.0-Z2 | 5/8 | 5/8 | 1-1/4 | 6 | .600 | 4 | 2 | TICN | CYLINDRICAL |

AN340

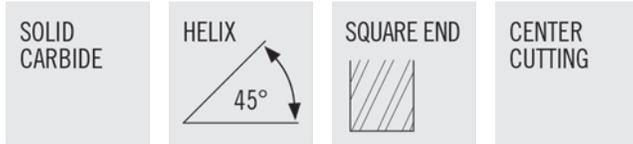


- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- With corner radius for strength
- Wiper flat to improve floor finish on the workpiece

- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|----------|--------|--------|----------|--------|-------------|
| N57881 | AN340-0.188-E1-R010.0-Z3 | 3/16 | 3/16 | 1/4 | 2 | .178 | 9/16 | 3 | UNCOATED | 0.010 | CYLINDRICAL |
| N57910 | AN340-0.188-E1-R010.0-Z3 | 3/16 | 3/16 | 1/4 | 2 | .178 | 9/16 | 3 | TICN | 0.010 | CYLINDRICAL |
| N57882 | AN340-0.188-E2-R010.0-Z3 | 3/16 | 3/16 | 1/4 | 3 | .178 | 1-9/16 | 3 | UNCOATED | 0.010 | CYLINDRICAL |
| N57911 | AN340-0.188-E2-R010.0-Z3 | 3/16 | 3/16 | 1/4 | 3 | .178 | 1-9/16 | 3 | TICN | 0.010 | CYLINDRICAL |
| N57884 | AN340-0.250-E1-R010.0-Z3 | 1/4 | 1/4 | 5/16 | 2-1/2 | .240 | 3/4 | 3 | UNCOATED | 0.010 | CYLINDRICAL |
| N57913 | AN340-0.250-E1-R010.0-Z3 | 1/4 | 1/4 | 5/16 | 2-1/2 | .240 | 3/4 | 3 | TICN | 0.010 | CYLINDRICAL |
| N57885 | AN340-0.250-E2-R010.0-Z3 | 1/4 | 1/4 | 5/16 | 3-1/4 | .240 | 1-3/4 | 3 | UNCOATED | 0.010 | CYLINDRICAL |
| N57914 | AN340-0.250-E2-R010.0-Z3 | 1/4 | 1/4 | 5/16 | 3-1/4 | .240 | 1-3/4 | 3 | TICN | 0.010 | CYLINDRICAL |
| N57888 | AN340-0.375-E1-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 2-1/2 | .360 | 7/8 | 3 | UNCOATED | 0.015 | CYLINDRICAL |
| N57917 | AN340-0.375-E1-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 2-1/2 | .360 | 7/8 | 3 | TICN | 0.015 | CYLINDRICAL |
| N57889 | AN340-0.375-E2-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 3 | .360 | 1-3/8 | 3 | UNCOATED | 0.015 | CYLINDRICAL |
| N57918 | AN340-0.375-E2-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 3 | .360 | 1-3/8 | 3 | TICN | 0.015 | CYLINDRICAL |
| N57890 | AN340-0.375-E3-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-3/8 | 3 | UNCOATED | 0.015 | CYLINDRICAL |
| N57919 | AN340-0.375-E3-R015.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-3/8 | 3 | TICN | 0.015 | CYLINDRICAL |
| N57893 | AN340-0.500-E1-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | .480 | 1-1/8 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N57922 | AN340-0.500-E1-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | .480 | 1-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N57894 | AN340-0.500-E2-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N57923 | AN340-0.500-E2-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N57895 | AN340-0.500-E3-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3-1/8 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N57924 | AN340-0.500-E3-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N57897 | AN340-0.625-E1-R025.0-Z3 | 5/8 | 5/8 | 3/4 | 3-1/2 | .600 | 1-1/2 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N57926 | AN340-0.625-E1-R025.0-Z3 | 5/8 | 5/8 | 3/4 | 3-1/2 | .600 | 1-1/2 | 3 | TICN | 0.025 | CYLINDRICAL |
| N57901 | AN340-0.750-E1-R030.0-Z3 | 3/4 | 3/4 | 1 | 4 | .720 | 1-7/8 | 3 | UNCOATED | 0.030 | CYLINDRICAL |
| N57930 | AN340-0.750-E1-R030.0-Z3 | 3/4 | 3/4 | 1 | 4 | .720 | 1-7/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N57902 | AN340-0.750-E2-R030.0-Z3 | 3/4 | 3/4 | 1 | 5 | .720 | 2-7/8 | 3 | UNCOATED | 0.030 | CYLINDRICAL |
| N57931 | AN340-0.750-E2-R030.0-Z3 | 3/4 | 3/4 | 1 | 5 | .720 | 2-7/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N57903 | AN340-0.750-E3-R030.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-7/8 | 3 | UNCOATED | 0.030 | CYLINDRICAL |
| N57932 | AN340-0.750-E3-R030.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-7/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N57906 | AN340-1.000-E1-R040.0-Z3 | 1 | 1 | 1-1/4 | 4 | .960 | 1-5/8 | 3 | UNCOATED | 0.040 | CYLINDRICAL |
| N57935 | AN340-1.000-E1-R040.0-Z3 | 1 | 1 | 1-1/4 | 4 | .960 | 1-5/8 | 3 | TICN | 0.040 | CYLINDRICAL |

A345

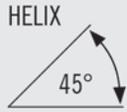


- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for peripheral milling in aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61534 | A345-0.125-D2-S.0-Z3 | 1/8 | 1/8 | 1/4 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61626 | A345-0.125-D2-S.0-Z3 | 1/8 | 1/8 | 1/4 | 1-1/2 | 3 | TICN | CYLINDRICAL |
| N61535 | A345-0.125-D3-S.0-Z3 | 1/8 | 1/8 | 3/8 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61627 | A345-0.125-D3-S.0-Z3 | 1/8 | 1/8 | 3/8 | 1-1/2 | 3 | TICN | CYLINDRICAL |
| N61536 | A345-0.156-F2-S.0-Z3 | 5/32 | 3/16 | 5/16 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N61628 | A345-0.156-F2-S.0-Z3 | 5/32 | 3/16 | 5/16 | 2 | 3 | TICN | CYLINDRICAL |
| N61537 | A345-0.156-F3-S.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N61629 | A345-0.156-F3-S.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TICN | CYLINDRICAL |
| N61538 | A345-0.188-D2-S.0-Z3 | 3/16 | 3/16 | 5/16 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N61630 | A345-0.188-D2-S.0-Z3 | 3/16 | 3/16 | 5/16 | 2 | 3 | TICN | CYLINDRICAL |
| N61539 | A345-0.188-D3-S.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N61631 | A345-0.188-D3-S.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | TICN | CYLINDRICAL |
| N61541 | A345-0.219-F3-S.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61633 | A345-0.219-F3-S.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61542 | A345-0.250-D2-S.0-Z3 | 1/4 | 1/4 | 3/8 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61634 | A345-0.250-D2-S.0-Z3 | 1/4 | 1/4 | 3/8 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61543 | A345-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61635 | A345-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61544 | A345-0.250-D5-S.0-Z3 | 1/4 | 1/4 | 1-1/4 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61636 | A345-0.250-D5-S.0-Z3 | 1/4 | 1/4 | 1-1/4 | 4 | 3 | TICN | CYLINDRICAL |
| N61547 | A345-0.313-D1-S.0-Z3 | 5/16 | 5/16 | 7/16 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61639 | A345-0.313-D1-S.0-Z3 | 5/16 | 5/16 | 7/16 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61548 | A345-0.313-D3-S.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61640 | A345-0.313-D3-S.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61549 | A345-0.313-D4-S.0-Z3 | 5/16 | 5/16 | 1-1/4 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61641 | A345-0.313-D4-S.0-Z3 | 5/16 | 5/16 | 1-1/4 | 3-1/2 | 3 | TICN | CYLINDRICAL |
| N61550 | A345-0.313-D7-S.0-Z3 | 5/16 | 5/16 | 2-1/4 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61642 | A345-0.313-D7-S.0-Z3 | 5/16 | 5/16 | 2-1/4 | 4 | 3 | TICN | CYLINDRICAL |
| N61553 | A345-0.375-D1-S.0-Z3 | 3/8 | 3/8 | 1/2 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61645 | A345-0.375-D1-S.0-Z3 | 3/8 | 3/8 | 1/2 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61554 | A345-0.375-D3-S.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61646 | A345-0.375-D3-S.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | CYLINDRICAL |
| N61555 | A345-0.375-D4-S.0-Z3 | 3/8 | 3/8 | 1-1/2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61647 | A345-0.375-D4-S.0-Z3 | 3/8 | 3/8 | 1-1/2 | 4 | 3 | TICN | CYLINDRICAL |
| N61559 | A345-0.438-D2-S.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | UNCOATED | CYLINDRICAL |
| N61651 | A345-0.438-D2-S.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | CYLINDRICAL |

A345 (CON'T)

SOLID
CARBIDE



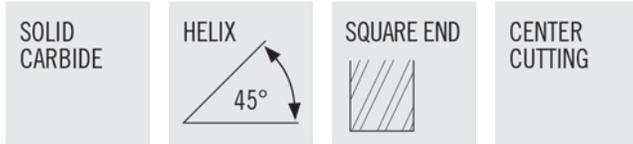
CENTER
CUTTING



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for peripheral milling in aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61562 | A345-0.500-D1-S.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N61654 | A345-0.500-D1-S.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | CYLINDRICAL |
| N61563 | A345-0.500-D3-S.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N61655 | A345-0.500-D3-S.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | CYLINDRICAL |
| N61564 | A345-0.500-D4-S.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61656 | A345-0.500-D4-S.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | CYLINDRICAL |
| N61565 | A345-0.500-D6-S.0-Z3 | 1/2 | 1/2 | 3-1/8 | 6 | 3 | UNCOATED | CYLINDRICAL |
| N61657 | A345-0.500-D6-S.0-Z3 | 1/2 | 1/2 | 3-1/8 | 6 | 3 | TICN | CYLINDRICAL |
| N61566 | A345-0.625-D1-S.0-Z3 | 5/8 | 5/8 | 3/4 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N61658 | A345-0.625-D1-S.0-Z3 | 5/8 | 5/8 | 3/4 | 3 | 3 | TICN | CYLINDRICAL |
| N61567 | A345-0.625-D3-S.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61659 | A345-0.625-D3-S.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | CYLINDRICAL |
| N61568 | A345-0.625-D4-S.0-Z3 | 5/8 | 5/8 | 2-1/2 | 5 | 3 | UNCOATED | CYLINDRICAL |
| N61660 | A345-0.625-D4-S.0-Z3 | 5/8 | 5/8 | 2-1/2 | 5 | 3 | TICN | CYLINDRICAL |
| N61569 | A345-0.625-D6-S.0-Z3 | 5/8 | 5/8 | 3-3/4 | 6 | 3 | UNCOATED | CYLINDRICAL |
| N61661 | A345-0.625-D6-S.0-Z3 | 5/8 | 5/8 | 3-3/4 | 6 | 3 | TICN | CYLINDRICAL |
| N61570 | A345-0.750-D1-S.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N61662 | A345-0.750-D1-S.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | CYLINDRICAL |
| N61571 | A345-0.750-D2-S.0-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61663 | A345-0.750-D2-S.0-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | TICN | CYLINDRICAL |
| N61572 | A345-0.750-D3-S.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | UNCOATED | CYLINDRICAL |
| N61664 | A345-0.750-D3-S.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | CYLINDRICAL |
| N61573 | A345-0.750-D4-S.0-Z3 | 3/4 | 3/4 | 3-1/4 | 6 | 3 | UNCOATED | CYLINDRICAL |
| N61665 | A345-0.750-D4-S.0-Z3 | 3/4 | 3/4 | 3-1/4 | 6 | 3 | TICN | CYLINDRICAL |
| N61574 | A345-0.750-D5-S.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N61666 | A345-0.750-D5-S.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | CYLINDRICAL |
| N61575 | A345-1.000-D1-S.0-Z3 | 1 | 1 | 1-1/4 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N61667 | A345-1.000-D1-S.0-Z3 | 1 | 1 | 1-1/4 | 4 | 3 | TICN | CYLINDRICAL |
| N61576 | A345-1.000-D2-S.0-Z3 | 1 | 1 | 2 | 5 | 3 | UNCOATED | CYLINDRICAL |
| N61668 | A345-1.000-D2-S.0-Z3 | 1 | 1 | 2 | 5 | 3 | TICN | CYLINDRICAL |
| N61577 | A345-1.000-D3-S.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | UNCOATED | CYLINDRICAL |
| N61669 | A345-1.000-D3-S.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | CYLINDRICAL |
| N61578 | A345-1.000-D4-S.0-Z3 | 1 | 1 | 3-1/4 | 6 | 3 | UNCOATED | CYLINDRICAL |
| N61670 | A345-1.000-D4-S.0-Z3 | 1 | 1 | 3-1/4 | 6 | 3 | TICN | CYLINDRICAL |
| N61579 | A345-1.000-D5-S.0-Z3 | 1 | 1 | 4-1/8 | 7 | 3 | UNCOATED | CYLINDRICAL |
| N61671 | A345-1.000-D5-S.0-Z3 | 1 | 1 | 4-1/8 | 7 | 3 | TICN | CYLINDRICAL |

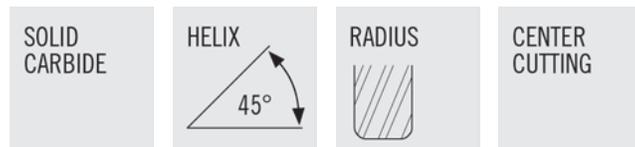
A345M



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 82
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|---------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N47812 | A345M-030-D4-S.0-Z3 | 3MM | 3MM | 12MM | 38MM | 3 | TICN | CYLINDRICAL |
| N47816 | A345M-040-D3-S.0-Z3 | 4MM | 4MM | 12MM | 50MM | 3 | TICN | CYLINDRICAL |
| N47818 | A345M-050-D3-S.0-Z3 | 5MM | 5MM | 14MM | 50MM | 3 | TICN | CYLINDRICAL |
| N47822 | A345M-060-D3-S.0-Z3 | 6MM | 6MM | 16MM | 58MM | 3 | TICN | CYLINDRICAL |
| N47826 | A345M-080-D2-S.0-Z3 | 8MM | 8MM | 20MM | 64MM | 3 | TICN | CYLINDRICAL |
| N47830 | A345M-100-D2-S.0-Z3 | 10MM | 10MM | 22MM | 73MM | 3 | TICN | CYLINDRICAL |
| N47834 | A345M-120-D3-S.0-Z3 | 12MM | 12MM | 32MM | 84MM | 3 | TICN | CYLINDRICAL |
| N47838 | A345M-140-D2-S.0-Z3 | 14MM | 14MM | 32MM | 83MM | 3 | TICN | CYLINDRICAL |
| N47842 | A345M-160-D2-S.0-Z3 | 16MM | 16MM | 36MM | 93MM | 3 | TICN | CYLINDRICAL |
| N47850 | A345M-200-D3-S.0-Z3 | 20MM | 20MM | 50MM | 104MM | 3 | TICN | CYLINDRICAL |
| N47854 | A345M-250-D3-S.0-Z3 | 25MM | 25MM | 60MM | 140MM | 3 | TICN | CYLINDRICAL |

A345R



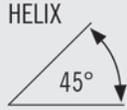
- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation

- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90753 | A345R-0.125-D3-R010.0-Z3 | 1/8 | 1/8 | 3/8 | 1-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90755 | A345R-0.125-D3-R020.0-Z3 | 1/8 | 1/8 | 3/8 | 1-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90756 | A345R-0.125-D3-R030.0-Z3 | 1/8 | 1/8 | 3/8 | 1-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90757 | A345R-0.156-F3-R010.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90759 | A345R-0.156-F3-R020.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90760 | A345R-0.156-F3-R030.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90761 | A345R-0.188-D3-R010.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90763 | A345R-0.188-D3-R020.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90764 | A345R-0.188-D3-R030.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90765 | A345R-0.219-F3-R010.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90767 | A345R-0.219-F3-R020.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90768 | A345R-0.219-F3-R030.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90769 | A345R-0.250-D3-R010.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90775 | A345R-0.250-D3-R020.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90776 | A345R-0.250-D3-R030.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90777 | A345R-0.250-D3-R045.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90778 | A345R-0.250-D3-R060.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90785 | A345R-0.313-D3-R010.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90787 | A345R-0.313-D3-R020.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90788 | A345R-0.313-D3-R030.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90789 | A345R-0.313-D3-R045.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90790 | A345R-0.313-D3-R060.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90803 | A345R-0.375-D3-R010.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90805 | A345R-0.375-D3-R020.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90806 | A345R-0.375-D3-R030.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90807 | A345R-0.375-D3-R045.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90808 | A345R-0.375-D3-R060.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90815 | A345R-0.438-D2-R010.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90817 | A345R-0.438-D2-R020.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90818 | A345R-0.438-D2-R030.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90819 | A345R-0.438-D2-R045.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90820 | A345R-0.438-D2-R060.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90821 | A345R-0.438-D2-R090.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90822 | A345R-0.438-D2-R125.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90831 | A345R-0.500-D1-R010.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.010 | CYLINDRICAL |

A345R (CON'T)

SOLID CARBIDE



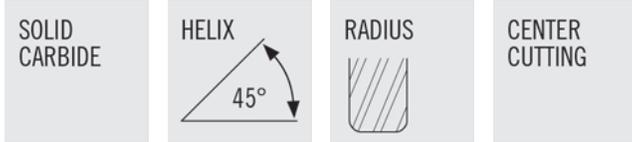
CENTER CUTTING



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90833 | A345R-0.500-D1-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90834 | A345R-0.500-D1-R030.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90835 | A345R-0.500-D1-R045.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90836 | A345R-0.500-D1-R060.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90837 | A345R-0.500-D1-R090.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90838 | A345R-0.500-D1-R125.0-Z3 | 1/2 | 1/2 | 5/8 | 3 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90839 | A345R-0.500-D3-R010.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90841 | A345R-0.500-D3-R020.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90842 | A345R-0.500-D3-R030.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90843 | A345R-0.500-D3-R045.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90844 | A345R-0.500-D3-R060.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90847 | A345R-0.500-D3-R090.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90848 | A345R-0.500-D3-R125.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90849 | A345R-0.500-D4-R010.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90851 | A345R-0.500-D4-R020.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90852 | A345R-0.500-D4-R030.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90853 | A345R-0.500-D4-R045.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90854 | A345R-0.500-D4-R060.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90855 | A345R-0.500-D4-R090.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90856 | A345R-0.500-D4-R125.0-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90865 | A345R-0.625-D3-R010.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90867 | A345R-0.625-D3-R020.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90868 | A345R-0.625-D3-R030.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90869 | A345R-0.625-D3-R045.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90870 | A345R-0.625-D3-R060.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90871 | A345R-0.625-D3-R090.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90872 | A345R-0.625-D3-R125.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90881 | A345R-0.750-D1-R010.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90883 | A345R-0.750-D1-R020.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90884 | A345R-0.750-D1-R030.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90885 | A345R-0.750-D1-R045.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90886 | A345R-0.750-D1-R060.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90887 | A345R-0.750-D1-R090.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90888 | A345R-0.750-D1-R125.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.125 | CYLINDRICAL |

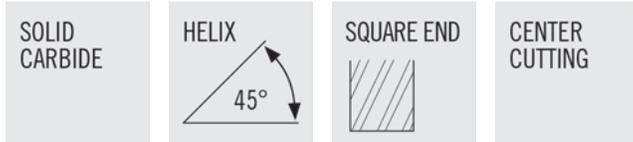
A345R (CON'T)



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 80
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90889 | A345R-0.750-D1-R190.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.190 | CYLINDRICAL |
| N90890 | A345R-0.750-D3-R010.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90892 | A345R-0.750-D3-R020.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90893 | A345R-0.750-D3-R030.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90894 | A345R-0.750-D3-R045.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90895 | A345R-0.750-D3-R060.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90896 | A345R-0.750-D3-R090.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90897 | A345R-0.750-D3-R125.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90899 | A345R-0.750-D3-R190.0-Z3 | 3/4 | 3/4 | 2-1/4 | 5 | 3 | TICN | 0.190 | CYLINDRICAL |
| N90900 | A345R-0.750-D5-R010.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90902 | A345R-0.750-D5-R020.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90903 | A345R-0.750-D5-R030.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90904 | A345R-0.750-D5-R045.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90905 | A345R-0.750-D5-R060.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90906 | A345R-0.750-D5-R090.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90907 | A345R-0.750-D5-R125.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90534 | A345R-0.750-D5-R190.0-Z3 | 3/4 | 3/4 | 4 | 6-1/2 | 3 | TICN | 0.190 | CYLINDRICAL |
| N90909 | A345R-1.000-D3-R010.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90911 | A345R-1.000-D3-R020.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90912 | A345R-1.000-D3-R030.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90913 | A345R-1.000-D3-R045.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90914 | A345R-1.000-D3-R060.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90915 | A345R-1.000-D3-R090.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90916 | A345R-1.000-D3-R125.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90917 | A345R-1.000-D3-R190.0-Z3 | 1 | 1 | 2-5/8 | 6 | 3 | TICN | 0.190 | CYLINDRICAL |

AN345



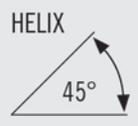
- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting, pocketing and long reach peripheral milling in aluminum
- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation

- Cutting Data - Page 81
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|----------|-------|--------|----------|-------------|
| N18597 | AN345-0.250-E2-S.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N57938 | AN345-0.250-E3-S.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | UNCOATED | CYLINDRICAL |
| N57939 | AN345-0.250-E4-S.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N18598 | AN345-0.313-E1-S.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N18599 | AN345-0.375-E1-S.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N18600 | AN345-0.375-E2-S.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N18601 | AN345-0.375-E3-S.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N57940 | AN345-0.375-E4-S.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N57941 | AN345-0.375-E5-S.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N18603 | AN345-0.500-E2-S.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N57942 | AN345-0.500-E4-S.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N18604 | AN345-0.500-E3-S.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N18606 | AN345-0.625-E2-S.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N18609 | AN345-0.750-E3-S.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N18610 | AN345-0.750-E4-S.0-Z3 | 3/4 | 3/4 | 1 | 7 | .720 | 4-1/8 | 3 | UNCOATED | CYLINDRICAL |
| N18612 | AN345-1.000-E2-S.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |

AN345R

SOLID
CARBIDE



HELIX
45°



RADIUS

CENTER
CUTTING



- Cylindrical land to eliminate chatter
 - Form ground flute shape
 - Eccentric primary relief
 - Ideal for slotting, pocketing and long reach peripheral milling in aluminum
 - Wiper flat to improve floor finish on the work piece
 - Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 81
 - Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N90288 | AN345R-0.250-E2-R010.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90255 | AN345R-0.250-E2-R020.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90289 | AN345R-0.250-E2-R030.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90290 | AN345R-0.250-E2-R045.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90291 | AN345R-0.250-E2-R060.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90489 | AN345R-0.250-E3-R010.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90279 | AN345R-0.250-E3-R020.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90490 | AN345R-0.250-E3-R030.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90491 | AN345R-0.250-E3-R045.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90492 | AN345R-0.250-E3-R060.0-Z3 | 1/4 | 1/4 | 1/2 | 3 | .240 | 1 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90497 | AN345R-0.250-E4-R010.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90281 | AN345R-0.250-E4-R020.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90498 | AN345R-0.250-E4-R030.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90499 | AN345R-0.250-E4-R045.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90500 | AN345R-0.250-E4-R060.0-Z3 | 1/4 | 1/4 | 1/2 | 4 | .240 | 1-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90262 | AN345R-0.313-E1-R020.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90292 | AN345R-0.313-E1-R010.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90293 | AN345R-0.313-E1-R030.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90294 | AN345R-0.313-E1-R045.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90295 | AN345R-0.313-E1-R060.0-Z3 | 5/16 | 5/16 | 7/16 | 4 | .300 | 2-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90296 | AN345R-0.375-E1-R010.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90263 | AN345R-0.375-E1-R020.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90297 | AN345R-0.375-E1-R030.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90298 | AN345R-0.375-E1-R045.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90299 | AN345R-0.375-E1-R060.0-Z3 | 3/8 | 3/8 | 3/8 | 2-1/2 | .360 | 1-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90301 | AN345R-0.375-E2-R010.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90265 | AN345R-0.375-E2-R020.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90302 | AN345R-0.375-E2-R030.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90303 | AN345R-0.375-E2-R045.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90306 | AN345R-0.375-E2-R060.0-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90307 | AN345R-0.375-E3-R010.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90266 | AN345R-0.375-E3-R020.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90308 | AN345R-0.375-E3-R030.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |

AN345R (CONT'D)

SOLID CARBIDE

HELIX



45°

RADIUS



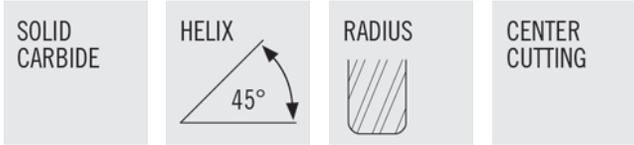
CENTER CUTTING



- Cylindrical land to eliminate chatter
 - Form ground flute shape
 - Eccentric primary relief
 - Ideal for slotting, pocketing and long reach peripheral milling in aluminum
 - Wiper flat to improve floor finish on the work piece
 - Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 81
 - Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N90309 | AN345R-0.375-E3-R045.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90310 | AN345R-0.375-E3-R060.0-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 4-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90501 | AN345R-0.375-E4-R010.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90282 | AN345R-0.375-E4-R020.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90506 | AN345R-0.375-E4-R030.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90510 | AN345R-0.375-E4-R045.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90514 | AN345R-0.375-E4-R060.0-Z3 | 3/8 | 3/8 | 3/4 | 4 | .360 | 2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90515 | AN345R-0.375-E5-R010.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90283 | AN345R-0.375-E5-R020.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90516 | AN345R-0.375-E5-R030.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90517 | AN345R-0.375-E5-R045.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90518 | AN345R-0.375-E5-R060.0-Z3 | 3/8 | 3/8 | 3/4 | 5 | .360 | 3 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90341 | AN345R-0.500-E2-R010.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90268 | AN345R-0.500-E2-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90342 | AN345R-0.500-E2-R030.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90343 | AN345R-0.500-E2-R045.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90344 | AN345R-0.500-E2-R060.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90346 | AN345R-0.500-E2-R090.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90347 | AN345R-0.500-E2-R125.0-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90519 | AN345R-0.500-E3-R010.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90286 | AN345R-0.500-E3-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90520 | AN345R-0.500-E3-R030.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90521 | AN345R-0.500-E3-R045.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90522 | AN345R-0.500-E3-R060.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90523 | AN345R-0.500-E3-R090.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90524 | AN345R-0.500-E3-R125.0-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90348 | AN345R-0.500-E4-R010.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90269 | AN345R-0.500-E4-R020.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90350 | AN345R-0.500-E4-R030.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90351 | AN345R-0.500-E4-R045.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90352 | AN345R-0.500-E4-R060.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90353 | AN345R-0.500-E4-R090.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90354 | AN345R-0.500-E4-R125.0-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | TICN | 0.125 | CYLINDRICAL |

AN345R (CONT'D)



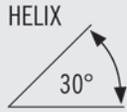
- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting, pocketing and long reach peripheral milling in aluminum
- Wiper flat to improve floor finish on the work piece
- Open end tooth gashing design to permit increased chip evacuation

- Cutting Data - Page 81
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N90361 | AN345R-0.625-E2-R010.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90271 | AN345R-0.625-E2-R020.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90362 | AN345R-0.625-E2-R030.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90363 | AN345R-0.625-E2-R045.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90364 | AN345R-0.625-E2-R060.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90365 | AN345R-0.625-E2-R090.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90366 | AN345R-0.625-E2-R125.0-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90380 | AN345R-0.750-E3-R010.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90274 | AN345R-0.750-E3-R020.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90382 | AN345R-0.750-E3-R030.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90383 | AN345R-0.750-E3-R045.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90384 | AN345R-0.750-E3-R060.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90385 | AN345R-0.750-E3-R090.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90386 | AN345R-0.750-E3-R125.0-Z3 | 3/4 | 3/4 | 1 | 6 | .720 | 3-1/2 | 3 | TICN | 0.125 | CYLINDRICAL |
| N90399 | AN345R-1.000-E2-R010.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.010 | CYLINDRICAL |
| N90277 | AN345R-1.000-E2-R020.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N90401 | AN345R-1.000-E2-R030.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.030 | CYLINDRICAL |
| N90402 | AN345R-1.000-E2-R045.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.045 | CYLINDRICAL |
| N90403 | AN345R-1.000-E2-R060.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.060 | CYLINDRICAL |
| N90404 | AN345R-1.000-E2-R090.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.090 | CYLINDRICAL |
| N90441 | AN345R-1.000-E2-R125.0-Z3 | 1 | 1 | 1-1/4 | 6 | .960 | 3-1/2 | 3 | TICN | 0.125 | CYLINDRICAL |

AR330

SOLID CARBIDE



CENTER CUTTING

COARSE PITCH



- Form ground flute shape
- Ideal for aluminum and non-ferrous materials
- Reduced radial pressure
- Cutting Data - Page 81
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|-------------|
| N76195 | AR330-0.250-D3-C020.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N76227 | AR330-0.250-D3-C020.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N76198 | AR330-0.375-D1-C020.0-Z3 | 3/8 | 3/8 | 1/2 | 2 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N76230 | AR330-0.375-D1-C020.0-Z3 | 3/8 | 3/8 | 1/2 | 2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N76199 | AR330-0.375-D3-C020.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | UNCOATED | 0.020 | CYLINDRICAL |
| N76231 | AR330-0.375-D3-C020.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TICN | 0.020 | CYLINDRICAL |
| N76203 | AR330-0.500-D3-C025.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N76235 | AR330-0.500-D3-C025.0-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | TICN | 0.025 | CYLINDRICAL |
| N76205 | AR330-0.625-D3-C025.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N76237 | AR330-0.625-D3-C025.0-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | TICN | 0.025 | CYLINDRICAL |
| N76206 | AR330-0.750-D1-C025.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N76238 | AR330-0.750-D1-C025.0-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | TICN | 0.025 | CYLINDRICAL |
| N76207 | AR330-0.750-D2-C025.0-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N76239 | AR330-0.750-D2-C025.0-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | TICN | 0.025 | CYLINDRICAL |
| N76209 | AR330-1.000-D2-C025.0-Z3 | 1 | 1 | 2 | 5 | 3 | UNCOATED | 0.025 | CYLINDRICAL |
| N76241 | AR330-1.000-D2-C025.0-Z3 | 1 | 1 | 2 | 5 | 3 | TICN | 0.025 | CYLINDRICAL |

CUTTING DATA - ELITE A SERIES HIGH PERFORMANCE

A245 / A245R / AB245 - START VALUES

| | | SLOTTING | | | | | | | | | | |
|-----------|------|------------------------|------------------------|------------------|----------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | $Z_n = 2$ | | | | | | | |
| | | | | | n (rev/min) | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| N | E 16 | 1.0 | 1.00 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f_z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 700 - 1300 | v_f (in/min) | 73.3 | 73.3 | 73.3 | 73.3 | 73.3 | 73.3 | 73.3 |
| | E 17 | 1.0 | 1.00 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f_z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0038 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 500 - 1100 | v_f (in/min) | 46.9 | 46.9 | 46.9 | 46.9 | 46.9 | 46.9 | 46.9 |

| | | SIDE MILLING - ROUGHING | | | | | | | | | | |
|---|------|-------------------------|------|------------|----------------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 2.0 | 0.50 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f_z (in) | 0.0015 | 0.0030 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | | | | 700 - 1300 | v_f (in/min) | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 | 91.7 |
| | E 17 | 1.5 | 0.50 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f_z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 500 - 1100 | v_f (in/min) | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 |

AN245 / ANB245 - START VALUES

| | | SLOTTING | | | | | | | | | | |
|-----------|------|------------------------|------------------------|------------------|----------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | $Z_n = 2$ | | | | | | | |
| | | | | | n (rev/min) | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| N | E 16 | 1.00 | 1.00 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f_z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0039 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 500 - 1100 | v_f (in/min) | 47.1 | 47.1 | 47.1 | 47.1 | 47.1 | 47.1 | 47.1 |
| | E 17 | 1.00 | 1.00 | 640 | n (rev/min) | 19558 | 9779 | 6519 | 4890 | 3912 | 3260 | 2445 |
| | | | | | f_z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0031 | 0.0038 | 0.0046 | 0.0061 |
| | | | | 340 - 940 | v_f (in/min) | 29.8 | 29.8 | 29.8 | 29.8 | 29.8 | 29.8 | 29.8 |

| | | SIDE MILLING - ROUGHING | | | | | | | | | | |
|---|------|-------------------------|------|------------|----------------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 2.00 | 0.50 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f_z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 500 - 1100 | v_f (in/min) | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 | 58.7 |
| | E 17 | 1.50 | 0.50 | 640 | n (rev/min) | 19558 | 9779 | 6519 | 4890 | 3912 | 3260 | 2445 |
| | | | | | f_z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0039 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 340 - 940 | v_f (in/min) | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

AN340 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|------|---------------------------|---------------------------|---------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | Z _n = 3 | | | | | | | |
| | | | | | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| N | E 16 | 1.0 | 1.00 | 1200 | n (rev/min) | 36672 | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 |
| | | | | | f _z (in) | 0.0019 | 0.0038 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 |
| | | | | 900 - 1500 | v _f (in/min) | 206.3 | 206.3 | 206.3 | 206.3 | 206.3 | 206.3 | 206.3 |
| | E 17 | 1.0 | 1.00 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f _z (in) | 0.0019 | 0.0038 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 |
| | | | | 700 - 1300 | v _f (in/min) | 171.9 | 171.9 | 171.9 | 171.9 | 171.9 | 171.9 | 171.9 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|------|-----|------|------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 1.0 | 0.25 | 1200 | n (rev/min) | 36672 | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 |
| | | | | | f _z (in) | 0.0028 | 0.0056 | 0.0084 | 0.0113 | 0.0141 | 0.0169 | 0.0225 |
| | | | | 900 - 1500 | v _f (in/min) | 309.4 | 309.4 | 309.4 | 309.4 | 309.4 | 309.4 | 309.4 |
| | E 17 | 1.0 | 0.25 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f _z (in) | 0.0028 | 0.0056 | 0.0084 | 0.0113 | 0.0141 | 0.0169 | 0.0225 |
| | | | | 700 - 1300 | v _f (in/min) | 257.9 | 257.9 | 257.9 | 257.9 | 257.9 | 257.9 | 257.9 |

A345 / A345R - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | Z _n = 3 | | | | | | | |
| | | | | | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| N | E / M / A 16 | 0.5 | 1.00 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f _z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 700 - 1300 | v _f (in/min) | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 |
| | E / M / A 17 | 0.5 | 1.00 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f _z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0038 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 500 - 1100 | v _f (in/min) | 70.4 | 70.4 | 70.4 | 70.4 | 70.4 | 70.4 | 70.4 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|--------------|-----|------|------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| N | E / M / A 16 | 2.0 | 0.40 | 1000 | n (rev/min) | 30560 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 |
| | | | | | f _z (in) | 0.0015 | 0.0030 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | | | | 700 - 1300 | v _f (in/min) | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 |
| | E / M / A 17 | 1.5 | 0.40 | 800 | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | f _z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 500 - 1100 | v _f (in/min) | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

AN345 / AN345R - START VALUES

| SLOTING | | | | | | | | | | | | | |
|-----------|------|---------------------------------------|---------------------------------------|---------------------------|---|---------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| N | E 16 | 0.5 | 1.00 | 800 | | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | | f _z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0039 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 500 | - | 1100 | v _f (in/min) | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 |
| | E 17 | 0.5 | 1.00 | 640 | | n (rev/min) | 19558 | 9779 | 6519 | 4890 | 3912 | 3260 | 2445 |
| | | | | | | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0031 | 0.0038 | 0.0046 | 0.0061 |
| | | | | 340 | - | 940 | v _f (in/min) | 44.7 | 44.7 | 44.7 | 44.7 | 44.7 | 44.7 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|------|-----|------|-----|---|---------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 2.0 | 0.40 | 800 | | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | | f _z (in) | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | 0.0096 |
| | | | | 500 | - | 1100 | v _f (in/min) | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 |
| | E 17 | 1.5 | 0.40 | 640 | | n (rev/min) | 19558 | 9779 | 6519 | 4890 | 3912 | 3260 | 2445 |
| | | | | | | f _z (in) | 0.0010 | 0.0019 | 0.0029 | 0.0039 | 0.0048 | 0.0058 | 0.0077 |
| | | | | 340 | - | 940 | v _f (in/min) | 56.5 | 56.5 | 56.5 | 56.5 | 56.5 | 56.5 |

AR330 - START VALUES

| SLOTING | | | | | | | | | | | | | |
|-----------|------|---------------------------------------|---------------------------------------|---------------------------|---|---------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| N | E 16 | 1.00 | 1.00 | 800 | | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | 500 | - | 1100 | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| | E 17 | 1.00 | 1.00 | 800 | | n (rev/min) | 24448 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 |
| | | | | | | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 |
| | | | | 500 | - | 1100 | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|------|------|------|------|---|---------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 1.00 | 0.25 | 1100 | | n (rev/min) | 33616 | 16808 | 11205 | 8404 | 6723 | 5603 | 4202 |
| | | | | | | f _z (in) | 0.0011 | 0.0021 | 0.0032 | 0.0042 | 0.0053 | 0.0063 | 0.0084 |
| | | | | 800 | - | 1400 | v _f (in/min) | 105.9 | 105.9 | 105.9 | 105.9 | 105.9 | 105.9 |
| | E 17 | 1.00 | 0.25 | 1100 | | n (rev/min) | 33616 | 16808 | 11205 | 8404 | 6723 | 5603 | 4202 |
| | | | | | | f _z (in) | 0.0011 | 0.0021 | 0.0032 | 0.0042 | 0.0053 | 0.0063 | 0.0084 |
| | | | | 800 | - | 1400 | v _f (in/min) | 105.9 | 105.9 | 105.9 | 105.9 | 105.9 | 105.9 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

A345M - START VALUES

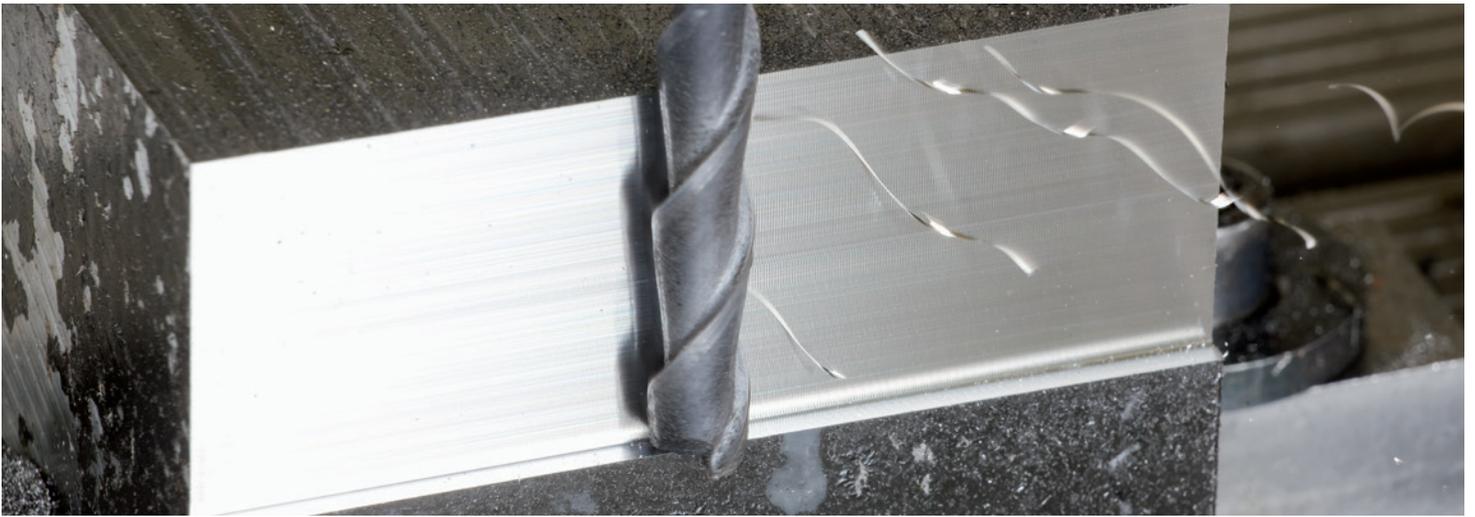
| SLOTTING | | | | | | | | | | | | | | | | | | |
|-----------|------|---------------------------------------|---------------------------------------|---------------------------|---|--------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 25 | | |
| N | E 16 | 0.5 | 1.00 | 1000 | - | 1300 | n (min-1) | 32343 | 24257 | 19406 | 16171 | 12129 | 9703 | 8086 | 6931 | 6064 | 4851 | 3881 |
| | | | | | | | fz (in) | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 | 0.0076 | 0.0094 |
| | | | | | | | vf (in/min) | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 |
| | E 17 | 0.5 | 1.00 | 800 | - | 1100 | n (min-1) | 25874 | 19406 | 15524 | 12937 | 9703 | 7762 | 6469 | 5544 | 4851 | 3881 | 3105 |
| | | | | | | | fz (in) | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | 0.0030 | 0.0036 | 0.0042 | 0.0049 | 0.0061 | 0.0076 |
| | | | | | | | vf (in/min) | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 | 70.6 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | | | |
|-------------------------|------|-----|------|------|---|------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 2.0 | 0.40 | 1000 | - | 1300 | n (min-1) | 32343 | 24257 | 19406 | 16171 | 12129 | 9703 | 8086 | 6931 | 6064 | 4851 | 3881 |
| | | | | | | | fz (in) | 0.0014 | 0.0019 | 0.0024 | 0.0028 | 0.0038 | 0.0047 | 0.0057 | 0.0066 | 0.0076 | 0.0094 | 0.0118 |
| | | | | | | | vf (in/min) | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 | 137.5 |
| | E 17 | 1.5 | 0.40 | 800 | - | 1100 | n (min-1) | 25874 | 19406 | 15524 | 12937 | 9703 | 7762 | 6469 | 5544 | 4851 | 3881 | 3105 |
| | | | | | | | fz (in) | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 | 0.0076 | 0.0094 |
| | | | | | | | vf (in/min) | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 | 88.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



SOLID CARBIDE LONG FLUTE END MILL FOR ONE PASS FINISHING

NS240R LONG FLUTE FINISHER

The Niagara NS240R long flute finisher is a geometry for optimized performance in general machining. The NS240R allows one pass machining in square shoulder milling applications, thus reducing cycle time. These end mills are designed especially to produce high tolerance straight walls in deep pockets and to provide excellent surface quality.

The Niagara long flute finishers are offered with a 5xD depth of cut as standard, ranging in diameters from 1/4" to 1 1/4" with various radii available.

The NS240R is effective in most materials but excels in stainless steel and titanium. A typical application for this end mill is in the manufacture of aerospace structural parts made from titanium and aluminum.

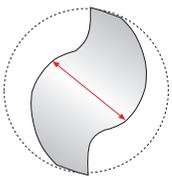
PRODUCT OVERVIEW

- NS240R stabilized edge design gives improved surface quality
- Increased core diameter for more stability
- Defined back taper from cutting length to compensate tool deflection
- Polished AlTiN coating gives increased tool life

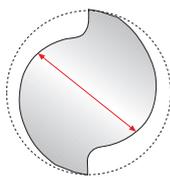
YOUR NIAGARA CUTTER BENEFIT

- Optimized finishing
- Vibration free machining
- High surface quality
- Correct workpiece dimensions in a single pass
- High process stability
- Aerospace corner radii available on some diameters

INCREASED CORE DIAMETER



Typical two flute core diameter

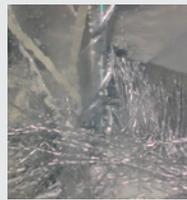


NS240R core diameter

The enlarged core diameter provides better cutter stability and less tool deflection during machining.

NS240R APPLICATION EXAMPLE

| | | |
|--------------|----------|--------------------------|
| Material | Titanium | |
| Spindle | BT50 | |
| Cutter | NS240R | |
| Diameter | 1 1/4" | |
| Cutting data | v_c | 165 sf/min |
| | n | 497 rev/min |
| | f_z | .012" |
| | v_f | 12 ipm |
| | a_e | .012" |
| | a_p | 5.5" |
| | h_m | .0011" |
| | Q | .50 in ³ /min |
| | R_a | 0.51 μ m |



COMMON APPLICATION AREAS

- Aerospace: wing parts, body and floor panels, engine casings, brackets

NS240R

| | | | |
|---------------|-----------|------------|----------------|
| SOLID CARBIDE | HELIX | RADIUS | CENTER CUTTING |
|---------------|-----------|------------|----------------|

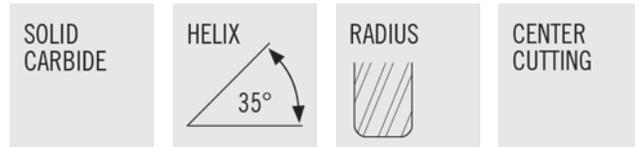


- Rigid design to minimize tool deflection
- Designed for peripheral finish milling of aerospace parts requiring long axial engagement in materials such as titanium, stainless steels, and super alloys.
- Cutting Data - Page 97
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N00291 | NS240R-0.250-D1-R010.0-Z2 | 1/4 | 1/4 | 1-1/4 | 3 | 2 | ALTIN | 0.010 | CYLINDRICAL |
| N00292 | NS240R-0.313-D1-R010.0-Z2 | 5/16 | 5/16 | 1-1/2 | 3-1/2 | 2 | ALTIN | 0.010 | CYLINDRICAL |
| N00293 | NS240R-0.375-D1-R010.0-Z2 | 3/8 | 3/8 | 1-7/8 | 4 | 2 | ALTIN | 0.010 | CYLINDRICAL |
| N00294 | NS240R-0.500-D1-R010.0-Z2 | 1/2 | 1/2 | 2-1/2 | 5 | 2 | ALTIN | 0.010 | CYLINDRICAL |
| N00295 | NS240R-0.625-D1-R015.0-Z2 | 5/8 | 5/8 | 3-1/8 | 6 | 2 | ALTIN | 0.015 | CYLINDRICAL |
| N00296 | NS240R-0.750-D1-R015.0-Z2 | 3/4 | 3/4 | 3-3/4 | 7 | 2 | ALTIN | 0.015 | CYLINDRICAL |
| N00297 | NS240R-0.750-D1-R120.0-Z2 | 3/4 | 3/4 | 3-3/4 | 7 | 2 | ALTIN | 0.120 | CYLINDRICAL |
| N00298 | NS240R-0.750-D1-R250.0-Z2 | 3/4 | 3/4 | 3-3/4 | 7 | 2 | ALTIN | 0.250 | CYLINDRICAL |
| N00299 | NS240R-1.000-D1-R015.0-Z2 | 1 | 1 | 5 | 8 | 2 | ALTIN | 0.015 | CYLINDRICAL |
| N00300 | NS240R-1.000-D1-R120.0-Z2 | 1 | 1 | 5 | 8 | 2 | ALTIN | 0.120 | CYLINDRICAL |
| N00301 | NS240R-1.000-D1-R250.0-Z2 | 1 | 1 | 5 | 8 | 2 | ALTIN | 0.250 | CYLINDRICAL |
| N00302 | NS240R-1.250-D1-R015.0-Z2 | 1-1/4 | 1-1/4 | 6-1/4 | 9-1/2 | 2 | ALTIN | 0.015 | CYLINDRICAL |
| N00303 | NS240R-1.250-D1-R120.0-Z2 | 1-1/4 | 1-1/4 | 6-1/4 | 9-1/2 | 2 | ALTIN | 0.120 | CYLINDRICAL |
| N00304 | NS240R-1.250-D1-R250.0-Z2 | 1-1/4 | 1-1/4 | 6-1/4 | 9-1/2 | 2 | ALTIN | 0.250 | CYLINDRICAL |

DUE TO THE LONG AXIAL ENGAGEMENT THE LENGTH OF CHIP CAN BE DIFFICULT TO EVACUATE. GOOD COOLANT VOLUME, VELOCITY, AND DIRECTION IS REQUIRED TO FLUSH THE LONG CHIPS AWAY FROM THE CUTTING ZONE TO AVOID RE-CUTTING OF CHIPS.

S335

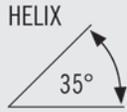


- Ideal for slotting in steel, stainless steel, titanium, and high temperature alloys
- Large area for chip evacuation
- Cutting Data - Page 98-99
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N61802 | S335-0.125-D2-R010.0-Z3 | 1/8 | 1/8 | 1/4 | 1-1/2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61803 | S335-0.125-D4-R010.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61804 | S335-0.156-F2-R010.0-Z3 | 5/32 | 3/16 | 5/16 | 2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61805 | S335-0.156-F4-R010.0-Z3 | 5/32 | 3/16 | 9/16 | 2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61806 | S335-0.188-D2-R010.0-Z3 | 3/16 | 3/16 | 5/16 | 2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61807 | S335-0.188-D3-R010.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | ALTIN | 0.010 | CYLINDRICAL |
| N61808 | S335-0.219-F2-R020.0-Z3 | 7/32 | 1/4 | 3/8 | 2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61809 | S335-0.219-F3-R020.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61810 | S335-0.250-D2-R020.0-Z3 | 1/4 | 1/4 | 3/8 | 2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61811 | S335-0.250-D3-R020.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61812 | S335-0.281-F2-R020.0-Z3 | 9/32 | 5/16 | 7/16 | 2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61813 | S335-0.281-F3-R020.0-Z3 | 9/32 | 5/16 | 13/16 | 2-1/2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61814 | S335-0.313-D1-R020.0-Z3 | 5/16 | 5/16 | 7/16 | 2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61815 | S335-0.313-D3-R020.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N61818 | S335-0.375-D1-R020.3-Z3 | 3/8 | 3/8 | 1/2 | 2 | 3 | ALTIN | 0.020 | WELDON |
| N61819 | S335-0.375-D3-R020.3-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | ALTIN | 0.020 | WELDON |
| N61820 | S335-0.438-D1-R020.3-Z3 | 7/16 | 7/16 | 9/16 | 2-1/2 | 3 | ALTIN | 0.020 | WELDON |
| N61821 | S335-0.438-D2-R020.3-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | ALTIN | 0.020 | WELDON |
| N61822 | S335-0.500-D1-R030.3-Z3 | 1/2 | 1/2 | 5/8 | 2-1/2 | 3 | ALTIN | 0.030 | WELDON |
| N61823 | S335-0.500-D3-R030.3-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | ALTIN | 0.030 | WELDON |
| N61824 | S335-0.625-D1-R030.3-Z3 | 5/8 | 5/8 | 3/4 | 3 | 3 | ALTIN | 0.030 | WELDON |
| N61825 | S335-0.625-D3-R030.3-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | ALTIN | 0.030 | WELDON |
| N61826 | S335-0.750-D1-R030.3-Z3 | 3/4 | 3/4 | 1 | 3 | 3 | ALTIN | 0.030 | WELDON |
| N61827 | S335-0.750-D2-R030.3-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | ALTIN | 0.030 | WELDON |
| N61828 | S335-1.000-D1-R030.3-Z3 | 1 | 1 | 1-1/4 | 4 | 3 | ALTIN | 0.030 | WELDON |
| N61829 | S335-1.000-D2-R030.3-Z3 | 1 | 1 | 2 | 5 | 3 | ALTIN | 0.030 | WELDON |

SB335

SOLID
CARBIDE



CENTER
CUTTING

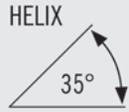


- Ideal for slotting in steel, stainless steel, titanium and high temperature alloys
- Large area for chip evacuation
- Cutting Data - Page 100-101
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N66218 | SB335-0.125-D2-B.0-Z3 | 1/8 | 1/8 | 1/4 | 1-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66219 | SB335-0.125-D4-B.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66220 | SB335-0.156-F2-B.0-Z3 | 5/32 | 3/16 | 5/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66221 | SB335-0.156-F4-B.0-Z3 | 5/32 | 3/16 | 9/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66222 | SB335-0.188-D2-B.0-Z3 | 3/16 | 3/16 | 5/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66223 | SB335-0.188-D3-B.0-Z3 | 3/16 | 3/16 | 9/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66224 | SB335-0.219-F2-B.0-Z3 | 7/32 | 1/4 | 3/8 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66225 | SB335-0.219-F3-B.0-Z3 | 7/32 | 1/4 | 3/4 | 2-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66226 | SB335-0.250-D2-B.0-Z3 | 1/4 | 1/4 | 3/8 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66227 | SB335-0.250-D3-B.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66228 | SB335-0.281-F2-B.0-Z3 | 9/32 | 5/16 | 7/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66229 | SB335-0.281-F3-B.0-Z3 | 9/32 | 5/16 | 13/16 | 2-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66230 | SB335-0.313-D1-B.0-Z3 | 5/16 | 5/16 | 7/16 | 2 | 3 | ALTIN | CYLINDRICAL |
| N66231 | SB335-0.313-D3-B.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | ALTIN | CYLINDRICAL |
| N66232 | SB335-0.344-F1-B.3-Z3 | 11/32 | 3/8 | 1/2 | 2 | 3 | ALTIN | WELDON |
| N66233 | SB335-0.344-F3-B.3-Z3 | 11/32 | 3/8 | 1 | 2-1/2 | 3 | ALTIN | WELDON |
| N66234 | SB335-0.375-D1-B.3-Z3 | 3/8 | 3/8 | 1/2 | 2 | 3 | ALTIN | WELDON |
| N66235 | SB335-0.375-D3-B.3-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | ALTIN | WELDON |
| N66236 | SB335-0.438-D1-B.3-Z3 | 7/16 | 7/16 | 9/16 | 2-1/2 | 3 | ALTIN | WELDON |
| N66237 | SB335-0.438-D2-B.3-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | ALTIN | WELDON |
| N66238 | SB335-0.500-D1-B.3-Z3 | 1/2 | 1/2 | 5/8 | 2-1/2 | 3 | ALTIN | WELDON |
| N66239 | SB335-0.500-D3-B.3-Z3 | 1/2 | 1/2 | 1-1/4 | 3 | 3 | ALTIN | WELDON |
| N66241 | SB335-0.625-D3-B.3-Z3 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 3 | ALTIN | WELDON |
| N66243 | SB335-0.750-D2-B.3-Z3 | 3/4 | 3/4 | 1-5/8 | 4 | 3 | ALTIN | WELDON |
| N66245 | SB335-1.000-D2-B.3-Z3 | 1 | 1 | 2 | 5 | 3 | ALTIN | WELDON |

SN335

SOLID
CARBIDE



CENTER
CUTTING

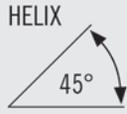


- Ideal for slotting, pocketing and long reach peripheral milling in steel, stainless steel, titanium, and exotic alloys
- Cutting Data - Page 102-103
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N18648 | SN335-0.250-E2-R020.0-Z3 | 1/4 | 1/4 | 3/8 | 4 | .240 | 2-1/8 | 3 | ALTIN | 0.020 | CYLINDRICAL |
| N18650 | SN335-0.375-E1-R020.3-Z3 | 3/8 | 3/8 | 1/2 | 4 | .360 | 2-1/8 | 3 | ALTIN | 0.020 | WELDON |
| N18651 | SN335-0.375-E2-R020.3-Z3 | 3/8 | 3/8 | 1/2 | 6 | .360 | 3-3/8 | 3 | ALTIN | 0.020 | WELDON |
| N18654 | SN335-0.500-E1-R030.3-Z3 | 1/2 | 1/2 | 5/8 | 4 | .480 | 2-1/8 | 3 | ALTIN | 0.030 | WELDON |
| N18655 | SN335-0.500-E2-R030.3-Z3 | 1/2 | 1/2 | 5/8 | 5 | .480 | 3-1/8 | 3 | ALTIN | 0.030 | WELDON |
| N18656 | SN335-0.500-E3-R030.3-Z3 | 1/2 | 1/2 | 5/8 | 6 | .480 | 4-1/8 | 3 | ALTIN | 0.030 | WELDON |
| N18657 | SN335-0.625-E1-R030.3-Z3 | 5/8 | 5/8 | 3/4 | 4 | .600 | 2-1/8 | 3 | ALTIN | 0.030 | WELDON |
| N18659 | SN335-0.625-E3-R030.3-Z3 | 5/8 | 5/8 | 3/4 | 6 | .600 | 4 | 3 | ALTIN | 0.030 | WELDON |
| N18661 | SN335-0.750-E2-R030.3-Z3 | 3/4 | 3/4 | 1 | 5 | .720 | 3 | 3 | ALTIN | 0.030 | WELDON |

S545

SOLID CARBIDE



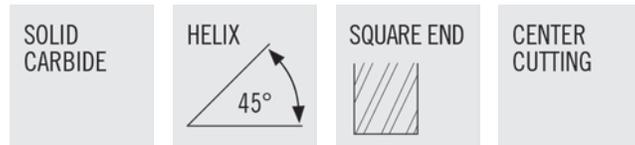
CENTER CUTTING



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 104
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61830 | S545-0.125-D2-S.0-Z5 | 1/8 | 1/8 | 1/4 | 1-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61983 | S545-0.125-D2-S.0-Z5 | 1/8 | 1/8 | 1/4 | 1-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61831 | S545-0.125-D4-S.0-Z5 | 1/8 | 1/8 | 1/2 | 1-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61984 | S545-0.125-D4-S.0-Z5 | 1/8 | 1/8 | 1/2 | 1-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61832 | S545-0.156-F2-S.0-Z5 | 5/32 | 3/16 | 5/16 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61985 | S545-0.156-F2-S.0-Z5 | 5/32 | 3/16 | 5/16 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61833 | S545-0.156-F4-S.0-Z5 | 5/32 | 3/16 | 9/16 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61986 | S545-0.156-F4-S.0-Z5 | 5/32 | 3/16 | 9/16 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61834 | S545-0.188-D2-S.0-Z5 | 3/16 | 3/16 | 5/16 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61987 | S545-0.188-D2-S.0-Z5 | 3/16 | 3/16 | 5/16 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61835 | S545-0.188-D3-S.0-Z5 | 3/16 | 3/16 | 9/16 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61988 | S545-0.188-D3-S.0-Z5 | 3/16 | 3/16 | 9/16 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61836 | S545-0.219-F2-S.0-Z5 | 7/32 | 1/4 | 3/8 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61989 | S545-0.219-F2-S.0-Z5 | 7/32 | 1/4 | 3/8 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61837 | S545-0.219-F3-S.0-Z5 | 7/32 | 1/4 | 3/4 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61990 | S545-0.219-F3-S.0-Z5 | 7/32 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61838 | S545-0.250-D2-S.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61991 | S545-0.250-D2-S.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61839 | S545-0.250-D3-S.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61992 | S545-0.250-D3-S.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61840 | S545-0.250-D5-S.0-Z5 | 1/4 | 1/4 | 1-1/4 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N61993 | S545-0.250-D5-S.0-Z5 | 1/4 | 1/4 | 1-1/4 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61842 | S545-0.281-F3-S.0-Z5 | 9/32 | 5/16 | 13/16 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61995 | S545-0.281-F3-S.0-Z5 | 9/32 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61843 | S545-0.313-D1-S.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N61996 | S545-0.313-D1-S.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | ALTIN | CYLINDRICAL |
| N61844 | S545-0.313-D3-S.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N61997 | S545-0.313-D3-S.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61845 | S545-0.313-D4-S.0-Z5 | 5/16 | 5/16 | 1-1/4 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N61998 | S545-0.313-D4-S.0-Z5 | 5/16 | 5/16 | 1-1/4 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61846 | S545-0.313-D7-S.0-Z5 | 5/16 | 5/16 | 2-1/8 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N61999 | S545-0.313-D7-S.0-Z5 | 5/16 | 5/16 | 2-1/8 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61849 | S545-0.375-D1-S.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | UNCOATED | CYLINDRICAL |
| N62002 | S545-0.375-D1-S.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | CYLINDRICAL |

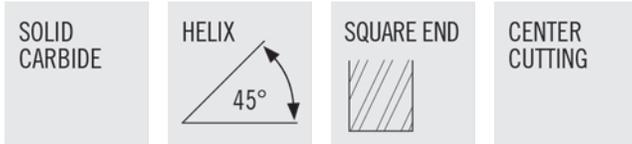
S545 (CON'T)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 104
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N61850 | S545-0.375-D3-S.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N62003 | S545-0.375-D3-S.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61851 | S545-0.375-D4-S.0-Z5 | 3/8 | 3/8 | 1-1/2 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62004 | S545-0.375-D4-S.0-Z5 | 3/8 | 3/8 | 1-1/2 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61852 | S545-0.375-D7-S.0-Z5 | 3/8 | 3/8 | 2-1/2 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62005 | S545-0.375-D7-S.0-Z5 | 3/8 | 3/8 | 2-1/2 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61855 | S545-0.438-D1-S.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N62008 | S545-0.438-D1-S.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61856 | S545-0.438-D2-S.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | UNCOATED | CYLINDRICAL |
| N62009 | S545-0.438-D2-S.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | CYLINDRICAL |
| N61857 | S545-0.438-D5-S.0-Z5 | 7/16 | 7/16 | 2 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62010 | S545-0.438-D5-S.0-Z5 | 7/16 | 7/16 | 2 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61860 | S545-0.500-D1-S.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N62013 | S545-0.500-D1-S.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61861 | S545-0.500-D3-S.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | UNCOATED | CYLINDRICAL |
| N62014 | S545-0.500-D3-S.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | CYLINDRICAL |
| N61862 | S545-0.500-D4-S.0-Z5 | 1/2 | 1/2 | 2 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62015 | S545-0.500-D4-S.0-Z5 | 1/2 | 1/2 | 2 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61863 | S545-0.500-D6-S.0-Z5 | 1/2 | 1/2 | 3-1/8 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62016 | S545-0.500-D6-S.0-Z5 | 1/2 | 1/2 | 3-1/8 | 6 | 5 | ALTIN | CYLINDRICAL |
| N55330 | S545-0.563-D3-S.0-Z5 | 9/16 | 9/16 | 1-1/2 | 3-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N55333 | S545-0.563-D3-S.0-Z5 | 9/16 | 9/16 | 1-1/2 | 3-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61864 | S545-0.625-D1-S.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | UNCOATED | CYLINDRICAL |
| N62017 | S545-0.625-D1-S.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | CYLINDRICAL |
| N61865 | S545-0.625-D3-S.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | UNCOATED | CYLINDRICAL |
| N62018 | S545-0.625-D3-S.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | CYLINDRICAL |
| N61866 | S545-0.625-D4-S.0-Z5 | 5/8 | 5/8 | 2-1/2 | 5 | 5 | UNCOATED | CYLINDRICAL |
| N62019 | S545-0.625-D4-S.0-Z5 | 5/8 | 5/8 | 2-1/2 | 5 | 5 | ALTIN | CYLINDRICAL |
| N61867 | S545-0.625-D6-S.0-Z5 | 5/8 | 5/8 | 4 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62020 | S545-0.625-D6-S.0-Z5 | 5/8 | 5/8 | 4 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61868 | S545-0.750-D1-S.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | UNCOATED | CYLINDRICAL |
| N62021 | S545-0.750-D1-S.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | CYLINDRICAL |
| N61869 | S545-0.750-D2-S.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62022 | S545-0.750-D2-S.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | CYLINDRICAL |

S545 (CONT'D) & S545M

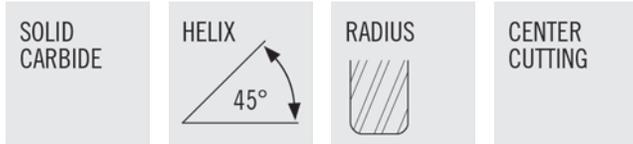


- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys

- Cutting Data S545 - Page 104
- Tolerance Specs S545 - Page 335
- Cutting Data S545M - Page 107
- Tolerance Specs S545M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|-----------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| INCH - S545 (CONT'D) | | | | | | | | |
| N61870 | S545-0.750-D3-S.0-Z5 | 3/4 | 3/4 | 2-1/4 | 5 | 5 | UNCOATED | CYLINDRICAL |
| N62023 | S545-0.750-D3-S.0-Z5 | 3/4 | 3/4 | 2-1/4 | 5 | 5 | ALTIN | CYLINDRICAL |
| N61871 | S545-0.750-D4-S.0-Z5 | 3/4 | 3/4 | 3-1/4 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62024 | S545-0.750-D4-S.0-Z5 | 3/4 | 3/4 | 3-1/4 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61872 | S545-0.750-D5-S.0-Z5 | 3/4 | 3/4 | 4 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62025 | S545-0.750-D5-S.0-Z5 | 3/4 | 3/4 | 4 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61873 | S545-1.000-D1-S.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62026 | S545-1.000-D1-S.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61874 | S545-1.000-D2-S.0-Z5 | 1 | 1 | 2 | 4 | 5 | UNCOATED | CYLINDRICAL |
| N62027 | S545-1.000-D2-S.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | CYLINDRICAL |
| N61875 | S545-1.000-D3-S.0-Z5 | 1 | 1 | 2-5/8 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62028 | S545-1.000-D3-S.0-Z5 | 1 | 1 | 2-5/8 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61876 | S545-1.000-D4-S.0-Z5 | 1 | 1 | 3-1/4 | 6 | 5 | UNCOATED | CYLINDRICAL |
| N62029 | S545-1.000-D4-S.0-Z5 | 1 | 1 | 3-1/4 | 6 | 5 | ALTIN | CYLINDRICAL |
| N61877 | S545-1.000-D5-S.0-Z5 | 1 | 1 | 4-1/8 | 7 | 5 | UNCOATED | CYLINDRICAL |
| N62030 | S545-1.000-D5-S.0-Z5 | 1 | 1 | 4-1/8 | 7 | 5 | ALTIN | CYLINDRICAL |
| N61878 | S545-1.250-D2-S.0-Z7 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 7 | UNCOATED | CYLINDRICAL |
| N62031 | S545-1.250-D2-S.0-Z7 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 7 | ALTIN | CYLINDRICAL |
| N61879 | S545-1.250-D3-S.0-Z7 | 1-1/4 | 1-1/4 | 3-1/4 | 6 | 7 | UNCOATED | CYLINDRICAL |
| N62032 | S545-1.250-D3-S.0-Z7 | 1-1/4 | 1-1/4 | 3-1/4 | 6 | 7 | ALTIN | CYLINDRICAL |
| N61880 | S545-1.250-D4-S.0-Z7 | 1-1/4 | 1-1/4 | 5 | 7-1/2 | 7 | UNCOATED | CYLINDRICAL |
| N62033 | S545-1.250-D4-S.0-Z7 | 1-1/4 | 1-1/4 | 5 | 7-1/2 | 7 | ALTIN | CYLINDRICAL |
| METRIC - S545M | | | | | | | | |
| N67967 | S545M-040-D3-S.0-Z5 | 4MM | 4MM | 11MM | 50MM | 5 | ALTIN | CYLINDRICAL |
| N67969 | S545M-060-D2-S.0-Z5 | 6MM | 6MM | 13MM | 57MM | 5 | ALTIN | CYLINDRICAL |
| N67970 | S545M-080-D2-S.0-Z5 | 8MM | 8MM | 19MM | 63MM | 5 | ALTIN | CYLINDRICAL |
| N67972 | S545M-100-D2-S.0-Z5 | 10MM | 10MM | 22MM | 72MM | 5 | ALTIN | CYLINDRICAL |
| N67973 | S545M-120-D2-S.0-Z5 | 12MM | 12MM | 26MM | 83MM | 5 | ALTIN | CYLINDRICAL |

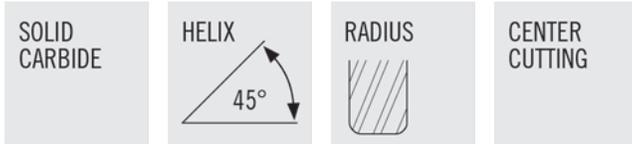
S545R



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 104
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90927 | S545R-0.125-D2-R015.0-Z5 | 1/8 | 1/8 | 1/4 | 1-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90928 | S545R-0.125-D2-R020.0-Z5 | 1/8 | 1/8 | 1/4 | 1-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90929 | S545R-0.125-D4-R015.0-Z5 | 1/8 | 1/8 | 1/2 | 1-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90930 | S545R-0.125-D4-R020.0-Z5 | 1/8 | 1/8 | 1/2 | 1-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90931 | S545R-0.188-D2-R015.0-Z5 | 3/16 | 3/16 | 5/16 | 2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90932 | S545R-0.188-D2-R020.0-Z5 | 3/16 | 3/16 | 5/16 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90908 | S545R-0.188-D3-R015.0-Z5 | 3/16 | 3/16 | 9/16 | 2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90933 | S545R-0.188-D3-R020.0-Z5 | 3/16 | 3/16 | 9/16 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90935 | S545R-0.250-D2-R015.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90936 | S545R-0.250-D2-R020.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90937 | S545R-0.250-D2-R030.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90938 | S545R-0.250-D2-R045.0-Z5 | 1/4 | 1/4 | 3/8 | 2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90926 | S545R-0.250-D3-R015.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90940 | S545R-0.250-D3-R020.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90934 | S545R-0.250-D3-R030.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90941 | S545R-0.250-D3-R045.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90943 | S545R-0.313-D1-R015.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90945 | S545R-0.313-D1-R030.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90944 | S545R-0.313-D1-R020.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90946 | S545R-0.313-D1-R045.0-Z5 | 5/16 | 5/16 | 7/16 | 2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90947 | S545R-0.313-D3-R015.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90948 | S545R-0.313-D3-R020.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90939 | S545R-0.313-D3-R030.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90949 | S545R-0.313-D3-R045.0-Z5 | 5/16 | 5/16 | 13/16 | 2-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90950 | S545R-0.375-D1-R015.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90952 | S545R-0.375-D1-R020.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90953 | S545R-0.375-D1-R030.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90954 | S545R-0.375-D1-R045.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90955 | S545R-0.375-D1-R060.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N90956 | S545R-0.375-D3-R015.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90957 | S545R-0.375-D3-R020.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90958 | S545R-0.375-D3-R030.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90942 | S545R-0.375-D3-R045.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90960 | S545R-0.438-D1-R015.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90961 | S545R-0.438-D1-R020.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90962 | S545R-0.438-D1-R030.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |

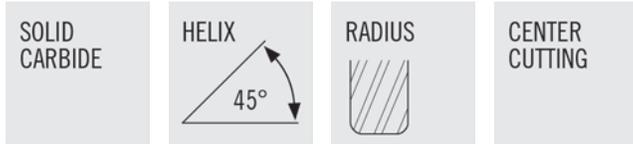
S545R (CONT'D)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 104
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N90963 | S545R-0.438-D1-R045.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90964 | S545R-0.438-D1-R060.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N90965 | S545R-0.438-D1-R090.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N90967 | S545R-0.438-D1-R125.0-Z5 | 7/16 | 7/16 | 9/16 | 2-1/2 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N90951 | S545R-0.438-D2-R015.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90972 | S545R-0.438-D2-R020.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N90973 | S545R-0.438-D2-R030.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N90976 | S545R-0.438-D2-R045.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N90977 | S545R-0.438-D2-R060.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N90978 | S545R-0.438-D2-R090.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N90979 | S545R-0.438-D2-R125.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N90982 | S545R-0.500-D1-R015.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N90987 | S545R-0.500-D1-R020.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91004 | S545R-0.500-D1-R030.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91008 | S545R-0.500-D1-R045.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91009 | S545R-0.500-D1-R060.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91010 | S545R-0.500-D1-R090.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91011 | S545R-0.500-D1-R125.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N90959 | S545R-0.500-D3-R015.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91012 | S545R-0.500-D3-R020.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91013 | S545R-0.500-D3-R030.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91015 | S545R-0.500-D3-R045.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91017 | S545R-0.500-D3-R060.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91019 | S545R-0.500-D3-R090.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91021 | S545R-0.500-D3-R125.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91042 | S545R-0.625-D1-R015.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91051 | S545R-0.625-D1-R020.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91060 | S545R-0.625-D1-R030.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91075 | S545R-0.625-D1-R045.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91076 | S545R-0.625-D1-R060.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91077 | S545R-0.625-D1-R090.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91078 | S545R-0.625-D1-R125.0-Z5 | 5/8 | 5/8 | 3/4 | 3 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N90980 | S545R-0.625-D3-R015.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91079 | S545R-0.625-D3-R020.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91084 | S545R-0.625-D3-R030.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91086 | S545R-0.625-D3-R045.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.045 | CYLINDRICAL |

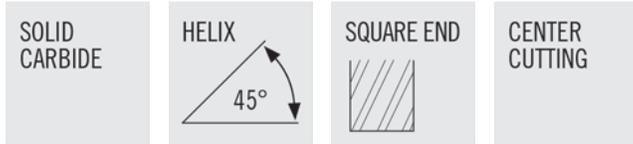
S545R (CONT'D)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 104
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N91090 | S545R-0.625-D3-R060.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91091 | S545R-0.625-D3-R090.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91093 | S545R-0.625-D3-R125.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91095 | S545R-0.750-D1-R015.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91096 | S545R-0.750-D1-R020.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91097 | S545R-0.750-D1-R030.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91098 | S545R-0.750-D1-R045.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91099 | S545R-0.750-D1-R060.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91102 | S545R-0.750-D1-R090.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91103 | S545R-0.750-D1-R125.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91104 | S545R-0.750-D1-R190.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.190 | CYLINDRICAL |
| N91039 | S545R-0.750-D2-R015.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91105 | S545R-0.750-D2-R020.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91107 | S545R-0.750-D2-R030.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91108 | S545R-0.750-D2-R045.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91110 | S545R-0.750-D2-R060.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91111 | S545R-0.750-D2-R090.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91116 | S545R-0.750-D2-R125.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91117 | S545R-0.750-D2-R190.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.190 | CYLINDRICAL |
| N91133 | S545R-1.000-D1-R015.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91135 | S545R-1.000-D1-R020.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91136 | S545R-1.000-D1-R030.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91138 | S545R-1.000-D1-R045.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91139 | S545R-1.000-D1-R060.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91142 | S545R-1.000-D1-R090.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91143 | S545R-1.000-D1-R125.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91145 | S545R-1.000-D1-R190.0-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.190 | CYLINDRICAL |
| N91094 | S545R-1.000-D2-R015.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.015 | CYLINDRICAL |
| N91146 | S545R-1.000-D2-R020.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N91148 | S545R-1.000-D2-R030.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.030 | CYLINDRICAL |
| N91149 | S545R-1.000-D2-R045.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.045 | CYLINDRICAL |
| N91152 | S545R-1.000-D2-R060.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.060 | CYLINDRICAL |
| N91155 | S545R-1.000-D2-R090.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.090 | CYLINDRICAL |
| N91158 | S545R-1.000-D2-R125.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.125 | CYLINDRICAL |
| N91163 | S545R-1.000-D2-R190.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.190 | CYLINDRICAL |

S645M



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 108
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|---------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N47858 | S645M-030-D4-S.0-Z6 | 3MM | 3MM | 12MM | 38MM | 6 | ALTIN | CYLINDRICAL |
| N47860 | S645M-040-D2-S.0-Z6 | 4MM | 4MM | 6MM | 50MM | 6 | ALTIN | CYLINDRICAL |
| N47862 | S645M-040-D3-S.0-Z6 | 4MM | 4MM | 12MM | 50MM | 6 | ALTIN | CYLINDRICAL |
| N47864 | S645M-050-D3-S.0-Z6 | 5MM | 5MM | 14MM | 50MM | 6 | ALTIN | CYLINDRICAL |
| N47866 | S645M-060-D1-S.0-Z6 | 6MM | 6MM | 8MM | 51MM | 6 | ALTIN | CYLINDRICAL |
| N47868 | S645M-060-D3-S.0-Z6 | 6MM | 6MM | 16MM | 58MM | 6 | ALTIN | CYLINDRICAL |
| N47870 | S645M-080-D1-S.0-Z6 | 8MM | 8MM | 10MM | 59MM | 6 | ALTIN | CYLINDRICAL |
| N47872 | S645M-080-D2-S.0-Z6 | 8MM | 8MM | 20MM | 64MM | 6 | ALTIN | CYLINDRICAL |
| N47874 | S645M-100-D1-S.0-Z6 | 10MM | 10MM | 11MM | 67MM | 6 | ALTIN | CYLINDRICAL |
| N47876 | S645M-100-D2-S.0-Z6 | 10MM | 10MM | 22MM | 73MM | 6 | ALTIN | CYLINDRICAL |
| N47880 | S645M-120-D3-S.0-Z6 | 12MM | 12MM | 32MM | 84MM | 6 | ALTIN | CYLINDRICAL |
| N47886 | S645M-160-D1-S.0-Z6 | 16MM | 16MM | 16MM | 83MM | 6 | ALTIN | CYLINDRICAL |
| N47888 | S645M-160-D2-S.0-Z6 | 16MM | 16MM | 36MM | 89MM | 6 | ALTIN | CYLINDRICAL |
| N47894 | S645M-200-D2-S.0-Z6 | 20MM | 20MM | 38MM | 101MM | 6 | ALTIN | CYLINDRICAL |
| N47896 | S645M-200-D3-S.0-Z6 | 20MM | 20MM | 50MM | 104MM | 6 | ALTIN | CYLINDRICAL |

SR420 & SR420M

SOLID CARBIDE



HELIX
20°



CHAMFER
45°

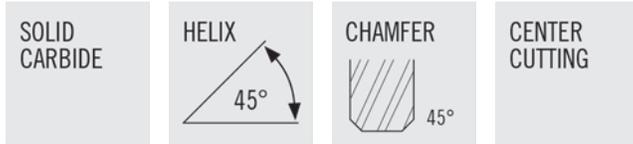
CENTER CUTTING



- Fine-pitch knuckle form
- Designed for steels, stainless steel, and cast iron
- Cutting Data SR420 - Page 105
- Tolerance Specs SR420 - Page 335
- Cutting Data SR420M - Page 109
- Tolerance Specs SR420M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|-------------|
| INCH - SR420 | | | | | | | | | |
| N76130 | SR420-0.250-D2-C020.0-Z4 | 1/4 | 1/4 | 3/8 | 2 | 4 | UNCOATED | 0.020 | CYLINDRICAL |
| N76178 | SR420-0.250-D2-C020.0-Z4 | 1/4 | 1/4 | 3/8 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N76131 | SR420-0.250-D3-C020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.020 | CYLINDRICAL |
| N76179 | SR420-0.250-D3-C020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N76132 | SR420-0.313-D1-C020.0-Z4 | 5/16 | 5/16 | 7/16 | 2 | 4 | UNCOATED | 0.020 | CYLINDRICAL |
| N76180 | SR420-0.313-D1-C020.0-Z4 | 5/16 | 5/16 | 7/16 | 2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N76133 | SR420-0.313-D3-C020.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | UNCOATED | 0.020 | CYLINDRICAL |
| N76181 | SR420-0.313-D3-C020.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | ALTIN | 0.020 | CYLINDRICAL |
| N76134 | SR420-0.375-D1-C020.3-Z4 | 3/8 | 3/8 | 1/2 | 2 | 4 | UNCOATED | 0.020 | WELDON |
| N76182 | SR420-0.375-D1-C020.3-Z4 | 3/8 | 3/8 | 1/2 | 2 | 4 | ALTIN | 0.020 | WELDON |
| N76135 | SR420-0.375-D3-C020.3-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | 0.020 | WELDON |
| N76183 | SR420-0.375-D3-C020.3-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | ALTIN | 0.020 | WELDON |
| N76136 | SR420-0.438-D1-C020.3-Z4 | 7/16 | 7/16 | 9/16 | 2-1/2 | 4 | UNCOATED | 0.020 | WELDON |
| N76184 | SR420-0.438-D1-C020.3-Z4 | 7/16 | 7/16 | 9/16 | 2-1/2 | 4 | ALTIN | 0.020 | WELDON |
| N76137 | SR420-0.438-D2-C020.3-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | 0.020 | WELDON |
| N76185 | SR420-0.438-D2-C020.3-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | ALTIN | 0.020 | WELDON |
| N76138 | SR420-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | UNCOATED | 0.025 | WELDON |
| N76186 | SR420-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | ALTIN | 0.025 | WELDON |
| N76139 | SR420-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | UNCOATED | 0.025 | WELDON |
| N76187 | SR420-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3 | 4 | ALTIN | 0.025 | WELDON |
| N76140 | SR420-0.625-D1-C025.3-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | UNCOATED | 0.025 | WELDON |
| N76188 | SR420-0.625-D1-C025.3-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | ALTIN | 0.025 | WELDON |
| N76141 | SR420-0.625-D3-C025.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 4 | UNCOATED | 0.025 | WELDON |
| N76189 | SR420-0.625-D3-C025.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 4 | ALTIN | 0.025 | WELDON |
| N76142 | SR420-0.750-D1-C025.3-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | UNCOATED | 0.025 | WELDON |
| N76190 | SR420-0.750-D1-C025.3-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | ALTIN | 0.025 | WELDON |
| N76143 | SR420-0.750-D2-C025.3-Z4 | 3/4 | 3/4 | 1-5/8 | 4 | 4 | UNCOATED | 0.025 | WELDON |
| N76191 | SR420-0.750-D2-C025.3-Z4 | 3/4 | 3/4 | 1-5/8 | 4 | 4 | ALTIN | 0.025 | WELDON |
| N76144 | SR420-1.000-D1-C025.3-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | UNCOATED | 0.025 | WELDON |
| N76192 | SR420-1.000-D1-C025.3-Z5 | 1 | 1 | 1-1/4 | 4 | 5 | ALTIN | 0.025 | WELDON |
| N76145 | SR420-1.000-D2-C025.3-Z5 | 1 | 1 | 2 | 5 | 5 | UNCOATED | 0.025 | WELDON |
| N76193 | SR420-1.000-D2-C025.3-Z5 | 1 | 1 | 2 | 5 | 5 | ALTIN | 0.025 | WELDON |
| METRIC - SR420M | | | | | | | | | |
| N47902 | SR420M-060-D3-C050.0-Z4 | 6MM | 6MM | 16MM | 58MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N47904 | SR420M-080-D2-C050.0-Z4 | 8MM | 8MM | 20MM | 64MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N47906 | SR420M-100-D2-C050.0-Z4 | 10MM | 10MM | 22MM | 73MM | 4 | ALTIN | 0.50MM | CYLINDRICAL |
| N47907 | SR420M-120-D1-C100.0-Z4 | 12MM | 12MM | 12MM | 74MM | 4 | ALTIN | 1.00MM | CYLINDRICAL |
| N47908 | SR420M-120-D3-C100.0-Z4 | 12MM | 12MM | 32MM | 84MM | 4 | ALTIN | 1.00MM | CYLINDRICAL |
| N47910 | SR420M-140-D2-C100.0-Z4 | 14MM | 14MM | 32MM | 84MM | 4 | ALTIN | 1.00MM | CYLINDRICAL |
| N47912 | SR420M-160-D2-C100.0-Z4 | 16MM | 16MM | 36MM | 93MM | 4 | ALTIN | 1.00MM | CYLINDRICAL |
| N47916 | SR420M-200-D3-C100.0-Z4 | 20MM | 20MM | 50MM | 105MM | 4 | ALTIN | 1.00MM | CYLINDRICAL |

SR545



- Fine-pitch knuckle profile
- Designed for peripheral milling (25% of tool diameter maximum) Stainless, High Temp Alloys, Titanium
- High shearing action to reduce radial deflection
- Fine pitch knuckle design
- Cutting Data - Page 106
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|-------------|
| N99050 | SR545-0.375-D1-C020.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | UNCOATED | 0.020 | CYLINDRICAL |
| N99092 | SR545-0.375-D1-C020.0-Z5 | 3/8 | 3/8 | 1/2 | 2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N99051 | SR545-0.375-D3-C020.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | UNCOATED | 0.020 | CYLINDRICAL |
| N99093 | SR545-0.375-D3-C020.0-Z5 | 3/8 | 3/8 | 1 | 2-1/2 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N99053 | SR545-0.438-D2-C020.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | UNCOATED | 0.020 | CYLINDRICAL |
| N99095 | SR545-0.438-D2-C020.0-Z5 | 7/16 | 7/16 | 1 | 2-3/4 | 5 | ALTIN | 0.020 | CYLINDRICAL |
| N99054 | SR545-0.500-D1-C025.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99096 | SR545-0.500-D1-C025.0-Z5 | 1/2 | 1/2 | 5/8 | 2-1/2 | 5 | ALTIN | 0.025 | CYLINDRICAL |
| N99055 | SR545-0.500-D3-C025.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99097 | SR545-0.500-D3-C025.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | ALTIN | 0.025 | CYLINDRICAL |
| N99057 | SR545-0.625-D3-C025.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99099 | SR545-0.625-D3-C025.0-Z5 | 5/8 | 5/8 | 1-5/8 | 3-1/2 | 5 | ALTIN | 0.025 | CYLINDRICAL |
| N99058 | SR545-0.750-D1-C025.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99100 | SR545-0.750-D1-C025.0-Z5 | 3/4 | 3/4 | 1 | 3 | 5 | ALTIN | 0.025 | CYLINDRICAL |
| N99059 | SR545-0.750-D2-C025.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99101 | SR545-0.750-D2-C025.0-Z5 | 3/4 | 3/4 | 1-5/8 | 4 | 5 | ALTIN | 0.025 | CYLINDRICAL |
| N99061 | SR545-1.000-D2-C025.0-Z5 | 1 | 1 | 2 | 4 | 5 | UNCOATED | 0.025 | CYLINDRICAL |
| N99103 | SR545-1.000-D2-C025.0-Z5 | 1 | 1 | 2 | 4 | 5 | ALTIN | 0.025 | CYLINDRICAL |

DISCOUNT CODE D43

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE



NS240R - START VALUES

SIDE MILLING - FINISHING

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _f (sf/min) | Z _n = 2 | | | | | | | | |
|----------------------------|----------------------|---------------------------|---------------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | |
| P | E / M / A 1 - 2 | 5 | 0.02 | 660 | n (rev/min) | 10080 | 8070 | 6720 | 5040 | 4030 | 3360 | 2520 | 2020 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | | | | 590 - 720 | v _f (in/min) | 50.4 | 50.4 | 50.4 | 50.4 | 50.4 | 50.4 | 50.4 | 50.5 |
| | E / M / A 3 - 4 | 5 | 0.02 | 590 | n (rev/min) | 9020 | 7210 | 6010 | 4510 | 3610 | 3010 | 2250 | 1800 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | | | | 520 - 660 | v _f (in/min) | 45.1 | 45.1 | 45.1 | 45.1 | 45.1 | 45.2 | 45.0 | 45.0 |
| E / M / A 5 - 6 | 5 | 0.02 | 520 | n (rev/min) | 7950 | 6360 | 5300 | 3970 | 3180 | 2650 | 1990 | 1590 | |
| | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | | |
| | | | 460 - 590 | v _f (in/min) | 39.8 | 39.8 | 39.8 | 39.7 | 39.8 | 39.8 | 39.8 | 39.8 | |
| M | E / M / A 8 - 9 | 5 | 0.02 | 330 | n (rev/min) | 5040 | 4030 | 3360 | 2520 | 2020 | 1680 | 1260 | 1010 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | E / M / A 10 - 11 | 5 | 0.02 | 260 | n (rev/min) | 3970 | 3180 | 2650 | 1990 | 1590 | 1320 | 990 | 790 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| K | E 12 - 13 | 5 | 0.02 | 390 | n (rev/min) | 5960 | 4770 | 3970 | 2980 | 2380 | 1990 | 1490 | 1190 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | E 14 - 15 | 5 | 0.02 | 330 | n (rev/min) | 5040 | 4030 | 3360 | 2520 | 2020 | 1680 | 1260 | 1010 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| N | E / M / A 16 | 5 | 0.02 | 2620 | n (rev/min) | 40030 | 32030 | 26690 | 20020 | 16010 | 13340 | 10010 | 8010 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | E / M / A 17 | 5 | 0.02 | 2300 - 2950 | v _f (in/min) | 200.2 | 200.2 | 200.2 | 200.2 | 200.1 | 200.1 | 200.2 | 200.3 |
| | | | | 2620 | n (rev/min) | 40030 | 32030 | 26690 | 20020 | 16010 | 13340 | 10010 | 8010 |
| | E / M / A 18 | 5 | 0.02 | 1310 | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 |
| | | | | 1150 - 1480 | v _f (in/min) | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 |
| S | E / M / A 19 | 5 | 0.02 | 160 | n (rev/min) | 2440 | 1960 | 1630 | 1220 | 980 | 810 | 610 | 490 |
| | | | | f _z (in) | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 | |
| | E / M / A 20 | 5 | 0.02 | 130 - 200 | v _f (in/min) | 8.5 | 8.6 | 8.6 | 8.5 | 8.6 | 8.5 | 8.5 | 8.6 |
| | | | | 160 | n (rev/min) | 2440 | 1960 | 1630 | 1220 | 980 | 810 | 610 | 490 |
| | E / M / A 21 | 5 | 0.02 | 130 | f _z (in) | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 |
| | | | | 100 - 160 | v _f (in/min) | 7.0 | 7.0 | 6.9 | 6.9 | 6.9 | 6.9 | 7.0 | 7.0 |
| | E / M / A 22 | 5 | 0.02 | 330 | n (rev/min) | 5040 | 4030 | 3360 | 2520 | 2020 | 1680 | 1260 | 1010 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | A / D GRAPHITE | 5 | 0.02 | 3280 | n (rev/min) | 50120 | 40090 | 33410 | 25060 | 20050 | 16710 | 12530 | 10020 |
| | | | | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| A / D PLASTIC (SOFT) | 5 | 0.02 | 2950 - 3610 | v _f (in/min) | 250.6 | 250.6 | 250.6 | 250.6 | 250.6 | 250.7 | 250.6 | 250.5 | |
| | | | 3280 | n (rev/min) | 50120 | 40090 | 33410 | 25060 | 20050 | 16710 | 12530 | 10020 | |
| A / D PLASTIC (HARD) | 5 | 0.02 | 1970 | f _z (in) | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | |
| | | | 1640 - 2300 | v _f (in/min) | 150.5 | 150.5 | 150.5 | 150.5 | 150.5 | 150.5 | 150.6 | 150.5 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

S335 - START VALUES

| | | SLOTTING | | | | | | | | | | | |
|-------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 1.00 | 395 | n (rev/min) | 24142 | 12071 | 6036 | 4024 | 3018 | 2414 | 2012 | 1509 |
| | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | v _f (in/min) | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 |
| | E 3 - 4 | 1.0 | 1.00 | 330 | n (rev/min) | 20170 | 10085 | 5042 | 3362 | 2521 | 2017 | 1681 | 1261 |
| | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | v _f (in/min) | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 |
| | E 5 - 6 | 1.0 | 1.00 | 260 | n (rev/min) | 15891 | 7946 | 3973 | 2649 | 1986 | 1589 | 1324 | 993 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | | | | | v _f (in/min) | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| M | E 8 - 9 | 1.0 | 1.00 | 260 | n (rev/min) | 15891 | 7946 | 3973 | 2649 | 1986 | 1589 | 1324 | 993 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0020 | 0.0026 |
| | | | | | v _f (in/min) | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| | E 10 - 11 | 1.0 | 1.00 | 230 | n (rev/min) | 14058 | 7029 | 3514 | 2343 | 1757 | 1406 | 1171 | 879 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0020 | 0.0026 |
| | | | | | v _f (in/min) | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| K | E 12 - 13 | 1.0 | 1.00 | 385 | n (rev/min) | 23531 | 11766 | 5883 | 3922 | 2941 | 2353 | 1961 | 1471 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | v _f (in/min) | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 |
| | E 14 - 15 | 1.0 | 1.00 | 340 | n (rev/min) | 20781 | 10390 | 5195 | 3463 | 2598 | 2078 | 1732 | 1299 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | v _f (in/min) | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 |
| S | E 19 | 1.0 | 1.00 | 110 | n (rev/min) | 6723 | 3362 | 1681 | 1121 | 840 | 672 | 560 | 420 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| | E 20 | 1.0 | 1.00 | 110 | n (rev/min) | 6723 | 3362 | 1681 | 1121 | 840 | 672 | 560 | 420 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| | E 21 | 1.0 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | E 22 | 1.0 | 1.00 | 180 | n (rev/min) | 11002 | 5501 | 2750 | 1834 | 1375 | 1100 | 917 | 688 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 |
| v _f (in/min) | | | | | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

S335 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | |
|-------------------------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|---------------------|--------|--------|--------|--------|--------|-----|-----|-----|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | | | |
| P | E 1 - 2 | 1.0 | 0.20 | 525 | n (rev/min) | 32088 | 16044 | 8022 | 5348 | 4011 | 3209 | 2674 | 2006 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | | | |
| | E 3 - 4 | 1.0 | 0.20 | 460 | n (rev/min) | 28115 | 14058 | 7029 | 4686 | 3514 | 2812 | 2343 | 1757 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | | | |
| | E 5 - 6 | 1.0 | 0.20 | 330 | n (rev/min) | 20170 | 10085 | 5042 | 3362 | 2521 | 2017 | 1681 | 1261 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | | | |
| M | E 8 - 9 | 1.0 | 0.20 | 280 | n (rev/min) | 17114 | 8557 | 4278 | 2852 | 2139 | 1711 | 1426 | 1070 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0017 | | | |
| | | | | | v _f (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | | | |
| | E 10 - 11 | 1.0 | 0.20 | 250 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0017 | | | |
| | | | | | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | | | |
| K | E 12 - 13 | 1.0 | 0.20 | 340 | n (rev/min) | 20781 | 10390 | 5195 | 3463 | 2598 | 2078 | 1732 | 1299 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | | |
| | E 14 - 15 | 1.0 | 0.20 | 440 | n (rev/min) | 26893 | 13446 | 6723 | 4482 | 3362 | 2689 | 2241 | 1681 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | | | |
| S | E 19 | 0.5 | 0.20 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | | | |
| | E 20 | 0.5 | 0.20 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | | | |
| | | | | | v _f (in/min) | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | | | |
| | E 21 | 0.5 | 0.20 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | | | |
| | E 22 | 0.5 | 0.20 | 220 | n (rev/min) | 13446 | 6723 | 3362 | 2241 | 1681 | 1345 | 1121 | 840 | | | |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | | | |
| v _f (in/min) | | | | | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | | | | |
| E 22 | | | | | 0.5 | 0.20 | 160 | n (rev/min) | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 |
| | | | | | | | | f _z (in) | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

SB335 - START VALUES

| | | SLOTTING | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 0.75 | 315 | n (rev/min) | 19253 | 9626 | 4813 | 3209 | 2407 | 1925 | 1604 | 1203 |
| | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | v _f (in/min) | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 |
| | E 3 - 4 | 1.0 | 0.75 | 264 | n (rev/min) | 16136 | 8068 | 4034 | 2689 | 2017 | 1614 | 1345 | 1008 |
| | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | v _f (in/min) | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 |
| | E 5 - 6 | 1.0 | 0.75 | 208 | n (rev/min) | 12713 | 6356 | 3178 | 2119 | 1589 | 1271 | 1059 | 795 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | | | | | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| M | E 8 - 9 | 1.0 | 0.75 | 208 | n (rev/min) | 12713 | 6356 | 3178 | 2119 | 1589 | 1271 | 1059 | 795 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0020 | 0.0026 |
| | | | | | v _f (in/min) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| | E 10 - 11 | 1.0 | 0.75 | 185 | n (rev/min) | 11307 | 5654 | 2827 | 1885 | 1413 | 1131 | 942 | 707 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0020 | 0.0026 |
| | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| K | E 12 - 13 | 1.0 | 0.75 | 308 | n (rev/min) | 18825 | 9412 | 4706 | 3137 | 2353 | 1882 | 1569 | 1177 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | v _f (in/min) | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 |
| | E 14 - 15 | 1.0 | 0.75 | 272 | n (rev/min) | 16625 | 8312 | 4156 | 2771 | 2078 | 1662 | 1385 | 1039 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | v _f (in/min) | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| S | E 19 | 1.0 | 0.75 | 88 | n (rev/min) | 5379 | 2689 | 1345 | 896 | 672 | 538 | 448 | 336 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| | E 20 | 1.0 | 0.75 | 88 | n (rev/min) | 5379 | 2689 | 1345 | 896 | 672 | 538 | 448 | 336 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| | E 21 | 1.0 | 0.75 | 56 | n (rev/min) | 3423 | 1711 | 856 | 570 | 428 | 342 | 285 | 214 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | | | | | v _f (in/min) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| | E 22 | 1.0 | 0.75 | 145 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 |
| | | | | | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

SB335 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|-------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 0.20 | 420 | n (rev/min) | 25670 | 12835 | 6418 | 4278 | 3209 | 2567 | 2139 | 1604 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | 360 - 480 | v _f (in/min) | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| | E 3 - 4 | 1.0 | 0.20 | 368 | n (rev/min) | 22492 | 11246 | 5623 | 3749 | 2812 | 2249 | 1874 | 1406 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | 308 - 428 | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| | E 5 - 6 | 1.0 | 0.20 | 264 | n (rev/min) | 16136 | 8068 | 4034 | 2689 | 2017 | 1614 | 1345 | 1008 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | 204 - 324 | v _f (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| M | E 8 - 9 | 1.0 | 0.20 | 225 | n (rev/min) | 13752 | 6876 | 3438 | 2292 | 1719 | 1375 | 1146 | 860 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0017 |
| | | | | 195 - 255 | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| | E 10 - 11 | 1.0 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0017 |
| | | | | 170 - 230 | v _f (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| K | E 12 - 13 | 1.0 | 0.20 | 272 | n (rev/min) | 16625 | 8312 | 4156 | 2771 | 2078 | 1662 | 1385 | 1039 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | 212 - 332 | v _f (in/min) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| | E 14 - 15 | 1.0 | 0.20 | 350 | n (rev/min) | 21392 | 10696 | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | 290 - 410 | v _f (in/min) | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 |
| S | E 19 | 0.5 | 0.20 | 96 | n (rev/min) | 5868 | 2934 | 1467 | 978 | 733 | 587 | 489 | 367 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | 66 - 126 | v _f (in/min) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | |
| | E 20 | 0.5 | 0.20 | 96 | n (rev/min) | 5868 | 2934 | 1467 | 978 | 733 | 587 | 489 | 367 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | 66 - 126 | v _f (in/min) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | |
| | E 21 | 0.5 | 0.20 | 64 | n (rev/min) | 3912 | 1956 | 978 | 652 | 489 | 391 | 326 | 244 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 |
| | 34 - 94 | v _f (in/min) | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | |
| | E 22 | 0.5 | 0.20 | 175 | n (rev/min) | 10696 | 5348 | 2674 | 1783 | 1337 | 1070 | 891 | 669 |
| f _z (in) | | | | | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | |
| 115 - 235 | v _f (in/min) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SN335 - START VALUES

| | | SLOTTING | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 1.00 | 316 | n (rev/min) | 19314 | 9657 | 4828 | 3219 | 2414 | 1931 | 1609 | 1207 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | v _f (in/min) | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 |
| | E 3 - 4 | 1.0 | 1.00 | 264 | n (rev/min) | 16136 | 8068 | 4034 | 2689 | 2017 | 1614 | 1345 | 1008 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | v _f (in/min) | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 |
| | E 5 - 6 | 1.0 | 1.00 | 210 | n (rev/min) | 12835 | 6418 | 3209 | 2139 | 1604 | 1284 | 1070 | 802 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | v _f (in/min) | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 |
| M | E 8 - 9 | 1.0 | 1.00 | 210 | n (rev/min) | 12835 | 6418 | 3209 | 2139 | 1604 | 1284 | 1070 | 802 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| | E 10 - 11 | 1.0 | 1.00 | 185 | n (rev/min) | 11307 | 5654 | 2827 | 1885 | 1413 | 1131 | 942 | 707 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | | v _f (in/min) | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| K | E 12 - 13 | 1.0 | 1.00 | 310 | n (rev/min) | 18947 | 9474 | 4737 | 3158 | 2368 | 1895 | 1579 | 1184 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | | v _f (in/min) | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 | 12.1 |
| | E 14 - 15 | 1.0 | 1.00 | 272 | n (rev/min) | 16625 | 8312 | 4156 | 2771 | 2078 | 1662 | 1385 | 1039 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | | v _f (in/min) | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| S | E 19 | 1.0 | 1.00 | 88 | n (rev/min) | 5379 | 2689 | 1345 | 896 | 672 | 538 | 448 | 336 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| | E 20 | 1.0 | 1.00 | 88 | n (rev/min) | 5379 | 2689 | 1345 | 896 | 672 | 538 | 448 | 336 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| | E 21 | 1.0 | 1.00 | 56 | n (rev/min) | 3423 | 1711 | 856 | 570 | 428 | 342 | 285 | 214 |
| | | | | | f _z (in) | 0.0001 | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0008 | 0.0011 |
| | | | | | v _f (in/min) | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| | E 22 | 1.0 | 1.00 | 144 | n (rev/min) | 8801 | 4401 | 2200 | 1467 | 1100 | 880 | 733 | 550 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0017 |
| | | | | | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |

SMG = Seco Material Group
n [min-1] = RPM
v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
a_p/D_c = % of diameter
v_f [in/min] = Feed rate
a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
All cutting data are start values. All cutting data is in inch values.
Please reference the Workpiece Material Classification chart located on page 15.

SN335 - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | |
|-------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 0.20 | 420 | n (rev/min) | 25670 | 12835 | 6418 | 4278 | 3209 | 2567 | 2139 | 1604 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 |
| | E 3 - 4 | 1.0 | 0.20 | 368 | n (rev/min) | 22492 | 11246 | 5623 | 3749 | 2812 | 2249 | 1874 | 1406 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| | E 5 - 6 | 1.0 | 0.20 | 264 | n (rev/min) | 16136 | 8068 | 4034 | 2689 | 2017 | 1614 | 1345 | 1008 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| M | E 8 - 9 | 1.0 | 0.20 | 224 | n (rev/min) | 13691 | 6845 | 3423 | 2282 | 1711 | 1369 | 1141 | 856 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0008 | 0.0010 | 0.0013 |
| | | | | | v _f (in/min) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| | E 10 - 11 | 1.0 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0008 | 0.0010 | 0.0013 |
| | | | | | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| K | E 12 - 13 | 1.0 | 0.20 | 272 | n (rev/min) | 16625 | 8312 | 4156 | 2771 | 2078 | 1662 | 1385 | 1039 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| | E 14 - 15 | 1.0 | 0.20 | 352 | n (rev/min) | 21514 | 10757 | 5379 | 3586 | 2689 | 2151 | 1793 | 1345 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| S | E 19 | 0.5 | 0.20 | 96 | n (rev/min) | 5868 | 2934 | 1467 | 978 | 733 | 587 | 489 | 367 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | E 20 | 0.5 | 0.20 | 96 | n (rev/min) | 5868 | 2934 | 1467 | 978 | 733 | 587 | 489 | 367 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | E 21 | 0.5 | 0.20 | 64 | n (rev/min) | 3912 | 1956 | 978 | 652 | 489 | 391 | 326 | 244 |
| | | | | | f _z (in) | 0.0001 | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0008 | 0.0011 |
| | | | | | v _f (in/min) | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| | E 22 | 0.5 | 0.20 | 176 | n (rev/min) | 10757 | 5379 | 2689 | 1793 | 1345 | 1076 | 896 | 672 |
| f _z (in) | | | | | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0017 | |
| v _f (in/min) | | | | | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | |
| | | | | | 116 | - | 236 | | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE



S545 / S545R - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | Z _n = 5 | | | | | | | |
|-------------------------|-------------------------------|--|--|------------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.0 | 0.25 | 500 | n (rev/min) | 30560 | 15280 | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | V _f (in/min) | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 | 43.0 |
| | E 3 - 4 | 1.0 | 0.25 | 380 | n (rev/min) | 23226 | 11613 | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | | | | | V _f (in/min) | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| | E 5 - 6 | 1.0 | 0.20 | 300 | n (rev/min) | 18336 | 9168 | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0019 | 0.0023 | 0.0031 |
| | | | | | V _f (in/min) | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 | 17.8 |
| H | M / A / D 7a (48-52HRC) | 1.0 | 0.10 | 150 | n (rev/min) | 9168 | 4584 | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0019 | 0.0023 | 0.0031 |
| | | | | | V _f (in/min) | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 |
| M | E 8 - 9 | 1.0 | 0.20 | 250 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0032 |
| | | | | | V _f (in/min) | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 |
| | E 10 - 11 | 1.0 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | V _f (in/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 |
| K | E 12 - 13 | 1.0 | 0.25 | 300 | n (rev/min) | 18336 | 9168 | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| | | | | | V _f (in/min) | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 |
| | E 12 - 13 | 1.0 | 0.25 | 180 | n (rev/min) | 11002 | 5501 | 2750 | 1834 | 1375 | 1100 | 917 | 688 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0016 | 0.0019 | 0.0023 | 0.0031 |
| | | | | | V _f (in/min) | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 |
| N | E / M / A 16 | 2.0 | 0.05 | 800 | n (rev/min) | 11002 | 5501 | 2750 | 1834 | 1375 | 1100 | 917 | 688 |
| | | | | | f _z (in) | 0.0005 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | | V _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| | E / M / A 17 | 2.0 | 0.05 | 800 | n (rev/min) | 11002 | 5501 | 2750 | 1834 | 1375 | 1100 | 917 | 688 |
| | | | | | f _z (in) | 0.0005 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0080 |
| | | | | | V _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| S | E 19 | 1.0 | 0.05 | 90 | n (rev/min) | 5501 | 2750 | 1375 | 917 | 688 | 550 | 458 | 344 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | V _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | E 20 | 1.0 | 0.05 | 90 | n (rev/min) | 5501 | 2750 | 1375 | 917 | 688 | 550 | 458 | 344 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | V _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | E 21 | 1.0 | 0.05 | 90 | n (rev/min) | 5501 | 2750 | 1375 | 917 | 688 | 550 | 458 | 344 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | V _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | E 22 | 1.0 | 0.15 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| f _z (in) | | | | | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| V _f (in/min) | | | | | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | |

SMG = Seco Material Group
 n [min-1] = RPM
 V_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

SR420 - START VALUES

| | | SLOTTING | | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 1.00 | 300 | n (rev/min) | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 |
| | | | | | v _f (in/min) | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 |
| | E 3 - 4 | 1.00 | 1.00 | 250 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0016 | 0.0021 |
| | | | | | v _f (in/min) | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 |
| | E 5 - 6 | 1.00 | 1.00 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | | | | | v _f (in/min) | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 |
| M | E 8 - 9 | 0.50 | 1.00 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0005 | 0.0008 | 0.0011 | 0.0014 | 0.0016 | 0.0022 |
| | | | | | v _f (in/min) | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 |
| | E 10 - 11 | 0.30 | 1.00 | 200 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | v _f (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| K | E 12 - 13 | 1.00 | 1.00 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | | v _f (in/min) | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 |
| | E 14 - 15 | 0.30 | 1.00 | 150 | n (rev/min) | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | | v _f (in/min) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |

| | | SIDE MILLING - ROUGHING | | | | | | | | | |
|---|--------------|-------------------------|------|-----|-------------------------|--------|--------|--------|--------|--------|--------|
| P | E 1 - 2 | 1.00 | 0.40 | 300 | n (rev/min) | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 |
| | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0024 | 0.0029 | 0.0039 |
| | | | | | v _f (in/min) | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 |
| | E 3 - 4 | 1.00 | 0.40 | 250 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | | v _f (in/min) | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 |
| | E 5 - 6 | 1.00 | 0.40 | 175 | n (rev/min) | 2674 | 1783 | 1337 | 1070 | 891 | 669 |
| | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | | v _f (in/min) | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| M | E 8 - 9 | 1.00 | 0.40 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | | v _f (in/min) | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 |
| | E 10 - 11 | 1.00 | 0.30 | 200 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| K | E 12 - 13 | 1.00 | 0.40 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | | v _f (in/min) | 33.7 | 33.7 | 33.7 | 33.7 | 33.7 | 33.7 |
| | E 14 - 15 | 1.00 | 0.30 | 150 | n (rev/min) | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | | v _f (in/min) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

SR545 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | |
|-------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 5 | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 300 | n (rev/min) | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 |
| | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0024 | 0.0029 | 0.0039 |
| | E 3 - 4 | 1.00 | 0.30 | 250 | v _f (in/min) | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 |
| | | | | | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | E 5 - 6 | 1.00 | 0.30 | 175 | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | | v _f (in/min) | 12.9 | 12.9 | 12.9 | 12.9 | 12.9 | 12.9 |
| M | E 8 - 9 | 1.00 | 0.30 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | E 10 - 11 | 1.00 | 0.25 | 200 | v _f (in/min) | 19.6 | 19.6 | 19.6 | 19.6 | 19.6 | 19.6 |
| | | | | | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | E 12 - 13 | 1.00 | 0.30 | 330 | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | v _f (in/min) | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| K | E 12 - 13 | 1.00 | 0.30 | 380 | n (rev/min) | 5806 | 3871 | 2903 | 2323 | 1935 | 1452 |
| | | | | | f _z (in) | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | E 14 - 15 | 1.00 | 0.25 | 150 | v _f (in/min) | 42.1 | 42.1 | 42.1 | 42.1 | 42.1 | 42.1 |
| | | | | | n (rev/min) | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| E 22 | 1.0 | 0.20 | 275 | f _z (in) | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 | |
| | | | | v _f (in/min) | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | |
| S | E 22 | 1.0 | 0.20 | 275 | n (rev/min) | 4202 | 2801 | 2101 | 1681 | 1401 | 1051 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| S | E 22 | 1.0 | 0.20 | 225 | v _f (in/min) | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

S545M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | |
|-------------------------|-------------------------|---------------------------------------|---------------------------------------|--------------------------|--------------------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (m / min) | Z _n = 5 | | | | | |
| | | | | | 4 | 6 | 8 | 10 | 12 | |
| P | E 1 - 2 | 1.0 | 0.25 | 490 395 - 690 | n (min-1) | 11886 | 7924 | 5943 | 4754 | 3962 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 42.1 | 42.1 | 42.1 | 42.1 | 42.1 |
| | E 3 - 4 | 1.0 | 0.25 | 395 330 - 690 | n (min-1) | 9582 | 6388 | 4791 | 3833 | 3194 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 |
| | E 5 - 6 | 1.0 | 0.20 | 295 195 - 395 | n (min-1) | 7156 | 4771 | 3578 | 2862 | 2385 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 25.4 | 25.4 | 25.4 | 25.4 | 25.4 |
| H | M / A / D 7a (48-52HRC) | 1.0 | 0.10 | 165 65 - 195 | n (min-1) | 4002 | 2668 | 2001 | 1601 | 1334 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| M | E 8 - 9 | 1.0 | 0.20 | 260 165 - 360 | n (min-1) | 6307 | 4205 | 3153 | 2523 | 2102 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 |
| | E 10 - 11 | 1.0 | 0.20 | 195 165 - 360 | n (min-1) | 4730 | 3153 | 2365 | 1892 | 1577 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 |
| K | E 12 - 13 | 1.0 | 0.25 | 295 230 - 360 | n (min-1) | 7156 | 4771 | 3578 | 2862 | 2385 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 25.4 | 25.4 | 25.4 | 25.4 | 25.4 |
| | E 12 - 13 | 1.0 | 0.25 | 165 100 - 230 | n (min-1) | 4002 | 2668 | 2001 | 1601 | 1334 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| N | E / M / A 16 | 2.0 | 0.05 | 785 655 - 1310 | n (min-1) | 19042 | 12694 | 9521 | 7617 | 6347 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 |
| | E / M / A 17 | 2.0 | 0.05 | 785 655 - 1310 | n (min-1) | 19042 | 12694 | 9521 | 7617 | 6347 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 |
| S | E 19 | 1.0 | 0.05 | 100 65 - 130 | n (min-1) | 2426 | 1617 | 1213 | 970 | 809 |
| | | | | | fz (in) | 0.0180 | 0.0270 | 0.0360 | 0.0450 | 0.0540 |
| | | | | | vf (in/min) | 218.3 | 218.3 | 218.3 | 218.3 | 218.3 |
| | E 20 | 1.0 | 0.05 | 100 65 - 130 | n (min-1) | 2426 | 1617 | 1213 | 970 | 809 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 21 | 1.0 | 0.05 | 100 65 - 130 | n (min-1) | 2426 | 1617 | 1213 | 970 | 809 |
| | | | | | fz (in) | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 |
| | | | | | vf (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 22 | 1.0 | 0.15 | 130 100 - 165 | n (min-1) | 3153 | 2102 | 1577 | 1261 | 1051 |
| fz (in) | | | | | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | |
| vf (in/min) | | | | | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE



S645M - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-----------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 20 |
| P | E 1 - 2 | 1.0 | 0.25 | 490 | n (min-1) | 15848 | 11886 | 9509 | 7924 | 5943 | 4754 | 3962 | 3396 | 2971 | 2377 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 | 50.5 |
| | E 3 - 4 | 1.0 | 0.25 | 395 | n (min-1) | 12775 | 9582 | 7665 | 6388 | 4791 | 3833 | 3194 | 2738 | 2395 | 1916 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 | 40.7 |
| E 5 - 6 | 1.0 | 0.20 | 295 | n (min-1) | 9541 | 7156 | 5725 | 4771 | 3578 | 2862 | 2385 | 2045 | 1789 | 1431 | |
| | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 | |
| | | | | vf (in/min) | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 |
| H | M / A / D 7a (48-52HRC) | 1.0 | 0.10 | 165 | n (min-1) | 5337 | 4002 | 3202 | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 |
| M | E 8 - 9 | 1.0 | 0.20 | 260 | n (min-1) | 8409 | 6307 | 5045 | 4205 | 3153 | 2523 | 2102 | 1802 | 1577 | 1261 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 | 26.8 |
| | E 10 - 11 | 1.0 | 0.20 | 195 | n (min-1) | 6307 | 4730 | 3784 | 3153 | 2365 | 1892 | 1577 | 1351 | 1183 | 946 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 |
| K | E 12 - 13 | 1.0 | 0.25 | 295 | n (min-1) | 9541 | 7156 | 5725 | 4771 | 3578 | 2862 | 2385 | 2045 | 1789 | 1431 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 |
| | E 14 - 15 | 1.0 | 0.25 | 165 | n (min-1) | 5337 | 4002 | 3202 | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 |
| N | E / M / A 16 | 2.0 | 0.05 | 785 | n (min-1) | 25389 | 19042 | 15233 | 12694 | 9521 | 7617 | 6347 | 5440 | 4760 | 3808 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 |
| | E / M / A 17 | 2.0 | 0.05 | 785 | n (min-1) | 25389 | 19042 | 15233 | 12694 | 9521 | 7617 | 6347 | 5440 | 4760 | 3808 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 |
| S | E 19 | 1.0 | 0.05 | 100 | n (min-1) | 3234 | 2426 | 1941 | 1617 | 1213 | 970 | 809 | 693 | 606 | 485 |
| | | | | | fz (in) | 0.0135 | 0.0180 | 0.0225 | 0.0270 | 0.0360 | 0.0450 | 0.0540 | 0.0630 | 0.0720 | 0.0900 |
| | | | | | vf (in/min) | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 | 262.0 |
| | E 20 | 1.0 | 0.05 | 100 | n (min-1) | 3234 | 2426 | 1941 | 1617 | 1213 | 970 | 809 | 693 | 606 | 485 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 |
| | E 21 | 1.0 | 0.05 | 100 | n (min-1) | 3234 | 2426 | 1941 | 1617 | 1213 | 970 | 809 | 693 | 606 | 485 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 |
| | E 22 | 1.0 | 0.15 | 130 | n (min-1) | 4205 | 3153 | 2523 | 2102 | 1577 | 1261 | 1051 | 901 | 788 | 631 |
| | | | | | fz (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0035 |
| | | | | | vf (in/min) | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE



SR420M - START VALUES

| | | SLOTING | | | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------|-------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | $Z_n = 4$ | | | | | | | |
| | | | | | 6 | 8 | 10 | 12 | 14 | 16 | 20 | |
| P | E 1 - 2 | 1.00 | 1.00 | 295 | n (min-1) | 4771 | 3578 | 2862 | 2385 | 2045 | 1789 | 1431 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 230 - 360 | vf (in/min) | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | E 3 - 4 | 1.00 | 1.00 | 260 | n (min-1) | 4205 | 3153 | 2523 | 2102 | 1802 | 1577 | 1261 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 195 - 295 | vf (in/min) | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 |
| | E 5 - 6 | 1.00 | 1.00 | 165 | n (min-1) | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 130 - 230 | vf (in/min) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| M | E 8 - 9 | 0.50 | 1.00 | 395 | n (min-1) | 6388 | 4791 | 3833 | 3194 | 2738 | 2395 | 1916 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 360 - 425 | vf (in/min) | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 |
| | E 10 - 11 | 0.30 | 1.00 | 195 | n (min-1) | 3153 | 2365 | 1892 | 1577 | 1351 | 1183 | 946 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 165 - 230 | vf (in/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 |
| K | E 12 - 13 | 1.00 | 1.00 | 395 | n (min-1) | 6388 | 4791 | 3833 | 3194 | 2738 | 2395 | 1916 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 330 - 425 | vf (in/min) | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 |
| | E 14 - 15 | 0.30 | 1.00 | 165 | n (min-1) | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 100 - 195 | vf (in/min) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |

| | | SIDE MILLING - ROUGHING | | | | | | | | | | |
|---|--------------|-------------------------|------|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|
| P | E 1 - 2 | 1.00 | 0.40 | 295 | n (min-1) | 4771 | 3578 | 2862 | 2385 | 2045 | 1789 | 1431 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 230 - 360 | vf (in/min) | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | E 3 - 4 | 1.00 | 0.40 | 260 | n (min-1) | 4205 | 3153 | 2523 | 2102 | 1802 | 1577 | 1261 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 195 - 295 | vf (in/min) | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 |
| | E 5 - 6 | 1.00 | 0.40 | 165 | n (min-1) | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 130 - 230 | vf (in/min) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| M | E 8 - 9 | 1.00 | 0.40 | 395 | n (min-1) | 6388 | 4791 | 3833 | 3194 | 2738 | 2395 | 1916 |
| | | | | | fz (in) | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0021 |
| | | | | 360 - 425 | vf (in/min) | 16.3 | 16.3 | 16.3 | 16.3 | 16.3 | 16.3 | 16.3 |
| | E 10 - 11 | 1.00 | 0.30 | 195 | n (min-1) | 3153 | 2365 | 1892 | 1577 | 1351 | 1183 | 946 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 165 - 230 | vf (in/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 |
| K | E 12 - 13 | 1.00 | 0.40 | 395 | n (min-1) | 6388 | 4791 | 3833 | 3194 | 2738 | 2395 | 1916 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 330 - 425 | vf (in/min) | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 |
| | E 14 - 15 | 1.00 | 0.30 | 165 | n (min-1) | 2668 | 2001 | 1601 | 1334 | 1144 | 1001 | 800 |
| | | | | | fz (in) | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0024 |
| | | | | 100 - 195 | vf (in/min) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



SOLID CARBIDE HIGH FEED MILL SN200R, 400R & 500R

The SN200R, SN400R and SN500R series offers a complete range of 2-, 4- and 5-flute end mills to cover a broad range of applications and materials. Available in 3, 5 and 7 times diameter reach, these end mills feature a defined radius (r_p) directing radial cutting pressure axially up into the tool holder and spindle. This feature allows for increased metal removal rates in deep pockets and long reach applications.

PRODUCT OVERVIEW

- Solid carbide high feed tools excel in face, slot and plunge milling
- High feed capabilities yield significant productivity gains
- Reduced production costs when processing deep and shallow pockets
- Longer tool life than previous cutters when applied at the same table feed rates
- Low radial forces minimize vibration and machine wear
- Wide application area covered, from steel to exotic materials
- AlTiN coating for high heat and abrasion resistance
- Edge prep to increase cutting edge strength
- JIF modifications on shank only

YOUR NIAGARA CUTTER BENEFIT

- Multiple flutes
- Long tool overhang
- Axial directed cutting forces
- High heat and abrasion resistant
- Reduced cycle time, higher metal removal rates
- Deep cavity milling
- Smoother cutting in long reach applications
- Long and predictable tool life

RANGE OVERVIEW

- 2-, 4- and 5-flute end mill diameters from 1/16"-1/2" diameter
- 3xD, 5xD and 7xD length versions available

TECHNICAL SPECIFICATIONS

| | |
|-------------------|----------------------------|
| Diameter range: | $\phi 1/16'' - \phi 1/2''$ |
| # flutes: | 2,4,5 |
| Helix angle: | 0° |
| Rake angle: | 0° |
| Relief: | -5° tapered |
| Flute Diameter | |
| Tolerance: | +0.000 / -0.002 |
| Shank Diameter | |
| Tolerance: | h6 |
| Corner Radius | |
| Tolerance: | + / -.0005 |
| Unequal Index: | No |
| Edge preparation: | Yes |
| Coating: | AlTiN |

MATERIAL GROUPS

| |
|-------------------------------|
| steel < 450 N/mm ² |
| 450 < 700 N/mm ² |
| 700 < 1200 N/mm ² |
| Hardened steel |
| Stainless steel |
| Cast Iron |
| Fe based super alloys |
| CO-based super alloys |
| Ni-based super alloys |
| Titanium alloys |

FOCUS ON ISO P, S AND K MATERIALS INCLUDING STAINLESS STEEL, INCONEL AND TITANIUM.

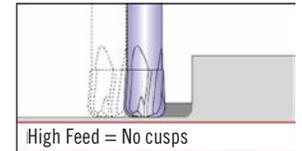
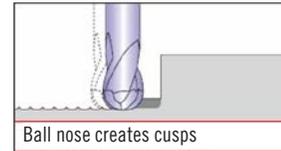
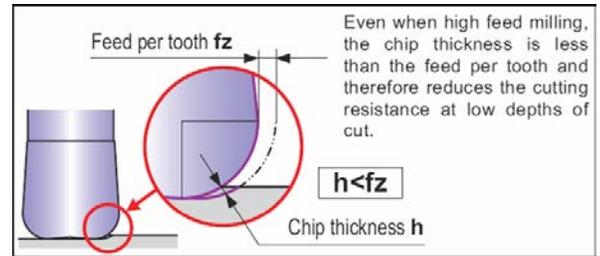
HOW DOES HIGH FEED MILLING WORK?

The key to high feed milling cutters is the lead angle (or large radius) that allows you to have higher feed rates based on chip thinning.

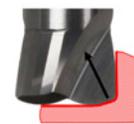
When milling with a ball end mill, varying the depth of cut results in a chip-thinning effect. Large depths of cut involve bigger chip thicknesses, while shallow depths of cut mean smaller chip thickness. Machining with smaller depths of cuts, allows you to increase the feed rate to get the proper chip thickness (load).

CHATTER AND SURFACE FINISH

High feed end mills have a low cutting resistance compared to ballnose endmills. This enables higher feed rates & longer overhangs to be achieved with less risk of vibration.



Ball nose directs force sideways, creating chatter.



High feed directs force upwards, minimizing chatter.

CHOOSING THE RIGHT HIGH FEED TOOL

| Product | Product Family | APMX | Range | Material suitability | Machine suitability | | Ramping capability | Plunging suitability |
|---------|--|----------|-------------|----------------------|---------------------|---|--------------------|----------------------|
| | | | | | | | | |
| | MZN410R & MZN510R - 4- and 5-flute versions - 1/8" - 5/8" diameters - AlTiN coating - Open flute cavity | 5.5%*DCX | 1/8" - 5/8" | P K S H | ✓ | = | ✓ | ✗ |
| | SN200R, 400R & 500R - 2-, 4- and 5-flute versions - 1/16"-1/2" diameter range - 3xD, 5xD and 7xD - Deep pockets and long reach - AlTiN coating | 9%*DCX | 1/16"-1/2" | P M K S H | ✓ | = | ✓ | ✓ |

SN200R

SOLID CARBIDE

NON CENTER CUTTING



- 3, 5, and 7 x Diameter of reach
- Defined radius (rp)
- Wide range of materials including Steels (<52 Rc), Stainless Steels, Titanium, and Cast Iron
- Face, slot, and plunge milling
- Long reach applications
- Deep cavity milling

- Cutting Data - Page 114-118
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N13984 | SN200R-0.063-G1-H007.0-Z2 | 1/16 | 1/4 | .004 | 2 | .055 | .188 | 2 | ALTIN | 0.0074 | CYLINDRICAL |
| N13985 | SN200R-0.063-G2-H007.0-Z2 | 1/16 | 1/4 | .004 | 2 | .055 | .313 | 2 | ALTIN | 0.0074 | CYLINDRICAL |
| N13986 | SN200R-0.063-J3-H007.0-Z2 | 1/16 | 1/4 | .004 | 2 | .055 | .438 | 2 | ALTIN | 0.0074 | CYLINDRICAL |
| N13987 | SN200R-0.094-G1-H011.0-Z2 | 3/32 | 1/4 | .006 | 2 | .082 | .281 | 2 | ALTIN | 0.0111 | CYLINDRICAL |
| N13988 | SN200R-0.094-G2-H011.0-Z2 | 3/32 | 1/4 | .006 | 2 | .082 | .469 | 2 | ALTIN | 0.0111 | CYLINDRICAL |
| N13989 | SN200R-0.094-J3-H011.0-Z2 | 3/32 | 1/4 | .006 | 2-1/2 | .082 | .656 | 2 | ALTIN | 0.0111 | CYLINDRICAL |
| N13992 | SN200R-0.125-G1-H015.0-Z2 | 1/8 | 1/4 | .008 | 2 | .082 | .375 | 2 | ALTIN | 0.0148 | CYLINDRICAL |
| N13993 | SN200R-0.125-G2-H015.0-Z2 | 1/8 | 1/4 | .008 | 2-1/2 | .109 | .625 | 2 | ALTIN | 0.0148 | CYLINDRICAL |
| N13994 | SN200R-0.125-J3-H015.0-Z2 | 1/8 | 1/4 | .008 | 2-1/2 | .109 | .875 | 2 | ALTIN | 0.0148 | CYLINDRICAL |
| N13997 | SN200R-0.156-G1-H020.0-Z2 | 5/32 | 1/4 | .010 | 2 | .136 | .469 | 2 | ALTIN | 0.0200 | CYLINDRICAL |
| N13998 | SN200R-0.156-G2-H020.0-Z2 | 5/32 | 1/4 | .010 | 2-1/2 | .136 | .781 | 2 | ALTIN | 0.0200 | CYLINDRICAL |
| N13999 | SN200R-0.156-J3-H020.0-Z2 | 5/32 | 1/4 | .010 | 2-1/2 | .136 | 1.094 | 2 | ALTIN | 0.0200 | CYLINDRICAL |
| N14004 | SN200R-0.188-G1-H023.0-Z2 | 3/16 | 1/4 | .012 | 2 | .166 | .562 | 2 | ALTIN | 0.0230 | CYLINDRICAL |
| N14005 | SN200R-0.188-G2-H023.0-Z2 | 3/16 | 1/4 | .012 | 2-1/2 | .166 | .937 | 2 | ALTIN | 0.0230 | CYLINDRICAL |
| N14006 | SN200R-0.188-J3-H023.0-Z2 | 3/16 | 1/4 | .012 | 3 | .166 | 1.313 | 2 | ALTIN | 0.0230 | CYLINDRICAL |
| N14009 | SN200R-0.250-E1-H032.0-Z2 | 1/4 | 1/4 | .014 | 2-1/2 | .218 | .750 | 2 | ALTIN | 0.0322 | CYLINDRICAL |
| N14012 | SN200R-0.250-E2-H032.0-Z2 | 1/4 | 1/4 | .014 | 3 | .218 | 1.250 | 2 | ALTIN | 0.0322 | CYLINDRICAL |
| N14013 | SN200R-0.250-J3-H032.0-Z2 | 1/4 | 1/4 | .014 | 3-1/2 | .218 | 1.750 | 2 | ALTIN | 0.0322 | CYLINDRICAL |
| N14016 | SN200R-0.313-G1-H037.0-Z2 | 5/16 | 3/8 | .016 | 2-1/2 | .273 | .938 | 2 | ALTIN | 0.0373 | CYLINDRICAL |
| N14017 | SN200R-0.313-G2-H037.0-Z2 | 5/16 | 3/8 | .016 | 3-1/2 | .273 | 1.563 | 2 | ALTIN | 0.0373 | CYLINDRICAL |
| N14018 | SN200R-0.313-J3-H037.0-Z2 | 5/16 | 3/8 | .016 | 4 | .273 | 2.188 | 2 | ALTIN | 0.0373 | CYLINDRICAL |
| N14023 | SN200R-0.375-E1-H043.0-Z2 | 3/8 | 3/8 | .018 | 3 | .329 | 1.125 | 2 | ALTIN | 0.0432 | CYLINDRICAL |
| N14024 | SN200R-0.375-E2-H043.0-Z2 | 3/8 | 3/8 | .018 | 3-1/2 | .329 | 1.875 | 2 | ALTIN | 0.0432 | CYLINDRICAL |
| N14025 | SN200R-0.375-J3-H043.0-Z2 | 3/8 | 3/8 | .018 | 4-1/2 | .329 | 2.625 | 2 | ALTIN | 0.0432 | CYLINDRICAL |
| N14029 | SN200R-0.500-E1-H061.0-Z2 | 1/2 | 1/2 | .020 | 3-1/2 | .444 | 1.500 | 2 | ALTIN | 0.0614 | CYLINDRICAL |
| N14032 | SN200R-0.500-E2-H061.0-Z2 | 1/2 | 1/2 | .020 | 4-1/2 | .444 | 2.500 | 2 | ALTIN | 0.0614 | CYLINDRICAL |
| N14033 | SN200R-0.500-J3-H061.0-Z2 | 1/2 | 1/2 | .020 | 6 | .444 | 3.500 | 2 | ALTIN | 0.0614 | CYLINDRICAL |

DISCOUNT CODE D43

SN400R

| | | | |
|---------------|--|--|--------------------|
| SOLID CARBIDE | | | NON CENTER CUTTING |
|---------------|--|--|--------------------|



- 3, 5 x Diameter of reach
 - Defined radius (rp)
 - Wide range of materials including Steels (<52 Rc), Stainless Steels, Titanium, and Cast Iron
 - Face, slot, and plunge milling
 - Long reach applications
 - Deep cavity milling
- Cutting Data - Page 114-118
 - Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N13995 | SN400R-0.125-G1-H015.0-Z4 | 1/8 | 1/4 | .008 | 2 | .109 | .375 | 4 | ALTIN | 0.0148 | CYLINDRICAL |
| N13996 | SN400R-0.125-G2-H015.0-Z4 | 1/8 | 1/4 | .008 | 2-1/2 | .109 | .625 | 4 | ALTIN | 0.0148 | CYLINDRICAL |
| N14002 | SN400R-0.156-G1-H020.0-Z4 | 5/32 | 1/4 | .010 | 2 | .136 | .469 | 4 | ALTIN | 0.0200 | CYLINDRICAL |
| N14003 | SN400R-0.156-G2-H020.0-Z4 | 5/32 | 1/4 | .010 | 2-1/2 | .136 | .781 | 4 | ALTIN | 0.0200 | CYLINDRICAL |
| N14007 | SN400R-0.188-G1-H023.0-Z4 | 3/16 | 1/4 | .012 | 2 | .166 | .562 | 4 | ALTIN | 0.0230 | CYLINDRICAL |
| N14008 | SN400R-0.188-G2-H023.0-Z4 | 3/16 | 1/4 | .012 | 2-1/2 | .166 | .937 | 4 | ALTIN | 0.0230 | CYLINDRICAL |
| N14014 | SN400R-0.250-E1-H032.0-Z4 | 1/4 | 1/4 | .014 | 2-1/2 | .218 | .750 | 4 | ALTIN | 0.0322 | CYLINDRICAL |
| N14015 | SN400R-0.250-E2-H032.0-Z4 | 1/4 | 1/4 | .014 | 3 | .218 | 1.250 | 4 | ALTIN | 0.0322 | CYLINDRICAL |
| N14019 | SN400R-0.313-G1-H037.0-Z4 | 5/16 | 3/8 | .016 | 2-1/2 | .273 | .938 | 4 | ALTIN | 0.0373 | CYLINDRICAL |
| N14022 | SN400R-0.313-G2-H037.0-Z4 | 5/16 | 3/8 | .016 | 3-1/2 | .273 | 1.563 | 4 | ALTIN | 0.0373 | CYLINDRICAL |
| N14026 | SN400R-0.375-E1-H043.0-Z4 | 3/8 | 3/8 | .018 | 3 | .329 | 1.125 | 4 | ALTIN | 0.0432 | CYLINDRICAL |
| N14028 | SN400R-0.375-E2-H043.0-Z4 | 3/8 | 3/8 | .018 | 3-1/2 | .329 | 1.875 | 4 | ALTIN | 0.0432 | CYLINDRICAL |
| N14034 | SN400R-0.500-E1-H061.0-Z4 | 1/2 | 1/2 | .020 | 3-1/2 | .444 | 1.500 | 4 | ALTIN | 0.0614 | CYLINDRICAL |
| N14036 | SN400R-0.500-E2-H061.0-Z4 | 1/2 | 1/2 | .020 | 4-1/2 | .444 | 2.500 | 4 | ALTIN | 0.0614 | CYLINDRICAL |

SN500R

| | | | |
|---------------|--|--|--------------------|
| SOLID CARBIDE | | | NON CENTER CUTTING |
|---------------|--|--|--------------------|



- 3 x Diameter of reach
 - Defined radius (rp)
 - Wide range of materials including Steels (<52 Rc), Stainless Steels, Titanium, and Cast Iron
 - Face, slot, and plunge milling
 - Long reach applications
 - Deep cavity milling
- Cutting Data - Page 114-118
 - Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N14027 | SN500R-0.375-E1-H043.0-Z5 | 3/8 | 3/8 | .018 | 3 | .329 | 1.125 | 5 | ALTIN | 0.0432 | CYLINDRICAL |
| N14035 | SN500R-0.500-E1-H061.0-Z5 | 1/2 | 1/2 | .020 | 3-1/2 | .444 | 1.500 | 5 | ALTIN | 0.0614 | CYLINDRICAL |

CUTTING DATA -SN200R, SN400R, SN500R SLOT MILLING - START VALUES

| | | SLOT MILLING | | | | | | | | | | | | | |
|-----------|------------------|----------------------|---------------------------|-------------|-------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _e (Max) | v _c (sf / min) | | Zn = 2 | | | | | | | | | | |
| | | | | | 1/16 | 3/32 | 1/8 | 5/32 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | | |
| P | M/A/D 1 - 2 | 1.00 x DCX | 984 | n [rev/min] | 60157 | 40105 | 30079 | 24062 | 20052 | 15039 | 12031 | 10026 | 7520 | | |
| | | | | fz [in] | 0.0021 | 0.0031 | 0.0041 | 0.0052 | 0.0062 | 0.0083 | 0.0103 | 0.0124 | 0.0165 | | |
| | | | 820 | 1148 | vf [in/min] | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | |
| | | M/A/D 3 - 4 | 1.00 x DCX | 738 | n [rev/min] | 45118 | 30079 | 22559 | 18047 | 15039 | 11280 | 9024 | 7520 | 5640 | |
| | | | | | fz [in] | 0.0019 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 | |
| | | | 656 | 820 | vf [in/min] | 169 | 169 | 169 | 169 | 169 | 169 | 169 | 169 | 169 | |
| | M/A/D 5 - 6 | 1.00 x DCX | 574 | n [rev/min] | 35092 | 23395 | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | | |
| | | | | fz [in] | 0.0017 | 0.0025 | 0.0034 | 0.0042 | 0.0051 | 0.0068 | 0.0084 | 0.0101 | 0.0135 | | |
| | | 492 | 656 | vf [in/min] | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | 118 | | |
| | H | M/A/D 7a | 1.00 x DCX | 312 | n [rev/min] | 19050 | 12700 | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 | |
| | | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | |
| | | | | 262 | 361 | vf [in/min] | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 |
| M | | | E/M/A 8 - 9 | 1.00 x DCX | 410 | n [rev/min] | 25066 | 16710 | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 |
| | | | | | | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 |
| | | | | | 361 | 459 | vf [in/min] | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
| K | E/M/A 12 - 13 | 1.00 x DCX | 574 | n [rev/min] | 35092 | 23395 | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | | |
| | | | | fz [in] | 0.0019 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 | | |
| | | | 492 | 656 | vf [in/min] | 132 | 132 | 132 | 132 | 132 | 132 | 132 | 132 | 132 | |
| | | E/M/A 14 - 15 | 1.00 x DCX | 410 | n [rev/min] | 25066 | 16710 | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | |
| | | | | | fz [in] | 0.0017 | 0.0025 | 0.0034 | 0.0042 | 0.0051 | 0.0068 | 0.0084 | 0.0101 | 0.0135 | |
| | | | 328 | 492 | vf [in/min] | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | |
| S | E 19 | 1.00 x DCX | 164 | n [rev/min] | 10026 | 6684 | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | | |
| | | | | fz [in] | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| | | | 131 | 197 | vf [in/min] | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | |
| | | E 20 | 1.00 x DCX | 164 | n [rev/min] | 10026 | 6684 | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | |
| | | | | | fz [in] | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | |
| | | | 131 | 197 | vf [in/min] | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | |
| | E 21 | 1.00 x DCX | 98 | n [rev/min] | 6016 | 4010 | 3008 | 2406 | 2005 | 1504 | 1203 | 1003 | 752 | | |
| | | | | fz [in] | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| | | 66 | 131 | vf [in/min] | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | | |
| | E 22 | 1.00 x DCX | 377 | n [rev/min] | 23060 | 15374 | 11530 | 9224 | 7687 | 5765 | 4612 | 3843 | 2883 | | |
| | | | | fz [in] | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| | | 328 | 427 | vf [in/min] | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | | |
| | | | | | ap max** | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 | 0.0080 | 0.0090 | 0.0100 | |

**Reduce APMX 20% and Feed per tooth 15% when using 5 x D version

**Reduce APMX 40% and Feed per tooth 30% when using 7 x D version

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA -SN200R, SN400R, SN500R SLOT MILLING - START VALUES

| ISO GROUP | SMG | a _e (Max) | v _c (sf / min) | SLOT MILLING | | | | | | | | | | | |
|-----------|------------------|----------------------|---------------------------|--------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| | | | | Zn = 4 | | | | | | | | | | Zn = 5 | |
| | | | | 1/8 | 5/32 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 3/8 | 1/2 | | | |
| P | M/A/D 1 - 2 | 1.00 x DCX | 984 | n [rev/min] | 30079 | 24062 | 20052 | 15039 | 12031 | 10026 | 7520 | 10026 | 7520 | | |
| | | | | fz [in] | 0.0041 | 0.0052 | 0.0062 | 0.0083 | 0.0103 | 0.0124 | 0.0165 | 0.0124 | 0.0165 | | |
| | | | 820 | 1148 | vf [in/min] | 496 | 496 | 496 | 496 | 496 | 496 | 496 | 620 | 620 | |
| | | 1.00 x DCX | 738 | n [rev/min] | 22559 | 18047 | 15039 | 11280 | 9024 | 7520 | 5640 | 7520 | 5640 | | |
| | | | | fz [in] | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 | 0.0113 | 0.0150 | | |
| | | | 656 | 820 | vf [in/min] | 338 | 338 | 338 | 338 | 338 | 338 | 338 | 423 | 423 | |
| | M/A/D 3 - 4 | 1.00 x DCX | 574 | n [rev/min] | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | 5849 | 4386 | | |
| | | | | fz [in] | 0.0034 | 0.0042 | 0.0051 | 0.0068 | 0.0084 | 0.0101 | 0.0135 | 0.0101 | 0.0135 | | |
| | | | 492 | 656 | vf [in/min] | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 296 | 296 | |
| | | M/A/D 5 - 6 | 1.00 x DCX | 312 | n [rev/min] | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 | 3175 | 2381 | |
| | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | |
| | | | 262 | 361 | vf [in/min] | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 143 | 143 | |
| H | M/A/D 7a | 1.00 x DCX | 312 | n [rev/min] | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 | 3175 | 2381 | | |
| | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | | |
| | | | 262 | 361 | vf [in/min] | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 143 | 143 | |
| | | 1.00 x DCX | 410 | n [rev/min] | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | 4178 | 3133 | | |
| | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | | |
| | | | 361 | 459 | vf [in/min] | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 188 | 188 | |
| M | E/M/A 8 - 9 | 1.00 x DCX | 312 | n [rev/min] | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 | 3175 | 2381 | | |
| | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | | |
| | | | 262 | 361 | vf [in/min] | 114 | 114 | 114 | 114 | 114 | 114 | 114 | 143 | 143 | |
| | | 1.00 x DCX | 574 | n [rev/min] | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | 5849 | 4386 | | |
| | | | | fz [in] | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 | 0.0113 | 0.0150 | | |
| | | | 492 | 656 | vf [in/min] | 263 | 263 | 263 | 263 | 263 | 263 | 263 | 329 | 329 | |
| K | E/M/A 12 - 13 | 1.00 x DCX | 410 | n [rev/min] | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | 4178 | 3133 | | |
| | | | | fz [in] | 0.0034 | 0.0042 | 0.0051 | 0.0068 | 0.0084 | 0.0101 | 0.0135 | 0.0101 | 0.0135 | | |
| | | | 328 | 492 | vf [in/min] | 169 | 169 | 169 | 169 | 169 | 169 | 169 | 211 | 211 | |
| | | 1.00 x DCX | 164 | n [rev/min] | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | 1671 | 1253 | | |
| | | | | fz [in] | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | 0.0068 | 0.0090 | | |
| | | | 131 | 197 | vf [in/min] | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 56 | 56 | |
| S | E 19 | 1.00 x DCX | 164 | n [rev/min] | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | 1671 | 1253 | | |
| | | | | fz [in] | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | 0.0068 | 0.0090 | | |
| | | | 131 | 197 | vf [in/min] | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 56 | 56 | |
| | | 1.00 x DCX | 164 | n [rev/min] | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | 1671 | 1253 | | |
| | | | | fz [in] | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | 0.0068 | 0.0090 | | |
| | | | 131 | 197 | vf [in/min] | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 56 | 56 | |
| | E 20 | 1.00 x DCX | 98 | n [rev/min] | 3008 | 2406 | 2005 | 1504 | 1203 | 1003 | 752 | 1003 | 752 | | |
| | | | | fz [in] | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | 0.0068 | 0.0090 | | |
| | | | 66 | 131 | vf [in/min] | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 34 | 34 | |
| | | 1.00 x DCX | 377 | n [rev/min] | 11530 | 9224 | 7687 | 5765 | 4612 | 3843 | 2883 | 3843 | 2883 | | |
| | | | | fz [in] | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | 0.0068 | 0.0090 | | |
| | | | 328 | 427 | vf [in/min] | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 130 | 130 | |

**Reduce APMX 20% and Feed per tooth 15% when using 5 x D version
 **Reduce APMX 40% and Feed per tooth 30% when using 7 x D version

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_f/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - SN200R, SN400R, SN500R SIDE MILLING - START VALUES

| ISO GROUP | SMG | a _e (Max) | v _c (sf / min) | SIDE MILLING | | | | | | | | | | | | |
|-----------|----------------|----------------------|---------------------------|----------------|-------------|------------|------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|
| | | | | Zn = 2 | | | | | | | | | | | | |
| | | | | 1/16 | 3/32 | 1/8 | 5/32 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | | | | |
| P | M/A/D 1 - 2 | 0.30 x DCX | 984 | n [rev/min] | 60157 | 40105 | 30079 | 24062 | 20052 | 15039 | 12031 | 10026 | 7520 | | | |
| | | | | fz [in] | 0.0034 | 0.0052 | 0.0069 | 0.0086 | 0.0103 | 0.0138 | 0.0172 | 0.0206 | 0.0275 | | | |
| | | | 820 | 1148 | vf [in/min] | 414 | 414 | 414 | 414 | 414 | 414 | 414 | 414 | 414 | | |
| | | 0.30 x DCX | 738 | ap max** | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 | 0.0140 | 0.0160 | 0.0180 | 0.0200 | | | |
| | | | | n [rev/min] | 45118 | 30079 | 22559 | 18047 | 15039 | 11280 | 9024 | 7520 | 5640 | | | |
| | | | 656 | 820 | fz [in] | 0.0031 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0250 | | |
| | H | M/A/D 7a | 0.30 x DCX | 312 | vf [in/min] | 282 | 282 | 282 | 282 | 282 | 282 | 282 | 282 | 282 | | |
| | | | | | ap max** | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 | 0.0140 | 0.0160 | 0.0180 | 0.0200 | | |
| | | | | 574 | n [rev/min] | 35092 | 23395 | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | | |
| | | | M | E/M/A 8 - 9 | 0.30 x DCX | 410 | fz [in] | 0.0028 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0113 | 0.0141 | 0.0169 | 0.0225 |
| | | | | | | | 492 | 656 | vf [in/min] | 197 | 197 | 197 | 197 | 197 | 197 | 197 |
| | | | | | | 0.30 x DCX | 312 | ap max** | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 | 0.0140 | 0.0160 | 0.0180 |
| 262 | | 361 | | | n [rev/min] | | | 19050 | 12700 | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 |
| K | | E/M/A 12 - 13 | | | 0.30 x DCX | | 410 | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 |
| | | | | | | 361 | | 459 | vf [in/min] | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | | | | 0.30 x DCX | | 459 | ap max** | 0.0032 | 0.0048 | 0.0064 | 0.0080 | 0.0096 | 0.0112 | 0.0128 | 0.0144 | 0.0160 |
| | | | | | 262 | | 361 | n [rev/min] | 28073 | 18716 | 14037 | 11229 | 9358 | 7018 | 5615 | 4679 |
| | | | | | S | E 19 | 0.30 x DCX | 164 | fz [in] | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 |
| | 492 | | | 656 | | | | | vf [in/min] | 175 | 175 | 175 | 175 | 175 | 175 | 175 |
| | 0.30 x DCX | 410 | | ap max** | | | | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 | 0.0140 | 0.0160 | 0.0180 | 0.0200 |
| | | | | 328 | | | 492 | n [rev/min] | 25066 | 16710 | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 |
| | | E | 20 | 0.30 x DCX | | | 164 | fz [in] | 0.0019 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 |
| | 131 | | | | | | | 197 | vf [in/min] | 94 | 94 | 94 | 94 | 94 | 94 | 94 |
| | 0.30 x DCX | | | | | 98 | ap max** | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 | 0.0140 | 0.0160 | 0.0180 | 0.0200 |
| | | | | 66 | | | 131 | n [rev/min] | 10026 | 6684 | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 |
| A | | | | 21 | | 0.30 x DCX | 164 | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | 131 | | | | | | | 197 | vf [in/min] | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | 0.30 x DCX | | 98 | | | | ap max** | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 | 0.0080 | 0.0090 | 0.0100 |
| | | | | | | 66 | 131 | n [rev/min] | 6016 | 4010 | 3008 | 2406 | 2005 | 1504 | 1203 | 1003 |
| | | | D | | 22 | 0.30 x DCX | 377 | fz [in] | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | 131 | | | | | | | 197 | vf [in/min] | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| | 0.30 x DCX | | | 98 | | | ap max** | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 | 0.0080 | 0.0090 | 0.0100 |
| | | | | | | 66 | 131 | n [rev/min] | 23060 | 15374 | 11530 | 9224 | 7687 | 5765 | 4612 | 3843 |

**Reduce APMX 20% and Feed per tooth 15% when using 5 x D version
 **Reduce APMX 40% and Feed per tooth 30% when using 7 x D version

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_f/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA -SN200R, SN400R, SN500R SIDE MILLING - START VALUES

| ISO GROUP | SMG | a _e (Max) | v _c (sf / min) | SIDE MILLING | | | | | | | | | | | | |
|-----------|------------------|----------------------|---------------------------|------------------|-------------|-------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Zn = 4 | | | | | | | | Zn = 5 | | | |
| | | | | | 1/8 | 5/32 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 3/8 | 1/2 | | | |
| P | M/A/D 1 - 2 | 0.30 x DCX | 984 | n [rev/min] | 30079 | 24062 | 20052 | 15039 | 12031 | 10026 | 7520 | 10026 | 7520 | | | |
| | | | | fz [in] | 0.0069 | 0.0086 | 0.0103 | 0.0138 | 0.0172 | 0.0206 | 0.0275 | 0.0206 | 0.0275 | | | |
| | | | 820 | 1148 | vf [in/min] | 827 | 827 | 827 | 827 | 827 | 827 | 827 | 1034 | 1034 | | |
| | M/A/D 3 - 4 | 0.30 x DCX | 738 | n [rev/min] | 22559 | 18047 | 15039 | 11280 | 9024 | 7520 | 5640 | 7520 | 5640 | | | |
| | | | | fz [in] | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0250 | 0.0188 | 0.0250 | | | |
| | | | 656 | 820 | vf [in/min] | 564 | 564 | 564 | 564 | 564 | 564 | 564 | 705 | 705 | | |
| | | | M/A/D 5 - 6 | 0.30 x DCX | 574 | n [rev/min] | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | 5849 | 4386 | |
| | | | | | | fz [in] | 0.0056 | 0.0070 | 0.0084 | 0.0113 | 0.0141 | 0.0169 | 0.0225 | 0.0169 | 0.0225 | |
| | | | H | M/A/D 7a | 0.30 x DCX | 312 | n [rev/min] | 9525 | 7620 | 6350 | 4762 | 3810 | 3175 | 2381 | 3175 | 2381 |
| fz [in] | 0.0050 | 0.0063 | | | | | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0200 | 0.0150 | 0.0200 | | | |
| 262 | 361 | vf [in/min] | | | | 190 | 190 | 190 | 190 | 190 | 190 | 190 | 238 | 238 | | |
| M | E/M/A 8 - 9 | 0.30 x DCX | | | | 410 | n [rev/min] | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | 4178 | 3133 |
| | | | | | | | fz [in] | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0200 | 0.0150 | 0.0200 |
| | | | | | | 361 | 459 | vf [in/min] | 251 | 251 | 251 | 251 | 251 | 251 | 251 | 313 |
| M | E/M/A 10 - 11 | 0.30 x DCX | | | | 459 | n [rev/min] | 14037 | 11229 | 9358 | 7018 | 5615 | 4679 | 3509 | 4679 | 3509 |
| | | | | | | | fz [in] | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0200 | 0.0150 | 0.0200 |
| | | | | | | 262 | 361 | vf [in/min] | 281 | 281 | 281 | 281 | 281 | 281 | 281 | 351 |
| K | E/M/A 12 - 13 | 0.30 x DCX | 574 | n [rev/min] | 17546 | 14036 | 11697 | 8773 | 7018 | 5849 | 4386 | 5849 | 4386 | | | |
| | | | | fz [in] | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0200 | 0.0150 | 0.0200 | | | |
| | | | 492 | 656 | vf [in/min] | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 439 | 439 | | |
| | | | K | E/M/A 14 - 15 | 0.30 x DCX | 410 | n [rev/min] | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | 4178 | 3133 |
| | | | | | | | fz [in] | 0.0038 | 0.0047 | 0.0056 | 0.0075 | 0.0094 | 0.0113 | 0.0150 | 0.0113 | 0.0150 |
| | | | | | | 328 | 492 | vf [in/min] | 188 | 188 | 188 | 188 | 188 | 188 | 188 | 235 |
| | | | S | E 19 | 0.30 x DCX | 164 | n [rev/min] | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | 1671 | 1253 |
| | | | | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 |
| | | | | | | 131 | 197 | vf [in/min] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 75 |
| E 20 | 0.30 x DCX | 164 | | n [rev/min] | 5013 | 4010 | 3342 | 2507 | 2005 | 1671 | 1253 | 1671 | 1253 | | | |
| | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | | | |
| | | 131 | | 197 | vf [in/min] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 75 | 75 | | |
| E 21 | 0.30 x DCX | 98 | | n [rev/min] | 3008 | 2406 | 2005 | 1504 | 1203 | 1003 | 752 | 1003 | 752 | | | |
| | | | | fz [in] | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 | 0.0120 | 0.0090 | 0.0120 | | | |
| | | 66 | | 131 | vf [in/min] | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 45 | 45 | | |
| E 22 | 0.30 x DCX | 377 | | n [rev/min] | 11530 | 9224 | 7687 | 5765 | 4612 | 3843 | 2883 | 3843 | 2883 | | | |
| | | | | fz [in] | 0.0044 | 0.0055 | 0.0066 | 0.0088 | 0.0109 | 0.0131 | 0.0175 | 0.0131 | 0.0175 | | | |
| | | 328 | | 427 | vf [in/min] | 202 | 202 | 202 | 202 | 202 | 202 | 202 | 252 | 252 | | |
| | | | | ap max** | 0.0040 | 0.0050 | 0.0060 | 0.0070 | 0.0080 | 0.0090 | 0.0100 | 0.0090 | 0.0100 | | | |

**Reduce APMX 20% and Feed per tooth 15% when using 5 x D version

**Reduce APMX 40% and Feed per tooth 30% when using 7 x D version

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - SN200R PLUNGE MILLING - START VALUES

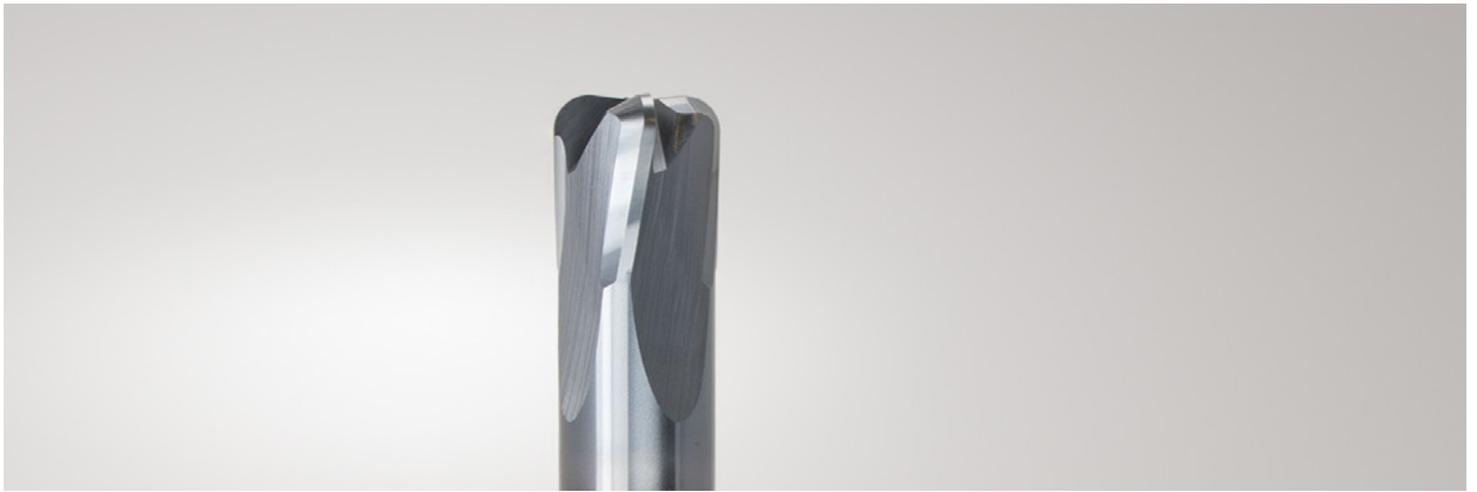
| ISO GROUP | SMG | a _e (Max) | v _c (sf / min) | PLUNGE MILLING | | | | | | | | | | |
|------------------|------------------|----------------------|---------------------------|----------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | Zn = 2 | | | | | | | | | | |
| | | | | 1/16 | 3/32 | 1/8 | 5/32 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | | |
| P | M/A/D 1 - 2 | 0.30 x DCX | 699 | n [rev/min] | 42712 | 28475 | 21356 | 17084 | 14237 | 10678 | 8542 | 7119 | 5339 | |
| | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | |
| | | | 576 | 822 | vf [in/min] | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| | | M/A/D 3 - 4 | 0.30 x DCX | 518 | n [rev/min] | 31683 | 21122 | 15841 | 12673 | 10561 | 7921 | 6337 | 5280 | 3960 |
| | | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | | 459 | 577 | vf [in/min] | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | M/A/D 5 - 6 | 0.30 x DCX | 410 | n [rev/min] | 25066 | 16710 | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 | |
| | | | | fz [in] | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | |
| | | | 361 | 459 | vf [in/min] | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | H | M/A/D 7a | 0.30 x DCX | 213 | n [rev/min] | 13034 | 8689 | 6517 | 5213 | 4345 | 3259 | 2607 | 2172 | 1629 |
| | | | | | fz [in] | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 |
| | | | | 180 | 246 | vf [in/min] | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| E/M/A 8 - 9 | | | 0.30 x DCX | 289 | n [rev/min] | 17646 | 11764 | 8823 | 7058 | 5882 | 4412 | 3529 | 2941 | 2206 |
| | | | | | fz [in] | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 |
| | | | | 246 | 331 | vf [in/min] | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| E/M/A 10 - 11 | | 0.30 x DCX | 246 | n [rev/min] | 15039 | 10026 | 7520 | 6016 | 5013 | 3760 | 3008 | 2507 | 1880 | |
| | | | | fz [in] | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | |
| | | | 180 | 246 | vf [in/min] | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| K | | E/M/A 12 - 13 | 0.30 x DCX | 410 | n [rev/min] | 25066 | 16710 | 12533 | 10026 | 8355 | 6266 | 5013 | 4178 | 3133 |
| | | | | | fz [in] | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 |
| | | | | 361 | 459 | vf [in/min] | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | E/M/A 14 - 15 | 0.30 x DCX | 295 | n [rev/min] | 18047 | 12031 | 9024 | 7219 | 6016 | 4512 | 3609 | 3008 | 2256 | |
| | | | | fz [in] | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | 230 | 361 | vf [in/min] | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| S | E 19 | 0.30 x DCX | 115 | n [rev/min] | 7018 | 4679 | 3509 | 2807 | 2339 | 1755 | 1404 | 1170 | 877 | |
| | | | | fz [in] | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | 98 | 131 | vf [in/min] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | | E 20 | 0.30 x DCX | 115 | n [rev/min] | 7018 | 4679 | 3509 | 2807 | 2339 | 1755 | 1404 | 1170 | 877 |
| | | | | | fz [in] | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 98 | 131 | vf [in/min] | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | E 21 | 0.30 x DCX | 75 | n [rev/min] | 4612 | 3075 | 2306 | 1845 | 1537 | 1153 | 922 | 769 | 577 | |
| | | | | fz [in] | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | 49 | 102 | vf [in/min] | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | E 22 | 0.30 x DCX | 262 | n [rev/min] | 16042 | 10695 | 8021 | 6417 | 5347 | 4010 | 3208 | 2674 | 2005 | |
| | | | | fz [in] | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | |
| | | | 230 | 295 | vf [in/min] | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | | | | ap=pd*** | 0.1250 | 0.1875 | 0.2500 | 0.3125 | 0.3750 | 0.5000 | 0.6250 | 0.7500 | 1.0000 | |

***pd: plunge depth

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



MOLD & DIE

MZN410R & MZN510R

The MZN410R and MZN510R are designed to maximize productivity in hardened steels and superalloys. These end mills feature optimized substrate, geometry and coating to offer superior performance and process reliability.

These high feed end mills are available in 1/8" to 5/8" diameters, in four or five flute options, depending on the diameter. This range also features a short and long reach option to fit various work piece requirements.

The MZN410R and MZN510R are effective in hardened steels, cast irons and nickel-based super alloys. A typical application for this end mill is when machining hardened tool steels used in mold & die components.

ADVANTAGES OF HIGH FEED MILLING

High Feed Milling (HFM) can reduce machining times and cut costs allowing one tool to be used in a wide range of operations & strategies. Reduce component costs by maximizing material removal rates and reduce processing time by allowing close-to-profile pocketing of 90° walls. HFM can also minimize semi-finishing operations, thus further increasing efficiency.

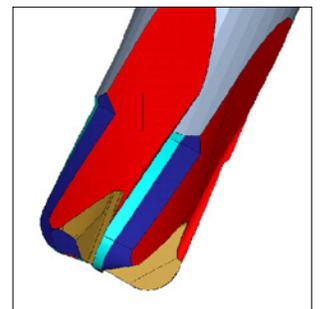
The open end tooth design provides superior chip evacuation. This provides process reliability because chips are effectively removed from the cutting zone and not being "re-cut" which leads to edge chipping.

PRODUCT OVERVIEW

- End tooth design - Improved surface quality
- Open flute cavity and relief length - Improved chip evacuation
- Full form radius - More stability
- Edge preparation - Increases tool life

THE NIAGARA CUTTER BENEFIT

- Added strength to the cutting edge
- Improved process reliability and performance due to enhanced chip evacuation
- Allows for machining to near net shape on forms and corners
- Strengthens and protects the cutting edge with improved wear resistance



MZN410R / MZN510R

SOLID
CARBIDE



CENTER
CUTTING



- Strong end tooth design
- Hardened steels (>48 Rc) and nickel based super alloys such as Inconel
- Edge preparation for increased cutting edge strength
- 2° back taper with reduced neck diameter for workpiece clearance
- Shrink fit first choice as toolholder
- Cutting Data - Page 121-122
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|-------------|
| N00305 | MZN410R-0.125-J1-R030.0-Z4 | 1/8 | 1/4 | 0.030 | 2-1/2 | .112 | .375 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N00001 | MZN410R-0.125-J2-R030.0-Z4 | 1/8 | 1/4 | 0.030 | 2-1/2 | .112 | .625 | 4 | ALTIN | 0.030 | CYLINDRICAL |
| N00002 | MZN410R-0.188-J1-R050.0-Z4 | 3/16 | 1/4 | 0.050 | 2-1/2 | .172 | .562 | 4 | ALTIN | 0.050 | CYLINDRICAL |
| N00003 | MZN410R-0.188-J2-R050.0-Z4 | 3/16 | 1/4 | 0.050 | 2-1/2 | .172 | .937 | 4 | ALTIN | 0.050 | CYLINDRICAL |
| N00004 | MZN410R-0.250-E1-R060.0-Z4 | 1/4 | 1/4 | 0.060 | 2-1/2 | .230 | .750 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N00005 | MZN410R-0.250-E2-R060.0-Z4 | 1/4 | 1/4 | 0.060 | 2-1/2 | .230 | 1.250 | 4 | ALTIN | 0.060 | CYLINDRICAL |
| N00006 | MZN410R-0.313-G1-R080.0-Z4 | 5/16 | 3/8 | 0.080 | 3 | .290 | .750 | 4 | ALTIN | 0.080 | CYLINDRICAL |
| N00007 | MZN410R-0.313-G2-R080.0-Z4 | 5/16 | 3/8 | 0.080 | 3 | .290 | 1.250 | 4 | ALTIN | 0.080 | CYLINDRICAL |
| N00008 | MZN410R-0.375-E1-R080.0-Z4 | 3/8 | 3/8 | 0.080 | 3 | .348 | 1.125 | 4 | ALTIN | 0.080 | CYLINDRICAL |
| N00009 | MZN510R-0.375-E2-R080.0-Z5 | 3/8 | 3/8 | 0.080 | 3 | .348 | 1.125 | 5 | ALTIN | 0.080 | CYLINDRICAL |
| N00010 | MZN410R-0.375-E3-R080.0-Z4 | 3/8 | 3/8 | 0.080 | 3 | .348 | 1.875 | 4 | ALTIN | 0.080 | CYLINDRICAL |
| N00011 | MZN410R-0.500-E1-R120.0-Z4 | 1/2 | 1/2 | 0.120 | 4 | .468 | 1.500 | 4 | ALTIN | 0.120 | CYLINDRICAL |
| N00012 | MZN510R-0.500-E2-R120.0-Z5 | 1/2 | 1/2 | 0.120 | 4 | .468 | 1.500 | 5 | ALTIN | 0.120 | CYLINDRICAL |
| N00013 | MZN510R-0.625-E1-R120.0-Z5 | 5/8 | 5/8 | 0.120 | 4 | .584 | 1.875 | 5 | ALTIN | 0.120 | CYLINDRICAL |

DISCOUNT CODE D43

MZN410R / MZN510R - START VALUES

| SLOTTING | | | | | | | | | | | | | | |
|------------|----------------------|-----------------------------|---------------------|--------|----------------|-----------|-------------|--------|--------|--------|--------|-----------|--------|--------|
| ISO GROUP | SMG | $a_e \times D_c^2$ (max) | v_c (sf / min) | | | $Z_n = 4$ | | | | | | $Z_n = 5$ | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 1/2 | 5/8 |
| P | E / M / A 5 - 6 | 1.00 | 740 | | n (rev/min) | 22614 | 15076 | 11967 | 9046 | 7538 | 5654 | 4523 | 5654 | 4523 |
| | | | | | f_z (in) | 0.0031 | 0.0047 | 0.0059 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0125 | 0.0156 |
| | | | 690 - 790 | | v_f (in/min) | 283 | 283 | 283 | 283 | 283 | 283 | 283 | 353 | 353 |
| | | | | | max (a_p) | 0.0059 | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 |
| H | M / A / D 7a | 1.00 | 440 | | n (rev/min) | 13446 | 8964 | 7115 | 5379 | 4482 | 3362 | 2689 | 3362 | 2689 |
| | | | | | f_z (in) | 0.0031 | 0.0047 | 0.0059 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0125 | 0.0156 |
| | | | 390 - 490 | | v_f (in/min) | 168 | 168 | 168 | 168 | 168 | 168 | 168 | 210 | 210 |
| | | | | | max (a_p) | 0.0059 | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 |
| | M / A / D 7b | 1.00 | 230 | | n (rev/min) | 7029 | 4686 | 3719 | 2812 | 2343 | 1757 | 1406 | 1757 | 1406 |
| | | | | | f_z (in) | 0.0025 | 0.0038 | 0.0047 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0100 | 0.0125 |
| | | | 200 - 260 | | v_f (in/min) | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 88 | 88 |
| | | | | | max (a_p) | 0.0030 | 0.0039 | 0.0049 | 0.0069 | 0.0079 | 0.0089 | 0.0098 | 0.0108 | 0.0108 |
| K | E / M / A 12 - 13 | 1.00 | 570 | | n (rev/min) | 17419 | 11610 | 9220 | 6970 | 5810 | 4350 | 3480 | 4350 | 3480 |
| | | | | | f_z (in) | 0.0030 | 0.0045 | 0.0057 | 0.0075 | 0.0090 | 0.0120 | 0.0150 | 0.0120 | 0.0150 |
| | | | 490 - 660 | | v_f (in/min) | 209 | 209 | 209 | 209 | 209 | 209 | 209 | 261 | 261 |
| | max (a_p) | 0.0059 | | | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 | | |
| | E / M / A 14 - 15 | 1.00 | | | 410 | | n (rev/min) | 12530 | 8353 | 6630 | 5012 | 4177 | 3132 | 2506 |
| | | | f_z (in) | 0.0023 | | | 0.0034 | 0.0043 | 0.0056 | 0.0068 | 0.0090 | 0.0113 | 0.0090 | 0.0113 |
| 330 - 490 | | | v_f (in/min) | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 141 | 141 | | |
| | | max (a_p) | 0.0059 | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 | | | |
| | | S | E 21 | 1.00 | 100 | | n (rev/min) | 3056 | 2037 | 1617 | 1222 | 1019 | 764 | 611 |
| f_z (in) | 0.0017 | | | | | | 0.0026 | 0.0033 | 0.0042 | 0.0051 | 0.0070 | 0.0087 | 0.0070 | 0.0087 |
| 90 - 110 | | | | | v_f (in/min) | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 27 | 27 |
| | | | | | max (a_p) | 0.0038 | 0.0050 | 0.0070 | 0.0077 | 0.0100 | 0.0150 | 0.0150 | 0.0150 | 0.0150 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

MZN410R / MZN510R - START VALUES

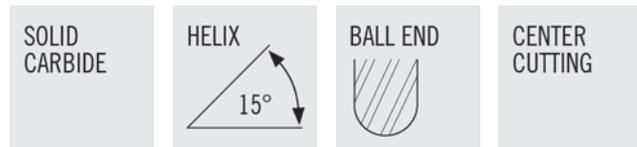
| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|----------------------|-----------------------------|---------------------|----------------|----------------|---------------|--------|--------|--------|--------|-----------|--------|--------|
| ISO GROUP | SMG | $a_e \times D_c^2$ (max) | v_c (sf / min) | | $Z_n = 4$ | | | | | | $Z_n = 5$ | | |
| | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 1/2 | 5/8 |
| P | E / M / A 5 - 6 | 0.30 | 740 | n (rev/min) | 22614 | 15076 | 11967 | 9046 | 7538 | 5654 | 4523 | 5654 | 4523 |
| | | | | | 790 | f_z (in) | 0.0050 | 0.0075 | 0.0094 | 0.0125 | 0.0150 | 0.0200 | 0.0250 |
| | | | 690 | v_f (in/min) | | | 452 | 452 | 452 | 452 | 452 | 452 | 452 |
| | | | | | 790 | max (a_p) | 0.0047 | 0.0063 | 0.0079 | 0.0110 | 0.0126 | 0.0142 | 0.0157 |
| H | M / A / D 7a | 0.30 | 480 | n (rev/min) | | | 14669 | 9779 | 7762 | 5868 | 4890 | 3667 | 2934 |
| | | | | | 520 | f_z (in) | 0.0050 | 0.0075 | 0.0094 | 0.0125 | 0.0150 | 0.0200 | 0.0250 |
| | | 430 | v_f (in/min) | 293 | | | 293 | 293 | 293 | 293 | 293 | 293 | 367 |
| | | | | 520 | max (a_p) | 0.0047 | 0.0063 | 0.0079 | 0.0110 | 0.0126 | 0.0142 | 0.0157 | 0.0173 |
| | M / A / D 7b | 0.30 | 260 | | | n (rev/min) | 7946 | 5297 | 4205 | 3178 | 2649 | 1986 | 1589 |
| | | | | 300 | f_z (in) | | 0.0038 | 0.0056 | 0.0071 | 0.0094 | 0.0113 | 0.0150 | 0.0188 |
| | | 230 | v_f (in/min) | | | 119 | 119 | 119 | 119 | 119 | 119 | 119 | 149 |
| | | | | 300 | max (a_p) | 0.0047 | 0.0063 | 0.0079 | 0.0110 | 0.0126 | 0.0142 | 0.0157 | 0.0173 |
| K | E / M / A 12 - 13 | 0.30 | 570 | | | n (rev/min) | 17419 | 11613 | 9218 | 6968 | 5806 | 4355 | 3484 |
| | | | | 660 | f_z (in) | | 0.0050 | 0.0075 | 0.0094 | 0.0125 | 0.0150 | 0.0200 | 0.0250 |
| | | 490 | v_f (in/min) | | | 348 | 348 | 348 | 348 | 348 | 348 | 348 | 435 |
| | 660 | | | max (a_p) | 0.0059 | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 |
| | | E / M / A 14 - 15 | 0.30 | | 410 | n (rev/min) | 12530 | 8353 | 6630 | 5012 | 4177 | 3132 | 2506 |
| | 490 | | | f_z (in) | | | 0.0038 | 0.0056 | 0.0071 | 0.0094 | 0.0113 | 0.0150 | 0.0188 |
| 330 | | | v_f (in/min) | | 188 | 188 | 188 | 188 | 188 | 188 | 188 | 235 | 235 |
| | 490 | max (a_p) | | 0.0059 | 0.0079 | 0.0098 | 0.0138 | 0.0157 | 0.0177 | 0.0197 | 0.0217 | 0.0217 | |
| S | | | E 21 | 0.30 | 100 | n (rev/min) | 3056 | 2037 | 1617 | 1222 | 1019 | 764 | 611 |
| | 110 | f_z (in) | | | | | 0.0026 | 0.0039 | 0.0049 | 0.0065 | 0.0078 | 0.0105 | 0.0130 |
| | | | | 90 | v_f (in/min) | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 40 |
| | 110 | max (a_p) | | | | 0.0038 | 0.0050 | 0.0070 | 0.0077 | 0.0100 | 0.0150 | 0.0150 | 0.0150 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

MB215 & MB215M

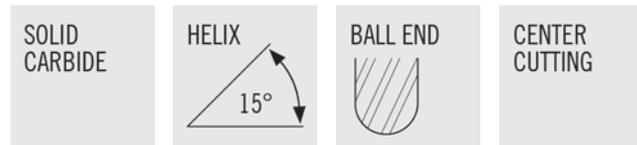


- Cylindrical Shank
- 7° Draft Angle
- Ideal for milling hardened mold and die steels up to 52HRc
- Rough and finish milling of contours and complex shapes

- Cutting Data MB215 - Page 125
- Tolerance Specs MB215 - Page 335
- Cutting Data MB215M - Page 125
- Tolerance Specs MB215M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|
| INCH - MB215 | | | | | | | | | |
| N76671 | MB215-0.063-G1-B.0-Z2 | 1/16 | 1/4 | 1/16 | 2-1/2 | .059 | 1/8 | 2 | ALTIN |
| N76673 | MB215-0.125-G1-B.0-Z2 | 1/8 | 1/4 | 1/8 | 3 | .121 | 1/4 | 2 | ALTIN |
| N76675 | MB215-0.250-E1-B.0-Z2 | 1/4 | 1/4 | 1/4 | 3 | .246 | 1/2 | 2 | ALTIN |
| N76677 | MB215-0.375-E1-B.0-Z2 | 3/8 | 3/8 | 3/8 | 3 | .367 | 3/4 | 2 | ALTIN |
| N76679 | MB215-0.500-E1-B.0-Z2 | 1/2 | 1/2 | 1/2 | 4 | .492 | 1 | 2 | ALTIN |
| METRIC - MB215M | | | | | | | | | |
| N76660 | MB215M-010-G1-B.0-Z2 | 1MM | 6MM | 1MM | 64MM | .9MM | 2MM | 2 | ALTIN |
| N76661 | MB215M-020-G1-B.0-Z2 | 2MM | 6MM | 2MM | 64MM | 1.9MM | 4MM | 2 | ALTIN |
| N76662 | MB215M-030-G1-B.0-Z2 | 3MM | 6MM | 3MM | 64MM | 2.9MM | 6MM | 2 | ALTIN |
| N76663 | MB215M-040-G1-B.0-Z2 | 4MM | 6MM | 4MM | 64MM | 3.9MM | 8MM | 2 | ALTIN |
| N76665 | MB215M-060-E1-B.0-Z2 | 6MM | 6MM | 6MM | 64MM | 5.9MM | 12MM | 2 | ALTIN |
| N76666 | MB215M-080-E1-B.0-Z2 | 8MM | 8MM | 8MM | 80MM | 7.8MM | 16MM | 2 | ALTIN |
| N76667 | MB215M-100-E1-B.0-Z2 | 10MM | 10MM | 10MM | 82MM | 9.8MM | 20MM | 2 | ALTIN |
| N76668 | MB215M-120-E1-B.0-Z2 | 12MM | 12MM | 12MM | 100MM | 11.8MM | 24MM | 2 | ALTIN |

MBZ215

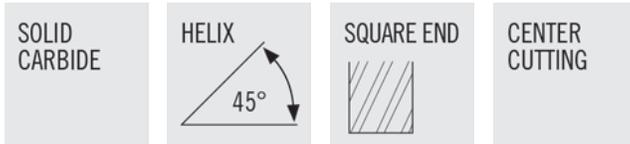


- Cylindrical Shank
- 7° Draft Angle
- Ideal for milling hardened mold and die steels up to 62HRc
- Rough and finish milling of contours and complex shapes

- Cutting Data - Page 126
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|
| N76691 | MBZ215-0.063-G1-B.0-Z2 | 1/16 | 1/4 | 1/16 | 2-1/2 | .059 | 1/8 | 2 | ALTIN |
| N76693 | MBZ215-0.125-G1-B.0-Z2 | 1/8 | 1/4 | 1/8 | 3 | .121 | 1/4 | 2 | ALTIN |
| N76695 | MBZ215-0.250-E1-B.0-Z2 | 1/4 | 1/4 | 1/4 | 3 | .246 | 1/2 | 2 | ALTIN |
| N76697 | MBZ215-0.375-E1-B.0-Z2 | 3/8 | 3/8 | 3/8 | 3 | .367 | 3/4 | 2 | ALTIN |
| N76699 | MBZ215-0.500-E1-B.0-Z2 | 1/2 | 1/2 | 1/2 | 4 | .492 | 1 | 2 | ALTIN |

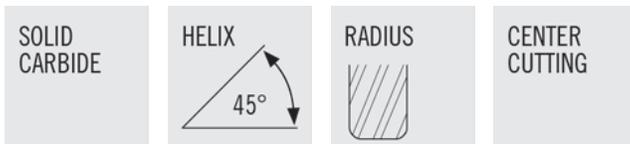
MZ645



- Cylindrical Shank
- Ideal for peripheral milling of hard steels up to 62HRc
- Cutting Data - Page 126
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|
| N76617 | MZ645-0.125-F3-S.0-Z6 | 1/8 | 1/4 | 3/8 | 3 | 6 | ALTIN |
| N76619 | MZ645-0.188-F3-S.0-Z6 | 3/16 | 1/4 | 1/2 | 3 | 6 | ALTIN |
| N76621 | MZ645-0.250-D3-S.0-Z6 | 1/4 | 1/4 | 5/8 | 3 | 6 | ALTIN |
| N76623 | MZ645-0.313-D2-S.0-Z6 | 5/16 | 5/16 | 3/4 | 3 | 6 | ALTIN |
| N76625 | MZ645-0.375-D3-S.0-Z6 | 3/8 | 3/8 | 1 | 3 | 6 | ALTIN |
| N76627 | MZ645-0.500-D2-S.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | 6 | ALTIN |

MZ645R



- Cylindrical Shank
- Ideal for peripheral milling of hard steels up to 62HRc
- Cutting Data - Page 126
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|
| N76616 | MZ645R-0.125-F3-R020.0-Z6 | 1/8 | 1/4 | 3/8 | 3 | 6 | ALTIN | 0.020 |
| N76618 | MZ645R-0.188-F3-R020.0-Z6 | 3/16 | 1/4 | 1/2 | 3 | 6 | ALTIN | 0.020 |
| N76620 | MZ645R-0.250-D3-R020.0-Z6 | 1/4 | 1/4 | 5/8 | 3 | 6 | ALTIN | 0.020 |
| N76622 | MZ645R-0.313-D2-R020.0-Z6 | 5/16 | 5/16 | 3/4 | 3 | 6 | ALTIN | 0.020 |
| N76624 | MZ645R-0.375-D3-R020.0-Z6 | 3/8 | 3/8 | 1 | 3 | 6 | ALTIN | 0.020 |
| N76626 | MZ645R-0.500-D2-R030.0-Z6 | 1/2 | 1/2 | 1-1/8 | 4 | 6 | ALTIN | 0.030 |

MB215 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | | |
| | | | | | | 1/32 | 1/16 | 3/32 | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 5 - 6 | 0.10 | 0.30 | 500 | n (rev/min) | 61120 | 30560 | 20373 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | | | f _z (in) | 0.00030 | 0.00059 | 0.00089 | 0.00119 | 0.00178 | 0.00238 | 0.00297 | 0.00356 | 0.00475 | 0.00594 | 0.00713 | 0.00950 |
| | | | | | v _f (in/min) | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 |
| H | M / A / D 7a (48>52HRc) | 0.05 | 0.20 | 450 | n (rev/min) | 55008 | 27504 | 18336 | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1719 |
| | | | | | f _z (in) | 0.00027 | 0.00054 | 0.00081 | 0.00108 | 0.00161 | 0.00215 | 0.00269 | 0.00323 | 0.00430 | 0.00538 | 0.00645 | 0.00860 |
| | | | | | v _f (in/min) | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 |

| SIDE MILLING - FINISHING | | | | | | | | | | | | | | | | | |
|--------------------------|-------------------------------|------|------|-----|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| P | E 5 - 6 | 0.10 | 0.15 | 500 | n (rev/min) | 61120 | 30560 | 20373 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | | | f _z (in) | 0.00030 | 0.00059 | 0.00089 | 0.00119 | 0.00178 | 0.00238 | 0.00297 | 0.00356 | 0.00475 | 0.00594 | 0.00713 | 0.00950 |
| | | | | | v _f (in/min) | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 |
| K | M / A / D 7a (48>52HRc) | 0.05 | 0.10 | 450 | n (rev/min) | 55008 | 27504 | 18336 | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1719 |
| | | | | | f _z (in) | 0.00027 | 0.00054 | 0.00081 | 0.00108 | 0.00161 | 0.00215 | 0.00269 | 0.00323 | 0.00430 | 0.00538 | 0.00645 | 0.00860 |
| | | | | | v _f (in/min) | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 |

MB215M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|--------------------------|-------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (m / min) | | Z _n = 2 | | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | |
| P | E 5 - 6 | 0.10 | 0.30 | 152 | n (rev/min) | 48380 | 24190 | 16130 | 12100 | 9680 | 8060 | 6050 | 4840 | 4030 | 3020 | |
| | | | | | f _z (mm) | 0.010 | 0.019 | 0.029 | 0.038 | 0.048 | 0.057 | 0.076 | 0.095 | 0.114 | 0.152 | |
| | | | | | v _f (mm/min) | 919 | 919 | 919 | 920 | 920 | 919 | 920 | 920 | 919 | 918 | |
| H | M / A / D 7a (48>52HRc) | 0.05 | 0.20 | 137 | n (rev/min) | 43610 | 21800 | 14540 | 10900 | 8720 | 7270 | 5450 | 4360 | 3630 | 2730 | |
| | | | | | f _z (mm) | 0.009 | 0.017 | 0.026 | 0.034 | 0.043 | 0.052 | 0.069 | 0.086 | 0.103 | 0.138 | |
| | | | | | v _f (mm/min) | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 749 | 751 | |

| SIDE MILLING - FINISHING | | | | | | | | | | | | | | | | |
|--------------------------|-------------------------------|------|------|-----|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| P | E 5 - 6 | 0.10 | 0.15 | 152 | n (rev/min) | 48380 | 24190 | 16130 | 12100 | 9680 | 8060 | 6050 | 4840 | 4030 | 3020 | |
| | | | | | f _z (mm) | 0.010 | 0.019 | 0.029 | 0.038 | 0.048 | 0.057 | 0.076 | 0.095 | 0.114 | 0.152 | |
| | | | | | v _f (mm/min) | 919 | 919 | 919 | 920 | 920 | 919 | 920 | 920 | 919 | 918 | |
| H | M / A / D 7a (48>52HRc) | 0.05 | 0.10 | 137 | n (rev/min) | 43610 | 21800 | 14540 | 10900 | 8720 | 7270 | 5450 | 4360 | 3630 | 2730 | |
| | | | | | f _z (mm) | 0.009 | 0.017 | 0.026 | 0.034 | 0.043 | 0.052 | 0.069 | 0.086 | 0.103 | 0.138 | |
| | | | | | v _f (mm/min) | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 749 | 751 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

MBZ215 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | | |
| | | | | | | 1/32 | 1/16 | 3/32 | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 5 - 6 | 0.10 | 0.30 | 500 | n (rev/min) | 61120 | 30560 | 20373 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | | | f _z (in) | 0.00030 | 0.00059 | 0.00089 | 0.00119 | 0.00178 | 0.00238 | 0.00297 | 0.00356 | 0.00475 | 0.00594 | 0.00713 | 0.00950 |
| | | | | | v _f (in/min) | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 |
| H | M / A / D 7a (48>52HRc) | 0.05 | 0.20 | 450 | n (rev/min) | 55008 | 27504 | 18336 | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1719 |
| | | | | | f _z (in) | 0.00027 | 0.00054 | 0.00081 | 0.00108 | 0.00161 | 0.00215 | 0.00269 | 0.00323 | 0.00430 | 0.00538 | 0.00645 | 0.00860 |
| | | | | | v _f (in/min) | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 |
| | M / A / D 7b (52>62HRc) | 0.03 | 0.10 | 400 | n (rev/min) | 48896 | 24448 | 16299 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.00019 | 0.00038 | 0.00056 | 0.00075 | 0.00113 | 0.00150 | 0.00188 | 0.00225 | 0.00300 | 0.00375 | 0.00450 | 0.00600 |
| | | | | | v _f (in/min) | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 |

| SIDE MILLING - FINISHING | | | | | | | | | | | | | | | | | |
|--------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | | |
| | | | | | | 1/32 | 1/16 | 3/32 | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 5 - 6 | 0.10 | 0.15 | 500 | n (rev/min) | 61120 | 30560 | 20373 | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | | | f _z (in) | 0.00030 | 0.00059 | 0.00089 | 0.00119 | 0.00178 | 0.00238 | 0.00297 | 0.00356 | 0.00475 | 0.00594 | 0.00713 | 0.00950 |
| | | | | | v _f (in/min) | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 | 36.3 |
| H | M / A / D 7a (48>52HRc) | 0.05 | 0.10 | 450 | n (rev/min) | 55008 | 27504 | 18336 | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1719 |
| | | | | | f _z (in) | 0.00027 | 0.00054 | 0.00081 | 0.00108 | 0.00161 | 0.00215 | 0.00269 | 0.00323 | 0.00430 | 0.00538 | 0.00645 | 0.00860 |
| | | | | | v _f (in/min) | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 | 29.6 |
| | M / A / D 7b (52>62HRc) | 0.03 | 0.05 | 400 | n (rev/min) | 48896 | 24448 | 16299 | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.00019 | 0.00038 | 0.00056 | 0.00075 | 0.00113 | 0.00150 | 0.00188 | 0.00225 | 0.00300 | 0.00375 | 0.00450 | 0.00600 |
| | | | | | v _f (in/min) | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 |

MZ645 / MZ645R - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|---------|---------|---------|---------|---------|--|--|--|--|--|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | | | | | |
| P | E 5 - 6 | 1.50 | 0.10 | 450 | n (rev/min) | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | | | | | |
| | | | | | f _z (in) | 0.00075 | 0.00113 | 0.00150 | 0.00188 | 0.00225 | 0.00300 | | | | | |
| | | | | | v _f (in/min) | 61.9 | 61.9 | 61.9 | 61.9 | 61.9 | 61.9 | | | | | |
| H | M / A / D 7a (48>52HRc) | 1.00 | 0.05 | 450 | n (rev/min) | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | | | | | |
| | | | | | f _z (in) | 0.00056 | 0.00084 | 0.00113 | 0.00141 | 0.00169 | 0.00225 | | | | | |
| | | | | | v _f (in/min) | 46.4 | 46.4 | 46.4 | 46.4 | 46.4 | 46.4 | | | | | |
| | M / A / D 7b (52>62HRc) | 1.00 | 0.02 | 400 | n (rev/min) | 12224 | 8149 | 6112 | 4890 | 4075 | 3056 | | | | | |
| | | | | | f _z (in) | 0.00040 | 0.00060 | 0.00080 | 0.00100 | 0.00120 | 0.00160 | | | | | |
| | | | | | v _f (in/min) | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter

v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



DESIGNED FOR GRAPHITE AND CARBON FIBER REINFORCED PLASTICS (CFRP) CVD DIAMOND COATING

Niagara Cutter CVD diamond raises the bar in performance and tool life when machining the toughest and most abrasive components made from graphite and CFRP. The unique in-house CVD diamond coating coupled with advanced geometries and the highest quality carbide substrates provide unsurpassed tool life and performance.

Niagara Cutter's graphite machining family of tools includes: DIA230, DIA230M, DIAL230, DIA430, DIA430M, DIACR430, DIAL430, DIAXRR430, DIAB230, DIAB230M, DIAB430, DIALB430, DIAXSB430 and DIAXRB430.

Developed for machining CFRP, the CVD Diamond range provides superior tool life while reducing un-cut fibers. Our offering includes the following products with both coarse and fine tooth configurations: Compression cutters DIACC and router burrs DIAEPB, DIABEB, DIAPPB. Also in this family of products is a new range of nicked routers for trimming and slot milling applications. Two versions are available, DIARTRBE - burr end style and DIARTREM - end mill style.

PRODUCT OVERVIEW

- In-house CVD diamond coated end mills for a wide range of applications
- Patented geometries yield significant productivity gains
- Continuous in-house R&D
- Premium carbide substrates

YOUR NIAGARA CUTTER BENEFIT

- Wide application area, from graphite electrodes to CFRP
- High performance at a competitive price
- Reduced cycle time, higher material removal rates
- Smoother cutting with advanced and patented geometries
- Long and predictable tool life with CVD coatings

RANGE OVERVIEW

- Inch and metric size available
- Wide range of geometries available
- Specials available upon request

| PREFERRED MATERIAL GROUPS |
|---------------------------|
| Graphite |
| Plastic |
| Thermoplast |
| Thermoset |

INDUSTRY TARGETS

- Mold & Die
- Aerospace
- Consumer
- Sports
- Auto

INDUSTRY APPLICATIONS

Aerospace: Well suited for a wide range of materials, a complete CVD diamond family sets Niagara Cutter apart from the competition.

DIA230 & DIA230M

| | | | |
|---------------|----------------------|-------------------|----------------|
| SOLID CARBIDE | <p>HELIX 30°</p> | <p>SQUARE END</p> | CENTER CUTTING |
|---------------|----------------------|-------------------|----------------|



- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIA230 - Page 140-141
- Tolerance Specs DIA230 - Page 335
- Cutting Data DIA230M - Page 144-145
- Tolerance Specs DIA230M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|-------------------------|------------------------|-----------|-----------|---------------|----------------|--------|---------|
| INCH - DIA230 | | | | | | | |
| N77898 | DIA230-0.016-F3-S.0-Z2 | 1/64 | 1/8 | 3/64 | 1-1/2 | 2 | CVDDIA |
| N77901 | DIA230-0.031-F3-S.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | CVDDIA |
| N77904 | DIA230-0.063-F3-S.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | CVDDIA |
| N77910 | DIA230-0.125-D4-S.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | CVDDIA |
| N77913 | DIA230-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | CVDDIA |
| N77916 | DIA230-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | CVDDIA |
| N77928 | DIA230-0.500-D2-S.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | CVDDIA |
| METRIC - DIA230M | | | | | | | |
| N77259 | DIA230M-010-F4-S.0-Z2 | 1MM | 3MM | 4MM | 45MM | 2 | CVDDIA |
| N77260 | DIA230M-020-F5-S.0-Z2 | 2MM | 3MM | 10MM | 45MM | 2 | CVDDIA |
| N77261 | DIA230M-030-D5-S.0-Z2 | 3MM | 3MM | 15MM | 45MM | 2 | CVDDIA |
| N77263 | DIA230M-060-D3-S.0-Z2 | 6MM | 6MM | 20MM | 64MM | 2 | CVDDIA |
| N77264 | DIA230M-080-D2-S.0-Z2 | 8MM | 8MM | 20MM | 64MM | 2 | CVDDIA |
| N77265 | DIA230M-100-D2-S.0-Z2 | 10MM | 10MM | 25MM | 63MM | 2 | CVDDIA |
| N77266 | DIA230M-120-D2-S.0-Z2 | 12MM | 12MM | 30MM | 76MM | 2 | CVDDIA |

DIAL230

| | | | |
|---------------|----------------------|-------------------|----------------|
| SOLID CARBIDE | <p>HELIX 30°</p> | <p>SQUARE END</p> | CENTER CUTTING |
|---------------|----------------------|-------------------|----------------|

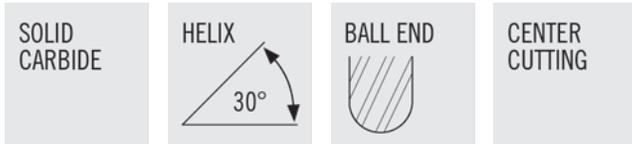


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 142-143
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N77964 | DIAL230-0.125-D8-S.0-Z2 | 1/8 | 1/8 | 1 | 3 | 2 | CVDDIA |
| N77967 | DIAL230-0.188-D6-S.0-Z2 | 3/16 | 3/16 | 1-1/8 | 3 | 2 | CVDDIA |
| N77970 | DIAL230-0.250-D5-S.0-Z2 | 1/4 | 1/4 | 1-1/4 | 3 | 2 | CVDDIA |
| N77976 | DIAL230-0.375-D4-S.0-Z2 | 3/8 | 3/8 | 1-3/8 | 3-1/4 | 2 | CVDDIA |
| N18692 | DIAL230-0.500-D4-S.0-Z2 | 1/2 | 1/2 | 1-3/8 | 6 | 2 | CVDDIA |
| N77982 | DIAL230-0.500-D5-S.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | CVDDIA |

DIAB230 & DIAB230M

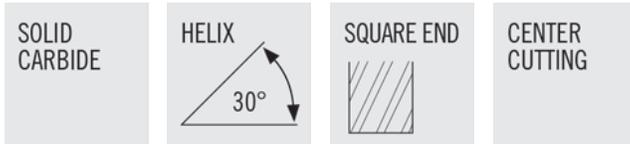


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIAB230 - Page 140-141
- Tolerance Specs DIAB230 - Page 335
- Cutting Data DIAB230M - Page 144-145
- Tolerance Specs DIAB230M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|--------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|
| INCH - DIAB230 | | | | | | | |
| N77931 | DIAB230-0.016-F3-B.0-Z2 | 1/64 | 1/8 | 3/64 | 1-1/2 | 2 | CVDDIA |
| N77934 | DIAB230-0.031-F3-B.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | CVDDIA |
| N77174 | DIAB230-0.047-F3-B.0-Z2 | 3/64 | 1/8 | 1/8 | 1-1/2 | 2 | CVDDIA |
| N77937 | DIAB230-0.063-F3-B.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | CVDDIA |
| N77943 | DIAB230-0.125-D4-B.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | CVDDIA |
| N77946 | DIAB230-0.188-D3-B.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | CVDDIA |
| N77949 | DIAB230-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | CVDDIA |
| N77961 | DIAB230-0.500-D2-B.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | CVDDIA |
| METRIC - DIAB230M | | | | | | | |
| N77267 | DIAB230M-010-F4-B.0-Z2 | 1MM | 3MM | 4MM | 45MM | 2 | CVDDIA |
| N77268 | DIAB230M-020-F5-B.0-Z2 | 2MM | 3MM | 10MM | 45MM | 2 | CVDDIA |
| N77269 | DIAB230M-030-D5-B.0-Z2 | 3MM | 3MM | 15MM | 45MM | 2 | CVDDIA |
| N77270 | DIAB230M-040-D4-B.0-Z2 | 4MM | 4MM | 15MM | 55MM | 2 | CVDDIA |
| N77271 | DIAB230M-060-D3-B.0-Z2 | 6MM | 6MM | 20MM | 64MM | 2 | CVDDIA |

DIA430 & DIA430M

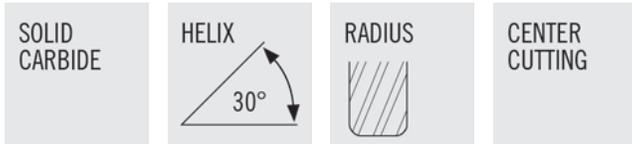


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIA430 - Page 146-147
- Tolerance Specs DIA430 - Page 335
- Cutting Data DIA430M - Page 150-151
- Tolerance Specs DIA430M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|-------------------------|------------------------|-----------|-----------|---------------|----------------|--------|---------|
| INCH - DIA430 | | | | | | | |
| N77790 | DIA430-0.016-F3-S.0-Z4 | 1/64 | 1/8 | 3/64 | 1-1/2 | 4 | CVDDIA |
| N77793 | DIA430-0.031-F3-S.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | CVDDIA |
| N77796 | DIA430-0.063-F3-S.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | CVDDIA |
| N77799 | DIA430-0.094-F4-S.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | CVDDIA |
| N77802 | DIA430-0.125-D4-S.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | CVDDIA |
| N77805 | DIA430-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | CVDDIA |
| N77808 | DIA430-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | CVDDIA |
| N77814 | DIA430-0.375-D2-S.0-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | CVDDIA |
| N77820 | DIA430-0.500-D2-S.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | CVDDIA |
| METRIC - DIA430M | | | | | | | |
| N77276 | DIA430M-020-F5-S.0-Z4 | 2MM | 3MM | 10MM | 45MM | 4 | CVDDIA |
| N77277 | DIA430M-030-D5-S.0-Z4 | 3MM | 3MM | 15MM | 45MM | 4 | CVDDIA |
| N77278 | DIA430M-040-D4-S.0-Z4 | 4MM | 4MM | 15MM | 55MM | 4 | CVDDIA |
| N77279 | DIA430M-060-D3-S.0-Z4 | 6MM | 6MM | 20MM | 64MM | 4 | CVDDIA |
| N77280 | DIA430M-080-D2-S.0-Z4 | 8MM | 8MM | 20MM | 64MM | 4 | CVDDIA |

DIACR430

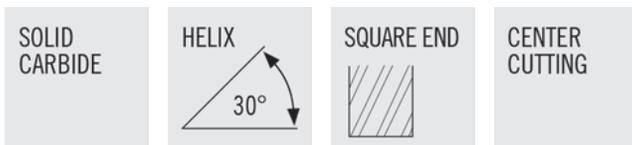


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 146-147
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|
| N18415 | DIACR430-0.063-F3-R010.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | CVDDIA | 0.010 |
| N18416 | DIACR430-0.063-F3-R015.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | CVDDIA | 0.015 |
| N18417 | DIACR430-0.125-D4-R015.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | CVDDIA | 0.015 |
| N18418 | DIACR430-0.125-D4-R020.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | CVDDIA | 0.020 |
| N18419 | DIACR430-0.188-D3-R020.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | CVDDIA | 0.020 |
| N18421 | DIACR430-0.250-D3-R020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | CVDDIA | 0.020 |
| N18422 | DIACR430-0.250-D3-R030.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | CVDDIA | 0.030 |
| N77191 | DIACR430-0.250-D6-R030.0-Z4 | 1/4 | 1/4 | 1-3/8 | 4 | 4 | CVDDIA | 0.030 |
| N18423 | DIACR430-0.375-D2-R020.0-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | CVDDIA | 0.020 |
| N18424 | DIACR430-0.375-D2-R030.0-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | CVDDIA | 0.030 |
| N18425 | DIACR430-0.500-D2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | CVDDIA | 0.030 |
| N18426 | DIACR430-0.500-D2-R060.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | CVDDIA | 0.060 |
| N77194 | DIACR430-0.500-D3-R030.0-Z4 | 1/2 | 1/2 | 1-3/8 | 4 | 4 | CVDDIA | 0.030 |

DIAL430



- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 148-149
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N77856 | DIAL430-0.125-D8-S.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | CVDDIA |
| N77859 | DIAL430-0.188-D5-S.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | CVDDIA |
| N72693 | DIAL430-0.188-D6-S.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | CVDDIA |
| N77862 | DIAL430-0.250-D5-S.0-Z4 | 1/4 | 1/4 | 1-1/4 | 3 | 4 | CVDDIA |
| N72699 | DIAL430-0.250-D6-S.0-Z4 | 1/4 | 1/4 | 1-3/8 | 4 | 4 | CVDDIA |
| N77868 | DIAL430-0.375-D4-S.0-Z4 | 3/8 | 3/8 | 1-3/8 | 3-1/4 | 4 | CVDDIA |
| N72717 | DIAL430-0.375-D5-S.0-Z4 | 3/8 | 3/8 | 1-3/8 | 4 | 4 | CVDDIA |
| N18695 | DIAL430-0.500-D3-S.0-Z4 | 1/2 | 1/2 | 1-3/8 | 4 | 4 | CVDDIA |
| N77874 | DIAL430-0.500-D5-S.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | CVDDIA |
| N72729 | DIAL430-0.500-D6-S.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | CVDDIA |

DIAB430

SOLID CARBIDE



CENTER CUTTING



- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 146-147
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N77823 | DIAB430-0.016-F3-B.0-Z4 | 1/64 | 1/8 | 3/64 | 1-1/2 | 4 | CVDDIA |
| N77826 | DIAB430-0.031-F3-B.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | CVDDIA |
| N77829 | DIAB430-0.063-F3-B.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | CVDDIA |
| N77183 | DIAB430-0.078-F3-B.0-Z4 | 5/64 | 1/8 | 1/4 | 1-1/2 | 4 | CVDDIA |
| N77832 | DIAB430-0.094-F4-B.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | CVDDIA |
| N77835 | DIAB430-0.125-D4-B.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | CVDDIA |
| N77838 | DIAB430-0.188-D3-B.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | CVDDIA |
| N77841 | DIAB430-0.250-D3-B.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | CVDDIA |
| N77847 | DIAB430-0.375-D2-B.0-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | CVDDIA |
| N77853 | DIAB430-0.500-D2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | CVDDIA |

DIALB430

SOLID CARBIDE



CENTER CUTTING

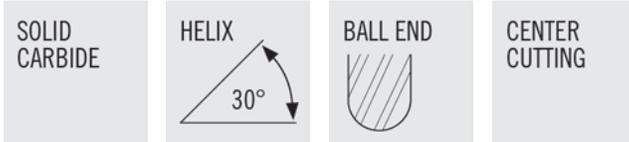


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green Ceramics

- Cutting Data - Page 148-149
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N77877 | DIALB430-0.125-D8-B.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | CVDDIA |
| N77880 | DIALB430-0.188-D5-B.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | CVDDIA |
| N72696 | DIALB430-0.188-D6-B.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | CVDDIA |
| N77883 | DIALB430-0.250-D5-B.0-Z4 | 1/4 | 1/4 | 1-1/4 | 3 | 4 | CVDDIA |
| N72702 | DIALB430-0.250-D6-B.0-Z4 | 1/4 | 1/4 | 1-3/8 | 4 | 4 | CVDDIA |
| N72708 | DIALB430-0.250-D7-B.0-Z4 | 1/4 | 1/4 | 1-3/8 | 6 | 4 | CVDDIA |
| N72720 | DIALB430-0.375-D5-B.0-Z4 | 3/8 | 3/8 | 1-3/8 | 4 | 4 | CVDDIA |
| N72726 | DIALB430-0.375-D6-B.0-Z4 | 3/8 | 3/8 | 1-3/8 | 6 | 4 | CVDDIA |
| N18697 | DIALB430-0.500-D3-B.0-Z4 | 1/2 | 1/2 | 1-3/8 | 4 | 4 | CVDDIA |
| N77895 | DIALB430-0.500-D5-B.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | CVDDIA |
| N18698 | DIALB430-0.500-D4-B.0-Z4 | 1/2 | 1/2 | 1-3/8 | 6 | 4 | CVDDIA |
| N72732 | DIALB430-0.500-D6-B.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | CVDDIA |

DIAXRB430 & DIAXS430

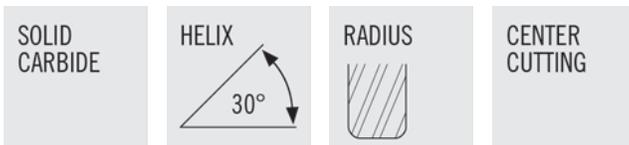


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 148-149
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING |
|-----------------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|
| REGULAR LENGTH - DIAXRB430 | | | | | | | | | |
| N18681 | DIAXRB430-0.031-G4-B.0-Z4 | 1/32 | 1/8 | 3/32 | 3 | .028 | 3/8 | 4 | CVDDIA |
| N18686 | DIAXRB430-0.031-G5-B.0-Z4 | 1/32 | 1/8 | 3/32 | 3 | .028 | 1/2 | 4 | CVDDIA |
| N18682 | DIAXRB430-0.047-G3-B.0-Z4 | 3/64 | 1/8 | 9/64 | 3 | .043 | 9/16 | 4 | CVDDIA |
| N18687 | DIAXRB430-0.047-G4-B.0-Z4 | 3/64 | 1/8 | 9/64 | 3 | .043 | 3/4 | 4 | CVDDIA |
| N18683 | DIAXRB430-0.063-G4-B.0-Z4 | 1/16 | 1/8 | 3/16 | 3 | .057 | 3/4 | 4 | CVDDIA |
| N18688 | DIAXRB430-0.063-G5-B.0-Z4 | 1/16 | 1/8 | 3/16 | 3 | .057 | 1 | 4 | CVDDIA |
| N18684 | DIAXRB430-0.094-G3-B.0-Z4 | 3/32 | 1/8 | 9/32 | 3 | .086 | 1 | 4 | CVDDIA |
| N18689 | DIAXRB430-0.094-G4-B.0-Z4 | 3/32 | 1/8 | 9/32 | 3 | .086 | 1-1/2 | 4 | CVDDIA |
| N18685 | DIAXRB430-0.125-E3-B.0-Z4 | 1/8 | 1/8 | 3/8 | 3 | .115 | 1-1/2 | 4 | CVDDIA |
| N18690 | DIAXRB430-0.125-E4-B.0-Z4 | 1/8 | 1/8 | 3/8 | 3 | .115 | 2 | 4 | CVDDIA |
| STUB LENGTH - DIAXS430 | | | | | | | | | |
| N77214 | DIAXS430-0.063-G1-B.0-Z4 | 1/16 | 1/8 | 1/16 | 3 | .057 | 5/16 | 4 | CVDDIA |
| N77216 | DIAXS430-0.125-E1-B.0-Z4 | 1/8 | 1/8 | 1/8 | 3 | .115 | 5/8 | 4 | CVDDIA |
| N77218 | DIAXS430-0.250-E1-B.0-Z4 | 1/4 | 1/4 | 1/4 | 4 | .240 | 3/4 | 4 | CVDDIA |

DIAXRR430



- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 148-149
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | RADIUS |
|------------------------|------------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|---------|--------|
| N18671 | DIAXRR430-0.031-G3-R005.0-Z4 | 1/32 | 1/8 | 3/32 | 3 | .028 | 3/8 | 4 | CVDDIA | 0.005 |
| N18676 | DIAXRR430-0.031-G4-R005.0-Z4 | 1/32 | 1/8 | 3/32 | 3 | .028 | 1/2 | 4 | CVDDIA | 0.005 |
| N18672 | DIAXRR430-0.047-G3-R010.0-Z4 | 3/64 | 1/8 | 9/64 | 3 | .043 | 9/16 | 4 | CVDDIA | 0.010 |
| N18677 | DIAXRR430-0.047-G4-R010.0-Z4 | 3/64 | 1/8 | 9/64 | 3 | .043 | 3/4 | 4 | CVDDIA | 0.010 |
| N18673 | DIAXRR430-0.063-G4-R010.0-Z4 | 1/16 | 1/8 | 3/16 | 3 | .057 | 3/4 | 4 | CVDDIA | 0.010 |
| N18678 | DIAXRR430-0.063-G5-R010.0-Z4 | 1/16 | 1/8 | 3/16 | 3 | .057 | 1 | 4 | CVDDIA | 0.010 |
| N18674 | DIAXRR430-0.094-G3-R010.0-Z4 | 3/32 | 1/8 | 9/32 | 3 | .086 | 1 | 4 | CVDDIA | 0.010 |
| N18679 | DIAXRR430-0.094-G4-R010.0-Z4 | 3/32 | 1/8 | 9/32 | 3 | .086 | 1-1/2 | 4 | CVDDIA | 0.010 |
| N18675 | DIAXRR430-0.125-E3-R010.0-Z4 | 1/8 | 1/8 | 3/8 | 3 | .115 | 1-1/2 | 4 | CVDDIA | 0.010 |
| N77253 | DIAXRR430-0.125-E6-R030.0-Z4 | 1/8 | 1/8 | 3/4 | 3 | .115 | 1-1/2 | 4 | CVDDIA | 0.030 |

DIACC

| | | | |
|---------------|--|--|----------------|
| SOLID CARBIDE | | | CENTER CUTTING |
|---------------|--|--|----------------|



- Compression Cutter
- Cylindrical Shank
- Chip breaking notches
- Open flute design
- "X" DIM equals the length to helix transition from end teeth
- Designed to avoid delamination
- Designed for carbon fiber, composite applications, graphite, and green ceramics
- Cutting Data - Page 152-153
- Tolerance Specs - Page 335

COARSE PITCH

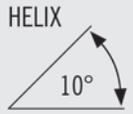
| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | "X" DIM |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N77311 | DIACC-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | CVDDIA | 0.150 |
| N77312 | DIACC-0.375-D3-S.0-Z3 | 3/8 | 3/8 | 1 | 3 | 3 | CVDDIA | 0.213 |
| N77313 | DIACC-0.500-D3-S.0-Z5 | 1/2 | 1/2 | 1-1/4 | 3 | 5 | CVDDIA | 0.275 |

FINE PITCH

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | "X" DIM |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N68196 | DIACC-0.250-D3-S.0-Z5 | 1/4 | 1/4 | 3/4 | 2-1/2 | 5 | CVDDIA | 0.150 |
| N68197 | DIACC-0.375-D3-S.0-Z5 | 3/8 | 3/8 | 1 | 3 | 5 | CVDDIA | 0.213 |
| N68198 | DIACC-0.500-D3-S.0-Z7 | 1/2 | 1/2 | 1-1/4 | 3 | 7 | CVDDIA | 0.275 |

DIARTREM

SOLID
CARBIDE



- Left hand helix directs cutting forces into workholding
- Right hand cut for normal spindle rotation direction
- Unique left hand flute shape reduces fluted length
- CVD diamond coating for maximum tool life
- Designed for carbon fiber, composite applications, and honeycomb materials
- For slotting and side milling
- End mill style end teeth
- Cutting Data - Page 154
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|--------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|
| 03134674 | DIARTREM-0.125-D3-S.0-Z6 | 1/8 | 1/8 | 3/8 | 1-1/2 | 6 | CVDDIA |
| 03134675 | DIARTREM-0.125-D4-S.0-Z8 | 1/8 | 1/8 | 1/2 | 1-1/2 | 8 | CVDDIA |
| 03134677 | DIARTREM-0.188-D3-S.0-Z6 | 3/16 | 3/16 | 9/16 | 2 | 6 | CVDDIA |
| 03134678 | DIARTREM-0.188-D4-S.0-Z8 | 3/16 | 3/16 | 3/4 | 2 | 8 | CVDDIA |
| 03134682 | DIARTREM-0.250-D3-S.0-Z10 | 1/4 | 1/4 | 3/4 | 2-1/2 | 10 | CVDDIA |
| 03134685 | DIARTREM-0.250-D4-S.0-Z10 | 1/4 | 1/4 | 1 | 3 | 10 | CVDDIA |
| 03134688 | DIARTREM-0.375-D3-S.0-Z12 | 3/8 | 3/8 | 1-1/8 | 3 | 12 | CVDDIA |
| 03134690 | DIARTREM-0.375-D4-S.0-Z12 | 3/8 | 3/8 | 1-1/2 | 4 | 12 | CVDDIA |
| 03134692 | DIARTREM-0.500-D2-S.0-Z14 | 1/2 | 1/2 | 1 | 3 | 14 | CVDDIA |

DISCOUNT CODE D43

DIARTRBE

SOLID
CARBIDE



- Left hand helix directs cutting forces into workholding
- Right hand cut for normal spindle rotation direction
- Unique left hand flute shape reduces fluted length
- CVD diamond coating for maximum tool life
- Designed for carbon fiber, composite applications, and honeycomb materials
- For slotting and side milling
- Burr end style end teeth
- Cutting Data - Page 154
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|--------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|
| 03134673 | DIARTRBE-0.125-D2-S.0-Z6 | 1/8 | 1/8 | 1/4 | 1-1/2 | 6 | CVDDIA |
| 03134676 | DIARTRBE-0.188-D2-S.0-Z6 | 3/16 | 3/16 | 3/8 | 2 | 6 | CVDDIA |
| 03134679 | DIARTRBE-0.250-D2-S.0-Z8 | 1/4 | 1/4 | 1/2 | 2-1/2 | 8 | CVDDIA |
| 03134680 | DIARTRBE-0.250-D3-S.0-Z8 | 1/4 | 1/4 | 3/4 | 2-1/2 | 8 | CVDDIA |
| 03134681 | DIARTRBE-0.250-D3-S.0-Z10 | 1/4 | 1/4 | 3/4 | 2-1/2 | 10 | CVDDIA |
| 03134683 | DIARTRBE-0.250-D4-S.0-Z8 | 1/4 | 1/4 | 1 | 3 | 8 | CVDDIA |
| 03134684 | DIARTRBE-0.250-D4-S.0-Z10 | 1/4 | 1/4 | 1 | 3 | 10 | CVDDIA |
| 03134686 | DIARTRBE-0.375-D2-S.0-Z12 | 3/8 | 3/8 | 3/4 | 2-1/2 | 12 | CVDDIA |
| 03134687 | DIARTRBE-0.375-D3-S.0-Z12 | 3/8 | 3/8 | 1-1/8 | 3 | 12 | CVDDIA |
| 03134689 | DIARTRBE-0.375-D4-S.0-Z12 | 3/8 | 3/8 | 1-1/2 | 4 | 12 | CVDDIA |
| 03134691 | DIARTRBE-0.500-D2-S.0-Z14 | 1/2 | 1/2 | 1 | 3 | 14 | CVDDIA |

DIAEPB

SOLID
CARBIDE

- End mill point burr
- Cylindrical Shank
- Positive end cutting geometry
- Low cutting forces
- End mill style end teeth geometry
- High shearing capabilities to reduce material delamination
- Designed for carbon fiber, composite applications, graphite and green ceramics
- Cutting Data - Page 155-157
- Tolerance Specs - Page 335

COARSE PITCH

- Can be utilized up to 100% radial engagement



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68077 | DIAEPB-0.125-D1-S.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68078 | DIAEPB-0.250-D2-S.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68079 | DIAEPB-0.250-D4-S.0-Z | 1/4 | 1/4 | 1-3/8 | 3 | CVDDIA |
| N68081 | DIAEPB-0.375-D1-S.0-Z | 3/8 | 3/8 | 1-3/8 | 3-1/4 | CVDDIA |
| N68083 | DIAEPB-0.500-D1-S.0-Z | 1/2 | 1/2 | 1 | 3 | CVDDIA |
| N68084 | DIAEPB-0.500-D3-S.0-Z | 1/2 | 1/2 | 2 | 4 | CVDDIA |

FINE PITCH

- Improved surface finish as compared to coarse pitch
- Up to 50% radial engagement



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68172 | DIAEPB-0.125-D2-S.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68173 | DIAEPB-0.250-D1-S.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68176 | DIAEPB-0.375-D4-S.0-Z | 3/8 | 3/8 | 1-3/8 | 3-1/4 | CVDDIA |
| N68178 | DIAEPB-0.500-D2-S.0-Z | 1/2 | 1/2 | 1 | 3 | CVDDIA |
| N68179 | DIAEPB-0.500-D4-S.0-Z | 1/2 | 1/2 | 2 | 4 | CVDDIA |

DIABEB

SOLID
CARBIDE

- Burr end burr
- Positive cutting geometry
- Lower cutting forces
- High shear capabilities to reduce material delamination
- Burr style end teeth geometry
- Designed for carbon fiber, composite applications, graphite and green ceramics
- Cutting Data - Page 155-157
- Tolerance Specs - Page 335

COARSE PITCH

- Can be utilized up to 100% radial engagement



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68093 | DIABEB-0.125-D1-S.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68094 | DIABEB-0.250-D1-S.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68097 | DIABEB-0.375-D1-S.0-Z | 3/8 | 3/8 | 1-3/8 | 3-1/4 | CVDDIA |
| N68098 | DIABEB-0.375-D7-S.0-Z | 3/8 | 3/8 | 2-1/8 | 4 | CVDDIA |
| N68099 | DIABEB-0.500-D1-S.0-Z | 1/2 | 1/2 | 1 | 3 | CVDDIA |
| N68100 | DIABEB-0.500-D3-S.0-Z | 1/2 | 1/2 | 2 | 4 | CVDDIA |

FINE PITCH

- Improved surface finish as compared to coarse pitch
- Up to 50% radial engagement



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68188 | DIABEB-0.125-D2-S.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68189 | DIABEB-0.250-D2-S.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68192 | DIABEB-0.375-D2-S.0-Z | 3/8 | 3/8 | 1-3/8 | 3-1/4 | CVDDIA |
| N68193 | DIABEB-0.375-D8-S.0-Z | 3/8 | 3/8 | 2-1/8 | 4 | CVDDIA |
| N68194 | DIABEB-0.500-D2-S.0-Z | 1/2 | 1/2 | 1 | 3 | CVDDIA |
| N68195 | DIABEB-0.500-D4-S.0-Z | 1/2 | 1/2 | 2 | 4 | CVDDIA |

DIAPPB

SOLID
CARBIDE

- Plunge point burr
- Cylindrical Shank
- Drill point design
- Positive end cutting geometry
- Low cutting forces
- High shearing capabilities to reduce material delamination
- Designed for carbon fiber, composite applications, graphite and green ceramics
- Cutting Data - Page 155-157
- Tolerance Specs - Page 335

COARSE PITCH



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68085 | DIAPPB-0.125-D1-C.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68086 | DIAPPB-0.250-D1-C.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68087 | DIAPPB-0.250-D3-C.0-Z | 1/4 | 1/4 | 1-3/8 | 3 | CVDDIA |
| N68088 | DIAPPB-0.250-D5-C.0-Z | 1/4 | 1/4 | 2 | 4 | CVDDIA |

FINE PITCH

- Improved surface finish as compared to coarse pitch



| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|---------|
| N68180 | DIAPPB-0.125-D2-C.0-Z | 1/8 | 1/8 | 1/2 | 1-1/2 | CVDDIA |
| N68181 | DIAPPB-0.250-D2-C.0-Z | 1/4 | 1/4 | 3/4 | 2-1/2 | CVDDIA |
| N68182 | DIAPPB-0.250-D4-C.0-Z | 1/4 | 1/4 | 1-3/8 | 3 | CVDDIA |
| N68183 | DIAPPB-0.250-D6-C.0-Z | 1/4 | 1/4 | 2 | 4 | CVDDIA |

DIA230 / DIAB230 - START VALUES

| SLOTTING | | | | | | | | | | | | | | |
|----------------|--|--|------------------------------|---------------------|--------------------|-------------------------|--------|--------|--------|--------|--------|--------|------|------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | |
| | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| GRAPHITE | 1.00 | 1.00 | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | | |
| | | | 1125 | - | 1725 | v _f (in/min) | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 |
| | | | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | | |
| | | | 1125 | - | 1725 | v _f (in/min) | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | | |
| | | | 1125 | - | 1725 | v _f (in/min) | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | |
| | | | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | | |
| | | | 1125 | - | 1725 | v _f (in/min) | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | |
| PLASTIC (HARD) | 1.00 | 1.00 | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | | |
| | | | 1125 | - | 1725 | v _f (in/min) | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | |
| | | | 1313 | n (rev/min) | 40110 | 26740 | 20055 | 16044 | 13370 | 10028 | 8022 | 6685 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | | |
| | | | 1163 | - | 1463 | v _f (in/min) | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | |
| THERMOPLAST | 0.80 | 1.00 | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0059 | | |
| | | | 1335 | - | 1515 | v _f (in/min) | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | |
| | | | 1313 | n (rev/min) | 40110 | 26740 | 20055 | 16044 | 13370 | 10028 | 8022 | 6685 | | |
| | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | | |
| | | | 1162.5 | - | 1462.5 | v _f (in/min) | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | |
| THERMOSET | 0.80 | 1.00 | 1425 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | | |
| | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0059 | | |
| | | | 1335 | - | 1515 | v _f (in/min) | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | 86.2 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA230 / DIAB230 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|------|------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Zn = 2 | | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| GRAPHITE | 1.00 | 0.40 | 1900 | - | 2200 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | 1600 | - | 2200 | v _f (in/min) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | |
| | | | | | | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1900 | - | 2200 | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | | | | v _f (in/min) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | |
| | | | 1600 | - | 2200 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| PLASTIC (HARD) | 1.00 | 0.40 | 1900 | - | 2200 | v _f (in/min) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | | |
| | | | | | | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | 1600 | - | 2200 | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | | | | v _f (in/min) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | |
| THERMOPLAST | CFRP | 1.00 | 0.40 | 1750 | - | 1900 | n (rev/min) | 53480 | 35653 | 26740 | 21392 | 17827 | 13370 | 10696 | 8913 |
| | | | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 |
| | | | | 1600 | - | 1900 | v _f (in/min) | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 |
| | GRP | 1.00 | 0.40 | 1900 | - | 1990 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 |
| | | | | | | | f _z (in) | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | | | | 1810 | - | 1990 | v _f (in/min) | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 |
| THERMOSET | CFRP | 1.00 | 0.40 | 1750 | - | 1900 | n (rev/min) | 53480 | 35653 | 26740 | 21392 | 17827 | 13370 | 10696 | 8913 |
| | | | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 |
| | | | | 1600 | - | 1900 | v _f (in/min) | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 | 80.2 |
| | GRP | 1.00 | 0.40 | 1900 | - | 1990 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 |
| | | | | | | | f _z (in) | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | | | | 1810 | - | 1990 | v _f (in/min) | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 | 174.2 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAL230 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-------------------|--|--|------------------------------|------|------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | | Zn = 2 | | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| GRAPHITE | 1.00 | 1.00 | 1140 | - | 1440 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | |
| | | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | |
| | | | 840 | - | 1440 | v _f (in/min) | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 |
| | | | | | | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1140 | - | 1440 | f _z (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | |
| | | | | | | v _f (in/min) | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 |
| | | | 840 | - | 1440 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | |
| | | | | | | f _z (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | |
| PLASTIC (HARD) | 1.00 | 1.00 | 1140 | - | 1440 | v _f (in/min) | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | |
| | | | | | | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | |
| | | | 840 | - | 1440 | f _z (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | |
| | | | | | | v _f (in/min) | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | |
| THERMOPLAST | CFRP | 1.00 | 1.00 | 1050 | - | 1200 | n (rev/min) | 32088 | 21392 | 16044 | 12835 | 10696 | 8022 | 6418 | 5348 |
| | | | | | | | f _z (in) | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0022 |
| | | | | 900 | - | 1200 | v _f (in/min) | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 |
| | GRP | 0.80 | 1.00 | 1140 | - | 1230 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 |
| | | | | | | | f _z (in) | 0.0007 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0030 | 0.0037 | 0.0045 |
| | | | | 1050 | - | 1230 | v _f (in/min) | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 |
| THERMOSET | CFRP | 1.00 | 1.00 | 1050 | - | 1200 | n (rev/min) | 32088 | 21392 | 16044 | 12835 | 10696 | 8022 | 6418 | 5348 |
| | | | | | | | f _z (in) | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0022 |
| | | | | 900 | - | 1200 | v _f (in/min) | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 | 23.8 |
| | GRP | 0.80 | 1.00 | 1140 | - | 1230 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 |
| | | | | | | | f _z (in) | 0.0007 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0030 | 0.0037 | 0.0045 |
| | | | | 1050 | - | 1230 | v _f (in/min) | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 | 51.7 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAL230 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|------|------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | | Zn = 2 | | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| GRAPHITE | 1.00 | 0.40 | 1520 | - | 1820 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | 1220 | - | 1820 | v _f (in/min) | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 |
| | | | | | | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1520 | - | 1820 | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | | | | v _f (in/min) | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 |
| | | | 1220 | - | 1820 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| PLASTIC (HARD) | 1.00 | 0.40 | 1520 | - | 1820 | v _f (in/min) | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | |
| | | | | | | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | 1220 | - | 1820 | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | | | | v _f (in/min) | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | 47.9 | |
| THERMOPLAST | CFRP | 1.00 | 0.40 | 1400 | - | 1550 | n (rev/min) | 42784 | 28523 | 21392 | 17114 | 14261 | 10696 | 8557 | 7131 |
| | | | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 |
| | | | | 1250 | - | 1550 | v _f (in/min) | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 |
| | GRP | 1.00 | 0.40 | 1520 | - | 1610 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 |
| | | | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 |
| | | | | 1430 | - | 1610 | v _f (in/min) | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 |
| THERMOSET | CFRP | 1.00 | 0.40 | 1400 | - | 1550 | n (rev/min) | 42784 | 28523 | 21392 | 17114 | 14261 | 10696 | 8557 | 7131 |
| | | | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 |
| | | | | 1250 | - | 1550 | v _f (in/min) | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 |
| | GRP | 1.00 | 0.40 | 1520 | - | 1610 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 |
| | | | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 |
| | | | | 1430 | - | 1610 | v _f (in/min) | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA230M / DIAB230M - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-------------------|------------------|------------------|------------------|-------------|------|-----------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | ap x Dc (max) | ae x Dc (max) | Vc (sf / min) | | | Zn = 2 | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | | |
| GRAPHITE | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 138265 | 69132 | 46088 | 34566 | 23044 | 17283 | 13826 | 11522 | |
| | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | vf (in/min) | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | | | |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 138265 | 69132 | 46088 | 34566 | 23044 | 17283 | 13826 | 11522 | |
| | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | vf (in/min) | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | | | |
| PLASTIC (HARD) | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 138265 | 69132 | 46088 | 34566 | 23044 | 17283 | 13826 | 11522 | |
| | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | vf (in/min) | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | 39.2 | | | |
| THERMOPLAST | CFRP | 1.00 | 1.00 | 1310 | - | 1465 | n (min-1) | 127107 | 63553 | 42369 | 31777 | 21184 | 15888 | 12711 | 10592 |
| | | | | | | | fz (in) | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 |
| | | | | vf (in/min) | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | | |
| | GRP | 0.80 | 1.00 | 1425 | - | 1515 | n (min-1) | 138265 | 69132 | 46088 | 34566 | 23044 | 17283 | 13826 | 11522 |
| | | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 | 0.0031 | 0.0037 |
| | | | | vf (in/min) | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | | |
| THERMOSET | CFRP | 1.00 | 1.00 | 1310 | - | 1465 | n (min-1) | 127107 | 63553 | 42369 | 31777 | 21184 | 15888 | 12711 | 10592 |
| | | | | | | | fz (in) | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 |
| | | | | vf (in/min) | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | | |
| | GRP | 0.80 | 1.00 | 1425 | - | 1515 | n (min-1) | 138265 | 69132 | 46088 | 34566 | 23044 | 17283 | 13826 | 11522 |
| | | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 | 0.0031 | 0.0037 |
| | | | | vf (in/min) | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 Vc (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 ap/Dc = % of diameter
 vf [in/min] = Feed rate
 ae/Dc = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA230M / DIAB230M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|---|------|-------------|-----------|--------|--------|--------|--------|--------|--------|--------|-------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Zn = 2 | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | | |
| GRAPHITE | 1.00 | 0.40 | 1600 | - | 2200 | 1900 | n (min-1) | 184353 | 92177 | 61451 | 46088 | 30726 | 23044 | 18435 | 15363 |
| | | | | | | fz (in) | 0.0002 | 0.0004 | 0.0006 | 0.0009 | 0.0013 | 0.0017 | 0.0022 | 0.0026 | |
| | | | | | | vf (in/min) | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | 79.8 | |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1600 | - | 2200 | 1900 | n (min-1) | 184353 | 92177 | 61451 | 46088 | 30726 | 23044 | 18435 | 15363 |
| | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | | | | vf (in/min) | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | |
| PLASTIC (HARD) | 1.00 | 0.40 | 1600 | - | 2200 | 1900 | n (min-1) | 184353 | 92177 | 61451 | 46088 | 30726 | 23044 | 18435 | 15363 |
| | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | | | | vf (in/min) | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | 52.3 | |
| THERMOPLAST | CFRP | 1.00 | 1600 | - | 1900 | 1750 | n (min-1) | 169799 | 84900 | 56600 | 42450 | 28300 | 21225 | 16980 | 14150 |
| | | | | | | fz (in) | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | |
| | | | | | | vf (in/min) | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | |
| | GRP | 1.00 | 1810 | - | 1990 | 1900 | n (min-1) | 184353 | 92177 | 61451 | 46088 | 30726 | 23044 | 18435 | 15363 |
| | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 | 0.0031 | 0.0037 | |
| | | | | | | vf (in/min) | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | |
| THERMOSET | CFRP | 1.00 | 1600 | - | 1900 | 1750 | n (min-1) | 169799 | 84900 | 56600 | 42450 | 28300 | 21225 | 16980 | 14150 |
| | | | | | | fz (in) | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | |
| | | | | | | vf (in/min) | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | 53.5 | |
| | GRP | 1.00 | 1810 | - | 1990 | 1900 | n (min-1) | 184353 | 92177 | 61451 | 46088 | 30726 | 23044 | 18435 | 15363 |
| | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 | 0.0031 | 0.0037 | |
| | | | | | | vf (in/min) | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | 114.7 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA430 / DIACR430 / DIAB430 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-------------------|--|--|------------------------------|---|--------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | | |
| | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| GRAPHITE | 1.00 | 1.00 | 1425 | - | 1725 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | 1125 | - | 1725 | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 |
| | | | | | | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | | | | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1425 | - | 1725 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | 1125 | - | 1725 | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | |
| | | | | | | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | | | | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | |
| PLASTIC (HARD) | 1.00 | 1.00 | 1425 | - | 1725 | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | 1125 | - | 1725 | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | |
| | | | | | | n (rev/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | | | | v _f (in/min) | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 | |
| THERMOPLAST | 1.00 | 1.00 | 1313 | - | 1463 | f _z (in) | 40110 | 26740 | 20055 | 16044 | 13370 | 10028 | 8022 | 6685 | |
| | | | | | | v _f (in/min) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | |
| | | | 1163 | - | 1463 | f _z (in) | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | |
| | | | | | | v _f (in/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0059 | |
| | | | | | | v _f (in/min) | 172.5 | 172.5 | 172.5 | 172.4 | 172.5 | 172.5 | 172.5 | 172.5 | |
| THERMOSET | 1.00 | 1.00 | 1313 | - | 1462.5 | f _z (in) | 40110 | 26740 | 20055 | 16044 | 13370 | 10028 | 8022 | 6685 | |
| | | | | | | v _f (in/min) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | |
| | | | 1162.5 | - | 1462.5 | f _z (in) | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | 79.4 | |
| | | | | | | v _f (in/min) | 43548 | 29032 | 21774 | 17419 | 14516 | 10887 | 8710 | 7258 | |
| | | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 | 0.0059 | |
| | | | | | | v _f (in/min) | 172.5 | 172.5 | 172.5 | 172.4 | 172.5 | 172.5 | 172.5 | 172.5 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA430 / DIACR430 / DIAB430 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | |
| | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | |
| GRAPHITE | 1.00 | 0.40 | 1900 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | 1600 - 2200 | v _f (in/min) | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | |
| | | | | | | | | | | | | | |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1900 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | 1600 - 2200 | v _f (in/min) | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | |
| | | | | | | | | | | | | | |
| PLASTIC (HARD) | 1.00 | 0.40 | 1900 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 | |
| | | | | f _z (in) | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0021 | 0.0028 | 0.0034 | 0.0041 | |
| | | | 1600 - 2200 | v _f (in/min) | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | |
| | | | | | | | | | | | | | |
| THERMOPLAST | CFRP | 1.00 | 0.40 | 1750 | n (rev/min) | 53480 | 35653 | 26740 | 21392 | 17827 | 13370 | 10696 | 8913 |
| | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 |
| | | | | 1600 - 1900 | v _f (in/min) | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 |
| | GRP | 1.00 | 0.40 | 1900 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 |
| | | | | | f _z (in) | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | | | | 1810 - 1990 | v _f (in/min) | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 |
| THERMOSET | CFRP | 1.00 | 0.40 | 1750 | n (rev/min) | 53480 | 35653 | 26740 | 21392 | 17827 | 13370 | 10696 | 8913 |
| | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 |
| | | | | 1600 - 1900 | v _f (in/min) | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 | 160.4 |
| | GRP | 1.00 | 0.40 | 1900 | n (rev/min) | 58064 | 38709 | 29032 | 23226 | 19355 | 14516 | 11613 | 9677 |
| | | | | | f _z (in) | 0.0015 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
| | | | | 1810 - 1990 | v _f (in/min) | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 | 348.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAXSB430 / DIAL430 / DIALB430 / DIAxRR430 / DIAxRB430 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | | | |
|----------------|------------------|------------------|------------------|------|------|-------------|--------|--------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| SMG | ap x Dc (max) | ae x Dc (max) | vc (sf / min) | | | | Zn = 4 | | | | | | | | | | |
| | | | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | | | |
| GRAPHITE | 1.00 | 1.00 | 1140 | - | 1440 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | | | |
| | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | | | |
| | | | | | | vf (in/min) | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | | |
| | | | PLASTIC (SOFT) | 1.00 | 1.00 | 1140 | - | 1440 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 |
| | | | | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 |
| | | | | | | | | | vf (in/min) | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 |
| PLASTIC (HARD) | 1.00 | 1.00 | 1140 | - | 1440 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 | | | |
| | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | | | |
| | | | | | | vf (in/min) | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | 47.4 | | |
| THERMOPLAST | 1.00 | 1.00 | 1050 | - | 1200 | n (rev/min) | 32088 | 21392 | 16044 | 12835 | 10696 | 8022 | 6418 | 5348 | | | |
| | | | | | | fz (in) | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | | | |
| | | | | | | vf (in/min) | 47.7 | 47.7 | 47.7 | 47.6 | 47.7 | 47.7 | 47.7 | 47.7 | 47.7 | | |
| | | | GRP | 0.80 | 1.00 | 1140 | - | 1230 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 |
| | | | | | | | | | fz (in) | 0.0007 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0030 | 0.0037 | 0.0045 |
| | | | | | | | | | vf (in/min) | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 |
| THERMOSET | 1.00 | 1.00 | 1050 | - | 1200 | n (rev/min) | 32088 | 21392 | 16044 | 12835 | 10696 | 8022 | 6418 | 5348 | | | |
| | | | | | | fz (in) | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | | | |
| | | | | | | vf (in/min) | 47.7 | 47.7 | 47.7 | 47.6 | 47.7 | 47.7 | 47.7 | 47.7 | 47.7 | | |
| | | | GRP | 0.80 | 1.00 | 1140 | - | 1230 | n (rev/min) | 34838 | 23226 | 17419 | 13935 | 11613 | 8710 | 6968 | 5806 |
| | | | | | | | | | fz (in) | 0.0007 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0030 | 0.0037 | 0.0045 |
| | | | | | | | | | vf (in/min) | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 |

SMG = Seco Material Group
 n [min-1] = RPM
 vc (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 ap/Dc = % of diameter
 vf [in/min] = Feed rate
 ae/Dc = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAXS430 / DIAL430 / DIALB430 / DIAARR430 / DIAARB430 - START VALUES

SIDE MILLING - ROUGHING

| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | |
|----------------|--|--|------------------------------|-------------------------|-------------------------|---------------------|-------------------------|-------------|---------------------|-------------------------|-------------|---------------------|-------------------------|
| | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | |
| | | | | | n (rev/min) | f _z (in) | v _f (in/min) | n (rev/min) | f _z (in) | v _f (in/min) | n (rev/min) | f _z (in) | v _f (in/min) |
| GRAPHITE | 1.00 | 0.40 | 1520 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | 1220 - 1820 | v _f (in/min) | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1520 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | 1220 - 1820 | v _f (in/min) | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 |
| PLASTIC (HARD) | 1.00 | 0.40 | 1520 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 | |
| | | | | f _z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0021 | 0.0026 | 0.0031 | |
| | | | 1220 - 1820 | v _f (in/min) | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 | 95.8 |
| THERMOPLAST | CFRP | 1.00 | 0.40 | 1400 | n (rev/min) | 42784 | 28523 | 21392 | 17114 | 14261 | 10696 | 8557 | 7131 |
| | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 |
| | | | | 1250 - 1550 | v _f (in/min) | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 |
| | GRP | 1.00 | 0.40 | 1520 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 |
| | | | | 1430 - 1610 | v _f (in/min) | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 |
| THERMOSET | CFRP | 1.00 | 0.40 | 1400 | n (rev/min) | 42784 | 28523 | 21392 | 17114 | 14261 | 10696 | 8557 | 7131 |
| | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0023 | 0.0028 | 0.0034 |
| | | | | 1250 - 1550 | v _f (in/min) | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 |
| | GRP | 1.00 | 0.40 | 1520 | n (rev/min) | 46451 | 30967 | 23226 | 18580 | 15484 | 11613 | 9290 | 7742 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 |
| | | | | 1430 - 1610 | v _f (in/min) | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 | 209.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA430M - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-------------------|--|--|------------------------------|-------------|-------|--------------------|-----------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | | Z _n = 4 | | | | | | |
| | | | | | | 2 | 3 | 4 | 6 | 8 | | |
| GRAPHITE | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 69132 | 46088 | 34566 | 23044 | 17283 | |
| | | | | | | fz (in) | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | |
| | | | vf (in/min) | 78.4 | 78.4 | 78.4 | 78.4 | 78.4 | | | | |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 69132 | 46088 | 34566 | 23044 | 17283 | |
| | | | | | | fz (in) | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | |
| | | | vf (in/min) | 78.4 | 78.4 | 78.4 | 78.4 | 78.4 | | | | |
| PLASTIC (HARD) | 1.00 | 1.00 | 1425 | - | 1725 | n (min-1) | 69132 | 46088 | 34566 | 23044 | 17283 | |
| | | | | | | fz (in) | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | |
| | | | vf (in/min) | 78.4 | 78.4 | 78.4 | 78.4 | 78.4 | | | | |
| THERMOPLAST | CFRP | 1.00 | 1310 | - | 1465 | n (min-1) | 63553 | 42369 | 31777 | 21184 | 15888 | |
| | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | |
| | | | vf (in/min) | 80.1 | 80.1 | 80.1 | 80.1 | 80.1 | | | | |
| | GRP | 0.80 | 1.00 | 1425 | - | 1515 | n (min-1) | 69132 | 46088 | 34566 | 23044 | 17283 |
| | | | | | | | fz (in) | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 |
| | | | | vf (in/min) | 172.0 | 172.0 | 172.0 | 172.0 | 172.0 | | | |
| THERMOSET | CFRP | 1.00 | 1310 | - | 1465 | n (min-1) | 63553 | 42369 | 31777 | 21184 | 15888 | |
| | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 | |
| | | | vf (in/min) | 80.1 | 80.1 | 80.1 | 80.1 | 80.1 | | | | |
| | GRP | 0.80 | 1.00 | 1425 | - | 1515 | n (min-1) | 69132 | 46088 | 34566 | 23044 | 17283 |
| | | | | | | | fz (in) | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 |
| | | | | vf (in/min) | 172.0 | 172.0 | 172.0 | 172.0 | 172.0 | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIA430M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|------|------|--------------------|-------------|--------|--------|--------|--------|--------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 4 | | | | | | |
| | | | | | | 2 | 3 | 4 | 6 | 8 | | |
| GRAPHITE | 1.00 | 0.40 | 1900 | | | n (min-1) | 92177 | 61451 | 46088 | 30726 | 23044 | |
| | | | | | | fz (in) | 0.0004 | 0.0006 | 0.0009 | 0.0013 | 0.0017 | |
| | | | 1600 | - | 2200 | vf (in/min) | 159.7 | 159.7 | 159.7 | 159.7 | 159.7 | |
| PLASTIC (SOFT) | 1.00 | 0.40 | 1900 | | | n (min-1) | 92177 | 61451 | 46088 | 30726 | 23044 | |
| | | | | | | fz (in) | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | |
| | | | 1600 | - | 2200 | vf (in/min) | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | |
| PLASTIC (HARD) | 1.00 | 0.40 | 1900 | | | n (min-1) | 92177 | 61451 | 46088 | 30726 | 23044 | |
| | | | | | | fz (in) | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | |
| | | | 1600 | - | 2200 | vf (in/min) | 104.5 | 104.5 | 104.5 | 104.5 | 104.5 | |
| THERMOPLAST | CFRP | 1.00 | 0.40 | 1750 | | | n (min-1) | 84900 | 56600 | 42450 | 28300 | 21225 |
| | | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 |
| | | | | 1600 | - | 1900 | vf (in/min) | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 |
| | GRP | 1.00 | 0.40 | 1900 | | | n (min-1) | 92177 | 61451 | 46088 | 30726 | 23044 |
| | | | | | | | fz (in) | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 |
| | | | | 1810 | - | 1990 | vf (in/min) | 229.4 | 229.4 | 229.4 | 229.4 | 229.4 |
| THERMOSET | CFRP | 1.00 | 0.40 | 1750 | | | n (min-1) | 84900 | 56600 | 42450 | 28300 | 21225 |
| | | | | | | | fz (in) | 0.0003 | 0.0005 | 0.0006 | 0.0009 | 0.0013 |
| | | | | 1600 | - | 1900 | vf (in/min) | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 |
| | GRP | 1.00 | 0.40 | 1900 | | | n (min-1) | 92177 | 61451 | 46088 | 30726 | 23044 |
| | | | | | | | fz (in) | 0.0006 | 0.0009 | 0.0012 | 0.0019 | 0.0025 |
| | | | | 1810 | - | 1990 | vf (in/min) | 229.4 | 229.4 | 229.4 | 229.4 | 229.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIACC COARSE-PITCH - START VALUES

| | | SLOTTING | | | | | | | | | | |
|----------------|---------------------------|---------------------------|---------------------|------|------|----------------|--------|-----------|----------------|--------|--------|--------|
| SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | | | $Z_n = 3$ | | $Z_n = 5$ | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | | | | |
| GRAPHITE | 1.00 | 1.00 | 1425 | - | 1725 | n (rev/min) | 21774 | 14516 | 10887 | | | |
| | | | | | | f_z (in) | 0.0009 | 0.0014 | 0.0018 | | | |
| | | | | | | v_f (in/min) | 59.3 | 59.3 | 98.8 | | | |
| | | | PLASTIC (SOFT) | 1.00 | 1.00 | 1425 | - | 1725 | n (rev/min) | 21774 | 14516 | 10887 |
| | | | | | | | | | f_z (in) | 0.0009 | 0.0014 | 0.0018 |
| | | | | | | | | | v_f (in/min) | 59.3 | 59.3 | 98.8 |
| PLASTIC (HARD) | 1.00 | 1.00 | | | | 1425 | - | 1725 | n (rev/min) | 21774 | 14516 | 10887 |
| | | | | | | | | | f_z (in) | 0.0009 | 0.0014 | 0.0018 |
| | | | | | | | | | v_f (in/min) | 59.3 | 59.3 | 98.8 |
| | | | THERMOPLAST | 1.00 | 1.00 | 1313 | - | 1463 | n (rev/min) | 20055 | 13370 | 10028 |
| | | | | | | | | | f_z (in) | 0.0010 | 0.0015 | 0.0020 |
| | | | | | | | | | v_f (in/min) | 59.6 | 59.6 | 99.3 |
| THERMOPLAST | 0.80 | 1.00 | | | | 1425 | - | 1515 | n (rev/min) | 21774 | 14516 | 10887 |
| | | | | | | | | | f_z (in) | 0.0010 | 0.0015 | 0.0020 |
| | | | | | | | | | v_f (in/min) | 64.7 | 64.7 | 107.8 |
| | | | THERMOSET | 1.00 | 1.00 | 1313 | - | 1462.5 | n (rev/min) | 20055 | 13370 | 10028 |
| | | | | | | | | | f_z (in) | 0.0010 | 0.0015 | 0.0020 |
| | | | | | | | | | v_f (in/min) | 59.6 | 59.6 | 99.3 |
| THERMOSET | 0.80 | 1.00 | | | | 1425 | - | 1515 | n (rev/min) | 21774 | 14516 | 10887 |
| | | | | | | | | | f_z (in) | 0.0010 | 0.0015 | 0.0020 |
| | | | | | | | | | v_f (in/min) | 64.7 | 64.7 | 107.8 |

| | | SIDE MILLING - ROUGHING | | | | | | | | | | |
|----------------|------|-------------------------|----------------|------|------|----------------|--------|--------|----------------|--------|--------|--------|
| GRAPHITE | 2.00 | 0.40 | 1900 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 | | | |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 | | | |
| | | | | | | v_f (in/min) | 119.8 | 119.8 | 199.6 | | | |
| | | | PLASTIC (SOFT) | 2.00 | 0.40 | 1900 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | | | | v_f (in/min) | 119.8 | 119.8 | 199.6 |
| PLASTIC (HARD) | 2.00 | 0.40 | | | | 1900 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | | | | v_f (in/min) | 119.8 | 119.8 | 199.6 |
| | | | THERMOPLAST | 2.00 | 0.40 | 1750 | - | 1900 | n (rev/min) | 26740 | 17827 | 13370 |
| | | | | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | | | | v_f (in/min) | 120.3 | 120.3 | 200.6 |
| THERMOPLAST | 2.00 | 0.40 | | | | 1900 | - | 1990 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | | | | v_f (in/min) | 130.6 | 130.6 | 217.7 |
| | | | THERMOSET | 2.00 | 0.40 | 1750 | - | 1900 | n (rev/min) | 26740 | 17827 | 13370 |
| | | | | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | | | | v_f (in/min) | 120.3 | 120.3 | 200.6 |
| THERMOSET | 2.00 | 0.40 | | | | 1900 | - | 1990 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | | | | v_f (in/min) | 130.6 | 130.6 | 217.7 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIACC - FINE PITCH - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | |
|----------------|---------------------------|---------------------------|---------------------|---|------|----------------|-----------|--------|-----------|
| SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | | | | $Z_n = 5$ | | $Z_n = 7$ |
| | | | | | | | 1/4 | 3/8 | 1/2 |
| GRAPHITE | 2.00 | 0.40 | 1600 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| | | | | | | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| PLASTIC (SOFT) | 2.00 | 0.40 | 1600 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| | | | | | | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| PLASTIC (HARD) | 2.00 | 0.40 | 1600 | - | 2200 | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| | | | | | | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0014 | 0.0021 | 0.0028 |
| | | | | | | v_f (in/min) | 199.6 | 199.6 | 279.4 |
| THERMOPLAST | 2.00 | 0.40 | 1600 | - | 1900 | n (rev/min) | 26740 | 17827 | 13370 |
| | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v_f (in/min) | 200.6 | 200.6 | 280.8 |
| | | | | | | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v_f (in/min) | 217.7 | 217.7 | 304.8 |
| THERMOSET | 2.00 | 0.40 | 1600 | - | 1900 | n (rev/min) | 26740 | 17827 | 13370 |
| | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v_f (in/min) | 200.6 | 200.6 | 280.8 |
| | | | | | | n (rev/min) | 29032 | 19355 | 14516 |
| | | | | | | f_z (in) | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v_f (in/min) | 217.7 | 217.7 | 304.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIARTRBE / DIARTREM - START VALUES

| SLOTTING | | | | | | | | | | | | | |
|---|------|---------|---------|------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | ap x DC | ae x DC | vc (m/min) | | Zn=6 | | Zn=8 | | | Zn=10 | Zn=12 | Zn=14 |
| | | | | | | 1/8 | 3/16 | 1/8 | 3/16 | 1/4 | 1/4 | 3/8 | 1/2 |
| A Thermoset Carbon & Glass Fiber | CFRP | 1.00 | 1.00 | 510 425 - 595 | n [min-1] | 15586 | 10390 | 15586 | 10390 | 7793 | 7793 | 5195 | 3896 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0011 |
| | | | | | vf [in/min] | 25.7 | 25.7 | 34.3 | 34.3 | 34.3 | 42.9 | 51.4 | 60.0 |
| | CRP | 1.00 | 1.00 | 330 260 - 400 | n [min-1] | 10085 | 6723 | 10085 | 6723 | 5042 | 5042 | 3362 | 2521 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0011 |
| | | | | | vf [in/min] | 16.6 | 16.6 | 22.2 | 22.2 | 22.2 | 27.7 | 33.3 | 38.8 |
| A Thermoplast Carbon & Glass Fiber | CFRP | 1.00 | 1.00 | 330 275 - 385 | n [min-1] | 10085 | 6723 | 10085 | 6723 | 5042 | 5042 | 3362 | 2521 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0011 |
| | | | | | vf [in/min] | 16.6 | 16.6 | 22.2 | 22.2 | 22.2 | 27.7 | 33.3 | 38.8 |
| | CRP | 1.00 | 1.00 | 165 100 - 230 | n [min-1] | 5042 | 3362 | 5042 | 3362 | 2521 | 2521 | 1681 | 1261 |
| | | | | | fz [in] | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0006 | 0.0006 | 0.0008 | 0.0011 |
| | | | | | vf [in/min] | 8.3 | 8.3 | 11.1 | 11.1 | 11.1 | 13.9 | 16.6 | 19.4 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|---|------|---------|---------|------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | ap x DC | ae x DC | vc (m/min) | | Zn=6 | | Zn=8 | | | Zn=10 | Zn=12 | Zn=14 |
| | | | | | | 1/8 | 3/16 | 1/8 | 3/16 | 1/4 | 1/4 | 3/8 | 1/2 |
| A Thermoset Carbon & Glass Fiber | CFRP | 1.50 | 0.35 | 605 510 - 700 | n [min-1] | 18489 | 12326 | 18489 | 12326 | 9244 | 9244 | 6163 | 4622 |
| | | | | | fz [in] | 0.0004 | 0.0006 | 0.0004 | 0.0006 | 0.0008 | 0.0008 | 0.0012 | 0.0016 |
| | | | | | vf [in/min] | 44.4 | 44.4 | 59.2 | 59.2 | 59.2 | 74.0 | 88.7 | 103.5 |
| | CRP | 1.50 | 0.35 | 410 330 - 490 | n [min-1] | 12530 | 8353 | 12530 | 8353 | 6265 | 6265 | 4177 | 3132 |
| | | | | | fz [in] | 0.0004 | 0.0006 | 0.0004 | 0.0006 | 0.0008 | 0.0008 | 0.0012 | 0.0016 |
| | | | | | vf [in/min] | 30.1 | 30.1 | 40.1 | 40.1 | 40.1 | 50.1 | 60.1 | 70.2 |
| A Thermoplast Carbon & Glass Fiber | CFRP | 1.50 | 0.35 | 410 295 - 525 | n [min-1] | 12530 | 8353 | 12530 | 8353 | 6265 | 6265 | 4177 | 3132 |
| | | | | | fz [in] | 0.0004 | 0.0006 | 0.0004 | 0.0006 | 0.0008 | 0.0008 | 0.0012 | 0.0016 |
| | | | | | vf [in/min] | 30.1 | 30.1 | 40.1 | 40.1 | 40.1 | 50.1 | 60.1 | 70.2 |
| | CRP | 1.50 | 0.35 | 195 120 - 270 | n [min-1] | 5959 | 3973 | 5959 | 3973 | 2980 | 2980 | 1986 | 1490 |
| | | | | | fz [in] | 0.0004 | 0.0006 | 0.0004 | 0.0006 | 0.0008 | 0.0008 | 0.0012 | 0.0016 |
| | | | | | vf [in/min] | 14.3 | 14.3 | 19.1 | 19.1 | 19.1 | 23.8 | 28.6 | 33.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 vc (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 ap/Dc = % of diameter
 vf [in/min] = Feed rate
 ae/Dc = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAEPB / DIAPPB / DIABEB COARSE PITCH - START VALUES

| SLOTTING | | | | | | | | | | | | |
|----------------|--|--|------------------------------|---|------|-------------------------|-------------|---------------------|-------------------------|-------------|---------------------|-------------------------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 |
| | | | | | | | n (rev/min) | f _z (in) | v _f (in/min) | n (rev/min) | f _z (in) | v _f (in/min) |
| GRAPHITE | 1.00 | 1.00 | 1800 | - | 2000 | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| | | | | | | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| PLASTIC (SOFT) | 1.00 | 1.00 | 1800 | - | 2000 | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| | | | | | | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| PLASTIC (HARD) | 1.00 | 1.00 | 1800 | - | 2000 | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| | | | | | | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | | v _f (in/min) | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| THERMOPLAST | 1.00 | 1.00 | 1800 | - | 2000 | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 |
| | | | | | | v _f (in/min) | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 |
| | | | | | | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 |
| | | | | | | v _f (in/min) | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 |
| THERMOSET | 0.80 | 1.00 | 1800 | - | 2000 | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 |
| | | | | | | v _f (in/min) | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 |
| | | | | | | n (rev/min) | 55008 | 36672 | 27504 | 22003 | 18336 | 13752 |
| | | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 |
| | | | | | | v _f (in/min) | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 | 27.2 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAEPB / DIAPPB / DIABEB COARSE PITCH - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | |
|-------------------------|--|--|------------------------------|-------------------------|--------|--------|---------------------|--------|--------|--------|--------|--------|--------|--|
| SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | | | | | | | | | |
| | | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | | | | |
| GRAPHITE | 2.00 | 0.50 | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | | | | |
| | | | | f _z (in) | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 | | | | |
| | | | 2200 - 2600 | v _f (in/min) | 66.5 | 66.5 | 66.5 | 66.5 | 66.5 | 66.5 | | | | |
| | | | | | | | | | | | | | | |
| | | | PLASTIC (SOFT) | 2.00 | 0.50 | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | |
| | | | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 | |
| 2200 - 2600 | v _f (in/min) | 66.5 | | | | 66.5 | 66.5 | 66.5 | 66.5 | 66.5 | | | | |
| | | | | | | | | | | | | | | |
| PLASTIC (HARD) | 2.00 | 0.50 | | | | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | |
| | | | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 | |
| | | | 2200 - 2600 | v _f (in/min) | 66.5 | 66.5 | 66.5 | 66.5 | 66.5 | 66.5 | | | | |
| | | | | | | | | | | | | | | |
| | | | THERMOPLAST | 2.00 | 0.50 | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | |
| | | | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| 2200 - 2600 | v _f (in/min) | 55.0 | | | | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | | | | |
| | | | | | | | | | | | | | | |
| THERMOSET | 2.00 | 0.50 | | | | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | |
| | | | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | | 2200 - 2600 | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | | | | |
| | | | | | | | | | | | | | | |
| | | | THERMOSET | 2.00 | 0.50 | 2400 | n (rev/min) | 73344 | 48896 | 36672 | 29338 | 24448 | 18336 | |
| | | | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| 2200 - 2600 | v _f (in/min) | 55.0 | | | | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | | | | |
| | | | | | | | | | | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

DIAEPB / DIAPPB / DIABEB FINE PITCH - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | |
|-------------------------|--|--|------------------------------|---|------|-------------------------|---------------------|-------------------------|-------------|---------------------|
| SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | | 1/8 | 1/4 | 3/8 | 1/2 | |
| | | | | | | n (rev/min) | f _z (in) | v _f (in/min) | n (rev/min) | f _z (in) |
| GRAPHITE | 2.00 | 0.25 | 2100 | - | 2700 | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | | | | f _z (in) | 0.0009 | 0.0018 | 0.0027 | 0.0036 |
| | | | 2400 | - | 2700 | v _f (in/min) | 66.5 | 66.5 | 66.5 | 66.5 |
| | | | | | | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| PLASTIC (SOFT) | 2.00 | 0.25 | 2100 | - | 2700 | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | | | | f _z (in) | 0.0009 | 0.0018 | 0.0027 | 0.0036 |
| | | | 2400 | - | 2700 | v _f (in/min) | 66.5 | 66.5 | 66.5 | 66.5 |
| | | | | | | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| PLASTIC (HARD) | 2.00 | 0.25 | 2100 | - | 2700 | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | | | | f _z (in) | 0.0009 | 0.0018 | 0.0027 | 0.0036 |
| | | | 2400 | - | 2700 | v _f (in/min) | 66.5 | 66.5 | 66.5 | 66.5 |
| | | | | | | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| THERMOPLAST | 2.00 | 0.25 | 2250 | - | 2550 | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | | | | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 |
| | | | 2400 | - | 2550 | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 |
| | | | | | | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | 2310 | - | 2490 | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 |
| THERMOSET | 2.00 | 0.25 | 2250 | - | 2550 | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | | | | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 |
| | | | 2400 | - | 2550 | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 |
| | | | | | | n (rev/min) | 73344 | 36672 | 24448 | 18336 |
| | | | 2310 | - | 2490 | f _z (in) | 0.0008 | 0.0015 | 0.0023 | 0.0030 |
| | | | | | | v _f (in/min) | 55.0 | 55.0 | 55.0 | 55.0 |

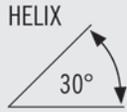
SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C230

SOLID
CARBIDE



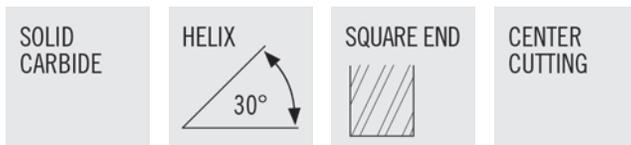
CENTER
CUTTING



- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85261 | C230-0.031-F3-S.0-Z2 | 1/32 | 1/8 | 5/64 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85337 | C230-0.031-F3-S.0-Z2 | 1/32 | 1/8 | 5/64 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54012 | C230-0.031-F4-S.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54018 | C230-0.031-F4-S.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85262 | C230-0.047-F2-S.0-Z2 | 3/64 | 1/8 | 7/64 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85338 | C230-0.047-F2-S.0-Z2 | 3/64 | 1/8 | 7/64 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54013 | C230-0.047-F3-S.0-Z2 | 3/64 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54019 | C230-0.047-F3-S.0-Z2 | 3/64 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85408 | C230-0.063-F2-S.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85434 | C230-0.063-F2-S.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85263 | C230-0.063-F3-S.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85339 | C230-0.063-F3-S.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55334 | C230-0.063-F4-S.0-Z2 | 1/16 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55430 | C230-0.063-F4-S.0-Z2 | 1/16 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85264 | C230-0.078-F2-S.0-Z2 | 5/64 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85340 | C230-0.078-F2-S.0-Z2 | 5/64 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55335 | C230-0.078-F3-S.0-Z2 | 5/64 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55431 | C230-0.078-F3-S.0-Z2 | 5/64 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85409 | C230-0.094-F2-S.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85435 | C230-0.094-F2-S.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85265 | C230-0.094-F3-S.0-Z2 | 3/32 | 1/8 | 9/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85341 | C230-0.094-F3-S.0-Z2 | 3/32 | 1/8 | 9/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55336 | C230-0.094-F4-S.0-Z2 | 3/32 | 1/8 | 3/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55432 | C230-0.094-F4-S.0-Z2 | 3/32 | 1/8 | 3/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85266 | C230-0.109-F3-S.0-Z2 | 7/64 | 1/8 | 3/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85342 | C230-0.109-F3-S.0-Z2 | 7/64 | 1/8 | 3/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85410 | C230-0.125-D2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85436 | C230-0.125-D2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85267 | C230-0.125-D4-S.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85343 | C230-0.125-D4-S.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55337 | C230-0.125-D5-S.0-Z2 | 1/8 | 1/8 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55433 | C230-0.125-D5-S.0-Z2 | 1/8 | 1/8 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N55338 | C230-0.125-D6-S.0-Z2 | 1/8 | 1/8 | 3/4 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55434 | C230-0.125-D6-S.0-Z2 | 1/8 | 1/8 | 3/4 | 3 | 2 | TIALN | CYLINDRICAL |
| N55339 | C230-0.125-D8-S.0-Z2 | 1/8 | 1/8 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55435 | C230-0.125-D8-S.0-Z2 | 1/8 | 1/8 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N85411 | C230-0.156-F2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85437 | C230-0.156-F2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | TIALN | CYLINDRICAL |
| N85269 | C230-0.156-F3-S.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |

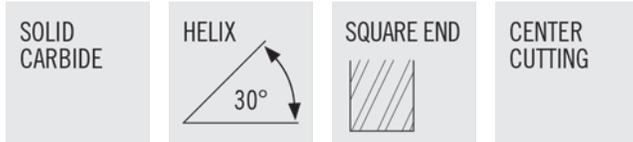
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85345 | C230-0.156-F3-S.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | TIALN | CYLINDRICAL |
| N85412 | C230-0.188-D2-S.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85438 | C230-0.188-D2-S.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N85271 | C230-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85347 | C230-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N85448 | C230-0.188-D4-S.0-Z2 | 3/16 | 3/16 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85484 | C230-0.188-D4-S.0-Z2 | 3/16 | 3/16 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55341 | C230-0.188-D6-S.0-Z2 | 3/16 | 3/16 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55437 | C230-0.188-D6-S.0-Z2 | 3/16 | 3/16 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N85449 | C230-0.188-D7-S.0-Z2 | 3/16 | 3/16 | 1-1/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N85485 | C230-0.188-D7-S.0-Z2 | 3/16 | 3/16 | 1-1/8 | 3 | 2 | TIALN | CYLINDRICAL |
| N85272 | C230-0.203-F3-S.0-Z2 | 13/64 | 1/4 | 5/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85348 | C230-0.203-F3-S.0-Z2 | 13/64 | 1/4 | 5/8 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85413 | C230-0.219-F2-S.0-Z2 | 7/32 | 1/4 | 7/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85439 | C230-0.219-F2-S.0-Z2 | 7/32 | 1/4 | 7/16 | 2 | 2 | TIALN | CYLINDRICAL |
| N85273 | C230-0.219-F3-S.0-Z2 | 7/32 | 1/4 | 5/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85349 | C230-0.219-F3-S.0-Z2 | 7/32 | 1/4 | 5/8 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85274 | C230-0.234-F3-S.0-Z2 | 15/64 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85350 | C230-0.234-F3-S.0-Z2 | 15/64 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85414 | C230-0.250-D2-S.0-Z2 | 1/4 | 1/4 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85440 | C230-0.250-D2-S.0-Z2 | 1/4 | 1/4 | 1/2 | 2 | 2 | TIALN | CYLINDRICAL |
| N85275 | C230-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85351 | C230-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55342 | C230-0.250-D4-S.0-Z2 | 1/4 | 1/4 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55438 | C230-0.250-D4-S.0-Z2 | 1/4 | 1/4 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55343 | C230-0.250-D5-S.0-Z2 | 1/4 | 1/4 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55439 | C230-0.250-D5-S.0-Z2 | 1/4 | 1/4 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N85450 | C230-0.250-D6-S.0-Z2 | 1/4 | 1/4 | 1-1/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N85486 | C230-0.250-D6-S.0-Z2 | 1/4 | 1/4 | 1-1/8 | 3 | 2 | TIALN | CYLINDRICAL |
| N85451 | C230-0.250-D7-S.0-Z2 | 1/4 | 1/4 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85487 | C230-0.250-D7-S.0-Z2 | 1/4 | 1/4 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55344 | C230-0.250-D8-S.0-Z2 | 1/4 | 1/4 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55440 | C230-0.250-D8-S.0-Z2 | 1/4 | 1/4 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N85276 | C230-0.266-F3-S.0-Z2 | 17/64 | 5/16 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85352 | C230-0.266-F3-S.0-Z2 | 17/64 | 5/16 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85277 | C230-0.281-F3-S.0-Z2 | 9/32 | 5/16 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85353 | C230-0.281-F3-S.0-Z2 | 9/32 | 5/16 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85415 | C230-0.313-D2-S.0-Z2 | 5/16 | 5/16 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |

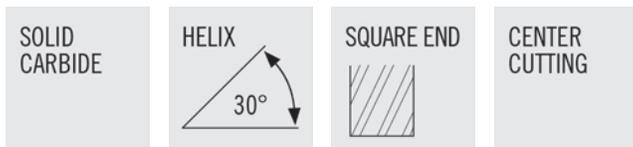
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85441 | C230-0.313-D2-S.0-Z2 | 5/16 | 5/16 | 1/2 | 2 | 2 | TIALN | CYLINDRICAL |
| N85279 | C230-0.313-D3-S.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85355 | C230-0.313-D3-S.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55345 | C230-0.313-D4-S.0-Z2 | 5/16 | 5/16 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55441 | C230-0.313-D4-S.0-Z2 | 5/16 | 5/16 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55346 | C230-0.313-D5-S.0-Z2 | 5/16 | 5/16 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55442 | C230-0.313-D5-S.0-Z2 | 5/16 | 5/16 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N85280 | C230-0.328-F3-S.0-Z2 | 21/64 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85356 | C230-0.328-F3-S.0-Z2 | 21/64 | 3/8 | 1 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85281 | C230-0.344-F3-S.0-Z2 | 11/32 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85357 | C230-0.344-F3-S.0-Z2 | 11/32 | 3/8 | 1 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85416 | C230-0.375-D1-S.0-Z2 | 3/8 | 3/8 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N85442 | C230-0.375-D1-S.0-Z2 | 3/8 | 3/8 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N85283 | C230-0.375-D2-S.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85359 | C230-0.375-D2-S.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55348 | C230-0.375-D3-S.0-Z2 | 3/8 | 3/8 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55444 | C230-0.375-D3-S.0-Z2 | 3/8 | 3/8 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55349 | C230-0.375-D4-S.0-Z2 | 3/8 | 3/8 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55445 | C230-0.375-D4-S.0-Z2 | 3/8 | 3/8 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N85454 | C230-0.375-D5-S.0-Z2 | 3/8 | 3/8 | 1-1/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N85490 | C230-0.375-D5-S.0-Z2 | 3/8 | 3/8 | 1-1/8 | 3 | 2 | TIALN | CYLINDRICAL |
| N55350 | C230-0.375-D6-S.0-Z2 | 3/8 | 3/8 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55446 | C230-0.375-D6-S.0-Z2 | 3/8 | 3/8 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N85455 | C230-0.375-D7-S.0-Z2 | 3/8 | 3/8 | 1-3/4 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85491 | C230-0.375-D7-S.0-Z2 | 3/8 | 3/8 | 1-3/4 | 4 | 2 | TIALN | CYLINDRICAL |
| N55351 | C230-0.375-D8-S.0-Z2 | 3/8 | 3/8 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55447 | C230-0.375-D8-S.0-Z2 | 3/8 | 3/8 | 2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55352 | C230-0.375-D9-S.0-Z2 | 3/8 | 3/8 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55448 | C230-0.375-D9-S.0-Z2 | 3/8 | 3/8 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N85287 | C230-0.438-D2-S.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | UNCOATED | CYLINDRICAL |
| N85363 | C230-0.438-D2-S.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | CYLINDRICAL |
| N55355 | C230-0.438-D5-S.0-Z2 | 7/16 | 7/16 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55451 | C230-0.438-D5-S.0-Z2 | 7/16 | 7/16 | 2 | 4 | 2 | TIALN | CYLINDRICAL |
| N85418 | C230-0.500-D1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85444 | C230-0.500-D1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85291 | C230-0.500-D2-S.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N85367 | C230-0.500-D2-S.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55356 | C230-0.500-D3-S.0-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |

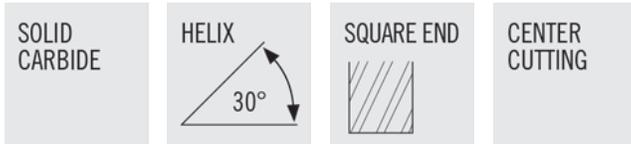
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N55452 | C230-0.500-D3-S.0-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55357 | C230-0.500-D4-S.0-Z2 | 1/2 | 1/2 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55453 | C230-0.500-D4-S.0-Z2 | 1/2 | 1/2 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N55358 | C230-0.500-D5-S.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55454 | C230-0.500-D5-S.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TIALN | CYLINDRICAL |
| N85458 | C230-0.500-D6-S.0-Z2 | 1/2 | 1/2 | 2 | 4-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85494 | C230-0.500-D6-S.0-Z2 | 1/2 | 1/2 | 2 | 4-1/2 | 2 | TIALN | CYLINDRICAL |
| N85459 | C230-0.500-D7-S.0-Z2 | 1/2 | 1/2 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N85495 | C230-0.500-D7-S.0-Z2 | 1/2 | 1/2 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N85292 | C230-0.563-D2-S.0-Z2 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85368 | C230-0.563-D2-S.0-Z2 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 2 | TIALN | CYLINDRICAL |
| N55360 | C230-0.563-D5-S.0-Z2 | 9/16 | 9/16 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55456 | C230-0.563-D5-S.0-Z2 | 9/16 | 9/16 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N85293 | C230-0.625-D2-S.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N85369 | C230-0.625-D2-S.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | CYLINDRICAL |
| N85460 | C230-0.625-D4-S.0-Z2 | 5/8 | 5/8 | 2-1/4 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N85496 | C230-0.625-D4-S.0-Z2 | 5/8 | 5/8 | 2-1/4 | 5 | 2 | TIALN | CYLINDRICAL |
| N85461 | C230-0.625-D5-S.0-Z2 | 5/8 | 5/8 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N85497 | C230-0.625-D5-S.0-Z2 | 5/8 | 5/8 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N85294 | C230-0.688-F2-S.0-Z2 | 11/16 | 3/4 | 1-3/8 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85370 | C230-0.688-F2-S.0-Z2 | 11/16 | 3/4 | 1-3/8 | 4 | 2 | TIALN | CYLINDRICAL |
| N85420 | C230-0.750-D1-S.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N85446 | C230-0.750-D1-S.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N85295 | C230-0.750-D2-S.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85371 | C230-0.750-D2-S.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55362 | C230-0.750-D3-S.0-Z2 | 3/4 | 3/4 | 2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55458 | C230-0.750-D3-S.0-Z2 | 3/4 | 3/4 | 2 | 6 | 2 | TIALN | CYLINDRICAL |
| N85462 | C230-0.750-D4-S.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | UNCOATED | CYLINDRICAL |
| N85498 | C230-0.750-D4-S.0-Z2 | 3/4 | 3/4 | 2-1/4 | 5 | 2 | TIALN | CYLINDRICAL |
| N85463 | C230-0.750-D5-S.0-Z2 | 3/4 | 3/4 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N85499 | C230-0.750-D5-S.0-Z2 | 3/4 | 3/4 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N85296 | C230-0.875-D2-S.0-Z2 | 7/8 | 7/8 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85372 | C230-0.875-D2-S.0-Z2 | 7/8 | 7/8 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N85297 | C230-1.000-D2-S.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N85373 | C230-1.000-D2-S.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N85465 | C230-1.000-D5-S.0-Z2 | 1 | 1 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N85501 | C230-1.000-D5-S.0-Z2 | 1 | 1 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N55365 | C230-1.000-D6-S.0-Z2 | 1 | 1 | 4 | 7 | 2 | UNCOATED | CYLINDRICAL |
| N55461 | C230-1.000-D6-S.0-Z2 | 1 | 1 | 4 | 7 | 2 | TIALN | CYLINDRICAL |

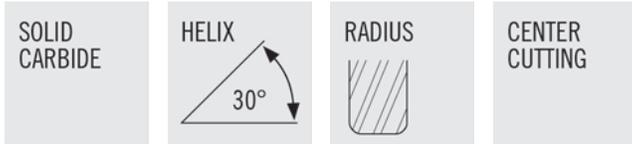
METRIC C230M



- General Purpose
- General machining of most material types
- Cutting Data - Page 196-197
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|---------------------|-----------|-----------|---------------|----------------|--------|---------|
| N46328 | C230M-010-F4-S.0-Z2 | 1MM | 3MM | 4MM | 39MM | 2 | ALTIN |
| N46332 | C230M-020-F3-S.0-Z2 | 2MM | 3MM | 6.3MM | 39MM | 2 | ALTIN |
| N46336 | C230M-030-D4-S.0-Z2 | 3MM | 3MM | 12MM | 39MM | 2 | ALTIN |
| N46340 | C230M-040-D4-S.0-Z2 | 4MM | 4MM | 14MM | 51MM | 2 | ALTIN |
| N46342 | C230M-045-F4-S.0-Z2 | 4.5MM | 6MM | 16MM | 51MM | 2 | ALTIN |
| N46346 | C230M-060-D3-S.0-Z2 | 6MM | 6MM | 19MM | 51MM | 2 | ALTIN |
| N46350 | C230M-080-D2-S.0-Z2 | 8MM | 8MM | 20MM | 64MM | 2 | ALTIN |
| N46354 | C230M-100-D2-S.0-Z2 | 10MM | 10MM | 22MM | 73MM | 2 | ALTIN |
| N46358 | C230M-120-D2-S.0-Z2 | 12MM | 12MM | 25MM | 74MM | 2 | ALTIN |
| N46360 | C230M-140-F2-S.0-Z2 | 14MM | 14MM | 32MM | 84MM | 2 | ALTIN |
| N46362 | C230M-160-D2-S.0-Z2 | 16MM | 16MM | 32MM | 93MM | 2 | ALTIN |
| N46364 | C230M-180-D2-S.0-Z2 | 18MM | 18MM | 38MM | 100MM | 2 | ALTIN |
| N46366 | C230M-200-D2-S.0-Z2 | 20MM | 20MM | 38MM | 100MM | 2 | ALTIN |

C230R

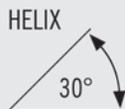


- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N91165 | C230R-0.125-D4-R015.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91168 | C230R-0.188-D3-R015.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91170 | C230R-0.250-D3-R015.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91173 | C230R-0.250-D3-R030.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91321 | C230R-0.375-D3-R015.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91323 | C230R-0.375-D3-R030.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91327 | C230R-0.438-D2-R015.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91330 | C230R-0.438-D2-R030.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91332 | C230R-0.438-D2-R060.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | 0.060 | CYLINDRICAL |
| N91333 | C230R-0.438-D2-R090.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | 0.090 | CYLINDRICAL |
| N91334 | C230R-0.438-D2-R125.0-Z2 | 7/16 | 7/16 | 1 | 2-3/4 | 2 | TIALN | 0.125 | CYLINDRICAL |
| N91335 | C230R-0.500-D2-R015.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91337 | C230R-0.500-D2-R030.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91339 | C230R-0.500-D2-R060.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | 0.060 | CYLINDRICAL |
| N91341 | C230R-0.500-D2-R090.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | 0.090 | CYLINDRICAL |
| N91342 | C230R-0.500-D2-R125.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | 0.125 | CYLINDRICAL |
| N91343 | C230R-0.625-D2-R015.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91345 | C230R-0.625-D2-R030.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91347 | C230R-0.625-D2-R060.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | 0.060 | CYLINDRICAL |
| N91348 | C230R-0.625-D2-R090.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | 0.090 | CYLINDRICAL |
| N91349 | C230R-0.625-D2-R125.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | 0.125 | CYLINDRICAL |
| N91132 | C230R-0.750-D2-R015.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91352 | C230R-0.750-D2-R030.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91159 | C230R-0.750-D2-R060.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.060 | CYLINDRICAL |
| N91356 | C230R-0.750-D2-R090.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.090 | CYLINDRICAL |
| N91358 | C230R-0.750-D2-R125.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.125 | CYLINDRICAL |
| N91362 | C230R-0.750-D2-R190.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | 0.190 | CYLINDRICAL |
| N91363 | C230R-1.000-D2-R015.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.015 | CYLINDRICAL |
| N91365 | C230R-1.000-D2-R030.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.030 | CYLINDRICAL |
| N91367 | C230R-1.000-D2-R060.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.060 | CYLINDRICAL |
| N91368 | C230R-1.000-D2-R090.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.090 | CYLINDRICAL |
| N91369 | C230R-1.000-D2-R125.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.125 | CYLINDRICAL |
| N91371 | C230R-1.000-D2-R190.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | 0.190 | CYLINDRICAL |

CB230

SOLID CARBIDE



CENTER CUTTING



- General Purpose
- General machining of most material types
- Cutting Data - Page 194-195
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86149 | CB230-0.016-F2-B.0-Z2 | 1/64 | 1/8 | 1/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86225 | CB230-0.016-F2-B.0-Z2 | 1/64 | 1/8 | 1/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86150 | CB230-0.031-F3-B.0-Z2 | 1/32 | 1/8 | 5/64 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86226 | CB230-0.031-F3-B.0-Z2 | 1/32 | 1/8 | 5/64 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54020 | CB230-0.031-F4-B.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54032 | CB230-0.031-F4-B.0-Z2 | 1/32 | 1/8 | 3/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86151 | CB230-0.047-F2-B.0-Z2 | 3/64 | 1/8 | 7/64 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86227 | CB230-0.047-F2-B.0-Z2 | 3/64 | 1/8 | 7/64 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54021 | CB230-0.047-F3-B.0-Z2 | 3/64 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54033 | CB230-0.047-F3-B.0-Z2 | 3/64 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55462 | CB230-0.063-F2-B.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55615 | CB230-0.063-F2-B.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86152 | CB230-0.063-F3-B.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86228 | CB230-0.063-F3-B.0-Z2 | 1/16 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54022 | CB230-0.063-F4-B.0-Z2 | 1/16 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54034 | CB230-0.063-F4-B.0-Z2 | 1/16 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86153 | CB230-0.078-F2-B.0-Z2 | 5/64 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86229 | CB230-0.078-F2-B.0-Z2 | 5/64 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N54023 | CB230-0.078-F3-B.0-Z2 | 5/64 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N54035 | CB230-0.078-F3-B.0-Z2 | 5/64 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55463 | CB230-0.094-F2-B.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55616 | CB230-0.094-F2-B.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86154 | CB230-0.094-F3-B.0-Z2 | 3/32 | 1/8 | 9/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86230 | CB230-0.094-F3-B.0-Z2 | 3/32 | 1/8 | 9/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55464 | CB230-0.094-F4-B.0-Z2 | 3/32 | 1/8 | 3/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55617 | CB230-0.094-F4-B.0-Z2 | 3/32 | 1/8 | 3/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55465 | CB230-0.125-D2-B.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55618 | CB230-0.125-D2-B.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N86156 | CB230-0.125-D4-B.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86232 | CB230-0.125-D4-B.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N55466 | CB230-0.125-D5-B.0-Z2 | 1/8 | 1/8 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55619 | CB230-0.125-D5-B.0-Z2 | 1/8 | 1/8 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N55467 | CB230-0.125-D6-B.0-Z2 | 1/8 | 1/8 | 3/4 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55620 | CB230-0.125-D6-B.0-Z2 | 1/8 | 1/8 | 3/4 | 3 | 2 | TIALN | CYLINDRICAL |
| N55468 | CB230-0.125-D8-B.0-Z2 | 1/8 | 1/8 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55621 | CB230-0.125-D8-B.0-Z2 | 1/8 | 1/8 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55469 | CB230-0.156-F2-B.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55622 | CB230-0.156-F2-B.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | TIALN | CYLINDRICAL |

CB230 (CONT'D)

SOLID
CARBIDE



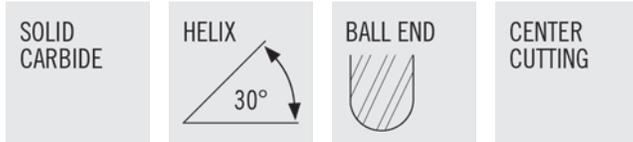
CENTER
CUTTING



- General Purpose
- General machining of most material types
- Cutting Data - Page 194-195
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86158 | CB230-0.156-F3-B.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N86234 | CB230-0.156-F3-B.0-Z2 | 5/32 | 3/16 | 1/2 | 2 | 2 | TIALN | CYLINDRICAL |
| N55470 | CB230-0.188-D2-B.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55623 | CB230-0.188-D2-B.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N86160 | CB230-0.188-D3-B.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N86236 | CB230-0.188-D3-B.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N55471 | CB230-0.188-D4-B.0-Z2 | 3/16 | 3/16 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55624 | CB230-0.188-D4-B.0-Z2 | 3/16 | 3/16 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55472 | CB230-0.188-D5-B.0-Z2 | 3/16 | 3/16 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55625 | CB230-0.188-D5-B.0-Z2 | 3/16 | 3/16 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55473 | CB230-0.188-D6-B.0-Z2 | 3/16 | 3/16 | 1-1/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55626 | CB230-0.188-D6-B.0-Z2 | 3/16 | 3/16 | 1-1/8 | 3 | 2 | TIALN | CYLINDRICAL |
| N55475 | CB230-0.250-D2-B.0-Z2 | 1/4 | 1/4 | 1/2 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55628 | CB230-0.250-D2-B.0-Z2 | 1/4 | 1/4 | 1/2 | 2 | 2 | TIALN | CYLINDRICAL |
| N86164 | CB230-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86240 | CB230-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55476 | CB230-0.250-D4-B.0-Z2 | 1/4 | 1/4 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55629 | CB230-0.250-D4-B.0-Z2 | 1/4 | 1/4 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55477 | CB230-0.250-D5-B.0-Z2 | 1/4 | 1/4 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55630 | CB230-0.250-D5-B.0-Z2 | 1/4 | 1/4 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55478 | CB230-0.250-D6-B.0-Z2 | 1/4 | 1/4 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55631 | CB230-0.250-D6-B.0-Z2 | 1/4 | 1/4 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55479 | CB230-0.250-D7-B.0-Z2 | 1/4 | 1/4 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55632 | CB230-0.250-D7-B.0-Z2 | 1/4 | 1/4 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N86166 | CB230-0.281-F3-B.0-Z2 | 9/32 | 5/16 | 3/4 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86242 | CB230-0.281-F3-B.0-Z2 | 9/32 | 5/16 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N86168 | CB230-0.313-D3-B.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86244 | CB230-0.313-D3-B.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55482 | CB230-0.313-D5-B.0-Z2 | 5/16 | 5/16 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55635 | CB230-0.313-D5-B.0-Z2 | 5/16 | 5/16 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55484 | CB230-0.313-D7-B.0-Z2 | 5/16 | 5/16 | 1-5/8 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55637 | CB230-0.313-D7-B.0-Z2 | 5/16 | 5/16 | 1-5/8 | 4 | 2 | TIALN | CYLINDRICAL |
| N55485 | CB230-0.375-D2-B.0-Z2 | 3/8 | 3/8 | 5/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N55638 | CB230-0.375-D2-B.0-Z2 | 3/8 | 3/8 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N86172 | CB230-0.375-D3-B.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86248 | CB230-0.375-D3-B.0-Z2 | 3/8 | 3/8 | 1 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N55486 | CB230-0.375-D4-B.0-Z2 | 3/8 | 3/8 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55639 | CB230-0.375-D4-B.0-Z2 | 3/8 | 3/8 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55487 | CB230-0.375-D5-B.0-Z2 | 3/8 | 3/8 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |

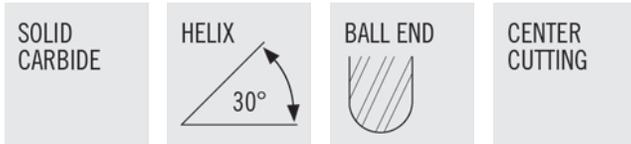
CB230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 194-195
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N55640 | CB230-0.375-D5-B.0-Z2 | 3/8 | 3/8 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55488 | CB230-0.375-D6-B.0-Z2 | 3/8 | 3/8 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55641 | CB230-0.375-D6-B.0-Z2 | 3/8 | 3/8 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N55489 | CB230-0.375-D7-B.0-Z2 | 3/8 | 3/8 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55642 | CB230-0.375-D7-B.0-Z2 | 3/8 | 3/8 | 2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55492 | CB230-0.438-D3-B.0-Z2 | 7/16 | 7/16 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55645 | CB230-0.438-D3-B.0-Z2 | 7/16 | 7/16 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55496 | CB230-0.500-D1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N55649 | CB230-0.500-D1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N86180 | CB230-0.500-D2-B.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N86256 | CB230-0.500-D2-B.0-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N55497 | CB230-0.500-D3-B.0-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55650 | CB230-0.500-D3-B.0-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | TIALN | CYLINDRICAL |
| N55498 | CB230-0.500-D4-B.0-Z2 | 1/2 | 1/2 | 1-1/2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55651 | CB230-0.500-D4-B.0-Z2 | 1/2 | 1/2 | 1-1/2 | 6 | 2 | TIALN | CYLINDRICAL |
| N55499 | CB230-0.500-D5-B.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N55652 | CB230-0.500-D5-B.0-Z2 | 1/2 | 1/2 | 2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55500 | CB230-0.500-D6-B.0-Z2 | 1/2 | 1/2 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55653 | CB230-0.500-D6-B.0-Z2 | 1/2 | 1/2 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N55501 | CB230-0.563-D4-B.0-Z2 | 9/16 | 9/16 | 2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55654 | CB230-0.563-D4-B.0-Z2 | 9/16 | 9/16 | 2 | 6 | 2 | TIALN | CYLINDRICAL |
| N86182 | CB230-0.625-D2-B.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N86258 | CB230-0.625-D2-B.0-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | CYLINDRICAL |
| N55506 | CB230-0.750-D1-B.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N55659 | CB230-0.750-D1-B.0-Z2 | 3/4 | 3/4 | 1 | 3 | 2 | TIALN | CYLINDRICAL |
| N86184 | CB230-0.750-D2-B.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N86260 | CB230-0.750-D2-B.0-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55507 | CB230-0.750-D3-B.0-Z2 | 3/4 | 3/4 | 2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55660 | CB230-0.750-D3-B.0-Z2 | 3/4 | 3/4 | 2 | 6 | 2 | TIALN | CYLINDRICAL |
| N55508 | CB230-0.750-D4-B.0-Z2 | 3/4 | 3/4 | 3 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55661 | CB230-0.750-D4-B.0-Z2 | 3/4 | 3/4 | 3 | 6 | 2 | TIALN | CYLINDRICAL |
| N86185 | CB230-0.875-D2-B.0-Z2 | 7/8 | 7/8 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N86261 | CB230-0.875-D2-B.0-Z2 | 7/8 | 7/8 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N86186 | CB230-1.000-D1-B.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | UNCOATED | CYLINDRICAL |
| N86262 | CB230-1.000-D1-B.0-Z2 | 1 | 1 | 1-1/2 | 4 | 2 | TIALN | CYLINDRICAL |
| N55510 | CB230-1.000-D2-B.0-Z2 | 1 | 1 | 2 | 6 | 2 | UNCOATED | CYLINDRICAL |
| N55663 | CB230-1.000-D2-B.0-Z2 | 1 | 1 | 2 | 6 | 2 | TIALN | CYLINDRICAL |
| N55512 | CB230-1.000-D4-B.0-Z2 | 1 | 1 | 4 | 7 | 2 | UNCOATED | CYLINDRICAL |
| N55665 | CB230-1.000-D4-B.0-Z2 | 1 | 1 | 4 | 7 | 2 | TIALN | CYLINDRICAL |

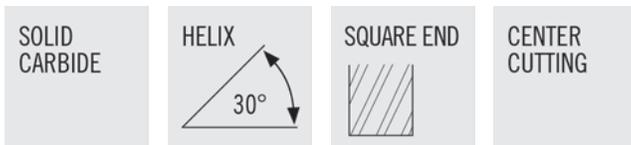
METRIC CB230M



- General Purpose
- General machining of most material types
- Cutting Data - Page 198-199
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N46370 | CB230M-010-F4-B.0-Z2 | 1MM | 3MM | 4MM | 39MM | 2 | ALTIN | CYLINDRICAL |
| N46374 | CB230M-020-F3-B.0-Z2 | 2MM | 3MM | 6.3MM | 39MM | 2 | ALTIN | CYLINDRICAL |
| N46378 | CB230M-030-D4-B.0-Z2 | 3MM | 3MM | 12MM | 39MM | 2 | ALTIN | CYLINDRICAL |
| N46382 | CB230M-040-D4-B.0-Z2 | 4MM | 4MM | 14MM | 51MM | 2 | ALTIN | CYLINDRICAL |
| N46386 | CB230M-050-F3-B.0-Z2 | 5MM | 6MM | 16MM | 51MM | 2 | ALTIN | CYLINDRICAL |
| N46388 | CB230M-060-D3-B.0-Z2 | 6MM | 6MM | 19MM | 51MM | 2 | ALTIN | CYLINDRICAL |
| N46392 | CB230M-080-D2-B.0-Z2 | 8MM | 8MM | 20MM | 64MM | 2 | ALTIN | CYLINDRICAL |

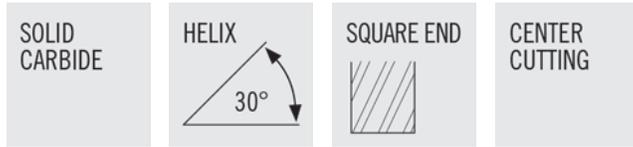
CD230



- General Purpose
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|------------|
| N85375 | CD230-0.125-XF3-S.3-Z2 | 1/8 | 3/8 | 3/8 | 3-1/16 | 2 | UNCOATED | WELDON |
| N85397 | CD230-0.125-XF3-S.3-Z2 | 1/8 | 3/8 | 3/8 | 3-1/16 | 2 | TIALN | WELDON |
| N85377 | CD230-0.188-XF3-S.3-Z2 | 3/16 | 3/8 | 1/2 | 3-1/4 | 2 | UNCOATED | WELDON |
| N85399 | CD230-0.188-XF3-S.3-Z2 | 3/16 | 3/8 | 1/2 | 3-1/4 | 2 | TIALN | WELDON |
| N85379 | CD230-0.250-XF3-S.3-Z2 | 1/4 | 3/8 | 5/8 | 3-3/8 | 2 | UNCOATED | WELDON |
| N85401 | CD230-0.250-XF3-S.3-Z2 | 1/4 | 3/8 | 5/8 | 3-3/8 | 2 | TIALN | WELDON |
| N85381 | CD230-0.313-XF2-S.3-Z2 | 5/16 | 3/8 | 3/4 | 3-1/2 | 2 | UNCOATED | WELDON |
| N85403 | CD230-0.313-XF2-S.3-Z2 | 5/16 | 3/8 | 3/4 | 3-1/2 | 2 | TIALN | WELDON |
| N85383 | CD230-0.375-XD2-S.3-Z2 | 3/8 | 3/8 | 3/4 | 3-1/2 | 2 | UNCOATED | WELDON |
| N85405 | CD230-0.375-XD2-S.3-Z2 | 3/8 | 3/8 | 3/4 | 3-1/2 | 2 | TIALN | WELDON |
| N85385 | CD230-0.500-XD2-S.3-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | UNCOATED | WELDON |
| N85407 | CD230-0.500-XD2-S.3-Z2 | 1/2 | 1/2 | 1 | 4 | 2 | TIALN | WELDON |

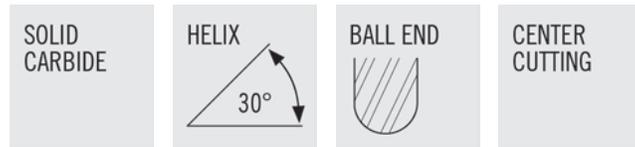
CSD230



- General Purpose
- Stub Length
- General Machining for most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N89650 | CSD230-0.031-XF2-S.0-Z2 | 1/32 | 1/8 | 1/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89653 | CSD230-0.031-XF2-S.0-Z2 | 1/32 | 1/8 | 1/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89654 | CSD230-0.047-XF2-S.0-Z2 | 3/64 | 1/8 | 3/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89657 | CSD230-0.047-XF2-S.0-Z2 | 3/64 | 1/8 | 3/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89658 | CSD230-0.063-XF2-S.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89661 | CSD230-0.063-XF2-S.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89662 | CSD230-0.078-XF2-S.0-Z2 | 5/64 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89665 | CSD230-0.078-XF2-S.0-Z2 | 5/64 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89666 | CSD230-0.094-XF2-S.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89669 | CSD230-0.094-XF2-S.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89674 | CSD230-0.125-XD2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89677 | CSD230-0.125-XD2-S.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89682 | CSD230-0.156-XF2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N89685 | CSD230-0.156-XF2-S.0-Z2 | 5/32 | 3/16 | 5/16 | 2 | 2 | TIALN | CYLINDRICAL |
| N89690 | CSD230-0.188-XD2-S.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N89693 | CSD230-0.188-XD2-S.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N89698 | CSD230-0.219-XF2-S.0-Z2 | 7/32 | 1/4 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89701 | CSD230-0.219-XF2-S.0-Z2 | 7/32 | 1/4 | 1/2 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89706 | CSD230-0.250-XD2-S.0-Z2 | 1/4 | 1/4 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89709 | CSD230-0.250-XD2-S.0-Z2 | 1/4 | 1/4 | 1/2 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89714 | CSD230-0.313-XD2-S.0-Z2 | 5/16 | 5/16 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89717 | CSD230-0.313-XD2-S.0-Z2 | 5/16 | 5/16 | 1/2 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89722 | CSD230-0.375-XD2-S.0-Z2 | 3/8 | 3/8 | 9/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89725 | CSD230-0.375-XD2-S.0-Z2 | 3/8 | 3/8 | 9/16 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89730 | CSD230-0.500-XD1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N89733 | CSD230-0.500-XD1-S.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | TIALN | CYLINDRICAL |

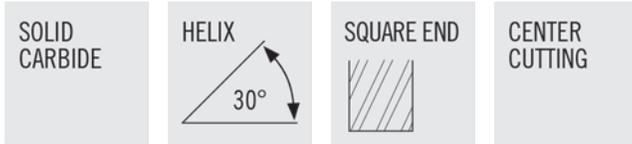
CSDB230



- General Purpose Stub Length
- General machining of most material types
- Cutting Data - Page 194-195
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N89734 | CSDB230-0.031-XF2-B.0-Z2 | 1/32 | 1/8 | 1/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89737 | CSDB230-0.031-XF2-B.0-Z2 | 1/32 | 1/8 | 1/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89738 | CSDB230-0.047-XF2-B.0-Z2 | 3/64 | 1/8 | 3/32 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89741 | CSDB230-0.047-XF2-B.0-Z2 | 3/64 | 1/8 | 3/32 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89742 | CSDB230-0.063-XF2-B.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89745 | CSDB230-0.063-XF2-B.0-Z2 | 1/16 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89746 | CSDB230-0.078-XF2-B.0-Z2 | 5/64 | 1/8 | 1/8 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89749 | CSDB230-0.078-XF2-B.0-Z2 | 5/64 | 1/8 | 1/8 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89750 | CSDB230-0.094-XF2-B.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89753 | CSDB230-0.094-XF2-B.0-Z2 | 3/32 | 1/8 | 3/16 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89758 | CSDB230-0.125-XD2-B.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89761 | CSDB230-0.125-XD2-B.0-Z2 | 1/8 | 1/8 | 1/4 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N89762 | CSDB230-0.141-XF2-B.0-Z2 | 9/64 | 3/16 | 5/16 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N89765 | CSDB230-0.141-XF2-B.0-Z2 | 9/64 | 3/16 | 5/16 | 2 | 2 | TIALN | CYLINDRICAL |
| N89774 | CSDB230-0.188-XD2-B.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | UNCOATED | CYLINDRICAL |
| N89777 | CSDB230-0.188-XD2-B.0-Z2 | 3/16 | 3/16 | 3/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N89790 | CSDB230-0.250-XD2-B.0-Z2 | 1/4 | 1/4 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89793 | CSDB230-0.250-XD2-B.0-Z2 | 1/4 | 1/4 | 1/2 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89798 | CSDB230-0.313-XD2-B.0-Z2 | 5/16 | 5/16 | 1/2 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89801 | CSDB230-0.313-XD2-B.0-Z2 | 5/16 | 5/16 | 1/2 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89806 | CSDB230-0.375-XD2-B.0-Z2 | 3/8 | 3/8 | 9/16 | 2-1/2 | 2 | UNCOATED | CYLINDRICAL |
| N89809 | CSDB230-0.375-XD2-B.0-Z2 | 3/8 | 3/8 | 9/16 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N89814 | CSDB230-0.500-XD1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | UNCOATED | CYLINDRICAL |
| N89817 | CSDB230-0.500-XD1-B.0-Z2 | 1/2 | 1/2 | 5/8 | 3 | 2 | TIALN | CYLINDRICAL |

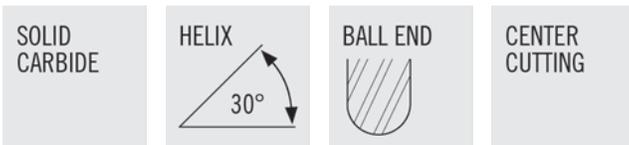
CNC230



- General Purpose
- NC Tolerance
- General machining of most material types
- Cutting Data - Page 192-193
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N85775 | CNC230-0.125-D4-S.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85777 | CNC230-0.188-D3-S.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N85779 | CNC230-0.250-D3-S.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85781 | CNC230-0.313-D3-S.0-Z2 | 5/16 | 5/16 | 13/16 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85782 | CNC230-0.375-D2-S.3-Z2 | 3/8 | 3/8 | 7/8 | 2-1/2 | 2 | TIALN | WELDON |
| N85784 | CNC230-0.500-D2-S.3-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | WELDON |
| N85786 | CNC230-0.625-D2-S.3-Z2 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 2 | TIALN | WELDON |
| N85787 | CNC230-0.750-D2-S.3-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | WELDON |

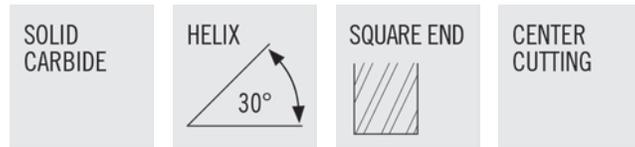
CNCB230



- General Purpose
- NC Tolerance
- General machining of most material types
- Cutting Data - Page 194-195
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N85818 | CNCB230-0.125-D4-B.0-Z2 | 1/8 | 1/8 | 1/2 | 1-1/2 | 2 | TIALN | CYLINDRICAL |
| N85820 | CNCB230-0.188-D3-B.0-Z2 | 3/16 | 3/16 | 5/8 | 2 | 2 | TIALN | CYLINDRICAL |
| N85825 | CNCB230-0.375-D2-B.3-Z2 | 3/8 | 3/8 | 7/8 | 2-1/2 | 2 | TIALN | WELDON |
| N85827 | CNCB230-0.500-D2-B.3-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TIALN | WELDON |
| N85822 | CNCB230-0.250-D3-B.0-Z2 | 1/4 | 1/4 | 3/4 | 2-1/2 | 2 | TIALN | CYLINDRICAL |
| N85830 | CNCB230-0.750-D2-B.3-Z2 | 3/4 | 3/4 | 1-1/2 | 4 | 2 | TIALN | WELDON |

C330

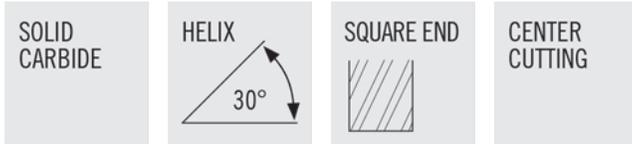


- General Purpose
- General machining (slotting/pocketing/profiling) of most material types

- Cutting Data - Page 200-201
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85920 | C330-0.031-F3-S.0-Z3 | 1/32 | 1/8 | 5/64 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N85996 | C330-0.031-F3-S.0-Z3 | 1/32 | 1/8 | 5/64 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85921 | C330-0.047-F2-S.0-Z3 | 3/64 | 1/8 | 7/64 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N85997 | C330-0.047-F2-S.0-Z3 | 3/64 | 1/8 | 7/64 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85922 | C330-0.063-F3-S.0-Z3 | 1/16 | 1/8 | 3/16 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N85998 | C330-0.063-F3-S.0-Z3 | 1/16 | 1/8 | 3/16 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85923 | C330-0.078-F2-S.0-Z3 | 5/64 | 1/8 | 3/16 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N85999 | C330-0.078-F2-S.0-Z3 | 5/64 | 1/8 | 3/16 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85924 | C330-0.094-F3-S.0-Z3 | 3/32 | 1/8 | 9/32 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86000 | C330-0.094-F3-S.0-Z3 | 3/32 | 1/8 | 9/32 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85925 | C330-0.109-F3-S.0-Z3 | 7/64 | 1/8 | 3/8 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86001 | C330-0.109-F3-S.0-Z3 | 7/64 | 1/8 | 3/8 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85926 | C330-0.125-D4-S.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86002 | C330-0.125-D4-S.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N85928 | C330-0.156-F3-S.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N86004 | C330-0.156-F3-S.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TIALN | CYLINDRICAL |
| N85930 | C330-0.188-D3-S.0-Z3 | 3/16 | 3/16 | 5/8 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N86006 | C330-0.188-D3-S.0-Z3 | 3/16 | 3/16 | 5/8 | 2 | 3 | TIALN | CYLINDRICAL |
| N85931 | C330-0.203-F3-S.0-Z3 | 13/64 | 1/4 | 5/8 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86007 | C330-0.203-F3-S.0-Z3 | 13/64 | 1/4 | 5/8 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85932 | C330-0.219-F3-S.0-Z3 | 7/32 | 1/4 | 5/8 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86008 | C330-0.219-F3-S.0-Z3 | 7/32 | 1/4 | 5/8 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85933 | C330-0.234-F3-S.0-Z3 | 15/64 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86009 | C330-0.234-F3-S.0-Z3 | 15/64 | 1/4 | 3/4 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85934 | C330-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86010 | C330-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85938 | C330-0.313-D3-S.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86014 | C330-0.313-D3-S.0-Z3 | 5/16 | 5/16 | 13/16 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85942 | C330-0.375-D3-S.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86018 | C330-0.375-D3-S.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N85946 | C330-0.438-D2-S.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | UNCOATED | CYLINDRICAL |
| N86022 | C330-0.438-D2-S.0-Z3 | 7/16 | 7/16 | 1 | 2-3/4 | 3 | TIALN | CYLINDRICAL |
| N85950 | C330-0.500-D2-S.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | UNCOATED | CYLINDRICAL |

C330 (CONT'D) & C330M

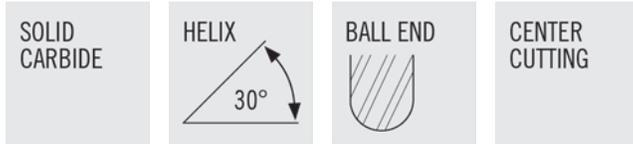


- General Purpose
- General machining (slotting/pocketing/profiling) of most material types

- Cutting Data C330 - Page 200-201
- Tolerance Specs C330 - Page 335
- Cutting Data C330M - Page 202-203
- Tolerance Specs C330M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|-----------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| INCH - C330 (CONT'D) | | | | | | | | |
| N86026 | C330-0.500-D2-S.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | TIALN | CYLINDRICAL |
| N85951 | C330-0.563-D2-S.0-Z3 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86027 | C330-0.563-D2-S.0-Z3 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 3 | TIALN | CYLINDRICAL |
| N85952 | C330-0.625-D2-S.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86028 | C330-0.625-D2-S.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | TIALN | CYLINDRICAL |
| N85954 | C330-0.750-D2-S.0-Z3 | 3/4 | 3/4 | 1-1/2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N86030 | C330-0.750-D2-S.0-Z3 | 3/4 | 3/4 | 1-1/2 | 4 | 3 | TIALN | CYLINDRICAL |
| N85955 | C330-0.875-D2-S.0-Z3 | 7/8 | 7/8 | 1-1/2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N86031 | C330-0.875-D2-S.0-Z3 | 7/8 | 7/8 | 1-1/2 | 4 | 3 | TIALN | CYLINDRICAL |
| N85956 | C330-1.000-D2-S.0-Z3 | 1 | 1 | 1-1/2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N86032 | C330-1.000-D2-S.0-Z3 | 1 | 1 | 1-1/2 | 4 | 3 | TIALN | CYLINDRICAL |
| METRIC - C330M | | | | | | | | |
| N47704 | C330M-010-F4-S.0-Z3 | 1MM | 3MM | 4MM | 39MM | 3 | ALTIN | CYLINDRICAL |
| N47714 | C330M-030-D4-S.0-Z3 | 3MM | 3MM | 12MM | 39MM | 3 | ALTIN | CYLINDRICAL |
| N47728 | C330M-060-D3-S.0-Z3 | 6MM | 6MM | 19MM | 51MM | 3 | ALTIN | CYLINDRICAL |
| N47734 | C330M-080-D2-S.0-Z3 | 8MM | 8MM | 20MM | 64MM | 3 | ALTIN | CYLINDRICAL |
| N47740 | C330M-100-D2-S.0-Z3 | 10MM | 10MM | 22MM | 73MM | 3 | ALTIN | CYLINDRICAL |
| N47742 | C330M-110-F2-S.0-Z3 | 11MM | 12MM | 25MM | 74MM | 3 | ALTIN | CYLINDRICAL |

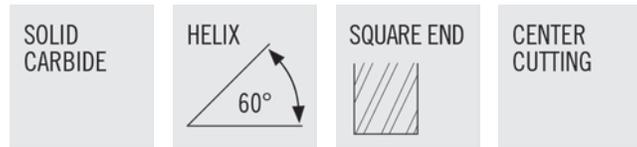
CB330



- General Purpose
- General machining (slotting/pocketing/profiling) of most material types
- Cutting Data - Page 204-205
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86034 | CB330-0.016-F2-B.0-Z3 | 1/64 | 1/8 | 1/32 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86110 | CB330-0.016-F2-B.0-Z3 | 1/64 | 1/8 | 1/32 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N86035 | CB330-0.031-F3-B.0-Z3 | 1/32 | 1/8 | 5/64 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86111 | CB330-0.031-F3-B.0-Z3 | 1/32 | 1/8 | 5/64 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N86037 | CB330-0.063-F3-B.0-Z3 | 1/16 | 1/8 | 3/16 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86113 | CB330-0.063-F3-B.0-Z3 | 1/16 | 1/8 | 3/16 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N86039 | CB330-0.094-F3-B.0-Z3 | 3/32 | 1/8 | 9/32 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86115 | CB330-0.094-F3-B.0-Z3 | 3/32 | 1/8 | 9/32 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N86041 | CB330-0.125-D4-B.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86117 | CB330-0.125-D4-B.0-Z3 | 1/8 | 1/8 | 1/2 | 1-1/2 | 3 | TIALN | CYLINDRICAL |
| N86043 | CB330-0.156-F3-B.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N86119 | CB330-0.156-F3-B.0-Z3 | 5/32 | 3/16 | 1/2 | 2 | 3 | TIALN | CYLINDRICAL |
| N86045 | CB330-0.188-D3-B.0-Z3 | 3/16 | 3/16 | 5/8 | 2 | 3 | UNCOATED | CYLINDRICAL |
| N86121 | CB330-0.188-D3-B.0-Z3 | 3/16 | 3/16 | 5/8 | 2 | 3 | TIALN | CYLINDRICAL |
| N86047 | CB330-0.219-F3-B.0-Z3 | 7/32 | 1/4 | 5/8 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86123 | CB330-0.219-F3-B.0-Z3 | 7/32 | 1/4 | 5/8 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N86049 | CB330-0.250-D3-B.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86125 | CB330-0.250-D3-B.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N86057 | CB330-0.375-D3-B.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86133 | CB330-0.375-D3-B.0-Z3 | 3/8 | 3/8 | 1 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N86065 | CB330-0.500-D2-B.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N86141 | CB330-0.500-D2-B.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | TIALN | CYLINDRICAL |
| N86066 | CB330-0.563-D2-B.0-Z3 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86142 | CB330-0.563-D2-B.0-Z3 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 3 | TIALN | CYLINDRICAL |
| N86067 | CB330-0.625-D2-B.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86143 | CB330-0.625-D2-B.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | TIALN | CYLINDRICAL |
| N86069 | CB330-0.750-D2-B.0-Z3 | 3/4 | 3/4 | 1-1/2 | 4 | 3 | UNCOATED | CYLINDRICAL |
| N86145 | CB330-0.750-D2-B.0-Z3 | 3/4 | 3/4 | 1-1/2 | 4 | 3 | TIALN | CYLINDRICAL |

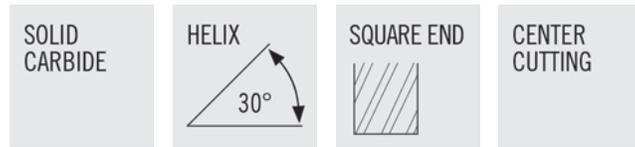
C360



- General Purpose
- General machining of most material types
- Cutting Data - Page 206
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N18854 | C360-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86850 | C360-0.250-D3-S.0-Z3 | 1/4 | 1/4 | 3/4 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N18858 | C360-0.375-D2-S.0-Z3 | 3/8 | 3/8 | 7/8 | 2-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86852 | C360-0.375-D2-S.0-Z3 | 3/8 | 3/8 | 7/8 | 2-1/2 | 3 | TIALN | CYLINDRICAL |
| N18862 | C360-0.500-D2-S.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | UNCOATED | CYLINDRICAL |
| N86854 | C360-0.500-D2-S.0-Z3 | 1/2 | 1/2 | 1 | 3 | 3 | TIALN | CYLINDRICAL |
| N18866 | C360-0.625-D2-S.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | UNCOATED | CYLINDRICAL |
| N86856 | C360-0.625-D2-S.0-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | TIALN | CYLINDRICAL |
| N18870 | C360-0.750-D3-S.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N86858 | C360-0.750-D3-S.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |

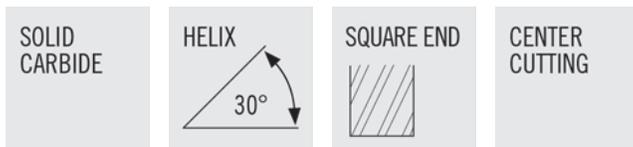
C430



- General Purpose
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85503 | C430-0.016-F2-S.0-Z4 | 1/64 | 1/8 | 1/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85579 | C430-0.016-F2-S.0-Z4 | 1/64 | 1/8 | 1/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85504 | C430-0.031-F3-S.0-Z4 | 1/32 | 1/8 | 5/64 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85580 | C430-0.031-F3-S.0-Z4 | 1/32 | 1/8 | 5/64 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55666 | C430-0.031-F4-S.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55792 | C430-0.031-F4-S.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85505 | C430-0.047-F2-S.0-Z4 | 3/64 | 1/8 | 7/64 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85581 | C430-0.047-F2-S.0-Z4 | 3/64 | 1/8 | 7/64 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55667 | C430-0.047-F3-S.0-Z4 | 3/64 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55793 | C430-0.047-F3-S.0-Z4 | 3/64 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85652 | C430-0.063-F2-S.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85678 | C430-0.063-F2-S.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85506 | C430-0.063-F3-S.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85582 | C430-0.063-F3-S.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55668 | C430-0.063-F4-S.0-Z4 | 1/16 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55794 | C430-0.063-F4-S.0-Z4 | 1/16 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55669 | C430-0.063-F8-S.0-Z4 | 1/16 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55795 | C430-0.063-F8-S.0-Z4 | 1/16 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55670 | C430-0.063-F9-S.0-Z4 | 1/16 | 1/8 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55796 | C430-0.063-F9-S.0-Z4 | 1/16 | 1/8 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85507 | C430-0.078-F2-S.0-Z4 | 5/64 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85583 | C430-0.078-F2-S.0-Z4 | 5/64 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55671 | C430-0.078-F3-S.0-Z4 | 5/64 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55797 | C430-0.078-F3-S.0-Z4 | 5/64 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85653 | C430-0.094-F2-S.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85679 | C430-0.094-F2-S.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85508 | C430-0.094-F3-S.0-Z4 | 3/32 | 1/8 | 9/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85584 | C430-0.094-F3-S.0-Z4 | 3/32 | 1/8 | 9/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55672 | C430-0.094-F4-S.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55798 | C430-0.094-F4-S.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55673 | C430-0.094-F8-S.0-Z4 | 3/32 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55799 | C430-0.094-F8-S.0-Z4 | 3/32 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N85509 | C430-0.109-F3-S.0-Z4 | 7/64 | 1/8 | 3/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85585 | C430-0.109-F3-S.0-Z4 | 7/64 | 1/8 | 3/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85654 | C430-0.125-D2-S.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85680 | C430-0.125-D2-S.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85510 | C430-0.125-D4-S.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85586 | C430-0.125-D4-S.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | CYLINDRICAL |

C430 (CONT'D)

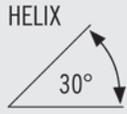


- General Purpose
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N55675 | C430-0.125-D5-S.0-Z4 | 1/8 | 1/8 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N55801 | C430-0.125-D5-S.0-Z4 | 1/8 | 1/8 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N55676 | C430-0.125-D6-S.0-Z4 | 1/8 | 1/8 | 3/4 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55802 | C430-0.125-D6-S.0-Z4 | 1/8 | 1/8 | 3/4 | 3 | 4 | TIALN | CYLINDRICAL |
| N55677 | C430-0.125-D8-S.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55803 | C430-0.125-D8-S.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55678 | C430-0.125-D9-S.0-Z4 | 1/8 | 1/8 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55804 | C430-0.125-D9-S.0-Z4 | 1/8 | 1/8 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85511 | C430-0.141-F4-S.0-Z4 | 9/64 | 3/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85587 | C430-0.141-F4-S.0-Z4 | 9/64 | 3/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N85655 | C430-0.156-F2-S.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85681 | C430-0.156-F2-S.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N85512 | C430-0.156-F3-S.0-Z4 | 5/32 | 3/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85588 | C430-0.156-F3-S.0-Z4 | 5/32 | 3/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N85513 | C430-0.172-F4-S.0-Z4 | 11/64 | 3/16 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85589 | C430-0.172-F4-S.0-Z4 | 11/64 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85656 | C430-0.188-D2-S.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85682 | C430-0.188-D2-S.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85514 | C430-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85590 | C430-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85692 | C430-0.188-D4-S.0-Z4 | 3/16 | 3/16 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85728 | C430-0.188-D4-S.0-Z4 | 3/16 | 3/16 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55679 | C430-0.188-D5-S.0-Z4 | 3/16 | 3/16 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55805 | C430-0.188-D5-S.0-Z4 | 3/16 | 3/16 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55680 | C430-0.188-D6-S.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55806 | C430-0.188-D6-S.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85693 | C430-0.188-D7-S.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85729 | C430-0.188-D7-S.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | TIALN | CYLINDRICAL |
| N85515 | C430-0.203-F3-S.0-Z4 | 13/64 | 1/4 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85591 | C430-0.203-F3-S.0-Z4 | 13/64 | 1/4 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85657 | C430-0.219-F2-S.0-Z4 | 7/32 | 1/4 | 7/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85683 | C430-0.219-F2-S.0-Z4 | 7/32 | 1/4 | 7/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N85516 | C430-0.219-F3-S.0-Z4 | 7/32 | 1/4 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85592 | C430-0.219-F3-S.0-Z4 | 7/32 | 1/4 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85517 | C430-0.234-F3-S.0-Z4 | 15/64 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85593 | C430-0.234-F3-S.0-Z4 | 15/64 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85658 | C430-0.250-D2-S.0-Z4 | 1/4 | 1/4 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85684 | C430-0.250-D2-S.0-Z4 | 1/4 | 1/4 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |

C430 (CONT'D)

SOLID
CARBIDE



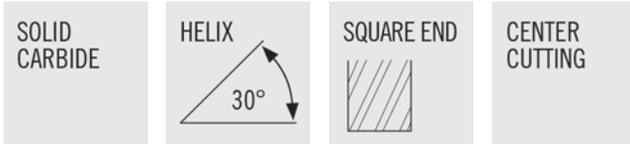
CENTER
CUTTING



- General Purpose
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85518 | C430-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85594 | C430-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55681 | C430-0.250-D4-S.0-Z4 | 1/4 | 1/4 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55807 | C430-0.250-D4-S.0-Z4 | 1/4 | 1/4 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55682 | C430-0.250-D5-S.0-Z4 | 1/4 | 1/4 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55808 | C430-0.250-D5-S.0-Z4 | 1/4 | 1/4 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85694 | C430-0.250-D6-S.0-Z4 | 1/4 | 1/4 | 1-1/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85730 | C430-0.250-D6-S.0-Z4 | 1/4 | 1/4 | 1-1/8 | 3 | 4 | TIALN | CYLINDRICAL |
| N85695 | C430-0.250-D7-S.0-Z4 | 1/4 | 1/4 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85731 | C430-0.250-D7-S.0-Z4 | 1/4 | 1/4 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55683 | C430-0.250-D8-S.0-Z4 | 1/4 | 1/4 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55809 | C430-0.250-D8-S.0-Z4 | 1/4 | 1/4 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85519 | C430-0.266-F3-S.0-Z4 | 17/64 | 5/16 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85595 | C430-0.266-F3-S.0-Z4 | 17/64 | 5/16 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85520 | C430-0.281-F3-S.0-Z4 | 9/32 | 5/16 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85596 | C430-0.281-F3-S.0-Z4 | 9/32 | 5/16 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85521 | C430-0.297-F3-S.0-Z4 | 19/64 | 5/16 | 13/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85597 | C430-0.297-F3-S.0-Z4 | 19/64 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85659 | C430-0.313-D2-S.0-Z4 | 5/16 | 5/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85685 | C430-0.313-D2-S.0-Z4 | 5/16 | 5/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N85522 | C430-0.313-D3-S.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85598 | C430-0.313-D3-S.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55684 | C430-0.313-D4-S.0-Z4 | 5/16 | 5/16 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55810 | C430-0.313-D4-S.0-Z4 | 5/16 | 5/16 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55685 | C430-0.313-D5-S.0-Z4 | 5/16 | 5/16 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55811 | C430-0.313-D5-S.0-Z4 | 5/16 | 5/16 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85696 | C430-0.313-D6-S.0-Z4 | 5/16 | 5/16 | 1-1/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85732 | C430-0.313-D6-S.0-Z4 | 5/16 | 5/16 | 1-1/8 | 3 | 4 | TIALN | CYLINDRICAL |
| N55686 | C430-0.313-D7-S.0-Z4 | 5/16 | 5/16 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55812 | C430-0.313-D7-S.0-Z4 | 5/16 | 5/16 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85697 | C430-0.313-D8-S.0-Z4 | 5/16 | 5/16 | 1-5/8 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85733 | C430-0.313-D8-S.0-Z4 | 5/16 | 5/16 | 1-5/8 | 4 | 4 | TIALN | CYLINDRICAL |
| N85523 | C430-0.328-F3-S.0-Z4 | 21/64 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85599 | C430-0.328-F3-S.0-Z4 | 21/64 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85524 | C430-0.344-F3-S.0-Z4 | 11/32 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85600 | C430-0.344-F3-S.0-Z4 | 11/32 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85525 | C430-0.359-F3-S.0-Z4 | 23/64 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85601 | C430-0.359-F3-S.0-Z4 | 23/64 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |

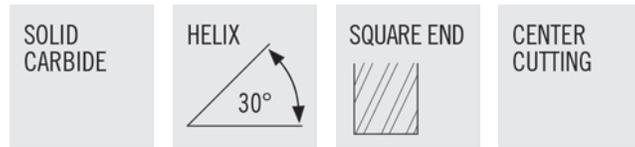
C430 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85660 | C430-0.375-D1-S.0-Z4 | 3/8 | 3/8 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85686 | C430-0.375-D1-S.0-Z4 | 3/8 | 3/8 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85526 | C430-0.375-D2-S.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85602 | C430-0.375-D2-S.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55687 | C430-0.375-D3-S.0-Z4 | 3/8 | 3/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55813 | C430-0.375-D3-S.0-Z4 | 3/8 | 3/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55688 | C430-0.375-D4-S.0-Z4 | 3/8 | 3/8 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55814 | C430-0.375-D4-S.0-Z4 | 3/8 | 3/8 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N85698 | C430-0.375-D5-S.0-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85734 | C430-0.375-D5-S.0-Z4 | 3/8 | 3/8 | 1-1/8 | 3 | 4 | TIALN | CYLINDRICAL |
| N55689 | C430-0.375-D6-S.0-Z4 | 3/8 | 3/8 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55815 | C430-0.375-D6-S.0-Z4 | 3/8 | 3/8 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85699 | C430-0.375-D7-S.0-Z4 | 3/8 | 3/8 | 1-3/4 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85735 | C430-0.375-D7-S.0-Z4 | 3/8 | 3/8 | 1-3/4 | 4 | 4 | TIALN | CYLINDRICAL |
| N55690 | C430-0.375-D8-S.0-Z4 | 3/8 | 3/8 | 2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55816 | C430-0.375-D8-S.0-Z4 | 3/8 | 3/8 | 2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55691 | C430-0.375-D9-S.0-Z4 | 3/8 | 3/8 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55817 | C430-0.375-D9-S.0-Z4 | 3/8 | 3/8 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N85527 | C430-0.391-F3-S.0-Z4 | 25/64 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N85603 | C430-0.391-F3-S.0-Z4 | 25/64 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N85528 | C430-0.406-F2-S.0-Z4 | 13/32 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N85604 | C430-0.406-F2-S.0-Z4 | 13/32 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N85529 | C430-0.422-F2-S.0-Z4 | 27/64 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N85605 | C430-0.422-F2-S.0-Z4 | 27/64 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N85661 | C430-0.438-D1-S.0-Z4 | 7/16 | 7/16 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85687 | C430-0.438-D1-S.0-Z4 | 7/16 | 7/16 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85530 | C430-0.438-D2-S.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N85606 | C430-0.438-D2-S.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N55692 | C430-0.438-D3-S.0-Z4 | 7/16 | 7/16 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55818 | C430-0.438-D3-S.0-Z4 | 7/16 | 7/16 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55693 | C430-0.438-D4-S.0-Z4 | 7/16 | 7/16 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55819 | C430-0.438-D4-S.0-Z4 | 7/16 | 7/16 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55694 | C430-0.438-D5-S.0-Z4 | 7/16 | 7/16 | 2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55820 | C430-0.438-D5-S.0-Z4 | 7/16 | 7/16 | 2 | 4 | 4 | TIALN | CYLINDRICAL |
| N85700 | C430-0.438-D6-S.0-Z4 | 7/16 | 7/16 | 2 | 4-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85736 | C430-0.438-D6-S.0-Z4 | 7/16 | 7/16 | 2 | 4-1/2 | 4 | TIALN | CYLINDRICAL |
| N85701 | C430-0.438-D7-S.0-Z4 | 7/16 | 7/16 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N85737 | C430-0.438-D7-S.0-Z4 | 7/16 | 7/16 | 3 | 6 | 4 | TIALN | CYLINDRICAL |

C430 (CONT'D)

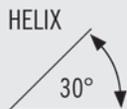


- General Purpose
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85532 | C430-0.469-F2-S.0-Z4 | 15/32 | 1/2 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85608 | C430-0.469-F2-S.0-Z4 | 15/32 | 1/2 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N85662 | C430-0.500-D1-S.0-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85688 | C430-0.500-D1-S.0-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85534 | C430-0.500-D2-S.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85610 | C430-0.500-D2-S.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55695 | C430-0.500-D3-S.0-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55821 | C430-0.500-D3-S.0-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55696 | C430-0.500-D4-S.0-Z4 | 1/2 | 1/2 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55822 | C430-0.500-D4-S.0-Z4 | 1/2 | 1/2 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55697 | C430-0.500-D5-S.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N55823 | C430-0.500-D5-S.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TIALN | CYLINDRICAL |
| N85702 | C430-0.500-D6-S.0-Z4 | 1/2 | 1/2 | 2 | 4-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85738 | C430-0.500-D6-S.0-Z4 | 1/2 | 1/2 | 2 | 4-1/2 | 4 | TIALN | CYLINDRICAL |
| N85703 | C430-0.500-D7-S.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N85739 | C430-0.500-D7-S.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N85535 | C430-0.563-D2-S.0-Z4 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85611 | C430-0.563-D2-S.0-Z4 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 4 | TIALN | CYLINDRICAL |
| N85663 | C430-0.625-D1-S.0-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85689 | C430-0.625-D1-S.0-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | TIALN | CYLINDRICAL |
| N85536 | C430-0.625-D2-S.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85612 | C430-0.625-D2-S.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | CYLINDRICAL |
| N55700 | C430-0.625-D3-S.0-Z4 | 5/8 | 5/8 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55826 | C430-0.625-D3-S.0-Z4 | 5/8 | 5/8 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85704 | C430-0.625-D4-S.0-Z4 | 5/8 | 5/8 | 2-1/4 | 5 | 4 | UNCOATED | CYLINDRICAL |
| N85740 | C430-0.625-D4-S.0-Z4 | 5/8 | 5/8 | 2-1/4 | 5 | 4 | TIALN | CYLINDRICAL |
| N85705 | C430-0.625-D5-S.0-Z4 | 5/8 | 5/8 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N85741 | C430-0.625-D5-S.0-Z4 | 5/8 | 5/8 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N85537 | C430-0.688-F2-S.0-Z4 | 11/16 | 3/4 | 1-3/8 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85613 | C430-0.688-F2-S.0-Z4 | 11/16 | 3/4 | 1-3/8 | 4 | 4 | TIALN | CYLINDRICAL |
| N85664 | C430-0.750-D1-S.0-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N85690 | C430-0.750-D1-S.0-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N85538 | C430-0.750-D2-S.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85614 | C430-0.750-D2-S.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55701 | C430-0.750-D3-S.0-Z4 | 3/4 | 3/4 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55827 | C430-0.750-D3-S.0-Z4 | 3/4 | 3/4 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85706 | C430-0.750-D4-S.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | UNCOATED | CYLINDRICAL |
| N85742 | C430-0.750-D4-S.0-Z4 | 3/4 | 3/4 | 2-1/4 | 5 | 4 | TIALN | CYLINDRICAL |
| N85707 | C430-0.750-D5-S.0-Z4 | 3/4 | 3/4 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N85743 | C430-0.750-D5-S.0-Z4 | 3/4 | 3/4 | 3 | 6 | 4 | TIALN | CYLINDRICAL |

C430 (CONT'D) & C430M

SOLID CARBIDE



CENTER CUTTING

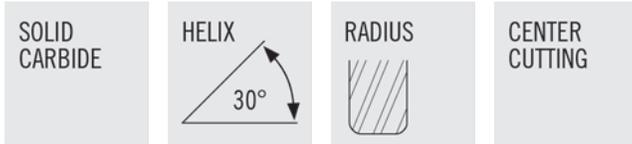


- General Purpose
- General machining of most material types

- Cutting Data C430 - Page 207-208
- Tolerance Specs C430 - Page 335
- Cutting Data C430M - Page 211-212
- Tolerance Specs C430M - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|-----------------------------|----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| INCH - C430 (CONT'D) | | | | | | | | |
| N55702 | C430-0.750-D6-S.0-Z4 | 3/4 | 3/4 | 4 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55828 | C430-0.750-D6-S.0-Z4 | 3/4 | 3/4 | 4 | 6 | 4 | TIALN | CYLINDRICAL |
| N85539 | C430-0.875-D2-S.0-Z4 | 7/8 | 7/8 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85615 | C430-0.875-D2-S.0-Z4 | 7/8 | 7/8 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55703 | C430-1.000-D1-S.0-Z4 | 1 | 1 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N55829 | C430-1.000-D1-S.0-Z4 | 1 | 1 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N85540 | C430-1.000-D2-S.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N85616 | C430-1.000-D2-S.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55704 | C430-1.000-D3-S.0-Z4 | 1 | 1 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55830 | C430-1.000-D3-S.0-Z4 | 1 | 1 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N85708 | C430-1.000-D4-S.0-Z4 | 1 | 1 | 2-1/4 | 5 | 4 | UNCOATED | CYLINDRICAL |
| N85744 | C430-1.000-D4-S.0-Z4 | 1 | 1 | 2-1/4 | 5 | 4 | TIALN | CYLINDRICAL |
| N85709 | C430-1.000-D5-S.0-Z4 | 1 | 1 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N85745 | C430-1.000-D5-S.0-Z4 | 1 | 1 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N55705 | C430-1.000-D6-S.0-Z4 | 1 | 1 | 4 | 7 | 4 | UNCOATED | CYLINDRICAL |
| N55831 | C430-1.000-D6-S.0-Z4 | 1 | 1 | 4 | 7 | 4 | TIALN | CYLINDRICAL |
| N55706 | C430-1.250-D2-S.0-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N55832 | C430-1.250-D2-S.0-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | TIALN | CYLINDRICAL |
| N55707 | C430-1.250-D3-S.0-Z4 | 1-1/4 | 1-1/4 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N55833 | C430-1.250-D3-S.0-Z4 | 1-1/4 | 1-1/4 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| METRIC - C430M | | | | | | | | |
| N46412 | C430M-010-F4-S.0-Z4 | 1MM | 3MM | 4MM | 39MM | 4 | ALTIN | CYLINDRICAL |
| N46414 | C430M-015-F3-S.0-Z4 | 1.5MM | 3MM | 4.5MM | 39MM | 4 | ALTIN | CYLINDRICAL |
| N34456 | C430M-020-F2-S.0-Z4 | 2MM | 3MM | 4MM | 39MM | 4 | ALTIN | CYLINDRICAL |
| N46416 | C430M-020-F3-S.0-Z4 | 2MM | 3MM | 6.3MM | 39MM | 4 | ALTIN | CYLINDRICAL |
| N46420 | C430M-030-D4-S.0-Z4 | 3MM | 3MM | 12MM | 39MM | 4 | ALTIN | CYLINDRICAL |
| N46422 | C430M-035-F3-S.0-Z4 | 3.5MM | 4MM | 12MM | 51MM | 4 | ALTIN | CYLINDRICAL |
| N46424 | C430M-040-D4-S.0-Z4 | 4MM | 4MM | 14MM | 51MM | 4 | ALTIN | CYLINDRICAL |
| N34332 | C430M-050-F5-S.0-Z4 | 5MM | 6MM | 25MM | 75MM | 4 | ALTIN | CYLINDRICAL |
| N46428 | C430M-050-F3-S.0-Z4 | 5MM | 6MM | 16MM | 51MM | 4 | ALTIN | CYLINDRICAL |
| N46430 | C430M-060-D3-S.0-Z4 | 6MM | 6MM | 19MM | 51MM | 4 | ALTIN | CYLINDRICAL |
| N46434 | C430M-080-D2-S.0-Z4 | 8MM | 8MM | 20MM | 64MM | 4 | ALTIN | CYLINDRICAL |
| N46436 | C430M-090-F2-S.0-Z4 | 9MM | 10MM | 22MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N46438 | C430M-100-D2-S.0-Z4 | 10MM | 10MM | 22MM | 73MM | 4 | ALTIN | CYLINDRICAL |
| N34344 | C430M-100-D5-S.0-Z4 | 10MM | 10MM | 38MM | 150MM | 4 | ALTIN | CYLINDRICAL |
| N46440 | C430M-110-F2-S.0-Z4 | 11MM | 12MM | 25MM | 74MM | 4 | ALTIN | CYLINDRICAL |
| N46442 | C430M-120-D2-S.0-Z4 | 12MM | 12MM | 25MM | 74MM | 4 | ALTIN | CYLINDRICAL |
| N34346 | C430M-120-D4-S.0-Z4 | 12MM | 12MM | 50MM | 100MM | 4 | ALTIN | CYLINDRICAL |

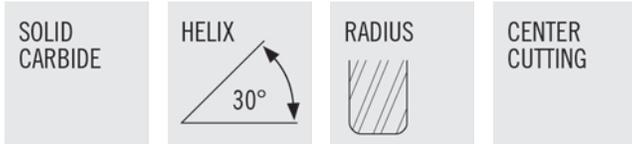
C430R



- General Purpose
- Standard with radius
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N91372 | C430R-0.125-D4-R015.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91373 | C430R-0.125-D4-R020.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91374 | C430R-0.125-D4-R030.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91375 | C430R-0.188-D3-R015.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91376 | C430R-0.188-D3-R020.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91377 | C430R-0.188-D3-R030.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91378 | C430R-0.250-D3-R015.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91379 | C430R-0.250-D3-R020.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91380 | C430R-0.250-D3-R030.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91381 | C430R-0.250-D3-R045.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91382 | C430R-0.313-D3-R015.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91383 | C430R-0.313-D3-R020.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91384 | C430R-0.313-D3-R030.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91385 | C430R-0.313-D3-R045.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91386 | C430R-0.375-D3-R015.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91387 | C430R-0.375-D3-R020.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91389 | C430R-0.375-D3-R030.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91390 | C430R-0.375-D3-R045.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91391 | C430R-0.438-D2-R015.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91393 | C430R-0.438-D2-R030.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91395 | C430R-0.438-D2-R060.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.060 | CYLINDRICAL |
| N91397 | C430R-0.438-D2-R125.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.125 | CYLINDRICAL |
| N91392 | C430R-0.438-D2-R020.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91394 | C430R-0.438-D2-R045.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91396 | C430R-0.438-D2-R090.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | 0.090 | CYLINDRICAL |
| N91398 | C430R-0.500-D2-R020.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91399 | C430R-0.500-D2-R030.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91401 | C430R-0.500-D2-R045.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91402 | C430R-0.500-D2-R060.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.060 | CYLINDRICAL |
| N91403 | C430R-0.500-D2-R090.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.090 | CYLINDRICAL |
| N91404 | C430R-0.500-D2-R125.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.125 | CYLINDRICAL |
| N91353 | C430R-0.500-D2-R015.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.015 | CYLINDRICAL |

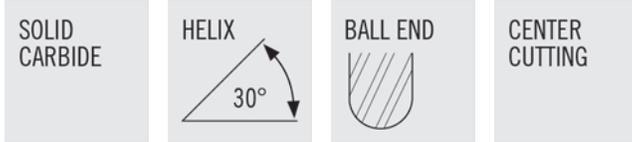
C430R (CONT'D)



- General Purpose
- Standard with radius
- General machining of most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|-------------|
| N91406 | C430R-0.625-D2-R015.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91408 | C430R-0.625-D2-R020.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91409 | C430R-0.625-D2-R030.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91410 | C430R-0.625-D2-R045.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91411 | C430R-0.625-D2-R060.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.060 | CYLINDRICAL |
| N91412 | C430R-0.625-D2-R090.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.090 | CYLINDRICAL |
| N91413 | C430R-0.625-D2-R125.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.125 | CYLINDRICAL |
| N91415 | C430R-0.750-D2-R020.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91416 | C430R-0.750-D2-R030.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.030 | CYLINDRICAL |
| N91417 | C430R-0.750-D2-R045.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91418 | C430R-0.750-D2-R060.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.060 | CYLINDRICAL |
| N91419 | C430R-0.750-D2-R090.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.090 | CYLINDRICAL |
| N91420 | C430R-0.750-D2-R125.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.125 | CYLINDRICAL |
| N91421 | C430R-0.750-D2-R190.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.190 | CYLINDRICAL |
| N91361 | C430R-0.750-D2-R015.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91422 | C430R-1.000-D2-R015.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.015 | CYLINDRICAL |
| N91423 | C430R-1.000-D2-R020.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.020 | CYLINDRICAL |
| N91424 | C430R-1.000-D2-R045.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.045 | CYLINDRICAL |
| N91425 | C430R-1.000-D2-R060.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.060 | CYLINDRICAL |
| N91426 | C430R-1.000-D2-R090.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.090 | CYLINDRICAL |
| N91427 | C430R-1.000-D2-R125.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.125 | CYLINDRICAL |
| N91428 | C430R-1.000-D2-R190.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.190 | CYLINDRICAL |
| N91405 | C430R-1.000-D2-R030.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | 0.030 | CYLINDRICAL |

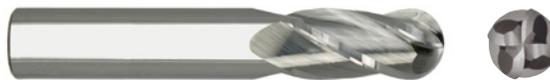
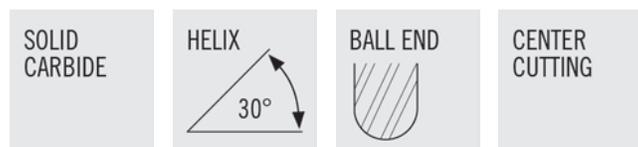
CB430



- General Purpose
- General machining for most material types
- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86264 | CB430-0.016-F2-B.0-Z4 | 1/64 | 1/8 | 1/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86340 | CB430-0.016-F2-B.0-Z4 | 1/64 | 1/8 | 1/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N86265 | CB430-0.031-F3-B.0-Z4 | 1/32 | 1/8 | 5/64 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86341 | CB430-0.031-F3-B.0-Z4 | 1/32 | 1/8 | 5/64 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55834 | CB430-0.031-F4-B.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56014 | CB430-0.031-F4-B.0-Z4 | 1/32 | 1/8 | 3/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N86266 | CB430-0.047-F2-B.0-Z4 | 3/64 | 1/8 | 7/64 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86342 | CB430-0.047-F2-B.0-Z4 | 3/64 | 1/8 | 7/64 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55835 | CB430-0.047-F3-B.0-Z4 | 3/64 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56015 | CB430-0.047-F3-B.0-Z4 | 3/64 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55836 | CB430-0.063-F2-B.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56016 | CB430-0.063-F2-B.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N86267 | CB430-0.063-F3-B.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86343 | CB430-0.063-F3-B.0-Z4 | 1/16 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55837 | CB430-0.063-F4-B.0-Z4 | 1/16 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56017 | CB430-0.063-F4-B.0-Z4 | 1/16 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55838 | CB430-0.063-F8-B.0-Z4 | 1/16 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N56018 | CB430-0.063-F8-B.0-Z4 | 1/16 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N86268 | CB430-0.078-F2-B.0-Z4 | 5/64 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86344 | CB430-0.078-F2-B.0-Z4 | 5/64 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55840 | CB430-0.078-F3-B.0-Z4 | 5/64 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56020 | CB430-0.078-F3-B.0-Z4 | 5/64 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55841 | CB430-0.094-F2-B.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56021 | CB430-0.094-F2-B.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N86269 | CB430-0.094-F3-B.0-Z4 | 3/32 | 1/8 | 9/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86345 | CB430-0.094-F3-B.0-Z4 | 3/32 | 1/8 | 9/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55842 | CB430-0.094-F4-B.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56022 | CB430-0.094-F4-B.0-Z4 | 3/32 | 1/8 | 3/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55843 | CB430-0.094-F8-B.0-Z4 | 3/32 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N56023 | CB430-0.094-F8-B.0-Z4 | 3/32 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N86270 | CB430-0.109-F3-B.0-Z4 | 7/64 | 1/8 | 3/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86346 | CB430-0.109-F3-B.0-Z4 | 7/64 | 1/8 | 3/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55845 | CB430-0.125-D2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N56025 | CB430-0.125-D2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N86271 | CB430-0.125-D4-B.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86347 | CB430-0.125-D4-B.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N55846 | CB430-0.125-D5-B.0-Z4 | 1/8 | 1/8 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N56026 | CB430-0.125-D5-B.0-Z4 | 1/8 | 1/8 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N55847 | CB430-0.125-D6-B.0-Z4 | 1/8 | 1/8 | 3/4 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N56027 | CB430-0.125-D6-B.0-Z4 | 1/8 | 1/8 | 3/4 | 3 | 4 | TIALN | CYLINDRICAL |

CB430 (CONT'D)

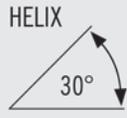


- General Purpose
- General machining for most material types
- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N55848 | CB430-0.125-D7-B.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N56028 | CB430-0.125-D7-B.0-Z4 | 1/8 | 1/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55849 | CB430-0.125-D8-B.0-Z4 | 1/8 | 1/8 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N56029 | CB430-0.125-D8-B.0-Z4 | 1/8 | 1/8 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N86272 | CB430-0.141-F4-B.0-Z4 | 9/64 | 3/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N86348 | CB430-0.141-F4-B.0-Z4 | 9/64 | 3/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N55850 | CB430-0.156-F2-B.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N56030 | CB430-0.156-F2-B.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N86273 | CB430-0.156-F3-B.0-Z4 | 5/32 | 3/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N86349 | CB430-0.156-F3-B.0-Z4 | 5/32 | 3/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N86274 | CB430-0.172-F4-B.0-Z4 | 11/64 | 3/16 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N86350 | CB430-0.172-F4-B.0-Z4 | 11/64 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N55851 | CB430-0.188-D2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N56031 | CB430-0.188-D2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N86275 | CB430-0.188-D3-B.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N86351 | CB430-0.188-D3-B.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N55852 | CB430-0.188-D4-B.0-Z4 | 3/16 | 3/16 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N56032 | CB430-0.188-D4-B.0-Z4 | 3/16 | 3/16 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55853 | CB430-0.188-D5-B.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N56033 | CB430-0.188-D5-B.0-Z4 | 3/16 | 3/16 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55854 | CB430-0.188-D6-B.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N53972 | CB430-0.188-D6-B.0-Z4 | 3/16 | 3/16 | 1-1/8 | 3 | 4 | TIALN | CYLINDRICAL |
| N86276 | CB430-0.203-F3-B.0-Z4 | 13/64 | 1/4 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86352 | CB430-0.203-F3-B.0-Z4 | 13/64 | 1/4 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N86277 | CB430-0.219-F3-B.0-Z4 | 7/32 | 1/4 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86353 | CB430-0.219-F3-B.0-Z4 | 7/32 | 1/4 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N86278 | CB430-0.234-F3-B.0-Z4 | 15/64 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86354 | CB430-0.234-F3-B.0-Z4 | 15/64 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55856 | CB430-0.250-D2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N53974 | CB430-0.250-D2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N86279 | CB430-0.250-D3-B.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86355 | CB430-0.250-D3-B.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55857 | CB430-0.250-D4-B.0-Z4 | 1/4 | 1/4 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N53975 | CB430-0.250-D4-B.0-Z4 | 1/4 | 1/4 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55858 | CB430-0.250-D5-B.0-Z4 | 1/4 | 1/4 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53976 | CB430-0.250-D5-B.0-Z4 | 1/4 | 1/4 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55859 | CB430-0.250-D6-B.0-Z4 | 1/4 | 1/4 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53977 | CB430-0.250-D6-B.0-Z4 | 1/4 | 1/4 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55860 | CB430-0.250-D7-B.0-Z4 | 1/4 | 1/4 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53978 | CB430-0.250-D7-B.0-Z4 | 1/4 | 1/4 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |

CB430 (CONT'D)

SOLID
CARBIDE



CENTER
CUTTING



- General Purpose
- General machining for most material types
- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86281 | CB430-0.281-F3-B.0-Z4 | 9/32 | 5/16 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86357 | CB430-0.281-F3-B.0-Z4 | 9/32 | 5/16 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55861 | CB430-0.313-D2-B.0-Z4 | 5/16 | 5/16 | 1/2 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N53979 | CB430-0.313-D2-B.0-Z4 | 5/16 | 5/16 | 1/2 | 2 | 4 | TIALN | CYLINDRICAL |
| N86283 | CB430-0.313-D3-B.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86359 | CB430-0.313-D3-B.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55862 | CB430-0.313-D4-B.0-Z4 | 5/16 | 5/16 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N53980 | CB430-0.313-D4-B.0-Z4 | 5/16 | 5/16 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55864 | CB430-0.313-D6-B.0-Z4 | 5/16 | 5/16 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53982 | CB430-0.313-D6-B.0-Z4 | 5/16 | 5/16 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N86284 | CB430-0.328-F3-B.0-Z4 | 21/64 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86360 | CB430-0.328-F3-B.0-Z4 | 21/64 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N86285 | CB430-0.344-F3-B.0-Z4 | 11/32 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86361 | CB430-0.344-F3-B.0-Z4 | 11/32 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55866 | CB430-0.375-D2-B.0-Z4 | 3/8 | 3/8 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N53984 | CB430-0.375-D2-B.0-Z4 | 3/8 | 3/8 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N86287 | CB430-0.375-D3-B.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86363 | CB430-0.375-D3-B.0-Z4 | 3/8 | 3/8 | 1 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N55867 | CB430-0.375-D4-B.0-Z4 | 3/8 | 3/8 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N53985 | CB430-0.375-D4-B.0-Z4 | 3/8 | 3/8 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55868 | CB430-0.375-D5-B.0-Z4 | 3/8 | 3/8 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53986 | CB430-0.375-D5-B.0-Z4 | 3/8 | 3/8 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55869 | CB430-0.375-D6-B.0-Z4 | 3/8 | 3/8 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53987 | CB430-0.375-D6-B.0-Z4 | 3/8 | 3/8 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55870 | CB430-0.375-D7-B.0-Z4 | 3/8 | 3/8 | 2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53988 | CB430-0.375-D7-B.0-Z4 | 3/8 | 3/8 | 2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55871 | CB430-0.375-D8-B.0-Z4 | 3/8 | 3/8 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53989 | CB430-0.375-D8-B.0-Z4 | 3/8 | 3/8 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N86289 | CB430-0.406-F2-B.0-Z4 | 13/32 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N86365 | CB430-0.406-F2-B.0-Z4 | 13/32 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N86291 | CB430-0.438-D2-B.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N86367 | CB430-0.438-D2-B.0-Z4 | 7/16 | 7/16 | 1 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N55873 | CB430-0.438-D3-B.0-Z4 | 7/16 | 7/16 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53991 | CB430-0.438-D3-B.0-Z4 | 7/16 | 7/16 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N86293 | CB430-0.469-F2-B.0-Z4 | 15/32 | 1/2 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N86369 | CB430-0.469-F2-B.0-Z4 | 15/32 | 1/2 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55877 | CB430-0.500-D1-B.0-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N53995 | CB430-0.500-D1-B.0-Z4 | 1/2 | 1/2 | 5/8 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N86295 | CB430-0.500-D2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |

CB430 (CONT'D)

SOLID CARBIDE



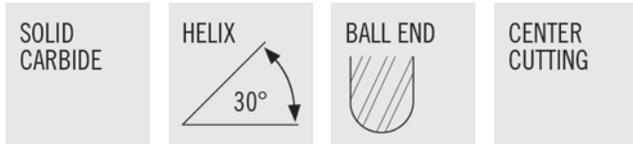
CENTER CUTTING



- General Purpose
- General machining for most material types
- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N86371 | CB430-0.500-D2-B.0-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N55878 | CB430-0.500-D3-B.0-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53996 | CB430-0.500-D3-B.0-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | TIALN | CYLINDRICAL |
| N55879 | CB430-0.500-D4-B.0-Z4 | 1/2 | 1/2 | 1-1/2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53997 | CB430-0.500-D4-B.0-Z4 | 1/2 | 1/2 | 1-1/2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55880 | CB430-0.500-D5-B.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N53998 | CB430-0.500-D5-B.0-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55881 | CB430-0.500-D6-B.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N53999 | CB430-0.500-D6-B.0-Z4 | 1/2 | 1/2 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N86296 | CB430-0.563-D2-B.0-Z4 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86372 | CB430-0.563-D2-B.0-Z4 | 9/16 | 9/16 | 1-1/8 | 3-1/2 | 4 | TIALN | CYLINDRICAL |
| N55884 | CB430-0.625-D1-B.0-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N54002 | CB430-0.625-D1-B.0-Z4 | 5/8 | 5/8 | 3/4 | 3 | 4 | TIALN | CYLINDRICAL |
| N86297 | CB430-0.625-D2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N86373 | CB430-0.625-D2-B.0-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | CYLINDRICAL |
| N55885 | CB430-0.625-D3-B.0-Z4 | 5/8 | 5/8 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54003 | CB430-0.625-D3-B.0-Z4 | 5/8 | 5/8 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55886 | CB430-0.625-D5-B.0-Z4 | 5/8 | 5/8 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54004 | CB430-0.625-D5-B.0-Z4 | 5/8 | 5/8 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N55887 | CB430-0.750-D1-B.0-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N54005 | CB430-0.750-D1-B.0-Z4 | 3/4 | 3/4 | 1 | 3 | 4 | TIALN | CYLINDRICAL |
| N86299 | CB430-0.750-D2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N86375 | CB430-0.750-D2-B.0-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55888 | CB430-0.750-D3-B.0-Z4 | 3/4 | 3/4 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54006 | CB430-0.750-D3-B.0-Z4 | 3/4 | 3/4 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55889 | CB430-0.750-D4-B.0-Z4 | 3/4 | 3/4 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54007 | CB430-0.750-D4-B.0-Z4 | 3/4 | 3/4 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N55890 | CB430-0.750-D5-B.0-Z4 | 3/4 | 3/4 | 4 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54008 | CB430-0.750-D5-B.0-Z4 | 3/4 | 3/4 | 4 | 6 | 4 | TIALN | CYLINDRICAL |
| N86300 | CB430-0.875-D2-B.0-Z4 | 7/8 | 7/8 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N86376 | CB430-0.875-D2-B.0-Z4 | 7/8 | 7/8 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N86301 | CB430-1.000-D2-B.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | UNCOATED | CYLINDRICAL |
| N86377 | CB430-1.000-D2-B.0-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | CYLINDRICAL |
| N55891 | CB430-1.000-D3-B.0-Z4 | 1 | 1 | 2 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54009 | CB430-1.000-D3-B.0-Z4 | 1 | 1 | 2 | 6 | 4 | TIALN | CYLINDRICAL |
| N55892 | CB430-1.000-D4-B.0-Z4 | 1 | 1 | 3 | 6 | 4 | UNCOATED | CYLINDRICAL |
| N54010 | CB430-1.000-D4-B.0-Z4 | 1 | 1 | 3 | 6 | 4 | TIALN | CYLINDRICAL |
| N55893 | CB430-1.000-D5-B.0-Z4 | 1 | 1 | 4 | 7 | 4 | UNCOATED | CYLINDRICAL |
| N54011 | CB430-1.000-D5-B.0-Z4 | 1 | 1 | 4 | 7 | 4 | TIALN | CYLINDRICAL |

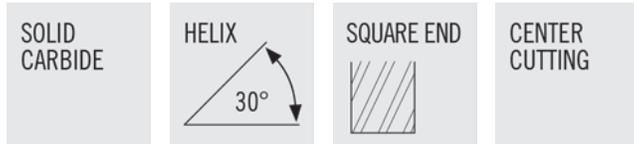
METRIC CB430M



- General Purpose
- General machining for most material types
- Cutting Data - Page 213-214
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|----------------------|-----------|-----------|---------------|----------------|--------|---------|
| N46454 | CB430M-010-F4-B.0-Z4 | 1MM | 3MM | 4MM | 39MM | 4 | ALTIN |
| N34478 | CB430M-020-F2-B.0-Z4 | 2MM | 3MM | 4MM | 39MM | 4 | ALTIN |
| N47938 | CB430M-030-D2-B.0-Z4 | 3MM | 3MM | 6MM | 39MM | 4 | ALTIN |
| N46462 | CB430M-030-D4-B.0-Z4 | 3MM | 3MM | 12MM | 39MM | 4 | ALTIN |
| N46466 | CB430M-040-D4-B.0-Z4 | 4MM | 4MM | 14MM | 51MM | 4 | ALTIN |
| N34362 | CB430M-040-D6-B.0-Z4 | 4MM | 4MM | 25MM | 75MM | 4 | ALTIN |
| N46470 | CB430M-050-F3-B.0-Z4 | 5MM | 6MM | 16MM | 51MM | 4 | ALTIN |
| N47942 | CB430M-060-D2-B.0-Z4 | 6MM | 6MM | 9MM | 51MM | 4 | ALTIN |
| N46472 | CB430M-060-D3-B.0-Z4 | 6MM | 6MM | 19MM | 51MM | 4 | ALTIN |
| N34370 | CB430M-080-D3-B.0-Z4 | 8MM | 8MM | 25MM | 75MM | 4 | ALTIN |
| N34372 | CB430M-080-D4-B.0-Z4 | 8MM | 8MM | 25MM | 150MM | 4 | ALTIN |
| N46480 | CB430M-100-D2-B.0-Z4 | 10MM | 10MM | 22MM | 73MM | 4 | ALTIN |
| N46484 | CB430M-120-D2-B.0-Z4 | 12MM | 12MM | 25MM | 74MM | 4 | ALTIN |

CD430



- General Purpose
- General machining for most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|------------|
| N85618 | CD430-0.125-XF3-S.3-Z4 | 1/8 | 3/8 | 3/8 | 3-1/16 | 4 | UNCOATED | WELDON |
| N85640 | CD430-0.125-XF3-S.3-Z4 | 1/8 | 3/8 | 3/8 | 3-1/16 | 4 | TIALN | WELDON |
| N85619 | CD430-0.156-XF3-S.3-Z4 | 5/32 | 3/8 | 7/16 | 3-1/8 | 4 | UNCOATED | WELDON |
| N85641 | CD430-0.156-XF3-S.3-Z4 | 5/32 | 3/8 | 7/16 | 3-1/8 | 4 | TIALN | WELDON |
| N85620 | CD430-0.188-XF3-S.3-Z4 | 3/16 | 3/8 | 1/2 | 3-1/4 | 4 | UNCOATED | WELDON |
| N85642 | CD430-0.188-XF3-S.3-Z4 | 3/16 | 3/8 | 1/2 | 3-1/4 | 4 | TIALN | WELDON |
| N85621 | CD430-0.219-XF3-S.3-Z4 | 7/32 | 3/8 | 9/16 | 3-3/8 | 4 | UNCOATED | WELDON |
| N85643 | CD430-0.219-XF3-S.3-Z4 | 7/32 | 3/8 | 9/16 | 3-3/8 | 4 | TIALN | WELDON |
| N85622 | CD430-0.250-XF3-S.3-Z4 | 1/4 | 3/8 | 5/8 | 3-3/8 | 4 | UNCOATED | WELDON |
| N85644 | CD430-0.250-XF3-S.3-Z4 | 1/4 | 3/8 | 5/8 | 3-3/8 | 4 | TIALN | WELDON |
| N85623 | CD430-0.281-XF2-S.3-Z4 | 9/32 | 3/8 | 11/16 | 3-1/2 | 4 | UNCOATED | WELDON |
| N85645 | CD430-0.281-XF2-S.3-Z4 | 9/32 | 3/8 | 11/16 | 3-1/2 | 4 | TIALN | WELDON |
| N85624 | CD430-0.313-XF2-S.3-Z4 | 5/16 | 3/8 | 3/4 | 3-1/2 | 4 | UNCOATED | WELDON |
| N85646 | CD430-0.313-XF2-S.3-Z4 | 5/16 | 3/8 | 3/4 | 3-1/2 | 4 | TIALN | WELDON |
| N85625 | CD430-0.344-XF2-S.3-Z4 | 11/32 | 3/8 | 3/4 | 3-1/2 | 4 | UNCOATED | WELDON |
| N85647 | CD430-0.344-XF2-S.3-Z4 | 11/32 | 3/8 | 3/4 | 3-1/2 | 4 | TIALN | WELDON |
| N85626 | CD430-0.375-XD2-S.3-Z4 | 3/8 | 3/8 | 3/4 | 3-1/2 | 4 | UNCOATED | WELDON |
| N85648 | CD430-0.375-XD2-S.3-Z4 | 3/8 | 3/8 | 3/4 | 3-1/2 | 4 | TIALN | WELDON |
| N85627 | CD430-0.438-XF2-S.3-Z4 | 7/16 | 1/2 | 7/8 | 4 | 4 | UNCOATED | WELDON |
| N85649 | CD430-0.438-XF2-S.3-Z4 | 7/16 | 1/2 | 7/8 | 4 | 4 | TIALN | WELDON |
| N85628 | CD430-0.500-XD2-S.3-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | UNCOATED | WELDON |
| N85650 | CD430-0.500-XD2-S.3-Z4 | 1/2 | 1/2 | 1 | 4 | 4 | TIALN | WELDON |

CSD430

SOLID CARBIDE



CENTER CUTTING

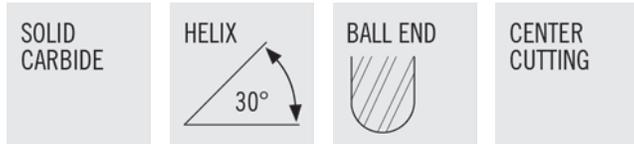


- General Purpose
- General machining for most material types
- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N89818 | CSD430-0.031-XF2-S.0-Z4 | 1/32 | 1/8 | 1/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89821 | CSD430-0.031-XF2-S.0-Z4 | 1/32 | 1/8 | 1/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89822 | CSD430-0.047-XF2-S.0-Z4 | 3/64 | 1/8 | 3/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89825 | CSD430-0.047-XF2-S.0-Z4 | 3/64 | 1/8 | 3/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89826 | CSD430-0.063-XF2-S.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89829 | CSD430-0.063-XF2-S.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89830 | CSD430-0.078-XF2-S.0-Z4 | 5/64 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89833 | CSD430-0.078-XF2-S.0-Z4 | 5/64 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89834 | CSD430-0.094-XF2-S.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89837 | CSD430-0.094-XF2-S.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89838 | CSD430-0.109-XF2-S.0-Z4 | 7/64 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89841 | CSD430-0.109-XF2-S.0-Z4 | 7/64 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89842 | CSD430-0.125-XD2-S.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89845 | CSD430-0.125-XD2-S.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89846 | CSD430-0.141-XF2-S.0-Z4 | 9/64 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89849 | CSD430-0.141-XF2-S.0-Z4 | 9/64 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89850 | CSD430-0.156-XF2-S.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89853 | CSD430-0.156-XF2-S.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89854 | CSD430-0.172-XF2-S.0-Z4 | 11/64 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89857 | CSD430-0.172-XF2-S.0-Z4 | 11/64 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89858 | CSD430-0.188-XD2-S.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89861 | CSD430-0.188-XD2-S.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N89862 | CSD430-0.203-XF2-S.0-Z4 | 13/64 | 1/4 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89865 | CSD430-0.203-XF2-S.0-Z4 | 13/64 | 1/4 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89866 | CSD430-0.219-XF2-S.0-Z4 | 7/32 | 1/4 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89869 | CSD430-0.219-XF2-S.0-Z4 | 7/32 | 1/4 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89870 | CSD430-0.234-XF2-S.0-Z4 | 15/64 | 1/4 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89873 | CSD430-0.234-XF2-S.0-Z4 | 15/64 | 1/4 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89874 | CSD430-0.250-XD2-S.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89877 | CSD430-0.250-XD2-S.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89878 | CSD430-0.281-XF2-S.0-Z4 | 9/32 | 5/16 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89881 | CSD430-0.281-XF2-S.0-Z4 | 9/32 | 5/16 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89882 | CSD430-0.313-XD2-S.0-Z4 | 5/16 | 5/16 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89885 | CSD430-0.313-XD2-S.0-Z4 | 5/16 | 5/16 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89886 | CSD430-0.344-XF2-S.0-Z4 | 11/32 | 3/8 | 9/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89890 | CSD430-0.375-XD2-S.0-Z4 | 3/8 | 3/8 | 9/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89893 | CSD430-0.375-XD2-S.0-Z4 | 3/8 | 3/8 | 9/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89894 | CSD430-0.438-XD1-S.0-Z4 | 7/16 | 7/16 | 9/16 | 2-3/4 | 4 | UNCOATED | CYLINDRICAL |
| N89897 | CSD430-0.438-XD1-S.0-Z4 | 7/16 | 7/16 | 9/16 | 2-3/4 | 4 | TIALN | CYLINDRICAL |
| N89898 | CSD430-0.500-XD1-S.0-Z4 | 1/2 | 1/2 | 5/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N89901 | CSD430-0.500-XD1-S.0-Z4 | 1/2 | 1/2 | 5/8 | 3 | 4 | TIALN | CYLINDRICAL |

DISCOUNT CODE D42

CSDB430



- General Purpose
- General machining for most material types
- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|--------------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N89902 | CSDB430-0.031-XF2-B.0-Z4 | 1/32 | 1/8 | 1/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89905 | CSDB430-0.031-XF2-B.0-Z4 | 1/32 | 1/8 | 1/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89906 | CSDB430-0.047-XF2-B.0-Z4 | 3/64 | 1/8 | 3/32 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89909 | CSDB430-0.047-XF2-B.0-Z4 | 3/64 | 1/8 | 3/32 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89910 | CSDB430-0.063-XF2-B.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89913 | CSDB430-0.063-XF2-B.0-Z4 | 1/16 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89914 | CSDB430-0.078-XF2-B.0-Z4 | 5/64 | 1/8 | 1/8 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89917 | CSDB430-0.078-XF2-B.0-Z4 | 5/64 | 1/8 | 1/8 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89918 | CSDB430-0.094-XF2-B.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89921 | CSDB430-0.094-XF2-B.0-Z4 | 3/32 | 1/8 | 3/16 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89926 | CSDB430-0.125-XD2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89929 | CSDB430-0.125-XD2-B.0-Z4 | 1/8 | 1/8 | 1/4 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N89930 | CSDB430-0.141-XF2-B.0-Z4 | 9/64 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89933 | CSDB430-0.141-XF2-B.0-Z4 | 9/64 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89934 | CSDB430-0.156-XF2-B.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89937 | CSDB430-0.156-XF2-B.0-Z4 | 5/32 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89938 | CSDB430-0.172-XF2-B.0-Z4 | 11/64 | 3/16 | 5/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89941 | CSDB430-0.172-XF2-B.0-Z4 | 11/64 | 3/16 | 5/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N89942 | CSDB430-0.188-XD2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N89945 | CSDB430-0.188-XD2-B.0-Z4 | 3/16 | 3/16 | 3/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N89958 | CSDB430-0.250-XD2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89961 | CSDB430-0.250-XD2-B.0-Z4 | 1/4 | 1/4 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89962 | CSDB430-0.281-XF2-B.0-Z4 | 9/32 | 5/16 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89965 | CSDB430-0.281-XF2-B.0-Z4 | 9/32 | 5/16 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89966 | CSDB430-0.313-XD2-B.0-Z4 | 5/16 | 5/16 | 1/2 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89969 | CSDB430-0.313-XD2-B.0-Z4 | 5/16 | 5/16 | 1/2 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89974 | CSDB430-0.375-XD2-B.0-Z4 | 3/8 | 3/8 | 9/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N89977 | CSDB430-0.375-XD2-B.0-Z4 | 3/8 | 3/8 | 9/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N89982 | CSDB430-0.500-XD1-B.0-Z4 | 1/2 | 1/2 | 5/8 | 3 | 4 | UNCOATED | CYLINDRICAL |
| N89985 | CSDB430-0.500-XD1-B.0-Z4 | 1/2 | 1/2 | 5/8 | 3 | 4 | TIALN | CYLINDRICAL |

CNC430

SOLID CARBIDE



CENTER CUTTING



- General Purpose
- NC Tolerance
- General machining for most material types

- Cutting Data - Page 207-208
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|-------------|
| N85833 | CNC430-0.125-D4-S.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85861 | CNC430-0.125-D4-S.0-Z4 | 1/8 | 1/8 | 1/2 | 1-1/2 | 4 | TIALN | CYLINDRICAL |
| N85834 | CNC430-0.156-F4-S.0-Z4 | 5/32 | 3/16 | 9/16 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85862 | CNC430-0.156-F4-S.0-Z4 | 5/32 | 3/16 | 9/16 | 2 | 4 | TIALN | CYLINDRICAL |
| N85835 | CNC430-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | UNCOATED | CYLINDRICAL |
| N85863 | CNC430-0.188-D3-S.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85837 | CNC430-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85865 | CNC430-0.250-D3-S.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85839 | CNC430-0.313-D3-S.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | UNCOATED | CYLINDRICAL |
| N85867 | CNC430-0.313-D3-S.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85840 | CNC430-0.375-D2-S.3-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | UNCOATED | WELDON |
| N85868 | CNC430-0.375-D2-S.3-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | TIALN | WELDON |
| N85842 | CNC430-0.500-D2-S.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | WELDON |
| N85870 | CNC430-0.500-D2-S.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | WELDON |
| N85844 | CNC430-0.625-D2-S.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | UNCOATED | WELDON |
| N85872 | CNC430-0.625-D2-S.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 4 | TIALN | WELDON |
| N85845 | CNC430-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | UNCOATED | WELDON |
| N85873 | CNC430-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-1/2 | 4 | 4 | TIALN | WELDON |
| N85846 | CNC430-1.000-D2-S.3-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | UNCOATED | WELDON |
| N85874 | CNC430-1.000-D2-S.3-Z4 | 1 | 1 | 1-1/2 | 4 | 4 | TIALN | WELDON |

CNCB430

SOLID CARBIDE



CENTER CUTTING



- General Purpose
- NC Tolerance
- General machining for most material types

- Cutting Data - Page 209-210
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|---------|-------------|
| N85906 | CNCB430-0.188-D3-B.0-Z4 | 3/16 | 3/16 | 5/8 | 2 | 4 | TIALN | CYLINDRICAL |
| N85908 | CNCB430-0.250-D3-B.0-Z4 | 1/4 | 1/4 | 3/4 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85910 | CNCB430-0.313-D3-B.0-Z4 | 5/16 | 5/16 | 13/16 | 2-1/2 | 4 | TIALN | CYLINDRICAL |
| N85911 | CNCB430-0.375-D2-B.3-Z4 | 3/8 | 3/8 | 7/8 | 2-1/2 | 4 | TIALN | WELDON |
| N85913 | CNCB430-0.500-D2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | WELDON |

C230 / G230R / CNC230 / CD230 / CSD230 - START VALUES

| SLOTING | | | | | | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 0.30 | 1.00 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | | 340 - 460 | v _f (in/min) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| | E 3 - 4 | 0.20 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 140 - 260 | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 5 - 6 | 0.20 | 1.00 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0019 |
| | | | | 40 - 160 | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | | | | 290 - 350 | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| | E 10 - 11 | 0.30 | 1.00 | 250 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 |
| | | | | 220 - 280 | v _f (in/min) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| K | E 12 - 13 | 0.30 | 1.00 | 270 | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 210 - 330 | v _f (in/min) | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| | E 14 - 15 | 0.20 | 1.00 | 145 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | 85 - 205 | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| N | E / M / A 16 | 1.00 | 1.00 | 700 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| | | | | 400 - 1000 | v _f (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| | E / M / A 17 | 1.00 | 1.00 | 700 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| | | | | 400 - 1000 | v _f (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| S | E 19 | 0.30 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 50 - 110 | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | E 20 | 0.30 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 50 - 110 | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | E 21 | 0.30 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 50 - 110 | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | E 22 | 0.30 | 1.00 | 140 | n (rev/min) | 8557 | 4278 | 2139 | 1426 | 1070 | 856 | 713 | 535 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 80 - 200 | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

C230 / G230R / CNC230 / CD230 / CSD230 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | | |
|-------------------------|---------|---------------------------------------|---------------------------------------|---------------------------|-----|--------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | | | | |
| P | E 1 - 2 | 1.00 | 0.25 | 400 | 340 | - | 460 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 | |
| | | | | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | |
| | E 3 - 4 | 1.00 | 0.25 | 200 | 140 | - | 260 | v _f (in/min) | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| | | | | | | | | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | |
| | E 5 - 6 | 1.00 | 0.20 | 100 | 40 | - | 160 | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | |
| | | | | | | | | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| E 8 - 9 | 0.50 | 0.20 | 320 | 290 | - | 350 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 | | |
| | | | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | | |
| E 10 - 11 | 0.30 | 0.20 | 250 | 220 | - | 280 | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| | | | | | | | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 | | |
| E 12 - 13 | 1.00 | 0.25 | 270 | 210 | - | 330 | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 | | |
| | | | | | | | v _f (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | |
| E 14 - 15 | 0.50 | 0.25 | 145 | 85 | - | 205 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 | | |
| | | | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | | |
| E 16 - 17 | 2.00 | 0.05 | 700 | 400 | - | 1000 | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | | |
| | | | | | | | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 | | |
| E 19 | 0.20 | 0.05 | 80 | 50 | - | 110 | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 | | |
| | | | | | | | v _f (in/min) | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | | |
| E 20 | 0.20 | 0.05 | 80 | 50 | - | 110 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 | | |
| | | | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 | | |
| E 21 | 0.20 | 0.05 | 80 | 50 | - | 110 | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | | |
| | | | | | | | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | | |
| E 22 | 0.30 | 0.15 | 140 | 80 | - | 200 | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| | | | | | | | v _f (in/min) | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | | |
| E 19 | 0.20 | 0.05 | 80 | 50 | - | 110 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | | |
| | | | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| E 20 | 0.20 | 0.05 | 80 | 50 | - | 110 | v _f (in/min) | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | 48.1 | | |
| | | | | | | | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | |
| E 21 | 0.20 | 0.05 | 80 | 50 | - | 110 | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| | | | | | | | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| E 22 | 0.30 | 0.15 | 140 | 80 | - | 200 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | |
| | | | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| E 22 | 0.30 | 0.15 | 140 | 80 | - | 200 | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| | | | | | | | n (rev/min) | 8557 | 4278 | 2139 | 1426 | 1070 | 856 | 713 | 535 | | |
| E 22 | 0.30 | 0.15 | 140 | 80 | - | 200 | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | | |
| | | | | | | | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB230 / CNCB230 / CSDB230 - START VALUES

| | | SLOTTING | | | | | | | | | | | |
|---------------------|-------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1-2 | 0.50 | 1.00 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | | 260 - 380 | v _f (in/min) | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | E 3-4 | 0.40 | 1.00 | 160 | n (rev/min) | 9779 | 4890 | 2445 | 1630 | 1222 | 978 | 815 | 611 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 100 - 220 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 5-6 | 0.30 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0019 |
| | | | | 20 - 140 | v _f (in/min) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| M | E 8-9 | 0.50 | 1.00 | 256 | n (rev/min) | 15647 | 7823 | 3912 | 2608 | 1956 | 1565 | 1304 | 978 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | 226 - 286 | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | | |
| | E 10-11 | 0.40 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| f _z (in) | | | | | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 | |
| 170 - 230 | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | | |
| K | E 12-13 | 0.50 | 1.00 | 216 | n (rev/min) | 13202 | 6601 | 3300 | 2200 | 1650 | 1320 | 1100 | 825 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | 156 - 276 | v _f (in/min) | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | | |
| | E 14-15 | 0.30 | 1.00 | 116 | n (rev/min) | 7090 | 3545 | 1772 | 1182 | 886 | 709 | 591 | 443 |
| f _z (in) | | | | | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 | |
| 56 - 176 | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | | |
| N | E / M / A 16 | 1.00 | 1.00 | 560 | n (rev/min) | 34227 | 17114 | 8557 | 5705 | 4278 | 3423 | 2852 | 2139 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| | 260 - 860 | v _f (in/min) | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | | |
| | E / M / A 17 | 1.00 | 1.00 | 560 | n (rev/min) | 34227 | 17114 | 8557 | 5705 | 4278 | 3423 | 2852 | 2139 |
| f _z (in) | | | | | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 | |
| 260 - 860 | v _f (in/min) | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | | |
| S | E 19 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 100 | v _f (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| | E 20 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 100 | v _f (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| | E 21 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| 40 - 100 | v _f (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | | | |
| E 22 | 0.30 | 1.00 | 112 | n (rev/min) | 6845 | 3423 | 1711 | 1141 | 856 | 685 | 570 | 428 | |
| | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 | |
| 52 - 172 | v _f (in/min) | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | |

SMG = Seco Material Group
n [min-1] = RPM
v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
a_p/D_c = % of diameter
v_f [in/min] = Feed rate
a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
All cutting data are start values. All cutting data is in inch values.
Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB230 / CNCB230 / CSDB230 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | | v _f (in/min) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| | E 3 - 4 | 1.00 | 0.30 | 160 | n (rev/min) | 9779 | 4890 | 2445 | 1630 | 1222 | 978 | 815 | 611 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 5 - 6 | 1.00 | 0.20 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| M | E 8 - 9 | 0.50 | 0.30 | 256 | n (rev/min) | 15647 | 7823 | 3912 | 2608 | 1956 | 1565 | 1304 | 978 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| | E 10 - 11 | 0.30 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | | v _f (in/min) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| K | E 12 - 13 | 1.00 | 0.50 | 216 | n (rev/min) | 13202 | 6601 | 3300 | 2200 | 1650 | 1320 | 1100 | 825 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | | v _f (in/min) | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| | E 14 - 15 | 0.50 | 0.30 | 116 | n (rev/min) | 7090 | 3545 | 1772 | 1182 | 886 | 709 | 591 | 443 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| N | E / M / A 16 | 2.00 | 0.50 | 560 | n (rev/min) | 34227 | 17114 | 8557 | 5705 | 4278 | 3423 | 2852 | 2139 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | | v _f (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| | E / M / A 17 | 2.00 | 0.50 | 560 | n (rev/min) | 34227 | 17114 | 8557 | 5705 | 4278 | 3423 | 2852 | 2139 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | | v _f (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| S | E 19 | 0.20 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | v _f (in/min) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | E 20 | 0.20 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | v _f (in/min) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | E 21 | 0.20 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | | v _f (in/min) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | E 22 | 0.30 | 0.20 | 112 | n (rev/min) | 6845 | 3423 | 1711 | 1141 | 856 | 685 | 570 | 428 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C230M - START VALUES

| | | SLOTTING | | | | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| P | E 1 - 2 | 0.30 | 1.00 | 400 | n [min-1] | 38811 | 19406 | 12937 | 9703 | 6469 | 4851 | 3881 | 3234 | 2772 | 2426 | 2156 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| | E 3 - 4 | 0.20 | 1.00 | 200 | n [min-1] | 19406 | 9703 | 6469 | 4851 | 3234 | 2426 | 1941 | 1617 | 1386 | 1213 | 1078 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| | E 5 - 6 | 0.20 | 1.00 | 100 | n [min-1] | 9703 | 4851 | 3234 | 2426 | 1617 | 1213 | 970 | 809 | 693 | 606 | 539 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | n [min-1] | 31049 | 15524 | 10350 | 7762 | 5175 | 3881 | 3105 | 2587 | 2218 | 1941 | 1725 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | E 10 - 11 | 0.30 | 1.00 | 250 | n [min-1] | 24257 | 12129 | 8086 | 6064 | 4043 | 3032 | 2426 | 2021 | 1733 | 1516 | 1348 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| K | E 12 - 13 | 0.30 | 1.00 | 270 | n [min-1] | 26198 | 13099 | 8733 | 6549 | 4366 | 3275 | 2620 | 2183 | 1871 | 1637 | 1455 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 |
| | E 14 - 15 | 0.20 | 1.00 | 145 | n [min-1] | 14069 | 7035 | 4690 | 3517 | 2345 | 1759 | 1407 | 1172 | 1005 | 879 | 782 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| N | E / M / A 16 | 1.00 | 1.00 | 700 | n [min-1] | 67920 | 33960 | 22640 | 16980 | 11320 | 8490 | 6792 | 5660 | 4851 | 4245 | 3773 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| | E / M / A 17 | 1.00 | 1.00 | 700 | n [min-1] | 67920 | 33960 | 22640 | 16980 | 11320 | 8490 | 6792 | 5660 | 4851 | 4245 | 3773 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| S | E 19 | 0.30 | 1.00 | 80 | n [min-1] | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz [in] | 0.0036 | 0.0072 | 0.0108 | 0.0144 | 0.0216 | 0.0288 | 0.0360 | 0.0432 | 0.0504 | 0.0576 | 0.0648 |
| | | | | | vf [in/min] | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 |
| | | | | | 50 - 110 | | | | | | | | | | | |
| | E 20 | 0.30 | 1.00 | 80 | n [min-1] | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | | | | | 50 - 110 | | | | | | | | | | | |
| | E 21 | 0.30 | 1.00 | 80 | n [min-1] | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf [in/min] | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | | | | | 50 - 110 | | | | | | | | | | | |
| E 22 | 0.30 | 1.00 | 140 | n [min-1] | 13584 | 6792 | 4528 | 3396 | 2264 | 1698 | 1358 | 1132 | 970 | 849 | 755 | |
| | | | | fz [in] | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf [in/min] | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | |
| | | | | 80 - 200 | | | | | | | | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

C230M - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| P | E 1 - 2 | 1.00 | 0.25 | 400 | n (min-1) | 38811 | 19406 | 12937 | 9703 | 6469 | 4851 | 3881 | 3234 | 2772 | 2426 | 2156 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| | E 3 - 4 | 1.00 | 0.25 | 200 | n (min-1) | 19406 | 9703 | 6469 | 4851 | 3234 | 2426 | 1941 | 1617 | 1386 | 1213 | 1078 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| E 5 - 6 | 1.00 | 0.20 | 100 | n (min-1) | 9703 | 4851 | 3234 | 2426 | 1617 | 1213 | 970 | 809 | 693 | 606 | 539 | |
| | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| M | E 8 - 9 | 0.50 | 0.20 | 320 | n (min-1) | 31049 | 15524 | 10350 | 7762 | 5175 | 3881 | 3105 | 2587 | 2218 | 1941 | 1725 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | E 10 - 11 | 0.30 | 0.20 | 250 | n (min-1) | 24257 | 12129 | 8086 | 6064 | 4043 | 3032 | 2426 | 2021 | 1733 | 1516 | 1348 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| K | E 12 - 13 | 1.00 | 0.25 | 270 | n (min-1) | 26198 | 13099 | 8733 | 6549 | 4366 | 3275 | 2620 | 2183 | 1871 | 1637 | 1455 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 |
| | E 14 - 15 | 0.50 | 0.25 | 145 | n (min-1) | 14069 | 7035 | 4690 | 3517 | 2345 | 1759 | 1407 | 1172 | 1005 | 879 | 782 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| N | E / M / A 16 | 2.00 | 0.05 | 700 | n (min-1) | 67920 | 33960 | 22640 | 16980 | 11320 | 8490 | 6792 | 5660 | 4851 | 4245 | 3773 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| | E / M / A 17 | 2.00 | 0.05 | 700 | n (min-1) | 67920 | 33960 | 22640 | 16980 | 11320 | 8490 | 6792 | 5660 | 4851 | 4245 | 3773 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| S | E 19 | 0.20 | 0.05 | 80 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz (in) | 0.0036 | 0.0072 | 0.0108 | 0.0144 | 0.0216 | 0.0288 | 0.0360 | 0.0432 | 0.0504 | 0.0576 | 0.0648 |
| | | | | | vf (in/min) | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 |
| | | | | 50 - 110 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | E 20 | 0.20 | 0.05 | 80 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | | | | 50 - 110 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 |
| | | | | | vf (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| E 21 | 0.20 | 0.05 | 80 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 | |
| | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| | | | 50 - 110 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 | |
| | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| E 22 | 0.30 | 0.15 | 140 | n (min-1) | 13584 | 6792 | 4528 | 3396 | 2264 | 1698 | 1358 | 1132 | 970 | 849 | 755 | |
| | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | |
| | | | 80 - 200 | n (min-1) | 13584 | 6792 | 4528 | 3396 | 2264 | 1698 | 1358 | 1132 | 970 | 849 | 755 | |
| | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | |
| | | | | vf (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CB230M - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-----|---|--------------------|-------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 2 | | | | | | | | |
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | | |
| P | E 1 - 2 | 0.50 | 1.00 | 320 | 260 | - | 380 | n (min-1) | 31049 | 15524 | 10350 | 7762 | 6210 | 5175 | 3881 |
| | | | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 |
| | | | | | | | | vf (in/min) | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | E 3 - 4 | 0.40 | 1.00 | 160 | 100 | - | 220 | n (min-1) | 15524 | 7762 | 5175 | 3881 | 3105 | 2587 | 1941 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 |
| | | | | | | | | vf (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 5 - 6 | 0.30 | 1.00 | 80 | 20 | - | 140 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1552 | 1294 | 970 |
| | | | | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0006 |
| | | | | | | | | vf (in/min) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| M | E 8 - 9 | 0.50 | 1.00 | 255 | 225 | - | 285 | n (min-1) | 24742 | 12371 | 8247 | 6186 | 4948 | 4124 | 3093 |
| | | | | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0006 |
| | | | | | | | | vf (in/min) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| | E 10 - 11 | 0.40 | 1.00 | 200 | 170 | - | 230 | n (min-1) | 19406 | 9703 | 6469 | 4851 | 3881 | 3234 | 2426 |
| | | | | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 |
| | | | | | | | | vf (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| K | E 12 - 13 | 0.50 | 1.00 | 215 | 155 | - | 275 | n (min-1) | 20861 | 10431 | 6954 | 5215 | 4172 | 3477 | 2608 |
| | | | | | | | | fz (in) | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | | | | vf (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| | E 14 - 15 | 0.30 | 1.00 | 115 | 55 | - | 175 | n (min-1) | 11158 | 5579 | 3719 | 2790 | 2232 | 1860 | 1395 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0009 |
| | | | | | | | | vf (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| N | E / M / A 16 | 1.00 | 1.00 | 560 | 260 | - | 860 | n (min-1) | 54336 | 27168 | 18112 | 13584 | 10867 | 9056 | 6792 |
| | | | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 |
| | | | | | | | | vf (in/min) | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 |
| | E / M / A 17 | 1.00 | 1.00 | 560 | 260 | - | 860 | n (min-1) | 54336 | 27168 | 18112 | 13584 | 10867 | 9056 | 6792 |
| | | | | | | | | fz (in) | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0023 |
| | | | | | | | | vf (in/min) | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 | 30.8 |
| S | E 19 | 0.20 | 1.00 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0024 | 0.0048 | 0.0072 | 0.0096 | 0.0120 | 0.0144 | 0.0192 |
| | | | | | | | | vf (in/min) | 32.6 | 32.6 | 32.6 | 32.6 | 32.6 | 32.6 | 32.6 |
| | E 20 | 0.20 | 1.00 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 |
| | | | | | | | | vf (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| | E 21 | 0.20 | 1.00 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 |
| | | | | | | | | vf (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| | E 22 | 0.30 | 1.00 | 110 | 50 | - | 170 | n (min-1) | 10673 | 5337 | 3558 | 2668 | 2135 | 1779 | 1334 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 |
| | | | | | | | | vf (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter

vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CB230M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-----|---|--------------------|-------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 2 | | | | | | | | |
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | | |
| P | E 1 - 2 | 1.00 | 0.30 | 320 | 260 | - | 380 | n (min-1) | 31049 | 15524 | 10350 | 7762 | 6210 | 5175 | 3881 |
| | | | | | | | | fz (in) | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 |
| | | | | | | | | vf (in/min) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| | E 3 - 4 | 1.00 | 0.30 | 160 | 100 | - | 220 | n (min-1) | 15524 | 7762 | 5175 | 3881 | 3105 | 2587 | 1941 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 |
| | | | | | | | | vf (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 5 - 6 | 1.00 | 0.20 | 80 | 20 | - | 140 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1552 | 1294 | 970 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 |
| | | | | | | | | vf (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| M | E 8 - 9 | 0.50 | 0.30 | 255 | 225 | - | 285 | n (min-1) | 24742 | 12371 | 8247 | 6186 | 4948 | 4124 | 3093 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 |
| | | | | | | | | vf (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| | E 10 - 11 | 0.30 | 0.20 | 200 | 170 | - | 230 | n (min-1) | 19406 | 9703 | 6469 | 4851 | 3881 | 3234 | 2426 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 |
| | | | | | | | | vf (in/min) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| K | E 12 - 13 | 1.00 | 0.50 | 215 | 155 | - | 275 | n (min-1) | 20861 | 10431 | 6954 | 5215 | 4172 | 3477 | 2608 |
| | | | | | | | | fz (in) | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| | | | | | | | | vf (in/min) | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| | E 14 - 15 | 0.50 | 0.30 | 115 | 55 | - | 175 | n (min-1) | 11158 | 5579 | 3719 | 2790 | 2232 | 1860 | 1395 |
| | | | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0008 | 0.0011 |
| | | | | | | | | vf (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| N | E / M / A 16 | 2.00 | 0.50 | 560 | 260 | - | 860 | n (min-1) | 54336 | 27168 | 18112 | 13584 | 10867 | 9056 | 6792 |
| | | | | | | | | fz (in) | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | | | | | vf (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| | E / M / A 17 | 2.00 | 0.50 | 560 | 260 | - | 860 | n (min-1) | 54336 | 27168 | 18112 | 13584 | 10867 | 9056 | 6792 |
| | | | | | | | | fz (in) | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | | | | | vf (in/min) | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| S | E 19 | 0.20 | 0.10 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0030 | 0.0060 | 0.0090 | 0.0120 | 0.0150 | 0.0180 | 0.0240 |
| | | | | | | | | vf (in/min) | 40.8 | 40.8 | 40.8 | 40.8 | 40.8 | 40.8 | 40.8 |
| | E 20 | 0.20 | 0.10 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 |
| | | | | | | | | vf (in/min) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | E 21 | 0.20 | 0.10 | 70 | 40 | - | 100 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 |
| | | | | | | | | vf (in/min) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | E 22 | 0.30 | 0.20 | 110 | 50 | - | 170 | n (min-1) | 10673 | 5337 | 3558 | 2668 | 2135 | 1779 | 1334 |
| | | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 |
| | | | | | | | | vf (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter

vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C330 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-----------|-------|---------------------------------------|---------------------------------------|---------------------------|------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | V _c (sf / min) | | Z _n = 3 | | | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | | |
| P | E 1-2 | 0.50 | 1.00 | 400 | - | 460 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | E 3-4 | 0.40 | 1.00 | 200 | - | 260 | v _f (in/min) | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 |
| | | | | | | | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | E 5-6 | 0.30 | 1.00 | 100 | - | 160 | v _f (in/min) | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| | | | | | | | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| E 8-9 | 0.50 | 1.00 | 320 | - | 350 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 | |
| | | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 | |
| E 10-11 | 0.40 | 1.00 | 290 | - | 320 | v _f (in/min) | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | |
| | | | | | | n (rev/min) | 17725 | 8862 | 4431 | 2954 | 2216 | 1772 | 1477 | 1108 | |
| E 12-13 | 0.50 | 1.00 | 270 | - | 330 | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 | |
| | | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 | |
| E 14-15 | 0.30 | 1.00 | 145 | - | 205 | v _f (in/min) | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | |
| | | | | | | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 | |
| E 16 | 1.00 | 1.00 | 700 | - | 1000 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | |
| | | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 | |
| E 17 | 1.00 | 1.00 | 700 | - | 1000 | v _f (in/min) | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | |
| | | | | | | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | |
| E 19 | 0.20 | 1.00 | 80 | - | 110 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | |
| | | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | |
| E 20 | 0.20 | 1.00 | 80 | - | 110 | v _f (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| | | | | | | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | |
| E 21 | 0.20 | 1.00 | 80 | - | 110 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | |
| | | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | |
| E 22 | 0.30 | 1.00 | 130 | - | 190 | v _f (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| | | | | | | n (rev/min) | 7946 | 3973 | 1986 | 1324 | 993 | 795 | 662 | 497 | |
| | | | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | | | | v _f (in/min) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |

SMG = Seco Material Group
 n [min-1] = RPM
 V_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

C330 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | 340 - 460 | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |
| | E 3 - 4 | 1.00 | 0.30 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 140 - 260 | v _f (in/min) | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| | E 5 - 6 | 1.00 | 0.20 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 160 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| M | E 8 - 9 | 0.50 | 0.30 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 290 - 350 | v _f (in/min) | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 |
| | E 10 - 11 | 0.30 | 0.20 | 290 | n (rev/min) | 17725 | 8862 | 4431 | 2954 | 2216 | 1772 | 1477 | 1108 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | 260 - 320 | v _f (in/min) | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | 210 - 330 | v _f (in/min) | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 |
| | E 14 - 15 | 0.50 | 0.30 | 145 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | 85 - 205 | v _f (in/min) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| N | E / M / A 16 | 2.00 | 0.50 | 700 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | 400 - 1000 | v _f (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 |
| | E / M / A 17 | 2.00 | 0.50 | 700 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | 400 - 1000 | v _f (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 |
| S | E 19 | 0.20 | 0.10 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 50 - 110 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| | E 20 | 0.20 | 0.10 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 50 - 110 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| | E 21 | 0.20 | 0.10 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 50 - 110 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| | E 22 | 0.30 | 0.20 | 130 | n (rev/min) | 7946 | 3973 | 1986 | 1324 | 993 | 795 | 662 | 497 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 70 - 190 | v _f (in/min) | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

C330M - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | |
| | | | | | | 1 | 3 | 6 | 8 | 10 | 11 | |
| P | E 1 - 2 | 0.50 | 1.00 | 400 | n (min-1) | | 38811 | 12937 | 6469 | 4851 | 3881 | 3528 |
| | | | | | fz (in) | | 0.0001 | 0.0004 | 0.0009 | 0.0011 | 0.0014 | 0.0016 |
| | | | | | vf (in/min) | | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 |
| | E 3 - 4 | 0.40 | 1.00 | 200 | n (min-1) | | 19406 | 6469 | 3234 | 2426 | 1941 | 1764 |
| | | | | | fz (in) | | 0.0001 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 |
| | | | | | vf (in/min) | | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| | E 5 - 6 | 0.30 | 1.00 | 100 | n (min-1) | | 9703 | 3234 | 1617 | 1213 | 970 | 882 |
| | | | | | fz (in) | | 0.0001 | 0.0002 | 0.0005 | 0.0006 | 0.0008 | 0.0008 |
| | | | | | vf (in/min) | | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | n (min-1) | | 31049 | 10350 | 5175 | 3881 | 3105 | 2823 |
| | | | | | fz (in) | | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0007 | 0.0008 |
| | | | | | vf (in/min) | | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| | E 10 - 11 | 0.40 | 1.00 | 290 | n (min-1) | | 28138 | 9379 | 4690 | 3517 | 2814 | 2558 |
| | | | | | fz (in) | | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0006 | 0.0007 |
| | | | | | vf (in/min) | | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 |
| K | E 12 - 13 | 0.50 | 1.00 | 270 | n (min-1) | | 26198 | 8733 | 4366 | 3275 | 2620 | 2382 |
| | | | | | fz (in) | | 0.0002 | 0.0005 | 0.0011 | 0.0015 | 0.0018 | 0.0020 |
| | | | | | vf (in/min) | | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 |
| | E 14 - 15 | 0.30 | 1.00 | 145 | n (min-1) | | 14069 | 4690 | 2345 | 1759 | 1407 | 1279 |
| | | | | | fz (in) | | 0.0001 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0012 |
| | | | | | vf (in/min) | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| N | E / M / A 16 | 1.00 | 1.00 | 700 | n (min-1) | | 67920 | 22640 | 11320 | 8490 | 6792 | 6175 |
| | | | | | fz (in) | | 0.0003 | 0.0009 | 0.0017 | 0.0023 | 0.0028 | 0.0031 |
| | | | | | vf (in/min) | | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 |
| | E / M / A 17 | 1.00 | 1.00 | 700 | n (min-1) | | 67920 | 22640 | 11320 | 8490 | 6792 | 6175 |
| | | | | | fz (in) | | 0.0003 | 0.0009 | 0.0017 | 0.0023 | 0.0028 | 0.0031 |
| | | | | | vf (in/min) | | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 |
| S | E 19 | 0.20 | 1.00 | 80 | n (min-1) | | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | fz (in) | | 0.0024 | 0.0072 | 0.0144 | 0.0192 | 0.0240 | 0.0264 |
| | | | | | vf (in/min) | | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 |
| | E 20 | 0.20 | 1.00 | 80 | n (min-1) | | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | fz (in) | | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0009 | 0.0010 |
| | | | | | vf (in/min) | | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | E 21 | 0.20 | 1.00 | 80 | n (min-1) | | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | fz (in) | | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0009 | 0.0010 |
| | | | | | vf (in/min) | | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| | E 22 | 0.30 | 1.00 | 130 | n (min-1) | | 12614 | 4205 | 2102 | 1577 | 1261 | 1147 |
| fz (in) | | | | | 0.0001 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | | |
| vf (in/min) | | | | | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter

vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

C330M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-----|--------|--------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 3 | | | | | | |
| | | | | | | | 1 | 3 | 6 | 8 | 10 | 11 | |
| P | E 1 - 2 | 1.00 | 0.30 | 400 | 340 | - 460 | n (min-1) | 38811 | 12937 | 6469 | 4851 | 3881 | 3528 |
| | | | | | | | fz (in) | 0.0002 | 0.0005 | 0.0011 | 0.0014 | 0.0018 | 0.0019 |
| | | | | | | | vf (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |
| | E 3 - 4 | 1.00 | 0.30 | 200 | 140 | - 260 | n (min-1) | 19406 | 6469 | 3234 | 2426 | 1941 | 1764 |
| | | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0007 | 0.0009 | 0.0011 | 0.0012 |
| | | | | | | | vf (in/min) | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| | E 5 - 6 | 1.00 | 0.20 | 100 | 40 | - 160 | n (min-1) | 9703 | 3234 | 1617 | 1213 | 970 | 882 |
| | | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0009 | 0.0010 |
| | | | | | | | vf (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| M | E 8 - 9 | 0.50 | 0.30 | 320 | 290 | - 350 | n (min-1) | 31049 | 10350 | 5175 | 3881 | 3105 | 2823 |
| | | | | | | | fz (in) | 0.0001 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0010 |
| | | | | | | | vf (in/min) | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 |
| | E 10 - 11 | 0.30 | 0.20 | 290 | 260 | - 320 | n (min-1) | 28138 | 9379 | 4690 | 3517 | 2814 | 2558 |
| | | | | | | | fz (in) | 0.0001 | 0.0002 | 0.0005 | 0.0006 | 0.0008 | 0.0009 |
| | | | | | | | vf (in/min) | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | 210 | - 330 | n (min-1) | 26198 | 8733 | 4366 | 3275 | 2620 | 2382 |
| | | | | | | | fz (in) | 0.0002 | 0.0007 | 0.0014 | 0.0018 | 0.0023 | 0.0025 |
| | | | | | | | vf (in/min) | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 |
| | E 14 - 15 | 0.50 | 0.30 | 145 | 85 | - 205 | n (min-1) | 14069 | 4690 | 2345 | 1759 | 1407 | 1279 |
| | | | | | | | fz (in) | 0.0001 | 0.0004 | 0.0008 | 0.0011 | 0.0013 | 0.0015 |
| | | | | | | | vf (in/min) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| N | E / M / A 16 | 2.00 | 0.50 | 700 | 400 | - 1000 | n (min-1) | 67920 | 22640 | 11320 | 8490 | 6792 | 6175 |
| | | | | | | | fz (in) | 0.0004 | 0.0011 | 0.0021 | 0.0028 | 0.0035 | 0.0039 |
| | | | | | | | vf (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 |
| | E / M / A 17 | 2.00 | 0.50 | 700 | 400 | - 1000 | n (min-1) | 67920 | 22640 | 11320 | 8490 | 6792 | 6175 |
| | | | | | | | fz (in) | 0.0004 | 0.0011 | 0.0021 | 0.0028 | 0.0035 | 0.0039 |
| | | | | | | | vf (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 |
| S | E 19 | 0.20 | 0.10 | 80 | 50 | - 110 | n (min-1) | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | | | fz (in) | 0.0030 | 0.0090 | 0.0180 | 0.0240 | 0.0300 | 0.0330 |
| | | | | | | | vf (in/min) | 69.9 | 69.9 | 69.9 | 69.9 | 69.9 | 69.9 |
| | E 20 | 0.20 | 0.10 | 80 | 50 | - 110 | n (min-1) | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | | | fz (in) | 0.0001 | 0.0004 | 0.0007 | 0.0009 | 0.0012 | 0.0013 |
| | | | | | | | vf (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| | E 21 | 0.20 | 0.10 | 80 | 50 | - 110 | n (min-1) | 7762 | 2587 | 1294 | 970 | 776 | 706 |
| | | | | | | | fz (in) | 0.0001 | 0.0004 | 0.0007 | 0.0009 | 0.0012 | 0.0013 |
| | | | | | | | vf (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| | E 22 | 0.30 | 0.20 | 130 | 70 | - 180 | n (min-1) | 12614 | 4205 | 2102 | 1577 | 1261 | 1147 |
| fz (in) | | | | | | | 0.0001 | 0.0003 | 0.0007 | 0.0009 | 0.0011 | 0.0012 | |
| vf (in/min) | | | | | | | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB330 - START VALUES

| | | SLOTTING | | | | | | | | | | | |
|------------|-----------------|---------------------------------------|---------------------------------------|---------------------------|---------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 0.30 | 1.00 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | | 260 | - | 380 | v _f (in/min) | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 |
| | E 3 - 4 | 0.20 | 1.00 | 150 | n (rev/min) | 9168 | 4584 | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 90 | - | 210 | v _f (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| E 5 - 6 | 0.20 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | |
| | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0019 | |
| | | | 20 | - | 140 | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| M | E 8 - 9 | 0.60 | 1.00 | 240 | n (rev/min) | 14669 | 7334 | 3667 | 2445 | 1834 | 1467 | 1222 | 917 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | E 10 - 11 | 0.30 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 |
| K | E 12 - 13 | 0.40 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 140 | - | 260 | v _f (in/min) | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| | E 14 - 15 | 0.20 | 1.00 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | 60 | - | 180 | v _f (in/min) | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| N | E / M / A 16 | 0.20 | 1.00 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| | E / M / A 17 | 0.20 | 1.00 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0005 | 0.0009 | 0.0018 | 0.0027 | 0.0036 | 0.0045 | 0.0054 | 0.0072 |
| S | E 19 | 0.10 | 1.00 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | E 20 | 0.10 | 1.00 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | E 21 | 0.10 | 1.00 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | E 22 | 0.10 | 1.00 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 40 | - | 160 | v _f (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |

SMG = Seco Material Group
n [min-1] = RPM
v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
a_p/D_c = % of diameter

v_f [in/min] = Feed rate
a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
All cutting data are start values. All cutting data is in inch values.
Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB330 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | 260 - 380 | v _f (in/min) | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 |
| | E 3 - 4 | 1.00 | 0.30 | 150 | n (rev/min) | 9168 | 4584 | 2292 | 1528 | 1146 | 917 | 764 | 573 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 90 - 210 | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| | E 5 - 6 | 1.00 | 0.20 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 20 - 140 | v _f (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| M | E 8 - 9 | 1.00 | 0.30 | 240 | n (rev/min) | 14669 | 7334 | 3667 | 2445 | 1834 | 1467 | 1222 | 917 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 210 - 270 | v _f (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| | E 10 - 11 | 1.00 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | 170 - 230 | v _f (in/min) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| K | E 12 - 13 | 1.00 | 0.40 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | 140 - 260 | v _f (in/min) | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 |
| | E 14 - 15 | 1.00 | 0.20 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | 60 - 180 | v _f (in/min) | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 |
| N | E / M / A 16 | 2.00 | 0.70 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | 100 - 700 | v _f (in/min) | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 |
| | E / M / A 17 | 2.00 | 0.70 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 |
| | | | | 100 - 700 | v _f (in/min) | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 | 41.3 |
| S | E 19 | 0.50 | 0.30 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 30 - 90 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| | E 20 | 0.50 | 0.30 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 30 - 90 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| | E 21 | 0.50 | 0.30 | 60 | n (rev/min) | 3667 | 1834 | 917 | 611 | 458 | 367 | 306 | 229 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 30 - 90 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| | E 22 | 0.50 | 0.20 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 40 - 160 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C360 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | |
|-------------------------|-------|---------------------------------------|---------------------------------------|---------------------------|------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | n (rev/min) | Z _n = 3 | | | | | | | | | |
| | | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | | |
| P | E 1-2 | 1.00 | 0.15 | 400 | - | 460 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 | |
| | | | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | |
| | E 3-4 | 1.00 | 0.15 | 200 | - | 260 | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |
| | | | | | | | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | |
| | E 5-6 | 1.00 | 0.15 | 100 | - | 160 | v _f (in/min) | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| | | | | | | | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 | |
| E 8-9 | 0.50 | 0.15 | 320 | - | 350 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 | | |
| | | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 | | |
| E 10-11 | 0.30 | 0.15 | 290 | - | 320 | v _f (in/min) | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | |
| | | | | | | n (rev/min) | 17725 | 8862 | 4431 | 2954 | 2216 | 1772 | 1477 | 1108 | | |
| E 12-13 | 1.00 | 0.15 | 270 | - | 330 | v _f (in/min) | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | |
| | | | | | | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 | | |
| E 14-15 | 0.50 | 0.15 | 145 | - | 205 | n (rev/min) | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | |
| | | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 | | |
| E 16-17 | 2.00 | 0.15 | 700 | - | 1000 | v _f (in/min) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | |
| | | | | | | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 | | |
| E 18-19 | 0.20 | 0.15 | 80 | - | 110 | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | | |
| | | | | | | f _z (in) | 0.0006 | 0.0011 | 0.0023 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0090 | | |
| E 20-21 | 2.00 | 0.15 | 700 | - | 1000 | v _f (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | |
| | | | | | | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | | |
| E 22-23 | 0.20 | 0.15 | 80 | - | 110 | v _f (in/min) | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | 72.2 | |
| | | | | | | n (rev/min) | 42784 | 21392 | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | | |
| E 24-25 | 0.20 | 0.15 | 80 | - | 110 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | |
| | | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| E 26-27 | 0.20 | 0.15 | 80 | - | 110 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | |
| | | | | | | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | |
| E 28-29 | 0.20 | 0.15 | 80 | - | 110 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | |
| | | | | | | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 | | |
| E 30-31 | 0.30 | 0.15 | 130 | - | 190 | n (rev/min) | 7946 | 3973 | 1986 | 1324 | 993 | 795 | 662 | 497 | | |
| | | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | | |
| E 32-33 | 0.30 | 0.15 | 130 | - | 190 | v _f (in/min) | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | |
| | | | | | | n (rev/min) | 7946 | 3973 | 1986 | 1324 | 993 | 795 | 662 | 497 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C430 / C430R / CNC430 / CD430 / CSD430 - START VALUES

| SLOTTING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 0.50 | 1.00 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | | 340 - 460 | v _f (in/min) | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| | E 3 - 4 | 0.40 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 140 - 260 | v _f (in/min) | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 |
| | E 5 - 6 | 0.30 | 1.00 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0019 |
| | | | | 40 - 160 | v _f (in/min) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | | | | 290 - 350 | v _f (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 10 - 11 | 0.40 | 1.00 | 250 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 |
| | | | | 220 - 280 | v _f (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| K | E 12 - 13 | 0.50 | 1.00 | 270 | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 210 - 330 | v _f (in/min) | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 |
| | E 14 - 15 | 0.30 | 1.00 | 145 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | 85 - 205 | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| S | E 19 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 - 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 20 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 - 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 21 | 0.20 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 - 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 22 | 0.20 | 1.00 | 112 | n (rev/min) | 6845 | 3423 | 1711 | 1141 | 856 | 685 | 570 | 428 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 52 - 172 | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C430 / C430R / CNC430 / CD430 / CSD430 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 400 | n (rev/min) | 24448 | 12224 | 6112 | 4075 | 3056 | 2445 | 2037 | 1528 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | 340 - 460 | v _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| | E 3 - 4 | 1.00 | 0.30 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 140 - 260 | v _f (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 5 - 6 | 1.00 | 0.20 | 100 | n (rev/min) | 6112 | 3056 | 1528 | 1019 | 764 | 611 | 509 | 382 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 160 | v _f (in/min) | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| M | E 8 - 9 | 0.50 | 0.30 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 290 - 350 | v _f (in/min) | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| | E 10 - 11 | 0.30 | 0.20 | 250 | n (rev/min) | 15280 | 7640 | 3820 | 2547 | 1910 | 1528 | 1273 | 955 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | 220 - 280 | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | n (rev/min) | 16502 | 8251 | 4126 | 2750 | 2063 | 1650 | 1375 | 1031 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | 210 - 330 | v _f (in/min) | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 |
| | E 14 - 15 | 0.50 | 0.30 | 145 | n (rev/min) | 8862 | 4431 | 2216 | 1477 | 1108 | 886 | 739 | 554 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | 85 - 205 | v _f (in/min) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| S | E 19 | 0.20 | 0.10 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 90 - 150 | v _f (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| | E 20 | 0.20 | 0.10 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 90 - 150 | v _f (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| | E 21 | 0.20 | 0.10 | 120 | n (rev/min) | 7334 | 3667 | 1834 | 1222 | 917 | 733 | 611 | 458 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 90 - 150 | v _f (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| | E 22 | 0.30 | 0.20 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 20 - 140 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB430 / CNCB430 / CSDB430 - START VALUES

| SLOTTING | | | | | | | | | | | | | |
|---------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|---------------------|-------------------------|-------------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 0.50 | 1.00 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0002 | 0.0005 | 0.0009 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | | 260 | - | 380 | v _f (in/min) | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 |
| | E 3 - 4 | 0.40 | 1.00 | 160 | n (rev/min) | 9779 | 4890 | 2445 | 1630 | 1222 | 978 | 815 | 611 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 100 | - | 220 | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| | E 5 - 6 | 0.30 | 1.00 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0019 |
| | | | | 20 | - | 140 | v _f (in/min) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| M | E 8 - 9 | 0.50 | 1.00 | 256 | n (rev/min) | 15647 | 7823 | 3912 | 2608 | 1956 | 1565 | 1304 | 978 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0018 |
| | | | | 226 | - | 286 | v _f (in/min) | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| | E 10 - 11 | 0.40 | 1.00 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0002 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0016 |
| | | | | 170 | - | 230 | v _f (in/min) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| K | E 12 - 13 | 0.50 | 1.00 | 216 | n (rev/min) | 13202 | 6601 | 3300 | 2200 | 1650 | 1320 | 1100 | 825 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0012 | 0.0017 | 0.0023 | 0.0029 | 0.0035 | 0.0046 |
| | | | | 156 | - | 276 | v _f (in/min) | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 |
| | E 14 - 15 | 0.30 | 1.00 | 116 | n (rev/min) | 7090 | 3545 | 1772 | 1182 | 886 | 709 | 591 | 443 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0007 | 0.0010 | 0.0014 | 0.0017 | 0.0020 | 0.0027 |
| | | | | 56 | - | 176 | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| S | E 19 | 0.10 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 | - | 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 20 | 0.10 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 | - | 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 21 | 0.10 | 1.00 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | | 40 | - | 100 | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 22 | 0.20 | 1.00 | 112 | n (rev/min) | 6845 | 3423 | 1711 | 1141 | 856 | 685 | 570 | 428 |
| f _z (in) | | | | | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | |
| 52 | | | | - | 172 | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CB430 / CNCB430 / CSDB430 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-------------------------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | |
| | | | | | | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 1.00 | 0.30 | 320 | n (rev/min) | 19558 | 9779 | 4890 | 3260 | 2445 | 1956 | 1630 | 1222 |
| | | | | | f _z (in) | 0.0003 | 0.0006 | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 |
| | | | | 260 - 380 | v _f (in/min) | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| | E 3 - 4 | 1.00 | 0.30 | 160 | n (rev/min) | 9779 | 4890 | 2445 | 1630 | 1222 | 978 | 815 | 611 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | | | 100 - 220 | v _f (in/min) | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 |
| | E 5 - 6 | 1.00 | 0.20 | 80 | n (rev/min) | 4890 | 2445 | 1222 | 815 | 611 | 489 | 407 | 306 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 20 - 140 | v _f (in/min) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| M | E 8 - 9 | 0.50 | 0.30 | 256 | n (rev/min) | 15647 | 7823 | 3912 | 2608 | 1956 | 1565 | 1304 | 978 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 226 - 286 | v _f (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 10 - 11 | 0.30 | 0.20 | 200 | n (rev/min) | 12224 | 6112 | 3056 | 2037 | 1528 | 1222 | 1019 | 764 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 |
| | | | | 170 - 230 | v _f (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| K | E 12 - 13 | 1.00 | 0.50 | 216 | n (rev/min) | 13202 | 6601 | 3300 | 2200 | 1650 | 1320 | 1100 | 825 |
| | | | | | f _z (in) | 0.0004 | 0.0007 | 0.0015 | 0.0022 | 0.0029 | 0.0036 | 0.0044 | 0.0058 |
| | | | | 156 - 276 | v _f (in/min) | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 |
| | E 14 - 15 | 0.50 | 0.30 | 116 | n (rev/min) | 7090 | 3545 | 1772 | 1182 | 886 | 709 | 591 | 443 |
| | | | | | f _z (in) | 0.0002 | 0.0004 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0026 | 0.0034 |
| | | | | 56 - 176 | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| S | E 19 | 0.30 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 100 | v _f (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |
| | E 20 | 0.30 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 100 | v _f (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |
| | E 21 | 0.30 | 0.10 | 70 | n (rev/min) | 4278 | 2139 | 1070 | 713 | 535 | 428 | 357 | 267 |
| | | | | | f _z (in) | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 |
| | | | | 40 - 100 | v _f (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |
| | E 22 | 0.40 | 0.20 | 112 | n (rev/min) | 6845 | 3423 | 1711 | 1141 | 856 | 685 | 570 | 428 |
| | | | | | f _z (in) | 0.0001 | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0022 |
| | | | | 52 - 172 | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C430M - START VALUES

| | | SLOTTING | | | | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | | | | |
| | | | | | | 1 | 1.5 | 2 | 3 | 3.5 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| P | E 1 - 2 | 0.50 | 1.00 | 400 | n (min-1) | 38811 | 25874 | 19406 | 12937 | 11089 | 9703 | 7762 | 6469 | 4851 | 4312 | 3881 | 3528 | 3234 |
| | | | | | fz (in) | .0001 | .0002 | .0003 | .0004 | .0005 | .0006 | .0007 | .0009 | .0011 | .0013 | .0014 | .0016 | .0017 |
| | | | | | vf (in/min) | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| | E 3 - 4 | 0.40 | 1.00 | 200 | n (min-1) | 19406 | 12937 | 9703 | 6469 | 5544 | 4851 | 3881 | 3234 | 2426 | 2156 | 1941 | 1764 | 1617 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0003 | .0004 | .0005 | .0007 | .0008 | .0009 | .0010 | .0010 |
| | | | | | vf (in/min) | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 |
| | E 5 - 6 | 0.30 | 1.00 | 100 | n (min-1) | 9703 | 6469 | 4851 | 3234 | 2772 | 2426 | 1941 | 1617 | 1213 | 1078 | 970 | 882 | 809 |
| | | | | | fz (in) | .0001 | .0001 | .0001 | .0002 | .0003 | .0003 | .0004 | .0004 | .0006 | .0007 | .0007 | .0008 | .0009 |
| | | | | | vf (in/min) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | n (min-1) | 31049 | 20699 | 15524 | 10350 | 8871 | 7762 | 6210 | 5175 | 3881 | 3450 | 3105 | 2823 | 2587 |
| | | | | | fz (in) | .0001 | .0001 | .0001 | .0002 | .0002 | .0003 | .0004 | .0004 | .0006 | .0006 | .0007 | .0008 | .0009 |
| | | | | | vf (in/min) | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| | E 10 - 11 | 0.40 | 1.00 | 250 | n (min-1) | 24257 | 16171 | 12129 | 8086 | 6931 | 6064 | 4851 | 4043 | 3032 | 2695 | 2426 | 2205 | 2021 |
| | | | | | fz (in) | .0001 | .0001 | .0001 | .0002 | .0002 | .0003 | .0003 | .0004 | .0005 | .0006 | .0006 | .0007 | .0008 |
| | | | | | vf (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| K | E 12 - 13 | 0.50 | 1.00 | 270 | n (min-1) | 26198 | 17465 | 13099 | 8733 | 7485 | 6549 | 5240 | 4366 | 3275 | 2911 | 2620 | 2382 | 2183 |
| | | | | | fz (in) | .0002 | .0003 | .0004 | .0005 | .0006 | .0007 | .0009 | .0011 | .0014 | .0016 | .0018 | .0020 | .0022 |
| | | | | | vf (in/min) | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| | E 14 - 15 | 0.30 | 1.00 | 145 | n (min-1) | 14069 | 9379 | 7035 | 4690 | 4020 | 3517 | 2814 | 2345 | 1759 | 1563 | 1407 | 1279 | 1172 |
| | | | | | fz (in) | .0001 | .0002 | .0002 | .0003 | .0004 | .0004 | .0005 | .0006 | .0009 | .0010 | .0011 | .0012 | .0013 |
| | | | | | vf (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| S | E 19 | 0.20 | 1.00 | 70 | n (min-1) | 6792 | 4528 | 3396 | 2264 | 1941 | 1698 | 1358 | 1132 | 849 | 755 | 679 | 617 | 566 |
| | | | | | fz (in) | .0030 | .0045 | .0060 | .0090 | .0105 | .0120 | .0150 | .0180 | .0240 | .0270 | .0300 | .0330 | .0360 |
| | | | | | vf (in/min) | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 |
| | E 20 | 0.20 | 1.00 | 70 | n (min-1) | 6792 | 4528 | 3396 | 2264 | 1941 | 1698 | 1358 | 1132 | 849 | 755 | 679 | 617 | 566 |
| | | | | | fz (in) | .0001 | .0002 | .0002 | .0004 | .0004 | .0005 | .0006 | .0007 | .0009 | .0011 | .0012 | .0013 | .0014 |
| | | | | | vf (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 21 | 0.20 | 1.00 | 70 | n (min-1) | 6792 | 4528 | 3396 | 2264 | 1941 | 1698 | 1358 | 1132 | 849 | 755 | 679 | 617 | 566 |
| | | | | | fz (in) | .0001 | .0002 | .0002 | .0004 | .0004 | .0005 | .0006 | .0007 | .0009 | .0011 | .0012 | .0013 | .0014 |
| | | | | | vf (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| | E 22 | 0.20 | 1.00 | 110 | n (min-1) | 10673 | 7115 | 5337 | 3558 | 3049 | 2668 | 2135 | 1779 | 1334 | 1186 | 1067 | 970 | 889 |
| | | | | | fz (in) | .0001 | .0002 | .0002 | .0003 | .0004 | .0004 | .0006 | .0007 | .0009 | .0010 | .0011 | .0012 | .0013 |
| | | | | | vf (in/min) | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

C430M - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | | | | |
| | | | | | | 1 | 1.5 | 2 | 3 | 3.5 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| P | E 1 - 2 | 1.00 | 0.30 | 400 | n (min-1) | 38811 | 25874 | 19406 | 12937 | 11089 | 9703 | 7762 | 6469 | 4851 | 4312 | 3881 | 3528 | 3234 |
| | | | | | fz (in) | .0002 | .0003 | .0004 | .0005 | .0006 | .0007 | .0009 | .0011 | .0014 | .0016 | .0018 | .0019 | .0021 |
| | | | | | vf (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| | E 3 - 4 | 1.00 | 0.30 | 200 | n (min-1) | 19406 | 12937 | 9703 | 6469 | 5544 | 4851 | 3881 | 3234 | 2426 | 2156 | 1941 | 1764 | 1617 |
| | | | | | fz (in) | .0001 | .0002 | .0002 | .0003 | .0004 | .0004 | .0006 | .0007 | .0009 | .0010 | .0011 | .0012 | .0013 |
| | | | | | vf (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| E 5 - 6 | 1.00 | 0.20 | 100 | n (min-1) | 9703 | 6469 | 4851 | 3234 | 2772 | 2426 | 1941 | 1617 | 1213 | 1078 | 970 | 882 | 809 | |
| | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0004 | .0005 | .0006 | .0008 | .0009 | .0009 | .0010 | .0011 | |
| | | | | vf (in/min) | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| M | E 8 - 9 | 0.50 | 0.30 | 320 | n (min-1) | 31049 | 20699 | 15524 | 10350 | 8871 | 7762 | 6210 | 5175 | 3881 | 3450 | 3105 | 2823 | 2587 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0003 | .0004 | .0005 | .0007 | .0008 | .0009 | .0010 | .0010 |
| | | | | | vf (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| | E 10 - 11 | 0.30 | 0.20 | 250 | n (min-1) | 24257 | 16171 | 12129 | 8086 | 6931 | 6064 | 4851 | 4043 | 3032 | 2695 | 2426 | 2205 | 2021 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0002 | .0003 | .0003 | .0004 | .0005 | .0006 | .0007 | .0008 | .0009 | .0009 |
| | | | | | vf (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | n (min-1) | 26198 | 17465 | 13099 | 8733 | 7485 | 6549 | 5240 | 4366 | 3275 | 2911 | 2620 | 2382 | 2183 |
| | | | | | fz (in) | .0002 | .0003 | .0005 | .0007 | .0008 | .0009 | .0011 | .0014 | .0018 | .0021 | .0023 | .0025 | .0027 |
| | | | | | vf (in/min) | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 |
| | E 14 - 15 | 0.50 | 0.30 | 145 | n (min-1) | 14069 | 9379 | 7035 | 4690 | 4020 | 3517 | 2814 | 2345 | 1759 | 1563 | 1407 | 1279 | 1172 |
| | | | | | fz (in) | .0001 | .0002 | .0003 | .0004 | .0005 | .0005 | .0007 | .0008 | .0011 | .0012 | .0013 | .0015 | .0016 |
| | | | | | vf (in/min) | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| S | E 19 | 0.20 | 0.10 | 120 | n (min-1) | 11643 | 7762 | 5822 | 3881 | 3327 | 2911 | 2329 | 1941 | 1455 | 1294 | 1164 | 1058 | 970 |
| | | | | | fz (in) | .0024 | .0036 | .0048 | .0072 | .0084 | .0096 | .0120 | .0144 | .0192 | .0216 | .0240 | .0264 | .0288 |
| | E 20 | 0.20 | 0.10 | 120 | n (min-1) | 11643 | 7762 | 5822 | 3881 | 3327 | 2911 | 2329 | 1941 | 1455 | 1294 | 1164 | 1058 | 970 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0004 | .0005 | .0006 | .0008 | .0009 | .0009 | .0010 | .0011 |
| | E 21 | 0.20 | 0.10 | 120 | n (min-1) | 11643 | 7762 | 5822 | 3881 | 3327 | 2911 | 2329 | 1941 | 1455 | 1294 | 1164 | 1058 | 970 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0004 | .0005 | .0006 | .0008 | .0009 | .0009 | .0010 | .0011 |
| | E 22 | 0.30 | 0.20 | 80 | n (min-1) | 7762 | 5175 | 3881 | 2587 | 2218 | 1941 | 1552 | 1294 | 970 | 862 | 776 | 706 | 647 |
| | | | | | fz (in) | .0001 | .0001 | .0002 | .0003 | .0003 | .0003 | .0004 | .0005 | .0007 | .0008 | .0009 | .0010 | .0010 |
| | | | | 20 | vf (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

CB430M - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | |
| P | E 1 - 2 | 0.50 | 1.00 | 320 | n (min-1) | 31049 | 15524 | 10350 | 7762 | 6210 | 5175 | 3881 | 3105 | 2587 | |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | |
| | | | | | vf (in/min) | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 |
| | E 3 - 4 | 0.40 | 1.00 | 160 | n (min-1) | 15524 | 7762 | 5175 | 3881 | 3105 | 2587 | 1941 | 1552 | 1294 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | |
| | | | | | vf (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| | E 5 - 6 | 0.30 | 1.00 | 80 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1552 | 1294 | 970 | 776 | 647 | |
| | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | |
| | | | | | vf (in/min) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| M | E 8 - 9 | 0.50 | 1.00 | 255 | n (min-1) | 24742 | 12371 | 8247 | 6186 | 4948 | 4124 | 3093 | 2474 | 2062 | |
| | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | |
| | | | | | vf (in/min) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| | E 10 - 11 | 0.40 | 1.00 | 200 | n (min-1) | 19406 | 9703 | 6469 | 4851 | 3881 | 3234 | 2426 | 1941 | 1617 | |
| | | | | | fz (in) | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | |
| | | | | | vf (in/min) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | |
| K | E 12 - 13 | 0.50 | 1.00 | 215 | n (min-1) | 20861 | 10431 | 6954 | 5215 | 4172 | 3477 | 2608 | 2086 | 1738 | |
| | | | | | fz (in) | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0022 | |
| | | | | | vf (in/min) | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | |
| | E 14 - 15 | 0.30 | 1.00 | 115 | n (min-1) | 11158 | 5579 | 3719 | 2790 | 2232 | 1860 | 1395 | 1116 | 930 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0009 | 0.0011 | 0.0013 | |
| | | | | | vf (in/min) | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | |
| S | E 19 | 0.10 | 1.00 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0030 | 0.0060 | 0.0090 | 0.0120 | 0.0150 | 0.0180 | 0.0240 | 0.0300 | 0.0360 | |
| | | | | | vf (in/min) | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | 81.5 | |
| | E 20 | 0.10 | 1.00 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | |
| | | | | | vf (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | |
| | E 21 | 0.10 | 1.00 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | |
| | | | | | vf (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | |
| | E 22 | 0.20 | 1.00 | 110 | n (min-1) | 10673 | 5337 | 3558 | 2668 | 2135 | 1779 | 1334 | 1067 | 889 | |
| fz (in) | | | | | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | | |
| vf (in/min) | | | | | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CB430M - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | |
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | |
| P | E 1 - 2 | 1.00 | 0.30 | 320 | n (min-1) | 31049 | 15524 | 10350 | 7762 | 6210 | 5175 | 3881 | 3105 | 2587 | |
| | | | | | fz (in) | 0.0002 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | |
| | | | | | vf (in/min) | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| | E 3 - 4 | 1.00 | 0.30 | 160 | n (min-1) | 15524 | 7762 | 5175 | 3881 | 3105 | 2587 | 1941 | 1552 | 1294 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | |
| | | | | | vf (in/min) | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 |
| | E 5 - 6 | 1.00 | 0.20 | 80 | n (min-1) | 7762 | 3881 | 2587 | 1941 | 1552 | 1294 | 970 | 776 | 647 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | |
| | | | | | vf (in/min) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |
| M | E 8 - 9 | 0.50 | 0.30 | 255 | n (min-1) | 24742 | 12371 | 8247 | 6186 | 4948 | 4124 | 3093 | 2474 | 2062 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | |
| | | | | | vf (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| | E 10 - 11 | 0.30 | 0.20 | 200 | n (min-1) | 19406 | 9703 | 6469 | 4851 | 3881 | 3234 | 2426 | 1941 | 1617 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | |
| | | | | | vf (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| K | E 12 - 13 | 1.00 | 0.50 | 215 | n (min-1) | 20861 | 10431 | 6954 | 5215 | 4172 | 3477 | 2608 | 2086 | 1738 | |
| | | | | | fz (in) | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | |
| | | | | | vf (in/min) | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 |
| | E 14 - 15 | 0.50 | 0.30 | 115 | n (min-1) | 11158 | 5579 | 3719 | 2790 | 2232 | 1860 | 1395 | 1116 | 930 | |
| | | | | | fz (in) | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0008 | 0.0011 | 0.0013 | 0.0016 | |
| | | | | | vf (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| S | E 19 | 0.30 | 0.10 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0024 | 0.0048 | 0.0072 | 0.0096 | 0.0120 | 0.0144 | 0.0192 | 0.0240 | 0.0288 | |
| | | | | | vf (in/min) | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 | 65.2 |
| | | | | | 40 | - | 100 | | | | | | | | |
| | E 20 | 0.30 | 0.10 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | |
| | | | | | vf (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | |
| | | | | | 40 | - | 100 | | | | | | | | |
| | E 21 | 0.30 | 0.10 | 70 | n (min-1) | 6792 | 3396 | 2264 | 1698 | 1358 | 1132 | 849 | 679 | 566 | |
| | | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | |
| | | | | | vf (in/min) | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | |
| | | | | | 40 | - | 100 | | | | | | | | |
| E 22 | 0.40 | 0.20 | 110 | n (min-1) | 10673 | 5337 | 3558 | 2668 | 2135 | 1779 | 1334 | 1067 | 889 | | |
| | | | | fz (in) | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0010 | | |
| | | | | vf (in/min) | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | | |
| | | | | 50 | - | 170 | | | | | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

ME230

SOLID
CARBIDE

HELIX

 30°

SQUARE END

CENTER
CUTTING



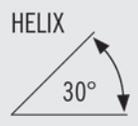
- Sub micron grain carbide
- Uncoated
- ME230 LOC = 3xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59570 | ME230-0.005-F3-S.0-Z2 | .005 | 1/8 | .0150 | 1-1/2 | 2 | CYLINDRICAL |
| N59571 | ME230-0.006-F3-S.0-Z2 | .006 | 1/8 | .0180 | 1-1/2 | 2 | CYLINDRICAL |
| N59572 | ME230-0.007-F3-S.0-Z2 | .007 | 1/8 | .0210 | 1-1/2 | 2 | CYLINDRICAL |
| N59573 | ME230-0.008-F3-S.0-Z2 | .008 | 1/8 | .0240 | 1-1/2 | 2 | CYLINDRICAL |
| N59574 | ME230-0.009-F3-S.0-Z2 | .009 | 1/8 | .0270 | 1-1/2 | 2 | CYLINDRICAL |
| N59575 | ME230-0.010-F3-S.0-Z2 | .010 | 1/8 | .0300 | 1-1/2 | 2 | CYLINDRICAL |
| N59576 | ME230-0.011-F3-S.0-Z2 | .011 | 1/8 | .0330 | 1-1/2 | 2 | CYLINDRICAL |
| N59577 | ME230-0.012-F3-S.0-Z2 | .012 | 1/8 | .0360 | 1-1/2 | 2 | CYLINDRICAL |
| N59578 | ME230-0.013-F3-S.0-Z2 | .013 | 1/8 | .0390 | 1-1/2 | 2 | CYLINDRICAL |
| N59579 | ME230-0.014-F3-S.0-Z2 | .014 | 1/8 | .0420 | 1-1/2 | 2 | CYLINDRICAL |
| N59580 | ME230-0.015-F3-S.0-Z2 | .015 | 1/8 | .0450 | 1-1/2 | 2 | CYLINDRICAL |
| N59581 | ME230-0.016-F3-S.0-Z2 | .016 | 1/8 | .0480 | 1-1/2 | 2 | CYLINDRICAL |
| N59582 | ME230-0.017-F3-S.0-Z2 | .017 | 1/8 | .0510 | 1-1/2 | 2 | CYLINDRICAL |
| N59583 | ME230-0.018-F3-S.0-Z2 | .018 | 1/8 | .0540 | 1-1/2 | 2 | CYLINDRICAL |
| N59584 | ME230-0.019-F3-S.0-Z2 | .019 | 1/8 | .0570 | 1-1/2 | 2 | CYLINDRICAL |
| N59585 | ME230-0.020-F3-S.0-Z2 | .020 | 1/8 | .0600 | 1-1/2 | 2 | CYLINDRICAL |
| N59586 | ME230-0.021-F3-S.0-Z2 | .021 | 1/8 | .0630 | 1-1/2 | 2 | CYLINDRICAL |
| N59587 | ME230-0.022-F3-S.0-Z2 | .022 | 1/8 | .0660 | 1-1/2 | 2 | CYLINDRICAL |
| N59588 | ME230-0.023-F3-S.0-Z2 | .023 | 1/8 | .0690 | 1-1/2 | 2 | CYLINDRICAL |
| N59589 | ME230-0.024-F3-S.0-Z2 | .024 | 1/8 | .0720 | 1-1/2 | 2 | CYLINDRICAL |
| N59590 | ME230-0.025-F3-S.0-Z2 | .025 | 1/8 | .0750 | 1-1/2 | 2 | CYLINDRICAL |
| N59591 | ME230-0.026-F3-S.0-Z2 | .026 | 1/8 | .0780 | 1-1/2 | 2 | CYLINDRICAL |
| N59592 | ME230-0.027-F3-S.0-Z2 | .027 | 1/8 | .0810 | 1-1/2 | 2 | CYLINDRICAL |
| N59593 | ME230-0.028-F3-S.0-Z2 | .028 | 1/8 | .0840 | 1-1/2 | 2 | CYLINDRICAL |
| N59594 | ME230-0.029-F3-S.0-Z2 | .029 | 1/8 | .0870 | 1-1/2 | 2 | CYLINDRICAL |
| N59595 | ME230-0.030-F3-S.0-Z2 | .030 | 1/8 | .0900 | 1-1/2 | 2 | CYLINDRICAL |
| N59596 | ME230-0.031-F3-S.0-Z2 | .031 | 1/8 | .0930 | 1-1/2 | 2 | CYLINDRICAL |
| N59597 | ME230-0.032-F3-S.0-Z2 | .032 | 1/8 | .0960 | 1-1/2 | 2 | CYLINDRICAL |
| N59598 | ME230-0.033-F3-S.0-Z2 | .033 | 1/8 | .0990 | 1-1/2 | 2 | CYLINDRICAL |
| N59599 | ME230-0.034-F3-S.0-Z2 | .034 | 1/8 | .1020 | 1-1/2 | 2 | CYLINDRICAL |
| N59600 | ME230-0.035-F3-S.0-Z2 | .035 | 1/8 | .1050 | 1-1/2 | 2 | CYLINDRICAL |
| N59601 | ME230-0.036-F3-S.0-Z2 | .036 | 1/8 | .1080 | 1-1/2 | 2 | CYLINDRICAL |
| N59602 | ME230-0.037-F3-S.0-Z2 | .037 | 1/8 | .1110 | 1-1/2 | 2 | CYLINDRICAL |
| N59603 | ME230-0.038-F3-S.0-Z2 | .038 | 1/8 | .1140 | 1-1/2 | 2 | CYLINDRICAL |
| N59604 | ME230-0.039-F3-S.0-Z2 | .039 | 1/8 | .1170 | 1-1/2 | 2 | CYLINDRICAL |
| N59605 | ME230-0.040-F3-S.0-Z2 | .040 | 1/8 | .1200 | 1-1/2 | 2 | CYLINDRICAL |
| N59606 | ME230-0.041-F3-S.0-Z2 | .041 | 1/8 | .1230 | 1-1/2 | 2 | CYLINDRICAL |
| N59607 | ME230-0.042-F3-S.0-Z2 | .042 | 1/8 | .1260 | 1-1/2 | 2 | CYLINDRICAL |
| N59608 | ME230-0.043-F3-S.0-Z2 | .043 | 1/8 | .1290 | 1-1/2 | 2 | CYLINDRICAL |

ME230 (CONT'D) & MES230

SOLID
CARBIDE



HELIX
30°



SQUARE END

CENTER
CUTTING



- Sub micron grain carbide
- Uncoated
- ME230 LOC = 3xD
- MES230 LOC = 1.5xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|--------------------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| REGULAR LENGTH ME230 (CONT'D) | | | | | | | |
| N59609 | ME230-0.044-F3-S.0-Z2 | .044 | 1/8 | .1320 | 1-1/2 | 2 | CYLINDRICAL |
| N59610 | ME230-0.045-F3-S.0-Z2 | .045 | 1/8 | .1350 | 1-1/2 | 2 | CYLINDRICAL |
| N59611 | ME230-0.046-F3-S.0-Z2 | .046 | 1/8 | .1380 | 1-1/2 | 2 | CYLINDRICAL |
| N59612 | ME230-0.047-F3-S.0-Z2 | .047 | 1/8 | .1410 | 1-1/2 | 2 | CYLINDRICAL |
| N59613 | ME230-0.048-F3-S.0-Z2 | .048 | 1/8 | .1440 | 1-1/2 | 2 | CYLINDRICAL |
| N59614 | ME230-0.049-F3-S.0-Z2 | .049 | 1/8 | .1470 | 1-1/2 | 2 | CYLINDRICAL |
| N59615 | ME230-0.050-F3-S.0-Z2 | .050 | 1/8 | .1500 | 1-1/2 | 2 | CYLINDRICAL |
| N59616 | ME230-0.051-F3-S.0-Z2 | .051 | 1/8 | .1530 | 1-1/2 | 2 | CYLINDRICAL |
| N59617 | ME230-0.052-F3-S.0-Z2 | .052 | 1/8 | .1560 | 1-1/2 | 2 | CYLINDRICAL |
| N59618 | ME230-0.053-F3-S.0-Z2 | .053 | 1/8 | .1590 | 1-1/2 | 2 | CYLINDRICAL |
| N59619 | ME230-0.054-F3-S.0-Z2 | .054 | 1/8 | .1620 | 1-1/2 | 2 | CYLINDRICAL |
| N59620 | ME230-0.055-F3-S.0-Z2 | .055 | 1/8 | .1650 | 1-1/2 | 2 | CYLINDRICAL |
| N59621 | ME230-0.060-F3-S.0-Z2 | .060 | 1/8 | .1800 | 1-1/2 | 2 | CYLINDRICAL |
| N59622 | ME230-0.065-F3-S.0-Z2 | .065 | 1/8 | .1950 | 1-1/2 | 2 | CYLINDRICAL |
| N59623 | ME230-0.070-F3-S.0-Z2 | .070 | 1/8 | .2100 | 1-1/2 | 2 | CYLINDRICAL |
| N59624 | ME230-0.075-F3-S.0-Z2 | .075 | 1/8 | .2250 | 1-1/2 | 2 | CYLINDRICAL |
| N59625 | ME230-0.080-F3-S.0-Z2 | .080 | 1/8 | .2400 | 1-1/2 | 2 | CYLINDRICAL |
| N59626 | ME230-0.085-F3-S.0-Z2 | .085 | 1/8 | .2550 | 1-1/2 | 2 | CYLINDRICAL |
| N59627 | ME230-0.090-F3-S.0-Z2 | .090 | 1/8 | .2700 | 1-1/2 | 2 | CYLINDRICAL |
| N59628 | ME230-0.095-F3-S.0-Z2 | .095 | 1/8 | .2850 | 1-1/2 | 2 | CYLINDRICAL |
| N59629 | ME230-0.100-F3-S.0-Z2 | .100 | 1/8 | .3000 | 1-1/2 | 2 | CYLINDRICAL |
| N59630 | ME230-0.105-F3-S.0-Z2 | .105 | 1/8 | .3150 | 1-1/2 | 2 | CYLINDRICAL |
| N59631 | ME230-0.110-F3-S.0-Z2 | .110 | 1/8 | .3300 | 1-1/2 | 2 | CYLINDRICAL |
| N59632 | ME230-0.115-F3-S.0-Z2 | .115 | 1/8 | .3450 | 1-1/2 | 2 | CYLINDRICAL |
| N59633 | ME230-0.120-F3-S.0-Z2 | .120 | 1/8 | .3600 | 1-1/2 | 2 | CYLINDRICAL |
| STUB LENGTH - MES230 | | | | | | | |
| N59693 | MES230-0.005-F2-S.0-Z2 | .005 | 1/8 | .0075 | 1-1/2 | 2 | CYLINDRICAL |
| N59694 | MES230-0.006-F2-S.0-Z2 | .006 | 1/8 | .0090 | 1-1/2 | 2 | CYLINDRICAL |
| N59695 | MES230-0.007-F2-S.0-Z2 | .007 | 1/8 | .0105 | 1-1/2 | 2 | CYLINDRICAL |
| N59696 | MES230-0.008-F2-S.0-Z2 | .008 | 1/8 | .0120 | 1-1/2 | 2 | CYLINDRICAL |
| N59697 | MES230-0.009-F2-S.0-Z2 | .009 | 1/8 | .0135 | 1-1/2 | 2 | CYLINDRICAL |
| N59698 | MES230-0.010-F2-S.0-Z2 | .010 | 1/8 | .0150 | 1-1/2 | 2 | CYLINDRICAL |
| N59699 | MES230-0.011-F2-S.0-Z2 | .011 | 1/8 | .0165 | 1-1/2 | 2 | CYLINDRICAL |
| N59700 | MES230-0.012-F2-S.0-Z2 | .012 | 1/8 | .0180 | 1-1/2 | 2 | CYLINDRICAL |
| N59701 | MES230-0.013-F2-S.0-Z2 | .013 | 1/8 | .0195 | 1-1/2 | 2 | CYLINDRICAL |
| N59702 | MES230-0.014-F2-S.0-Z2 | .014 | 1/8 | .0210 | 1-1/2 | 2 | CYLINDRICAL |
| N59703 | MES230-0.015-F2-S.0-Z2 | .015 | 1/8 | .0225 | 1-1/2 | 2 | CYLINDRICAL |
| N59704 | MES230-0.016-F2-S.0-Z2 | .016 | 1/8 | .0240 | 1-1/2 | 2 | CYLINDRICAL |

DISCOUNT CODE D42

MES230 (CONT'D)

SOLID CARBIDE

HELIX
30°

SQUARE END

CENTER CUTTING

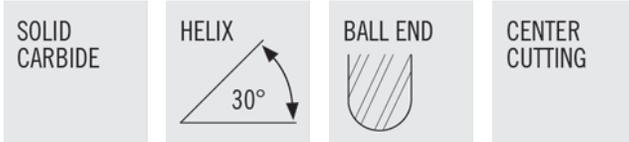


- Sub micron grain carbide
- Uncoated
- MES230 LOC = 1.5xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59705 | MES230-0.017-F2-S.0-Z2 | .017 | 1/8 | .0255 | 1-1/2 | 2 | CYLINDRICAL |
| N59706 | MES230-0.018-F2-S.0-Z2 | .018 | 1/8 | .0270 | 1-1/2 | 2 | CYLINDRICAL |
| N59707 | MES230-0.019-F2-S.0-Z2 | .019 | 1/8 | .0285 | 1-1/2 | 2 | CYLINDRICAL |
| N59708 | MES230-0.020-F2-S.0-Z2 | .020 | 1/8 | .0300 | 1-1/2 | 2 | CYLINDRICAL |
| N59709 | MES230-0.021-F2-S.0-Z2 | .021 | 1/8 | .0315 | 1-1/2 | 2 | CYLINDRICAL |
| N59710 | MES230-0.022-F2-S.0-Z2 | .022 | 1/8 | .0330 | 1-1/2 | 2 | CYLINDRICAL |
| N59711 | MES230-0.023-F2-S.0-Z2 | .023 | 1/8 | .0345 | 1-1/2 | 2 | CYLINDRICAL |
| N59712 | MES230-0.024-F2-S.0-Z2 | .024 | 1/8 | .0360 | 1-1/2 | 2 | CYLINDRICAL |
| N59713 | MES230-0.025-F2-S.0-Z2 | .025 | 1/8 | .0375 | 1-1/2 | 2 | CYLINDRICAL |
| N59714 | MES230-0.026-F2-S.0-Z2 | .026 | 1/8 | .0390 | 1-1/2 | 2 | CYLINDRICAL |
| N59715 | MES230-0.027-F2-S.0-Z2 | .027 | 1/8 | .0405 | 1-1/2 | 2 | CYLINDRICAL |
| N59716 | MES230-0.028-F2-S.0-Z2 | .028 | 1/8 | .0420 | 1-1/2 | 2 | CYLINDRICAL |
| N59717 | MES230-0.029-F2-S.0-Z2 | .029 | 1/8 | .0435 | 1-1/2 | 2 | CYLINDRICAL |
| N59718 | MES230-0.030-F2-S.0-Z2 | .030 | 1/8 | .0450 | 1-1/2 | 2 | CYLINDRICAL |
| N59719 | MES230-0.031-F2-S.0-Z2 | .031 | 1/8 | .0465 | 1-1/2 | 2 | CYLINDRICAL |
| N59720 | MES230-0.032-F2-S.0-Z2 | .032 | 1/8 | .0480 | 1-1/2 | 2 | CYLINDRICAL |
| N59721 | MES230-0.033-F2-S.0-Z2 | .033 | 1/8 | .0495 | 1-1/2 | 2 | CYLINDRICAL |
| N59722 | MES230-0.034-F2-S.0-Z2 | .034 | 1/8 | .0510 | 1-1/2 | 2 | CYLINDRICAL |
| N59723 | MES230-0.035-F2-S.0-Z2 | .035 | 1/8 | .0525 | 1-1/2 | 2 | CYLINDRICAL |
| N59724 | MES230-0.036-F2-S.0-Z2 | .036 | 1/8 | .0540 | 1-1/2 | 2 | CYLINDRICAL |
| N59725 | MES230-0.037-F2-S.0-Z2 | .037 | 1/8 | .0555 | 1-1/2 | 2 | CYLINDRICAL |
| N59726 | MES230-0.038-F2-S.0-Z2 | .038 | 1/8 | .0570 | 1-1/2 | 2 | CYLINDRICAL |
| N59727 | MES230-0.039-F2-S.0-Z2 | .039 | 1/8 | .0585 | 1-1/2 | 2 | CYLINDRICAL |
| N59728 | MES230-0.040-F2-S.0-Z2 | .040 | 1/8 | .0600 | 1-1/2 | 2 | CYLINDRICAL |
| N59729 | MES230-0.041-F2-S.0-Z2 | .041 | 1/8 | .0615 | 1-1/2 | 2 | CYLINDRICAL |
| N59730 | MES230-0.042-F2-S.0-Z2 | .042 | 1/8 | .0630 | 1-1/2 | 2 | CYLINDRICAL |
| N59731 | MES230-0.043-F2-S.0-Z2 | .043 | 1/8 | .0645 | 1-1/2 | 2 | CYLINDRICAL |
| N59732 | MES230-0.044-F2-S.0-Z2 | .044 | 1/8 | .0660 | 1-1/2 | 2 | CYLINDRICAL |
| N59733 | MES230-0.045-F2-S.0-Z2 | .045 | 1/8 | .0675 | 1-1/2 | 2 | CYLINDRICAL |
| N59734 | MES230-0.046-F2-S.0-Z2 | .046 | 1/8 | .0690 | 1-1/2 | 2 | CYLINDRICAL |
| N59735 | MES230-0.047-F2-S.0-Z2 | .047 | 1/8 | .0705 | 1-1/2 | 2 | CYLINDRICAL |
| N59736 | MES230-0.048-F2-S.0-Z2 | .048 | 1/8 | .0720 | 1-1/2 | 2 | CYLINDRICAL |
| N59737 | MES230-0.049-F2-S.0-Z2 | .049 | 1/8 | .0735 | 1-1/2 | 2 | CYLINDRICAL |
| N59738 | MES230-0.050-F2-S.0-Z2 | .050 | 1/8 | .0750 | 1-1/2 | 2 | CYLINDRICAL |
| N59739 | MES230-0.051-F2-S.0-Z2 | .051 | 1/8 | .0765 | 1-1/2 | 2 | CYLINDRICAL |
| N59740 | MES230-0.052-F2-S.0-Z2 | .052 | 1/8 | .0780 | 1-1/2 | 2 | CYLINDRICAL |
| N59741 | MES230-0.053-F2-S.0-Z2 | .053 | 1/8 | .0795 | 1-1/2 | 2 | CYLINDRICAL |
| N59742 | MES230-0.054-F2-S.0-Z2 | .054 | 1/8 | .0810 | 1-1/2 | 2 | CYLINDRICAL |
| N59743 | MES230-0.055-F2-S.0-Z2 | .055 | 1/8 | .0825 | 1-1/2 | 2 | CYLINDRICAL |

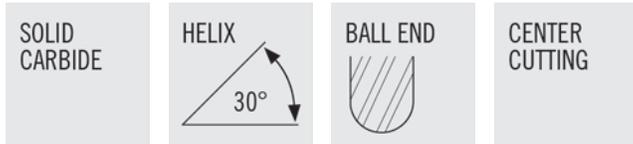
MEB230



- Sub micron grain carbide
- Uncoated
- MEB230 LOC = 3xD
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59634 | MEB230-0.010-F3-B.0-Z2 | .010 | 1/8 | .0300 | 1-1/2 | 2 | CYLINDRICAL |
| N59635 | MEB230-0.011-F3-B.0-Z2 | .011 | 1/8 | .0330 | 1-1/2 | 2 | CYLINDRICAL |
| N59636 | MEB230-0.012-F3-B.0-Z2 | .012 | 1/8 | .0360 | 1-1/2 | 2 | CYLINDRICAL |
| N59637 | MEB230-0.013-F3-B.0-Z2 | .013 | 1/8 | .0390 | 1-1/2 | 2 | CYLINDRICAL |
| N59638 | MEB230-0.014-F3-B.0-Z2 | .014 | 1/8 | .0420 | 1-1/2 | 2 | CYLINDRICAL |
| N59639 | MEB230-0.015-F3-B.0-Z2 | .015 | 1/8 | .0450 | 1-1/2 | 2 | CYLINDRICAL |
| N59640 | MEB230-0.016-F3-B.0-Z2 | .016 | 1/8 | .0480 | 1-1/2 | 2 | CYLINDRICAL |
| N59641 | MEB230-0.017-F3-B.0-Z2 | .017 | 1/8 | .0510 | 1-1/2 | 2 | CYLINDRICAL |
| N59642 | MEB230-0.018-F3-B.0-Z2 | .018 | 1/8 | .0540 | 1-1/2 | 2 | CYLINDRICAL |
| N59643 | MEB230-0.019-F3-B.0-Z2 | .019 | 1/8 | .0570 | 1-1/2 | 2 | CYLINDRICAL |
| N59644 | MEB230-0.020-F3-B.0-Z2 | .020 | 1/8 | .0600 | 1-1/2 | 2 | CYLINDRICAL |
| N59645 | MEB230-0.021-F3-B.0-Z2 | .021 | 1/8 | .0630 | 1-1/2 | 2 | CYLINDRICAL |
| N59646 | MEB230-0.022-F3-B.0-Z2 | .022 | 1/8 | .0660 | 1-1/2 | 2 | CYLINDRICAL |
| N59647 | MEB230-0.023-F3-B.0-Z2 | .023 | 1/8 | .0690 | 1-1/2 | 2 | CYLINDRICAL |
| N59648 | MEB230-0.024-F3-B.0-Z2 | .024 | 1/8 | .0720 | 1-1/2 | 2 | CYLINDRICAL |
| N59649 | MEB230-0.025-F3-B.0-Z2 | .025 | 1/8 | .0750 | 1-1/2 | 2 | CYLINDRICAL |
| N59650 | MEB230-0.026-F3-B.0-Z2 | .026 | 1/8 | .0780 | 1-1/2 | 2 | CYLINDRICAL |
| N59651 | MEB230-0.027-F3-B.0-Z2 | .027 | 1/8 | .0810 | 1-1/2 | 2 | CYLINDRICAL |
| N59652 | MEB230-0.028-F3-B.0-Z2 | .028 | 1/8 | .0840 | 1-1/2 | 2 | CYLINDRICAL |
| N59653 | MEB230-0.029-F3-B.0-Z2 | .029 | 1/8 | .0870 | 1-1/2 | 2 | CYLINDRICAL |
| N59654 | MEB230-0.030-F3-B.0-Z2 | .030 | 1/8 | .0900 | 1-1/2 | 2 | CYLINDRICAL |
| N59655 | MEB230-0.031-F3-B.0-Z2 | .031 | 1/8 | .0930 | 1-1/2 | 2 | CYLINDRICAL |
| N59656 | MEB230-0.032-F3-B.0-Z2 | .032 | 1/8 | .0960 | 1-1/2 | 2 | CYLINDRICAL |
| N59657 | MEB230-0.033-F3-B.0-Z2 | .033 | 1/8 | .0990 | 1-1/2 | 2 | CYLINDRICAL |
| N59658 | MEB230-0.034-F3-B.0-Z2 | .034 | 1/8 | .1020 | 1-1/2 | 2 | CYLINDRICAL |
| N59659 | MEB230-0.035-F3-B.0-Z2 | .035 | 1/8 | .1050 | 1-1/2 | 2 | CYLINDRICAL |
| N59660 | MEB230-0.036-F3-B.0-Z2 | .036 | 1/8 | .1080 | 1-1/2 | 2 | CYLINDRICAL |
| N59661 | MEB230-0.037-F3-B.0-Z2 | .037 | 1/8 | .1110 | 1-1/2 | 2 | CYLINDRICAL |
| N59662 | MEB230-0.038-F3-B.0-Z2 | .038 | 1/8 | .1140 | 1-1/2 | 2 | CYLINDRICAL |
| N59663 | MEB230-0.039-F3-B.0-Z2 | .039 | 1/8 | .1170 | 1-1/2 | 2 | CYLINDRICAL |
| N59664 | MEB230-0.040-F3-B.0-Z2 | .040 | 1/8 | .1200 | 1-1/2 | 2 | CYLINDRICAL |
| N59665 | MEB230-0.041-F3-B.0-Z2 | .041 | 1/8 | .1230 | 1-1/2 | 2 | CYLINDRICAL |
| N59666 | MEB230-0.042-F3-B.0-Z2 | .042 | 1/8 | .1260 | 1-1/2 | 2 | CYLINDRICAL |
| N59667 | MEB230-0.043-F3-B.0-Z2 | .043 | 1/8 | .1290 | 1-1/2 | 2 | CYLINDRICAL |
| N59668 | MEB230-0.044-F3-B.0-Z2 | .044 | 1/8 | .1320 | 1-1/2 | 2 | CYLINDRICAL |
| N59669 | MEB230-0.045-F3-B.0-Z2 | .045 | 1/8 | .1350 | 1-1/2 | 2 | CYLINDRICAL |
| N59670 | MEB230-0.046-F3-B.0-Z2 | .046 | 1/8 | .1380 | 1-1/2 | 2 | CYLINDRICAL |

MEB230 (CONT'D) & MESB230



- Sub micron grain carbide
- Uncoated
- MEB230 LOC = 3xD , MESB230 LOC = 1.5xD
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|---------------------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| REGULAR LENGTH MEB230 (CONT'D) | | | | | | | |
| N59671 | MEB230-0.047-F3-B.0-Z2 | .047 | 1/8 | .1410 | 1-1/2 | 2 | CYLINDRICAL |
| N59672 | MEB230-0.048-F3-B.0-Z2 | .048 | 1/8 | .1440 | 1-1/2 | 2 | CYLINDRICAL |
| N59673 | MEB230-0.049-F3-B.0-Z2 | .049 | 1/8 | .1470 | 1-1/2 | 2 | CYLINDRICAL |
| N59674 | MEB230-0.050-F3-B.0-Z2 | .050 | 1/8 | .1500 | 1-1/2 | 2 | CYLINDRICAL |
| N59675 | MEB230-0.051-F3-B.0-Z2 | .051 | 1/8 | .1530 | 1-1/2 | 2 | CYLINDRICAL |
| N59676 | MEB230-0.052-F3-B.0-Z2 | .052 | 1/8 | .1560 | 1-1/2 | 2 | CYLINDRICAL |
| N59677 | MEB230-0.053-F3-B.0-Z2 | .053 | 1/8 | .1590 | 1-1/2 | 2 | CYLINDRICAL |
| N59678 | MEB230-0.054-F3-B.0-Z2 | .054 | 1/8 | .1620 | 1-1/2 | 2 | CYLINDRICAL |
| N59679 | MEB230-0.055-F3-B.0-Z2 | .055 | 1/8 | .1650 | 1-1/2 | 2 | CYLINDRICAL |
| N59680 | MEB230-0.060-F3-B.0-Z2 | .060 | 1/8 | .1800 | 1-1/2 | 2 | CYLINDRICAL |
| N59681 | MEB230-0.065-F3-B.0-Z2 | .065 | 1/8 | .1950 | 1-1/2 | 2 | CYLINDRICAL |
| N59682 | MEB230-0.070-F3-B.0-Z2 | .070 | 1/8 | .2100 | 1-1/2 | 2 | CYLINDRICAL |
| N59683 | MEB230-0.075-F3-B.0-Z2 | .075 | 1/8 | .2250 | 1-1/2 | 2 | CYLINDRICAL |
| N59684 | MEB230-0.080-F3-B.0-Z2 | .080 | 1/8 | .2400 | 1-1/2 | 2 | CYLINDRICAL |
| N59685 | MEB230-0.085-F3-B.0-Z2 | .085 | 1/8 | .2550 | 1-1/2 | 2 | CYLINDRICAL |
| N59686 | MEB230-0.090-F3-B.0-Z2 | .090 | 1/8 | .2700 | 1-1/2 | 2 | CYLINDRICAL |
| N59687 | MEB230-0.095-F3-B.0-Z2 | .095 | 1/8 | .2850 | 1-1/2 | 2 | CYLINDRICAL |
| N59688 | MEB230-0.100-F3-B.0-Z2 | .100 | 1/8 | .3000 | 1-1/2 | 2 | CYLINDRICAL |
| N59689 | MEB230-0.105-F3-B.0-Z2 | .105 | 1/8 | .3150 | 1-1/2 | 2 | CYLINDRICAL |
| N59690 | MEB230-0.110-F3-B.0-Z2 | .110 | 1/8 | .3300 | 1-1/2 | 2 | CYLINDRICAL |
| N59691 | MEB230-0.115-F3-B.0-Z2 | .115 | 1/8 | .3450 | 1-1/2 | 2 | CYLINDRICAL |
| N59692 | MEB230-0.120-F3-B.0-Z2 | .120 | 1/8 | .3600 | 1-1/2 | 2 | CYLINDRICAL |
| STUB LENGTH MESB230 | | | | | | | |
| N59744 | MESB230-0.005-F2-B.0-Z2 | .005 | 1/8 | .0075 | 1-1/2 | 2 | CYLINDRICAL |
| N59745 | MESB230-0.006-F2-B.0-Z2 | .006 | 1/8 | .0090 | 1-1/2 | 2 | CYLINDRICAL |
| N59746 | MESB230-0.007-F2-B.0-Z2 | .007 | 1/8 | .0105 | 1-1/2 | 2 | CYLINDRICAL |
| N59747 | MESB230-0.008-F2-B.0-Z2 | .008 | 1/8 | .0120 | 1-1/2 | 2 | CYLINDRICAL |
| N59748 | MESB230-0.009-F2-B.0-Z2 | .009 | 1/8 | .0135 | 1-1/2 | 2 | CYLINDRICAL |
| N59749 | MESB230-0.010-F2-B.0-Z2 | .010 | 1/8 | .0150 | 1-1/2 | 2 | CYLINDRICAL |
| N59750 | MESB230-0.011-F2-B.0-Z2 | .011 | 1/8 | .0165 | 1-1/2 | 2 | CYLINDRICAL |
| N59751 | MESB230-0.012-F2-B.0-Z2 | .012 | 1/8 | .0180 | 1-1/2 | 2 | CYLINDRICAL |
| N59752 | MESB230-0.013-F2-B.0-Z2 | .013 | 1/8 | .0195 | 1-1/2 | 2 | CYLINDRICAL |
| N59753 | MESB230-0.014-F2-B.0-Z2 | .014 | 1/8 | .0210 | 1-1/2 | 2 | CYLINDRICAL |
| N59754 | MESB230-0.015-F2-B.0-Z2 | .015 | 1/8 | .0225 | 1-1/2 | 2 | CYLINDRICAL |
| N59755 | MESB230-0.016-F2-B.0-Z2 | .016 | 1/8 | .0240 | 1-1/2 | 2 | CYLINDRICAL |
| N59756 | MESB230-0.017-F2-B.0-Z2 | .017 | 1/8 | .0255 | 1-1/2 | 2 | CYLINDRICAL |

MESB230 (CONT'D)

SOLID
CARBIDE



BALL END



CENTER
CUTTING



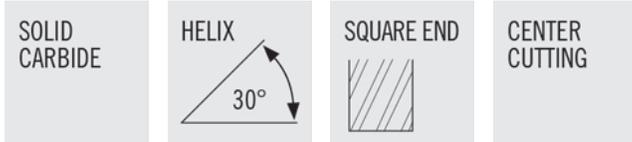
- Sub micron grain carbide
- Uncoated
- MESB230 LOC = 1.5xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59757 | MESB230-0.018-F2-B.0-Z2 | .018 | 1/8 | .0270 | 1-1/2 | 2 | CYLINDRICAL |
| N59758 | MESB230-0.019-F2-B.0-Z2 | .019 | 1/8 | .0285 | 1-1/2 | 2 | CYLINDRICAL |
| N59759 | MESB230-0.020-F2-B.0-Z2 | .020 | 1/8 | .0300 | 1-1/2 | 2 | CYLINDRICAL |
| N59760 | MESB230-0.021-F2-B.0-Z2 | .021 | 1/8 | .0315 | 1-1/2 | 2 | CYLINDRICAL |
| N59761 | MESB230-0.022-F2-B.0-Z2 | .022 | 1/8 | .0330 | 1-1/2 | 2 | CYLINDRICAL |
| N59762 | MESB230-0.023-F2-B.0-Z2 | .023 | 1/8 | .0345 | 1-1/2 | 2 | CYLINDRICAL |
| N59763 | MESB230-0.024-F2-B.0-Z2 | .024 | 1/8 | .0360 | 1-1/2 | 2 | CYLINDRICAL |
| N59764 | MESB230-0.025-F2-B.0-Z2 | .025 | 1/8 | .0375 | 1-1/2 | 2 | CYLINDRICAL |
| N59765 | MESB230-0.026-F2-B.0-Z2 | .026 | 1/8 | .0390 | 1-1/2 | 2 | CYLINDRICAL |
| N59766 | MESB230-0.027-F2-B.0-Z2 | .027 | 1/8 | .0405 | 1-1/2 | 2 | CYLINDRICAL |
| N59767 | MESB230-0.028-F2-B.0-Z2 | .028 | 1/8 | .0420 | 1-1/2 | 2 | CYLINDRICAL |
| N59768 | MESB230-0.029-F2-B.0-Z2 | .029 | 1/8 | .0435 | 1-1/2 | 2 | CYLINDRICAL |
| N59769 | MESB230-0.030-F2-B.0-Z2 | .030 | 1/8 | .0450 | 1-1/2 | 2 | CYLINDRICAL |
| N59770 | MESB230-0.031-F2-B.0-Z2 | .031 | 1/8 | .0465 | 1-1/2 | 2 | CYLINDRICAL |
| N59771 | MESB230-0.032-F2-B.0-Z2 | .032 | 1/8 | .0480 | 1-1/2 | 2 | CYLINDRICAL |
| N59772 | MESB230-0.033-F2-B.0-Z2 | .033 | 1/8 | .0495 | 1-1/2 | 2 | CYLINDRICAL |
| N59773 | MESB230-0.034-F2-B.0-Z2 | .034 | 1/8 | .0510 | 1-1/2 | 2 | CYLINDRICAL |
| N59774 | MESB230-0.035-F2-B.0-Z2 | .035 | 1/8 | .0525 | 1-1/2 | 2 | CYLINDRICAL |
| N59775 | MESB230-0.036-F2-B.0-Z2 | .036 | 1/8 | .0540 | 1-1/2 | 2 | CYLINDRICAL |
| N59776 | MESB230-0.037-F2-B.0-Z2 | .037 | 1/8 | .0555 | 1-1/2 | 2 | CYLINDRICAL |
| N59777 | MESB230-0.038-F2-B.0-Z2 | .038 | 1/8 | .0570 | 1-1/2 | 2 | CYLINDRICAL |
| N59778 | MESB230-0.039-F2-B.0-Z2 | .039 | 1/8 | .0585 | 1-1/2 | 2 | CYLINDRICAL |
| N59779 | MESB230-0.040-F2-B.0-Z2 | .040 | 1/8 | .0600 | 1-1/2 | 2 | CYLINDRICAL |
| N59780 | MESB230-0.041-F2-B.0-Z2 | .041 | 1/8 | .0615 | 1-1/2 | 2 | CYLINDRICAL |
| N59781 | MESB230-0.042-F2-B.0-Z2 | .042 | 1/8 | .0630 | 1-1/2 | 2 | CYLINDRICAL |
| N59782 | MESB230-0.043-F2-B.0-Z2 | .043 | 1/8 | .0645 | 1-1/2 | 2 | CYLINDRICAL |
| N59783 | MESB230-0.044-F2-B.0-Z2 | .044 | 1/8 | .0660 | 1-1/2 | 2 | CYLINDRICAL |
| N59784 | MESB230-0.045-F2-B.0-Z2 | .045 | 1/8 | .0675 | 1-1/2 | 2 | CYLINDRICAL |
| N59785 | MESB230-0.046-F2-B.0-Z2 | .046 | 1/8 | .0690 | 1-1/2 | 2 | CYLINDRICAL |
| N59786 | MESB230-0.047-F2-B.0-Z2 | .047 | 1/8 | .0705 | 1-1/2 | 2 | CYLINDRICAL |
| N59787 | MESB230-0.048-F2-B.0-Z2 | .048 | 1/8 | .0720 | 1-1/2 | 2 | CYLINDRICAL |
| N59788 | MESB230-0.049-F2-B.0-Z2 | .049 | 1/8 | .0735 | 1-1/2 | 2 | CYLINDRICAL |
| N59789 | MESB230-0.050-F2-B.0-Z2 | .050 | 1/8 | .0750 | 1-1/2 | 2 | CYLINDRICAL |
| N59790 | MESB230-0.051-F2-B.0-Z2 | .051 | 1/8 | .0765 | 1-1/2 | 2 | CYLINDRICAL |
| N59791 | MESB230-0.052-F2-B.0-Z2 | .052 | 1/8 | .0780 | 1-1/2 | 2 | CYLINDRICAL |
| N59792 | MESB230-0.053-F2-B.0-Z2 | .053 | 1/8 | .0795 | 1-1/2 | 2 | CYLINDRICAL |
| N59793 | MESB230-0.054-F2-B.0-Z2 | .054 | 1/8 | .0810 | 1-1/2 | 2 | CYLINDRICAL |
| N59794 | MESB230-0.055-F2-B.0-Z2 | .055 | 1/8 | .0825 | 1-1/2 | 2 | CYLINDRICAL |

DISCOUNT CODE D42

ME430



- Sub micron grain carbide
- Uncoated
- ME430 LOC = 3xD
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59795 | ME430-0.005-F3-S.0-Z4 | .005 | 1/8 | .0150 | 1-1/2 | 4 | CYLINDRICAL |
| N59796 | ME430-0.006-F3-S.0-Z4 | .006 | 1/8 | .0180 | 1-1/2 | 4 | CYLINDRICAL |
| N59797 | ME430-0.007-F3-S.0-Z4 | .007 | 1/8 | .0210 | 1-1/2 | 4 | CYLINDRICAL |
| N59798 | ME430-0.008-F3-S.0-Z4 | .008 | 1/8 | .0240 | 1-1/2 | 4 | CYLINDRICAL |
| N59799 | ME430-0.009-F3-S.0-Z4 | .009 | 1/8 | .0270 | 1-1/2 | 4 | CYLINDRICAL |
| N59800 | ME430-0.010-F3-S.0-Z4 | .010 | 1/8 | .0300 | 1-1/2 | 4 | CYLINDRICAL |
| N59801 | ME430-0.011-F3-S.0-Z4 | .011 | 1/8 | .0330 | 1-1/2 | 4 | CYLINDRICAL |
| N59802 | ME430-0.012-F3-S.0-Z4 | .012 | 1/8 | .0360 | 1-1/2 | 4 | CYLINDRICAL |
| N59803 | ME430-0.013-F3-S.0-Z4 | .013 | 1/8 | .0390 | 1-1/2 | 4 | CYLINDRICAL |
| N59804 | ME430-0.014-F3-S.0-Z4 | .014 | 1/8 | .0420 | 1-1/2 | 4 | CYLINDRICAL |
| N59805 | ME430-0.015-F3-S.0-Z4 | .015 | 1/8 | .0450 | 1-1/2 | 4 | CYLINDRICAL |
| N59806 | ME430-0.016-F3-S.0-Z4 | .016 | 1/8 | .0480 | 1-1/2 | 4 | CYLINDRICAL |
| N59807 | ME430-0.017-F3-S.0-Z4 | .017 | 1/8 | .0510 | 1-1/2 | 4 | CYLINDRICAL |
| N59808 | ME430-0.018-F3-S.0-Z4 | .018 | 1/8 | .0540 | 1-1/2 | 4 | CYLINDRICAL |
| N59809 | ME430-0.019-F3-S.0-Z4 | .019 | 1/8 | .0570 | 1-1/2 | 4 | CYLINDRICAL |
| N59810 | ME430-0.020-F3-S.0-Z4 | .020 | 1/8 | .0600 | 1-1/2 | 4 | CYLINDRICAL |
| N59811 | ME430-0.021-F3-S.0-Z4 | .021 | 1/8 | .0630 | 1-1/2 | 4 | CYLINDRICAL |
| N59812 | ME430-0.022-F3-S.0-Z4 | .022 | 1/8 | .0660 | 1-1/2 | 4 | CYLINDRICAL |
| N59813 | ME430-0.023-F3-S.0-Z4 | .023 | 1/8 | .0690 | 1-1/2 | 4 | CYLINDRICAL |
| N59814 | ME430-0.024-F3-S.0-Z4 | .024 | 1/8 | .0720 | 1-1/2 | 4 | CYLINDRICAL |
| N59815 | ME430-0.025-F3-S.0-Z4 | .025 | 1/8 | .0750 | 1-1/2 | 4 | CYLINDRICAL |
| N59816 | ME430-0.026-F3-S.0-Z4 | .026 | 1/8 | .0780 | 1-1/2 | 4 | CYLINDRICAL |
| N59817 | ME430-0.027-F3-S.0-Z4 | .027 | 1/8 | .0810 | 1-1/2 | 4 | CYLINDRICAL |
| N59818 | ME430-0.028-F3-S.0-Z4 | .028 | 1/8 | .0840 | 1-1/2 | 4 | CYLINDRICAL |
| N59819 | ME430-0.029-F3-S.0-Z4 | .029 | 1/8 | .0870 | 1-1/2 | 4 | CYLINDRICAL |
| N59820 | ME430-0.030-F3-S.0-Z4 | .030 | 1/8 | .0900 | 1-1/2 | 4 | CYLINDRICAL |
| N59821 | ME430-0.031-F3-S.0-Z4 | .031 | 1/8 | .0930 | 1-1/2 | 4 | CYLINDRICAL |
| N59822 | ME430-0.032-F3-S.0-Z4 | .032 | 1/8 | .0960 | 1-1/2 | 4 | CYLINDRICAL |
| N59823 | ME430-0.033-F3-S.0-Z4 | .033 | 1/8 | .0990 | 1-1/2 | 4 | CYLINDRICAL |
| N59824 | ME430-0.034-F3-S.0-Z4 | .034 | 1/8 | .1020 | 1-1/2 | 4 | CYLINDRICAL |
| N59825 | ME430-0.035-F3-S.0-Z4 | .035 | 1/8 | .1050 | 1-1/2 | 4 | CYLINDRICAL |
| N59826 | ME430-0.036-F3-S.0-Z4 | .036 | 1/8 | .1080 | 1-1/2 | 4 | CYLINDRICAL |
| N59827 | ME430-0.037-F3-S.0-Z4 | .037 | 1/8 | .1110 | 1-1/2 | 4 | CYLINDRICAL |

ME430 (CONT'D)

SOLID CARBIDE

HELIX

30°

SQUARE END

CENTER CUTTING



- Sub micron grain carbide
- Uncoated
- ME430 LOC = 3xD
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59828 | ME430-0.038-F3-S.0-Z4 | .038 | 1/8 | .1140 | 1-1/2 | 4 | CYLINDRICAL |
| N59829 | ME430-0.039-F3-S.0-Z4 | .039 | 1/8 | .1170 | 1-1/2 | 4 | CYLINDRICAL |
| N59830 | ME430-0.040-F3-S.0-Z4 | .040 | 1/8 | .1200 | 1-1/2 | 4 | CYLINDRICAL |
| N59831 | ME430-0.041-F3-S.0-Z4 | .041 | 1/8 | .1230 | 1-1/2 | 4 | CYLINDRICAL |
| N59832 | ME430-0.042-F3-S.0-Z4 | .042 | 1/8 | .1260 | 1-1/2 | 4 | CYLINDRICAL |
| N59833 | ME430-0.043-F3-S.0-Z4 | .043 | 1/8 | .1290 | 1-1/2 | 4 | CYLINDRICAL |
| N59834 | ME430-0.044-F3-S.0-Z4 | .044 | 1/8 | .1320 | 1-1/2 | 4 | CYLINDRICAL |
| N59835 | ME430-0.045-F3-S.0-Z4 | .045 | 1/8 | .1350 | 1-1/2 | 4 | CYLINDRICAL |
| N59836 | ME430-0.046-F3-S.0-Z4 | .046 | 1/8 | .1380 | 1-1/2 | 4 | CYLINDRICAL |
| N59837 | ME430-0.047-F3-S.0-Z4 | .047 | 1/8 | .1410 | 1-1/2 | 4 | CYLINDRICAL |
| N59838 | ME430-0.048-F3-S.0-Z4 | .048 | 1/8 | .1440 | 1-1/2 | 4 | CYLINDRICAL |
| N59839 | ME430-0.049-F3-S.0-Z4 | .049 | 1/8 | .1470 | 1-1/2 | 4 | CYLINDRICAL |
| N59840 | ME430-0.050-F3-S.0-Z4 | .050 | 1/8 | .1500 | 1-1/2 | 4 | CYLINDRICAL |
| N59841 | ME430-0.051-F3-S.0-Z4 | .051 | 1/8 | .1530 | 1-1/2 | 4 | CYLINDRICAL |
| N59842 | ME430-0.052-F3-S.0-Z4 | .052 | 1/8 | .1560 | 1-1/2 | 4 | CYLINDRICAL |
| N59843 | ME430-0.053-F3-S.0-Z4 | .053 | 1/8 | .1590 | 1-1/2 | 4 | CYLINDRICAL |
| N59844 | ME430-0.054-F3-S.0-Z4 | .054 | 1/8 | .1620 | 1-1/2 | 4 | CYLINDRICAL |
| N59845 | ME430-0.055-F3-S.0-Z4 | .055 | 1/8 | .1650 | 1-1/2 | 4 | CYLINDRICAL |
| N59846 | ME430-0.060-F3-S.0-Z4 | .060 | 1/8 | .1800 | 1-1/2 | 4 | CYLINDRICAL |
| N59847 | ME430-0.065-F3-S.0-Z4 | .065 | 1/8 | .1950 | 1-1/2 | 4 | CYLINDRICAL |
| N59848 | ME430-0.070-F3-S.0-Z4 | .070 | 1/8 | .2100 | 1-1/2 | 4 | CYLINDRICAL |
| N59849 | ME430-0.075-F3-S.0-Z4 | .075 | 1/8 | .2250 | 1-1/2 | 4 | CYLINDRICAL |
| N59850 | ME430-0.080-F3-S.0-Z4 | .080 | 1/8 | .2400 | 1-1/2 | 4 | CYLINDRICAL |
| N59851 | ME430-0.085-F3-S.0-Z4 | .085 | 1/8 | .2550 | 1-1/2 | 4 | CYLINDRICAL |
| N59852 | ME430-0.090-F3-S.0-Z4 | .090 | 1/8 | .2700 | 1-1/2 | 4 | CYLINDRICAL |
| N59853 | ME430-0.095-F3-S.0-Z4 | .095 | 1/8 | .2850 | 1-1/2 | 4 | CYLINDRICAL |
| N59854 | ME430-0.100-F3-S.0-Z4 | .100 | 1/8 | .3000 | 1-1/2 | 4 | CYLINDRICAL |
| N59855 | ME430-0.105-F3-S.0-Z4 | .105 | 1/8 | .3150 | 1-1/2 | 4 | CYLINDRICAL |
| N59856 | ME430-0.110-F3-S.0-Z4 | .110 | 1/8 | .3300 | 1-1/2 | 4 | CYLINDRICAL |
| N59857 | ME430-0.115-F3-S.0-Z4 | .115 | 1/8 | .3450 | 1-1/2 | 4 | CYLINDRICAL |
| N59858 | ME430-0.120-F3-S.0-Z4 | .120 | 1/8 | .3600 | 1-1/2 | 4 | CYLINDRICAL |

MEB430

SOLID CARBIDE



CENTER CUTTING



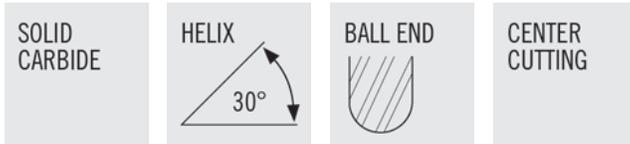
- Sub micron grain carbide
- Uncoated
- MEB430 LOC = 3xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59859 | MEB430-0.015-F3-B.0-Z4 | .015 | 1/8 | .0450 | 1-1/2 | 4 | CYLINDRICAL |
| N59860 | MEB430-0.016-F3-B.0-Z4 | .016 | 1/8 | .0480 | 1-1/2 | 4 | CYLINDRICAL |
| N59861 | MEB430-0.017-F3-B.0-Z4 | .017 | 1/8 | .0510 | 1-1/2 | 4 | CYLINDRICAL |
| N59862 | MEB430-0.018-F3-B.0-Z4 | .018 | 1/8 | .0540 | 1-1/2 | 4 | CYLINDRICAL |
| N59863 | MEB430-0.019-F3-B.0-Z4 | .019 | 1/8 | .0570 | 1-1/2 | 4 | CYLINDRICAL |
| N59864 | MEB430-0.020-F3-B.0-Z4 | .020 | 1/8 | .0600 | 1-1/2 | 4 | CYLINDRICAL |
| N59865 | MEB430-0.021-F3-B.0-Z4 | .021 | 1/8 | .0630 | 1-1/2 | 4 | CYLINDRICAL |
| N59866 | MEB430-0.022-F3-B.0-Z4 | .022 | 1/8 | .0660 | 1-1/2 | 4 | CYLINDRICAL |
| N59867 | MEB430-0.023-F3-B.0-Z4 | .023 | 1/8 | .0690 | 1-1/2 | 4 | CYLINDRICAL |
| N59868 | MEB430-0.024-F3-B.0-Z4 | .024 | 1/8 | .0720 | 1-1/2 | 4 | CYLINDRICAL |
| N59869 | MEB430-0.025-F3-B.0-Z4 | .025 | 1/8 | .0750 | 1-1/2 | 4 | CYLINDRICAL |
| N59870 | MEB430-0.026-F3-B.0-Z4 | .026 | 1/8 | .0780 | 1-1/2 | 4 | CYLINDRICAL |
| N59871 | MEB430-0.027-F3-B.0-Z4 | .027 | 1/8 | .0810 | 1-1/2 | 4 | CYLINDRICAL |
| N59872 | MEB430-0.028-F3-B.0-Z4 | .028 | 1/8 | .0840 | 1-1/2 | 4 | CYLINDRICAL |
| N59873 | MEB430-0.029-F3-B.0-Z4 | .029 | 1/8 | .0870 | 1-1/2 | 4 | CYLINDRICAL |
| N59874 | MEB430-0.030-F3-B.0-Z4 | .030 | 1/8 | .0900 | 1-1/2 | 4 | CYLINDRICAL |
| N59875 | MEB430-0.031-F3-B.0-Z4 | .031 | 1/8 | .0930 | 1-1/2 | 4 | CYLINDRICAL |
| N59876 | MEB430-0.032-F3-B.0-Z4 | .032 | 1/8 | .0960 | 1-1/2 | 4 | CYLINDRICAL |
| N59877 | MEB430-0.033-F3-B.0-Z4 | .033 | 1/8 | .0990 | 1-1/2 | 4 | CYLINDRICAL |
| N59878 | MEB430-0.034-F3-B.0-Z4 | .034 | 1/8 | .1020 | 1-1/2 | 4 | CYLINDRICAL |
| N59879 | MEB430-0.035-F3-B.0-Z4 | .035 | 1/8 | .1050 | 1-1/2 | 4 | CYLINDRICAL |
| N59880 | MEB430-0.036-F3-B.0-Z4 | .036 | 1/8 | .1080 | 1-1/2 | 4 | CYLINDRICAL |
| N59881 | MEB430-0.037-F3-B.0-Z4 | .037 | 1/8 | .1110 | 1-1/2 | 4 | CYLINDRICAL |
| N59882 | MEB430-0.038-F3-B.0-Z4 | .038 | 1/8 | .1140 | 1-1/2 | 4 | CYLINDRICAL |
| N59883 | MEB430-0.039-F3-B.0-Z4 | .039 | 1/8 | .1170 | 1-1/2 | 4 | CYLINDRICAL |
| N59884 | MEB430-0.040-F3-B.0-Z4 | .040 | 1/8 | .1200 | 1-1/2 | 4 | CYLINDRICAL |
| N59885 | MEB430-0.041-F3-B.0-Z4 | .041 | 1/8 | .1230 | 1-1/2 | 4 | CYLINDRICAL |
| N59886 | MEB430-0.042-F3-B.0-Z4 | .042 | 1/8 | .1260 | 1-1/2 | 4 | CYLINDRICAL |
| N59887 | MEB430-0.043-F3-B.0-Z4 | .043 | 1/8 | .1290 | 1-1/2 | 4 | CYLINDRICAL |
| N59888 | MEB430-0.044-F3-B.0-Z4 | .044 | 1/8 | .1320 | 1-1/2 | 4 | CYLINDRICAL |
| N59889 | MEB430-0.045-F3-B.0-Z4 | .045 | 1/8 | .1350 | 1-1/2 | 4 | CYLINDRICAL |
| N59890 | MEB430-0.046-F3-B.0-Z4 | .046 | 1/8 | .1380 | 1-1/2 | 4 | CYLINDRICAL |
| N59891 | MEB430-0.047-F3-B.0-Z4 | .047 | 1/8 | .1410 | 1-1/2 | 4 | CYLINDRICAL |
| N59892 | MEB430-0.048-F3-B.0-Z4 | .048 | 1/8 | .1440 | 1-1/2 | 4 | CYLINDRICAL |
| N59893 | MEB430-0.049-F3-B.0-Z4 | .049 | 1/8 | .1470 | 1-1/2 | 4 | CYLINDRICAL |
| N59894 | MEB430-0.050-F3-B.0-Z4 | .050 | 1/8 | .1500 | 1-1/2 | 4 | CYLINDRICAL |
| N59895 | MEB430-0.051-F3-B.0-Z4 | .051 | 1/8 | .1530 | 1-1/2 | 4 | CYLINDRICAL |
| N59896 | MEB430-0.052-F3-B.0-Z4 | .052 | 1/8 | .1560 | 1-1/2 | 4 | CYLINDRICAL |

DISCOUNT CODE D42

MEB430 (CONT'D)

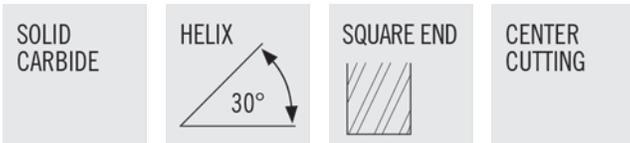


- Sub micron grain carbide
- Uncoated
- MEB430 LOC = 3xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59897 | MEB430-0.053-F3-B.0-Z4 | .053 | 1/8 | .1590 | 1-1/2 | 4 | CYLINDRICAL |
| N59898 | MEB430-0.054-F3-B.0-Z4 | .054 | 1/8 | .1620 | 1-1/2 | 4 | CYLINDRICAL |
| N59899 | MEB430-0.055-F3-B.0-Z4 | .055 | 1/8 | .1650 | 1-1/2 | 4 | CYLINDRICAL |
| N59900 | MEB430-0.060-F3-B.0-Z4 | .060 | 1/8 | .1800 | 1-1/2 | 4 | CYLINDRICAL |
| N59901 | MEB430-0.065-F3-B.0-Z4 | .065 | 1/8 | .1950 | 1-1/2 | 4 | CYLINDRICAL |
| N59902 | MEB430-0.070-F3-B.0-Z4 | .070 | 1/8 | .2100 | 1-1/2 | 4 | CYLINDRICAL |
| N59903 | MEB430-0.075-F3-B.0-Z4 | .075 | 1/8 | .2250 | 1-1/2 | 4 | CYLINDRICAL |
| N59904 | MEB430-0.080-F3-B.0-Z4 | .080 | 1/8 | .2400 | 1-1/2 | 4 | CYLINDRICAL |
| N59905 | MEB430-0.085-F3-B.0-Z4 | .085 | 1/8 | .2550 | 1-1/2 | 4 | CYLINDRICAL |
| N59906 | MEB430-0.090-F3-B.0-Z4 | .090 | 1/8 | .2700 | 1-1/2 | 4 | CYLINDRICAL |
| N59907 | MEB430-0.095-F3-B.0-Z4 | .095 | 1/8 | .2850 | 1-1/2 | 4 | CYLINDRICAL |
| N59908 | MEB430-0.100-F3-B.0-Z4 | .100 | 1/8 | .3000 | 1-1/2 | 4 | CYLINDRICAL |
| N59909 | MEB430-0.105-F3-B.0-Z4 | .105 | 1/8 | .3150 | 1-1/2 | 4 | CYLINDRICAL |
| N59910 | MEB430-0.110-F3-B.0-Z4 | .110 | 1/8 | .3300 | 1-1/2 | 4 | CYLINDRICAL |
| N59911 | MEB430-0.115-F3-B.0-Z4 | .115 | 1/8 | .3450 | 1-1/2 | 4 | CYLINDRICAL |
| N59912 | MEB430-0.120-F3-B.0-Z4 | .120 | 1/8 | .3600 | 1-1/2 | 4 | CYLINDRICAL |

MES430



- Sub micron grain carbide
- Uncoated
- MES430 LOC = 1.5xD

- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59913 | MES430-0.005-F2-S.0-Z4 | .005 | 1/8 | .0075 | 1-1/2 | 4 | CYLINDRICAL |
| N59914 | MES430-0.006-F2-S.0-Z4 | .006 | 1/8 | .0090 | 1-1/2 | 4 | CYLINDRICAL |
| N59915 | MES430-0.007-F2-S.0-Z4 | .007 | 1/8 | .0105 | 1-1/2 | 4 | CYLINDRICAL |
| N59916 | MES430-0.008-F2-S.0-Z4 | .008 | 1/8 | .0120 | 1-1/2 | 4 | CYLINDRICAL |
| N59917 | MES430-0.009-F2-S.0-Z4 | .009 | 1/8 | .0135 | 1-1/2 | 4 | CYLINDRICAL |
| N59918 | MES430-0.010-F2-S.0-Z4 | .010 | 1/8 | .0150 | 1-1/2 | 4 | CYLINDRICAL |
| N59919 | MES430-0.011-F2-S.0-Z4 | .011 | 1/8 | .0165 | 1-1/2 | 4 | CYLINDRICAL |
| N59920 | MES430-0.012-F2-S.0-Z4 | .012 | 1/8 | .0180 | 1-1/2 | 4 | CYLINDRICAL |
| N59921 | MES430-0.013-F2-S.0-Z4 | .013 | 1/8 | .0195 | 1-1/2 | 4 | CYLINDRICAL |
| N59922 | MES430-0.014-F2-S.0-Z4 | .014 | 1/8 | .0210 | 1-1/2 | 4 | CYLINDRICAL |
| N59923 | MES430-0.015-F2-S.0-Z4 | .015 | 1/8 | .0225 | 1-1/2 | 4 | CYLINDRICAL |

DISCOUNT CODE D42

MES430 (CONT'D)

SOLID CARBIDE

HELIX

SQUARE END

CENTER CUTTING



- Sub micron grain carbide
- Uncoated
- MES430 LOC = 1.5xD
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | SHANK TYPE |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|-------------|
| N59924 | MES430-0.016-F2-S.0-Z4 | .016 | 1/8 | .0240 | 1-1/2 | 4 | CYLINDRICAL |
| N59925 | MES430-0.017-F2-S.0-Z4 | .017 | 1/8 | .0255 | 1-1/2 | 4 | CYLINDRICAL |
| N59926 | MES430-0.018-F2-S.0-Z4 | .018 | 1/8 | .0270 | 1-1/2 | 4 | CYLINDRICAL |
| N59927 | MES430-0.019-F2-S.0-Z4 | .019 | 1/8 | .0285 | 1-1/2 | 4 | CYLINDRICAL |
| N59928 | MES430-0.020-F2-S.0-Z4 | .020 | 1/8 | .0300 | 1-1/2 | 4 | CYLINDRICAL |
| N59929 | MES430-0.021-F2-S.0-Z4 | .021 | 1/8 | .0315 | 1-1/2 | 4 | CYLINDRICAL |
| N59930 | MES430-0.022-F2-S.0-Z4 | .022 | 1/8 | .0330 | 1-1/2 | 4 | CYLINDRICAL |
| N59931 | MES430-0.023-F2-S.0-Z4 | .023 | 1/8 | .0345 | 1-1/2 | 4 | CYLINDRICAL |
| N59932 | MES430-0.024-F2-S.0-Z4 | .024 | 1/8 | .0360 | 1-1/2 | 4 | CYLINDRICAL |
| N59933 | MES430-0.025-F2-S.0-Z4 | .025 | 1/8 | .0375 | 1-1/2 | 4 | CYLINDRICAL |
| N59934 | MES430-0.026-F2-S.0-Z4 | .026 | 1/8 | .0390 | 1-1/2 | 4 | CYLINDRICAL |
| N59935 | MES430-0.027-F2-S.0-Z4 | .027 | 1/8 | .0405 | 1-1/2 | 4 | CYLINDRICAL |
| N59936 | MES430-0.028-F2-S.0-Z4 | .028 | 1/8 | .0420 | 1-1/2 | 4 | CYLINDRICAL |
| N59937 | MES430-0.029-F2-S.0-Z4 | .029 | 1/8 | .0435 | 1-1/2 | 4 | CYLINDRICAL |
| N59938 | MES430-0.030-F2-S.0-Z4 | .030 | 1/8 | .0450 | 1-1/2 | 4 | CYLINDRICAL |
| N59939 | MES430-0.031-F2-S.0-Z4 | .031 | 1/8 | .0465 | 1-1/2 | 4 | CYLINDRICAL |
| N59940 | MES430-0.032-F2-S.0-Z4 | .032 | 1/8 | .0480 | 1-1/2 | 4 | CYLINDRICAL |
| N59941 | MES430-0.033-F2-S.0-Z4 | .033 | 1/8 | .0495 | 1-1/2 | 4 | CYLINDRICAL |
| N59942 | MES430-0.034-F2-S.0-Z4 | .034 | 1/8 | .0510 | 1-1/2 | 4 | CYLINDRICAL |
| N59943 | MES430-0.035-F2-S.0-Z4 | .035 | 1/8 | .0525 | 1-1/2 | 4 | CYLINDRICAL |
| N59944 | MES430-0.036-F2-S.0-Z4 | .036 | 1/8 | .0540 | 1-1/2 | 4 | CYLINDRICAL |
| N59945 | MES430-0.037-F2-S.0-Z4 | .037 | 1/8 | .0555 | 1-1/2 | 4 | CYLINDRICAL |
| N59946 | MES430-0.038-F2-S.0-Z4 | .038 | 1/8 | .0570 | 1-1/2 | 4 | CYLINDRICAL |
| N59947 | MES430-0.039-F2-S.0-Z4 | .039 | 1/8 | .0585 | 1-1/2 | 4 | CYLINDRICAL |
| N59948 | MES430-0.040-F2-S.0-Z4 | .040 | 1/8 | .0600 | 1-1/2 | 4 | CYLINDRICAL |
| N59949 | MES430-0.041-F2-S.0-Z4 | .041 | 1/8 | .0615 | 1-1/2 | 4 | CYLINDRICAL |
| N59950 | MES430-0.042-F2-S.0-Z4 | .042 | 1/8 | .0630 | 1-1/2 | 4 | CYLINDRICAL |
| N59951 | MES430-0.043-F2-S.0-Z4 | .043 | 1/8 | .0645 | 1-1/2 | 4 | CYLINDRICAL |
| N59952 | MES430-0.044-F2-S.0-Z4 | .044 | 1/8 | .0660 | 1-1/2 | 4 | CYLINDRICAL |
| N59953 | MES430-0.045-F2-S.0-Z4 | .045 | 1/8 | .0675 | 1-1/2 | 4 | CYLINDRICAL |
| N59954 | MES430-0.046-F2-S.0-Z4 | .046 | 1/8 | .0690 | 1-1/2 | 4 | CYLINDRICAL |
| N59955 | MES430-0.047-F2-S.0-Z4 | .047 | 1/8 | .0705 | 1-1/2 | 4 | CYLINDRICAL |
| N59956 | MES430-0.048-F2-S.0-Z4 | .048 | 1/8 | .0720 | 1-1/2 | 4 | CYLINDRICAL |
| N59957 | MES430-0.049-F2-S.0-Z4 | .049 | 1/8 | .0735 | 1-1/2 | 4 | CYLINDRICAL |
| N59958 | MES430-0.050-F2-S.0-Z4 | .050 | 1/8 | .0750 | 1-1/2 | 4 | CYLINDRICAL |
| N59959 | MES430-0.051-F2-S.0-Z4 | .051 | 1/8 | .0765 | 1-1/2 | 4 | CYLINDRICAL |
| N59960 | MES430-0.052-F2-S.0-Z4 | .052 | 1/8 | .0780 | 1-1/2 | 4 | CYLINDRICAL |
| N59961 | MES430-0.053-F2-S.0-Z4 | .053 | 1/8 | .0795 | 1-1/2 | 4 | CYLINDRICAL |
| N59962 | MES430-0.054-F2-S.0-Z4 | .054 | 1/8 | .0810 | 1-1/2 | 4 | CYLINDRICAL |
| N59963 | MES430-0.055-F2-S.0-Z4 | .055 | 1/8 | .0825 | 1-1/2 | 4 | CYLINDRICAL |

DISCOUNT CODE D42

CM260

| | | | |
|---------------|--|--|----------------|
| SOLID CARBIDE | | | CENTER CUTTING |
|---------------|--|--|----------------|



- Cylindrical Shank
- General Purpose
- Cutting Data - Page 228-229
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N76590 | CM260-0.250-D1-C.0-Z2 | 1/4 | 1/4 | 3/16 | 2-1/2 | 2 | TIALN | 60° |
| N76591 | CM260-0.375-D1-C.0-Z2 | 3/8 | 3/8 | 5/16 | 2-1/2 | 2 | TIALN | 60° |
| N76592 | CM260-0.500-D1-C.0-Z2 | 1/2 | 1/2 | 7/16 | 3 | 2 | TIALN | 60° |

CM290

| | | | |
|---------------|--|--|----------------|
| SOLID CARBIDE | | | CENTER CUTTING |
|---------------|--|--|----------------|



- Cylindrical Shank
- General Purpose
- Cutting Data - Page 228-229
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N76593 | CM290-0.250-D1-C.0-Z2 | 1/4 | 1/4 | 1/8 | 2-1/2 | 2 | TIALN | 90° |
| N76594 | CM290-0.375-D1-C.0-Z2 | 3/8 | 3/8 | 3/16 | 2-1/2 | 2 | TIALN | 90° |
| N76595 | CM290-0.500-D1-C.0-Z2 | 1/2 | 1/2 | 1/4 | 3 | 2 | TIALN | 90° |

CM460

| | | | |
|---------------|--|--|----------------|
| SOLID CARBIDE | | | CENTER CUTTING |
|---------------|--|--|----------------|



- Cylindrical Shank
- General Purpose
- Cutting Data - Page 230-231
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N76596 | CM460-0.250-D1-C.0-Z4 | 1/4 | 1/4 | 3/16 | 2-1/2 | 4 | TIALN | 60° |
| N76597 | CM460-0.375-D1-C.0-Z4 | 3/8 | 3/8 | 5/16 | 2-1/2 | 4 | TIALN | 60° |
| N76598 | CM460-0.500-D1-C.0-Z4 | 1/2 | 1/2 | 7/16 | 3 | 4 | TIALN | 60° |
| N76599 | CM460-0.750-D1-C.0-Z4 | 3/4 | 3/4 | 5/8 | 3 | 4 | TIALN | 60° |

CM490

| | | | |
|---------------|--|--|----------------|
| SOLID CARBIDE | | | CENTER CUTTING |
|---------------|--|--|----------------|



- Cylindrical Shank
- General Purpose
- Cutting Data - Page 230-231
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|---------|---------|
| N76600 | CM490-0.250-D1-C.0-Z4 | 1/4 | 1/4 | 1/8 | 2-1/2 | 4 | TIALN | 90° |
| N76601 | CM490-0.375-D1-C.0-Z4 | 3/8 | 3/8 | 3/16 | 2-1/2 | 4 | TIALN | 90° |
| N76602 | CM490-0.500-D1-C.0-Z4 | 1/2 | 1/2 | 1/4 | 3 | 4 | TIALN | 90° |
| N76603 | CM490-0.750-D1-C.0-Z4 | 3/4 | 3/4 | 3/8 | 3 | 4 | TIALN | 90° |

CM260 / CM290 - START VALUES

| | | SLOTTING | | | | | | | | | | |
|-----------|-------------------------------|--|--|------------------------------|-----|-----|---------------------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 2 | | | | | |
| | | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| P | E 1 - 2 | 0.30 | 1.00 | 340 | - | 460 | n (rev/min) | 6112 | 4075 | 3056 | 2445 | 2037 |
| | | | | | | | f _z (in) | 0.00050 | 0.00075 | 0.00100 | 0.00125 | 0.00150 |
| | | | | v _f (in/min) | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | | | |
| | E 3 - 4 | 0.20 | 1.00 | 140 | - | 260 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 |
| | | | | | | | f _z (in) | 0.00028 | 0.00042 | 0.00056 | 0.00070 | 0.00084 |
| | | | | v _f (in/min) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | | | |
| | E 5 - 6 | 0.20 | 1.00 | 40 | - | 160 | n (rev/min) | 1528 | 1019 | 764 | 611 | 509 |
| | | | | | | | f _z (in) | 0.00240 | 0.00360 | 0.00480 | 0.00600 | 0.00720 |
| | | | | v _f (in/min) | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | | | |
| H | M / A / D 7a (48-52HRc) | 0.20 | 1.00 | 55 | - | 85 | n (rev/min) | 1070 | 713 | 535 | 428 | 357 |
| | | | | | | | f _z (in) | 0.00016 | 0.00024 | 0.00032 | 0.00040 | 0.00048 |
| | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | | | |
| M | E 8 - 9 | 0.50 | 1.00 | 290 | - | 350 | n (rev/min) | 4890 | 3260 | 2445 | 1956 | 1630 |
| | | | | | | | f _z (in) | 0.00024 | 0.00036 | 0.00048 | 0.00060 | 0.00072 |
| | | | | v _f (in/min) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | | | |
| | E 10 - 11 | 0.30 | 1.00 | 220 | - | 280 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 |
| | | | | | | | f _z (in) | 0.00020 | 0.00030 | 0.00040 | 0.00050 | 0.00060 |
| | | | | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | | |
| K | E 12 - 13 | 0.30 | 1.00 | 210 | - | 330 | n (rev/min) | 4126 | 2750 | 2063 | 1650 | 1375 |
| | | | | | | | f _z (in) | 0.00058 | 0.00087 | 0.00116 | 0.00145 | 0.00174 |
| | | | | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | | | |
| | E 14 - 15 | 0.20 | 1.00 | 85 | - | 205 | n (rev/min) | 2216 | 1477 | 1108 | 886 | 739 |
| | | | | | | | f _z (in) | 0.00034 | 0.00051 | 0.00068 | 0.00085 | 0.00102 |
| | | | | v _f (in/min) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CM260 / CM290 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|-----|-----|---------------------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 2 | | | | | |
| | | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| P | E 1 - 2 | 1.00 | 0.50 | 400 | - | 460 | n (rev/min) | 6112 | 4075 | 3056 | 2445 | 2037 |
| | | | | | | | f _z (in) | 0.00063 | 0.00094 | 0.00125 | 0.00156 | 0.00188 |
| | | | | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | | | |
| | E 3 - 4 | 1.00 | 0.50 | 200 | - | 260 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 |
| | | | | | | | f _z (in) | 0.00035 | 0.00053 | 0.00070 | 0.00088 | 0.00105 |
| | | | | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | | | |
| | E 5 - 6 | 1.00 | 0.50 | 100 | - | 160 | n (rev/min) | 1528 | 1019 | 764 | 611 | 509 |
| | | | | | | | f _z (in) | 0.00030 | 0.00045 | 0.00060 | 0.00075 | 0.00090 |
| | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | | | |
| H | M / A / D 7a (48-52HRc) | 0.30 | 0.20 | 70 | - | 85 | n (rev/min) | 1070 | 713 | 535 | 428 | 357 |
| | | | | | | | f _z (in) | 0.00020 | 0.00030 | 0.00040 | 0.00050 | 0.00060 |
| | | | | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | | | |
| M | E 8 - 9 | 1.00 | 0.50 | 320 | - | 350 | n (rev/min) | 4890 | 3260 | 2445 | 1956 | 1630 |
| | | | | | | | f _z (in) | 0.00030 | 0.00045 | 0.00060 | 0.00075 | 0.00090 |
| | | | | v _f (in/min) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | | | |
| | E 10 - 11 | 1.00 | 0.50 | 250 | - | 280 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 |
| | | | | | | | f _z (in) | 0.00025 | 0.00038 | 0.00050 | 0.00063 | 0.00075 |
| | | | | v _f (in/min) | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | - | 330 | n (rev/min) | 4126 | 2750 | 2063 | 1650 | 1375 |
| | | | | | | | f _z (in) | 0.00073 | 0.00109 | 0.00145 | 0.00181 | 0.00218 |
| | | | | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | | |
| | E 14 - 15 | 1.00 | 0.50 | 145 | - | 205 | n (rev/min) | 2216 | 1477 | 1108 | 886 | 739 |
| | | | | | | | f _z (in) | 0.00043 | 0.00064 | 0.00085 | 0.00106 | 0.00128 |
| | | | | v _f (in/min) | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CM460 / CM490 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|-------------------------------|--|--|------------------------------|---|-----|-------------------------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 4 | | | | | |
| | | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| P | E 1 - 2 | 0.30 | 1.00 | 400 | - | 460 | n (rev/min) | 6112 | 4075 | 3056 | 2445 | 2037 |
| | | | | | | | f _z (in) | 0.00050 | 0.00075 | 0.00100 | 0.00125 | 0.00150 |
| | | | | 340 | - | 460 | v _f (in/min) | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 |
| | E 3 - 4 | 0.20 | 1.00 | 200 | - | 260 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 |
| | | | | | | | f _z (in) | 0.00028 | 0.00042 | 0.00056 | 0.00070 | 0.00084 |
| | | | | 140 | - | 260 | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 5 - 6 | 0.20 | 1.00 | 100 | - | 160 | n (rev/min) | 1528 | 1019 | 764 | 611 | 509 |
| | | | | | | | f _z (in) | 0.00240 | 0.00360 | 0.00480 | 0.00600 | 0.00720 |
| | | | | 40 | - | 160 | v _f (in/min) | 14.7 | 14.7 | 14.7 | 14.7 | 14.7 |
| H | M / A / D 7a (48-52HRc) | 0.20 | 1.00 | 70 | - | 85 | n (rev/min) | 1070 | 713 | 535 | 428 | 357 |
| | | | | | | | f _z (in) | 0.00016 | 0.00024 | 0.00032 | 0.00040 | 0.00048 |
| | | | | 55 | - | 85 | v _f (in/min) | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| M | E 8 - 9 | 0.50 | 1.00 | 320 | - | 350 | n (rev/min) | 4890 | 3260 | 2445 | 1956 | 1630 |
| | | | | | | | f _z (in) | 0.00024 | 0.00036 | 0.00048 | 0.00060 | 0.00072 |
| | | | | 290 | - | 350 | v _f (in/min) | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 |
| | E 10 - 11 | 0.30 | 1.00 | 250 | - | 280 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 |
| | | | | | | | f _z (in) | 0.00020 | 0.00030 | 0.00040 | 0.00050 | 0.00060 |
| | | | | 220 | - | 280 | v _f (in/min) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| K | E 12 - 13 | 0.30 | 1.00 | 270 | - | 330 | n (rev/min) | 4126 | 2750 | 2063 | 1650 | 1375 |
| | | | | | | | f _z (in) | 0.00058 | 0.00087 | 0.00116 | 0.00145 | 0.00174 |
| | | | | 210 | - | 330 | v _f (in/min) | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| | E 14 - 15 | 0.20 | 1.00 | 145 | - | 205 | n (rev/min) | 2216 | 1477 | 1108 | 886 | 739 |
| | | | | | | | f _z (in) | 0.00034 | 0.00051 | 0.00068 | 0.00085 | 0.00102 |
| | | | | 85 | - | 205 | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CM460 / CM490 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|-------------------------------|---------------------------------------|---------------------------------------|---------------------------|------|------|---------------------|---------|---------|---------|---------|---------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 4 | | | | | |
| | | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| P | E 1 - 2 | 1.00 | 0.50 | 400 | - | 460 | n (rev/min) | 6112 | 4075 | 3056 | 2445 | 2037 |
| | | | | | | | f _z (in) | 0.00063 | 0.00094 | 0.00125 | 0.00156 | 0.00188 |
| | | | | v _f (in/min) | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | | | |
| | E 3 - 4 | 1.00 | 0.50 | 200 | - | 260 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 |
| | | | | | | | f _z (in) | 0.00035 | 0.00053 | 0.00070 | 0.00088 | 0.00105 |
| | | | | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | | | |
| | E 5 - 6 | 1.00 | 0.50 | 100 | - | 160 | n (rev/min) | 1528 | 1019 | 764 | 611 | 509 |
| | | | | | | | f _z (in) | 0.00030 | 0.00045 | 0.00060 | 0.00075 | 0.00090 |
| | | | | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | | |
| H | M / A / D 7a (48-52HRc) | 0.30 | 0.20 | 70 | - | 85 | n (rev/min) | 1070 | 713 | 535 | 428 | 357 |
| | | | | | | | f _z (in) | 0.00020 | 0.00030 | 0.00040 | 0.00050 | 0.00060 |
| | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | | | |
| M | E 8 - 9 | 1.00 | 0.50 | 320 | - | 350 | n (rev/min) | 4890 | 3260 | 2445 | 1956 | 1630 |
| | | | | | | | f _z (in) | 0.00030 | 0.00045 | 0.00060 | 0.00075 | 0.00090 |
| | | | | v _f (in/min) | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | | | |
| | E 10 - 11 | 1.00 | 0.50 | 250 | - | 280 | n (rev/min) | 3820 | 2547 | 1910 | 1528 | 1273 |
| | | | | | | | f _z (in) | 0.00025 | 0.00038 | 0.00050 | 0.00063 | 0.00075 |
| | | | | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | | | |
| K | E 12 - 13 | 1.00 | 0.50 | 270 | - | 330 | n (rev/min) | 4126 | 2750 | 2063 | 1650 | 1375 |
| | | | | | | | f _z (in) | 0.00073 | 0.00109 | 0.00145 | 0.00181 | 0.00218 |
| | | | | v _f (in/min) | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | | | |
| | E 14 - 15 | 1.00 | 0.50 | 145 | - | 205 | n (rev/min) | 2216 | 1477 | 1108 | 886 | 739 |
| | | | | | | | f _z (in) | 0.00043 | 0.00064 | 0.00085 | 0.00106 | 0.00128 |
| | | | | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.



COBALT HIGH PERFORMANCE MILLING

VARIABLE FACE PROFILE

The VFP product family has been specifically engineered for milling Titanium. The variable helix and polished rake face provide increased material shearing capability, yielding excellent chip formation and evacuation. The VFP's unique geometry and superior cutting edge result in reduced heat generation and excellent workpiece surface finish.

PRODUCT OVERVIEW

- M42 Cobalt Material
- Polished rake face
- Center cutting end teeth
- Standard with corner chamfer
- Standard with Weldon flat
- Uncoated & AlCrN coated
- Radius modification possible on all sizes

YOUR NIAGARA CUTTER BENEFIT

- Optimal chip formation and evacuation
- Increased metal removal rates compared to alternative endmills
- Smooth workpiece finish
- Reduced horsepower requirements

RANGE OVERVIEW

VFP435 / VFP635 / VFP²435 / VFP²635

- Diameters 3/4" - 2"
- Up to .156" corner radius through modification

VFP435SB / VFP635SB / VFP435SBR / VFP635SBR

- Diameters 1 1/4" - 2"
- Up to .250" corner radius option
- Short block design
- AlCrN coated option

TECHNICAL SPECIFICATIONS

| | |
|------------------------|-------------------|
| Diameter range: | ø3/4" - ø2" |
| # flutes: | 4-6 |
| Helix angle: | Variable |
| Rake angle: | 10° |
| Relief: | 10° |
| Shank Dia Tolerance: | - .0001 / - .0005 |
| Cutting Dia Tolerance: | + .002 / - .000 |
| Chamfer: | 45° |
| Unequal Index: | No |
| Edge preparation: | No |
| Coating: | AlCrN or Uncoated |

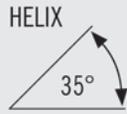
PREFERRED MATERIAL GROUPS

Stainless steel

Titanium alloys

VFP435 / VFP635

M42
8% COBALT



CENTER
CUTTING

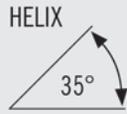


- Optimal chip formation and evacuation
- Polished rake face
- Weldon flat standard
- Up to .156" Corner Radius through modification
- Designed for stainless steel and titanium
- Cutting Data - Page 290
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N68948 | VFP435-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | 0.030 |
| N68949 | VFP435-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 2-1/4 | 4-1/2 | 4 | 0.030 |
| N68950 | VFP435-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | 0.030 |
| N68952 | VFP435-1.000-D2-C030.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | 0.030 |
| N68953 | VFP635-1.000-D2-C030.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | 0.030 |
| N68954 | VFP435-1.000-D3-C030.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | 0.030 |
| N68955 | VFP635-1.000-D3-C030.3-Z6 | 1 | 1 | 3 | 5-1/2 | 6 | 0.030 |
| N68956 | VFP435-1.000-D4-C030.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | 0.030 |
| N68957 | VFP635-1.000-D4-C030.3-Z6 | 1 | 1 | 4 | 6-1/2 | 6 | 0.030 |
| N68958 | VFP435-1.250-D2-C040.3-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | 0.040 |
| N68959 | VFP635-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | 0.040 |
| N68960 | VFP435-1.250-D3-C040.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | 0.040 |
| N68961 | VFP635-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | 0.040 |
| N68962 | VFP435-1.250-D4-C040.3-Z4 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 4 | 0.040 |
| N68963 | VFP635-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | 0.040 |
| N68965 | VFP635-1.500-P1-C040.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | 0.040 |
| N68966 | VFP635-1.500-P2-C040.3-Z6 | 1-1/2 | 1-1/4 | 3 | 5-1/2 | 6 | 0.040 |
| N68967 | VFP635-1.500-P3-C040.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | 0.040 |
| N68968 | VFP635-1.500-P4-C040.3-Z6 | 1-1/2 | 1-1/4 | 6 | 8-1/2 | 6 | 0.040 |
| N68969 | VFP635-2.000-D1-C040.3-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | 0.040 |
| N68970 | VFP635-2.000-D2-C040.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | 0.040 |
| N68971 | VFP635-2.000-D3-C040.3-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | 0.040 |
| N68972 | VFP635-2.000-D4-C040.3-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | 0.040 |

VFP²435 / VFP²635

M42
8% COBALT



CENTER
CUTTING

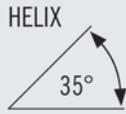


- For less rigid setups
- Optimal chip formation and evacuation
- Polished rake face
- Weldon flat standard
- Less aggressive profile compared to VFP1
- Up to .156" Corner Radius through modification
- Designed for stainless steel and titanium
- Cutting Data - Page 290
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | CHAMFER |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N68974 | VFP2435-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | 0.030 |
| N68975 | VFP2435-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 2-1/4 | 4-1/2 | 4 | 0.030 |
| N68976 | VFP2435-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | 0.030 |
| N68978 | VFP2435-1.000-D2-C030.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | 0.030 |
| N68979 | VFP2635-1.000-D2-C030.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | 0.030 |
| N68980 | VFP2435-1.000-D3-C030.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | 0.030 |
| N68981 | VFP2635-1.000-D3-C030.3-Z6 | 1 | 1 | 3 | 5-1/2 | 6 | 0.030 |
| N68983 | VFP2635-1.000-D4-C030.3-Z6 | 1 | 1 | 4 | 6-1/2 | 6 | 0.030 |
| N68985 | VFP2635-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | 0.040 |
| N68987 | VFP2635-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | 0.040 |
| N68989 | VFP2635-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | 0.040 |
| N68996 | VFP2635-2.000-D2-C040.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | 0.040 |

SHORT BLOCK-VFP435SB / VFP635SB

M42
8% COBALT



CENTER
CUTTING



- Optimal chip formation and evacuation
- Polished rake face
- Weldon flat standard
- Up to .250" corner radius through modification
- Designed for stainless steel and titanium

- Cutting Data - Page 290
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | CHAMFER |
|------------------------|-----------------------------|-----------|-----------|---------------|----------------|--------|---------|
| N69387 | VFP435SB-1.250-D2-C040.3-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | 0.040 |
| N69388 | VFP635SB-1.250-D1-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | 0.040 |
| N69389 | VFP435SB-1.250-D3-C040.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | 0.040 |
| N69390 | VFP635SB-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | 0.040 |
| N69391 | VFP435SB-1.250-D4-C040.3-Z4 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 4 | 0.040 |
| N69392 | VFP635SB-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | 0.040 |
| N69393 | VFP635SB-1.250-D5-C040.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | 0.040 |
| N69394 | VFP635SB-2.000-D1-C040.3-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | 0.040 |
| N69395 | VFP635SB-2.000-D2-C040.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | 0.040 |
| N69396 | VFP635SB-2.000-D3-C040.3-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | 0.040 |
| N69397 | VFP635SB-2.000-D4-C040.3-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | 0.040 |
| N69398 | VFP635SB-2.000-D5-C040.3-Z6 | 2 | 2 | 8 | 11-3/4 | 6 | 0.040 |

ALCRN COATED - VFP435SB / VFP435SBR / VFP635SB / VFP635SBR



- Optimal chip formation and evacuation
 - Polished rake face
 - Weldon flat standard
 - AlCrN coated for increased performance and tool life
 - Specifically engineered for titanium and stainless steel
 - Available with chamfer or corner radius
- Cutting Data - Page 290
 - Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | RADIUS | CHAMFER |
|--------------------------|------------------------------|-----------|-----------|---------------|----------------|--------|---------|--------|---------|
| 03136025 | VFP435SBR-1.250-D2-R120.3-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | AlCrN | 0.120 | - |
| 03136026 | VFP635SBR-1.250-D2-R120.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | AlCrN | 0.120 | - |
| 03136027 | VFP435SB-1.250-D3-C040.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | AlCrN | - | 0.040 |
| 03136028 | VFP635SB-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | AlCrN | - | 0.040 |
| 03136029 | VFP635SBR-1.250-D3-R120.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | AlCrN | 0.120 | - |
| 03136030 | VFP635SBR-1.250-D3-R156.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | AlCrN | 0.156 | - |
| 03136031 | VFP435SBR-1.250-D4-R120.3-Z4 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 4 | AlCrN | 0.120 | - |
| 03136032 | VFP635SB-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | AlCrN | - | 0.040 |
| 03136033 | VFP635SBR-1.250-D4-R120.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | AlCrN | 0.120 | - |
| 03136034 | VFP635SBR-1.250-D4-R156.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | AlCrN | 0.156 | - |
| 03136035 | VFP635SBR-1.250-D6-R120.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | AlCrN | 0.120 | - |
| 03136036 | VFP635SB-2.000-D1-C040.3-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | AlCrN | - | 0.040 |
| 03136037 | VFP635SBR-2.000-D1-R120.3-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | AlCrN | 0.120 | - |
| 03136038 | VFP635SBR-2.000-D1-R250.3-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | AlCrN | 0.250 | - |
| 03136039 | VFP635SB-2.000-D2-C040.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | AlCrN | - | 0.040 |
| 03136040 | VFP635SBR-2.000-D2-R120.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | AlCrN | 0.120 | - |
| 03136041 | VFP635SBR-2.000-D2-R250.3-Z6 | 2 | 2 | 3 | 6-3/4 | 6 | AlCrN | 0.250 | - |
| 03136042 | VFP635SB-2.000-D3-C040.3-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | AlCrN | - | 0.040 |
| 03136043 | VFP635SBR-2.000-D3-R120.3-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | AlCrN | 0.120 | - |
| 03136044 | VFP635SBR-2.000-D3-R250.3-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | AlCrN | 0.250 | - |
| 03136045 | VFP635SB-2.000-D4-C040.3-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | AlCrN | - | 0.040 |
| 03136046 | VFP635SBR-2.000-D4-R120.3-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | AlCrN | 0.120 | - |
| 03136047 | VFP635SBR-2.000-D4-R250.3-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | AlCrN | 0.250 | - |

DISCOUNT CODE D41

SP205

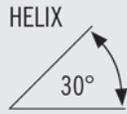


- Weldon flat standard
- Designed for pocketing and slotting in all materials including high temperature alloys
- Cutting Data - Page 264-265
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|
| N50041 | SP205-0.125-F3-S.3-Z2 | 1/8 | 3/8 | 3/8 | 2-5/16 | 2 | UNCOATED |
| N88565 | SP205-0.125-F3-S.3-Z2 | 1/8 | 3/8 | 3/8 | 2-5/16 | 2 | TICN |
| N50051 | SP205-0.156-F3-S.3-Z2 | 5/32 | 3/8 | 7/16 | 2-5/16 | 2 | UNCOATED |
| N88566 | SP205-0.156-F3-S.3-Z2 | 5/32 | 3/8 | 7/16 | 2-5/16 | 2 | TICN |
| N50061 | SP205-0.188-F2-S.3-Z2 | 3/16 | 3/8 | 7/16 | 2-5/16 | 2 | UNCOATED |
| N88567 | SP205-0.188-F2-S.3-Z2 | 3/16 | 3/8 | 7/16 | 2-5/16 | 2 | TICN |
| N50071 | SP205-0.219-F2-S.3-Z2 | 7/32 | 3/8 | 1/2 | 2-5/16 | 2 | UNCOATED |
| N88568 | SP205-0.219-F2-S.3-Z2 | 7/32 | 3/8 | 1/2 | 2-5/16 | 2 | TICN |
| N50081 | SP205-0.250-F2-S.3-Z2 | 1/4 | 3/8 | 1/2 | 2-5/16 | 2 | UNCOATED |
| N88569 | SP205-0.250-F2-S.3-Z2 | 1/4 | 3/8 | 1/2 | 2-5/16 | 2 | TICN |
| N50091 | SP205-0.281-F2-S.3-Z2 | 9/32 | 3/8 | 9/16 | 2-5/16 | 2 | UNCOATED |
| N88570 | SP205-0.281-F2-S.3-Z2 | 9/32 | 3/8 | 9/16 | 2-5/16 | 2 | TICN |
| N50101 | SP205-0.313-F2-S.3-Z2 | 5/16 | 3/8 | 9/16 | 2-5/16 | 2 | UNCOATED |
| N88571 | SP205-0.313-F2-S.3-Z2 | 5/16 | 3/8 | 9/16 | 2-5/16 | 2 | TICN |
| N50121 | SP205-0.375-D2-S.3-Z2 | 3/8 | 3/8 | 9/16 | 2-5/16 | 2 | UNCOATED |
| N88573 | SP205-0.375-D2-S.3-Z2 | 3/8 | 3/8 | 9/16 | 2-5/16 | 2 | TICN |
| N50141 | SP205-0.438-P2-S.3-Z2 | 7/16 | 3/8 | 13/16 | 2-1/2 | 2 | UNCOATED |
| N88574 | SP205-0.438-P2-S.3-Z2 | 7/16 | 3/8 | 13/16 | 2-1/2 | 2 | TICN |
| N50161 | SP205-0.500-P2-S.3-Z2 | 1/2 | 3/8 | 13/16 | 2-1/2 | 2 | UNCOATED |
| N88575 | SP205-0.500-P2-S.3-Z2 | 1/2 | 3/8 | 13/16 | 2-1/2 | 2 | TICN |
| N50162 | SP205-0.500-D2-S.3-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | UNCOATED |
| N88576 | SP205-0.500-D2-S.3-Z2 | 1/2 | 1/2 | 1 | 3 | 2 | TICN |
| N50182 | SP205-0.563-P2-S.3-Z2 | 9/16 | 1/2 | 1-1/8 | 3-1/8 | 2 | UNCOATED |
| N88577 | SP205-0.563-P2-S.3-Z2 | 9/16 | 1/2 | 1-1/8 | 3-1/8 | 2 | TICN |
| N50203 | SP205-0.625-D2-S.3-Z2 | 5/8 | 5/8 | 1-5/16 | 3-7/16 | 2 | UNCOATED |
| N88578 | SP205-0.625-D2-S.3-Z2 | 5/8 | 5/8 | 1-5/16 | 3-7/16 | 2 | TICN |
| N50242 | SP205-0.750-P2-S.3-Z2 | 3/4 | 1/2 | 1-5/16 | 3-5/16 | 2 | UNCOATED |
| N88579 | SP205-0.750-P2-S.3-Z2 | 3/4 | 1/2 | 1-5/16 | 3-5/16 | 2 | TICN |
| N50244 | SP205-0.750-D2-S.3-Z2 | 3/4 | 3/4 | 1-5/16 | 3-9/16 | 2 | UNCOATED |
| N88580 | SP205-0.750-D2-S.3-Z2 | 3/4 | 3/4 | 1-5/16 | 3-9/16 | 2 | TICN |
| N50285 | SP205-0.875-D2-S.3-Z2 | 7/8 | 7/8 | 1-1/2 | 3-3/4 | 2 | UNCOATED |
| N88581 | SP205-0.875-D2-S.3-Z2 | 7/8 | 7/8 | 1-1/2 | 3-3/4 | 2 | TICN |
| N50324 | SP205-1.000-P2-S.3-Z2 | 1 | 3/4 | 1-1/2 | 3-3/4 | 2 | UNCOATED |
| N88582 | SP205-1.000-P2-S.3-Z2 | 1 | 3/4 | 1-1/2 | 3-3/4 | 2 | TICN |

SP205 (CONT'D)

M42
8% COBALT



CENTER
CUTTING

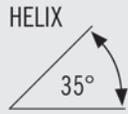


- Weldon flat standard
- Designed for pocketing and slotting in all materials including high temperature alloys
- Cutting Data - Page 264-265
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|
| N50326 | SP205-1.000-D2-S.3-Z2 | 1 | 1 | 1-5/8 | 4-1/8 | 2 | UNCOATED |
| N88583 | SP205-1.000-D2-S.3-Z2 | 1 | 1 | 1-5/8 | 4-1/8 | 2 | TICN |
| N50366 | SP205-1.125-P1-S.3-Z2 | 1-1/8 | 1 | 1-5/8 | 4-1/8 | 2 | UNCOATED |
| N88584 | SP205-1.125-P1-S.3-Z2 | 1-1/8 | 1 | 1-5/8 | 4-1/8 | 2 | TICN |
| N50407 | SP205-1.250-D1-S.3-Z2 | 1-1/4 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | UNCOATED |
| N88586 | SP205-1.250-D1-S.3-Z2 | 1-1/4 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | TICN |
| N50487 | SP205-1.500-P1-S.3-Z2 | 1-1/2 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | UNCOATED |
| N88587 | SP205-1.500-P1-S.3-Z2 | 1-1/2 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | TICN |
| N50647 | SP205-2.000-P1-S.3-Z2 | 2 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | UNCOATED |
| N88588 | SP205-2.000-P1-S.3-Z2 | 2 | 1-1/4 | 1-5/8 | 4-1/8 | 2 | TICN |

EXCEL SERIES-EX350

PREMIUM
PARTICLE
METAL
8.5% COBALT



CENTER
CUTTING

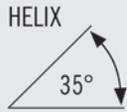


- Weldon flat standard
- Form ground flutes
- Cutting Data - Page 266-267
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|
| N53342 | EX350-0.375-D7-S.3-Z4 | 3/8 | 3/8 | 2-1/2 | 4-1/4 | 4 | UNCOATED |
| N53458 | EX350-0.375-D7-S.3-Z4 | 3/8 | 3/8 | 2-1/2 | 4-1/4 | 4 | TICN |
| N53343 | EX350-0.500-D1-S.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | UNCOATED |
| N53459 | EX350-0.500-D1-S.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | TICN |
| N53344 | EX350-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N53460 | EX350-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN |
| N53346 | EX350-0.500-D8-S.3-Z4 | 1/2 | 1/2 | 4 | 6 | 4 | UNCOATED |
| N53462 | EX350-0.500-D8-S.3-Z4 | 1/2 | 1/2 | 4 | 6 | 4 | TICN |
| N53347 | EX350-0.625-D1-S.3-Z4 | 5/8 | 5/8 | 5/8 | 2-3/4 | 4 | UNCOATED |
| N53463 | EX350-0.625-D1-S.3-Z4 | 5/8 | 5/8 | 5/8 | 2-3/4 | 4 | TICN |
| N53348 | EX350-0.625-D3-S.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N53464 | EX350-0.625-D3-S.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N53352 | EX350-0.750-D1-S.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | UNCOATED |
| N53468 | EX350-0.750-D1-S.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | TICN |
| N53353 | EX350-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED |
| N53469 | EX350-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN |
| N53355 | EX350-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED |
| N53471 | EX350-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN |
| N53357 | EX350-0.750-D4-S.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED |
| N53473 | EX350-0.750-D4-S.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TICN |
| N53359 | EX350-0.750-D5-S.3-Z4 | 3/4 | 3/4 | 4 | 6-1/4 | 4 | UNCOATED |
| N53475 | EX350-0.750-D5-S.3-Z4 | 3/4 | 3/4 | 4 | 6-1/4 | 4 | TICN |
| N53363 | EX350-1.000-D1-S.3-Z4 | 1 | 1 | 1 | 3-1/2 | 4 | UNCOATED |
| N53479 | EX350-1.000-D1-S.3-Z4 | 1 | 1 | 1 | 3-1/2 | 4 | TICN |
| N53364 | EX350-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | UNCOATED |
| N53480 | EX350-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | TICN |
| N53366 | EX350-1.000-D3-S.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | UNCOATED |
| N53482 | EX350-1.000-D3-S.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | TICN |
| N53368 | EX350-1.000-D4-S.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | UNCOATED |
| N53484 | EX350-1.000-D4-S.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | TICN |
| N53370 | EX350-1.000-D6-S.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | UNCOATED |
| N53486 | EX350-1.000-D6-S.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | TICN |
| N53374 | EX350-1.250-D3-S.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | UNCOATED |
| N53490 | EX350-1.250-D3-S.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | TICN |
| N53375 | EX350-1.250-D3-S.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | UNCOATED |

EXCEL SERIES-EX350 (CONT'D)

PREMIUM
PARTICLE
METAL
8.5% COBALT



CENTER
CUTTING



- Weldon flat standard
- Form ground flutes

- Cutting Data - Page 266-267
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-----------------------|-----------|-----------|---------------|----------------|--------|----------|
| N53491 | EX350-1.250-D3-S.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | TICN |
| N53379 | EX350-1.250-D5-S.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | UNCOATED |
| N53495 | EX350-1.250-D5-S.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | TICN |
| N53385 | EX350-1.500-P3-S.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED |
| N53501 | EX350-1.500-P3-S.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | TICN |
| N53395 | EX350-2.000-D4-S.7-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | UNCOATED |
| N53511 | EX350-2.000-D4-S.7-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | TICN |

SPC408

M42
8% COBALT



CENTER
CUTTING



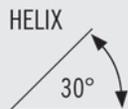
- Weldon flat standard
- Designed for profiling in all materials

- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N52041 | SPC408-0.125-F3-S.3-Z4 | 1/8 | 3/8 | 3/8 | 2-5/16 | 4 | UNCOATED |
| N88604 | SPC408-0.125-F3-S.3-Z4 | 1/8 | 3/8 | 3/8 | 2-5/16 | 4 | TICN |
| N52051 | SPC408-0.156-F3-S.3-Z4 | 5/32 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED |
| N88605 | SPC408-0.156-F3-S.3-Z4 | 5/32 | 3/8 | 1/2 | 2-3/8 | 4 | TICN |
| N52049 | SPC408-0.188-F1-S.3-Z4 | 3/16 | 3/8 | 3/16 | 2-1/16 | 4 | UNCOATED |
| N89446 | SPC408-0.188-F1-S.3-Z4 | 3/16 | 3/8 | 3/16 | 2-1/16 | 4 | TICN |
| N52061 | SPC408-0.188-F3-S.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED |
| N88606 | SPC408-0.188-F3-S.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TICN |
| N52071 | SPC408-0.219-F3-S.3-Z4 | 7/32 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED |
| N88607 | SPC408-0.219-F3-S.3-Z4 | 7/32 | 3/8 | 5/8 | 2-7/16 | 4 | TICN |
| N52069 | SPC408-0.250-F1-S.3-Z4 | 1/4 | 3/8 | 1/4 | 2-1/16 | 4 | UNCOATED |
| N89447 | SPC408-0.250-F1-S.3-Z4 | 1/4 | 3/8 | 1/4 | 2-1/16 | 4 | TICN |
| N52081 | SPC408-0.250-F3-S.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED |
| N88608 | SPC408-0.250-F3-S.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN |
| N52082 | SPC408-0.250-F5-S.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED |
| N88609 | SPC408-0.250-F5-S.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TICN |

SPC408 (CONT'D)

M42
8% COBALT



CENTER
CUTTING

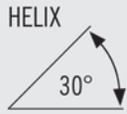


- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N52083 | SPC408-0.250-F7-S.3-Z4 | 1/4 | 3/8 | 1-3/4 | 3-9/16 | 4 | UNCOATED |
| N88610 | SPC408-0.250-F7-S.3-Z4 | 1/4 | 3/8 | 1-3/4 | 3-9/16 | 4 | TICN |
| N52091 | SPC408-0.281-F2-S.3-Z4 | 9/32 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED |
| N88611 | SPC408-0.281-F2-S.3-Z4 | 9/32 | 3/8 | 5/8 | 2-7/16 | 4 | TICN |
| N52109 | SPC408-0.313-F1-S.3-Z4 | 5/16 | 3/8 | 5/16 | 2-1/16 | 4 | UNCOATED |
| N89448 | SPC408-0.313-F1-S.3-Z4 | 5/16 | 3/8 | 5/16 | 2-1/16 | 4 | TICN |
| N52101 | SPC408-0.313-F2-S.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED |
| N88612 | SPC408-0.313-F2-S.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TICN |
| N52102 | SPC408-0.313-F4-S.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | UNCOATED |
| N88613 | SPC408-0.313-F4-S.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | TICN |
| N52103 | SPC408-0.313-F6-S.3-Z4 | 5/16 | 3/8 | 2 | 3-3/4 | 4 | UNCOATED |
| N88614 | SPC408-0.313-F6-S.3-Z4 | 5/16 | 3/8 | 2 | 3-3/4 | 4 | TICN |
| N52129 | SPC408-0.375-D1-S.3-Z4 | 3/8 | 3/8 | 3/8 | 2-1/8 | 4 | UNCOATED |
| N89449 | SPC408-0.375-D1-S.3-Z4 | 3/8 | 3/8 | 3/8 | 2-1/8 | 4 | TICN |
| N52121 | SPC408-0.375-D2-S.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED |
| N88616 | SPC408-0.375-D2-S.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TICN |
| N52122 | SPC408-0.375-D4-S.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED |
| N88617 | SPC408-0.375-D4-S.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TICN |
| N52123 | SPC408-0.375-D7-S.3-Z4 | 3/8 | 3/8 | 2-1/2 | 4-1/4 | 4 | UNCOATED |
| N88618 | SPC408-0.375-D7-S.3-Z4 | 3/8 | 3/8 | 2-1/2 | 4-1/4 | 4 | TICN |
| N52141 | SPC408-0.438-P2-S.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | UNCOATED |
| N88619 | SPC408-0.438-P2-S.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | TICN |
| N52142 | SPC408-0.438-P5-S.3-Z4 | 7/16 | 3/8 | 2 | 3-11/16 | 4 | UNCOATED |
| N88620 | SPC408-0.438-P5-S.3-Z4 | 7/16 | 3/8 | 2 | 3-11/16 | 4 | TICN |
| N52166 | SPC408-0.500-P2-S.3-Z4 | 1/2 | 3/8 | 1 | 2-11/16 | 4 | UNCOATED |
| N88625 | SPC408-0.500-P2-S.3-Z4 | 1/2 | 3/8 | 1 | 2-11/16 | 4 | TICN |
| N52160 | SPC408-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N88621 | SPC408-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN |
| N52162 | SPC408-0.500-D3-S.3-Z6 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 6 | UNCOATED |
| N88622 | SPC408-0.500-D3-S.3-Z6 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 6 | TICN |
| N52163 | SPC408-0.500-D4-S.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED |
| N88623 | SPC408-0.500-D4-S.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TICN |
| N52164 | SPC408-0.500-D6-S.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | UNCOATED |
| N88624 | SPC408-0.500-D6-S.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | TICN |
| N52167 | SPC408-0.500-D8-S.3-Z4 | 1/2 | 1/2 | 4 | 6 | 4 | UNCOATED |

SPC408 (CONT'D)

M42
8% COBALT



CENTER
CUTTING



- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N88626 | SPC408-0.500-D8-S.3-Z4 | 1/2 | 1/2 | 4 | 6 | 4 | TICN |
| N52182 | SPC408-0.563-P2-S.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | UNCOATED |
| N88627 | SPC408-0.563-P2-S.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | TICN |
| N52200 | SPC408-0.625-D3-S.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N88628 | SPC408-0.625-D3-S.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N52203 | SPC408-0.625-D3-S.3-Z6 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 6 | UNCOATED |
| N88631 | SPC408-0.625-D3-S.3-Z6 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 6 | TICN |
| N52201 | SPC408-0.625-D4-S.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED |
| N88629 | SPC408-0.625-D4-S.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TICN |
| N52202 | SPC408-0.625-D5-S.3-Z4 | 5/8 | 5/8 | 3 | 5-1/8 | 4 | UNCOATED |
| N88630 | SPC408-0.625-D5-S.3-Z4 | 5/8 | 5/8 | 3 | 5-1/8 | 4 | TICN |
| N52204 | SPC408-0.625-D6-S.3-Z4 | 5/8 | 5/8 | 4 | 6-1/8 | 4 | UNCOATED |
| N88632 | SPC408-0.625-D6-S.3-Z4 | 5/8 | 5/8 | 4 | 6-1/8 | 4 | TICN |
| N52206 | SPC408-0.750-P2-S.3-Z4 | 3/4 | 1/2 | 1-5/8 | 3-5/8 | 4 | UNCOATED |
| N88633 | SPC408-0.750-P2-S.3-Z4 | 3/4 | 1/2 | 1-5/8 | 3-5/8 | 4 | TICN |
| N52240 | SPC408-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED |
| N88634 | SPC408-0.750-D2-S.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN |
| N52244 | SPC408-0.750-D2-S.3-Z6 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 6 | UNCOATED |
| N88638 | SPC408-0.750-D2-S.3-Z6 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 6 | TICN |
| N52241 | SPC408-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED |
| N88635 | SPC408-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN |
| N52242 | SPC408-0.750-D4-S.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED |
| N88636 | SPC408-0.750-D4-S.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TICN |
| N52243 | SPC408-0.750-D5-S.3-Z4 | 3/4 | 3/4 | 4 | 6-1/4 | 4 | UNCOATED |
| N88637 | SPC408-0.750-D5-S.3-Z4 | 3/4 | 3/4 | 4 | 6-1/4 | 4 | TICN |
| N52247 | SPC408-0.750-D5-S.3-Z6 | 3/4 | 3/4 | 4 | 6-1/4 | 6 | UNCOATED |
| N88640 | SPC408-0.750-D5-S.3-Z6 | 3/4 | 3/4 | 4 | 6-1/4 | 6 | TICN |
| N52285 | SPC408-0.875-D2-S.3-Z4 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 4 | UNCOATED |
| N88642 | SPC408-0.875-D2-S.3-Z4 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 4 | TICN |
| N52286 | SPC408-0.875-D4-S.3-Z4 | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 4 | UNCOATED |
| N88643 | SPC408-0.875-D4-S.3-Z4 | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 4 | TICN |
| N52334 | SPC408-1.000-P2-S.3-Z4 | 1 | 3/4 | 1-7/8 | 4-1/8 | 4 | UNCOATED |
| N88652 | SPC408-1.000-P2-S.3-Z4 | 1 | 3/4 | 1-7/8 | 4-1/8 | 4 | TICN |
| N52320 | SPC408-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | UNCOATED |
| N88644 | SPC408-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | TICN |

SPC408 (CONT'D)

M42
8% COBALT

HELIX

SQUARE END

CENTER CUTTING



- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N52326 | SPC408-1.000-D2-S.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | UNCOATED |
| N88649 | SPC408-1.000-D2-S.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | TICN |
| N52321 | SPC408-1.000-D3-S.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | UNCOATED |
| N88645 | SPC408-1.000-D3-S.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | TICN |
| N52327 | SPC408-1.000-D3-S.3-Z6 | 1 | 1 | 3 | 5-1/2 | 6 | UNCOATED |
| N88650 | SPC408-1.000-D3-S.3-Z6 | 1 | 1 | 3 | 5-1/2 | 6 | TICN |
| N52322 | SPC408-1.000-D4-S.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | UNCOATED |
| N88646 | SPC408-1.000-D4-S.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | TICN |
| N52324 | SPC408-1.000-D4-S.3-Z6 | 1 | 1 | 4 | 6-1/2 | 6 | UNCOATED |
| N88648 | SPC408-1.000-D4-S.3-Z6 | 1 | 1 | 4 | 6-1/2 | 6 | TICN |
| N52323 | SPC408-1.000-D6-S.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | UNCOATED |
| N88647 | SPC408-1.000-D6-S.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | TICN |
| N52329 | SPC408-1.000-D6-S.3-Z6 | 1 | 1 | 6 | 8-1/2 | 6 | UNCOATED |
| N88651 | SPC408-1.000-D6-S.3-Z6 | 1 | 1 | 6 | 8-1/2 | 6 | TICN |
| N52366 | SPC408-1.125-P2-S.3-Z6 | 1-1/8 | 1 | 2 | 4-1/2 | 6 | UNCOATED |
| N88653 | SPC408-1.125-P2-S.3-Z6 | 1-1/8 | 1 | 2 | 4-1/2 | 6 | TICN |
| N52367 | SPC408-1.125-P4-S.3-Z6 | 1-1/8 | 1 | 4 | 6-1/2 | 6 | UNCOATED |
| N88654 | SPC408-1.125-P4-S.3-Z6 | 1-1/8 | 1 | 4 | 6-1/2 | 6 | TICN |
| N52414 | SPC408-1.250-P2-S.3-Z4 | 1-1/4 | 1 | 2 | 4-1/2 | 4 | UNCOATED |
| N88663 | SPC408-1.250-P2-S.3-Z4 | 1-1/4 | 1 | 2 | 4-1/2 | 4 | TICN |
| N52416 | SPC408-1.250-P2-S.3-Z6 | 1-1/4 | 1 | 2 | 4-1/2 | 6 | UNCOATED |
| N88664 | SPC408-1.250-P2-S.3-Z6 | 1-1/4 | 1 | 2 | 4-1/2 | 6 | TICN |
| N52400 | SPC408-1.250-D1-S.3-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | UNCOATED |
| N88655 | SPC408-1.250-D1-S.3-Z4 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 4 | TICN |
| N52407 | SPC408-1.250-D1-S.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED |
| N88660 | SPC408-1.250-D1-S.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | TICN |
| N52401 | SPC408-1.250-D2-S.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | UNCOATED |
| N88656 | SPC408-1.250-D2-S.3-Z4 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 4 | TICN |
| N52406 | SPC408-1.250-D2-S.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | UNCOATED |
| N88659 | SPC408-1.250-D2-S.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | TICN |
| N52402 | SPC408-1.250-D3-S.3-Z4 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 4 | UNCOATED |
| N88657 | SPC408-1.250-D3-S.3-Z4 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 4 | TICN |
| N52409 | SPC408-1.250-D3-S.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED |
| N88661 | SPC408-1.250-D3-S.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | TICN |

SPC408 (CONT'D)

M42
8% COBALT



CENTER
CUTTING



- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N52403 | SPC408-1.250-D5-S.3-Z4 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 4 | UNCOATED |
| N88658 | SPC408-1.250-D5-S.3-Z4 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 4 | TICN |
| N52410 | SPC408-1.250-D5-S.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | UNCOATED |
| N88662 | SPC408-1.250-D5-S.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | TICN |
| N52480 | SPC408-1.500-P1-S.3-Z4 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 4 | UNCOATED |
| N88665 | SPC408-1.500-P1-S.3-Z4 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 4 | TICN |
| N52487 | SPC408-1.500-P1-S.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED |
| N88667 | SPC408-1.500-P1-S.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | TICN |
| N52486 | SPC408-1.500-P4-S.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED |
| N88666 | SPC408-1.500-P4-S.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | TICN |
| N52499 | SPC408-1.500-P5-S.3-Z6 | 1-1/2 | 1-1/4 | 8 | 10-1/2 | 6 | UNCOATED |
| N88669 | SPC408-1.500-P5-S.3-Z6 | 1-1/2 | 1-1/4 | 8 | 10-1/2 | 6 | TICN |
| N52644 | SPC408-2.000-P1-S.3-Z6 | 2 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED |
| N88670 | SPC408-2.000-P1-S.3-Z6 | 2 | 1-1/4 | 2 | 4-1/2 | 6 | TICN |
| N52646 | SPC408-2.000-P2-S.3-Z6 | 2 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED |
| N88671 | SPC408-2.000-P2-S.3-Z6 | 2 | 1-1/4 | 4 | 6-1/2 | 6 | TICN |

SMM845

M42
8% COBALT



CENTER
CUTTING

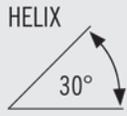


- Weldon flat standard
- Metric flute
- Inch shank
- Designed for profiling in all materials
- Cutting Data - Page 271-272
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N72861 | SMM845-0.118-F3-S.3-Z4 | 3MM | 3/8 | 3/8 | 2-5/16 | 4 | UNCOATED |
| N88949 | SMM845-0.118-F3-S.3-Z4 | 3MM | 3/8 | 3/8 | 2-5/16 | 4 | TICN |
| N72862 | SMM845-0.157-F3-S.3-Z4 | 4MM | 3/8 | 1/2 | 2-5/16 | 4 | UNCOATED |
| N88950 | SMM845-0.157-F3-S.3-Z4 | 4MM | 3/8 | 1/2 | 2-5/16 | 4 | TICN |
| N72863 | SMM845-0.197-F3-S.3-Z4 | 5MM | 3/8 | 9/16 | 2-1/2 | 4 | UNCOATED |
| N88951 | SMM845-0.197-F3-S.3-Z4 | 5MM | 3/8 | 9/16 | 2-1/2 | 4 | TICN |
| N72864 | SMM845-0.236-F3-S.3-Z4 | 6MM | 3/8 | 5/8 | 2-1/2 | 4 | UNCOATED |
| N88952 | SMM845-0.236-F3-S.3-Z4 | 6MM | 3/8 | 5/8 | 2-1/2 | 4 | TICN |
| N72866 | SMM845-0.315-F2-S.3-Z4 | 8MM | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED |
| N88954 | SMM845-0.315-F2-S.3-Z4 | 8MM | 3/8 | 3/4 | 2-1/2 | 4 | TICN |
| N72867 | SMM845-0.394-P3-S.3-Z4 | 10MM | 3/8 | 1 | 2-11/16 | 4 | UNCOATED |
| N88955 | SMM845-0.394-P3-S.3-Z4 | 10MM | 3/8 | 1 | 2-11/16 | 4 | TICN |
| N72868 | SMM845-0.472-F2-S.3-Z4 | 12MM | 1/2 | 1 | 3 | 4 | UNCOATED |
| N88956 | SMM845-0.472-F2-S.3-Z4 | 12MM | 1/2 | 1 | 3 | 4 | TICN |
| N72869 | SMM845-0.551-P2-S.3-Z4 | 14MM | 1/2 | 1-3/8 | 3-3/8 | 4 | UNCOATED |
| N88957 | SMM845-0.551-P2-S.3-Z4 | 14MM | 1/2 | 1-3/8 | 3-3/8 | 4 | TICN |
| N72870 | SMM845-0.630-P3-S.3-Z4 | 16MM | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N88958 | SMM845-0.630-P3-S.3-Z4 | 16MM | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N72871 | SMM845-0.709-P2-S.3-Z4 | 18MM | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N88959 | SMM845-0.709-P2-S.3-Z4 | 18MM | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N72872 | SMM845-0.787-P2-S.3-Z4 | 20MM | 3/4 | 1-7/8 | 4-1/8 | 4 | UNCOATED |
| N88960 | SMM845-0.787-P2-S.3-Z4 | 20MM | 3/4 | 1-7/8 | 4-1/8 | 4 | TICN |

SPB540

M42
8% COBALT



CENTER
CUTTING



- Weldon flat standard
- Designed for profiling and contouring in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N54041 | SPB540-0.125-F3-B.3-Z4 | 1/8 | 3/8 | 3/8 | 2-5/16 | 4 | UNCOATED |
| N88688 | SPB540-0.125-F3-B.3-Z4 | 1/8 | 3/8 | 3/8 | 2-5/16 | 4 | TICN |
| N54061 | SPB540-0.188-F3-B.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED |
| N88689 | SPB540-0.188-F3-B.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TICN |
| N54081 | SPB540-0.250-F3-B.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED |
| N88690 | SPB540-0.250-F3-B.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN |
| N54121 | SPB540-0.375-D2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED |
| N88692 | SPB540-0.375-D2-B.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TICN |
| N67272 | SPB540-0.375-D4-B.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED |
| N67342 | SPB540-0.375-D4-B.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TICN |
| N67275 | SPB540-0.500-D2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED |
| N67345 | SPB540-0.500-D2-B.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TICN |
| N54160 | SPB540-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N88693 | SPB540-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN |
| N67276 | SPB540-0.500-D4-B.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED |
| N67346 | SPB540-0.500-D4-B.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TICN |
| N67277 | SPB540-0.500-D5-B.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | UNCOATED |
| N67347 | SPB540-0.500-D5-B.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | TICN |
| N54200 | SPB540-0.625-D3-B.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N88694 | SPB540-0.625-D3-B.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N54240 | SPB540-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED |
| N88695 | SPB540-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN |
| N67283 | SPB540-0.750-D3-B.3-Z4 | 3/4 | 3/4 | 2-1/4 | 4-1/2 | 4 | UNCOATED |
| N67353 | SPB540-0.750-D3-B.3-Z4 | 3/4 | 3/4 | 2-1/4 | 4-1/2 | 4 | TICN |
| N54280 | SPB540-0.875-D2-B.3-Z4 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 4 | UNCOATED |
| N88696 | SPB540-0.875-D2-B.3-Z4 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 4 | TICN |
| N54320 | SPB540-1.000-D2-B.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | UNCOATED |
| N88697 | SPB540-1.000-D2-B.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | TICN |
| N67287 | SPB540-1.000-D3-B.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | UNCOATED |
| N67357 | SPB540-1.000-D3-B.3-Z4 | 1 | 1 | 3 | 5-1/2 | 4 | TICN |
| N67288 | SPB540-1.000-D4-B.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | UNCOATED |
| N67358 | SPB540-1.000-D4-B.3-Z4 | 1 | 1 | 4 | 6-1/2 | 4 | TICN |
| N67290 | SPB540-1.000-D6-B.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | UNCOATED |
| N67360 | SPB540-1.000-D6-B.3-Z4 | 1 | 1 | 6 | 8-1/2 | 4 | TICN |
| N54407 | SPB540-1.250-D1-B.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED |
| N88698 | SPB540-1.250-D1-B.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | TICN |

SPB540 (CONT'D)

| | | | |
|------------------|-----------|--------------|----------------|
| M42 8% COBALT | HELIX | BALL END | CENTER CUTTING |
|------------------|-----------|--------------|----------------|



- Weldon flat standard
- Designed for profiling and contouring in all materials
- Cutting Data - Page 268-270
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N54487 | SPB540-1.500-P1-B.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED |
| N88699 | SPB540-1.500-P1-B.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | TICN |
| N67297 | SPB540-2.000-D1-B.7-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | UNCOATED |
| N67367 | SPB540-2.000-D1-B.7-Z6 | 2 | 2 | 2 | 5-3/4 | 6 | TICN |
| N67299 | SPB540-2.000-D3-B.7-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | UNCOATED |
| N67369 | SPB540-2.000-D3-B.7-Z6 | 2 | 2 | 4 | 7-3/4 | 6 | TICN |
| N67300 | SPB540-2.000-D4-B.7-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | UNCOATED |
| N67370 | SPB540-2.000-D4-B.7-Z6 | 2 | 2 | 6 | 9-3/4 | 6 | TICN |

RTM713

| | | | | |
|------------------|-----------|-------------|----------------|------------------|
| M42 8% COBALT | HELIX | CHAMFER | CENTER CUTTING | COARSE PITCH |
|------------------|-----------|-------------|----------------|------------------|



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 273
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N73081 | RTM713-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-1/2 | 3 | UNCOATED | 0.020 |
| N89019 | RTM713-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-1/2 | 3 | TICN | 0.020 |
| N73121 | RTM713-0.375-D2-C020.3-Z3 | 3/8 | 3/8 | 7/8 | 2-3/4 | 3 | UNCOATED | 0.020 |
| N89022 | RTM713-0.375-D2-C020.3-Z3 | 3/8 | 3/8 | 7/8 | 2-3/4 | 3 | TICN | 0.020 |
| N73162 | RTM713-0.500-D2-C025.3-Z3 | 1/2 | 1/2 | 1 | 3-1/16 | 3 | UNCOATED | 0.025 |
| N89025 | RTM713-0.500-D2-C025.3-Z3 | 1/2 | 1/2 | 1 | 3-1/16 | 3 | TICN | 0.025 |
| N73203 | RTM713-0.625-D2-C025.3-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | UNCOATED | 0.025 |
| N89027 | RTM713-0.625-D2-C025.3-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | TICN | 0.025 |
| N73249 | RTM713-0.750-D1-C025.3-Z3 | 3/4 | 3/4 | 3/4 | 3 | 3 | UNCOATED | 0.025 |
| N89030 | RTM713-0.750-D1-C025.3-Z3 | 3/4 | 3/4 | 3/4 | 3 | 3 | TICN | 0.025 |
| N73244 | RTM713-0.750-D2-C025.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | UNCOATED | 0.025 |
| N89029 | RTM713-0.750-D2-C025.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | TICN | 0.025 |
| N73327 | RTM713-1.000-P1-C030.3-Z3 | 1 | 3/4 | 1 | 3-1/4 | 3 | UNCOATED | 0.030 |
| N89035 | RTM713-1.000-P1-C030.3-Z3 | 1 | 3/4 | 1 | 3-1/4 | 3 | TICN | 0.030 |
| N73326 | RTM713-1.000-D2-C030.3-Z3 | 1 | 1 | 1-3/4 | 4-5/8 | 3 | UNCOATED | 0.030 |
| N89034 | RTM713-1.000-D2-C030.3-Z3 | 1 | 1 | 1-3/4 | 4-5/8 | 3 | TICN | 0.030 |

RTM447

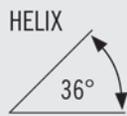


- Weldon flat standard
- Designed for profiling and slotting in steel, stainless steel and high temperature alloys
- Cutting Data - Page 275-276
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N44701 | RTM447-0.250-F1-C020.3-Z3 | 1/4 | 3/8 | 1/4 | 2-1/8 | 3 | UNCOATED | 0.020 |
| N88456 | RTM447-0.250-F1-C020.3-Z3 | 1/4 | 3/8 | 1/4 | 2-1/8 | 3 | TICN | 0.020 |
| N44703 | RTM447-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-1/2 | 3 | UNCOATED | 0.020 |
| N88457 | RTM447-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-1/2 | 3 | TICN | 0.020 |
| N44705 | RTM447-0.375-D1-C020.3-Z3 | 3/8 | 3/8 | 3/8 | 2-1/4 | 3 | UNCOATED | 0.020 |
| N88458 | RTM447-0.375-D1-C020.3-Z3 | 3/8 | 3/8 | 3/8 | 2-1/4 | 3 | TICN | 0.020 |
| N44707 | RTM447-0.375-D2-C020.3-Z3 | 3/8 | 3/8 | 7/8 | 2-3/4 | 3 | UNCOATED | 0.020 |
| N88459 | RTM447-0.375-D2-C020.3-Z3 | 3/8 | 3/8 | 7/8 | 2-3/4 | 3 | TICN | 0.020 |
| N44709 | RTM447-0.500-D1-C025.3-Z3 | 1/2 | 1/2 | 1/2 | 2-9/16 | 3 | UNCOATED | 0.025 |
| N88460 | RTM447-0.500-D1-C025.3-Z3 | 1/2 | 1/2 | 1/2 | 2-9/16 | 3 | TICN | 0.025 |
| N44711 | RTM447-0.500-D2-C025.3-Z3 | 1/2 | 1/2 | 1 | 3-1/16 | 3 | UNCOATED | 0.025 |
| N88461 | RTM447-0.500-D2-C025.3-Z3 | 1/2 | 1/2 | 1 | 3-1/16 | 3 | TICN | 0.025 |
| N44713 | RTM447-0.625-D1-C025.3-Z3 | 5/8 | 5/8 | 5/8 | 2-7/8 | 3 | UNCOATED | 0.025 |
| N88462 | RTM447-0.625-D1-C025.3-Z3 | 5/8 | 5/8 | 5/8 | 2-7/8 | 3 | TICN | 0.025 |
| N44715 | RTM447-0.625-D2-C025.3-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | UNCOATED | 0.025 |
| N88463 | RTM447-0.625-D2-C025.3-Z3 | 5/8 | 5/8 | 1-1/4 | 3-1/2 | 3 | TICN | 0.025 |
| N44719 | RTM447-0.750-D2-C025.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | UNCOATED | 0.025 |
| N88465 | RTM447-0.750-D2-C025.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | TICN | 0.025 |
| N44731 | RTM447-1.000-D2-C030.3-Z3 | 1 | 1 | 1-3/4 | 4-5/8 | 3 | UNCOATED | 0.030 |
| N88471 | RTM447-1.000-D2-C030.3-Z3 | 1 | 1 | 1-3/4 | 4-5/8 | 3 | TICN | 0.030 |

RHC752

M42
8% COBALT



CENTER
CUTTING



- Weldon flat standard
- Designed for profiling and slotting in aluminum and non-ferrous materials
- Cutting Data - Page 274
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N75215 | RHC752-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 | UNCOATED | 0.020 |
| N79460 | RHC752-0.250-F3-C020.3-Z3 | 1/4 | 3/8 | 5/8 | 2-7/16 | 3 | TICN | 0.020 |
| N75201 | RHC752-0.375-D2-C025.3-Z3 | 3/8 | 3/8 | 3/4 | 2-1/2 | 3 | UNCOATED | 0.025 |
| N69360 | RHC752-0.375-D2-C025.3-Z3 | 3/8 | 3/8 | 3/4 | 2-1/2 | 3 | TICN | 0.025 |
| N75203 | RHC752-0.375-D4-C025.3-Z3 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 3 | UNCOATED | 0.025 |
| N79464 | RHC752-0.375-D4-C025.3-Z3 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 3 | TICN | 0.025 |
| N75205 | RHC752-0.500-D2-C030.3-Z3 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 3 | UNCOATED | 0.030 |
| N69361 | RHC752-0.500-D2-C030.3-Z3 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 3 | TICN | 0.030 |
| N75209 | RHC752-0.500-D4-C030.3-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | UNCOATED | 0.030 |
| N69362 | RHC752-0.500-D4-C030.3-Z3 | 1/2 | 1/2 | 2 | 4 | 3 | TICN | 0.030 |
| N75213 | RHC752-0.625-D3-C040.3-Z3 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 3 | UNCOATED | 0.040 |
| N69363 | RHC752-0.625-D3-C040.3-Z3 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 3 | TICN | 0.040 |
| N75217 | RHC752-0.625-D5-C040.3-Z3 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 3 | UNCOATED | 0.040 |
| N69364 | RHC752-0.625-D5-C040.3-Z3 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 3 | TICN | 0.040 |
| N75233 | RHC752-0.750-D1-C040.3-Z3 | 3/4 | 3/4 | 3/4 | 3 | 3 | UNCOATED | 0.040 |
| N69368 | RHC752-0.750-D1-C040.3-Z3 | 3/4 | 3/4 | 3/4 | 3 | 3 | TICN | 0.040 |
| N75229 | RHC752-0.750-D3-C040.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | UNCOATED | 0.040 |
| N69367 | RHC752-0.750-D3-C040.3-Z3 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 3 | TICN | 0.040 |
| N75221 | RHC752-0.750-D4-C040.3-Z3 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 3 | UNCOATED | 0.040 |
| N69365 | RHC752-0.750-D4-C040.3-Z3 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 3 | TICN | 0.040 |
| N75225 | RHC752-0.750-D5-C040.3-Z3 | 3/4 | 3/4 | 2 | 4-1/4 | 3 | UNCOATED | 0.040 |
| N69366 | RHC752-0.750-D5-C040.3-Z3 | 3/4 | 3/4 | 2 | 4-1/4 | 3 | TICN | 0.040 |
| N75223 | RHC752-0.750-D6-C040.3-Z3 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 3 | UNCOATED | 0.040 |
| N79478 | RHC752-0.750-D6-C040.3-Z3 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 3 | TICN | 0.040 |
| N75235 | RHC752-0.750-D7-C040.3-Z3 | 3/4 | 3/4 | 3 | 5-1/4 | 3 | UNCOATED | 0.040 |
| N79479 | RHC752-0.750-D7-C040.3-Z3 | 3/4 | 3/4 | 3 | 5-1/4 | 3 | TICN | 0.040 |
| N75253 | RHC752-1.000-P3-C040.3-Z3 | 1 | 3/4 | 1-1/2 | 3-3/4 | 3 | UNCOATED | 0.040 |
| N69373 | RHC752-1.000-P3-C040.3-Z3 | 1 | 3/4 | 1-1/2 | 3-3/4 | 3 | TICN | 0.040 |
| N75245 | RHC752-1.000-D3-C040.3-Z3 | 1 | 1 | 2 | 4-1/2 | 3 | UNCOATED | 0.040 |
| N69371 | RHC752-1.000-D3-C040.3-Z3 | 1 | 1 | 2 | 4-1/2 | 3 | TICN | 0.040 |
| N75249 | RHC752-1.000-D4-C040.3-Z3 | 1 | 1 | 3 | 5-1/2 | 3 | UNCOATED | 0.040 |
| N69372 | RHC752-1.000-D4-C040.3-Z3 | 1 | 1 | 3 | 5-1/2 | 3 | TICN | 0.040 |
| N75351 | RHC752-1.000-D5-C040.3-Z3 | 1 | 1 | 4 | 6-1/2 | 3 | UNCOATED | 0.040 |
| N79493 | RHC752-1.000-D5-C040.3-Z3 | 1 | 1 | 4 | 6-1/2 | 3 | TICN | 0.040 |
| N75261 | RHC752-1.250-D2-C045.3-Z3 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 3 | UNCOATED | 0.045 |
| N69375 | RHC752-1.250-D2-C045.3-Z3 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 3 | TICN | 0.045 |
| N75265 | RHC752-1.250-D3-C045.3-Z3 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 3 | UNCOATED | 0.045 |
| N69376 | RHC752-1.250-D3-C045.3-Z3 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 3 | TICN | 0.045 |
| N75283 | RHC752-1.500-P7-C045.3-Z3 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 3 | UNCOATED | 0.045 |
| N79508 | RHC752-1.500-P7-C045.3-Z3 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 3 | TICN | 0.045 |

RHLC754

M42
8% COBALT



CENTER
CUTTING

COARSE
PITCH

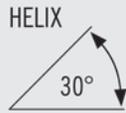


- Weldon flat standard
- Designed for profiling and slotting in aluminum and non-ferrous materials
- Cutting Data - Page 274
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | CHAMFER |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|----------|---------|
| N75421 | RHLC754-1.000-E2-C040.3-Z3 | 1 | 1 | 2-1/2 | 6-1/2 | .850 | 4 | 3 | UNCOATED | 0.040 |
| N89112 | RHLC754-1.000-E2-C040.3-Z3 | 1 | 1 | 2-1/2 | 6-1/2 | .850 | 4 | 3 | TICN | 0.040 |
| N75425 | RHLC754-1.000-E3-C040.3-Z3 | 1 | 1 | 2-1/2 | 8-1/2 | .850 | 6 | 3 | UNCOATED | 0.040 |
| N89113 | RHLC754-1.000-E3-C040.3-Z3 | 1 | 1 | 2-1/2 | 8-1/2 | .850 | 6 | 3 | TICN | 0.040 |
| N75441 | RHLC754-1.250-E3-C045.3-Z3 | 1-1/4 | 1-1/4 | 2-1/2 | 8-1/2 | 1.050 | 6 | 3 | UNCOATED | 0.045 |
| N89115 | RHLC754-1.250-E3-C045.3-Z3 | 1-1/4 | 1-1/4 | 2-1/2 | 8-1/2 | 1.050 | 6 | 3 | TICN | 0.045 |
| N75459 | RHLC754-1.500-P6-C045.3-Z3 | 1-1/2 | 1-1/4 | 2-1/2 | 10-1/2 | 1.050 | 6 | 3 | UNCOATED | 0.045 |
| N89118 | RHLC754-1.500-P6-C045.3-Z3 | 1-1/2 | 1-1/4 | 2-1/2 | 10-1/2 | 1.050 | 6 | 3 | TICN | 0.045 |

REM710

M42
8% COBALT



NON
CENTER
CUTTING

COARSE
PITCH



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N71061 | REM710-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED | 0.020 |
| N69290 | REM710-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TICN | 0.020 |
| N71081 | REM710-0.250-F2-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N71084 | REM710-0.250-F2-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN | 0.020 |
| N71082 | REM710-0.250-F4-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED | 0.020 |
| N69291 | REM710-0.250-F4-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TICN | 0.020 |
| N71101 | REM710-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N71104 | REM710-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N71102 | REM710-0.313-F4-C025.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | UNCOATED | 0.025 |
| N69293 | REM710-0.313-F4-C025.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | TICN | 0.025 |
| N71121 | REM710-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N71124 | REM710-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N71126 | REM710-0.375-D3-C025.3-Z4 | 3/8 | 3/8 | 1-3/8 | 3-1/8 | 4 | UNCOATED | 0.025 |
| N70940 | REM710-0.375-D3-C025.3-Z4 | 3/8 | 3/8 | 1-3/8 | 3-1/8 | 4 | TICN | 0.025 |
| N71122 | REM710-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N69294 | REM710-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TICN | 0.025 |

REM710 - (CONT'D)

M42
8% COBALT



NON
CENTER
CUTTING

COARSE
PITCH



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N71141 | REM710-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | UNCOATED | 0.025 |
| N69295 | REM710-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | TICN | 0.025 |
| N71161 | REM710-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | 0.025 |
| N79420 | REM710-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TICN | 0.025 |
| N71162 | REM710-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N71165 | REM710-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN | 0.025 |
| N72162 | REM710-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | UNCOATED | 0.025 |
| N79421 | REM710-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | TICN | 0.025 |
| N71163 | REM710-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N69296 | REM710-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TICN | 0.025 |
| N72163 | REM710-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | UNCOATED | 0.025 |
| N79422 | REM710-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | TICN | 0.025 |
| N72167 | REM710-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | UNCOATED | 0.025 |
| N79423 | REM710-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | TICN | 0.025 |
| N71182 | REM710-0.563-P2-C025.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | UNCOATED | 0.025 |
| N69297 | REM710-0.563-P2-C025.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | TICN | 0.025 |
| N71206 | REM710-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 3/4 | 2-7/8 | 4 | UNCOATED | 0.030 |
| N79424 | REM710-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 3/4 | 2-7/8 | 4 | TICN | 0.030 |
| N71202 | REM710-0.625-D2-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | UNCOATED | 0.030 |
| N79425 | REM710-0.625-D2-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | TICN | 0.030 |
| N71203 | REM710-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N71208 | REM710-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN | 0.030 |
| N71204 | REM710-0.625-D5-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED | 0.030 |
| N69298 | REM710-0.625-D5-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TICN | 0.030 |
| N72204 | REM710-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N79427 | REM710-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | TICN | 0.030 |
| N71243 | REM710-0.750-P2-C030.3-Z4 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N69301 | REM710-0.750-P2-C030.3-Z4 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN | 0.030 |
| N72243 | REM710-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | UNCOATED | 0.030 |
| N69300 | REM710-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | TICN | 0.030 |
| N71241 | REM710-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | UNCOATED | 0.030 |
| N79429 | REM710-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | TICN | 0.030 |
| N72241 | REM710-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N79430 | REM710-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | TICN | 0.030 |
| N71244 | REM710-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N71245 | REM710-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN | 0.030 |
| N71247 | REM710-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED | 0.030 |
| N79431 | REM710-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN | 0.030 |
| N72245 | REM710-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | UNCOATED | 0.030 |

REM710 (CONT'D)

M42
8% COBALT



NON
CENTER
CUTTING



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N79432 | REM710-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | TICN | 0.030 |
| N72244 | REM710-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N69299 | REM710-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TICN | 0.030 |
| N72248 | REM710-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | UNCOATED | 0.030 |
| N79433 | REM710-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | TICN | 0.030 |
| N72284 | REM710-0.875-P3-C030.3-Z5 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 | UNCOATED | 0.030 |
| N69302 | REM710-0.875-P3-C030.3-Z5 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 | TICN | 0.030 |
| N71283 | REM710-0.875-P4-C030.3-Z5 | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 | UNCOATED | 0.030 |
| N69303 | REM710-0.875-P4-C030.3-Z5 | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 | TICN | 0.030 |
| N71284 | REM710-0.875-D2-C030.3-Z5 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 | UNCOATED | 0.030 |
| N69304 | REM710-0.875-D2-C030.3-Z5 | 7/8 | 7/8 | 1-7/8 | 4-1/8 | 5 | TICN | 0.030 |
| N71285 | REM710-0.875-D4-C030.3-Z5 | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 5 | UNCOATED | 0.030 |
| N69305 | REM710-0.875-D4-C030.3-Z5 | 7/8 | 7/8 | 3-1/2 | 5-3/4 | 5 | TICN | 0.030 |
| N71324 | REM710-1.000-P1-C030.3-Z5 | 1 | 3/4 | 3/4 | 3 | 5 | UNCOATED | 0.030 |
| N69310 | REM710-1.000-P1-C030.3-Z5 | 1 | 3/4 | 3/4 | 3 | 5 | TICN | 0.030 |
| N72324 | REM710-1.000-P3-C030.3-Z5 | 1 | 3/4 | 1-1/2 | 3-3/4 | 5 | UNCOATED | 0.030 |
| N69309 | REM710-1.000-P3-C030.3-Z5 | 1 | 3/4 | 1-1/2 | 3-3/4 | 5 | TICN | 0.030 |
| N71330 | REM710-1.000-P4-C030.3-Z5 | 1 | 3/4 | 2 | 4-1/4 | 5 | UNCOATED | 0.030 |
| N79439 | REM710-1.000-P4-C030.3-Z5 | 1 | 3/4 | 2 | 4-1/4 | 5 | TICN | 0.030 |
| N71326 | REM710-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED | 0.030 |
| N71329 | REM710-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TICN | 0.030 |
| N71327 | REM710-1.000-D4-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | UNCOATED | 0.030 |
| N69306 | REM710-1.000-D4-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | TICN | 0.030 |
| N72326 | REM710-1.000-D5-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | UNCOATED | 0.030 |
| N69307 | REM710-1.000-D5-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | TICN | 0.030 |
| N72327 | REM710-1.000-D6-C030.3-Z5 | 1 | 1 | 6 | 8-1/2 | 5 | UNCOATED | 0.030 |
| N69308 | REM710-1.000-D6-C030.3-Z5 | 1 | 1 | 6 | 8-1/2 | 5 | TICN | 0.030 |
| N71366 | REM710-1.125-P3-C040.3-Z6 | 1-1/8 | 1 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |
| N69311 | REM710-1.125-P3-C040.3-Z6 | 1-1/8 | 1 | 2 | 4-1/2 | 6 | TICN | 0.040 |
| N71367 | REM710-1.125-P4-C040.3-Z6 | 1-1/8 | 1 | 3-1/2 | 6 | 6 | UNCOATED | 0.040 |
| N79446 | REM710-1.125-P4-C040.3-Z6 | 1-1/8 | 1 | 3-1/2 | 6 | 6 | TICN | 0.040 |
| N71404 | REM710-1.250-P1-C040.3-Z6 | 1-1/4 | 3/4 | 3/4 | 3 | 6 | UNCOATED | 0.040 |
| N69317 | REM710-1.250-P1-C040.3-Z6 | 1-1/4 | 3/4 | 3/4 | 3 | 6 | TICN | 0.040 |
| N72404 | REM710-1.250-P3-C040.3-Z6 | 1-1/4 | 3/4 | 1-1/2 | 3-3/4 | 6 | UNCOATED | 0.040 |
| N69316 | REM710-1.250-P3-C040.3-Z6 | 1-1/4 | 3/4 | 1-1/2 | 3-3/4 | 6 | TICN | 0.040 |
| N71406 | REM710-1.250-P4-C040.3-Z6 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 | UNCOATED | 0.040 |
| N79448 | REM710-1.250-P4-C040.3-Z6 | 1-1/4 | 3/4 | 2 | 4-1/4 | 6 | TICN | 0.040 |
| N71407 | REM710-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |

REM710 (CONT'D)

M42
8% COBALT



NON
CENTER
CUTTING



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|----------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N69312 | REM710-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | TICN | 0.040 |
| N71408 | REM710-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | UNCOATED | 0.040 |
| N69313 | REM710-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | TICN | 0.040 |
| N72407 | REM710-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED | 0.040 |
| N69314 | REM710-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | TICN | 0.040 |
| N72408 | REM710-1.250-D5-C040.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | UNCOATED | 0.040 |
| N69315 | REM710-1.250-D5-C040.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | TICN | 0.040 |
| N72484 | REM710-1.500-P3-C040.3-Z6 | 1-1/2 | 3/4 | 1-1/2 | 3-3/4 | 6 | UNCOATED | 0.040 |
| N69324 | REM710-1.500-P3-C040.3-Z6 | 1-1/2 | 3/4 | 1-1/2 | 3-3/4 | 6 | TICN | 0.040 |
| N72485 | REM710-1.500-P4-C040.3-Z6 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 | UNCOATED | 0.040 |
| N79453 | REM710-1.500-P4-C040.3-Z6 | 1-1/2 | 3/4 | 2 | 4-1/4 | 6 | TICN | 0.040 |
| N71487 | REM710-1.500-P5-C040.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |
| N69318 | REM710-1.500-P5-C040.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | TICN | 0.040 |
| N71488 | REM710-1.500-P6-C040.3-Z6 | 1-1/2 | 1-1/4 | 3 | 5-1/2 | 6 | UNCOATED | 0.040 |
| N69319 | REM710-1.500-P6-C040.3-Z6 | 1-1/2 | 1-1/4 | 3 | 5-1/2 | 6 | TICN | 0.040 |
| N72487 | REM710-1.500-P7-C040.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED | 0.040 |
| N69320 | REM710-1.500-P7-C040.3-Z6 | 1-1/2 | 1-1/4 | 4 | 6-1/2 | 6 | TICN | 0.040 |
| N72488 | REM710-1.500-P8-C040.3-Z6 | 1-1/2 | 1-1/4 | 5 | 7-1/2 | 6 | UNCOATED | 0.040 |
| N69321 | REM710-1.500-P8-C040.3-Z6 | 1-1/2 | 1-1/4 | 5 | 7-1/2 | 6 | TICN | 0.040 |
| N71489 | REM710-1.500-P9-C040.3-Z6 | 1-1/2 | 1-1/4 | 6 | 8-1/2 | 6 | UNCOATED | 0.040 |
| N69322 | REM710-1.500-P9-C040.3-Z6 | 1-1/2 | 1-1/4 | 6 | 8-1/2 | 6 | TICN | 0.040 |
| N72489 | REM710-1.500-P10-C040.3-Z6 | 1-1/2 | 1-1/4 | 8 | 10-1/2 | 6 | UNCOATED | 0.040 |
| N69323 | REM710-1.500-P10-C040.3-Z6 | 1-1/2 | 1-1/4 | 8 | 10-1/2 | 6 | TICN | 0.040 |
| N72574 | REM710-1.750-P5-C040.3-Z6 | 1-3/4 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED | 0.040 |
| N69328 | REM710-1.750-P5-C040.3-Z6 | 1-3/4 | 1-1/4 | 4 | 6-1/2 | 6 | TICN | 0.040 |
| N71640 | REM710-2.000-P2-C040.3-Z8 | 2 | 3/4 | 1-1/8 | 3-3/8 | 8 | UNCOATED | 0.040 |
| N79456 | REM710-2.000-P2-C040.3-Z8 | 2 | 3/4 | 1-1/8 | 3-3/8 | 8 | TICN | 0.040 |
| N71645 | REM710-2.000-P4-C040.3-Z8 | 2 | 1-1/4 | 2 | 4-1/2 | 8 | UNCOATED | 0.040 |
| N69331 | REM710-2.000-P4-C040.3-Z8 | 2 | 1-1/4 | 2 | 4-1/2 | 8 | TICN | 0.040 |
| N71648 | REM710-2.000-P5-C040.3-Z8 | 2 | 1-1/4 | 4 | 6-1/2 | 8 | UNCOATED | 0.040 |
| N69332 | REM710-2.000-P5-C040.3-Z8 | 2 | 1-1/4 | 4 | 6-1/2 | 8 | TICN | 0.040 |
| N71343 | REM710-2.000-D3-C040.7-Z8 | 2 | 2 | 4 | 7-3/4 | 8 | UNCOATED | 0.040 |
| N69335 | REM710-2.000-D3-C040.7-Z8 | 2 | 2 | 4 | 7-3/4 | 8 | TICN | 0.040 |
| N71353 | REM710-2.000-D4-C040.7-Z8 | 2 | 2 | 5 | 8-3/4 | 8 | UNCOATED | 0.040 |
| N69336 | REM710-2.000-D4-C040.7-Z8 | 2 | 2 | 5 | 8-3/4 | 8 | TICN | 0.040 |
| N71363 | REM710-2.000-D5-C040.7-Z8 | 2 | 2 | 6 | 9-3/4 | 8 | UNCOATED | 0.040 |
| N69337 | REM710-2.000-D5-C040.7-Z8 | 2 | 2 | 6 | 9-3/4 | 8 | TICN | 0.040 |
| N71383 | REM710-2.000-D7-C040.7-Z8 | 2 | 2 | 8 | 11-3/4 | 8 | UNCOATED | 0.040 |
| N69339 | REM710-2.000-D7-C040.7-Z8 | 2 | 2 | 8 | 11-3/4 | 8 | TICN | 0.040 |

REC700

M42
8% COBALT



CENTER
CUTTING

COARSE
PITCH

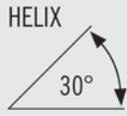


- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N70013 | REC700-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED | 0.020 |
| N88861 | REC700-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TICN | 0.020 |
| N70210 | REC700-0.250-F2-C020.3-Z4 | 1/4 | 3/8 | 3/8 | 2-3/16 | 4 | UNCOATED | 0.020 |
| N70212 | REC700-0.250-F2-C020.3-Z4 | 1/4 | 3/8 | 3/8 | 2-3/16 | 4 | TICN | 0.020 |
| N70015 | REC700-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N88862 | REC700-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN | 0.020 |
| N70017 | REC700-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED | 0.020 |
| N88863 | REC700-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TICN | 0.020 |
| N70019 | REC700-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N88864 | REC700-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N70023 | REC700-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N88866 | REC700-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N70025 | REC700-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N88867 | REC700-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TICN | 0.025 |
| N70027 | REC700-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | UNCOATED | 0.025 |
| N88868 | REC700-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | TICN | 0.025 |
| N70216 | REC700-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-5/8 | 4 | UNCOATED | 0.025 |
| N70218 | REC700-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-5/8 | 4 | TICN | 0.025 |
| N70129 | REC700-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | 0.025 |
| N88869 | REC700-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TICN | 0.025 |
| N70031 | REC700-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N88870 | REC700-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN | 0.025 |
| N70033 | REC700-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | UNCOATED | 0.025 |
| N79526 | REC700-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | TICN | 0.025 |
| N70035 | REC700-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N88871 | REC700-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TICN | 0.025 |
| N70137 | REC700-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | UNCOATED | 0.025 |
| N79527 | REC700-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | TICN | 0.025 |
| N70139 | REC700-0.500-D7-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | UNCOATED | 0.025 |
| N79528 | REC700-0.500-D7-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | TICN | 0.025 |
| N70037 | REC700-0.563-P2-C025.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | UNCOATED | 0.025 |
| N88872 | REC700-0.563-P2-C025.3-Z4 | 9/16 | 1/2 | 1-3/8 | 3-3/8 | 4 | TICN | 0.025 |
| N70029 | REC700-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | UNCOATED | 0.030 |
| N79530 | REC700-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | TICN | 0.030 |
| N70039 | REC700-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N88873 | REC700-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN | 0.030 |
| N70043 | REC700-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED | 0.030 |
| N88874 | REC700-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TICN | 0.030 |
| N70045 | REC700-0.625-D7-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N79532 | REC700-0.625-D7-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | TICN | 0.030 |

REC700 (CONT'D)

M42
8% COBALT



CENTER
CUTTING

COARSE
PITCH



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N70049 | REC700-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | UNCOATED | 0.030 |
| N88876 | REC700-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | TICN | 0.030 |
| N70151 | REC700-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | UNCOATED | 0.030 |
| N79534 | REC700-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | TICN | 0.030 |
| N70153 | REC700-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N79535 | REC700-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | TICN | 0.030 |
| N70047 | REC700-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N88875 | REC700-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN | 0.030 |
| N70149 | REC700-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED | 0.030 |
| N79536 | REC700-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN | 0.030 |
| N70155 | REC700-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | UNCOATED | 0.030 |
| N79537 | REC700-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | TICN | 0.030 |
| N70051 | REC700-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N88877 | REC700-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TICN | 0.030 |
| N70157 | REC700-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | UNCOATED | 0.030 |
| N79538 | REC700-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | TICN | 0.030 |
| N70055 | REC700-0.875-P3-C030.3-Z5 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 | UNCOATED | 0.030 |
| N88879 | REC700-0.875-P3-C030.3-Z5 | 7/8 | 3/4 | 1-7/8 | 4-1/8 | 5 | TICN | 0.030 |
| N70059 | REC700-0.875-P4-C030.3-Z5 | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 | UNCOATED | 0.030 |
| N88880 | REC700-0.875-P4-C030.3-Z5 | 7/8 | 3/4 | 3-1/2 | 5-3/4 | 5 | TICN | 0.030 |

RMB700

M42
8% COBALT



CENTER
CUTTING

COARSE
PITCH



- Weldon flat standard
- Designed for profiling, slotting and contouring in all materials
- Cutting Data - Page 277-278
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N70162 | RMB700-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N88897 | RMB700-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN |
| N70203 | RMB700-0.625-D3-B.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED |
| N88898 | RMB700-0.625-D3-B.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN |
| N70244 | RMB700-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED |
| N88899 | RMB700-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN |
| N70326 | RMB700-1.000-D2-B.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED |
| N88900 | RMB700-1.000-D2-B.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TICN |

DISCOUNT CODE D41

RXC753

| | | | | | | |
|------------------|--------------|----------------|----------------|--------------|--|---|
| M42 8% COBALT | HELIX 30° | CHAMFER 45° | CENTER CUTTING | COARSE PITCH |  |  |
|------------------|--------------|----------------|----------------|--------------|--|---|

- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 279
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | NECK DIA | REACH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|----------|-------|--------|----------|---------|
| N75341 | RXC753-1.000-E2-C030.3-Z5 | 1 | 1 | 2-1/2 | 6-1/2 | .850 | 4 | 5 | UNCOATED | 0.030 |
| N89100 | RXC753-1.000-E2-C030.3-Z5 | 1 | 1 | 2-1/2 | 6-1/2 | .850 | 4 | 5 | TICN | 0.030 |
| N75345 | RXC753-1.000-E3-C030.3-Z5 | 1 | 1 | 2-1/2 | 8-1/2 | .850 | 6 | 5 | UNCOATED | 0.030 |
| N89101 | RXC753-1.000-E3-C030.3-Z5 | 1 | 1 | 2-1/2 | 8-1/2 | .850 | 6 | 5 | TICN | 0.030 |
| N75353 | RXC753-1.250-E3-C040.3-Z6 | 1-1/4 | 1-1/4 | 2-1/2 | 8-1/2 | 1.050 | 6 | 6 | UNCOATED | 0.040 |
| N89103 | RXC753-1.250-E3-C040.3-Z6 | 1-1/4 | 1-1/4 | 2-1/2 | 8-1/2 | 1.050 | 6 | 6 | TICN | 0.040 |
| N75365 | RXC753-1.500-P4-C040.3-Z6 | 1-1/2 | 1-1/4 | 2-1/2 | 10-1/2 | 1.050 | 8 | 6 | UNCOATED | 0.040 |
| N89106 | RXC753-1.500-P4-C040.3-Z6 | 1-1/2 | 1-1/4 | 2-1/2 | 10-1/2 | 1.050 | 8 | 6 | TICN | 0.040 |

EXCEL SERIES-EXR350

| | | | | | | |
|---------------------------------------|--------------|----------------|----------------|------------|--|---|
| PREMIUM PARTICLE METAL 8.5% COBALT | HELIX 35° | CHAMFER 45° | CENTER CUTTING | FINE PITCH |  |  |
|---------------------------------------|--------------|----------------|----------------|------------|--|---|

- Weldon flat standard
- Designed for pocketing, profiling and slotting applications
- Cutting Data - Page 280-281
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N53809 | EXR350-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N53911 | EXR350-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TIALN | 0.025 |
| N53810 | EXR350-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N53912 | EXR350-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TIALN | 0.025 |
| N53811 | EXR350-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N53913 | EXR350-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 1/2 | 2-1/2 | 4 | TIALN | 0.025 |
| N53812 | EXR350-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N53914 | EXR350-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TIALN | 0.025 |
| N53813 | EXR350-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N53915 | EXR350-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TIALN | 0.025 |
| N53815 | EXR350-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N53917 | EXR350-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TIALN | 0.030 |
| N53818 | EXR350-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N53920 | EXR350-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-1/2 | 4 | TIALN | 0.030 |
| N53819 | EXR350-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N53921 | EXR350-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TIALN | 0.030 |
| N53820 | EXR350-1.000-D1-C030.3-Z5 | 1 | 1 | 1 | 3-1/2 | 5 | UNCOATED | 0.030 |

EXCEL SERIES-EXR350 (CONT'D)

| | | | | | | |
|--|---------------------|-----------------------|-----------------------|-----------------------|--|--|
| PREMIUM PARTICLE METAL 8.5% COBALT | HELIX 35° | CHAMFER 45° | CENTER CUTTING | FINE PITCH | | |
|--|---------------------|-----------------------|-----------------------|-----------------------|--|--|

- Weldon flat standard
- Designed for pocketing, profiling and slotting applications
- Cutting Data - Page 280-281
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N53922 | EXR350-1.000-D1-C030.3-Z5 | 1 | 1 | 1 | 3-1/2 | 5 | TIALN | 0.030 |
| N53821 | EXR350-1.000-D2-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED | 0.030 |
| N53923 | EXR350-1.000-D2-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TIALN | 0.030 |
| N53822 | EXR350-1.000-D3-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | UNCOATED | 0.030 |
| N53924 | EXR350-1.000-D3-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | TIALN | 0.030 |
| N53823 | EXR350-1.000-D4-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | UNCOATED | 0.030 |
| N53925 | EXR350-1.000-D4-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | TIALN | 0.030 |
| N53826 | EXR350-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |
| N53928 | EXR350-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | TIALN | 0.040 |
| N53828 | EXR350-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED | 0.040 |
| N53930 | EXR350-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | TIALN | 0.040 |

REM445

| | | | | | | |
|-------------------------|---------------------|-----------------------|---------------------------|-----------------------|--|--|
| M42 8% COBALT | HELIX 30° | CHAMFER 45° | NON CENTER CUTTING | FINE PITCH | | |
|-------------------------|---------------------|-----------------------|---------------------------|-----------------------|--|--|

- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 282-283
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N44501 | REM445-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED | 0.020 |
| N75655 | REM445-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TIALN | 0.020 |
| N44503 | REM445-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N75656 | REM445-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TIALN | 0.020 |
| N44505 | REM445-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED | 0.020 |
| N75657 | REM445-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TIALN | 0.020 |
| N44507 | REM445-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N75658 | REM445-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TIALN | 0.025 |
| N44509 | REM445-0.313-F4-C025.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | UNCOATED | 0.025 |
| N75659 | REM445-0.313-F4-C025.3-Z4 | 5/16 | 3/8 | 1-3/8 | 3-1/8 | 4 | TIALN | 0.025 |
| N44511 | REM445-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N75660 | REM445-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TIALN | 0.025 |
| N44513 | REM445-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED | 0.025 |

REM445 (CONT'D)

M42
8% COBALT



NON
CENTER
CUTTING

FINE PITCH




- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 282-283
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N75661 | REM445-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TIALN | 0.025 |
| N44515 | REM445-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | UNCOATED | 0.025 |
| N75662 | REM445-0.438-P2-C025.3-Z4 | 7/16 | 3/8 | 1 | 2-11/16 | 4 | TIALN | 0.025 |
| N45415 | REM445-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | UNCOATED | 0.025 |
| N75663 | REM445-0.500-D2-C025.3-Z4 | 1/2 | 1/2 | 1 | 3 | 4 | TIALN | 0.025 |
| N44517 | REM445-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N75664 | REM445-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TIALN | 0.025 |
| N45417 | REM445-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | UNCOATED | 0.025 |
| N75665 | REM445-0.500-D5-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | TIALN | 0.025 |
| N44519 | REM445-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N75666 | REM445-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TIALN | 0.025 |
| N45419 | REM445-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | UNCOATED | 0.025 |
| N75667 | REM445-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 2-1/2 | 4-1/2 | 4 | TIALN | 0.025 |
| N45421 | REM445-0.500-D7-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | UNCOATED | 0.025 |
| N75668 | REM445-0.500-D7-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | TIALN | 0.025 |
| N45423 | REM445-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 3/4 | 2-7/8 | 4 | UNCOATED | 0.030 |
| N75670 | REM445-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 3/4 | 2-7/8 | 4 | TIALN | 0.030 |
| N45425 | REM445-0.625-D2-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | UNCOATED | 0.030 |
| N75671 | REM445-0.625-D2-C030.3-Z4 | 5/8 | 5/8 | 1-1/4 | 3-3/8 | 4 | TIALN | 0.030 |
| N44523 | REM445-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N75672 | REM445-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TIALN | 0.030 |
| N45427 | REM445-0.625-D5-C030.3-Z4 | 5/8 | 5/8 | 2-1/8 | 4-1/4 | 4 | UNCOATED | 0.030 |
| N75673 | REM445-0.625-D5-C030.3-Z4 | 5/8 | 5/8 | 2-1/8 | 4-1/4 | 4 | TIALN | 0.030 |
| N44525 | REM445-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED | 0.030 |
| N75674 | REM445-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TIALN | 0.030 |
| N45429 | REM445-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N75675 | REM445-0.625-D6-C030.3-Z4 | 5/8 | 5/8 | 3-1/8 | 5-1/4 | 4 | TIALN | 0.030 |
| N44531 | REM445-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | UNCOATED | 0.030 |
| N75678 | REM445-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | TIALN | 0.030 |
| N45433 | REM445-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | UNCOATED | 0.030 |
| N75679 | REM445-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-1/4 | 3-1/2 | 4 | TIALN | 0.030 |
| N45435 | REM445-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N75680 | REM445-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 1-1/2 | 3-3/4 | 4 | TIALN | 0.030 |
| N44527 | REM445-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N75681 | REM445-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TIALN | 0.030 |
| N45437 | REM445-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED | 0.030 |

REM445 (CONT'D)



- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 282-283
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N75682 | REM445-0.750-D5-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TIALN | 0.030 |
| N45439 | REM445-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | UNCOATED | 0.030 |
| N75683 | REM445-0.750-D6-C030.3-Z4 | 3/4 | 3/4 | 2-1/2 | 4-3/4 | 4 | TIALN | 0.030 |
| N44529 | REM445-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N75684 | REM445-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TIALN | 0.030 |
| N45441 | REM445-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | UNCOATED | 0.030 |
| N75685 | REM445-0.750-D8-C030.3-Z4 | 3/4 | 3/4 | 4-1/8 | 6-3/8 | 4 | TIALN | 0.030 |
| N44551 | REM445-1.000-P3-C030.3-Z5 | 1 | 3/4 | 1-1/2 | 3-3/4 | 5 | UNCOATED | 0.030 |
| N75696 | REM445-1.000-P3-C030.3-Z5 | 1 | 3/4 | 1-1/2 | 3-3/4 | 5 | TIALN | 0.030 |
| N45453 | REM445-1.000-P4-C030.3-Z5 | 1 | 3/4 | 2 | 4-1/4 | 5 | UNCOATED | 0.030 |
| N75697 | REM445-1.000-P4-C030.3-Z5 | 1 | 3/4 | 2 | 4-1/4 | 5 | TIALN | 0.030 |
| N45459 | REM445-1.000-D1-C030.3-Z5 | 1 | 1 | 1-1/8 | 3-5/8 | 5 | UNCOATED | 0.030 |
| N75700 | REM445-1.000-D1-C030.3-Z5 | 1 | 1 | 1-1/8 | 3-5/8 | 5 | TIALN | 0.030 |
| N44543 | REM445-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED | 0.030 |
| N75702 | REM445-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TIALN | 0.030 |
| N44545 | REM445-1.000-D4-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | UNCOATED | 0.030 |
| N75703 | REM445-1.000-D4-C030.3-Z5 | 1 | 1 | 3 | 5-1/2 | 5 | TIALN | 0.030 |
| N44547 | REM445-1.000-D5-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | UNCOATED | 0.030 |
| N75704 | REM445-1.000-D5-C030.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | TIALN | 0.030 |
| N44549 | REM445-1.000-D6-C030.3-Z5 | 1 | 1 | 6 | 8-1/2 | 5 | UNCOATED | 0.030 |
| N75705 | REM445-1.000-D6-C030.3-Z5 | 1 | 1 | 6 | 8-1/2 | 5 | TIALN | 0.030 |
| N44557 | REM445-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |
| N75715 | REM445-1.250-D2-C040.3-Z6 | 1-1/4 | 1-1/4 | 2 | 4-1/2 | 6 | TIALN | 0.040 |
| N44559 | REM445-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | UNCOATED | 0.040 |
| N75716 | REM445-1.250-D3-C040.3-Z6 | 1-1/4 | 1-1/4 | 3 | 5-1/2 | 6 | TIALN | 0.040 |
| N44561 | REM445-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | UNCOATED | 0.040 |
| N75717 | REM445-1.250-D4-C040.3-Z6 | 1-1/4 | 1-1/4 | 4 | 6-1/2 | 6 | TIALN | 0.040 |
| N44563 | REM445-1.250-D5-C040.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | UNCOATED | 0.040 |
| N75718 | REM445-1.250-D5-C040.3-Z6 | 1-1/4 | 1-1/4 | 6 | 8-1/2 | 6 | TIALN | 0.040 |
| N44569 | REM445-1.500-P5-C040.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | UNCOATED | 0.040 |
| N75725 | REM445-1.500-P5-C040.3-Z6 | 1-1/2 | 1-1/4 | 2 | 4-1/2 | 6 | TIALN | 0.040 |
| N44599 | REM445-2.000-D3-C040.7-Z8 | 2 | 2 | 4 | 7-3/4 | 8 | UNCOATED | 0.040 |
| N75745 | REM445-2.000-D3-C040.7-Z8 | 2 | 2 | 4 | 7-3/4 | 8 | TIALN | 0.040 |
| N44603 | REM445-2.000-D5-C040.7-Z8 | 2 | 2 | 6 | 9-3/4 | 8 | UNCOATED | 0.040 |
| N75747 | REM445-2.000-D5-C040.7-Z8 | 2 | 2 | 6 | 9-3/4 | 8 | TIALN | 0.040 |

REC448



- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 282-283
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N44839 | REC448-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED | 0.020 |
| N14554 | REC448-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TIALN | 0.020 |
| N44841 | REC448-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N14555 | REC448-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TIALN | 0.020 |
| N44843 | REC448-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED | 0.020 |
| N14556 | REC448-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TIALN | 0.020 |
| N44845 | REC448-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N14558 | REC448-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TIALN | 0.025 |
| N44873 | REC448-0.375-D1-C025.3-Z4 | 3/8 | 3/8 | 1/2 | 2-1/4 | 4 | UNCOATED | 0.025 |
| N14560 | REC448-0.375-D1-C025.3-Z4 | 3/8 | 3/8 | 1/2 | 2-1/4 | 4 | TIALN | 0.025 |
| N44849 | REC448-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N14561 | REC448-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TIALN | 0.025 |
| N44876 | REC448-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-5/8 | 4 | UNCOATED | 0.025 |
| N14564 | REC448-0.500-D1-C025.3-Z4 | 1/2 | 1/2 | 5/8 | 2-5/8 | 4 | TIALN | 0.025 |
| N44801 | REC448-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N14565 | REC448-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TIALN | 0.025 |
| N44803 | REC448-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N14566 | REC448-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TIALN | 0.025 |
| N44879 | REC448-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 5/8 | 2-3/4 | 4 | UNCOATED | 0.030 |
| N14568 | REC448-0.625-D1-C030.3-Z4 | 5/8 | 5/8 | 5/8 | 2-3/4 | 4 | TIALN | 0.030 |
| N44805 | REC448-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N14570 | REC448-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TIALN | 0.030 |
| N44807 | REC448-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED | 0.030 |
| N14571 | REC448-0.625-D4-C030.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TIALN | 0.030 |
| N44859 | REC448-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | UNCOATED | 0.030 |
| N14573 | REC448-0.750-D1-C030.3-Z4 | 3/4 | 3/4 | 3/4 | 3 | 4 | TIALN | 0.030 |
| N44809 | REC448-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N14574 | REC448-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TIALN | 0.030 |
| N44811 | REC448-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N14575 | REC448-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TIALN | 0.030 |

RMB449

M42
8% COBALT



CENTER
CUTTING

FINE PITCH

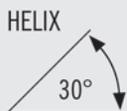



- Weldon flat standard
- Designed for profiling, slotting and contouring in all materials including high temperature alloys
- Cutting Data - Page 282-283
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N44901 | RMB449-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N75764 | RMB449-0.500-D3-B.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TIALN |
| N45903 | RMB449-0.625-D4-B.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | UNCOATED |
| N75767 | RMB449-0.625-D4-B.3-Z4 | 5/8 | 5/8 | 2-1/2 | 4-5/8 | 4 | TIALN |
| N44905 | RMB449-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED |
| N75768 | RMB449-0.750-D2-B.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TIALN |
| N45907 | RMB449-1.000-D4-B.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | UNCOATED |
| N75771 | RMB449-1.000-D4-B.3-Z5 | 1 | 1 | 4 | 6-1/2 | 5 | TIALN |

RFM440

M42
8% COBALT



NON
CENTER
CUTTING

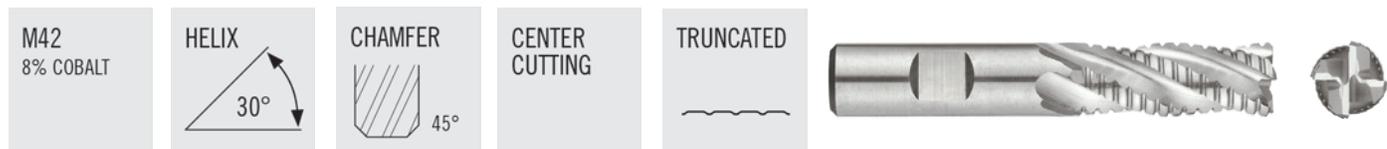
TRUNCATED



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 284-286
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N44063 | RFM440-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | UNCOATED | 0.020 |
| N43700 | RFM440-0.188-F3-C020.3-Z4 | 3/16 | 3/8 | 1/2 | 2-3/8 | 4 | TICN | 0.020 |
| N44083 | RFM440-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N43701 | RFM440-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN | 0.020 |
| N44085 | RFM440-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | UNCOATED | 0.020 |
| N43702 | RFM440-0.250-F5-C020.3-Z4 | 1/4 | 3/8 | 1-1/4 | 3-1/16 | 4 | TICN | 0.020 |
| N44103 | RFM440-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N43703 | RFM440-0.313-F2-C025.3-Z4 | 5/16 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N44123 | RFM440-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | UNCOATED | 0.025 |
| N43705 | RFM440-0.375-D2-C025.3-Z4 | 3/8 | 3/8 | 3/4 | 2-1/2 | 4 | TICN | 0.025 |
| N44125 | RFM440-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N43706 | RFM440-0.375-D4-C025.3-Z4 | 3/8 | 3/8 | 1-1/2 | 3-1/4 | 4 | TICN | 0.025 |
| N43163 | RFM440-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED | 0.025 |
| N43709 | RFM440-0.500-D3-C025.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN | 0.025 |
| N44163 | RFM440-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | UNCOATED | 0.025 |
| N43710 | RFM440-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 1-5/8 | 3-5/8 | 4 | TICN | 0.025 |
| N44204 | RFM440-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N43717 | RFM440-0.625-D3-C030.3-Z4 | 5/8 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN | 0.030 |
| N43241 | RFM440-0.750-P2-C030.3-Z4 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 | UNCOATED | 0.030 |
| N43722 | RFM440-0.750-P2-C030.3-Z4 | 3/4 | 5/8 | 1-5/8 | 3-3/4 | 4 | TICN | 0.030 |
| N44245 | RFM440-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N43726 | RFM440-0.750-D4-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN | 0.030 |
| N44248 | RFM440-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | UNCOATED | 0.030 |
| N43729 | RFM440-0.750-D7-C030.3-Z4 | 3/4 | 3/4 | 3 | 5-1/4 | 4 | TICN | 0.030 |
| N43322 | RFM440-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED | 0.030 |
| N43747 | RFM440-1.000-D3-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TICN | 0.030 |
| N44653 | RFM440-2.000-D7-C040.7-Z8 | 2 | 2 | 8 | 11-3/4 | 8 | UNCOATED | 0.040 |
| N43791 | RFM440-2.000-D7-C040.7-Z8 | 2 | 2 | 8 | 11-3/4 | 8 | TICN | 0.040 |

RFM441



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 284-286
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING | CHAMFER |
|------------------------|---------------------------|-----------|-----------|---------------|----------------|--------|----------|---------|
| N41667 | RFM441-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | UNCOATED | 0.020 |
| N41669 | RFM441-0.250-F3-C020.3-Z4 | 1/4 | 3/8 | 5/8 | 2-7/16 | 4 | TICN | 0.020 |
| N41679 | RFM441-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | UNCOATED | 0.025 |
| N41681 | RFM441-0.500-D4-C025.3-Z4 | 1/2 | 1/2 | 2 | 4 | 4 | TICN | 0.025 |
| N41682 | RFM441-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | UNCOATED | 0.025 |
| N41684 | RFM441-0.500-D6-C025.3-Z4 | 1/2 | 1/2 | 3 | 5 | 4 | TICN | 0.025 |
| N41697 | RFM441-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | UNCOATED | 0.030 |
| N41699 | RFM441-0.750-D2-C030.3-Z4 | 3/4 | 3/4 | 1-5/8 | 3-7/8 | 4 | TICN | 0.030 |
| N41703 | RFM441-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED | 0.030 |
| N41705 | RFM441-0.750-D3-C030.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN | 0.030 |
| N41724 | RFM441-1.000-D2-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | UNCOATED | 0.030 |
| N41726 | RFM441-1.000-D2-C030.3-Z5 | 1 | 1 | 2 | 4-1/2 | 5 | TICN | 0.030 |
| N41766 | RFM441-2.000-P1-C040.3-Z8 | 2 | 1-1/4 | 2 | 4-1/2 | 8 | UNCOATED | 0.040 |
| N41768 | RFM441-2.000-P1-C040.3-Z8 | 2 | 1-1/4 | 2 | 4-1/2 | 8 | TICN | 0.040 |

RFCB444



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 287-289
- Tolerance Specs - Page 336

| ORDER NO. | DESCRIPTION | FLUTE DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | FLUTES | COATING |
|------------------------|-------------------------|-----------|-----------|---------------|----------------|--------|----------|
| N44918 | RFCB444-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | UNCOATED |
| N44920 | RFCB444-0.500-D3-S.3-Z4 | 1/2 | 1/2 | 1-1/4 | 3-1/4 | 4 | TICN |
| N44939 | RFCB444-0.625-D6-S.3-Z4 | 5/8 | 5/8 | 4 | 6-1/8 | 4 | UNCOATED |
| N44941 | RFCB444-0.625-D6-S.3-Z4 | 5/8 | 5/8 | 4 | 6-1/8 | 4 | TICN |
| N44948 | RFCB444-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | UNCOATED |
| N44950 | RFCB444-0.750-D3-S.3-Z4 | 3/4 | 3/4 | 2 | 4-1/4 | 4 | TICN |
| N44969 | RFCB444-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | UNCOATED |
| N44971 | RFCB444-1.000-D2-S.3-Z4 | 1 | 1 | 2 | 4-1/2 | 4 | TICN |
| N44972 | RFCB444-1.000-D2-S.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | UNCOATED |
| N44974 | RFCB444-1.000-D2-S.3-Z6 | 1 | 1 | 2 | 4-1/2 | 6 | TICN |

SP205 - START VALUES

| | | SLOTTING | | | | | | | | | | | | | | |
|-----------|---------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | |
| P | E 1 - 2 | 1.00 | 1.00 | 110 | n (rev/min) | 1681 | 1121 | 840 | 672 | 560 | 420 | 336 | 280 | 240 | 210 | |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 | |
| | E 3 - 4 | 1.00 | 1.00 | 50 | v _f (in/min) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| | | | | | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 | |
| | E 5 - 6 | 1.00 | 1.00 | 35 | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | |
| | | | | | v _f (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| E 8 - 9 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 | | |
| | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | | |
| E 10 - 11 | 1.00 | 1.00 | 40 | v _f (in/min) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | | |
| | | | | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 | | |
| E 12 - 13 | 1.00 | 1.00 | 50 | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 | | |
| | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | | |
| E 14 - 15 | 1.00 | 1.00 | 40 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 | | |
| | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 | | |
| E 18 | 1.00 | 1.00 | 240 | v _f (in/min) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | | |
| | | | | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 | | |
| E 20 | 1.00 | 1.00 | 8 | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | | |
| | | | | v _f (in/min) | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | |
| E 21 | 1.00 | 1.00 | 8 | n (rev/min) | 3667 | 2445 | 1834 | 1467 | 1222 | 917 | 733 | 611 | 524 | 458 | | |
| | | | | f _z (in) | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0088 | 0.0100 | | |
| E 22 | 1.00 | 1.00 | 40 | v _f (in/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | | |
| | | | | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 | | |
| E 20 | 1.00 | 1.00 | 8 | f _z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | | |
| | | | | v _f (in/min) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | |
| E 21 | 1.00 | 1.00 | 8 | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 | | |
| | | | | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 | | |
| E 22 | 1.00 | 1.00 | 40 | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | | |
| | | | | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 | | |
| E 20 | 1.00 | 1.00 | 8 | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | | |
| | | | | v _f (in/min) | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter

v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

SP205 - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 2 | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (rev/min) | 2445 | 1630 | 1222 | 978 | 815 | 611 | 489 | 407 | 349 | 306 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | 120 - 200 | v _f (in/min) | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 |
| | E 3 - 4 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | 60 - 100 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| E 5 - 6 | 1.50 | 0.25 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 | |
| | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | | | 30 - 70 | v _f (in/min) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| M | E 8 - 9 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | 60 - 100 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 10 - 11 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | 0.0075 |
| | | | | 40 - 80 | v _f (in/min) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| K | E 12 - 13 | 1.50 | 0.25 | 95 | n (rev/min) | 1452 | 968 | 726 | 581 | 484 | 363 | 290 | 242 | 207 | 181 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | 75 - 115 | v _f (in/min) | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| | E 14 - 15 | 1.50 | 0.25 | 65 | n (rev/min) | 993 | 662 | 497 | 397 | 331 | 248 | 199 | 166 | 142 | 124 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | 45 - 85 | v _f (in/min) | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| N | E 18 | 1.50 | 0.25 | 350 | n (rev/min) | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 | 1070 | 891 | 764 | 669 |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 | 0.0125 |
| S | E 20 | 1.50 | 0.25 | 10 | n (rev/min) | 153 | 102 | 76 | 61 | 51 | 38 | 31 | 25 | 22 | 19 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | | | | 8 - 12 | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | E 21 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | 0.0063 |
| | | | | 10 - 14 | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| E 22 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 | |
| | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | | | 40 - 80 | v _f (in/min) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |

SMG = Seco Material Group
n [min-1] = RPM
v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
a_p/D_c = % of diameter

v_f [in/min] = Feed rate
a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
All cutting data are start values. All cutting data is in inch values.
Please reference the Workpiece Material Classification chart located on page 15.

EX350 - START VALUES

| SLOTTING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|---------------------|-------------------------|-------------------------|--------|--------|--------|--------------------|--------------------|-------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 2 | | | | Z _n = 5 | Z _n = 6 | |
| | | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 |
| M | E 8 - 9 | 1.00 | 1.00 | 80 | n (rev/min) | 815 | 611 | 489 | 407 | 306 | 244 | 204 | |
| | | | | | f _z (in) | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | |
| | | | | 70 | - | 90 | v _f (in/min) | 3.7 | 3.7 | 3.7 | 3.7 | 4.6 | 5.5 |
| | E 10 - 11 | 1.00 | 1.00 | 60 | n (rev/min) | 611 | 458 | 367 | 306 | 229 | 183 | 153 | |
| | | | | | f _z (in) | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | |
| | | | | 50 | - | 70 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 3.4 | 4.1 |
| S | E 20 | 1.00 | 1.00 | 8 | n (rev/min) | 81 | 61 | 49 | 41 | 31 | 24 | 20 | |
| | | | | | f _z (in) | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | |
| | | | | 6 | - | 10 | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |
| | E 21 | 1.00 | 1.00 | 8 | n (rev/min) | 81 | 61 | 49 | 41 | 31 | 24 | 20 | |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | |
| | | | | 6 | - | 10 | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 |
| E 22 | 1.00 | 1.00 | 40 | n (rev/min) | 407 | 306 | 244 | 204 | 153 | 122 | 102 | | |
| | | | | f _z (in) | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | | |
| | | | 30 | - | 50 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.7 | 3.2 | 3.2 |

EX350 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|---------------------|-------------------------|-------------------------|-----|--|--|--|--|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 8 | | | | | |
| | | | | | | | 2 | 2 | | | | |
| M | E 8 - 9 | 0.50 | 1.00 | 80 | n (rev/min) | 153 | | | | | | |
| | | | | | f _z (in) | 0.0060 | | | | | | |
| | | | | 70 | - | 90 | v _f (in/min) | 7.3 | | | | |
| | E 10 - 11 | 0.50 | 1.00 | 60 | n (rev/min) | 115 | | | | | | |
| | | | | | f _z (in) | 0.0060 | | | | | | |
| | | | | 50 | - | 70 | v _f (in/min) | 5.5 | | | | |
| S | E 20 | 0.50 | 1.00 | 8 | n (rev/min) | 15 | | | | | | |
| | | | | | f _z (in) | 0.0030 | | | | | | |
| | | | | 6 | - | 10 | v _f (in/min) | 0.4 | | | | |
| | E 21 | 0.50 | 1.00 | 8 | n (rev/min) | 15 | | | | | | |
| | | | | | f _z (in) | 0.0050 | | | | | | |
| | | | | 6 | - | 10 | v _f (in/min) | 0.6 | | | | |
| E 22 | 0.50 | 1.00 | 40 | n (rev/min) | 76 | | | | | | | |
| | | | | f _z (in) | 0.0070 | | | | | | | |
| | | | 30 | - | 50 | v _f (in/min) | 4.3 | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

EX350 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | | Z _n = 4 | | | | Z _n = 5 | Z _n = 6 | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|----|----|-------------------------|-------------------------|--------|--------|--------------------|--------------------|--------|--------|--------|
| | | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | | |
| M | E 8 - 9 | 1.50 | 0.25 | 96 | 86 | - | 106 | n (rev/min) | 978 | 733 | 587 | 489 | 367 | 293 | 244 |
| | | | | | | | | f _z (in) | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 |
| | | | | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 6.9 | 8.3 | 8.3 |
| | E 10 - 11 | 1.50 | 0.25 | 72 | 62 | - | 82 | n (rev/min) | 733 | 550 | 440 | 367 | 275 | 220 | 183 |
| | | | | | | | | f _z (in) | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 |
| | | | | | | | | v _f (in/min) | 4.1 | 4.1 | 4.1 | 4.1 | 5.2 | 6.2 | 6.2 |
| S | E 20 | 1.50 | 0.25 | 10 | 8 | - | 12 | n (rev/min) | 98 | 73 | 59 | 49 | 37 | 29 | 24 |
| | | | | | | | | f _z (in) | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0023 | 0.0028 |
| | | | | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |
| | E 21 | 1.50 | 0.25 | 10 | 8 | - | 12 | n (rev/min) | 98 | 73 | 59 | 49 | 37 | 29 | 24 |
| | | | | | | | | f _z (in) | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 |
| | | | | | | | | v _f (in/min) | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 |
| E 22 | 1.50 | 0.25 | 48 | 38 | - | 58 | n (rev/min) | 489 | 367 | 293 | 244 | 183 | 147 | 122 | |
| | | | | | | | f _z (in) | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | |
| | | | | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 4.0 | 4.8 | 4.8 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS



SPC408 / SPB540 - START VALUES

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | SLOTTING | | | | | | | | | | |
|---------------------|-------------------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | Z _n = 4 | | | | | | | | | | |
| | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | |
| P | E 1 - 2 | 1.00 | 1.00 | 110 | n (rev/min) | 1681 | 1121 | 840 | 672 | 560 | 420 | 336 | 280 | 240 | 210 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 |
| | | | | 80 - 140 | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| | E 3 - 4 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | 40 - 60 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| E 5 - 6 | 1.00 | 1.00 | 35 | n (rev/min) | 535 | 357 | 267 | 214 | 178 | 134 | 107 | 89 | 76 | 67 | |
| | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | |
| | | | 25 - 45 | v _f (in/min) | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| M | E 8 - 9 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | 40 - 60 | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | | |
| | E 10 - 11 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 |
| f _z (in) | | | | | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 | |
| 30 - 50 | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| K | E 12 - 13 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 |
| | 40 - 60 | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | | |
| | E 14 - 15 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 |
| f _z (in) | | | | | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | |
| 30 - 50 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | | |
| N | E 18 | 1.00 | 1.00 | 240 | n (rev/min) | 3667 | 2445 | 1834 | 1467 | 1222 | 917 | 733 | 611 | 524 | 458 |
| | | | | | f _z (in) | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0088 | 0.0100 |
| 200 - 280 | v _f (in/min) | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | |
| S | E 20 | 1.00 | 1.00 | 8 | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 |
| | | | | | f _z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0026 | 0.0030 |
| | | | | 6 - 10 | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | E 21 | 1.00 | 1.00 | 8 | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | 6 - 10 | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | |
| E 22 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 | |
| | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 | |
| 20 - 60 | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

SPC408 / SPB540 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (rev/min) | 2445 | 1630 | 1222 | 978 | 815 | 611 | 489 | 407 | 349 | 306 | |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 | |
| | E 3 - 4 | 1.50 | 0.25 | 80 | v _f (in/min) | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| | | | | | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 | |
| | E 5 - 6 | 1.50 | 0.25 | 50 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | | | | | v _f (in/min) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 |
| M | E 8 - 9 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 | |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | E 10 - 11 | 1.50 | 0.25 | 60 | v _f (in/min) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | |
| | | | | | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 | |
| | E 12 - 13 | 1.50 | 0.25 | 95 | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | 0.0075 | |
| | | | | | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| E 14 - 15 | 1.50 | 0.25 | 65 | n (rev/min) | 1452 | 968 | 726 | 581 | 484 | 363 | 290 | 242 | 207 | 181 | | |
| | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 | | |
| E 16 - 17 | 1.50 | 0.25 | 75 - 115 | v _f (in/min) | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | | |
| | | | | n (rev/min) | 993 | 662 | 497 | 397 | 331 | 248 | 199 | 166 | 142 | 124 | | |
| E 18 | 1.50 | 0.25 | 350 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | | |
| | | | | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | |
| S | E 20 | 1.50 | 0.25 | 10 | n (rev/min) | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 | 1070 | 891 | 764 | 669 | |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 | 0.0125 | |
| | E 21 | 1.50 | 0.25 | 12 | v _f (in/min) | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | |
| | | | | | n (rev/min) | 153 | 102 | 76 | 61 | 51 | 38 | 31 | 25 | 22 | 19 | |
| | E 22 | 1.50 | 0.25 | 60 | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 | |
| | | | | | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| E 23 | 1.50 | 0.25 | 8 - 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 | | |
| | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | 0.0063 | | |
| E 24 | 1.50 | 0.25 | 10 - 14 | v _f (in/min) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | | |
| | | | | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 | | |
| E 25 | 1.50 | 0.25 | 40 - 80 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | | |
| | | | | v _f (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |

SMG = Seco Material Group
n [min-1] = RPM
v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
a_p/D_c = % of diameter
v_f [in/min] = Feed rate
a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
All cutting data are start values. All cutting data is in inch values.
Please reference the Workpiece Material Classification chart located on page 15.

SPC408 / SPB540 - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (rev/min) | 2445 | 1630 | 1222 | 978 | 815 | 611 | 489 | 407 | 349 | 306 |
| | | | | | f _z (mm) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | | v _f (m/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |
| | E 3 - 4 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (mm) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (m/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | E 5 - 6 | 1.50 | 0.25 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (mm) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (m/min) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| M | E 8 - 9 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (mm) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (m/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | E 10 - 11 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 |
| | | | | | f _z (mm) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | 0.0075 |
| | | | | | v _f (m/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 |
| K | E 12 - 13 | 1.50 | 0.25 | 95 | n (rev/min) | 1452 | 968 | 726 | 581 | 484 | 363 | 290 | 242 | 207 | 181 |
| | | | | | f _z (mm) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | | v _f (m/min) | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 |
| | E 14 - 15 | 1.50 | 0.25 | 65 | n (rev/min) | 993 | 662 | 497 | 397 | 331 | 248 | 199 | 166 | 142 | 124 |
| | | | | | f _z (mm) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (m/min) | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| N | E 18 | 1.50 | 0.25 | 350 | n (rev/min) | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 | 1070 | 891 | 764 | 669 |
| | | | | | f _z (mm) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 | 0.0125 |
| S | E 20 | 1.50 | 0.25 | 10 | n (rev/min) | 153 | 102 | 76 | 61 | 51 | 38 | 31 | 25 | 22 | 19 |
| | | | | | f _z (mm) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | | | | | v _f (m/min) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | E 21 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 |
| | | | | | f _z (mm) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | 0.0063 |
| | E 22 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 |
| | | | | | f _z (mm) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (m/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

SMM845 - START VALUES

| | | SLOTTING | | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|--------------------------|-----------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (m / min) | | Z _n = 4 | | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| P | E 1 - 2 | 1.00 | 1.00 | 110 | n (min-1) | 3558 | 2668 | 2135 | 1779 | 1334 | 1067 | 889 | 762 | 667 | 593 | 534 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0011 | .0014 | .0018 | .0021 | .0025 | .0028 | .0032 | .0035 |
| | | | | | 80 - 140 | vf (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| | E 3 - 4 | 1.00 | 1.00 | 50 | n (min-1) | 1617 | 1213 | 970 | 809 | 606 | 485 | 404 | 347 | 303 | 270 | 243 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0008 | .0011 | .0014 | .0017 | .0019 | .0022 | .0025 | .0028 |
| | | | | | 40 - 60 | vf (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 5 - 6 | 1.00 | 1.00 | 35 | n (min-1) | 1132 | 849 | 679 | 566 | 424 | 340 | 283 | 243 | 212 | 189 | 170 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0008 | .0011 | .0014 | .0017 | .0019 | .0022 | .0025 | .0028 |
| | | | | | 25 - 45 | vf (in/min) | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| M | E 8 - 9 | 1.00 | 1.00 | 50 | n (min-1) | 1617 | 1213 | 970 | 809 | 606 | 485 | 404 | 347 | 303 | 270 | 243 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0008 | .0011 | .0014 | .0017 | .0019 | .0022 | .0025 | .0028 |
| | | | | | 40 - 60 | vf (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 10 - 11 | 1.00 | 1.00 | 40 | n (min-1) | 1294 | 970 | 776 | 647 | 485 | 388 | 323 | 277 | 243 | 216 | 194 |
| | | | | | fz (in) | .0004 | .0005 | .0006 | .0007 | .0009 | .0012 | .0014 | .0017 | .0019 | .0021 | .0024 |
| | | | | | 30 - 50 | vf (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| K | E 12 - 13 | 1.00 | 1.00 | 50 | n (min-1) | 1617 | 1213 | 970 | 809 | 606 | 485 | 404 | 347 | 303 | 270 | 243 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0011 | .0014 | .0018 | .0021 | .0025 | .0028 | .0032 | .0035 |
| | | | | | 40 - 60 | vf (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 14 - 15 | 1.00 | 1.00 | 40 | n (min-1) | 1294 | 970 | 776 | 647 | 485 | 388 | 323 | 277 | 243 | 216 | 194 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0008 | .0011 | .0014 | .0017 | .0019 | .0022 | .0025 | .0028 |
| | | | | | 30 - 50 | vf (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| N | E 18 | 1.00 | 1.00 | 240 | n (min-1) | 7762 | 5822 | 4657 | 3881 | 2911 | 2329 | 1941 | 1663 | 1455 | 1294 | 1164 |
| | | | | | fz (in) | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 | .0028 | .0031 | .0035 | .0039 |
| S | E 20 | 1.00 | 1.00 | 5 | n (min-1) | 162 | 121 | 97 | 81 | 61 | 49 | 40 | 35 | 30 | 27 | 24 |
| | | | | | fz (in) | .0002 | .0002 | .0003 | .0004 | .0005 | .0006 | .0007 | .0008 | .0009 | .0011 | .0012 |
| | | | | | 5 - 10 | vf (in/min) | .1 | .1 | .1 | .1 | .1 | .1 | .1 | .1 | .1 | .1 |
| | E 21 | 1.00 | 1.00 | 5 | n (min-1) | 162 | 121 | 97 | 81 | 61 | 49 | 40 | 35 | 30 | 27 | 24 |
| | | | | | fz (in) | .0003 | .0004 | .0005 | .0006 | .0008 | .0010 | .0012 | .0014 | .0016 | .0018 | .0020 |
| | | | | | 5 - 10 | vf (in/min) | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | .2 |
| | E 22 | 1.00 | 1.00 | 40 | n (min-1) | 1294 | 970 | 776 | 647 | 485 | 388 | 323 | 277 | 243 | 216 | 194 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0008 | .0011 | .0014 | .0017 | .0019 | .0022 | .0025 | .0028 |
| | | | | | 20 - 60 | vf (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS



SMM845 - START VALUES

| | | SIDE MILLING - ROUGHING | | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (m / min) | | Z _n = 4 | | | | | | | | | | |
| | | | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (min-1) | 5175 | 3881 | 3105 | 2587 | 1941 | 1552 | 1294 | 1109 | 970 | 862 | 776 |
| | | | | | fz (in) | .0007 | .0009 | .0011 | .0013 | .0018 | .0022 | .0026 | .0031 | .0035 | .0040 | .0044 |
| | | | | | vf (in/min) | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 |
| | E 3 - 4 | 1.50 | 0.25 | 80 | n (min-1) | 2587 | 1941 | 1552 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 | 388 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0010 | .0014 | .0017 | .0021 | .0024 | .0028 | .0031 | .0035 |
| | | | | | vf (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| | E 5 - 6 | 1.50 | 0.25 | 50 | n (min-1) | 1617 | 1213 | 970 | 809 | 606 | 485 | 404 | 347 | 303 | 270 | 243 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0010 | .0014 | .0017 | .0021 | .0024 | .0028 | .0031 | .0035 |
| | | | | | vf (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| M | E 8 - 9 | 1.50 | 0.25 | 80 | n (min-1) | 2587 | 1941 | 1552 | 1294 | 970 | 776 | 647 | 554 | 485 | 431 | 388 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0010 | .0014 | .0017 | .0021 | .0024 | .0028 | .0031 | .0035 |
| | | | | | vf (in/min) | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| | E 10 - 11 | 1.50 | 0.25 | 60 | n (min-1) | 1941 | 1455 | 1164 | 970 | 728 | 582 | 485 | 416 | 364 | 323 | 291 |
| | | | | | fz (in) | .0004 | .0006 | .0007 | .0009 | .0012 | .0015 | .0018 | .0021 | .0024 | .0027 | .0030 |
| | | | | | vf (in/min) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| K | E 12 - 13 | 1.50 | 0.25 | 95 | n (min-1) | 3073 | 2304 | 1844 | 1536 | 1152 | 922 | 768 | 658 | 576 | 512 | 461 |
| | | | | | fz (in) | .0007 | .0009 | .0011 | .0013 | .0018 | .0022 | .0026 | .0031 | .0035 | .0040 | .0044 |
| | | | | | vf (in/min) | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 |
| | E 14 - 15 | 1.50 | 0.25 | 65 | n (min-1) | 2102 | 1577 | 1261 | 1051 | 788 | 631 | 526 | 450 | 394 | 350 | 315 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0010 | .0014 | .0017 | .0021 | .0024 | .0028 | .0031 | .0035 |
| | | | | | vf (in/min) | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| N | E 18 | 1.50 | 0.25 | 350 | n (min-1) | 11320 | 8490 | 6792 | 5660 | 4245 | 3396 | 2830 | 2426 | 2122 | 1887 | 1698 |
| | | | | | fz (in) | .0007 | .0010 | .0012 | .0015 | .0020 | .0025 | .0030 | .0035 | .0040 | .0045 | .0050 |
| S | E 20 | 1.50 | 0.25 | 10 | n (min-1) | 323 | 243 | 194 | 162 | 121 | 97 | 81 | 69 | 61 | 54 | 49 |
| | | | | | fz (in) | .0003 | .0004 | .0005 | .0006 | .0008 | .0010 | .0012 | .0014 | .0016 | .0018 | .0020 |
| | | | | | vf (in/min) | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |
| | E 21 | 1.50 | 0.25 | 15 | n (min-1) | 485 | 364 | 291 | 243 | 182 | 146 | 121 | 104 | 91 | 81 | 73 |
| | | | | | fz (in) | .0004 | .0005 | .0006 | .0007 | .0010 | .0012 | .0015 | .0017 | .0020 | .0022 | .0024 |
| | | | | | vf (in/min) | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 |
| | E 22 | 1.50 | 0.25 | 60 | n (min-1) | 1941 | 1455 | 1164 | 970 | 728 | 582 | 485 | 416 | 364 | 323 | 291 |
| | | | | | fz (in) | .0005 | .0007 | .0009 | .0010 | .0014 | .0017 | .0021 | .0024 | .0028 | .0031 | .0035 |
| | | | | | vf (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

fz [in] = Feed/tooth
 a_p/D_c = % of diameter
 vf [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RTM713 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 |
| P | E 1 - 2 | 1.00 | 1.00 | 132 | n (rev/min) | 2017 | 1345 | 1008 | 807 | 672 | 504 | 403 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 |
| | | | | 102 - 162 | v _f (in/min) | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| | E 3 - 4 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 |
| | | | | 50 - 70 | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| K | E 12 - 13 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 |
| | | | | 50 - 70 | v _f (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| N | E 18 | 1.00 | 1.00 | 288 | n (rev/min) | 4401 | 2934 | 2200 | 1760 | 1467 | 1100 | 880 |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 |
| | | | | 248 - 328 | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|--------------|------|------|-----------|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| P | E 1 - 2 | 1.50 | 0.25 | 192 | n (rev/min) | 2934 | 1956 | 1467 | 1174 | 978 | 733 | 587 |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 |
| | | | | 152 - 232 | v _f (in/min) | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 |
| | E 3 - 4 | 1.50 | 0.25 | 96 | n (rev/min) | 1467 | 978 | 733 | 587 | 489 | 367 | 293 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 |
| | | | | 76 - 116 | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| K | E 12 - 13 | 1.50 | 0.25 | 114 | n (rev/min) | 1742 | 1161 | 871 | 697 | 581 | 435 | 348 |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 |
| | | | | 94 - 134 | v _f (in/min) | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 |
| N | E 18 | 1.50 | 0.25 | 420 | n (rev/min) | 6418 | 4278 | 3209 | 2567 | 2139 | 1604 | 1284 |
| | | | | | f _z (in) | 0.0020 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0078 | 0.0098 |
| | | | | 370 - 470 | v _f (in/min) | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 | 37.6 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RHC752 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-----------|------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| N | E 16 | 1.00 | 1.00 | 600 | n (rev/min) | 9168 | 6112 | 4584 | 3667 | 3056 | 2292 | 1834 | 1528 | 1310 | 1146 |
| | | | | | f _z (in) | 0.0031 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0219 | 0.0250 |
| | | | | | v _f (in/min) | 86.0 | 86.0 | 86.0 | 85.9 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 |
| | E 17 | 1.00 | 1.00 | 600 | n (rev/min) | 9168 | 6112 | 4584 | 3667 | 3056 | 2292 | 1834 | 1528 | 1310 | 1146 |
| | | | | | f _z (in) | 0.0031 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0219 | 0.0250 |
| | | | | | v _f (in/min) | 86.0 | 86.0 | 86.0 | 85.9 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|------|------|------|-----|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 1.50 | 0.25 | 900 | n (rev/min) | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1965 | 1719 |
| | | | | | f _z (in) | 0.0039 | 0.0059 | 0.0078 | 0.0098 | 0.0117 | 0.0156 | 0.0195 | 0.0234 | 0.0273 | 0.0313 |
| | | | | | v _f (in/min) | 161.2 | 161.2 | 161.2 | 161.2 | 161.2 | 161.2 | 161.1 | 161.2 | 161.2 | 161.2 |
| | E 17 | 1.50 | 0.25 | 900 | n (rev/min) | 13752 | 9168 | 6876 | 5501 | 4584 | 3438 | 2750 | 2292 | 1965 | 1719 |
| | | | | | f _z (in) | 0.0039 | 0.0059 | 0.0078 | 0.0098 | 0.0117 | 0.0156 | 0.0195 | 0.0234 | 0.0273 | 0.0313 |
| | | | | | v _f (in/min) | 161.2 | 161.2 | 161.2 | 161.2 | 161.2 | 161.2 | 161.1 | 161.2 | 161.2 | 161.2 |

RHLC754 - START VALUES

| SLOTTING | | | | | | | | | | | | | | | |
|-----------|------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| N | E 16 | 1.00 | 1.00 | 500 | n (rev/min) | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 | 1528 | 1273 | 1091 | 955 |
| | | | | | f _z (in) | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0175 | 0.0200 |
| | | | | | v _f (in/min) | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 |
| | E 17 | 1.00 | 1.00 | 500 | n (rev/min) | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 | 1528 | 1273 | 1091 | 955 |
| | | | | | f _z (in) | 0.0025 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0100 | 0.0125 | 0.0150 | 0.0175 | 0.0200 |
| | | | | | v _f (in/min) | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 | 57.3 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|------|------|------|-----|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| N | E 16 | 1.50 | 0.25 | 750 | n (rev/min) | 11460 | 7640 | 5730 | 4584 | 3820 | 2865 | 2292 | 1910 | 1637 | 1433 |
| | | | | | f _z (in) | 0.0031 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0219 | 0.0250 |
| | | | | | v _f (in/min) | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 |
| | E 17 | 1.50 | 0.25 | 750 | n (rev/min) | 11460 | 7640 | 5730 | 4584 | 3820 | 2865 | 2292 | 1910 | 1637 | 1433 |
| | | | | | f _z (in) | 0.0031 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0125 | 0.0156 | 0.0188 | 0.0219 | 0.0250 |
| | | | | | v _f (in/min) | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 | 107.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

RTM447 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 |
| P | E 5 - 6 | 1.00 | 1.00 | 42 | n (rev/min) | 642 | 428 | 321 | 257 | 214 | 160 | 128 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 |
| | | | | | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| M | E 8 - 9 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 |
| | | | | | v _f (in/min) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| | E 10 - 11 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 |
| | | | | | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| K | E 14 - 15 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 |
| | | | | | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| S | E 20 | 1.00 | 1.00 | 9.6 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 |
| | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0023 |
| | | | | | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | E 21 | 1.00 | 1.00 | 9.6 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 |
| | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | E 22 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 |
| | | | | | v _f (in/min) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RTM447 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | |
|-------------------------|---------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|-------------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 3 | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 |
| P | E 5 - 6 | 1.50 | 0.25 | 63 | n (rev/min) | 955 | 637 | 478 | 382 | 318 | 239 | 191 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 |
| | | | | 53 - 73 | v _f (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| | | | | M | E 8 - 9 | 1.50 | 0.25 | 96 | n (rev/min) | 1467 | 978 | 733 |
| f _z (in) | 0.0014 | 0.0018 | 0.0023 | | | | | | 0.0029 | 0.0035 | 0.0047 | 0.0059 |
| | | | | 86 - 106 | v _f (in/min) | 6.0 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 |
| | | | | M | E 10 - 11 | 1.50 | 0.25 | 72 | n (rev/min) | 1100 | 733 | 550 |
| f _z (in) | 0.0012 | 0.0018 | 0.0023 | | | | | | 0.0029 | 0.0035 | 0.0047 | 0.0059 |
| | | | | 62 - 82 | v _f (in/min) | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| | | | | K | E 14 - 15 | 1.50 | 0.25 | 78 | n (rev/min) | 1192 | 795 | 596 |
| f _z (in) | 0.0014 | 0.0021 | 0.0027 | | | | | | 0.0034 | 0.0041 | 0.0055 | 0.0068 |
| | | | | 68 - 88 | v _f (in/min) | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| | | | | S | E 20 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 |
| f _z (in) | 0.0006 | 0.0009 | 0.0012 | | | | | | 0.0015 | 0.0018 | 0.0023 | 0.0029 |
| | | | | 10 - 14 | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | | | | S | E 21 | 1.50 | 0.25 | 14 | n (rev/min) | 220 | 147 | 110 |
| f _z (in) | 0.0010 | 0.0015 | 0.0020 | | | | | | 0.0024 | 0.0029 | 0.0039 | 0.0049 |
| | | | | 12 - 16 | v _f (in/min) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | | | | S | E 22 | 1.50 | 0.25 | 72 | n (rev/min) | 1100 | 733 | 550 |
| f _z (in) | 0.0014 | 0.0021 | 0.0027 | | | | | | 0.0034 | 0.0041 | 0.0055 | 0.0068 |
| | | | | 62 - 82 | v _f (in/min) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

REM710 / REC700 / RMB700 - START VALUES

| SLOTTING | | | | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------------------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | Z _n = 5 | Z _n = 6 | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 |
| P | E 1 - 2 | 1.00 | 1.00 | 132 | n (rev/min) | 2017 | 1345 | 1008 | 807 | 672 | 504 | 403 | 336 | 288 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 |
| | | | | | v _f (in/min) | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 14.2 | 17.0 | 17.0 | 17.0 |
| | E 3 - 4 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 |
| | | | | | v _f (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | 6.0 | 6.0 | 6.0 |
| K | E 12 - 13 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 |
| | | | | | v _f (in/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 6.4 | 7.7 | 7.7 | 7.7 |
| N | E 18 | 1.00 | 1.00 | 288 | n (rev/min) | 4401 | 2934 | 2200 | 1760 | 1467 | 1100 | 880 | 733 | 629 |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 |
| | | | | | v _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 34.4 | 41.3 | 41.3 | 41.3 |

REM710 / REC700 / RMB700 - START VALUES

| SLOTTING | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|---------------------|--|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 8 | | Z _n = 10 | |
| | | | | | | 2 | 2 1/2 | 3 | |
| P | E 1 - 2 | 0.50 | 1.00 | 132 | n (rev/min) | 252 | 202 | 168 | |
| | | | | | f _z (in) | 0.0113 | 0.0141 | 0.0169 | |
| | | | | | v _f (in/min) | 22.7 | 22.7 | 28.4 | |
| | E 3 - 4 | 0.50 | 1.00 | 60 | n (rev/min) | 115 | 92 | 76 | |
| | | | | | f _z (in) | 0.0088 | 0.0109 | 0.0131 | |
| | | | | | v _f (in/min) | 8.0 | 8.0 | 10.0 | |
| K | E 12 - 13 | 0.50 | 1.00 | 60 | n (rev/min) | 115 | 92 | 76 | |
| | | | | | f _z (in) | 0.0113 | 0.0141 | 0.0169 | |
| | | | | | v _f (in/min) | 10.3 | 10.3 | 12.9 | |
| N | E 18 | 0.50 | 1.00 | 288 | n (rev/min) | 550 | 440 | 367 | |
| | | | | | f _z (in) | 0.0125 | 0.0156 | 0.0188 | |
| | | | | | v _f (in/min) | 55.0 | 55.0 | 68.8 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

REM710 / REC700 / RMB700 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n | | | | | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------|--------------------|--------|--------|--------------------|--------|---------------------|
| | | | | | | Z _n = 4 | | | | | Z _n = 5 | | Z _n = 6 | | | Z _n = 8 | | Z _n = 10 |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 | |
| P | E 1 - 2 | 1.50 | 0.25 | 192 | n (rev/min) | 2934 | 1956 | 1467 | 1174 | 978 | 733 | 587 | 489 | 419 | 367 | 293 | 244 | |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 | 0.0105 | 0.0123 | 0.0141 | 0.0176 | 0.0211 | |
| | | | | 152 - 232 | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 25.8 | 30.9 | 30.9 | 30.9 | 41.3 | 41.3 | 51.6 | |
| | E 3 - 4 | 1.50 | 0.25 | 96 | n (rev/min) | 1467 | 978 | 733 | 587 | 489 | 367 | 293 | 244 | 210 | 183 | 147 | 122 | |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 | 0.0137 | 0.0164 | |
| | | | | 76 - 116 | v _f (in/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 10.0 | 12.0 | 12.0 | 12.0 | 16.0 | 16.0 | 20.1 | |
| K | E 12 - 13 | 1.50 | 0.25 | 114 | n (rev/min) | 1742 | 1161 | 871 | 697 | 581 | 435 | 348 | 290 | 249 | 218 | 174 | 145 | |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 | 0.0105 | 0.0123 | 0.0141 | 0.0176 | 0.0211 | |
| | | | | 94 - 134 | v _f (in/min) | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 15.3 | 18.4 | 18.4 | 18.4 | 24.5 | 24.5 | 30.6 | |
| N | E 18 | 1.50 | 0.25 | 420 | n (rev/min) | 6418 | 4278 | 3209 | 2567 | 2139 | 1604 | 1284 | 1070 | 917 | 802 | 642 | 535 | |
| | | | | | f _z (in) | 0.0020 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0078 | 0.0098 | 0.0117 | 0.0137 | 0.0156 | 0.0195 | 0.0234 | |
| | | | | 370 - 470 | v _f (in/min) | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 62.7 | 75.2 | 75.2 | 75.2 | 100.3 | 100.3 | 125.3 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RXC753 - START VALUES

| SLOTTING | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|---------------------|-------------------------|--------|--------------------|------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 5 | | Z _n = 6 | |
| | | | | | | 1 | 1 1/4 | 1 1/2 | |
| P | E 1 - 2 | 1.00 | 1.00 | 110 | n (rev/min) | 420 | 336 | 280 | |
| | | | | | f _z (in) | 0.0045 | 0.0056 | 0.0068 | |
| | | | | | 80 - 140 | v _f (in/min) | 9.5 | 11.3 | 11.3 |
| | E 3 - 4 | 1.00 | 1.00 | 50 | n (rev/min) | 191 | 153 | 127 | |
| | | | | | f _z (in) | 0.0035 | 0.0044 | 0.0053 | |
| | | | | | 40 - 60 | v _f (in/min) | 3.3 | 4.0 | 4.0 |
| K | E 12 - 13 | 1.00 | 1.00 | 50 | n (rev/min) | 191 | 153 | 127 | |
| | | | | | f _z (in) | 0.0045 | 0.0056 | 0.0068 | |
| | | | | | 40 - 60 | v _f (in/min) | 4.3 | 5.2 | 5.2 |
| N | E 18 | 1.00 | 1.00 | 240 | n (rev/min) | 917 | 733 | 611 | |
| | | | | | f _z (in) | 0.0050 | 0.0063 | 0.0075 | |
| | | | | | 200 - 280 | v _f (in/min) | 22.9 | 27.5 | 27.5 |

RXC753 - START VALUES

| SLOTTING | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|---------------------|-------------------------|------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 8 | |
| | | | | | | 2 | |
| P | E 1 - 2 | 0.50 | 1.00 | 110 | n (rev/min) | 210 | |
| | | | | | f _z (in) | 0.0090 | |
| | | | | | 80 - 140 | v _f (in/min) | 15.1 |
| | E 3 - 4 | 0.50 | 1.00 | 50 | n (rev/min) | 96 | |
| | | | | | f _z (in) | 0.0070 | |
| | | | | | 40 - 60 | v _f (in/min) | 5.3 |
| K | E 12 - 13 | 0.50 | 1.00 | 50 | n (rev/min) | 96 | |
| | | | | | f _z (in) | 0.0090 | |
| | | | | | 40 - 60 | v _f (in/min) | 6.9 |
| N | E 18 | 0.50 | 1.00 | 240 | n (rev/min) | 458 | |
| | | | | | f _z (in) | 0.0100 | |
| | | | | | 200 - 280 | v _f (in/min) | 36.7 |

RXC753 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | |
|-------------------------|-----------|---------------------------|---------------------------|---------------------------|---------------------|-------------------------|--------|--------------------|--------|--------------------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 5 | | Z _n = 6 | | Z _n = 8 |
| | | | | | | 1 | 1 1/4 | 1 1/2 | 2 | |
| P | E 1 - 2 | 1.50 | 0.25 | 192 | n (rev/min) | 733 | 587 | 489 | 367 | |
| | | | | | f _z (in) | 0.0056 | 0.0070 | 0.0084 | 0.0113 | |
| | | | | | 152 - 232 | v _f (in/min) | 20.6 | 24.8 | 24.8 | 33.0 |
| | E 3 - 4 | 1.50 | 0.25 | 96 | n (rev/min) | 367 | 293 | 244 | 183 | |
| | | | | | f _z (in) | 0.0044 | 0.0055 | 0.0066 | 0.0088 | |
| | | | | | 76 - 116 | v _f (in/min) | 8.0 | 9.6 | 9.6 | 12.8 |
| K | E 12 - 13 | 1.50 | 0.25 | 114 | n (rev/min) | 435 | 348 | 290 | 218 | |
| | | | | | f _z (in) | 0.0056 | 0.0070 | 0.0084 | 0.0113 | |
| | | | | | 94 - 134 | v _f (in/min) | 12.2 | 14.7 | 14.7 | 19.6 |
| N | E 18 | 1.50 | 0.25 | 420 | n (rev/min) | 1604 | 1284 | 1070 | 802 | |
| | | | | | f _z (in) | 0.0063 | 0.0078 | 0.0094 | 0.0125 | |
| | | | | | 370 - 470 | v _f (in/min) | 50.1 | 60.2 | 60.2 | 80.2 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

EXR350 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------------------|--------------------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | Z _n = 5 | Z _n = 6 | |
| | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 |
| M | E 8 - 9 | 1.00 | 1.00 | 96 | n (rev/min) | 978 | 733 | 587 | 489 | 367 | 293 | 244 |
| | | | | | f _z (in) | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 |
| | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 6.9 | 8.3 | 8.3 |
| | E 10 - 11 | 1.00 | 1.00 | 72 | n (rev/min) | 733 | 550 | 440 | 367 | 275 | 220 | 183 |
| | | | | | f _z (in) | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 |
| | | | | | v _f (in/min) | 4.1 | 4.1 | 4.1 | 4.1 | 5.2 | 6.2 | 6.2 |
| S | E 20 | 1.00 | 1.00 | 10 | n (rev/min) | 98 | 73 | 59 | 49 | 37 | 29 | 24 |
| | | | | | f _z (in) | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0023 | 0.0028 |
| | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |
| | E 21 | 1.00 | 1.00 | 10 | n (rev/min) | 98 | 73 | 59 | 49 | 37 | 29 | 24 |
| | | | | | f _z (in) | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 |
| | | | | | v _f (in/min) | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 |
| E 22 | 1.00 | 1.00 | 48 | n (rev/min) | 489 | 367 | 293 | 244 | 183 | 147 | 122 | |
| | | | | f _z (in) | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | |
| | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 4.0 | 4.8 | 4.8 | |

EXR350 - START VALUES

| SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--|--|--|--|--|--|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 8 | | | | | | |
| | | | | | | 2 | | | | | | |
| M | E 8 - 9 | 0.50 | 1.00 | 96 | n (rev/min) | 183 | | | | | | |
| | | | | | f _z (in) | 0.0075 | | | | | | |
| | | | | | v _f (in/min) | 11.0 | | | | | | |
| | E 10 - 11 | 0.50 | 1.00 | 72 | n (rev/min) | 138 | | | | | | |
| | | | | | f _z (in) | 0.0075 | | | | | | |
| | | | | | v _f (in/min) | 8.3 | | | | | | |
| S | E 20 | 0.50 | 1.00 | 10 | n (rev/min) | 18 | | | | | | |
| | | | | | f _z (in) | 0.0038 | | | | | | |
| | | | | | v _f (in/min) | 0.6 | | | | | | |
| | E 21 | 0.50 | 1.00 | 10 | n (rev/min) | 18 | | | | | | |
| | | | | | f _z (in) | 0.0063 | | | | | | |
| | | | | | v _f (in/min) | 0.9 | | | | | | |
| E 22 | 0.50 | 1.00 | 48 | n (rev/min) | 92 | | | | | | | |
| | | | | f _z (in) | 0.0088 | | | | | | | |
| | | | | v _f (in/min) | 6.4 | | | | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

EXR350 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | Z _n = 5 | Z _n = 6 | | Z _n = 8 |
|-----------|--------------|--|--|------------------------------|-------------------------|--------------------|--------|--------|--------|--------------------|--------------------|--------|--------------------|
| | | | | | | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 |
| M | E 8 - 9 | 1.50 | 0.25 | 115 | n (rev/min) | 1174 | 880 | 704 | 587 | 440 | 352 | 293 | 220 |
| | | | | | f _z (in) | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0094 |
| | | | | 105 - 125 | v _f (in/min) | 8.3 | 8.3 | 8.3 | 8.3 | 10.3 | 12.4 | 12.4 | 16.5 |
| | E 10 - 11 | 1.50 | 0.25 | 86 | n (rev/min) | 880 | 660 | 528 | 440 | 330 | 264 | 220 | 165 |
| | | | | | f _z (in) | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0094 |
| | | | | 76 - 96 | v _f (in/min) | 6.2 | 6.2 | 6.2 | 6.2 | 7.7 | 9.3 | 9.3 | 12.4 |
| S | E 20 | 1.50 | 0.25 | 12 | n (rev/min) | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 23 |
| | | | | | f _z (in) | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 |
| | | | | 10 - 14 | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.9 |
| | E 21 | 1.50 | 0.25 | 12 | n (rev/min) | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 23 |
| | | | | | f _z (in) | 0.0015 | 0.0020 | 0.0024 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0078 |
| | | | | 10 - 14 | v _f (in/min) | 0.7 | 0.7 | 0.7 | 0.7 | 0.9 | 1.1 | 1.1 | 1.4 |
| E 22 | 1.50 | 0.25 | 57.6 | n (rev/min) | 587 | 440 | 352 | 293 | 220 | 176 | 147 | 110 | |
| | | | | f _z (in) | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0109 | |
| | | | 47.6 - 67.6 | v _f (in/min) | 4.8 | 4.8 | 4.8 | 4.8 | 6.0 | 7.2 | 7.2 | 9.6 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

REM445 / REC448 / RMB449 - START VALUES

| | | SLOTTING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------|--------------------|--------|--|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | Z _n = 5 | | Z _n = 6 | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | |
| P | E 5 - 6 | 1.00 | 1.00 | 42 | n (rev/min) | 642 | 428 | 321 | 257 | 214 | 160 | 128 | 107 | 92 | |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | |
| | | | | | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.5 | 4.2 | 4.2 | 4.2 | |
| M | E 8 - 9 | 1.00 | 1.00 | 96 | n (rev/min) | 1467 | 978 | 733 | 587 | 489 | 367 | 293 | 244 | 210 | |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | |
| | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 6.9 | 8.3 | 8.3 | 8.3 | |
| | E 10 - 11 | 1.00 | 1.00 | 72 | n (rev/min) | 1100 | 733 | 550 | 440 | 367 | 275 | 220 | 183 | 157 | |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | |
| | | | | | v _f (in/min) | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 5.2 | 6.2 | 6.2 | 6.2 | |
| S | E 20 | 1.00 | 1.00 | 9.6 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 | 24 | 21 | |
| | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0033 | |
| | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | |
| | E 21 | 1.00 | 1.00 | 9.6 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 | 24 | 21 | |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | |
| | | | | | v _f (in/min) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 | |
| E 22 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 | 122 | 105 | | |
| | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | | |
| | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 4.0 | 4.8 | 4.8 | 4.8 | | |

REM445 / REC448 / RMB449 - START VALUES

| | | SLOTTING | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|---------------------|--|--|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 8 | | | Z _n = 10 | | |
| | | | | | | 2 | 2 1/2 | 3 | | | |
| P | E 5 - 6 | 0.50 | 1.00 | 42 | n (rev/min) | 80 | 64 | 53 | | | |
| | | | | | f _z (in) | 0.0088 | 0.0109 | 0.0131 | | | |
| | | | | | v _f (in/min) | 5.6 | 5.6 | 7.0 | | | |
| M | E 8 - 9 | 0.50 | 1.00 | 96 | n (rev/min) | 183 | 147 | 122 | | | |
| | | | | | f _z (in) | 0.0075 | 0.0094 | 0.0113 | | | |
| | | | | | v _f (in/min) | 11.0 | 11.0 | 13.8 | | | |
| | E 10 - 11 | 0.50 | 1.00 | 72 | n (rev/min) | 138 | 110 | 92 | | | |
| | | | | | f _z (in) | 0.0075 | 0.0094 | 0.0113 | | | |
| | | | | | v _f (in/min) | 8.3 | 8.3 | 10.3 | | | |
| S | E 20 | 0.50 | 1.00 | 9.6 | n (rev/min) | 18 | 15 | 12 | | | |
| | | | | | f _z (in) | 0.0038 | 0.0047 | 0.0056 | | | |
| | | | | | v _f (in/min) | 0.6 | 0.6 | 0.7 | | | |
| | E 21 | 0.50 | 1.00 | 9.6 | n (rev/min) | 18 | 15 | 12 | | | |
| | | | | | f _z (in) | 0.0063 | 0.0078 | 0.0094 | | | |
| | | | | | v _f (in/min) | 0.9 | 0.9 | 1.1 | | | |
| E 22 | 0.50 | 1.00 | 48 | n (rev/min) | 92 | 73 | 61 | | | | |
| | | | | f _z (in) | 0.0088 | 0.0109 | 0.0131 | | | | |
| | | | | v _f (in/min) | 6.4 | 6.4 | 8.0 | | | | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

REM445 / REC448 / RMB449 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n | | | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------------------|--------|--------|--------------------|--------|---------------------|
| | | | | | | Z _n = 4 | | | | | Z _n = 5 | Z _n = 6 | | | Z _n = 8 | | Z _n = 10 |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 |
| P | E 5 - 6 | 1.50 | 0.25 | 63 | n (rev/min) | 955 | 637 | 478 | 382 | 318 | 239 | 191 | 159 | 136 | 119 | 96 | 80 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 | 0.0137 | 0.0164 |
| | | | | | v _f (in/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 6.5 | 7.8 | 7.8 | 7.8 | 10.4 | 10.4 | 13.1 |
| M | E 8 - 9 | 1.50 | 0.25 | 115 | n (rev/min) | 1760 | 1174 | 880 | 704 | 587 | 440 | 352 | 293 | 251 | 220 | 176 | 147 |
| | | | | | f _z (in) | 0.0012 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0082 | 0.0094 | 0.0117 | 0.0141 |
| | | | | | v _f (in/min) | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 10.3 | 12.4 | 12.4 | 12.4 | 16.5 | 16.5 | 20.6 |
| | E 10 - 11 | 1.50 | 0.25 | 86 | n (rev/min) | 1320 | 880 | 660 | 528 | 440 | 330 | 264 | 220 | 189 | 165 | 132 | 110 |
| | | | | | f _z (in) | 0.0012 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0082 | 0.0094 | 0.0117 | 0.0141 |
| | | | | | v _f (in/min) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 7.7 | 9.3 | 9.3 | 9.3 | 12.4 | 12.4 | 15.5 |
| S | E 20 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 | 18 | 15 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0041 | 0.0047 | 0.0059 | 0.0070 |
| | | | | | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 0.9 | 0.9 | 1.1 |
| | E 21 | 1.50 | 0.25 | 14 | n (rev/min) | 220 | 147 | 110 | 88 | 73 | 55 | 44 | 37 | 31 | 28 | 22 | 18 |
| | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0024 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0068 | 0.0078 | 0.0098 | 0.0117 |
| | | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.3 | 1.3 | 1.3 | 1.7 | 1.7 | 2.1 |
| E 22 | 1.50 | 0.25 | 72 | n (rev/min) | 1100 | 733 | 550 | 440 | 367 | 275 | 220 | 183 | 157 | 138 | 110 | 92 | |
| | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 | 0.0137 | 0.0164 | |
| | | | | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 7.5 | 9.0 | 9.0 | 9.0 | 12.0 | 12.0 | 15.0 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RFM440 / RFM441 - START VALUES

| | | SLOTTING | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------------------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | Z _n = 5 | Z _n = 6 | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 |
| P | E 1 - 2 | 1.00 | 1.00 | 132 | n (rev/min) | 2017 | 1345 | 1008 | 807 | 672 | 504 | 403 | 336 | 288 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 |
| | | | | | v _f (in/min) | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 14.2 | 17.0 | 17.0 | 17.0 |
| | E 3 - 4 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 |
| | | | | | v _f (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | 6.0 | 6.0 | 6.0 |
| | E 5 - 6 | 1.00 | 1.00 | 42 | n (rev/min) | 642 | 428 | 321 | 257 | 214 | 160 | 128 | 107 | 92 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 |
| | | | | | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.5 | 4.2 | 4.2 | 4.2 |
| M | E 8 - 9 | 1.00 | 1.00 | 96 | n (rev/min) | 1467 | 978 | 733 | 587 | 489 | 367 | 293 | 244 | 210 |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 |
| | | | | | v _f (in/min) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 6.9 | 8.3 | 8.3 | 8.3 |
| | E 10 - 11 | 1.00 | 1.00 | 72 | n (rev/min) | 1100 | 733 | 550 | 440 | 367 | 275 | 220 | 183 | 157 |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 |
| | | | | | v _f (in/min) | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 5.2 | 6.2 | 6.2 | 6.2 |
| K | E 12 - 13 | 1.00 | 1.00 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 |
| | | | | | v _f (in/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 6.4 | 7.7 | 7.7 | 7.7 |
| | E 14 - 15 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 | 122 | 105 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 |
| | | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 4.0 | 4.8 | 4.8 | 4.8 |
| N | E 18 | 1.00 | 1.00 | 288 | n (rev/min) | 4401 | 2934 | 2200 | 1760 | 1467 | 1100 | 880 | 733 | 629 |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 |
| | | | | | v _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 34.4 | 41.3 | 41.3 | 41.3 |
| S | E 20 | 1.00 | 1.00 | 10 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 | 24 | 21 |
| | | | | | f _z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0033 |
| | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| | E 21 | 1.00 | 1.00 | 10 | n (rev/min) | 147 | 98 | 73 | 59 | 49 | 37 | 29 | 24 | 21 |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 |
| | | | | | v _f (in/min) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 |
| E 22 | 1.00 | 1.00 | 48 | n (rev/min) | 733 | 489 | 367 | 293 | 244 | 183 | 147 | 122 | 105 | |
| | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | |
| | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 4.0 | 4.8 | 4.8 | 4.8 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RFM440 / RFM441 - START VALUES

| SLOTTING | | | | | | | | |
|-----------|--------------|---------------------------|---------------------------|---------------------|--------|--|----------------|--------|
| ISO GROUP | SMG | $a_p \times D_c$ (max) | $a_e \times D_c$ (max) | v_c (sf / min) | | | $Z_n = 8$ | |
| | | | | | | | | 2 |
| P | E 1 - 2 | 0.50 | 1.00 | 132 | | | n (rev/min) | 252 |
| | | | | | | | f_z (in) | 0.0113 |
| | | | | 122 - 142 | | | v_f (in/min) | 22.7 |
| | E 3 - 4 | 0.50 | 1.00 | | | | 60 | |
| | | | | f_z (in) | 0.0088 | | | |
| | | | | 50 - 70 | | | v_f (in/min) | 8.0 |
| | E 5 - 6 | 0.50 | 1.00 | | | | 42 | |
| | | | | f_z (in) | 0.0088 | | | |
| | | | | 32 - 52 | | | v_f (in/min) | 5.6 |
| M | E 8 - 9 | 0.50 | 1.00 | | | | 96 | |
| | | | | f_z (in) | 0.0075 | | | |
| | | | | 86 - 106 | | | v_f (in/min) | 11.0 |
| | E 10 - 11 | 0.50 | 1.00 | | | | 72 | |
| | | | | f_z (in) | 0.0075 | | | |
| | | | | 62 - 82 | | | v_f (in/min) | 8.3 |
| K | E 12 - 13 | 0.50 | 1.00 | | | | 60 | |
| | | | | f_z (in) | 0.0113 | | | |
| | | | | 50 - 70 | | | v_f (in/min) | 10.3 |
| | E 14 - 15 | 0.50 | 1.00 | | | | 48 | |
| | | | | f_z (in) | 0.0088 | | | |
| | | | | 38 - 58 | | | v_f (in/min) | 6.4 |
| N | E 18 | 0.50 | 1.00 | | | | 288 | |
| | | | | f_z (in) | 0.0125 | | | |
| | | | | 286 - 290 | | | v_f (in/min) | 55.0 |
| S | E 20 | 0.50 | 1.00 | | | | 10 | |
| | | | | f_z (in) | 0.0038 | | | |
| | | | | 8 - 12 | | | v_f (in/min) | 0.6 |
| | E 21 | 0.50 | 1.00 | | | | 10 | |
| | | | | f_z (in) | 0.0063 | | | |
| | | | | 8 - 12 | | | v_f (in/min) | 0.9 |
| | E 22 | 0.50 | 1.00 | | | | 48 | |
| | | | | f_z (in) | 0.0088 | | | |
| | | | | 38 - 58 | | | v_f (in/min) | 6.4 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RFM440 / RFM441 - START VALUES

| SIDE MILLING - ROUGHING | | | | | | | | | | | | | | | |
|-------------------------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------------------|--------------------|--------|--------|--------------------|
| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | Z _n = 5 | Z _n = 6 | | | Z _n = 8 |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| P | E 1 - 2 | 1.50 | 0.25 | 192 | n (rev/min) | 2934 | 1956 | 1467 | 1174 | 978 | 733 | 587 | 489 | 419 | 367 |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 | 0.0105 | 0.0123 | 0.0141 |
| | | | | | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 25.8 | 30.9 | 30.9 | 30.9 | 41.3 |
| | E 3 - 4 | 1.50 | 0.25 | 96 | n (rev/min) | 1467 | 978 | 733 | 587 | 489 | 367 | 293 | 244 | 210 | 183 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 |
| | | | | | v _f (in/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 10.0 | 12.0 | 12.0 | 12.0 | 16.0 |
| E 5 - 6 | 1.50 | 0.25 | 63 | n (rev/min) | 955 | 637 | 478 | 382 | 318 | 239 | 191 | 159 | 136 | 119 | |
| | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 | |
| | | | | v _f (in/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 6.5 | 7.8 | 7.8 | 7.8 | 10.4 | |
| M | E 8 - 9 | 1.50 | 0.25 | 115 | n (rev/min) | 1760 | 1174 | 880 | 704 | 587 | 440 | 352 | 293 | 251 | 220 |
| | | | | | f _z (in) | 0.0012 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0082 | 0.0094 |
| | | | | | v _f (in/min) | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 10.3 | 12.4 | 12.4 | 12.4 | 16.5 |
| | E 10 - 11 | 1.50 | 0.25 | 86 | n (rev/min) | 1320 | 880 | 660 | 528 | 440 | 330 | 264 | 220 | 189 | 165 |
| | | | | | f _z (in) | 0.0012 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0047 | 0.0059 | 0.0070 | 0.0082 | 0.0094 |
| | | | | | v _f (in/min) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 7.7 | 9.3 | 9.3 | 9.3 | 12.4 |
| K | E 12 - 13 | 1.50 | 0.25 | 114 | n (rev/min) | 1742 | 1161 | 871 | 697 | 581 | 435 | 348 | 290 | 249 | 218 |
| | | | | | f _z (in) | 0.0018 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0070 | 0.0088 | 0.0105 | 0.0123 | 0.0141 |
| | | | | | v _f (in/min) | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 15.3 | 18.4 | 18.4 | 18.4 | 24.5 |
| | E 14 - 15 | 1.50 | 0.25 | 78 | n (rev/min) | 1192 | 795 | 596 | 477 | 397 | 298 | 238 | 199 | 170 | 149 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 |
| | | | | | v _f (in/min) | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 8.1 | 9.8 | 9.8 | 9.8 | 13.0 |
| N | E 18 | 1.50 | 0.25 | 420 | n (rev/min) | 6418 | 4278 | 3209 | 2567 | 2139 | 1604 | 1284 | 1070 | 917 | 802 |
| | | | | | f _z (in) | 0.0020 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0078 | 0.0098 | 0.0117 | 0.0137 | 0.0156 |
| S | E 20 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0023 | 0.0029 | 0.0035 | 0.0041 | 0.0047 |
| | | | | | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 0.9 |
| | E 21 | 1.50 | 0.25 | 14 | n (rev/min) | 220 | 147 | 110 | 88 | 73 | 55 | 44 | 37 | 31 | 28 |
| | | | | | f _z (in) | 0.0010 | 0.0015 | 0.0020 | 0.0024 | 0.0029 | 0.0039 | 0.0049 | 0.0059 | 0.0068 | 0.0078 |
| | | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.3 | 1.3 | 1.3 | 1.7 |
| E 22 | 1.50 | 0.25 | 72 | n (rev/min) | 1100 | 733 | 550 | 440 | 367 | 275 | 220 | 183 | 157 | 138 | |
| | | | | f _z (in) | 0.0014 | 0.0021 | 0.0027 | 0.0034 | 0.0041 | 0.0055 | 0.0068 | 0.0082 | 0.0096 | 0.0109 | |
| | | | | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 7.5 | 9.0 | 9.0 | 9.0 | 12.0 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

RFCB444 - START VALUES

| | | SLOTTING | | | | | | | | | | | | | |
|-----------|-----------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | |
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| P | E 1 - 2 | 1.00 | 1.00 | 110 | n (rev/min) | 1681 | 1121 | 840 | 672 | 560 | 420 | 336 | 280 | 240 | 210 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 |
| | | | | | v _f (in/min) | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| | E 3 - 4 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 5 - 6 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| M | E 8 - 9 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | | v _f (in/min) | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | E 10 - 11 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 |
| | | | | | f _z (in) | 0.0008 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | 0.0038 | 0.0045 | 0.0053 | 0.0060 |
| | | | | | v _f (in/min) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| K | E 12 - 13 | 1.00 | 1.00 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0011 | 0.0017 | 0.0023 | 0.0028 | 0.0034 | 0.0045 | 0.0056 | 0.0068 | 0.0079 | 0.0090 |
| | | | | | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| | E 14 - 15 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| N | E 18 | 1.00 | 1.00 | 240 | n (rev/min) | 3667 | 2445 | 1834 | 1467 | 1222 | 917 | 733 | 611 | 524 | 458 |
| | | | | | f _z (in) | 0.0013 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | 0.0063 | 0.0075 | 0.0088 | 0.0100 |
| | | | | | v _f (in/min) | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 |
| S | E 20 | 1.00 | 1.00 | 8 | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 |
| | | | | | f _z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0026 | 0.0030 |
| | | | | | v _f (in/min) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | E 21 | 1.00 | 1.00 | 8 | n (rev/min) | 122 | 81 | 61 | 49 | 41 | 31 | 24 | 20 | 17 | 15 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | | | | | v _f (in/min) | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | E 22 | 1.00 | 1.00 | 40 | n (rev/min) | 611 | 407 | 306 | 244 | 204 | 153 | 122 | 102 | 87 | 76 |
| | | | | | f _z (in) | 0.0009 | 0.0013 | 0.0018 | 0.0022 | 0.0026 | 0.0035 | 0.0044 | 0.0053 | 0.0061 | 0.0070 |
| | | | | | v _f (in/min) | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RFCB444 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 4 | | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (rev/min) | 2445 | 1630 | 1222 | 978 | 815 | 611 | 489 | 407 | 349 | 306 | |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 | |
| | E 3 - 4 | 1.50 | 0.25 | 80 | v _f (in/min) | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| | | | | | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 | |
| | E 5 - 6 | 1.50 | 0.25 | 60 - 100 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | | | | | v _f (in/min) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 |
| M | E 8 - 9 | 1.50 | 0.25 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 | |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | E 10 - 11 | 1.50 | 0.25 | 80 | v _f (in/min) | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | |
| | | | | | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 | |
| | E 12 - 13 | 1.50 | 0.25 | 60 - 100 | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | 0.0075 | |
| | | | | | v _f (in/min) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| K | E 14 - 15 | 1.50 | 0.25 | 95 | n (rev/min) | 1452 | 968 | 726 | 581 | 484 | 363 | 290 | 242 | 207 | 181 | |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 | |
| | E 16 - 17 | 1.50 | 0.25 | 75 - 115 | v _f (in/min) | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | |
| | | | | | n (rev/min) | 993 | 662 | 497 | 397 | 331 | 248 | 199 | 166 | 142 | 124 | |
| | E 18 - 19 | 1.50 | 0.25 | 65 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | |
| | | | | | v _f (in/min) | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| E 20 - 21 | 1.50 | 0.25 | 45 - 85 | n (rev/min) | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 | 1070 | 891 | 764 | 669 | | |
| | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 | 0.0125 | | |
| S | E 22 - 23 | 1.50 | 0.25 | 300 - 400 | v _f (in/min) | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 | |
| | | | | | n (rev/min) | 153 | 102 | 76 | 61 | 51 | 38 | 31 | 25 | 22 | 19 | |
| | E 24 - 25 | 1.50 | 0.25 | 10 | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 | |
| | | | | | v _f (in/min) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| | E 26 - 27 | 1.50 | 0.25 | 8 - 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 | |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | 0.0063 | |
| E 28 - 29 | 1.50 | 0.25 | 10 - 14 | v _f (in/min) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | | |
| | | | | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 | | |
| E 30 - 31 | 1.50 | 0.25 | 60 | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 | | |
| | | | | v _f (in/min) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter

v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

RFCB444 - START VALUES

SIDE MILLING - ROUGHING

| ISO GROUP | SMG | a _p x Dc (max) | a _e x Dc (max) | v _c (sf / min) | | Z _n = 6 | | | | | | | | | |
|-----------|-----------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| P | E 1 - 2 | 1.50 | 0.25 | 160 | n (rev/min) | 2445 | 1630 | 1222 | 978 | 815 | 611 | 489 | 407 | 349 | 306 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | | v _f (in/min) | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 |
| | E 3 - 4 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (in/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | E 5 - 6 | 1.50 | 0.25 | 50 | n (rev/min) | 764 | 509 | 382 | 306 | 255 | 191 | 153 | 127 | 109 | 96 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (in/min) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| M | E 8 - 9 | 1.50 | 0.25 | 80 | n (rev/min) | 1222 | 815 | 611 | 489 | 407 | 306 | 244 | 204 | 175 | 153 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (in/min) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | E 10 - 11 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 |
| | | | | | f _z (in) | 0.0009 | 0.0014 | 0.0019 | 0.0023 | 0.0028 | 0.0038 | 0.0047 | 0.0056 | 0.0066 | 0.0075 |
| | | | | | v _f (in/min) | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 | 5.2 |
| K | E 12 - 13 | 1.50 | 0.25 | 95 | n (rev/min) | 1452 | 968 | 726 | 581 | 484 | 363 | 290 | 242 | 207 | 181 |
| | | | | | f _z (in) | 0.0014 | 0.0021 | 0.0028 | 0.0035 | 0.0042 | 0.0056 | 0.0070 | 0.0084 | 0.0098 | 0.0113 |
| | | | | | v _f (in/min) | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 | 12.2 |
| | E 14 - 15 | 1.50 | 0.25 | 65 | n (rev/min) | 993 | 662 | 497 | 397 | 331 | 248 | 199 | 166 | 142 | 124 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (in/min) | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| N | E 18 | 1.50 | 0.25 | 350 | n (rev/min) | 5348 | 3565 | 2674 | 2139 | 1783 | 1337 | 1070 | 891 | 764 | 669 |
| | | | | | f _z (in) | 0.0016 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0063 | 0.0078 | 0.0094 | 0.0109 | 0.0125 |
| | | | | | v _f (in/min) | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 | 50.1 |
| S | E 20 | 1.50 | 0.25 | 10 | n (rev/min) | 153 | 102 | 76 | 61 | 51 | 38 | 31 | 25 | 22 | 19 |
| | | | | | f _z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0044 | 0.0050 |
| | | | | | v _f (in/min) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | E 21 | 1.50 | 0.25 | 12 | n (rev/min) | 183 | 122 | 92 | 73 | 61 | 46 | 37 | 31 | 26 | 23 |
| | | | | | f _z (in) | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0023 | 0.0031 | 0.0039 | 0.0047 | 0.0055 | 0.0063 |
| | | | | | v _f (in/min) | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| | E 22 | 1.50 | 0.25 | 60 | n (rev/min) | 917 | 611 | 458 | 367 | 306 | 229 | 183 | 153 | 131 | 115 |
| | | | | | f _z (in) | 0.0011 | 0.0016 | 0.0022 | 0.0027 | 0.0033 | 0.0044 | 0.0055 | 0.0066 | 0.0077 | 0.0088 |
| | | | | | v _f (in/min) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

VFP435 / VFP635 / VFP²435 / VFP²635 / VFP435SB / VFP635SB / VFP435SBR / VFP635SBR - START VALUES

| SLOTTING | | | | | | | | | | | |
|-----------|--------------|---------------------------------------|---------------------------------------|---------------------------|-------------------------|--------------------|--------|--------|--------------------|--------|--------|
| ISO GROUP | SMG | a _p x D _c (max) | a _e x D _c (max) | v _c (sf / min) | | Z _n = 4 | | | Z _n = 6 | | |
| | | | | | | 3/4 | 1 | 1 1/4 | 1 1/4 | 1 1/2 | 2 |
| M | E 8 - 9 | 1.00 | 1.00 | 65 | n (rev/min) | 331 | 248 | 199 | 199 | 166 | 124 |
| | | | | | f _z (in) | 0.0024 | 0.0032 | 0.0040 | 0.0040 | 0.0048 | 0.0064 |
| | | | | | v _f (in/min) | 3.2 | 3.2 | 3.2 | 4.8 | 4.8 | 4.8 |
| | E 10 - 11 | 1.00 | 1.00 | 40 | n (rev/min) | 204 | 153 | 122 | 122 | 102 | 76 |
| | | | | | f _z (in) | 0.0024 | 0.0032 | 0.0040 | 0.0040 | 0.0048 | 0.0064 |
| | | | | | v _f (in/min) | 2.0 | 2.0 | 2.0 | 2.9 | 2.9 | 2.9 |
| S | E 22 | 1.00 | 1.00 | 60 | n (rev/min) | 306 | 229 | 183 | 183 | 153 | 115 |
| | | | | | f _z (in) | 0.0021 | 0.0028 | 0.0035 | 0.0035 | 0.0042 | 0.0056 |
| | | | | | v _f (in/min) | 2.6 | 2.6 | 2.6 | 3.9 | 3.9 | 3.9 |

| SIDE MILLING - ROUGHING | | | | | | | | | | | |
|-------------------------|--------------|------|------|----|-------------------------|--------|--------|--------|--------|--------|--------|
| M | E 8 - 9 | 1.50 | 0.25 | 78 | n (rev/min) | 397 | 298 | 238 | 238 | 199 | 149 |
| | | | | | f _z (in) | 0.0030 | 0.0040 | 0.0050 | 0.0050 | 0.0060 | 0.0080 |
| | | | | | v _f (in/min) | 4.8 | 4.8 | 4.8 | 7.2 | 7.2 | 7.2 |
| | E 10 - 11 | 1.50 | 0.25 | 48 | n (rev/min) | 244 | 183 | 147 | 147 | 122 | 92 |
| | | | | | f _z (in) | 0.0030 | 0.0040 | 0.0050 | 0.0050 | 0.0060 | 0.0080 |
| | | | | | v _f (in/min) | 2.9 | 2.9 | 2.9 | 4.4 | 4.4 | 4.4 |
| S | E 22 | 1.50 | 0.25 | 72 | n (rev/min) | 367 | 275 | 220 | 220 | 183 | 138 |
| | | | | | f _z (in) | 0.0026 | 0.0035 | 0.0044 | 0.0044 | 0.0053 | 0.0070 |
| | | | | | v _f (in/min) | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 | 5.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_e/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

UN THREADMILLS-NTM100UN

SOLID CARBIDE



- Helical flutes for internal and external threading
- Ideal for flat bottom holes
- Large diameter applications where torque and horsepower requirements for taps are not available
- Suitable for use in most materials
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | DRILL SIZE 50% | DRILL SIZE 75% |
|------------------------|------------------------|-------------|------------------|------------|-----------|---------------|----------------|---------------|---------|----------------|----------------|
| N68794 | NTM100-5/8X18UN-.500 | 5/8 | 18 | 0.470 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 19/32 | 37/64 |
| N68796 | NTM100-3/4X10UN-.500 | 3/4 | 10 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 | 21/32 |
| N68798 | NTM100-3/4X12UN-.500 | 3/4 | 12 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 | 43/64 |
| N68800 | NTM100-3/4X16UN-.500 | 3/4 | 16 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 45/64 | 11/16 |
| N68802 | NTM100-3/4X20UN-.500 | 3/4 | 20 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 23/32 | 45/64 |
| N68804 | NTM100-7/8X9UN-.625 | 7/8 | 9 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 51/64 | 49/64 |
| N68806 | NTM100-7/8X12UN-.625 | 7/8 | 12 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 13/16 | 51/64 |
| N68808 | NTM100-7/8X14UN-.625 | 7/8 | 14 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 53/64 | 13/16 |
| N68810 | NTM100-7/8X16UN-.625 | 7/8 | 16 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 53/64 | 13/16 |
| N68812 | NTM100-7/8X20UN-.625 | 7/8 | 20 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 27/32 | 53/64 |
| N68814 | NTM100-1X8UN-.625 | 1 | 8 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 59/64 | 7/8 |
| N68816 | NTM100-1X12UN-.625 | 1 | 12 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 61/64 | 15/16 |
| N68818 | NTM100-1X16UN-.625 | 1 | 16 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 61/64 | 15/16 |
| N68746 | NTM100-NR.2X56UN-.125 | 2 | 56 | 0.065 | 1/8 | .1250 | 2 | 3 | ALCRN | 49 | 50 |
| N68748 | NTM100-NR.4X40UN-.125 | 4 | 40 | 0.085 | 1/8 | .1750 | 2 | 3 | ALCRN | 41 | 43 |
| N68750 | NTM100-NR.6X32UN-.125 | 6 | 32 | 0.100 | 1/8 | .2180 | 2 | 3 | ALCRN | 32 | 36 |
| N68752 | NTM100-NR.8X32UN-.125 | 8 | 32 | 0.115 | 1/8 | .2500 | 2 | 3 | ALCRN | 27 | 29 |
| N68754 | NTM100-NR.10X24UN-.187 | 10 | 24 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 20 | 25 |
| N68756 | NTM100-NR.12X28UN-.187 | 10 | 28 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 19 | 23 |
| N68758 | NTM100-NR.10X32UN-.187 | 10 | 32 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 18 | 21 |
| N68760 | NTM100-1/4X20UN-.187 | 1/4 | 20 | 0.180 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 7/32 | 7 |
| N68762 | NTM100-1/4X28UN-.187 | 1/4 | 28 | 0.180 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 1 | 3 |
| N68764 | NTM100-1/4X32UN-.187 | 1/4 | 32 | 0.180 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 1 | 7/32 |
| N68766 | NTM100-5/16X18UN-.250 | 5/16 | 18 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | J | F |
| N68768 | NTM100-5/16X24UN-.250 | 5/16 | 24 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | 9/32 | I |
| N68770 | NTM100-5/16X32UN-.250 | 5/16 | 32 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | L | 9/32 |
| N68772 | NTM100-3/8X16UN-.312 | 3/8 | 16 | 0.285 | 5/16 | .7500 | 3 | 3 | ALCRN | Q | 5/16 |
| N68774 | NTM100-3/8X24UN-.312 | 3/8 | 24 | 0.285 | 5/16 | .7500 | 3 | 3 | ALCRN | S | Q |
| N68776 | NTM100-7/16X14UN-.312 | 7/16 | 14 | 0.305 | 5/16 | .8750 | 3 | 3 | ALCRN | 25/64 | U |
| N68778 | NTM100-7/16X20UN-.312 | 7/16 | 20 | 0.305 | 5/16 | .8750 | 3 | 3 | ALCRN | 13/32 | 25/64 |
| N68780 | NTM100-1/2X13UN-.375 | 1/2 | 13 | 0.350 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 29/64 | 27/64 |
| N68782 | NTM100-1/2X20UN-.375 | 1/2 | 20 | 0.350 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 15/32 | 29/64 |
| N68784 | NTM100-1/2X28UN-.375 | 1/2 | 28 | 0.350 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 15/32 | 15/32 |
| N68786 | NTM100-9/16X12UN-.375 | 9/16 | 12 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 33/64 | 31/64 |
| N68788 | NTM100-9/16X18UN-.375 | 9/16 | 18 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 17/32 | 33/64 |
| N68790 | NTM100-5/8X11UN-.500 | 5/8 | 11 | 0.470 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 9/16 | 17/32 |
| N68792 | NTM100-5/8X12UN-.500 | 5/8 | 12 | 0.470 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 9/16 | 35/64 |

UN THREADMILLS-NTM120UN

SOLID
CARBIDE



- Helical flutes for internal and external threading
- Coolant-through feature
- Ideal for flat bottom holes
- Large diameter applications where torque and horsepower requirements for taps are not available
- Suitable for use in most materials
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | DRILL SIZE 50% | DRILL SIZE 75% |
|------------------------|------------------------|-------------|------------------|------------|-----------|---------------|----------------|---------------|---------|----------------|----------------|
| N34479 | NTM120-NR.10X24UN-.187 | 10 | 24 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 20 | 25 |
| N34480 | NTM120-NR.10X32UN-.187 | 10 | 32 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 18 | 21 |
| N34481 | NTM120-1/4X20UN-.187 | 1/4 | 20 | 0.180 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 7/32 | 7 |
| N34482 | NTM120-1/4X28UN-.187 | 1/4 | 28 | 0.180 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 1 | 3 |
| N34483 | NTM120-5/16X18UN-.250 | 5/16 | 18 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | J | F |
| N34484 | NTM120-5/16X24UN-.250 | 5/16 | 24 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | 9/32 | I |
| N34485 | NTM120-3/8X16UN-.312 | 3/8 | 16 | 0.285 | 5/16 | .7500 | 3 | 3 | ALCRN | Q | 5/16 |
| N34486 | NTM120-3/8X24UN-.312 | 3/8 | 24 | 0.285 | 5/16 | .7500 | 3 | 3 | ALCRN | S | Q |
| N34487 | NTM120-7/16X14UN-.312 | 7/16 | 14 | 0.305 | 5/16 | .8750 | 3 | 3 | ALCRN | 25/64 | U |
| N34488 | NTM120-7/16X20UN-.312 | 7/16 | 20 | 0.305 | 5/16 | .8750 | 3 | 3 | ALCRN | 13/32 | 25/64 |
| N34489 | NTM120-1/2X13UN-.375 | 1/2 | 13 | 0.350 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 29/64 | 27/64 |
| N34490 | NTM120-1/2X20UN-.375 | 1/2 | 20 | 0.350 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 15/32 | 29/64 |
| N34491 | NTM120-9/16X12UN-.375 | 9/16 | 12 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 33/64 | 31/64 |
| N34492 | NTM120-9/16X18UN-.375 | 9/16 | 18 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 17/32 | 33/64 |
| N34493 | NTM120-5/8X11UN-.500 | 5/8 | 11 | 0.470 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 9/16 | 17/32 |
| N34494 | NTM120-3/4X10UN-.500 | 3/4 | 10 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 | 21/32 |
| N34495 | NTM120-3/4X12UN-.500 | 3/4 | 12 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 | 43/64 |
| N34496 | NTM120-3/4X16UN-.500 | 3/4 | 16 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 45/64 | 11/16 |
| N34497 | NTM120-7/8X9UN-.625 | 7/8 | 9 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 51/64 | 49/64 |
| N34498 | NTM120-1X8UN-.625 | 1 | 8 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 59/64 | 7/8 |

UN THREAD MILLS-NTM160UN

SOLID
CARBIDE



- Helical flutes for internal and external threading
- Extended reach
- Ideal for flat bottom holes
- Large diameter applications where torque and horsepower requirements for taps are not available
- Suitable for use in most materials
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | REACH | DRILL SIZE 50% | DRILL SIZE 75% |
|------------------------|------------------------|-------------|------------------|------------|-----------|---------------|----------------|---------------|---------|-------|----------------|----------------|
| N34570 | NTM160-NR.10X32UN-.187 | 10 | 32 | 0.134 | 3/16 | .1000 | 2 | 3 | ALCRN | .500 | 18 | 21 |
| N34569 | NTM160-NR.10X28UN-.187 | 10 | 28 | 0.134 | 3/16 | .1100 | 2 | 3 | ALCRN | .400 | 19 | 23 |
| N34568 | NTM160-NR.10X24UN-.187 | 10 | 24 | 0.134 | 3/16 | .1250 | 2 | 3 | ALCRN | .300 | 20 | 25 |
| N34573 | NTM160-1/4X32UN-.187 | 1/4 | 32 | 0.180 | 3/16 | .1000 | 2-1/2 | 3 | ALCRN | .950 | 1 | 7/32 |
| N34572 | NTM160-1/4X28UN-.187 | 1/4 | 28 | 0.180 | 3/16 | .1100 | 2-1/2 | 3 | ALCRN | .875 | 1 | 3 |
| N34571 | NTM160-1/4X20UN-.187 | 1/4 | 20 | 0.180 | 3/16 | .1500 | 2-1/2 | 3 | ALCRN | .670 | 7/32 | 7 |
| N34576 | NTM160-5/16X32UN-.250 | 5/16 | 32 | 0.235 | 1/4 | .1000 | 2-1/2 | 3 | ALCRN | 1.375 | L | 9/32 |
| N34575 | NTM160-5/16X24UN-.250 | 5/16 | 24 | 0.235 | 1/4 | .1250 | 2-1/2 | 3 | ALCRN | 1.250 | 9/32 | I |
| N34574 | NTM160-5/16X18UN-.250 | 5/16 | 18 | 0.235 | 1/4 | .1700 | 2-1/2 | 3 | ALCRN | 1 | J | F |
| N34578 | NTM160-3/8X24UN-.312 | 3/8 | 24 | 0.285 | 5/16 | .1250 | 3 | 3 | ALCRN | 1.625 | S | Q |
| N34577 | NTM160-3/8X16UN-.312 | 3/8 | 16 | 0.285 | 5/16 | .1880 | 3 | 3 | ALCRN | 1.350 | Q | 5/16 |
| N34580 | NTM160-7/16X20UN-.312 | 7/16 | 20 | 0.305 | 5/16 | .1500 | 3 | 3 | ALCRN | 1.670 | 13/32 | 25/64 |
| N34579 | NTM160-7/16X14UN-.312 | 7/16 | 14 | 0.305 | 5/16 | .2150 | 3 | 3 | ALCRN | 1.375 | 25/64 | U |
| N34583 | NTM160-1/2X28UN-.375 | 1/2 | 28 | 0.350 | 3/8 | .1100 | 4 | 3 | ALCRN | 2.250 | 15/32 | 15/32 |
| N34582 | NTM160-1/2X20UN-.375 | 1/2 | 20 | 0.350 | 3/8 | .1500 | 4 | 3 | ALCRN | 1.250 | 15/32 | 29/64 |
| N34581 | NTM160-1/2X13UN-.375 | 1/2 | 13 | 0.350 | 3/8 | .2300 | 4 | 3 | ALCRN | 1.670 | 29/64 | 27/64 |
| N34584 | NTM160-9/16X12UN-.375 | 9/16 | 12 | 0.370 | 3/8 | .2500 | 4 | 4 | ALCRN | 1.725 | 33/64 | 31/64 |
| N34585 | NTM160-9/16X18UN-.375 | 9/16 | 18 | 0.370 | 3/8 | .1700 | 4 | 4 | ALCRN | 2.100 | 17/32 | 33/64 |
| N34588 | NTM160-5/8X18UN-.500 | 5/8 | 18 | 0.470 | 1/2 | .1700 | 4-1/2 | 4 | ALCRN | 2.900 | 19/32 | 37/64 |
| N34587 | NTM160-5/8X12UN-.500 | 5/8 | 12 | 0.470 | 1/2 | .2500 | 4-1/2 | 4 | ALCRN | 2.525 | 9/16 | 35/64 |
| N34586 | NTM160-5/8X11UN-.500 | 5/8 | 11 | 0.470 | 1/2 | .2750 | 4-1/2 | 4 | ALCRN | 2.400 | 9/16 | 17/32 |
| N34592 | NTM160-3/4X20UN-.500 | 3/4 | 20 | 0.495 | 1/2 | .1500 | 5 | 4 | ALCRN | 3.188 | 23/32 | 45/64 |
| N34591 | NTM160-3/4X16UN-.500 | 3/4 | 16 | 0.495 | 1/2 | .1880 | 5 | 4 | ALCRN | 3.000 | 45/64 | 11/16 |
| N34590 | NTM160-3/4X12UN-.500 | 3/4 | 12 | 0.495 | 1/2 | .2500 | 5 | 4 | ALCRN | 2.750 | 11/16 | 43/64 |
| N34589 | NTM160-3/4X10UN-.500 | 3/4 | 10 | 0.495 | 1/2 | .3000 | 5 | 4 | ALCRN | 2.500 | 11/16 | 21/32 |
| N34597 | NTM160-7/8X20UN-.625 | 7/8 | 20 | 0.620 | 5/8 | .1500 | 6 | 4 | ALCRN | 4.188 | 27/32 | 53/64 |
| N34596 | NTM160-7/8X16UN-.625 | 7/8 | 16 | 0.620 | 5/8 | .1880 | 6 | 4 | ALCRN | 4.000 | 53/64 | 13/16 |
| N34595 | NTM160-7/8X14UN-.625 | 7/8 | 14 | 0.620 | 5/8 | .2150 | 6 | 4 | ALCRN | 3.900 | 53/64 | 13/16 |
| N34594 | NTM160-7/8X12UN-.625 | 7/8 | 12 | 0.620 | 5/8 | .2500 | 6 | 4 | ALCRN | 3.725 | 13/16 | 51/64 |
| N34593 | NTM160-7/8X9UN-.625 | 7/8 | 9 | 0.620 | 5/8 | .3300 | 6 | 4 | ALCRN | 3.300 | 51/64 | 49/64 |
| N34600 | NTM160-1X16UN-.625 | 1 | 16 | 0.620 | 5/8 | .1880 | 6 | 4 | ALCRN | 4.000 | 61/64 | 15/16 |
| N34599 | NTM160-1X12UN-.625 | 1 | 12 | 0.620 | 5/8 | .2500 | 6 | 4 | ALCRN | 3.725 | 61/64 | 15/16 |
| N34598 | NTM160-1X8UN-.625 | 1 | 8 | 0.620 | 5/8 | .3750 | 6 | 4 | ALCRN | 3.150 | 59/64 | 7/8 |

METRIC THREAD MILLS-NTM400MI

SOLID
CARBIDE



- Helical flutes for internal and external threading
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIA | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | DRILL SIZE 75% |
|------------------------|-------------------------|-------------|------------------|------------|-----------|---------------|----------------|---------------|---------|----------------|
| N68850 | NTM400-M3X.5ISO-.125 | M3 | 0.5 | 0.085 | 1/8 | .1780 | 2 | 3 | ALCRN | 39 |
| N68852 | NTM400-M3.5X.6ISO-.125 | M3.5 | 0.6 | 0.095 | 1/8 | .2350 | 2 | 3 | ALCRN | 32 |
| N68854 | NTM400-M4X.7ISO-.125 | M4 | 0.7 | 0.115 | 1/8 | .2760 | 2 | 3 | ALCRN | 30 |
| N68856 | NTM400-M4.5X.75ISO-.187 | M4.5 | 0.75 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 19 |
| N68858 | NTM400-M5-X.8ISO-.187 | M5 | 0.8 | 0.134 | 3/16 | .3130 | 2 | 3 | ALCRN | 19 |
| N68860 | NTM400-M6X1.0ISO-.187 | M6 | 1 | 0.170 | 3/16 | .5000 | 2-1/2 | 3 | ALCRN | 8 |
| N68862 | NTM400-M8X1.0ISO-.250 | M8 | 1 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | J |
| N68864 | NTM400-M8X1.25ISO-.250 | M8 | 1.25 | 0.235 | 1/4 | .6250 | 2-1/2 | 3 | ALCRN | H |
| N68866 | NTM400-M10X1.25ISO-.312 | M10 | 1.25 | 0.300 | 5/16 | .7500 | 3 | 3 | ALCRN | 11/32 |
| N68868 | NTM400-M10X1.5ISO-.312 | M10 | 1.5 | 0.300 | 5/16 | .7500 | 3 | 3 | ALCRN | R |
| N68870 | NTM400-M12X1.25ISO-.375 | M12 | 1.25 | 0.360 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 27/64 |
| N68872 | NTM400-M12X1.75ISO-.375 | M12 | 1.75 | 0.360 | 3/8 | .8750 | 3-1/2 | 3 | ALCRN | 13/32 |
| N68874 | NTM400-M14X1.25ISO-.375 | M14 | 1.25 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 1/2 |
| N68876 | NTM400-M14X1.5ISO-.375 | M14 | 1.5 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 1/2 |
| N68878 | NTM400-M14X2.0ISO-.375 | M14 | 2 | 0.370 | 3/8 | .8750 | 3-1/2 | 4 | ALCRN | 15/32 |
| N68880 | NTM400-M16X2.0ISO-.500 | M16 | 2 | 0.470 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 35/64 |
| N68882 | NTM400-M18X2.5ISO-.500 | M18 | 2.5 | 0.490 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 39/64 |
| N68884 | NTM400-M20X1.5ISO-.500 | M20 | 1.5 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 47/64 |
| N68886 | NTM400-M20X2.0ISO-.500 | M20 | 2 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 |
| N68888 | NTM400-M20X2.5ISO-.500 | M20 | 2.5 | 0.495 | 1/2 | 1.2500 | 4 | 4 | ALCRN | 11/16 |
| N68890 | NTM400-M24X1.5ISO-.625 | M24 | 1.5 | 0.620 | 5/8 | 1.3730 | 4 | 4 | ALCRN | 22.5MM |
| N68892 | NTM400-M24X2.0ISO-.625 | M24 | 2 | 0.620 | 5/8 | 1.3730 | 4 | 4 | ALCRN | 7/8 |
| N68894 | NTM400-M24X2.5ISO-.625 | M24 | 2.5 | 0.620 | 5/8 | 1.3730 | 4 | 4 | ALCRN | 21.5MM |
| N68896 | NTM400-M24X3.0ISO-.625 | M24 | 3 | 0.620 | 5/8 | 1.3750 | 4 | 4 | ALCRN | 53/64 |

THREAD MILLS-NTM200NPT

SOLID CARBIDE



- Straight flutes for internal and external threading
- National Pipe Taper
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIAMETER | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | DRILL SIZE |
|------------------------|------------------------|-------------|------------------|-----------------|-----------|---------------|----------------|---------------|---------|------------|
| N68820 | NTM200-1/16X27NPT-.250 | 1/16 | 27 | 0.245 | 1/4 | .4375 | 2-1/2 | 3 | ALCRN | B |
| N68822 | NTM200-1/8X27NPT-.250 | 1/8 | 27 | 0.245 | 1/4 | .4375 | 2-1/2 | 3 | ALCRN | 21/64 |
| N68824 | NTM200-1/4X18NPT-.312 | 1/4 | 18 | 0.312 | 5/16 | .6250 | 3 | 3 | ALCRN | 27/64 |
| N68826 | NTM200-3/8X18NPT-.312 | 3/8 | 18 | 0.312 | 5/16 | .6250 | 3 | 3 | ALCRN | 9/16 |
| N68828 | NTM200-1/2X14NPT-.500 | 1/2 | 14 | 0.495 | 1/2 | .8750 | 4 | 4 | ALCRN | 11/16 |
| N68830 | NTM200-3/4X14NPT-.500 | 3/4 | 14 | 0.495 | 1/2 | .8750 | 4 | 4 | ALCRN | 29/32 |
| N68832 | NTM200-1X11.5NPT-.625 | 1 | 11.5 | 0.620 | 5/8 | 1.1250 | 4 | 4 | ALCRN | 1-5/32 |
| N68834 | NTM200-2-1/2X8NPT-.750 | 2.5 | 8 | 0.745 | 3/4 | 1.5000 | 5 | 4 | ALCRN | 2-39/64 |

THREAD MILLS-NTM300NPTF

SOLID CARBIDE



- Straight flutes for internal and external threading
- National Pipe Taper for Fuels
- Cutting Data - Page 296-297
- Tolerance Specs - Page 335

| ORDER NO. | DESCRIPTION | THREAD SIZE | THREADS PER INCH | CUTTER DIAMETER | SHANK DIA | LENGTH OF CUT | OVERALL LENGTH | CUTTING TEETH | COATING | DRILL SIZE |
|------------------------|-------------------------|-------------|------------------|-----------------|-----------|---------------|----------------|---------------|---------|------------|
| N68836 | NTM300-1/16X27NPTF-.250 | 1/16 | 27 | 0.245 | 1/4 | .4375 | 2-1/2 | 3 | ALCRN | B |
| N68838 | NTM300-1/8X27NPTF-.250 | 1/8 | 27 | 0.245 | 1/4 | .4375 | 2-1/2 | 3 | ALCRN | 21/64 |
| N68840 | NTM300-1/4X18NPTF-.312 | 1/4 | 18 | 0.305 | 5/16 | .6250 | 3 | 3 | ALCRN | 27/64 |
| N68842 | NTM300-3/8X18NPTF-.312 | 3/8 | 18 | 0.305 | 5/16 | .6250 | 3 | 3 | ALCRN | 9/16 |
| N68844 | NTM300-1/2X14NPTF-.500 | 1/2 | 14 | 0.495 | 1/2 | .8750 | 4 | 4 | ALCRN | 11/16 |
| N68846 | NTM300-3/4X14NPTF-.500 | 3/4 | 14 | 0.495 | 1/2 | .8750 | 4 | 4 | ALCRN | 29/32 |
| N68848 | NTM300-1X11.5NPTF-.625 | 1 | 11.5 | 0.620 | 5/8 | 1.1250 | 4 | 4 | ALCRN | 1-5/32 |

THREAD MILLS - INCH - START VALUES

| | | THREAD MILLING | | | | | | | | | | |
|-------------------------|-------------------------|------------------------------|-------------------------|---------------------|--------|--------|--------|--------|--------|--------------------|--------|--------|
| ISO GROUP | SMG | V _C (sf / min) | | Z _n = 3 | | | | | | Z _n = 4 | | |
| | | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| P | E 1 - 2 | 500 | n (rev/min) | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 |
| | | | f _Z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |
| | 450 - 550 | v _f (in/min) | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 30.6 | 30.6 | 30.6 | |
| | | n (rev/min) | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | 2139 | 1783 | 1337 | |
| | E 3 - 4 | 350 | f _Z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 |
| | | | v _f (in/min) | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 19.3 | 19.3 | 19.3 |
| E 5 - 6 | 275 | n (rev/min) | 8404 | 5603 | 4202 | 3362 | 2801 | 2101 | 1681 | 1401 | 1051 | |
| | | f _Z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| 250 - 300 | v _f (in/min) | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 12.6 | 12.6 | 12.6 | | |
| | H | M / A 7 >45HRc | 150 | n (rev/min) | 4584 | 3056 | 2292 | 1834 | 1528 | 1146 | 917 | 764 |
| f _Z (in) | | | | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 |
| 125 - 175 | | | v _f (in/min) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 4.1 | 4.1 | 4.1 |
| M | E 8 - 9 | 350 | n (rev/min) | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | 2139 | 1783 | 1337 |
| | | | f _Z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | 300 - 400 | v _f (in/min) | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 16.0 | 16.0 | 16.0 | |
| | | n (rev/min) | 7640 | 5093 | 3820 | 3056 | 2547 | 1910 | 1528 | 1273 | 955 | |
| | E 10 - 11 | 250 | f _Z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 |
| | | | v _f (in/min) | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 11.5 | 11.5 | 11.5 |
| 200 - 300 | n (rev/min) | 15280 | 10187 | 7640 | 6112 | 5093 | 3820 | 3056 | 2547 | 1910 | | |
| | K | E 12 - 13 | 500 | f _Z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 |
| v _f (in/min) | | | | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 38.2 | 38.2 | 38.2 |
| 450 - 550 | | n (rev/min) | 12988 | 8659 | 6494 | 5195 | 4329 | 3247 | 2598 | 2165 | 1624 | |
| | | f _Z (in) | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0023 | 0.0027 | 0.0036 | |
| 375 - 475 | | v _f (in/min) | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 23.4 | 23.4 | 23.4 | |
| | | n (rev/min) | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 | 3667 | 3056 | 2292 | |
| N | E 16 | 600 | f _Z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 |
| | | | v _f (in/min) | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 45.8 | 45.8 | 45.8 |
| | 550 - 650 | n (rev/min) | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 | 3667 | 3056 | 2292 | |
| | | f _Z (in) | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | |
| | E 17 | 600 | v _f (in/min) | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 45.8 | 45.8 | 45.8 |
| | | | n (rev/min) | 18336 | 12224 | 9168 | 7334 | 6112 | 4584 | 3667 | 3056 | 2292 |
| E 18 | 600 | f _Z (in) | 0.0005 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | |
| | | v _f (in/min) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 36.7 | 36.7 | 36.7 | |
| 550 - 650 | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | 611 | 509 | 382 | | |
| | S | E 20 | 100 | f _Z (in) | 0.0003 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0012 | 0.0015 | 0.0018 |
| v _f (in/min) | | | | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.7 | 3.7 | 3.7 |
| 80 - 120 | | n (rev/min) | 3056 | 2037 | 1528 | 1222 | 1019 | 764 | 611 | 509 | 382 | |
| | | f _Z (in) | 0.0003 | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0024 | |
| E 21 | | 100 | v _f (in/min) | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.7 | 3.7 | 3.7 |
| | | | n (rev/min) | 10696 | 7131 | 5348 | 4278 | 3565 | 2674 | 2139 | 1783 | 1337 |
| E 22 | 350 | f _Z (in) | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | |
| | | v _f (in/min) | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 16.0 | 16.0 | 16.0 | |
| 330 - 370 | n (rev/min) | 9168 | 6112 | 4584 | 3667 | 3056 | 2292 | 1834 | 1528 | 1146 | | |
| | f _Z (in) | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 | | |
| 250 - 350 | v _f (in/min) | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 12.8 | 12.8 | 12.8 | | |
| | GRAPHITE | | 300 | n (rev/min) | 9168 | 6112 | 4584 | 3667 | 3056 | 2292 | 1834 | 1528 |
| | | f _Z (in) | | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0028 |
| | | 250 - 350 | v _f (in/min) | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 12.8 | 12.8 | 12.8 |

SMG = Seco Material Group
 n [min-1] = RPM
 V_C (sf/min) = Surface feet/min

f_Z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

THREAD MILLS - METRIC - START VALUES

| | | THREAD MILLING | | | | | | | | | | | | | | | |
|--------------|----------------------|-----------------|-------------|-------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|------|
| ISO GROUP | SMG | vc (m / min) | | Zn = 3 | | | | | | | | Zn = 4 | | | | | |
| | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | | |
| P | E 1 - 2 | 500 | n [min-1] | 16171 | 12129 | 9703 | 8086 | 6064 | 4851 | 4043 | 3465 | 3032 | 2695 | 2426 | 2021 | | |
| | | | fz [in] | .0005 | .0006 | .0008 | .0009 | .0013 | .0016 | .0019 | .0022 | .0025 | .0028 | .0031 | .0038 | | |
| | E 3 - 4 | 350 | 450 - 550 | vf [in/min] | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | |
| | | | n [min-1] | 11320 | 8490 | 6792 | 5660 | 4245 | 3396 | 2830 | 2426 | 2122 | 1887 | 1698 | 1415 | | |
| | E 5 - 6 | 275 | 400 - 400 | fz [in] | .0004 | .0006 | .0007 | .0009 | .0011 | .0014 | .0017 | .0020 | .0023 | .0026 | .0028 | .0034 | |
| | | | | vf [in/min] | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 19.3 | 19.3 | 19.3 | 19.3 | 19.3 |
| H | M / A 7 >45HRc | 150 | n [min-1] | 8894 | 6671 | 5337 | 4447 | 3335 | 2668 | 2224 | 1906 | 1668 | 1482 | 1334 | 1112 | | |
| | | | fz [in] | .0004 | .0005 | .0006 | .0007 | .0009 | .0012 | .0014 | .0017 | .0019 | .0021 | .0024 | .0028 | | |
| M | E 8 - 9 | 350 | 125 - 175 | vf [in/min] | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 12.6 | 12.6 | 12.6 | 12.6 | | |
| | | | n [min-1] | 4851 | 3639 | 2911 | 2426 | 1819 | 1455 | 1213 | 1040 | 910 | 809 | 728 | 606 | | |
| | E 10 - 11 | 250 | 300 - 1310 | fz [in] | .0002 | .0003 | .0004 | .0004 | .0006 | .0007 | .0009 | .0010 | .0011 | .0013 | .0014 | .0017 | |
| | | | | vf [in/min] | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| | E 12 - 13 | 500 | 450 - 550 | n [min-1] | 11320 | 8490 | 6792 | 5660 | 4245 | 3396 | 2830 | 2426 | 2122 | 1887 | 1698 | 1415 | |
| | | | | fz [in] | .0004 | .0005 | .0006 | .0007 | .0009 | .0012 | .0014 | .0017 | .0019 | .0021 | .0024 | .0028 | |
| E 14 - 15 | 425 | 375 - 475 | vf [in/min] | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | | |
| | | | n [min-1] | 8086 | 6064 | 4851 | 4043 | 3032 | 2426 | 2021 | 1733 | 1516 | 1348 | 1213 | 1011 | | |
| E 16 | 600 | 550 - 650 | fz [in] | .0004 | .0005 | .0006 | .0007 | .0009 | .0012 | .0014 | .0017 | .0019 | .0021 | .0024 | .0028 | | |
| | | | vf [in/min] | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | |
| K | E 12 - 13 | 500 | n [min-1] | 16171 | 12129 | 9703 | 8086 | 6064 | 4851 | 4043 | 3465 | 3032 | 2695 | 2426 | 2021 | | |
| | | | fz [in] | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 | .0028 | .0031 | .0035 | .0039 | .0047 | | |
| | E 14 - 15 | 425 | 450 - 550 | vf [in/min] | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 28.7 | 38.2 | 38.2 | 38.2 | 38.2 | | |
| | | | | n [min-1] | 13746 | 10309 | 8247 | 6873 | 5155 | 4124 | 3436 | 2945 | 2577 | 2291 | 2062 | 1718 | |
| | E 16 | 600 | 550 - 650 | fz [in] | .0004 | .0006 | .0007 | .0009 | .0011 | .0014 | .0017 | .0020 | .0023 | .0026 | .0028 | .0034 | |
| | | | | vf [in/min] | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 23.4 | 23.4 | 23.4 | 23.4 | 23.4 |
| N | E 17 | 600 | n [min-1] | 19406 | 14554 | 11643 | 9703 | 7277 | 5822 | 4851 | 4158 | 3639 | 3234 | 2911 | 2426 | | |
| | | | fz [in] | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 | .0028 | .0031 | .0035 | .0039 | .0047 | | |
| | E 18 | 600 | 550 - 650 | vf [in/min] | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 45.8 | 45.8 | 45.8 | 45.8 | | |
| | | | | n [min-1] | 19406 | 14554 | 11643 | 9703 | 7277 | 5822 | 4851 | 4158 | 3639 | 3234 | 2911 | 2426 | |
| | E 20 | 100 | 80 - 120 | fz [in] | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 | .0028 | .0031 | .0035 | .0039 | .0047 | |
| | | | | vf [in/min] | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 |
| S | E 21 | 100 | n [min-1] | 19406 | 14554 | 11643 | 9703 | 7277 | 5822 | 4851 | 4158 | 3639 | 3234 | 2911 | 2426 | | |
| | | | fz [in] | .0005 | .0006 | .0008 | .0009 | .0013 | .0016 | .0019 | .0022 | .0025 | .0028 | .0031 | .0038 | | |
| | E 22 | 350 | 330 - 370 | vf [in/min] | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 36.7 | 36.7 | 36.7 | 36.7 | | |
| | | | | n [min-1] | 3234 | 2426 | 1941 | 1617 | 1213 | 970 | 809 | 693 | 606 | 539 | 485 | 404 | |
| | GRAPHITE | 300 | 250 - 350 | fz [in] | .0003 | .0004 | .0005 | .0006 | .0008 | .0009 | .0011 | .0013 | .0015 | .0017 | .0019 | .0023 | |
| | | | | vf [in/min] | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |

SMG = Seco Material Group

n [min-1] = RPM

vc (sf/min) = Surface feet/min

fz [in] = Feed/tooth

a_p/D_c = % of diameter

vf [in/min] = Feed rate

a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist

All cutting data are start values. All cutting data is in inch values.

Please reference the Workpiece Material Classification chart located on page 15.

THREAD FORMS AND DESIGN

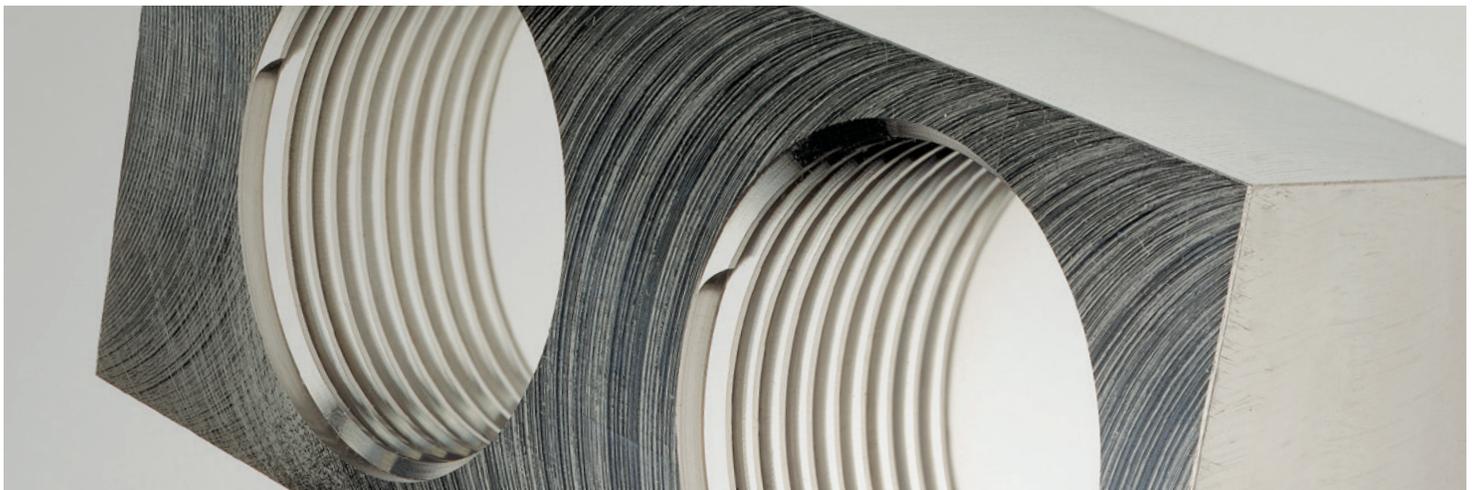
Standard Niagara Cutter Thread Mills - Thread Form Styles

- Unified National Coarse – UNC / 60 Degree / Common Std.
- Unified National Fine – UNF / 60 Degree / Common Std.
- Unified National Extra Fine – UNEF / 60 Degree / Common Std.
- National Pipe Tapered – NPT – 60 Degree
- National Pipe Tapered - NPTF
- Metric – M Series

THREAD MILL DESIGN

Niagara Cutter Thread Mills are designed and comply with following standards:

- UN - ASME B1.1
- NPT / NPTF - ANSI / ASME B1.20.1
- Metric ISO 724



THREAD MILL JUSTIFICATION

With modern machining centers utilizing helical interpolation programs, thread milling operations can be achieved economically. Thread milling offers many advantages over tapping and is a fast growing machining concept in the industry today.

Thread milling offers many advantages:

- One thread mill produces varying thread diameters of the same pitch
- One tool for left and right hand threads
- Increases quality; milled threads can be cut to full depth with excellent form, finish, and dimensional accuracy
- Easy machining of difficult materials
- Pitch diameter can be controlled by CNC offset
- NPT holes do not require taper reaming
- Produces small controllable chips
- Eliminates the safety issues and downtime associated with tap breakage
- Smaller machines can produce larger threads due to less spindle torque
- Less cutting pressure for thin walled workpieces
- Allows 100% thread depth -Tapping usually permits 65-75%



Is it faster to thread mill or tap the work piece?

This question is often asked. Look at the following example:

THREADING APPLICATION COMPARISON

| | | |
|-----------------------|----------------|------------------|
| Material | 4140 Steel | |
| Thread Size | 1/4 - 20 | |
| Depth-of-Thread | 1/2" | |
| Parameters | Thread Milling | Standard Tapping |
| SFM | 150 | 50 |
| IPM | 16.04 | 38.20 |
| Time-in-Cut (seconds) | .100 | .218 |

Thread milling is generating a very small circumference at a high feed rate.

Example: Circumference = .050" Feed Rate = 16.04 IPM

TAPPING VS THREAD MILLING

| Machining Comparison | Thread Mill | Traditional Tap |
|---|-------------|-----------------|
| Broken Tooling Easy to Remove | + | - |
| Free Cutting | + | - |
| Consistent Results | + | - |
| Easy to thread difficult materials: Inconel, Stainless, Titanium, etc. | + | - |
| Special Programming | - | + |

APPLICATION RECOMMENDATIONS

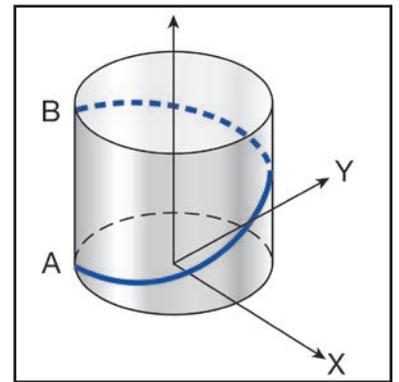
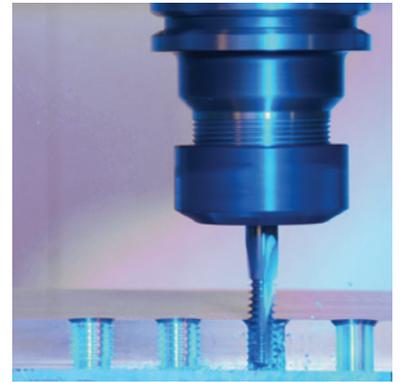
Thread milling tools form a thread using a motion referred to as helical interpolation. This process involves the movement of all three axes on the machine simultaneously. The X and Y axes move in a circular motion and the Z in an axial direction per 360 degrees at a distance equal to the pitch of the thread being machined.

Shown in Figure 1, the programmed tool path starts from the bottom (Point A) and moves toward the top (Point B). A right-hand thread will be climb cut using this process.

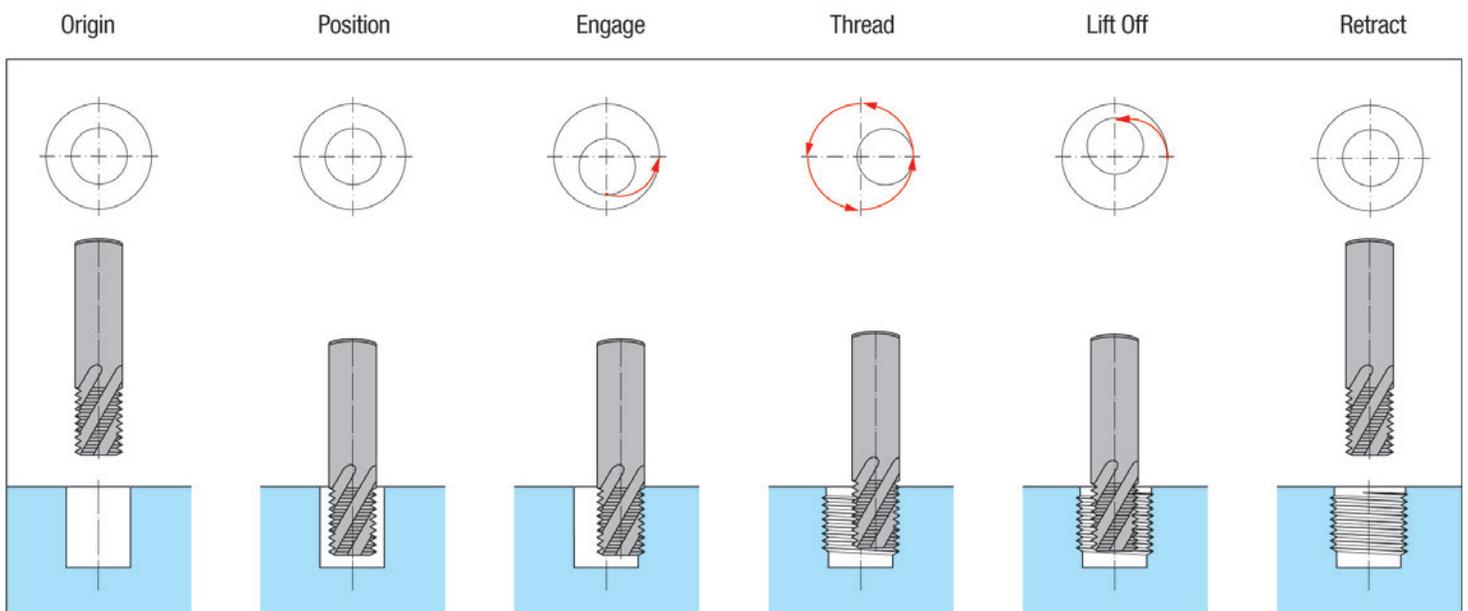
Note: When machining a right-hand thread you will be machining from bottom-to-top for climb cutting. If machining a left-hand thread you will start from top-to-bottom with a right-hand helix tool.

Left-hand threads can be climb cut with a left-hand helix tool starting from the bottom-to-top.

- Climb milling is the preferred method
- Start from the bottom of the hole to avoid re-cutting any chips
- Offset tool from center of the hole to allow a smooth start into the thread
- For difficult materials it may be necessary to make multiple passes



TOOL PATH DURING THREADMILLING





FLEXIBILITY & PERFORMANCE

NIAGARA UNIVERSAL DRILL

Niagara Universal solid carbide drills feature advanced coating technology and optimized geometries for specialized applications that focus on hole quality, high-volume production and achieving the lowest cost per hole. The Universal Drill line adds to the Niagara Cutter family by bringing versatility and reduced inventory costs to low and medium batch production.

MULTI-PURPOSE GEOMETRY

Niagara Universal drills offer performance and value for holemaking applications across all industry segments. The line features a multi-purpose, 4 facet point geometry that provides excellent centering capability, maintains an IT8 / 9 hole tolerance and is easy to regrind. These drills also feature a polished AlCrN coating that offers high-abrasion resistance, toughness and good chip evacuation.

PRODUCT FEATURES

- Drills steel, stainless steel, cast iron and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

YOUR NIAGARA BENEFIT

- Rigid multi-purpose geometry for predictable tool life
- Application security and high-capacity utilization
- Versatility and reduced inventory cost

RANGE OVERVIEW

- Diameters ranging from 0.118" - 0.787" (3 - 20 mm), in increments of 0.004" (0.1 mm)
- 5 x D, coolant-through, R1 cylindrical shank
- 3 x D, coolant-through, R1 cylindrical shank
- 3 x D, non-coolant, R1 cylindrical shank
- Compatible with Seco shrinkfit holders, Seco hydraulic chucks and Seco high-precision collet chucks

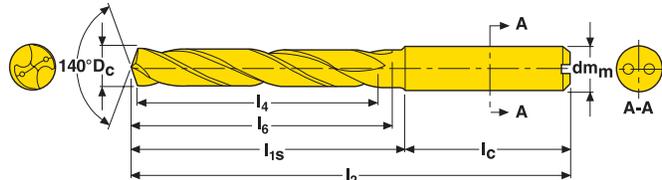
ND1103A - INTERNAL COOLANT

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 3xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|-----------------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00453 | DRILL_3.0MM_3XD_A | 3.000 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00525 | DRILL_3.1MM_3XD_A | 3.100 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00687 | DRILL_1/8_3XD_A | 3.175 | 1/8 | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00526 | DRILL_3.2MM_3XD_A | 3.200 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00527 | DRILL_3.25MM_3XD_A | 3.250 | — | — | — | M3.5 | 14 | 62 | 26 | 36 | 20 | 6 |
| N00528 | DRILL_3.3MM_3XD_A | 3.300 | — | — | M4 | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00529 | DRILL_3.4MM_3XD_A | 3.400 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00532 | DRILL_3.5MM_3XD_A | 3.500 | — | — | UNC8-32 / MF4X0.5 / UNF8-36 | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00688 | DRILL_9/64_3XD_A | 3.572 | 9/64 | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00533 | DRILL_3.6MM_3XD_A | 3.600 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00534 | DRILL_3.65MM_3XD_A | 3.650 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00535 | DRILL_3.7MM_3XD_A | 3.700 | — | — | M4.5 | M4 | 14 | 62 | 26 | 36 | 20 | 6 |
| N00536 | DRILL_3.8MM_3XD_A | 3.800 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00537 | DRILL_3.9MM_3XD_A | 3.900 | — | 4H7 | UNC10-24 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00689 | DRILL_5/32_3XD_A | 3.969 | 5/32 | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00538 | DRILL_4.0MM_3XD_A | 4.000 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00539 | DRILL_4.1MM_3XD_A | 4.100 | — | — | UNF10-32 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00542 | DRILL_4.2MM_3XD_A | 4.200 | — | — | M5 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00543 | DRILL_4.3MM_3XD_A | 4.300 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00692 | DRILL_11/64_3XD_A | 4.366 | 11/64 | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00545 | DRILL_4.5MM_3XD_A | 4.500 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00546 | DRILL_4.6MM_3XD_A | 4.600 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00547 | DRILL_4.65MM_3XD_A | 4.650 | — | — | — | M5 | 17 | 66 | 30 | 36 | 24 | 6 |
| N00548 | DRILL_4.7MM_3XD_A | 4.700 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00693 | DRILL_3/16_3XD_A | 4.763 | 3/16 | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00549 | DRILL_4.8MM_3XD_A | 4.800 | — | — | — | MF5 | 20 | 66 | 30 | 36 | 28 | 6 |
| N00552 | DRILL_4.9MM_3XD_A | 4.900 | — | 5H7 | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00424 | DRILL_5.0MM_3XD_A | 5.000 | — | — | M6 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00553 | DRILL_5.1MM_3XD_A | 5.100 | — | — | UNC1/4-20 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00694 | DRILL_13/64_3XD_A | 5.159 | 13/64 | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00564 | DRILL_5.2MM_3XD_A | 5.200 | — | — | MF6X0.75 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00554 | DRILL_5.3MM_3XD_A | 5.300 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |

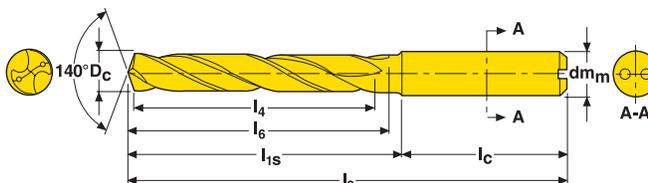
ND1103A - INTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holmaking applications
- High-volume production with lowest cost per hole
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- Drilling Depth 3xD
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- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|-----------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00555 | DRILL_5.4MM_3XD_A | 5.400 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00556 | DRILL_5.5MM_3XD_A | 5.500 | — | — | UNF1/4-28 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00557 | DRILL_5.55MM_3XD_A | 5.550 | — | — | — | M6 | 20 | 66 | 30 | 36 | 28 | 6 |
| N00695 | DRILL_7/32_3XD_A | 5.556 | 7/32 | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00558 | DRILL_5.6MM_3XD_A | 5.600 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00559 | DRILL_5.7MM_3XD_A | 5.700 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00562 | DRILL_5.8MM_3XD_A | 5.800 | — | 6H6 | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00563 | DRILL_5.9MM_3XD_A | 5.900 | — | 6H6/6H7 | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00696 | DRILL_15/64_3XD_A | 5.953 | 15/64 | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00565 | DRILL_6.0MM_3XD_A | 6.000 | — | — | M7 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00566 | DRILL_6.1MM_3XD_A | 6.100 | — | — | NPT1/16 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00567 | DRILL_6.2MM_3XD_A | 6.200 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00568 | DRILL_6.3MM_3XD_A | 6.300 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00697 | DRILL_1/4_3XD_A | 6.350 | 1/4 | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00569 | DRILL_6.4MM_3XD_A | 6.400 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00572 | DRILL_6.5MM_3XD_A | 6.500 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00573 | DRILL_6.6MM_3XD_A | 6.600 | — | — | UNC5/16-18 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00544 | DRILL_6.7MM_3XD_A | 6.700 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00698 | DRILL_17/64_3XD_A | 6.747 | 17/64 | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00574 | DRILL_6.8MM_3XD_A | 6.800 | — | 7H6 | M8 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00575 | DRILL_6.9MM_3XD_A | 6.900 | — | 7H6/7H7 | UNF5/16-24 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00576 | DRILL_7.0MM_3XD_A | 7.000 | — | — | MF8X1 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00577 | DRILL_7.1MM_3XD_A | 7.100 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00699 | DRILL_9/32_3XD_A | 7.144 | 9/32 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00578 | DRILL_7.2MM_3XD_A | 7.200 | — | — | MF8X0.75 | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00579 | DRILL_7.3MM_3XD_A | 7.300 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00582 | DRILL_7.4MM_3XD_A | 7.400 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00423 | DRILL_7.5MM_3XD_A | 7.500 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00702 | DRILL_19/64_3XD_A | 7.541 | 19/64 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00583 | DRILL_7.55MM_3XD_A | 7.550 | — | — | — | MF8 | 29 | 79 | 43 | 36 | 41 | 8 |
| N00584 | DRILL_7.6MM_3XD_A | 7.600 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00585 | DRILL_7.7MM_3XD_A | 7.700 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |

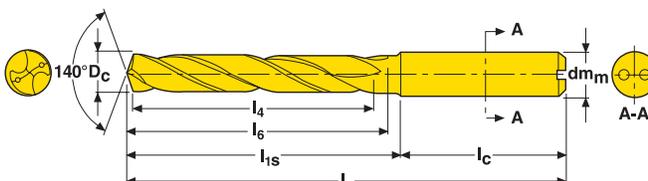
ND1103A - INTERNAL COOLANT (CONT'D)

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- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|------------------|-------------|------------------|----------------|-----------------|----------------|----------------|-------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm h6 |
| N00586 | DRILL_7.8MM_3XD_A | 7.800 | — | 8H6 | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00587 | DRILL_7.9MM_3XD_A | 7.900 | — | 8H6/8H7 | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00703 | DRILL_5/16_3XD_A | 7.938 | 5/16 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00588 | DRILL_8.0MM_3XD_A | 8.000 | — | — | UNC3/8-16 | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00589 | DRILL_8.1MM_3XD_A | 8.100 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00592 | DRILL_8.2MM_3XD_A | 8.200 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00593 | DRILL_8.3MM_3XD_A | 8.300 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00704 | DRILL_21/64_3XD_A | 8.334 | 21/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00594 | DRILL_8.4MM_3XD_A | 8.400 | — | — | NPT1/8 / NPTF1/8 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00595 | DRILL_8.5MM_3XD_A | 8.500 | — | — | M10 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00596 | DRILL_8.6MM_3XD_A | 8.600 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00597 | DRILL_8.7MM_3XD_A | 8.700 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00705 | DRILL_11/32_3XD_A | 8.731 | 11/32 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00598 | DRILL_8.8MM_3XD_A | 8.800 | — | 9H6 | G1/8 / MF10X1.25 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00599 | DRILL_8.9MM_3XD_A | 8.900 | — | 9H6/9H7 | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00602 | DRILL_9.0MM_3XD_A | 9.000 | — | — | MF10X1 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00603 | DRILL_9.1MM_3XD_A | 9.100 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00706 | DRILL_23/64_3XD_A | 9.128 | 23/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00604 | DRILL_9.2MM_3XD_A | 9.200 | — | — | MF10X0.75 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00605 | DRILL_9.3MM_3XD_A | 9.300 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00606 | DRILL_9.4MM_3XD_A | 9.400 | — | — | UNC7/16-14 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00607 | DRILL_9.5MM_3XD_A | 9.500 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00707 | DRILL_3/8_3XD_A | 9.525 | 3/8 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00608 | DRILL_9.55MM_3XD_A | 9.550 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00609 | DRILL_9.6MM_3XD_A | 9.600 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00612 | DRILL_9.7MM_3XD_A | 9.700 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00613 | DRILL_9.8MM_3XD_A | 9.800 | — | 10H6/10H7 | UNF7/16-20 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00708 | DRILL_25/64_3XD_A | 9.922 | 25/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00614 | DRILL_9.9MM_3XD_A | 9.900 | — | 10H6/10H7 | — | MF10 | 35 | 89 | 49 | 40 | 47 | 10 |
| N00615 | DRILL_10.0MM_3XD_A | 10.000 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00616 | DRILL_10.2MM_3XD_A | 10.200 | — | — | M12 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00709 | DRILL_13/32_3XD_A | 10.319 | 13/32 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00617 | DRILL_10.4MM_3XD_A | 10.400 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |

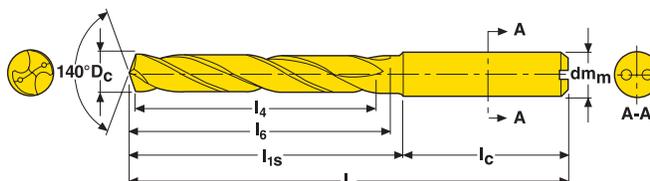
ND1103A - INTERNAL COOLANT (CONT'D)

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- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|---------------------|------------------------|--------------------------|-------------|-----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|-------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm h6 |
| N00618 | DRILL_10.5MM_3XD_A | 10.500 | — | — | MF12X1.5 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00619 | DRILL_10.6MM_3XD_A | 10.600 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00712 | DRILL_27/64_3XD_A | 10.716 | 27/64 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00622 | DRILL_10.8MM_3XD_A | 10.800 | — | 11H6/11H7 | UNC1/2-13 / MF12X1.25 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00623 | DRILL_10.9MM_3XD_A | 10.900 | — | 11H6/11H7 | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00624 | DRILL_11.0MM_3XD_A | 11.000 | — | — | MF12X1 / NPTF1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00625 | DRILL_11.1MM_3XD_A | 11.100 | — | — | NPT1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00713 | DRILL_7/16_3XD_A | 11.113 | 7/16 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00626 | DRILL_11.2MM_3XD_A | 11.200 | — | — | — | M12 | 40 | 102 | 57 | 45 | 55 | 12 |
| N00627 | DRILL_11.3MM_3XD_A | 11.300 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00628 | DRILL_11.4MM_3XD_A | 11.400 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00629 | DRILL_11.5MM_3XD_A | 11.500 | — | — | UNF1/2-20 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00714 | DRILL_29/64_3XD_A | 11.509 | 29/64 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00632 | DRILL_11.55MM_3XD_A | 11.550 | — | — | — | MF12 | 40 | 102 | 57 | 45 | 55 | 12 |
| N00633 | DRILL_11.6MM_3XD_A | 11.600 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00634 | DRILL_11.7MM_3XD_A | 11.700 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00635 | DRILL_11.8MM_3XD_A | 11.800 | — | 12H6/12H7 | G1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00636 | DRILL_11.9MM_3XD_A | 11.900 | — | 12H6/12H7 | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00715 | DRILL_15/32_3XD_A | 11.906 | 15/32 | 12H6/12H7 | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00637 | DRILL_12.0MM_3XD_A | 12.000 | — | — | M14 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00638 | DRILL_12.1MM_3XD_A | 12.100 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00639 | DRILL_12.2MM_3XD_A | 12.200 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00716 | DRILL_31/64_3XD_A | 12.303 | 31/64 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00642 | DRILL_12.4MM_3XD_A | 12.400 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00643 | DRILL_12.5MM_3XD_A | 12.500 | — | — | MF14X1.5 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00644 | DRILL_12.6MM_3XD_A | 12.600 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00717 | DRILL_1/2_3XD_A | 12.700 | 1/2 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00645 | DRILL_12.75MM_3XD_A | 12.750 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00646 | DRILL_12.8MM_3XD_A | 12.800 | — | 13H6/13H7 | MF14X1.25 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00647 | DRILL_12.9MM_3XD_A | 12.900 | — | 13H6/13H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00648 | DRILL_13.0MM_3XD_A | 13.000 | — | — | MF14X1 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00649 | DRILL_33/64_3XD_A | 13.100 | 33/64 | — | — | M14 | 43 | 107 | 62 | 45 | 60 | 14 |
| N00652 | DRILL_13.2MM_3XD_A | 13.200 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |

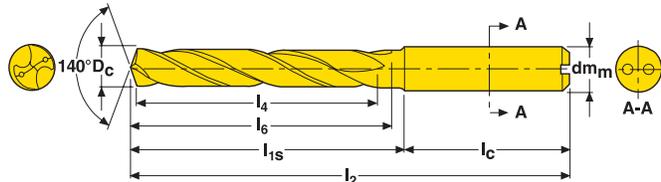
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| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|-----------|---------------------|------------------------|--------------------------|-------------|----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00653 | DRILL_13.3MM_3XD_A | 13.300 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00654 | DRILL_13.4MM_3XD_A | 13.400 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00718 | DRILL_17/32_3XD_A | 13.494 | 17/32 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00655 | DRILL_13.5MM_3XD_A | 13.500 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00656 | DRILL_13.6MM_3XD_A | 13.600 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00657 | DRILL_13.7MM_3XD_A | 13.700 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00658 | DRILL_13.8MM_3XD_A | 13.800 | — | 14H6/14H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00659 | DRILL_35/64_3XD_A | 13.890 | 35/64 | 14H6/14H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00662 | DRILL_14.0MM_3XD_A | 14.000 | — | — | M16 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00663 | DRILL_14.2MM_3XD_A | 14.200 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00719 | DRILL_9/16_3XD_A | 14.288 | 9/16 | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00664 | DRILL_14.5MM_3XD_A | 14.500 | — | — | MF16X1.5 / UNF5/8-18 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00665 | DRILL_37/64_3XD_A | 14.680 | 37/64 | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00666 | DRILL_14.75MM_3XD_A | 14.750 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00667 | DRILL_14.8MM_3XD_A | 14.800 | — | 15H6/15H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00668 | DRILL_15.0MM_3XD_A | 15.000 | — | — | MF16X1 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00669 | DRILL_15.1MM_3XD_A | 15.100 | — | — | — | M16 | 45 | 115 | 67 | 48 | 65 | 16 |
| N00672 | DRILL_15.3MM_3XD_A | 15.300 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00673 | DRILL_39/64_3XD_A | 15.480 | 39/64 | — | M18 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00674 | DRILL_15.7MM_3XD_A | 15.700 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00675 | DRILL_15.8MM_3XD_A | 15.800 | — | 16H6/16H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00722 | DRILL_5/8_3XD_A | 15.875 | 5/8 | 16H6/16H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00676 | DRILL_16.0MM_3XD_A | 16.000 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00677 | DRILL_16.5MM_3XD_A | 16.500 | — | — | MF18X1.5 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00678 | DRILL_17.0MM_3XD_A | 17.000 | — | — | MF18X1 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00679 | DRILL_11/16_3XD_A | 17.460 | 11/16 | — | M20 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00682 | DRILL_18.0MM_3XD_A | 18.000 | — | — | — | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00683 | DRILL_18.5MM_3XD_A | 18.500 | — | — | MF20X1.5 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00684 | DRILL_19.0MM_3XD_A | 19.000 | — | — | G1/2 / MF20X1 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00723 | DRILL_3/4_3XD_A | 19.050 | 3/4 | — | — | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00685 | DRILL_49/64_3XD_A | 19.470 | 49/64 | — | M22 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00686 | DRILL_20.0MM_3XD_A | 20.000 | — | — | — | — | 55 | 131 | 81 | 50 | 79 | 20 |

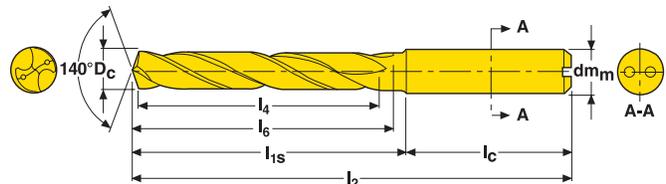
ND1105A - INTERNAL COOLANT

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c mm (mm) | D _c mm (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|-----------------------------|-------------|------------------|----------------|-----------------|----------------|----------------|-------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm h6 |
| N00966 | DRILL_3.0MM_5XD_A | 3.000 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00967 | DRILL_3.1MM_5XD_A | 3.100 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N12142 | DRILL_1/8_5XD_A | 3.175 | 1/8 | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00968 | DRILL_3.2MM_5XD_A | 3.200 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00969 | DRILL_3.25MM_5XD_A | 3.250 | — | — | — | M3.5 | 23 | 66 | 30 | 36 | 28 | 6 |
| N00972 | DRILL_3.3MM_5XD_A | 3.300 | — | — | M4 | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00973 | DRILL_3.4MM_5XD_A | 3.400 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00974 | DRILL_3.5MM_5XD_A | 3.500 | — | — | UNC8-32 / MF4X0.5 / UNF8-36 | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N12143 | DRILL_9/64_5XD_A | 3.572 | 9/64 | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00975 | DRILL_3.6MM_5XD_A | 3.600 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00976 | DRILL_3.65MM_5XD_A | 3.650 | — | — | — | — | 23 | 66 | 30 | 36 | 28 | 6 |
| N00977 | DRILL_3.7MM_5XD_A | 3.700 | — | — | M4.5 | M4 | 23 | 66 | 30 | 36 | 28 | 6 |
| N00978 | DRILL_3.8MM_5XD_A | 3.800 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00979 | DRILL_3.9MM_5XD_A | 3.900 | — | 4H7 | UNC10-24 | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N12144 | DRILL_5/32_5XD_A | 3.969 | 5/32 | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00982 | DRILL_4.0MM_5XD_A | 4.000 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00983 | DRILL_4.1MM_5XD_A | 4.100 | — | — | UNF10-32 | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00984 | DRILL_4.2MM_5XD_A | 4.200 | — | — | M5 | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00985 | DRILL_4.3MM_5XD_A | 4.300 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N12145 | DRILL_11/64_5XD_A | 4.366 | 11/64 | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00986 | DRILL_4.4MM_5XD_A | 4.400 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00987 | DRILL_4.5MM_5XD_A | 4.500 | — | — | UNC12-24 / MF5X0.5 | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00988 | DRILL_4.6MM_5XD_A | 4.600 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N00989 | DRILL_4.65MM_5XD_A | 4.650 | — | — | — | M5 | 29 | 74 | 38 | 36 | 36 | 6 |
| N00992 | DRILL_4.7MM_5XD_A | 4.700 | — | — | — | — | 29 | 74 | 38 | 36 | 36 | 6 |
| N12146 | DRILL_3/16_5XD_A | 4.763 | 3/16 | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N12177 | DRILL_4.8MM_5XD_A | 4.800 | — | — | — | MF5 | 35 | 82 | 46 | 36 | 44 | 6 |
| N00993 | DRILL_4.9MM_5XD_A | 4.900 | — | 5H7 | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N00994 | DRILL_5.0MM_5XD_A | 5.000 | — | — | M6 | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N00995 | DRILL_5.1MM_5XD_A | 5.100 | — | — | UNC1/4-20 | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N12147 | DRILL_13/64_5XD_A | 5.159 | 13/64 | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |

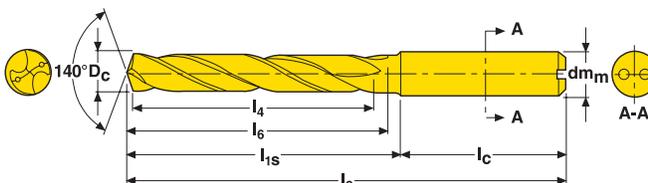
ND1105A - INTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|-----------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00996 | DRILL_5.2MM_5XD_A | 5.200 | — | — | MF6X0.75 | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N00997 | DRILL_5.3MM_5XD_A | 5.300 | — | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N00998 | DRILL_5.4MM_5XD_A | 5.400 | — | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N00999 | DRILL_5.5MM_5XD_A | 5.500 | — | — | UNF1/4-28 | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N12178 | DRILL_5.55MM_5XD_A | 5.550 | — | — | — | M6 | 35 | 82 | 46 | 36 | 44 | 6 |
| N12148 | DRILL_7/32_5XD_A | 5.556 | 7/32 | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01002 | DRILL_5.6MM_5XD_A | 5.600 | — | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01003 | DRILL_5.7MM_5XD_A | 5.700 | — | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01004 | DRILL_5.8MM_5XD_A | 5.800 | — | 6H6 | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01005 | DRILL_5.9MM_5XD_A | 5.900 | — | 6H6/6H7 | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N12149 | DRILL_15/64_5XD_A | 5.953 | 15/64 | — | — | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01006 | DRILL_6.0MM_5XD_A | 6.000 | — | — | M7 | — | 35 | 82 | 46 | 36 | 44 | 6 |
| N01007 | DRILL_6.1MM_5XD_A | 6.100 | — | — | NPTF1/16 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01008 | DRILL_6.2MM_5XD_A | 6.200 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01009 | DRILL_6.3MM_5XD_A | 6.300 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N12152 | DRILL_1/4_5XD_A | 6.350 | 1/4 | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01012 | DRILL_6.4MM_5XD_A | 6.400 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01013 | DRILL_6.5MM_5XD_A | 6.500 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01014 | DRILL_6.6MM_5XD_A | 6.600 | — | — | UNC5/16-18 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01015 | DRILL_6.7MM_5XD_A | 6.700 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N12153 | DRILL_17/64_5XD_A | 6.747 | 17/64 | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01016 | DRILL_6.8MM_5XD_A | 6.800 | — | 7H6 | M8 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01017 | DRILL_6.9MM_5XD_A | 6.900 | — | 7H6/7H7 | UNF5/16-24 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01018 | DRILL_7.0MM_5XD_A | 7.000 | — | — | MF8X1 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01019 | DRILL_7.1MM_5XD_A | 7.100 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N12154 | DRILL_9/32_5XD_A | 7.144 | 9/32 | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01022 | DRILL_7.2MM_5XD_A | 7.200 | — | — | MF8X0.75 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01023 | DRILL_7.3MM_5XD_A | 7.300 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01024 | DRILL_7.4MM_5XD_A | 7.400 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01025 | DRILL_7.5MM_5XD_A | 7.500 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N12155 | DRILL_19/64_5XD_A | 7.541 | 19/64 | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |

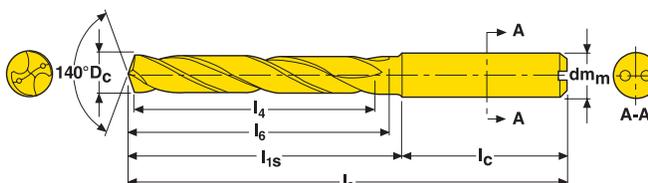
ND1105A - INTERNAL COOLANT (CONT'D)

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- Performance and value for holmaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
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- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | I ₄ | I ₂ | I _{1s} | I _c | I ₆ | dm _m h6 |
| N01026 | DRILL_7.55MM_5XD_A | 7.550 | — | — | — | MF8 | 43 | 91 | 55 | 36 | 53 | 8 |
| N01027 | DRILL_7.6MM_5XD_A | 7.600 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01028 | DRILL_7.7MM_5XD_A | 7.700 | — | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01029 | DRILL_7.8MM_5XD_A | 7.800 | — | 8H6 | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01032 | DRILL_7.9MM_5XD_A | 7.900 | — | 8H6/8H7 | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N12156 | DRILL_5/16_5XD_A | 7.938 | 5/16 | — | — | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01033 | DRILL_8.0MM_5XD_A | 8.000 | — | — | UNC3/8-16 | — | 43 | 91 | 55 | 36 | 53 | 8 |
| N01034 | DRILL_8.1MM_5XD_A | 8.100 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01035 | DRILL_8.2MM_5XD_A | 8.200 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01036 | DRILL_8.3MM_5XD_A | 8.300 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N12157 | DRILL_21/64_5XD_A | 8.334 | 21/64 | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01037 | DRILL_8.4MM_5XD_A | 8.400 | — | — | NPT1/8 / NPTF1/8 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01038 | DRILL_8.5MM_5XD_A | 8.500 | — | — | M10 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01039 | DRILL_8.6MM_5XD_A | 8.600 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01042 | DRILL_8.7MM_5XD_A | 8.700 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N12158 | DRILL_11/32_5XD_A | 8.731 | 11/32 | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01043 | DRILL_8.8MM_5XD_A | 8.800 | — | 9H6 | G1/8 / MF10X1.25 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01044 | DRILL_8.9MM_5XD_A | 8.900 | — | 9H6/9H7 | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01045 | DRILL_9.0MM_5XD_A | 9.000 | — | — | MF10X1 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01046 | DRILL_9.1MM_5XD_A | 9.100 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N12159 | DRILL_23/64_5XD_A | 9.128 | 23/64 | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N01047 | DRILL_9.2MM_5XD_A | 9.200 | — | — | MF10X0.75 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09239 | DRILL_9.3MM_5XD_A | 9.300 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09242 | DRILL_9.4MM_5XD_A | 9.400 | — | — | UNC7/16-14 | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09243 | DRILL_9.5MM_5XD_A | 9.500 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N12162 | DRILL_3/8_5XD_A | 9.525 | 3/8 | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09244 | DRILL_9.55MM_5XD_A | 9.550 | — | — | — | MF10 | 49 | 103 | 63 | 40 | 61 | 10 |
| N09245 | DRILL_9.6MM_5XD_A | 9.600 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09246 | DRILL_9.7MM_5XD_A | 9.700 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09247 | DRILL_9.8MM_5XD_A | 9.800 | — | 10H6/10H7 | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09249 | DRILL_9.9MM_5XD_A | 9.900 | — | 10H6/10H7 | UNF7/16-20 | — | 49 | 103 | 63 | 40 | 61 | 10 |

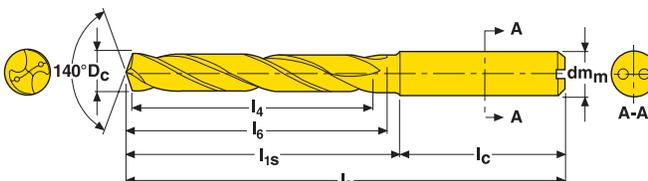
ND1105A - INTERNAL COOLANT (CONT'D)

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- Hole tolerance: IT8-9



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|------------------------|---------------------|------------------------|--------------------------|-------------|-----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N12163 | DRILL_25/64_5XD_A | 9.922 | 25/64 | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09252 | DRILL_10.0MM_5XD_A | 10.000 | — | — | — | — | 49 | 103 | 63 | 40 | 61 | 10 |
| N09253 | DRILL_10.1MM_5XD_A | 10.100 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09254 | DRILL_10.2MM_5XD_A | 10.200 | — | — | M12 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09255 | DRILL_10.3MM_5XD_A | 10.300 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N12164 | DRILL_13/32_5XD_A | 10.319 | 13/32 | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09256 | DRILL_10.4MM_5XD_A | 10.400 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09257 | DRILL_10.5MM_5XD_A | 10.500 | — | — | MF12X1.5 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09259 | DRILL_10.6MM_5XD_A | 10.600 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09262 | DRILL_10.7MM_5XD_A | 10.700 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N12165 | DRILL_27/64_5XD_A | 10.716 | 27/64 | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09263 | DRILL_10.8MM_5XD_A | 10.800 | — | 11H6/11H7 | UNC1/2-13 / MF12X1.25 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09264 | DRILL_10.9MM_5XD_A | 10.900 | — | 11H6/11H7 | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09265 | DRILL_11.0MM_5XD_A | 11.000 | — | — | MF12X1 / NPTF1/4 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09266 | DRILL_11.1MM_5XD_A | 11.100 | — | — | NPT1/4 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N12166 | DRILL_7/16_5XD_A | 11.113 | 7/16 | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09267 | DRILL_11.2MM_5XD_A | 11.200 | — | — | — | M12 | 56 | 118 | 73 | 45 | 71 | 12 |
| N09269 | DRILL_11.3MM_5XD_A | 11.300 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09272 | DRILL_11.4MM_5XD_A | 11.400 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09273 | DRILL_11.5MM_5XD_A | 11.500 | — | — | UNF1/2-20 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N12167 | DRILL_29/64_5XD_A | 11.509 | 29/64 | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09274 | DRILL_11.55MM_5XD_A | 11.550 | — | — | — | MF12 | 56 | 118 | 73 | 45 | 71 | 12 |
| N09275 | DRILL_11.6MM_5XD_A | 11.600 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09276 | DRILL_11.7MM_5XD_A | 11.700 | — | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09277 | DRILL_11.8MM_5XD_A | 11.800 | — | 12H6/12H7 | G1/4 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09279 | DRILL_11.9MM_5XD_A | 11.900 | — | 12H6/12H7 | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N12168 | DRILL_15/32_5XD_A | 11.906 | 15/32 | — | — | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09282 | DRILL_12.0MM_5XD_A | 12.000 | — | — | M14 | — | 56 | 118 | 73 | 45 | 71 | 12 |
| N09283 | DRILL_12.1MM_5XD_A | 12.100 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09284 | DRILL_12.2MM_5XD_A | 12.200 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09285 | DRILL_12.25MM_5XD_A | 12.250 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |

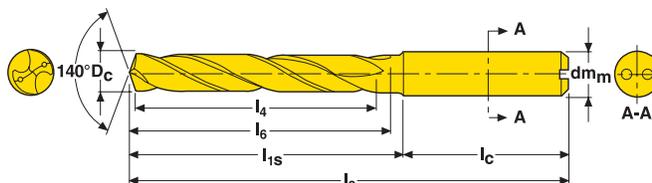
ND1105A - INTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|---------------------|------------------------|--------------------------|-------------|----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N12169 | DRILL_31/64_5XD_A | 12.303 | 31/64 | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09286 | DRILL_12.4MM_5XD_A | 12.400 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09287 | DRILL_12.5MM_5XD_A | 12.500 | — | — | MF14X1.5 | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09289 | DRILL_12.6MM_5XD_A | 12.600 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N12172 | DRILL_1/2_5XD_A | 12.700 | 1/2 | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09292 | DRILL_12.75MM_5XD_A | 12.750 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09293 | DRILL_12.8MM_5XD_A | 12.800 | — | 13H6/13H7 | MF14X1.25 | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09294 | DRILL_12.9MM_5XD_A | 12.900 | — | 13H6/13H7 | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09295 | DRILL_13.0MM_5XD_A | 13.000 | — | — | MF14X1 | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09296 | DRILL_33/64_5XD_A | 13.100 | 33/64 | — | — | M14 | 60 | 124 | 79 | 45 | 77 | 14 |
| N09297 | DRILL_13.2MM_5XD_A | 13.200 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09299 | DRILL_13.3MM_5XD_A | 13.300 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09302 | DRILL_13.4MM_5XD_A | 13.400 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N12173 | DRILL_17/32_5XD_A | 13.494 | 17/32 | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09303 | DRILL_13.5MM_5XD_A | 13.500 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09304 | DRILL_13.6MM_5XD_A | 13.600 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09305 | DRILL_13.7MM_5XD_A | 13.700 | — | — | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09306 | DRILL_13.8MM_5XD_A | 13.800 | — | 14H6/14H7 | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09307 | DRILL_35/64_5XD_A | 13.890 | 35/64 | 14H6/14H7 | — | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09309 | DRILL_14.0MM_5XD_A | 14.000 | — | — | M16 | — | 60 | 124 | 79 | 45 | 77 | 14 |
| N09313 | DRILL_14.1MM_5XD_A | 14.100 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09316 | DRILL_14.2MM_5XD_A | 14.200 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12174 | DRILL_9/16_5XD_A | 14.288 | 9/16 | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09317 | DRILL_14.3MM_5XD_A | 14.300 | — | — | NPT3/8 / NPTF3/8 | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09319 | DRILL_14.4MM_5XD_A | 14.400 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09323 | DRILL_14.5MM_5XD_A | 14.500 | — | — | MF16X1.5 / UNF5/8-18 | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09326 | DRILL_14.6MM_5XD_A | 14.600 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N09353 | DRILL_37/64_5XD_A | 14.680 | 37/64 | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N10398 | DRILL_14.75MM_5XD_A | 14.750 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N11428 | DRILL_14.8MM_5XD_A | 14.800 | — | 15H6/15H7 | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N11460 | DRILL_14.9MM_5XD_A | 14.900 | — | 15H6/15H7 | — | — | 63 | 133 | 85 | 48 | 83 | 16 |

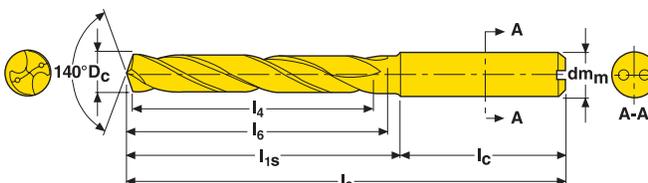
ND1105A - INTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|---------------------|------------------------|--------------------------|-------------|-----------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N11929 | DRILL_15.0MM_5XD_A | 15.000 | — | — | MF16X1 | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12077 | DRILL_19/32_5XD_A | 15.080 | 19/32 | — | — | M16 | 63 | 133 | 85 | 48 | 83 | 16 |
| N12078 | DRILL_15.2MM_5XD_A | 15.200 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12079 | DRILL_15.3MM_5XD_A | 15.300 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12082 | DRILL_15.4MM_5XD_A | 15.400 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12083 | DRILL_39/64_5XD_A | 15.480 | 39/64 | — | M18 | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12084 | DRILL_15.6MM_5XD_A | 15.600 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12085 | DRILL_15.7MM_5XD_A | 15.700 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12086 | DRILL_15.8MM_5XD_A | 15.800 | — | 16H6/16H7 | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12175 | DRILL_5/8_5XD_A | 15.875 | 5/8 | 16H6/16H7 | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12087 | DRILL_15.9MM_5XD_A | 15.900 | — | 16H6/16H7 | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12088 | DRILL_16.0MM_5XD_A | 16.000 | — | — | — | — | 63 | 133 | 85 | 48 | 83 | 16 |
| N12089 | DRILL_16.1MM_5XD_A | 16.100 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12092 | DRILL_16.2MM_5XD_A | 16.200 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12093 | DRILL_41/64_5XD_A | 16.270 | 41/64 | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12094 | DRILL_16.4MM_5XD_A | 16.400 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12095 | DRILL_16.5MM_5XD_A | 16.500 | — | — | MF18X1.5 | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12096 | DRILL_16.6MM_5XD_A | 16.600 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12097 | DRILL_21/32_5XD_A | 16.670 | 21/32 | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12098 | DRILL_16.75MM_5XD_A | 16.750 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12099 | DRILL_16.8MM_5XD_A | 16.800 | — | 17H6/17H7 | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12102 | DRILL_16.9MM_5XD_A | 16.900 | — | 17H6/17H7 | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12103 | DRILL_17.0MM_5XD_A | 17.000 | — | — | MF18X1 | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12104 | DRILL_43/64_5XD_A | 17.070 | 43/64 | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12105 | DRILL_17.2MM_5XD_A | 17.200 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12106 | DRILL_17.3MM_5XD_A | 17.300 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12107 | DRILL_17.4MM_5XD_A | 17.400 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12108 | DRILL_11/16_5XD_A | 17.460 | 11/16 | — | M20 | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12109 | DRILL_17.6MM_5XD_A | 17.600 | — | — | NPTF1/2 | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12112 | DRILL_17.7MM_5XD_A | 17.700 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |

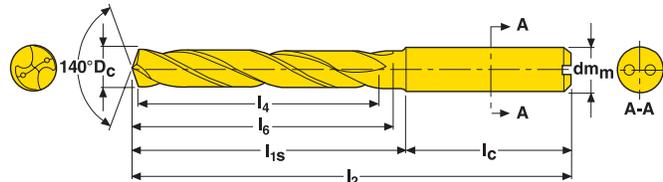
ND1105A - INTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holmaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 5xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|--------------------|------------------------|--------------------------|-------------|-----------------|-------------|------------------|-----|-----------------|----------------|----------------|--------------------|
| | | | | | | | l4 | l2 | l _{1s} | l _c | l ₆ | dm _m h6 |
| N12113 | DRILL_17.8MM_5XD_A | 17.800 | — | 18H6/18H7 | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12114 | DRILL_45/64_5XD_A | 17.860 | 45/64 | 18H6/18H7 | NPT1/2 | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12115 | DRILL_18.0MM_5XD_A | 18.000 | — | — | — | — | 71 | 143 | 95 | 48 | 93 | 18 |
| N12116 | DRILL_18.1MM_5XD_A | 18.100 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12117 | DRILL_18.2MM_5XD_A | 18.200 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12118 | DRILL_23/32_5XD_A | 18.260 | 23/32 | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12119 | DRILL_18.4MM_5XD_A | 18.400 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12122 | DRILL_18.5MM_5XD_A | 18.500 | — | — | MF20X1.5 | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12123 | DRILL_18.6MM_5XD_A | 18.600 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12124 | DRILL_47/64_5XD_A | 18.650 | 47/64 | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12125 | DRILL_18.8MM_5XD_A | 18.800 | — | 19H6/19H7 | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12126 | DRILL_18.9MM_5XD_A | 18.900 | — | 19H6/19H7 | — | M20 | 77 | 153 | 103 | 50 | 101 | 20 |
| N12127 | DRILL_19.0MM_5XD_A | 19.000 | — | — | G1/2 / MF20X1 | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12176 | DRILL_3/4_5XD_A | 19.050 | 3/4 | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12128 | DRILL_19.1MM_5XD_A | 19.100 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12129 | DRILL_19.2MM_5XD_A | 19.200 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12132 | DRILL_19.3MM_5XD_A | 19.300 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12133 | DRILL_19.4MM_5XD_A | 19.400 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12134 | DRILL_49/64_5XD_A | 19.450 | 49/64 | — | M22 | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12135 | DRILL_19.6MM_5XD_A | 19.600 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12136 | DRILL_19.7MM_5XD_A | 19.700 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12137 | DRILL_19.8MM_5XD_A | 19.800 | — | 20H6/20H7 | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12138 | DRILL_25/32_5XD_A | 19.840 | 25/32 | 20H6/20H7 | — | — | 77 | 153 | 103 | 50 | 101 | 20 |
| N12139 | DRILL_20.0MM_5XD_A | 20.000 | — | — | — | — | 77 | 153 | 103 | 50 | 101 | 20 |

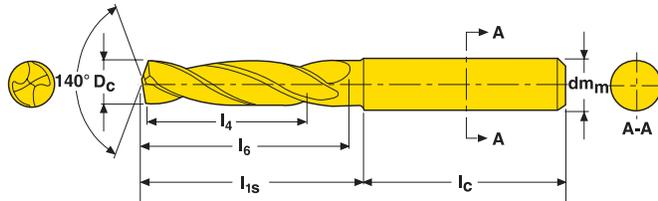
ND1103 - EXTERNAL COOLANT

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 3xD
- Ideal for drill steel, stainless steel, cast iron, and more
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- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|------------------|------------------------|--------------------------|-------------|-----------------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00963 | DRILL_3.0MM_3XD | 3.000 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00724 | DRILL_3.1MM_3XD | 3.100 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00926 | DRILL_1/8_3XD | 3.175 | 1/8 | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00725 | DRILL_3.2MM_3XD | 3.200 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00726 | DRILL_3.25MM_3XD | 3.250 | — | — | — | M3.5 | 14 | 62 | 26 | 36 | 20 | 6 |
| N00727 | DRILL_3.3MM_3XD | 3.300 | — | — | M4 | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00728 | DRILL_3.4MM_3XD | 3.400 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00729 | DRILL_3.5MM_3XD | 3.500 | — | — | UNC8-32 / MF4X0.5 / UNF8-36 | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00927 | DRILL_9/64_3XD | 3.572 | 9/64 | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00732 | DRILL_3.6MM_3XD | 3.600 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00733 | DRILL_3.65MM_3XD | 3.650 | — | — | — | — | 14 | 62 | 26 | 36 | 20 | 6 |
| N00734 | DRILL_3.7MM_3XD | 3.700 | — | — | M4.5 | M4 | 14 | 62 | 26 | 36 | 20 | 6 |
| N00735 | DRILL_3.8MM_3XD | 3.800 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00736 | DRILL_3.9MM_3XD | 3.900 | — | 4H7 | UNC10-24 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00928 | DRILL_5/32_3XD | 3.969 | 5/32 | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00737 | DRILL_4.0MM_3XD | 4.000 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00738 | DRILL_4.1MM_3XD | 4.100 | — | — | UNF10-32 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00739 | DRILL_4.2MM_3XD | 4.200 | — | — | M5 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00742 | DRILL_4.3MM_3XD | 4.300 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00929 | DRILL_11/64_3XD | 4.366 | 11/64 | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00743 | DRILL_4.4MM_3XD | 4.400 | — | — | UNC12-24 / MF5X0.5 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00744 | DRILL_4.5MM_3XD | 4.500 | — | — | UNC12-24 / MF5X0.5 | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00745 | DRILL_4.6MM_3XD | 4.600 | — | — | — | M5 | 17 | 66 | 30 | 36 | 24 | 6 |
| N00746 | DRILL_4.65MM_3XD | 4.650 | — | — | — | M5 | 17 | 66 | 30 | 36 | 24 | 6 |
| N00747 | DRILL_4.7MM_3XD | 4.700 | — | — | — | — | 17 | 66 | 30 | 36 | 24 | 6 |
| N00932 | DRILL_3/16_3XD | 4.763 | 3/16 | — | — | MF5 | 20 | 66 | 30 | 36 | 28 | 6 |
| N00748 | DRILL_4.8MM_3XD | 4.800 | — | — | — | MF5 | 20 | 66 | 30 | 36 | 28 | 6 |
| N00749 | DRILL_4.9MM_3XD | 4.900 | — | 5H7 | M6 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00964 | DRILL_5.0MM_3XD | 5.000 | — | — | UNC1/4-20 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00752 | DRILL_5.1MM_3XD | 5.100 | — | — | UNC1/4-20 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00933 | DRILL_13/64_3XD | 5.159 | 13/64 | — | MF6X0.75 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00753 | DRILL_5.2MM_3XD | 5.200 | — | — | MF6X0.75 | — | 20 | 66 | 30 | 36 | 28 | 6 |

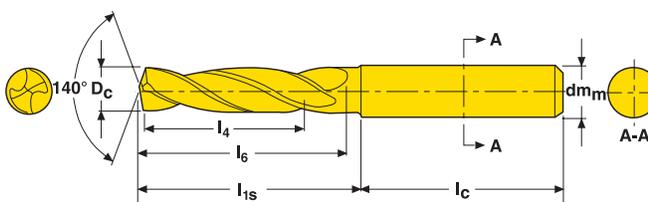
ND1103 - EXTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holemaking applications
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- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c mm (mm) | D _c mm (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|------------------|------------------------|--------------------------|-------------|-----------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | L ₄ | L ₂ | L _{1s} | L _c | L ₆ | dm _m h6 |
| N00754 | DRILL_5.3MM_3XD | 5.300 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00755 | DRILL_5.4MM_3XD | 5.400 | — | — | UNF1/4-28 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00756 | DRILL_5.5MM_3XD | 5.500 | — | — | UNF1/4-28 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00757 | DRILL_5.55MM_3XD | 5.550 | — | — | — | M6 | 20 | 66 | 30 | 36 | 28 | 6 |
| N00934 | DRILL_7/32_3XD | 5.556 | 7/32 | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00758 | DRILL_5.6MM_3XD | 5.600 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00759 | DRILL_5.7MM_3XD | 5.700 | — | — | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00762 | DRILL_5.8MM_3XD | 5.800 | — | 6H6 | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00763 | DRILL_5.9MM_3XD | 5.900 | — | 6H6/6H7 | — | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00935 | DRILL_15/64_3XD | 5.953 | 15/64 | — | M7 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00764 | DRILL_6.0MM_3XD | 6.000 | — | — | NPTF1/16 | — | 20 | 66 | 30 | 36 | 28 | 6 |
| N00765 | DRILL_6.1MM_3XD | 6.100 | — | — | NPTF1/16 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00766 | DRILL_6.2MM_3XD | 6.200 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00767 | DRILL_6.3MM_3XD | 6.300 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00936 | DRILL_1/4_3XD | 6.350 | 1/4 | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00787 | DRILL_6.4MM_3XD | 6.400 | — | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00788 | DRILL_6.5MM_3XD | 6.500 | — | — | UNC5/16-18 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00804 | DRILL_6.6MM_3XD | 6.600 | — | — | UNC5/16-18 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00937 | DRILL_17/64_3XD | 6.747 | 17/64 | — | — | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00805 | DRILL_6.8MM_3XD | 6.800 | — | 7H6 | M8 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00806 | DRILL_6.9MM_3XD | 6.900 | — | 7H6/7H7 | UNF5/16-24 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00807 | DRILL_7.0MM_3XD | 7.000 | — | — | MF8X1 | — | 24 | 79 | 43 | 36 | 34 | 8 |
| N00808 | DRILL_7.1MM_3XD | 7.100 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00938 | DRILL_9/32_3XD | 7.144 | 9/32 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00809 | DRILL_7.2MM_3XD | 7.200 | — | — | MF8X0.75 | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00814 | DRILL_7.3MM_3XD | 7.300 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00815 | DRILL_7.4MM_3XD | 7.400 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00816 | DRILL_7.5MM_3XD | 7.500 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00939 | DRILL_19/64_3XD | 7.541 | 19/64 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00817 | DRILL_7.55MM_3XD | 7.550 | — | — | — | MF8 | 29 | 79 | 43 | 36 | 41 | 8 |
| N00818 | DRILL_7.6MM_3XD | 7.600 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00819 | DRILL_7.7MM_3XD | 7.700 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |

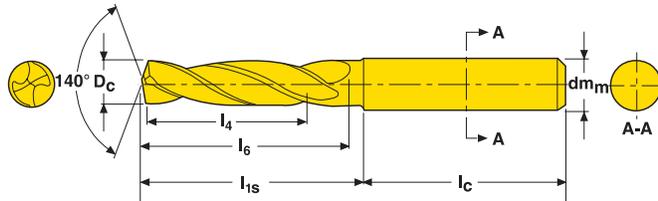
ND1103 - EXTERNAL COOLANT (CONT'D)

SOLID CARBIDE



- Performance and value for holemaking applications
- High-volume production with lowest cost per hole
- Easy to regrind
- Drilling Depth 3xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|------------------|------------------------|--------------------------|-------------|------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00824 | DRILL_7.8MM_3XD | 7.800 | — | 8H6 | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00825 | DRILL_7.9MM_3XD | 7.900 | — | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00942 | DRILL_5/16_3XD | 7.938 | 5/16 | — | — | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00826 | DRILL_8.0MM_3XD | 8.000 | — | — | UNC3/8-16 | — | 29 | 79 | 43 | 36 | 41 | 8 |
| N00827 | DRILL_8.1MM_3XD | 8.100 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00828 | DRILL_8.2MM_3XD | 8.200 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00829 | DRILL_8.3MM_3XD | 8.300 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00943 | DRILL_21/64_3XD | 8.334 | 21/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00834 | DRILL_8.4MM_3XD | 8.400 | — | — | NPT1/8 / NPTF1/8 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00835 | DRILL_8.5MM_3XD | 8.500 | — | — | M10 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00836 | DRILL_8.6MM_3XD | 8.600 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00837 | DRILL_8.7MM_3XD | 8.700 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00944 | DRILL_11/32_3XD | 8.731 | 11/32 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00838 | DRILL_8.8MM_3XD | 8.800 | — | 9H6 | G1/8 / MF10X1.25 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00839 | DRILL_8.9MM_3XD | 8.900 | — | 9H6/9H7 | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00842 | DRILL_9.0MM_3XD | 9.000 | — | — | MF10X1 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00843 | DRILL_9.1MM_3XD | 9.100 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00945 | DRILL_23/64_3XD | 9.128 | 23/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00844 | DRILL_9.2MM_3XD | 9.200 | — | — | MF10X0.75 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00845 | DRILL_9.3MM_3XD | 9.300 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00846 | DRILL_9.4MM_3XD | 9.400 | — | — | UNC7/16-14 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00847 | DRILL_9.5MM_3XD | 9.500 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00946 | DRILL_3/8_3XD | 9.525 | 3/8 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00848 | DRILL_9.55MM_3XD | 9.550 | — | — | — | MF10 | 35 | 89 | 49 | 40 | 47 | 10 |
| N00849 | DRILL_9.6MM_3XD | 9.600 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00852 | DRILL_9.7MM_3XD | 9.700 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00853 | DRILL_9.8MM_3XD | 9.800 | — | 10H6/10H7 | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00854 | DRILL_9.9MM_3XD | 9.900 | — | 10H6/10H7 | UNF7/16-20 | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00947 | DRILL_25/64_3XD | 9.922 | 25/64 | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00855 | DRILL_10.0MM_3XD | 10.000 | — | — | — | — | 35 | 89 | 49 | 40 | 47 | 10 |
| N00856 | DRILL_10.2MM_3XD | 10.200 | — | — | M12 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00948 | DRILL_13/32_3XD | 10.319 | 13/32 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00857 | DRILL_10.4MM_3XD | 10.400 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |

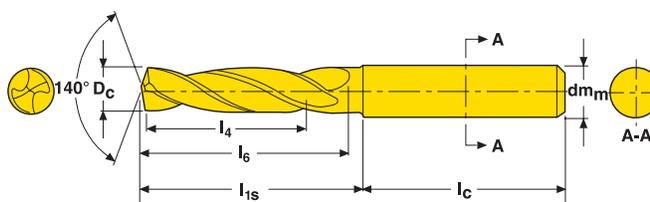
ND1103 - EXTERNAL COOLANT (CONT'D)

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- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|-------------------|------------------------|--------------------------|-------------|-----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | I ₄ | I ₂ | I _{1s} | I _c | L ₆ | dm _m h6 |
| N00858 | DRILL_10.5MM_3XD | 10.500 | — | — | MF12X1.5 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00859 | DRILL_10.6MM_3XD | 10.600 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00949 | DRILL_27/64_3XD | 10.716 | 27/64 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00862 | DRILL_10.8MM_3XD | 10.800 | — | 11H6/11H7 | UNC1/2-13 / MF12X1.25 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00863 | DRILL_10.9MM_3XD | 10.900 | — | 11H6/11H7 | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00864 | DRILL_11.0MM_3XD | 11.000 | — | — | MF12X1 / NPTF1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00865 | DRILL_11.1MM_3XD | 11.100 | — | — | NPT1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00952 | DRILL_7/16_3XD | 11.113 | 7/16 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00866 | DRILL_11.2MM_3XD | 11.200 | — | — | — | M12 | 40 | 102 | 57 | 45 | 55 | 12 |
| N00867 | DRILL_11.3MM_3XD | 11.300 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00868 | DRILL_11.4MM_3XD | 11.400 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00869 | DRILL_11.5MM_3XD | 11.500 | — | — | UNF1/2-20 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00953 | DRILL_29/64_3XD | 11.509 | 29/64 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00872 | DRILL_11.55MM_3XD | 11.550 | — | — | — | MF12 | 40 | 102 | 57 | 45 | 55 | 12 |
| N00873 | DRILL_11.6MM_3XD | 11.600 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00874 | DRILL_11.7MM_3XD | 11.700 | — | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00875 | DRILL_11.8MM_3XD | 11.800 | — | 12H6/12H7 | G1/4 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00876 | DRILL_11.9MM_3XD | 11.900 | — | 12H6/12H7 | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00954 | DRILL_15/32_3XD | 11.906 | 15/32 | — | — | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00877 | DRILL_12.0MM_3XD | 12.000 | — | — | M14 | — | 40 | 102 | 57 | 45 | 55 | 12 |
| N00965 | DRILL_12.1MM_3XD | 12.100 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00878 | DRILL_12.2MM_3XD | 12.200 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00955 | DRILL_31/64_3XD | 12.303 | 31/64 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00879 | DRILL_12.4MM_3XD | 12.400 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00882 | DRILL_12.5MM_3XD | 12.500 | — | — | MF14X1.5 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00883 | DRILL_12.6MM_3XD | 12.600 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00956 | DRILL_1/2_3XD | 12.700 | 1/2 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00884 | DRILL_12.75MM_3XD | 12.750 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00885 | DRILL_12.8MM_3XD | 12.800 | — | 13H6/13H7 | MF14X1.25 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00886 | DRILL_12.9MM_3XD | 12.900 | — | 13H6/13H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00887 | DRILL_13.0MM_3XD | 13.000 | — | — | MF14X1 | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00888 | DRILL_33/64_3XD | 13.100 | 33/64 | — | — | M14 | 43 | 107 | 62 | 45 | 60 | 14 |
| N00889 | DRILL_13.2MM_3XD | 13.200 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |

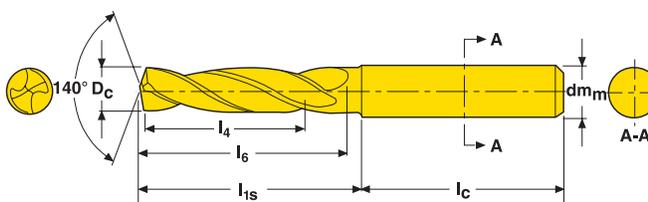
ND1103 - EXTERNAL COOLANT (CONT'D)

SOLID CARBIDE



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- Easy to regrind
- Drilling Depth 3xD
- Ideal for drill steel, stainless steel, cast iron, and more
- Incorporates a multi-purpose, 4 facet point geometry
- Optimized through a polished AlCrN coating

- Cutting Data - Page 319
- Hole tolerance: IT8-9



| ORDER NO. | DESCRIPTION | D _c m7 (mm) | D _c m7 (inch) | REAMER SIZE | TAP THREAD TYPE | FORMING TAP | DIMENSIONS IN MM | | | | | |
|------------------------|-------------------|------------------------|--------------------------|-------------|----------------------|-------------|------------------|----------------|-----------------|----------------|----------------|--------------------|
| | | | | | | | l ₄ | l ₂ | l _{1s} | l _c | l ₆ | dm _m h6 |
| N00892 | DRILL_13.3MM_3XD | 13.300 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00893 | DRILL_13.4MM_3XD | 13.400 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00957 | DRILL_17/32_3XD | 13.494 | 17/32 | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00894 | DRILL_13.5MM_3XD | 13.500 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00895 | DRILL_13.6MM_3XD | 13.600 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00896 | DRILL_13.7MM_3XD | 13.700 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00897 | DRILL_13.8MM_3XD | 13.800 | — | 14H6/14H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00898 | DRILL_35/64_3XD | 13.890 | 35/64 | 14H6/14H7 | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00899 | DRILL_14.0MM_3XD | 14.000 | — | — | — | — | 43 | 107 | 62 | 45 | 60 | 14 |
| N00902 | DRILL_14.2MM_3XD | 14.200 | — | — | — | M16 | 45 | 115 | 67 | 48 | 65 | 16 |
| N00958 | DRILL_9/16_3XD | 14.288 | 9/16 | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00903 | DRILL_14.5MM_3XD | 14.500 | — | — | MF16X1.5 / UNF5/8-18 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00904 | DRILL_37/64_3XD | 14.680 | 37/64 | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00905 | DRILL_14.75MM_3XD | 14.750 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00906 | DRILL_14.8MM_3XD | 14.800 | — | 15H6/15H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00907 | DRILL_15.0MM_3XD | 15.000 | — | — | MF16X1 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00908 | DRILL_15.1MM_3XD | 15.100 | — | — | — | M16 | 45 | 115 | 67 | 48 | 65 | 16 |
| N00909 | DRILL_15.3MM_3XD | 15.300 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00912 | DRILL_39/64_3XD | 15.480 | 39/64 | — | M18 | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00913 | DRILL_15.7MM_3XD | 15.700 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00914 | DRILL_15.8MM_3XD | 15.800 | — | 16H6/16H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00959 | DRILL_5/8_3XD | 15.875 | 5/8 | 16H6/16H7 | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00915 | DRILL_16.0MM_3XD | 16.000 | — | — | — | — | 45 | 115 | 67 | 48 | 65 | 16 |
| N00916 | DRILL_16.5MM_3XD | 16.500 | — | — | MF18X1.5 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00917 | DRILL_17.0MM_3XD | 17.000 | — | — | MF18X1 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00918 | DRILL_11/16_3XD | 17.460 | 11/16 | — | M20 | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00919 | DRILL_18.0MM_3XD | 18.000 | — | — | — | — | 51 | 123 | 75 | 48 | 73 | 18 |
| N00922 | DRILL_18.5MM_3XD | 18.500 | — | — | MF20X1.5 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00923 | DRILL_19.0MM_3XD | 19.000 | — | — | G1/2 / MF20X1 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00962 | DRILL_3/4_3XD | 19.050 | 3/4 | — | — | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00924 | DRILL_49/64_3XD | 19.447 | 49/64 | — | M22 | — | 55 | 131 | 81 | 50 | 79 | 20 |
| N00925 | DRILL_20.0MM_3XD | 20.000 | — | — | — | — | 55 | 131 | 81 | 50 | 79 | 20 |

ND110X – Ø 0.118-0.787 - START VALUES

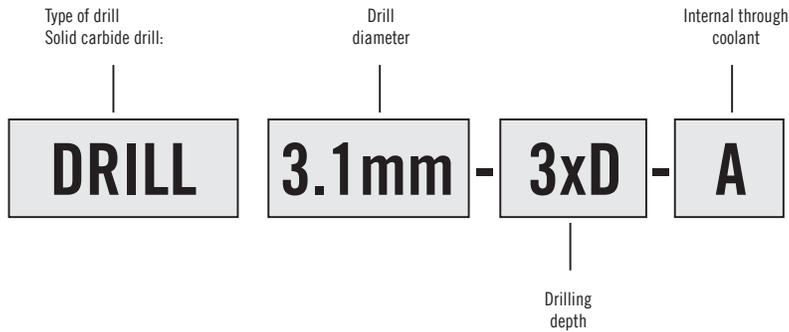
| ISO GROUP | SMG | Recommended cutting speed Vc (sf/min) | | Recommended feed f, (in/rev) | | | | | | | | | |
|-----------|---------|---------------------------------------|-------------------------|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | External Coolant Supply | Internal Coolant Supply | .118 | .157 | .236 | .315 | .394 | .472 | .551 | .630 | .709 | .787 |
| P | 1 | 322 | 413 | .0045 | .0055 | .0065 | .0090 | .0110 | .0115 | .0135 | .0145 | .0155 | .0155 |
| | 2 - 3 | 231 | 368 | .0045 | .0055 | .0065 | .0090 | .0110 | .0115 | .0135 | .0145 | .0155 | .0155 |
| | 4 - 5 | 231 | 298 | .0045 | .0055 | .0065 | .0080 | .0100 | .0110 | .0125 | .0135 | .0135 | .0135 |
| | 6 | 186 | 231 | .0035 | .0045 | .0055 | .0070 | .0080 | .0090 | .0110 | .0115 | .0115 | .0115 |
| H | 7 | 140 | 186 | .0025 | .0035 | .0045 | .0055 | .0065 | .0070 | .0080 | .0090 | .0100 | .0100 |
| M | 8 - 9 | 140 | 186 | .0025 | .0025 | .0035 | .0045 | .0055 | .0065 | .0070 | .0070 | .0070 | .0080 |
| K | 12 | 252 | 322 | .0065 | .0070 | .0090 | .0115 | .0145 | .0155 | .0180 | .0190 | .0200 | .0205 |
| | 13 - 14 | 231 | 277 | .0055 | .0070 | .0080 | .0110 | .0125 | .0135 | .0160 | .0170 | .0170 | .0180 |
| | 15 | 161 | 207 | .0035 | .0035 | .0045 | .0065 | .0070 | .0080 | .0090 | .0100 | .0100 | .0100 |

SMG = Seco Material Group
 n [min-1] = RPM
 v_c (sf/min) = Surface feet/min

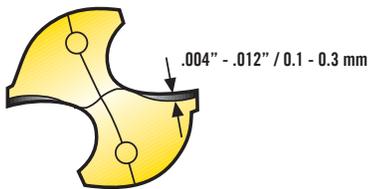
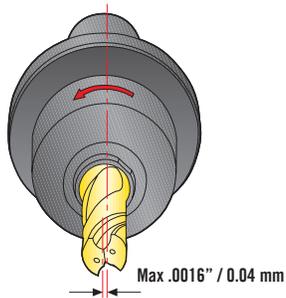
f_z [in] = Feed/tooth
 a_p/D_c = % of diameter
 v_f [in/min] = Feed rate
 a_p/D_c = % of diameter

A = Air D = Dry E = Emulsion (flood coolant) M = Mist
 All cutting data are start values. All cutting data is in inch values.
 Please reference the Workpiece Material Classification chart located on page 15.

CODE KEY NIAGARA CUTTER UNIVERSAL



SET UP



HOLDING/RUN-OUT

Drills with cylindrical shanks can be used with Shrinkfit holders, hydraulic chucks or collet chucks. For best results keep run-out < .0008" / .02 mm. Keep the total indicated run-out of the drill within Max .0016" / .04 mm.

STABILITY

The stability of the application is important to obtain the best tool life and hole accuracy. Check the condition of the machine spindle, fixture and fixturing of the component to secure maximum stability and rigidity. Unstable conditions can cause tool breakages.

TOOL LIFE

Drills should not be used with flank wear exceeding .004" - .012" / 0.1 - 0.3 mm measured at the largest point.

RECOMMENDED TOOL HOLDERS

For best result use holders:
 Type 5603 - Shrinkfit holders, DIN type
 Type 5834 - Hydraulic chucks
 Type 5672 - High precision collet chucks
 For more information see EPB Tooling systems catalog

SHRINKFIT HOLDER

(For cylindrical, R1 shanks only)



HYDRAULIC CHUCK

(For cylindrical, -R1 shanks only)



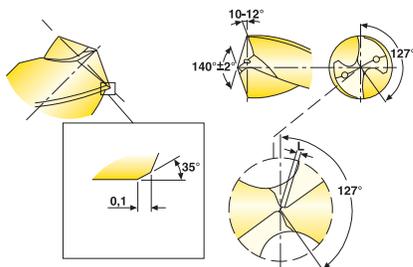
HIGH PRECISION COLLET CHUCKS

(For cylindrical, -R1 shanks only)



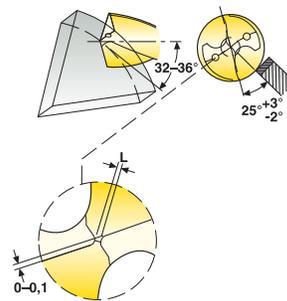
REGRINDING INSTRUCTIONS

1. FOUR FACET POINT



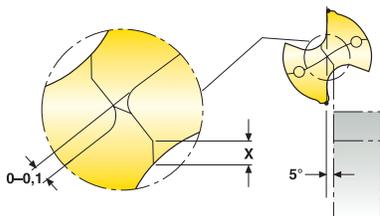
Lip height distance (axial run-out) to be within 0.02 mm

2. WEB THINNING



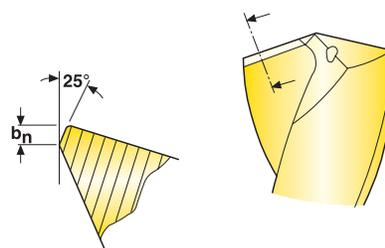
| Drill $\varnothing D_c$ (mm) | L (mm) |
|------------------------------|---------|
| 2-10 | 0.1-0.3 |
| 10-20 | 0.2-0.4 |

3. GRINDING OF FLAT X



$$X = 0,08 \times \text{drill diameter } D_c$$

4. EDGE PREPARATION



| Workpiece material | b_n (mm) | |
|--------------------|----------------------------------|-------------------------------|
| | Drill $\varnothing \leq 10$ (mm) | Drill $\varnothing > 10$ (mm) |
| Steel | 0.05 | 0.10 |
| Stainless steel | 0.05 | 0.05 |
| Cast iron | 0.05 | 0.10 |

Max. allowed flank wear before regrinding is 0.1-0.3 mm / .004"-0.012" measured at the largest point.

SPECIFICATIONS

Proposed specification of diamond wheels:

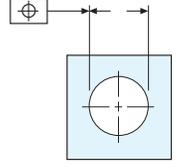
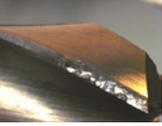
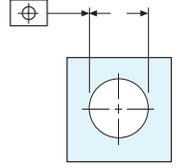
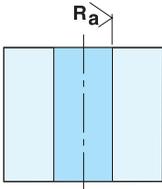
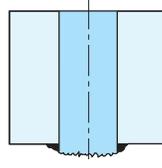
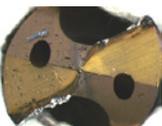
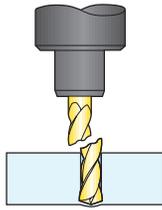
- Conical clearance: Wheel shape 12A2 Grit size D54 (picture 1)
- Gashing: Wheel shape 1A1 or 1V1 Grit size D64-D46 (picture 2-3)
- Corner chamfer: Wheel shape 1A1 or 12A2 (picture 1)
- Edge treatment: grinding K-land or brushing (picture 4)

IMPORTANT:

- The cutting edges must be uniform and have the same size of edge preparation
- The edge preparation must be applied on the whole length of the cutting edges

TROUBLESHOOTING – INITIAL CHECK POINTS

- Fixturing stability
- Machine spindle condition
- Tool holder condition
- Clamping of tool:
 - Run-out within .02 mm / .0008" TIR
 - If using pre drilling within .04 mm / .0016" TIR
- Chip evacuation:
 - Cutting data
- Coolant:
 - Pressure
 - Flow
 - Concentration

| RAPID FLANK WEAR | UNSATISFACTORY DIAMETER TOLERANCE |
|---|--|
| <ul style="list-style-type: none"> • Reduce the cutting speed • Increase coolant concentration  | <ul style="list-style-type: none"> • Increase the feed/rev • Use a reaming operation • Use a boring operation  |
| WEAR / PERIPHERY LAND | UNSATISFACTORY POSITIONING OF THE HOLE |
| <ul style="list-style-type: none"> • Reduce the cutting speed • Increase coolant concentration  | <ul style="list-style-type: none"> • Reduce feed/rev on entrance / Reduce feed/rev • Use a boring operation • If drilling through rough, hard and angled surfaces - reduce the feed by 30%-50% during entrance and exit • Center drill with a 140° point angle  |
| CHIPPING / CENTER | UNSATISFACTORY SURFACE FINISH |
| <ul style="list-style-type: none"> • Reduce feed during entrance • Increase coolant pressure and adjust the feed to optimize the chip formation  | <ul style="list-style-type: none"> • Reduce the feed/rev • Increase the cutting speed • Use a reaming operation  |
| CHIPPING / OUTER CORNER, CUTTING EDGE | BURRS ON EXIT |
| <ul style="list-style-type: none"> • Reduce feed during entrance/ exit • Reduce the cutting speed • Increase coolant concentration • Regrind the drill  | <ul style="list-style-type: none"> • Reduce the feed/rev. on exit • Reduce the width of edge preparation (b_n)  |
| BUILT-UP EDGE | BREAKAGE ON CONTACT / AT HOLE BOTTOM |
| <ul style="list-style-type: none"> • If closer to the periphery increase the cutting speed • If closer to center increase feed/ rev • If the drill is worn, regrind it  | <ul style="list-style-type: none"> • Reduce the feed/rev. during entrance/exit • Adjust cutting data for improved chip evacuation  |

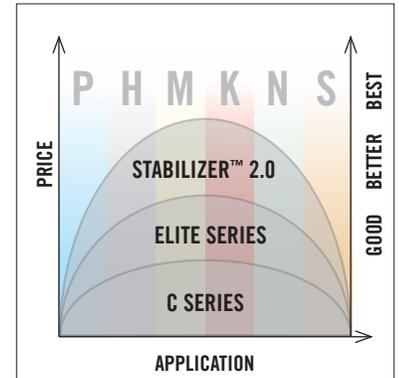
We can help you to increase your productivity, enhance your performance and reduce your costs with the range of products we offer that cover the full spectrum of application and performance requirements. Although every situation is different, we can make some general suggestions on tool selection, per material and machining application. You will need to assess every opportunity and decide which tool is the best fit for your requirements.

PROVIDING SOLUTIONS FOR ANY APPLICATION

Stabilizer™ series tools provide high performance in the general machining category. These tools should be applied where performance is critical. The Stabilizer family offers high performance and versatility in a variety of materials and operations. The 4 flute Stabilizer 2.0 is available in square, ball and radius ends and an AlTiN coating. The 5 flute Stabilizer is available in square and radius ends with AlCrN coated inch tools and AlTiN coated metric tools.

Elite series tools are a high performance solution for material specific machining applications where performance is important. These tools come with and AlTiN coatings as standard and are available in multiple geometries and number of flutes to provide process optimization in various materials.

Niagara C series should be applied in basic general machining environments. These tools are offered in uncoated or TiAlN coated as standard. Square shoulder and ball end geometries with 2, 3 or 4 flute versions are available.



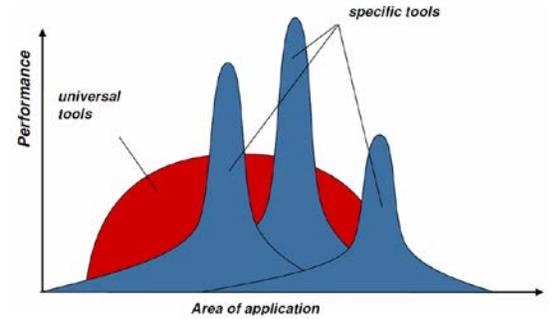
RECOMMENDED TOOLING

| ISO GROUP | SELECTION | SLOTTING | | PROFILING | | COPY MILLING | |
|-----------|------------|----------------|------------|----------------|--------------|----------------|-------------|
| | | PRODUCT FAMILY | RANGE | PRODUCT FAMILY | RANGE | PRODUCT FAMILY | RANGE |
| P | 1ST CHOICE | STR430.2 | 1/8 - 1" | STR540 | 1/4 - 1" | STB430.2 | 1/8 - 1" |
| | 2ND CHOICE | S335 | 1/8 - 1" | S638 | 1/8 - 1" | CB230 | 1/64 - 1" |
| M | 1ST CHOICE | STR440.2 | 1/8 - 1" | S638 | 1/8 - 1" | STB440.2 | 1/8 - 1" |
| | 2ND CHOICE | STR430.2 | 1/8 - 1" | S738/S938 | 1/4 - 1" | SB335 | 1/8 - 1" |
| K | 1ST CHOICE | STR430.2 | 1/8 - 1" | S638 | 1/8 - 1" | STB430.2 | 1/8 - 1" |
| | 2ND CHOICE | S335 | 1/8 - 1" | S545 | 1/8 - 1 1/4" | CB230 | 1/64 - 1" |
| N | 1ST CHOICE | AN340 | 3/16 - 1" | A345 | 1/8 - 1" | AB245 | 1/4 - 1" |
| | 2ND CHOICE | A245 | 1/8 - 1" | A345R | 1/8 - 1" | CB230 | 1/64 - 1" |
| S | 1ST CHOICE | STR440.2 | 1/8 - 1" | S638 | 1/8 - 1" | STB440.2 | 1/8 - 1" |
| | 2ND CHOICE | STR430.2 | 1/8 - 1" | S738/S938 | 1/4 - 1" | MB215 | 1/16 - 1/2" |
| H | 1ST CHOICE | MZN410R | 1/8 - 5/8" | MZ645/MZ645R | 1/8 - 1/2" | MBZ215 | 1/16 - 1/2" |
| | 2ND CHOICE | STR440.2 | 1/8 - 1" | S738/S938 | 1/4 - 1" | MB215 | 1/16 - 1/2" |

HIGH PERFORMANCE VS. GENERAL PURPOSE

Both High Performance and General Purpose tools use the highest quality carbide substrate and coatings. The difference between the two categories lies in their geometries.

High performance tools are designed to run exceptionally well in specific applications. General purpose tools are designed with versatility in mind, and run well over a wide application area.



TOOL MATERIAL TYPES

COBALT (HSCO)

- Low Cost
- Tough
- Shock Absorbing
- Versatile
- Greater heat and wear resistance than HSS

SOLID CARBIDE

- Hardest material
- Most wear resistant
- Most brittle
- Most cost (above 1/2")
- Longest life
- High productivity
- Higher SFPM

POWDER METAL (ASP2030)

- Finer grain size as compared to HSCO yielding increased toughness, superior wear resistance, and more shock resistance
- Great for High Temp Alloys (Inconel, Waspalloy)
- Higher cost than HSS or HSCO

FACTORS IN CHOOSING THE CORRECT TOOL MATERIAL

- Age, type, strength, condition, hp of machine
- Rigidity of the machine and fixturing
- Spindle speed available
- Manual or power feed
- Workpiece material and condition
- Number of pcs to be produced
- Material removal rate required

WHAT DO COATINGS DO?

In short, coatings increase tool life. They provide a thermal barrier between the cutting edge & the workpiece. Coatings increase the hardness on the surface of the tool. Coatings also increase lubricity for better chip flow and evacuation, causing less heat. They minimize built-up edge, improving surface finish, and reduce abrasive wear.

PVD COATINGS

TiN - TITANIUM NITRIDE

A general purpose coating for HSS, HSCO, and Solid Carbide end mills that provides effective protection against wear, abrasion, and edge buildup. Primary applications are milling steels in a non-hardened condition.

TiCN - TITANIUM CARBONITRIDE

Incorporation of Carbon into the TiN matrix to increase hardness and abrasion resistance. TiCN is an alternative to TiN for HSS and HSCO applications where additional wear resistance is required. Primary Solid Carbide applications are milling aluminum alloys & cast iron.

TiAlN - TITANIUM ALUMINUM NITRIDE

TiAlN offers a higher level of thermal stability above TiN and TiCN with abrasion resistance. Ideal for high heat applications found in milling steels, stainless steels and high temp alloys with a hardness 52 Rc and below.

AlTiN - ALUMINUM TITANIUM NITRIDE

Increased thermal stability when milling high temp alloys and Die/Mold steels with a hardness 52 Rc and above. Excellent for HSM applications, Titanium, and Stainless Steels. HSS/HSCO end mills can't be coated with AlTiN.

AlCrN - ALUMINUM CHROMIUM NITRIDE

Excellent wear resistance under conventional and extreme conditions when milling Die/Mold steels with a hardness 52 Rc and below. Excellent choice for tool steel, alloy steel, and stainless steel applications.

CVD COATINGS

DIAMONDPLUS

DiamondPlus coatings are made of multiple layers of uniquely structured nano-crystalline diamonds. The 100% ultra fine-grain diamond throughout the coating results in a tool that resists abrasive & adhesive wear and stands up to mechanical shock. The hard, smooth surface provides the best part finish with no built up edges. Primary applications are composite materials, high silicon aluminum, and graphite. When milling graphite, tool life 12-20 times longer than uncoated tungsten carbide is typical.

Do not use DiamondPlus on steels. The high heat generated from milling steels causes the carbon from the diamond to diffuse into the iron, causing chemical wear. Regrinding a DiamondPlus endmill is not recommended. Standard C430's or similar cannot be coated with DiamondPlus.

FLUTE NUMBERS

2 & 3 FLUTE

- For slotting
- Maximum chip evacuation
- Preferred for softer materials



4 FLUTE

- For slotting and profiling
- Transitional tool between 3 flute and Multi Flute



5 FLUTE

- For profiling
- More teeth in cut for greater stability



6 FLUTE

- Profiling in hard milling
- Reduced chip loads
- Larger core diameter for greatest rigidity



END MILL CORNER DESIGN

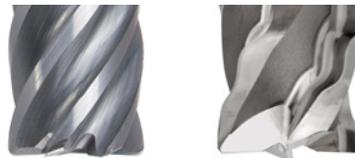
SQUARE

Designed for general machining at a true square angle.



CORNER RADIUS / CORNER CHAMFER

For general machining. Creates corner protection for increased tool life. Good in roughing operations.



BALL NOSE

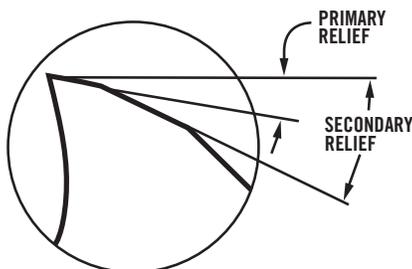
Designed for molds and dies, especially finishing 3d parts. There is zero cutting speed at center.



RADIAL RELIEF

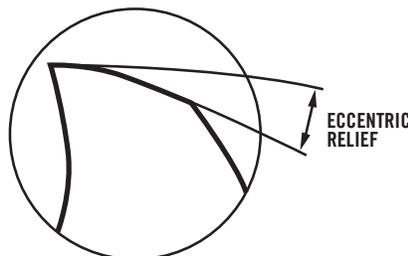
STANDARD

The most common type of radial relief. Regrind primary relief to sharpen cutting edge (caution: radial rake can be affected).



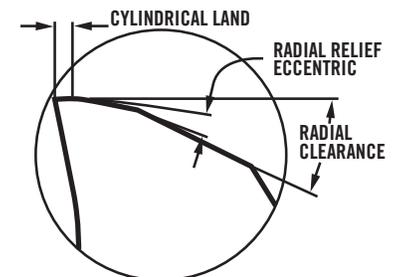
ECCENTRIC

Stronger cutting edge than standard relief. Easier to regrind (face regrind). Constant relief angle.



CYLINDRICAL LAND

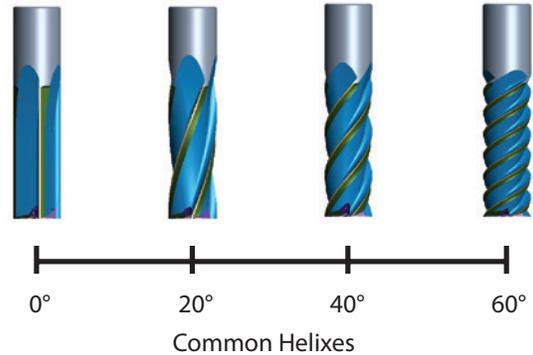
Balances the cutting edge in the cut. Best in aluminum applications. Reduced chatter and vibration. Eccentric relief strengthens the tooth.



HELIX ANGLES

The helix angle is the angle of the cutting edge in relationship to the centerline. It affects the following:

- Cutting forces or shearing of the material
- Chip evacuation
- Surface finish



KNUCKLE PITCH

FINE PITCH



- Moderate chip loads
- Wide range of materials

APPLICATION AREAS

Ductile Cast Irons, Alloy Steels, Stainless Steels, Cobalt Alloys, Magnesium Alloys, Nickel Alloys, Titanium Alloys, Alloys

COARSE PITCH



- Higher chip loads
- General purpose

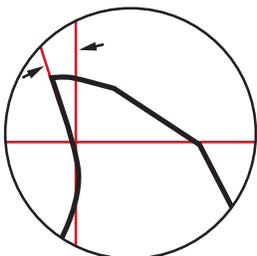
APPLICATION AREAS

Plastics, Wood, Aluminum Alloys, Copper Alloys, Lead, Tin, Zinc, Carbon Steel, Gray Cast Iron

RAKE ANGLE

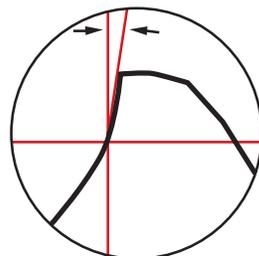
POSITIVE RAKE ANGLE

Allows for freer machining and reduced cutting pressure. It is effective in softer and ferrous materials such as steels and stainless steels.

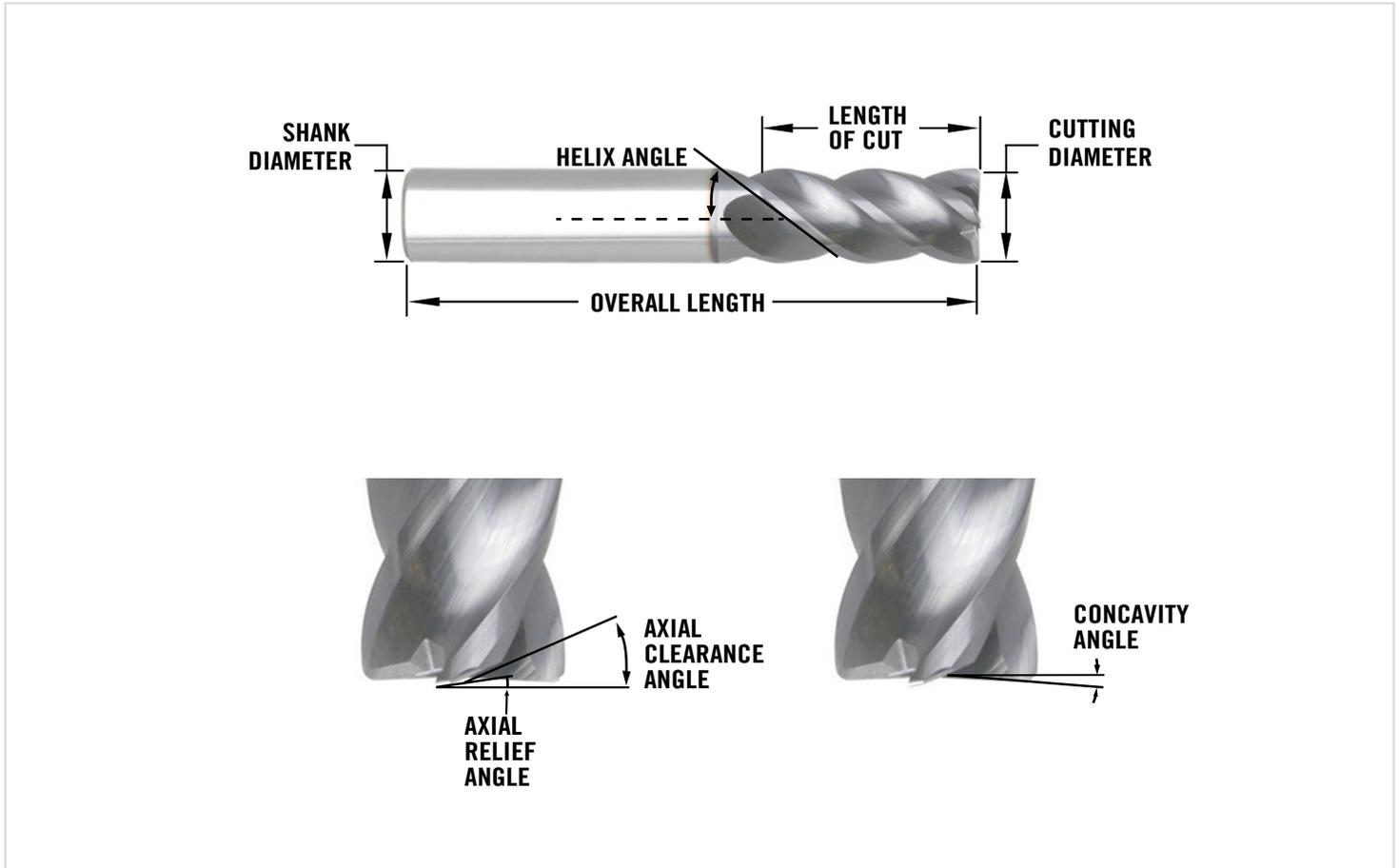


NEGATIVE RAKE ANGLE

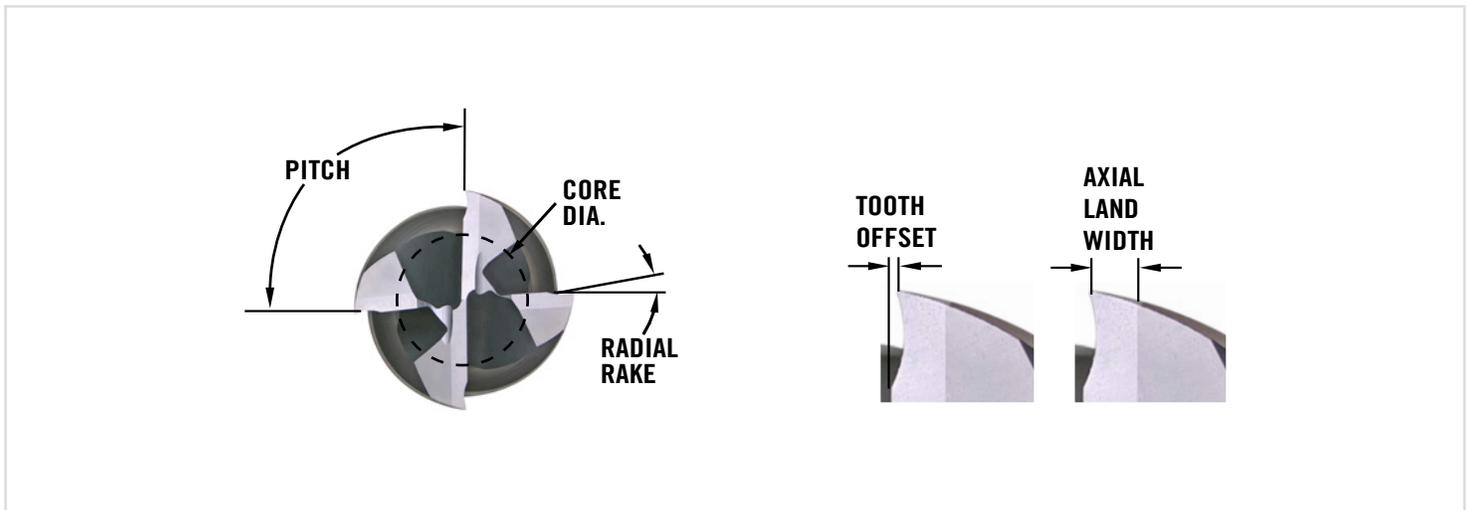
Creates stronger cutting edges optimal for harder to machine materials such as tool steels and hardened steels.



SIDE VIEW



END VIEW

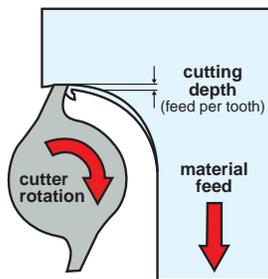


CLIMB MILLING VS. CONVENTIONAL MILLING

CLIMB MILLING (1ST CHOICE)

The tooth meets the work at the top of the cut, producing the thickest part of the chip first.

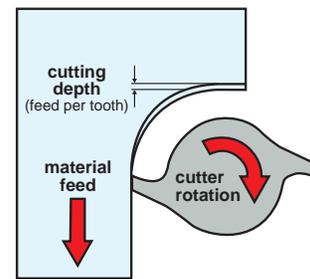
- Efficient cutting
- Long and reliable tool life
- Better surface finish, especially with stainless steels, aluminum or titanium alloys
- Risk tool breakage due to sudden machining backlash if the machine lacks rigidity



CONVENTIONAL MILLING

The width of the chip starts at zero and increases to a maximum at the end of the cut.

- Use only when the machine tool lacks rigidity or works loosely (old milling machine, low quality machine, worn machine)
- Tendency to push the workpiece away
- Tool edge slides instead of cutting, causing high friction between tool flank face and material



MILLING CONSIDERATIONS IN STEEL, ALUMINUM, AND STAINLESS STEEL

STEEL

- Material grade
- Material hardness
- Rigidity is a must (machine, fixturing)
- Chip formation
- Chip evacuation
- Tool overhang must be kept to a minimum

ALUMINUM

- Chatter
- Minimizing aluminum sticking to the cutting edge
- Chip formation
- Chip evacuation (controlling large amount of chips)
- Tool Rigidity / core strength

STAINLESS STEEL

- Rigidity is a must (machine, fixturing)
- Tool overhang must be kept to a minimum
- Use flood coolant
- Use sufficient cutting depth so not to work harden the part (avoid rubbing and dwelling)
- Use a tool with a corner radius whenever possible (corner strength)
- Higher chip loads per tooth can be used with end mills that have a corner radius
- Surface finish is improved with a corner radius (larger radius the better the finish)



Good aluminum chips.



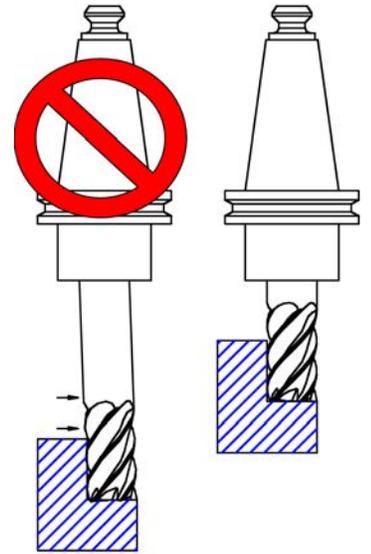
Caution!

Work Hardening: The remaining milled surface becomes harder, changing the cutting conditions. This occurs when the radial depth of cut is not sufficient and there is a rubbing action at the cutting interface. Work hardening results in increased cutting forces and increased heat.

TOOL OVERHANG AND RUN-OUT

Tool Overhang is the distance that the tool extends from the end of toolholder (diameter to length ratio). Cutting forces, which push the tool away from the cut, cause tool deflection when tool overhang is excessive. The rule of thumb is to keep the maximum overhang 8:1 for length of cut and 12:1 for overall length.

Keeping tool overhang to a minimum can lead to the following benefits: increased tool life, reduced chatter and vibration, improved part finish, increased speed and feed, and increased productivity.



DEFLECTION AND RELATIVE RIGIDITY (CANTILEVER BEAM)

The table below shows the relative rigidity of an endmill based on the diameter and tool overhang*. In this case the basis is 1/4" x 1". From the table below, a 1/2" x 1" end mill is 16 times more rigid than a 1/4" x 1" end mill.

Quick Tips:

A 20% reduction of length reduces deflection by 50%.

A 20% increase in tool diameter reduces deflection by 50%.

Optimal tool life can only be achieved if run-out is less than 0.0004".

| DIAMETER | OVERHANG | RELATIVE RIGIDITY |
|----------|----------|-------------------|
| 1/4" | 1" | 1X |
| 1/2" | 1" | 16X |
| 1/2" | 2" | 2X |
| 1/2" | 4" | .26X |
| 3/4" | 1" | 81X |
| 3/4" | 2" | 10X |
| 3/4" | 4" | 1.3X |
| 1" | 1" | 260X |
| 1" | 2" | 34X |
| 1" | 4" | 4X |



Smooth surface - rigid setup.



Chatter - unstable setup.

WELDON TOOLHOLDERS - RECOMMENDED SET SCREW TIGHTENING TORQUE

| HOLDER HOLE SIZE | SET SCREW SIZE | MAX FOOT POUNDS |
|------------------|----------------|-----------------|
| 3/16" | 1/4" - 20 | 6.5 |
| 3/8" | 3/8" - 16 | 16.7 |
| 1/2" | 7/16" - 14 | 25 |
| 5/8" | 9/16" - 12 | 37.5 |
| 3/4" | 5/8" - 11 | 76.7 |
| 7/8" | 5/8" - 11 | 76.7 |
| 1" | 3/4" - 10 | 125 |
| 1 1/4" | 3/4" - 10 | 125 |
| 2" | 1" - 14 | 300 |
| 2 1/2" | 1" - 14 | 300 |





TROUBLESHOOTING GUIDE

| PROBLEM / CAUSE | SOLUTION |
|--|---|
| TOOL BREAKAGE | |
| Feed rate excessive | Reduce feed rate |
| Depth of cut excessive | Decrease width and depth of cut |
| Overhang of tool is too much | Hold shank deeper, use shorter end mill |
| Wear is too much | Regrind at earlier stage |
| EXCESSIVE WEAR | |
| Speed is too fast | Decrease spindle speed, use better coolant |
| Hard work material | Use the right coating |
| Improper speed and feed (usually too slow) | Increase feed and speed |
| Improper helix angle | Change tool to correct helix angle |
| Primary relief angle is too large | Change to smaller relief angle |
| Recutting chips | Change feed and speed / Use more coolant or high pressure coolant/air |
| REDUCED TOOL LIFE | |
| Cutting friction is excessive | Regrind at earlier stage |
| Hard work material | Use an appropriate coolant |
| Improper helix and relief angle | Change to correct helix angle and primary relief |
| CHIPPED CUTTING EDGES | |
| Feed rate excessive | Reduce feed rate |
| Feed too heavy on first cut | Reduce feed rate on first cut |
| Lack of rigidity (machine & holder) | Use better machine or tool holder or change parameters |
| Lack of rigidity (tool) | Use shorter tool, hold shank deeper, try climb milling |
| Tool cutting corner too sharp | Decrease primary relief and cutting angle, reduce radial width-of-cut |
| Single chipped cutting edge | Reduce run-out to less than .0004" |
| CHIP PACKING | |
| Cut too heavy | Decrease width and depth of cut |
| Not enough chip clearance | Use end mill with fewer flutes |
| Not enough coolant | Use higher coolant pressure and reposition nozzle to point of cut or use air pressure |

| PROBLEM / CAUSE | SOLUTION |
|---|--|
| WORK PIECE BURRS | |
| Wear on primary relief is too much | Regrind at earlier stage |
| Incorrect feed and speed rates | Correct cutting parameters |
| Improper helix angle | Change to correct cutting angle |
| ROUGH SURFACE FINISH | |
| Feed rate too high | Reduce feed rate |
| Cutting speed too slow | Increase RPM |
| Wear is excessive | Regrind at earlier stage |
| Recutting chips | Change feed and speed. Use more coolant or high pressure coolant/air |
| SQUEAL AND CHATTERING | |
| Feed and speed too fast | Correct cutting parameters |
| Lack of rigidity (machine & holder) | Use better machine or tool holder or change parameters |
| Poor set up | Improve clamping rigidity |
| Cut is too heavy | Decrease width and depth of cut |
| Overhang of tool excessive | Hold shank deeper, use shorter end mill |
| Lack of relief | Decrease relief angle |
| SIDE WALL TAPER IN WORKPIECE | |
| Feed rate too heavy | Reduce feed rate |
| Overhang of tool excessive | Hold shank deeper, use shorter end mill |
| Too few flutes | Use multiflute end mill, use end mill with higher rigidity |
| NO DIMENSIONAL ACCURACY | |
| Cut is too heavy | Decrease width and depth of cut |
| Lack of accuracy (machine & holder) | Repair machine or holder |
| Rigidity is insufficient (machine & holder) | Change machine or tool holder or change parameters |
| Too few flutes | Use multiflute end mill, use end mill with higher rigidity |

WHEN IS IT TIME TO CHANGE A TOOL?

- When the part's surface finish is no longer acceptable
- When accuracy is no longer achievable and constant offset adjustment is required
- When Burrs start to appear on the work piece that were not there before
- When chips change to a blue, purple, black color
- When unusual noises start (increased vibration)
- When the spindle load reaches an unacceptable level (power consumption)
- When a pre-determined number of parts has been reached
- When the wear land reaches a certain level for the diameter and type of end mill (reference only, see right)

| CUTTING DIAMETER | FINISHING END MILL | ROUGHING END MILL |
|------------------|--------------------|-------------------|
| 1/8" - 3/8" | UP TO 0.004" | 0.004" - 0.006" |
| 3/8" - 3/4" | UP TO 0.006" | 0.006" - 0.010" |
| 3/4" - 1" | UP TO 0.008" | 0.010" - 0.012" |
| 1" - 1 1/4" | UP TO 0.010" | 0.012" - 0.016" |

Surface speed, surface footage, surface area are directly related. Cutting speed is the peripheral speed (velocity) at the outside edge of an endmill (surface speed). The faster the spindle speed the higher the SFM. SFM is the distance in feet that the cutting edge travels in one minute. IPM and IPT (The rate at which the cutting tool is advanced into the workpiece). Feed per tooth is the thickness of chip that each cutting edge removes in one pass.

RPM

$$n = \frac{v_c \cdot 12}{\pi \cdot D_c} \text{ or } \frac{v_c \cdot 3.82}{D_c} \quad (\text{rev/min})$$

CUTTING SPEED

$$v_c = \frac{n \cdot \pi \cdot D_c}{12} \text{ or } \frac{n \cdot D_c}{3.82} \quad (\text{sf/min})$$

FEED SPEED

$$v_f = n \cdot z_n \cdot f_z \quad (\text{inch/min})$$

$$v_f = n \cdot z_c \cdot f_z$$

FEED PER REVOLUTION

$$f = z_n \cdot f_z \quad (\text{inch/rev})$$

$$f = z_c \cdot f_z$$

METAL REMOVAL RATE

$$Q = a_e \cdot a_p \cdot v_f \quad (\text{inch}^3/\text{min})$$

CUTTING SPEED AND RPM FOR COPYING

$$v_c = \frac{n \cdot \pi \cdot D_w}{12} \text{ or } \frac{n \cdot D_w}{3.82} \quad (\text{sf/min})$$

$$n = \frac{v_c \cdot 12}{\pi \cdot D_w} \text{ or } \frac{v_c \cdot 3.82}{D_w} \quad (\text{RPM})$$

$$D_w = 2 \cdot \sqrt{a_p (D_c - a_p)} \quad (\text{inch})$$

CALCULATION OF a_p VS. OVERHANG LENGTH:

If the overhang length (XS) is longer than $4 \times D_c$ and Cylindrical shanks are used it is important to adopt another depth of cut (a_p) value than that indicated in the table. Use the following formula to calculate the new a_p value

$$a_p = a_p \cdot (4 \cdot D_c / xs) 2$$

PROFILE HEIGHT

$$H = \frac{D_c}{2} - \sqrt{\frac{D_c^2 - a_e^2}{2}}$$

$$D_w = 2 \cdot \sqrt{a_p (D_c - a_p)}$$

Profile height H (um)

| D _c | Pitch a _e (μm) | | | | | | |
|----------------|---------------------------|------|------|------|-------|-------|-------|
| | 0.06 | 0.08 | 0.11 | 0.15 | 0.20 | 0.30 | 0.45 |
| 1 | 0.90 | 1.60 | 3.00 | 5.70 | 10.00 | 23.00 | 53.00 |
| 2 | 0.45 | 0.80 | 1.50 | 2.80 | 5.00 | 11.00 | 26.00 |
| 4 | 0.23 | 0.40 | 0.76 | 1.40 | 2.50 | 5.60 | 13.00 |
| 6 | 0.15 | 0.27 | 0.50 | 0.94 | 1.70 | 3.80 | 8.40 |
| 8 | 0.11 | 0.20 | 0.38 | 0.70 | 1.30 | 2.80 | 6.30 |
| 10 | 0.09 | 0.16 | 0.30 | 0.56 | 1.00 | 2.30 | 5.10 |
| 12 | 0.08 | 0.13 | 0.25 | 0.47 | 0.83 | 1.90 | 4.20 |

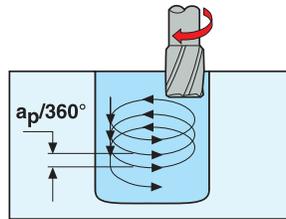
- a_p = Depth of cut mm/axial depth of cut (in)
- a_e = Width of cut mm/radial depth of cut (in)
- D_c = Cutter diameter
- f = Feed per revolution (in/rev)
- f_z = Feed per tooth (in/tooth)
- z_n = No. of teeth
- n = RPM (rev/min)
- Q = Material removal rate (in³/min)
- v_c = Cutting speed (sf/min)
- v_f = Feed speed (in/min)
- D_w = Working diameter

HELICAL INTERPOLATION

The table below shows the minimum hole diameter that should be made per the diameter of the end mill being used.

RECOMMENDED DIAMETER OF HOLE FOR HELICAL INTERPOLATION RAMPING

| DIAMETER OF END MILL D_c | DIAMETER OF HOLE |
|----------------------------|-------------------|
| 1/32 - 3/32 | $1.4 \times D_c$ |
| 1/8 - 1/4 | $1.3 \times D_c$ |
| 3/8 - 1/2 | $1.2 \times D_c$ |
| 5/8 - 1 1/4 | $1.15 \times D_c$ |

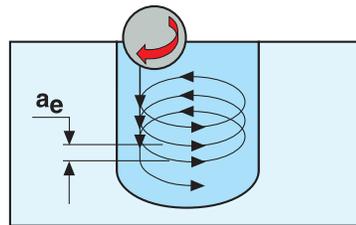


TROCHOIDAL METHOD

The figure below shows a method often called the trochoidal method for milling slots.

RECOMMENDED WIDTH OF SLOT

| DIAMETER OF END MILL D_c | SLOT WIDTH |
|----------------------------|------------------|
| 1/32 - 3/32 | $1.8 \times D_c$ |
| 1/8 - 1/4 | $1.6 \times D_c$ |
| 3/8 - 1/2 | $1.4 \times D_c$ |
| 5/8 - 1 1/4 | $1.2 \times D_c$ |



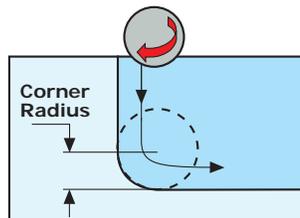
CORNER CONTACT

Generate component corners to optimize tool life.

- Use maximum diameter of cutting tool, but have maximum difference between the radius of the tool and the radius in the corner of the component.
- In a corner the contact arc of the tool increases rapidly according to the difference in radius between the tool and the component. This results in more forces on the tool, resulting in deflection and increased temperature in the corner, which means a reduction in tool life.

RECOMMENDATIONS

| END MILL DIAMETER | MINIMUM CORNER RADIUS |
|-------------------|-----------------------|
| 1/64 - 3/32 | $D_c / 2 \times 1.4$ |
| 1/8 - 1/4 | $D_c / 2 \times 1.3$ |
| 3/8 - 1/2 | $D_c / 2 \times 1.2$ |
| 5/8 - 1 1/4 | $D_c / 2 \times 1.15$ |



Ex: 1/4 tool, minimum corner radius to be generated is .1625.

SOLID CARBIDE END MILLS

| END MILL STYLE | NUMBER OF FLUTES | NIAGARA CUT DIAMETER TOLERANCE | CORRESPONDING LIST NUMBERS |
|---|------------------|---|---|
| SINGLE-END DOUBLE-END FINISHERS | ALL | + .000 / - .002 | STS430.2, STR430.2, STB430.2, STRN430.2, STBN430.2, STS430M.2, STR430M.2, STB430M.2, STR440.2, STB440.2, STRN440.2, STBN440.2, STR440M.2, STB440M.2, STS540, STR540, STS540M, STR540M, A245, A245R, AB245, AN245, ANB245, AN340, A345, A345R, AN345, AN345R, A345M, S335, SB335, SN335, S545, S545R, S638, S638R, SB638, SBN638, SN638, SN638R, SCS638, SCS638R, S738, S738R, SCS738R, S938, S938R, SCS938R, S545M, S645M, SN200R, SN400R, SN500R, C230, C230R, C330, C360, C430, C430R, CB230, CB330, CB430, C230M, C430M, CB230M, CB430M, C330M, CD230, CD430, CSD230, CSD430, CSDB230, CSDB430 |
| SINGLE-END & DOUBLE-END FINISHERS (FLUTE DIA <=7/64") | ALL | + / - .0005 | C230, CB230, CSD230, CSDB230, C330, CB330, C430, CB430, CSD430, CSDB430, C230M, CB230M, C330M, C430M, CB430M |
| HIGH FEED (FLUTE DIA <1/8") | 2 | + / - .0005 | SN200R |
| SINGLE-END FINISHERS NC TOLERANCE | 2 & 4 | + .001 / - .000 | CNC230, CNCB230, CNC430, CNCB430 |
| SINGLE-END ROUGHERS | 3, 4 & 5 | + .000 / - .003 | AR330, SR420, SR545, SR420M |
| SINGLE-END MICRO DECIMAL | 2 & 4 | + / - .0005 | ME230, MES230, MEB230, MESB230, ME430, MES430, MEB430 |
| THREAD MILLS | ALL | + .000 / - .002 | NTM100UN, NTM120UN, NTM160UN, NTM200NPT, NTM300NPTF, NTM400MI |
| COMPOSITE CUTTING TOOLS | ALL | + .000 / - .002 | DIARTREM, DIARTRBE, DIACC, DIAEPB, DIAPPB, DIABEB |
| DIAMOND COATED END MILLS | 2 & 4 | + / - .001 | DIA230, DIA430, DIAB230, DIAB430, DIACR430, DIAL230, DIAL430, DIALB430, DIAXRB430, DIAXRR430, DIAXSB430, DIA230M, DIAB230M, DIA430M |
| MOLD AND DIE | 6 | + .000 / - .002 | MZ645, MZ645R |
| MOLD AND DIE (FLUTE DIA < SHANK DIA) | 2 | + / - .0005 | MB215, MB215M, MBZ215 |
| MOLD AND DIE (FLUTE DIA = SHANK DIA) | 2 | + .000 / - .001 | MB215, MB215M, MBZ215 |
| BALL-END | ALL | BALL RADIUS TOLERANCE: FLUTE DIA TOLERANCE / 2 | ALL |
| CORNER RADIUS | ALL | + / - .001 | ALL SERIES |

| SHANK DIAMETER TOLERANCES | END MILL STYLE | NIAGARA TOLERANCE |
|---------------------------|------------------|-------------------|
| | ALL INCH SHANK | - .0001 / - .0004 |
| | ALL METRIC SHANK | H6 |

| LENGTH OF CUT TOLERANCES | END MILL STYLE | NIAGARA TOLERANCE |
|--------------------------|-----------------------------|-------------------|
| | ALL EXCLUDING MICRO DECIMAL | + .030 / -0 |
| | MICRO DECIMAL | + .010 / -0 |

| OVERALL LENGTH TOLERANCES | END MILL STYLE | NIAGARA TOLERANCE |
|---------------------------|----------------|-------------------|
| | ALL | + / - .060 |

| TIR CONDITION | END MILL STYLE | CUTTING DIAMETER | NIAGARA TOLERANCE |
|---------------|------------------------|------------------|-------------------|
| | | .005 - .030 | .0001 MAX |
| | ALL EXCEPT ROUGHERS | .031 - .060 | .0002 MAX |
| | | .061 - .111 | .0003 MAX |
| | | .112 AND ABOVE | .0005 MAX |
| | ROUGHERS | ALL | .0010 MAX |

| BACK TAPER | END MILL STYLE | NIAGARA TOLERANCE |
|------------|----------------|---|
| | ALL | .0005 MAX BACK TAPER PER INCH PERMISSIBLE. NOT TO EXCEED THE CUTTING DIAMETER TOLERANCE. |

NOTE: ALL DIMENSIONS IN INCH UNLESS OTHERWISE NOTED

COBALT END MILLS

| END MILL STYLE | NUMBER OF FLUTES | TYPE OR RANGE | ANSI* TOLERANCE | NIAGARA CUT DIAMETER TOLERANCE | CORRESPONDING LIST NUMBERS |
|--|------------------|---|-------------------|--|---|
| SINGLE-END FINISHERS | 2, 4, & 6 | ALL SIZES | + .003 / - .000 | + .001 / - .000 | SP205 , SPC408, SPB540 |
| MULTI FLUTE COARSE & FINE PITCH ROUGHERS | 4, 5, 6, & 8 | 1" FLUTE & UNDER 1-1/8" FLUTE & OVER | + .025 / - .005 | + .003 / - .000 + .006 / - .000 | EXR350 , RMB700 , RMB449 , REM710 , REC700 , RXC753, REM445 , REC448 |
| ALL 3 FLUTE COARSE & FINE PITCH ROUGHERS | 3 | ALL SIZES | + .025 / - .005 | + .005 / - .000 | RTM713, RHC752, RHLC754, RTM447 |
| TRUNCATED ROUGHER/FINISHERS AND CHIPBREAKERS | 4, 5, 6, & 8 | ALL SIZES | NO SPECIFICATIONS | + .001 / - .000 | RFM440 , RFM441 , RFCB444 |
| METRIC FINISHERS WITH INCH SHANK | 4 | ALL SIZES | NO SPECIFICATIONS | + .001 / - .000 | SMM845 |
| VFP | 4 & 6 | ALL SIZES | NO SPECIFICATIONS | + .002 / - .000 | VFP435, VFP635, VFP ² 435, VFP ² 635, VFP435SB, VFP635SB, VFP435SBR, VFP635SBR |
| BALL-END | ALL | ALL SIZES | NO SPECIFICATIONS | BALL RADIUS TOLERANCES: FLUTE DIA TOLERANCES / 2 | |

| SHANK DIAMETER TOLERANCES | END MILL STYLE | OTHER SPECIFICATION | ANSI* TOLERANCE | NIAGARA TOLERANCE |
|---------------------------|------------------|-----------------------------------|-------------------|-------------------|
| | ALL INCH SHANK | | - .0001 / - .0005 | - .0001 / - .0005 |
| | ALL METRIC SHANK | SPECIFICATION PER DIN 1835 FORM B | NO SPECIFICATION | DIN (H6)MM |

| LENGTH OF CUT TOLERANCES | END MILL STYLE | OTHER SPECIFICATION | ANSI* TOLERANCE | NIAGARA TOLERANCE |
|--------------------------|--------------------------|---------------------------|------------------|-------------------|
| | ALL EXCLUDING HEAVY DUTY | | + .031 / - .031 | + .031 / - .000 |
| | HEAVY DUTY | | + .062 / - .062 | + .062 / - .000 |
| | ALL METRIC SHANK | SPECIFICATION PER DIN ANS | NO SPECIFICATION | + 0.7MM / - 0 |

| OVERALL LENGTH TOLERANCES | END MILL STYLE | OTHER SPECIFICATION | ANSI* TOLERANCE | NIAGARA TOLERANCE |
|---------------------------|------------------------------------|---------------------------|------------------|-------------------|
| | ALL EXCEPT HEAVY DUTY 3" DIA FLUTE | | + .062 / - .062 | + .062 / - .000 |
| | 3" DIA HEAVY DUTY | | + .125 / - .125 | + .125 / - .000 |
| | ALL METRIC SHANK | SPECIFICATION PER DIN ANS | NO SPECIFICATION | + 0.7MM / - 0 |

| TIR CONDITION | END MILL STYLE | CUTTING DIAMETER | NIAGARA TOLERANCE |
|---------------|---------------------|------------------|-------------------|
| | ALL EXCEPT ROUGHERS | ALL SIZES | .0010 MAX |
| | | LESS THAN .750 | .0010 MAX |
| | ROUGHERS | .750 - 1.249 | .0020 MAX |
| | | 1.250 AND ABOVE | .0030 MAX |

| BACK TAPER | END MILL STYLE | NIAGARA TOLERANCE |
|------------|----------------|--|
| | ALL | .0005 MAX BACK TAPER PER INCH PERMISSIBLE. NOT TO EXCEED THE CUTTING DIAMETER TOLERANCE. |

*TAKEN FROM TABLE 77 OF THE USA STANDARDS FOR MILLING CUTTERS AND END MILLS, ANSI B94.19-1985 PUBLISHED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

NOTE: ALL DIMENSIONS IN INCH UNLESS OTHERWISE NOTED.

**MECHANICAL/PHYSICAL HAZARD**

Cutting tools and holders may fragment in use. Metal chips can be very hot with sharp edges and should not be moved by hand. Chips can cause burns to the skin and damage to the eyes.

Make sure the insert and component are correctly secured in their holder before use, to prevent them coming loose during the process operation. Too much overhang can result in vibration and lead to tool damage/breakage.

Always wear appropriate safety equipment at all times and ensure all machine guards and safety interlocks are in place prior and during the operation. **DO NOT USE** any tool or product that shows signs of damage. Return the product to the appropriate location for repair, replacement or recycling.

Use all appropriate safety guards or machine encapsulations to securely collect particles such as chips or cutting elements that may spin off. Always use appropriate personal protective equipment.

**DUST AND MIST HAZARD**

Hardmetal products and tools should not be reground or sharpened without taking appropriate safety measures to contain dust and to prevent exposure to dust (e.g. ventilation and personal protection equipment). Operations such as grinding, cutting, burning and welding of hardmetal products may produce dust or fumes, which can be inhaled, swallowed or come in contact with the skin and eyes. Dust/mist may cause inflammation of the airways and irritate nose, throat, skin and eyes. Repeatedly inhaling high levels of hardmetal dust has been reported in publications to cause hardmetal disease (interstitial lung fibrosis). In a two-year study on rats and mice, inhalation of cobalt was shown to cause cancer.

SENSITIZING HAZARD

Uncoated hardmetal products may cause an allergic skin reaction as a result of prolonged skin contact with the product. Handle in a way that avoids direct skin contact or use gloves to minimize the risk of an allergic skin reaction when handling hardmetal products and tools. Cobalt and hardmetal are known sensitizers having potential to cause allergy through repeated exposure. A sensitized person could react with asthmatic symptoms or eczema.

Always review and understand the Safety Data Sheet or Safety Information Sheet for the product you are using, before using the product.

PREVENTIVE MEASURES

- Avoid formation and inhalation of dust. Use adequate local exhaust ventilation to keep personal exposure below the nationally allowed limits.
- If ventilation is not available or adequate, use nationally approved respirators for the purpose.
- Avoid skin contact. Wear suitable gloves. Wash skin thoroughly after handling.
- Use suitable protective clothing. Launder clothing as needed.
- Do not eat, drink, or smoke in the working area. Wash skin thoroughly before eating, drinking or smoking.
- Use safety goggles or glasses with side shields when necessary.
- Always wear appropriate safety equipment.
- Only operate machinery when all necessary guards, interlocks and other safety devices are in place and functional.
- **DO NOT** use or operate damaged tools or products.

Revised May 25, 2017. For more information and documents, visit niagaracutter.com/safety and P65Warnings.ca.gov.

CEMENTED CARBIDE END MILLS

Cemented carbide end mills from Niagara Cutter are not included in the product range intended for the following requirements. Nevertheless Niagara Cutter can make the following declaration.

These products meet all requirements in RoHS (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment), WEEE (Waste Electrical & Electronic Equipment) and ELV (End of Life Vehicles) requirements. Products do not contain mercury, lead, hexavalent chromium, cadmium, CFC, HCFC, flame retardants or solvents in concentrations that exceed specifications in the regulations.

REGRINDING

Wet or dry grinding can produce potentially hazardous dusts or mists that can irritate skin, eyes, nose, throat and result in lung damage or disease. To avoid injury use proper safety precautions and protective equipment.

DISPOSAL

Niagara Cutter will buy back solid carbide tools for recycling. Solid carbide tools should be separated from other metal waste (steel, aluminium, copper etc). All packing material is fully recyclable.

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CUSTOMIZED TOOLING

A significant portion of Niagara's offering is in the form of customized tools. Our engineers work in close cooperation with you to provide the best possible solution to specific machining challenges where the demands stretch beyond standard tools. We also offer a quick delivery solution for standard tools requiring simple modifications to meet specific dimensional requirements. Fast turnaround from quotation to product delivery is a hallmark of our modified tool program.

RECONDITIONING CUTS COST & TOOL INVENTORY

Niagara's modern carbide tools offer remarkable performance by utilizing the best combinations of carbide substrates with high wear resistant coatings, optimized cutting geometry and controlled edge preparation.

However good a tool is, as part of its function, it will eventually show signs of wear on the cutting edge. Controlling this wear and the timely replacement of the tool will allow the used tool to be reconditioned, thus reducing tool investment costs.

We recondition your solid carbide tools using the same advanced technology and care that we use to manufacture our new products. These tools are remanufactured to our normal high standards with the original Niagara geometry, edge preparation and coating processes.

RECYCLING

Tungsten carbide is a valuable and limited resource. Estimations of the existing reserves of tungsten suggest that with present consumption resources will be depleted within 40 - 100 years. For the last few years demand has been higher than production and a general trend toward higher consumption can clearly be seen.

Recycling of used material compared to the mining of virgin material reduces the environmental impact. By recycling we can prolong the time before the resources are at an end and reduce energy consumption by approximately 35%. At the same time, recycling tungsten carbide reduces CO2 emissions by approximately 40%.

For further information on custom, modified, reconditioned tools or to set-up your recycling program please contact your local Authorized Distributor.

MORE
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BRAND

To find an Authorized SECO/Niagara
Cutter Distributor near you, please refer
to our Distributor Locator:

SECOLOCATOR.COM

For customer service, call:
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For technical assistance, call:
1-800-TEC-TEAM (1-800-832-8326)

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