

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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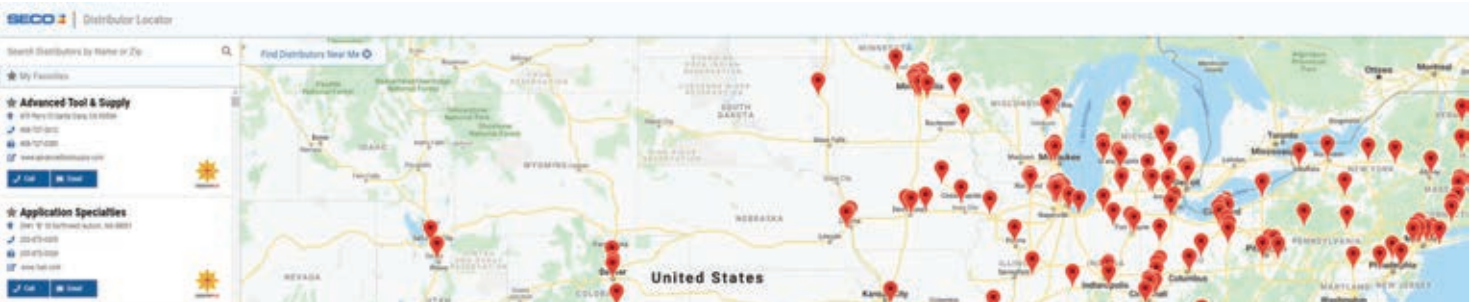


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Get the ultimate Seco solid milling guide. Calculate cutting data, application recommendations, horsepower, metal removal rates, and more for over 5,000 Seco solid carbide end mills from Jabro® and Niagara Cutter. A newly redesigned rpm optimizer makes it easier to maintain a constant chip load, maximizing tool life. The full functionality the Solid Milling App (videos aside) is available off-line so you can get cutting data anywhere in the shop, even while you are standing at the machine. Download the free app from the [App Store](#) or [Google Play](#) today!

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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, and special cutting tools to customer blueprints. With multiple material substrates (cobalt, tungsten carbide), tool geometries and PVD and CVD 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™ AND STABILIZER 2.0 SERIES - Page 17

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.

Simplify tool selection and part programming with the newly expanded ST540 family of 5-flute end mills from Seco. Gain part processing versatility with the ability to handle slot milling, side mill roughing, side mill finishing and face milling applications as well as in traditional and high-performance optimized roughing, pocketing and ramping in all major material families – all with a single product family.



ELITE A & S SERIES - Page 61

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

The 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, four, five, six, seven and nine flutes.



HIGH FEED & MOLD & DIE - Page 136

The mold & die range offers geometries for hard milling of steels up to 65Rc.

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 MZN and MBZ family of end mills 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 164

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 194

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.



CHAMFER MILLS - Page 241

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



COBALT - Page 247

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.

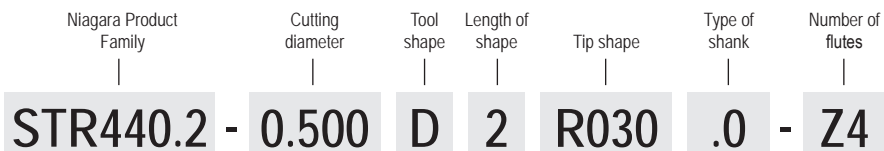


THREAD MILLS - Page 301

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.

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 SHAPE

- 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

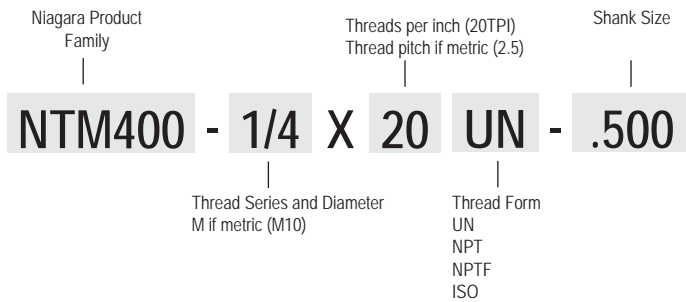
This figure indicates the number of flutes in the cutter.
 For example:
 Z2 = 2 flutes, Z6 = 6 flutes

COATING

DESCRIPTION

AICrN	AICrN
AITiN	AITiN
CVDDIA	Diamond CVD
TiAIN	TiAIN
TiCN	TiCN
	Uncoated

THREAD MILLING PRODUCT CODE KEY



FORMULA





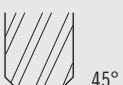


a_e = Width of cut/radial depth of cut
 a_p = Depth of cut/axial depth of cut
 f = Feed per revolution
 f_z = Feed per tooth
 n = Rev/min RPM
 v_c = Surface footage/min
 v_f = Table travel (in/min)
 z_n = Number of teeth

SYMBOL KEY





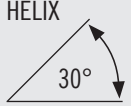



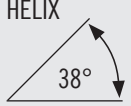
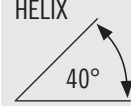


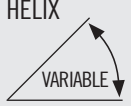
TOOL MATERIAL - SUBSTRATE

SOLID CARBIDE	PREMIUM PARTICLE METAL 8.5% COBALT	M42 8% COBALT
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TOOL END SHAPE

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



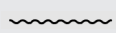
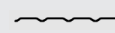
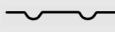
HELIX ANGLE

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
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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	kc1.1 x 1000 lbf/in2	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

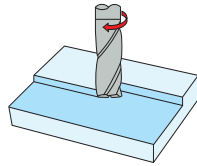
k_{c,1}-values with 0 degree effective cutting rake angle. For other rake angles, reduce the k_{c,1}-value by 1% for every degree increase in the cutting rake angle and vice versa. Keep in mind that the BHN-value is only an aid in the selection of the material group when the material has been worked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

BASIC MILLING OPERATIONS

FACE MILLING

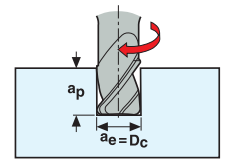
Operation where the tool is in engagement with less than 180° arc of contact.

Tool engagement:
Small a_p and large a_e .



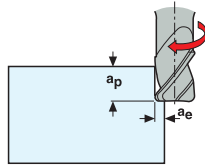
SLOT MILLING

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.



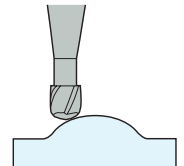
SIDE MILLING

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



COPY MILLING

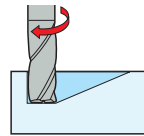
Operation where the radius is in engagement. a_p and a_e are both small.



ADVANCED MILLING OPERATIONS

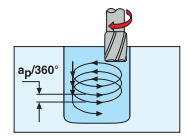
RAMPING

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



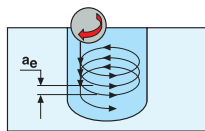
HELICAL INTERPOLATION RAMPING

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



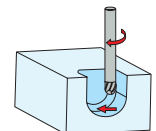
TROCHOIDAL

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



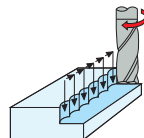
PUSH-PULL

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



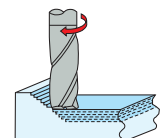
PLUNGE MILLING

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



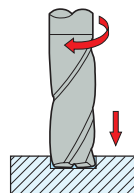
Z-LEVELING

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



DRILLING

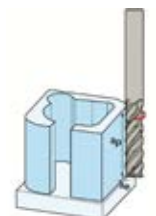
Making a hole with movement in Z axis.



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 RATES

STABILIZER™ 2.0

Raise the bar in your high performance milling operations with the Stabilizer 2.0 family of end mills. A patented continuously varying asymmetrical geometry 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.

RANGE OVERVIEW

- 365 inch and 100 metric sizes
- Square, radius, and ball nose options
- Cylindrical shank with weldon option on inch product
- Diameters from 1/8" - 1" and 3 mm - 25 mm
- 1 x D, 2 x D and 3 x D length versions available

STS430.2 / STR430.2 - 4-FLUTE, SQUARE END AND RADIUS

- .125" – 1.000" diameters, up to 3xD flute length

STB430.2 - 4-FLUTE, BALL NOSE

- .125" – 1.000" diameters, 2xD flute length

STRN430.2 / STBN430.2 - 4-FLUTE, RADIUS AND BALL NOSE NECKED OPTION

- .250" – 1.000" diameters, 2xD flute length and 3xD reach length

STS430M.2 / STR430M.2 - 4-FLUTE, SQUARE END AND RADIUS

- 3 – 25mm diameters, up to 3xD flute length

STB430M.2 - 4-FLUTE, BALL NOSE

- 3 – 25mm diameters, up to 3xD flute length

STR440.2 - 4-FLUTE, RADIUS

- .125" – 1.000" diameters, up to 3xD flute length

STB440.2 - 4-FLUTE, BALL NOSE

- .125" – 1.000" diameters, 2xD flute length

STRN440.2 / STBN440.2 - 4-FLUTE, RADIUS AND BALL NOSE NECKED OPTION

- .250" – 1.000" diameters, 2xD flute length and 3xD reach length

STR440M.2 / STB440M.2 - 4-FLUTE, SQUARE END AND RADIUS

- 3 – 25mm diameters, up to 3xD flute length

MATERIAL GROUPS (430 SERIES)

Steel 1-6

Cast Iron 12-15

Non-ferrous 18

MATERIAL GROUPS (440 SERIES)

Stainless Steel 8-11

Superalloys 19-22

INDUSTRY TARGETS

- General Machining
- Aerospace
- Medical



6 TIPS

HIGH PERFORMANCE MACHINING

High performance machining (HPM) with the new Stabilizer 2.0 can be highly effective in many 2D applications including slot milling, pocket milling and side milling. Higher metal removal rates can be achieved by increased feed rates and step overs pushing 50%+ of the cutter diameter compared to conventional machining strategies. Achieving the best possible results requires using these few common practices.

1. UNDERSTANDING THE NEED FOR INCREASED CUTTING PRESSURE

Due to the advanced flute geometry of the new Stabilizer 2.0, large step-overs need to be incorporated into the milling strategy in order to stabilize the tool while in cut. As a rule of thumb, a minimum of 20% of the diameter of the tool should be utilized. If the part and/or machine configuration does not allow for this large of a step-over, then the recommended catalog feed rate should be doubled to increase cutting pressure. Failure to "load" the tool may cause premature wear and a loss in productivity.

2. USE STRONG, SECURE TOOLHOLDERS & FIXTURING

The heavy cutting pressure of the Stabilizer 2.0 demands secure tool holders and fixturing. Utilizing an anti-pull-out system is the first choice when high performance milling is applied. Side lock holders, milling chucks and shrinkfit holders with anti-pull-out systems will help ensure that the tools are secure and provide optimal run-out of less than 0.0004". Some high precision collet systems and heavy-duty reinforced hydraulic chucks are a second option. However, the pull-out cannot be forgotten. Rigid fixturing and clamping will help ensure that the work piece stays fastened to the machining table.

3. LIMITING FACTORS OF MACHINE TOOLS

Knowing machine tool limitations and horse power consumption rates prior to implementing HPM strategies is crucial for success. These methods consume higher levels of horsepower and torque compared to standard milling strategies, this can push machine tools past their limits causing catastrophic failures. Using greater than a ½" diameter end mill in a CAT40 or similar size taper machine tool while utilizing HPM strategies could be problematic. Knowing your machine's limits is always the best option.

4. NOT ALL STAINLESS STEELS ARE CREATED EQUAL

To ensure optimal success, careful consideration must be taken when machining common pH hardened stainless steels such as 13-8, 15-5 and 17-4. When heat treated to a range of 32-42 Hrc, these materials have a machining characteristic like common tool steel. The ST430.2 is designed for steel machining applications and may be a better option than the ST440.2 which is the first choice tool for stainless steel applications. Utilizing the recommended cutting parameters for the ST440.2 while using the ST430.2, is a safe common practice.

5. VERSATILE STABILIZER 2.0

If you wanted to choose one Stabilizer 2.0 series as an all-around tool for machining both steel and stainless steels, the ST440.2 series is the answer. Feed rates in steel are lower than the ST430.2 series due to reduced chip spacing (higher helix angle = less chip spacing). On average, the fpt of the ST440.2 series is 25% of the max feed rate in steel compared to the ST430.2 series.

EXAMPLE: fpt in 4140 for a 1.00" OD ST430.2 is 0.005", fpt for a 1.00" OD ST440.2 will only be 0.00375"

6. RECOMMENDED CUTTING PARAMETERS

Through meticulous research and years of first-hand experience, we have developed specific recommended cutting parameters. Cutting data is optimized for each tool's design, specifications and material groups. These configurations should always be used as a starting point and then modified from there depending on the application.



STABILIZER™ 2.0-STS430.2

SOLID
CARBIDE



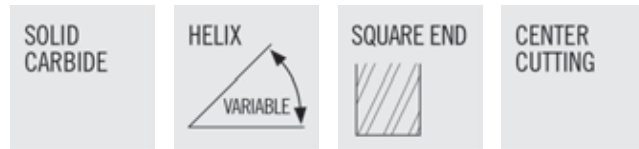
CENTER
CUTTING



- 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 44
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

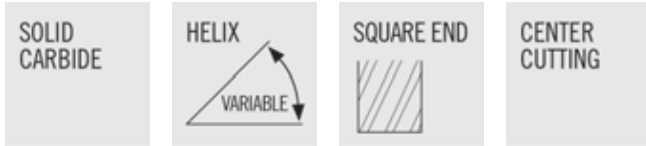
STABILIZER™ 2.0-STS430.2 (CON'T)



- 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 44
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

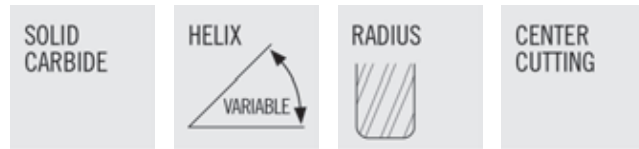
STABILIZER™ 2.0-STS430M.2



- 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 45
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

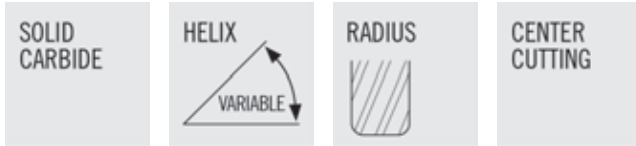
STABILIZER™ 2.0-STR430.2



- 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 44
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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

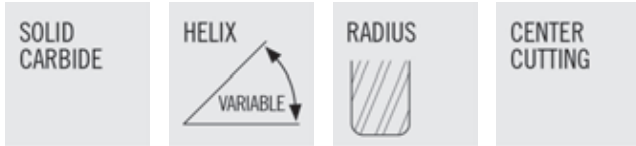
STABILIZER™ 2.0-STR430.2 (CON'T)



- 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 44
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
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
03212567	STR430.2-0.500-D2-R060.0-Z4	1/2	1/2	1	3	4	ALTIN	0.060	CYLINDRICAL
03212568	STR430.2-0.500-D2-R060.3-Z4	1/2	1/2	1	3	4	ALTIN	0.060	WELDON
03212569	STR430.2-0.500-D2-R120.0-Z4	1/2	1/2	1	3	4	ALTIN	0.120	CYLINDRICAL
03212570	STR430.2-0.500-D2-R120.3-Z4	1/2	1/2	1	3	4	ALTIN	0.120	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
03212571	STR430.2-0.500-D3-R060.0-Z4	1/2	1/2	1-1/4	3	4	ALTIN	0.060	CYLINDRICAL
03212572	STR430.2-0.500-D3-R060.3-Z4	1/2	1/2	1-1/4	3	4	ALTIN	0.060	WELDON
03212573	STR430.2-0.500-D3-R120.0-Z4	1/2	1/2	1-1/4	3	4	ALTIN	0.120	CYLINDRICAL
03212574	STR430.2-0.500-D3-R120.3-Z4	1/2	1/2	1-1/4	3	4	ALTIN	0.120	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
03212575	STR430.2-0.500-D4-R060.0-Z4	1/2	1/2	1-1/2	4	4	ALTIN	0.060	CYLINDRICAL
03212576	STR430.2-0.500-D4-R060.3-Z4	1/2	1/2	1-1/2	4	4	ALTIN	0.060	WELDON
03212577	STR430.2-0.500-D4-R120.0-Z4	1/2	1/2	1-1/2	4	4	ALTIN	0.120	CYLINDRICAL
03212578	STR430.2-0.500-D4-R120.3-Z4	1/2	1/2	1-1/2	4	4	ALTIN	0.120	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
03212579	STR430.2-0.625-D2-R060.0-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.060	CYLINDRICAL
03212580	STR430.2-0.625-D2-R060.3-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.060	WELDON
03212581	STR430.2-0.625-D2-R090.0-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.090	CYLINDRICAL
03212582	STR430.2-0.625-D2-R090.3-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.090	WELDON
03212583	STR430.2-0.625-D2-R120.0-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.120	CYLINDRICAL
03212584	STR430.2-0.625-D2-R120.3-Z4	5/8	5/8	1-1/4	3-1/2	4	ALTIN	0.120	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
03212585	STR430.2-0.625-D3-R060.0-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.060	CYLINDRICAL
03212586	STR430.2-0.625-D3-R060.3-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.060	WELDON
03212587	STR430.2-0.625-D3-R090.0-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.090	CYLINDRICAL
03212588	STR430.2-0.625-D3-R090.3-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.090	WELDON
03212589	STR430.2-0.625-D3-R120.0-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.120	CYLINDRICAL

STABILIZER™ 2.0-STR430.2 (CON'T)

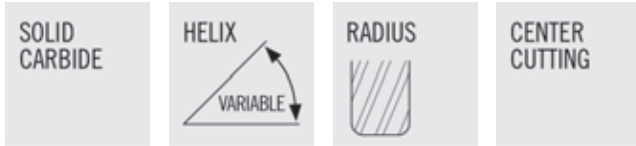


- US Patent # 6,991,409
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- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
03212590	STR430.2-0.625-D3-R120.3-Z4	5/8	5/8	1-7/8	4	4	ALTIN	0.120	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
03212591	STR430.2-0.750-D2-R060.0-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.060	CYLINDRICAL
03212592	STR430.2-0.750-D2-R060.3-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.060	WELDON
03212593	STR430.2-0.750-D2-R090.0-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.090	CYLINDRICAL
03212594	STR430.2-0.750-D2-R090.3-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.090	WELDON
03212595	STR430.2-0.750-D2-R120.0-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.120	CYLINDRICAL
03212596	STR430.2-0.750-D2-R120.3-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.120	WELDON
03212597	STR430.2-0.750-D2-R250.0-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.250	CYLINDRICAL
03212598	STR430.2-0.750-D2-R250.3-Z4	3/4	3/4	1-1/2	4	4	ALTIN	0.250	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
03212599	STR430.2-0.750-D3-R060.0-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.060	CYLINDRICAL
03212600	STR430.2-0.750-D3-R060.3-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.060	WELDON
03212601	STR430.2-0.750-D3-R090.0-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.090	CYLINDRICAL
03212602	STR430.2-0.750-D3-R090.3-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.090	WELDON
03212603	STR430.2-0.750-D3-R120.0-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.120	CYLINDRICAL
03212604	STR430.2-0.750-D3-R120.3-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.120	WELDON
03212606	STR430.2-0.750-D3-R250.0-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.250	CYLINDRICAL
03212607	STR430.2-0.750-D3-R250.3-Z4	3/4	3/4	2-1/4	5	4	ALTIN	0.250	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

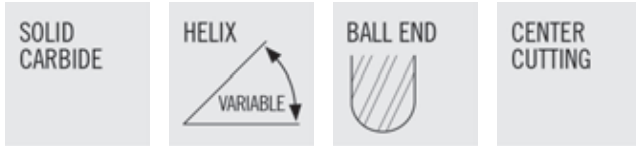
STABILIZER™ 2.0-STR430M.2



- 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 45
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

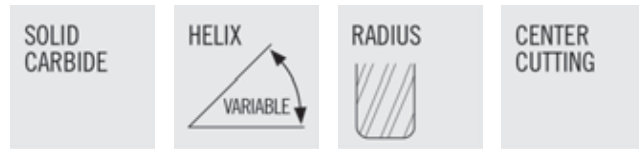
STABILIZER™ 2.0-STB430.2 & STB430M.2



- 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 44
- Tolerance Specs STB430.2- Page 323
- Cutting Data STB430M.2 - Page 45
- Tolerance Specs STB430M.2- Page 323

PRODUCT NUMBER	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

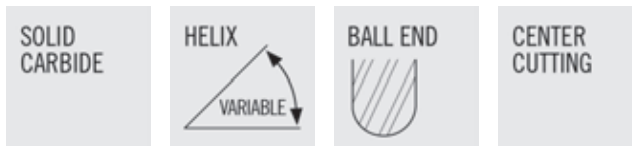
STABILIZER™ 2.0-STRN430.2



- 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 46
- Tolerance Specs - Page 323

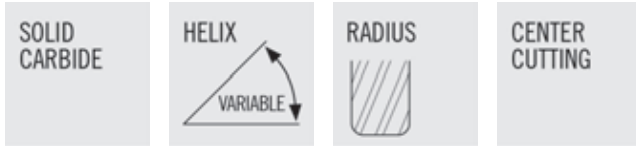
PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	RADIUS	SHANK TYPE
N09447	STRN430.2-0.250-E2-R020.0-Z4	1/4	1/4	1/2	2-1/2	0.240	3/4	4	ALTIN	0.020	CYLINDRICAL
N09448	STRN430.2-0.313-E2-R020.0-Z4	5/16	5/16	5/8	3	0.300	15/16	4	ALTIN	0.020	CYLINDRICAL
N09449	STRN430.2-0.375-E2-R020.0-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	0.020	CYLINDRICAL
N09456	STRN430.2-0.375-E2-R020.3-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	0.020	WELDON
N09457	STRN430.2-0.438-E2-R020.0-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	0.020	CYLINDRICAL
N09462	STRN430.2-0.438-E2-R020.3-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	0.020	WELDON
N09463	STRN430.2-0.500-E2-R030.0-Z4	1/2	1/2	1	3	0.480	1-1/2	4	ALTIN	0.030	CYLINDRICAL
N09464	STRN430.2-0.500-E2-R030.3-Z4	1/2	1/2	1	3	0.480	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	0.600	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	0.600	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	0.720	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	0.720	2-1/4	4	ALTIN	0.030	WELDON
N09469	STRN430.2-1.000-E2-R030.0-Z4	1	1	2	5	0.960	3	4	ALTIN	0.030	CYLINDRICAL
N09472	STRN430.2-1.000-E2-R030.3-Z4	1	1	2	5	0.960	3	4	ALTIN	0.030	WELDON

STABILIZER™ 2.0-STBN430.2



PRODUCT NUMBER	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	0.240	3/4	4	ALTIN	CYLINDRICAL
N09474	STBN430.2-0.313-E2-B.0-Z4	5/16	5/16	5/8	3	0.300	15/16	4	ALTIN	CYLINDRICAL
N09475	STBN430.2-0.375-E2-B.0-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	CYLINDRICAL
N09476	STBN430.2-0.375-E2-B.3-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	WELDON
N09477	STBN430.2-0.438-E2-B.0-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	CYLINDRICAL
N09478	STBN430.2-0.438-E2-B.3-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	WELDON
N09479	STBN430.2-0.500-E2-B.0-Z4	1/2	1/2	1	3	0.480	1-1/2	4	ALTIN	CYLINDRICAL
N09493	STBN430.2-0.500-E2-B.3-Z4	1/2	1/2	1	3	0.480	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	0.600	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	0.600	1-7/8	4	ALTIN	WELDON
N09496	STBN430.2-0.750-E2-B.0-Z4	3/4	3/4	1-1/2	4	0.720	2-1/4	4	ALTIN	CYLINDRICAL
N09497	STBN430.2-0.750-E2-B.3-Z4	3/4	3/4	1-1/2	4	0.720	2-1/4	4	ALTIN	WELDON
N09499	STBN430.2-1.000-E2-B.0-Z4	1	1	2	5	0.960	3	4	ALTIN	CYLINDRICAL
N09502	STBN430.2-1.000-E2-B.3-Z4	1	1	2	5	0.960	3	4	ALTIN	WELDON

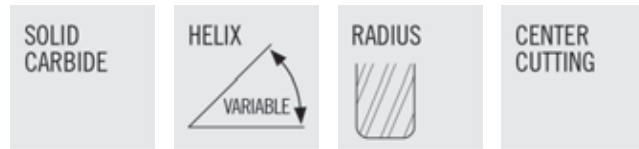
STABILIZER™ 2.0-STR440.2



- 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 47
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

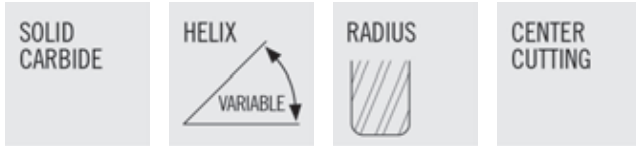
STABILIZER™ 2.0-STR440.2 (CON'T)



- 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 47
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

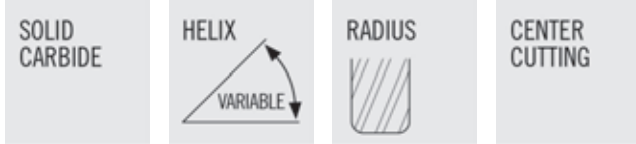
STABILIZER™ 2.0-STR440.2 (CON'T)



- 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 47
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

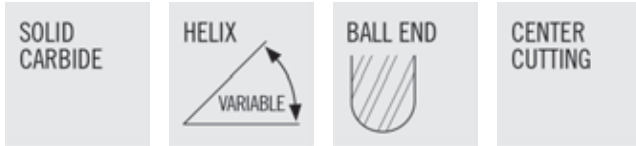
STABILIZER™ 2.0-STR440M.2



- 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 48
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

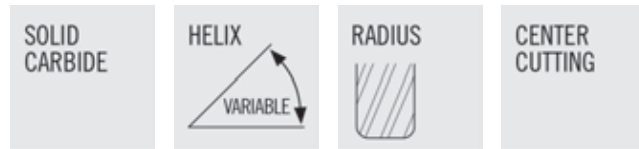
STABILIZER™ 2.0-STB440.2 & STB440M.2



- 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 47
- Tolerance Specs STB440.2 - Page 323
- Cutting Data STB440M.2 - Page 48
- Tolerance Specs STB440M.2 - Page 323

PRODUCT NUMBER	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

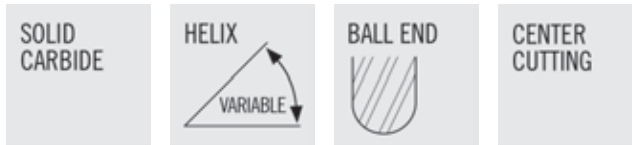


- US Patent # 6,991,409
- Eccentric Primary Relief
- Continuous Varying Asymmetrical Flute Geometry
- Ideal for profiling and slotting in stainless steels, steels over 42 Rc, titanium, and inconel

- Cutting Data STRN440.2 - Page 49
- Tolerance Specs STRN440.2 - Page 323
- Cutting Data STBN440.2 - Page 49
- Tolerance Specs STBN440.2 - Page 323

PRODUCT NUMBER	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	0.240	3/4	4	ALTIN	0.020	CYLINDRICAL
N09504	STRN440.2-0.313-E2-R020.0-Z4	5/16	5/16	5/8	3	0.300	15/16	4	ALTIN	0.020	CYLINDRICAL
N09505	STRN440.2-0.375-E2-R020.0-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	0.020	CYLINDRICAL
N09506	STRN440.2-0.375-E2-R020.3-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	0.020	WELDON
N09507	STRN440.2-0.438-E2-R020.0-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	0.020	CYLINDRICAL
N09508	STRN440.2-0.438-E2-R020.3-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	0.020	WELDON
N09509	STRN440.2-0.500-E2-R030.0-Z4	1/2	1/2	1	3	0.480	1-1/2	4	ALTIN	0.030	CYLINDRICAL
N09512	STRN440.2-0.500-E2-R030.3-Z4	1/2	1/2	1	3	0.480	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	0.600	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	0.600	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	0.720	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	0.720	2-1/4	4	ALTIN	0.030	WELDON
N09518	STRN440.2-1.000-E2-R030.0-Z4	1	1	2	5	0.960	3	4	ALTIN	0.030	CYLINDRICAL
N09519	STRN440.2-1.000-E2-R030.3-Z4	1	1	2	5	0.960	3	4	ALTIN	0.030	WELDON

STABILIZER™ 2.0-STBN440.2



PRODUCT NUMBER	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	0.240	3/4	4	ALTIN	CYLINDRICAL
N09523	STBN440.2-0.313-E2-B.0-Z4	5/16	5/16	5/8	3	0.300	15/16	4	ALTIN	CYLINDRICAL
N09524	STBN440.2-0.375-E2-B.0-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	CYLINDRICAL
N09525	STBN440.2-0.375-E2-B.3-Z4	3/8	3/8	3/4	3	0.360	1-1/8	4	ALTIN	WELDON
N09526	STBN440.2-0.438-E2-B.0-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	CYLINDRICAL
N09527	STBN440.2-0.438-E2-B.3-Z4	7/16	7/16	7/8	4	0.420	1-5/16	4	ALTIN	WELDON
N09528	STBN440.2-0.500-E2-B.0-Z4	1/2	1/2	1	3	0.480	1-1/2	4	ALTIN	CYLINDRICAL
N09529	STBN440.2-0.500-E2-B.3-Z4	1/2	1/2	1	3	0.480	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	0.600	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	0.600	1-7/8	4	ALTIN	WELDON
N09534	STBN440.2-0.750-E2-B.0-Z4	3/4	3/4	1-1/2	4	0.720	2-1/4	4	ALTIN	CYLINDRICAL
N09535	STBN440.2-0.750-E2-B.3-Z4	3/4	3/4	1-1/2	4	0.720	2-1/4	4	ALTIN	WELDON
N09536	STBN440.2-1.000-E2-B.0-Z4	1	1	2	5	0.960	3	4	ALTIN	CYLINDRICAL
N09537	STBN440.2-1.000-E2-B.3-Z4	1	1	2	5	0.960	3	4	ALTIN	WELDON



GET A TOOLROOM WORTH OF PRODUCTIVITY AND VERSATILITY IN ONE END MILL

STABILIZER™ 5-FLUTE

Simplify tool selection and part programming with the new Niagara Cutter™ multi-purpose ST540 family of 5-flute end mills. Gain part processing versatility with the ability to handle slot milling, side mill roughing, side mill finishing and face milling applications as well as in traditional and high-performance optimized roughing, pocketing and ramping – all with a single product family. Reduce your tool inventory with the universal ST540 family and work equally effective in all materials such as steel, cast iron, stainless steels and superalloys.

RANGE OVERVIEW

- 1/81 inch and metric sizes
- Cylindrical and Weldon Shank Options

STS540 / STR540 - 5-FLUTE, SQUARE & RADIUS

- .125" – 1.000" diameters (and 6mm-12mm), up to 4xD flute length

STRN540 - 5-FLUTE, NECKED SERIES

- .250" – 1.000" diameters, up to 2xD flute length and 8xD reach length

STRCS540 - 5-FLUTE, CHIP SPLITTER SERIES

- .250" – .750" diameters, up to 3.2xD flute length

YOUR BENEFITS

- More aggressive full slotting and large radial stepover cuts made possible by the 5-flute design's efficient chip evacuation
- Maintain optimal cutting speeds and achieve high-quality surfaces with the superior harmonics and chatter reduction of variable geometry
- Superior tool life, wear resistance and edge strength thanks to advanced coatings, full eccentric reliefs and asymmetrical cutting edges
- Maximize material removal in long-tool applications and prevent long chips from nesting and causing downtime or ruining surface finishes with extended reach configurations and a new advanced chip splitter

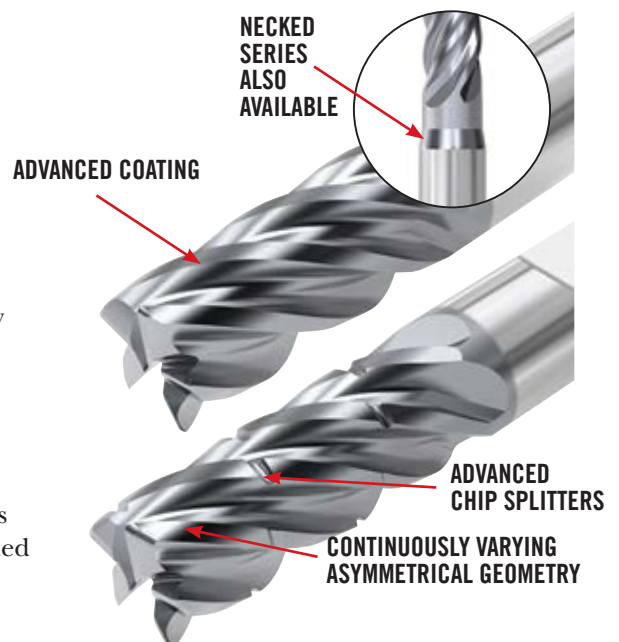
MATERIAL GROUPS

Steel 1-6
Stainless Steel 8-11
Cast Iron 12-15
Superalloys 19-22

Bridge the gap between the Stabilizer™ 2.0 and the S638, S738, S938 Multi Flute product family

INDUSTRY TARGETS

- Aerospace
- Automotive
- General Machining
- Medical



4 TIPS

FOR HIGH-PERFORMANCE VERSATILITY

The right 5-Flute end mill offers a unique balance of versatility and performance across a variety of high performance applications, materials, and setups. Subpar machines with limited horsepower, fixture rigidity, spindle type, CNC controller lookahead and programming styles can wreak havoc on more specialized high-performance end mills. 5-Flutes rough, finish, even optimize rough without requiring the finer tuning or optimal setups of its 4 or 6-flute counterparts.

1. BEING STUCK IN THE MIDDLE CAN BE A GOOD THING

4-flute end mills designed for heavy roughing applications typically struggle to perform when it comes to light radial stepovers less than 20% of the diameter of the tool. This means that finishing cuts are almost always out of the question. On the other side of the spectrum, multi-flute end mills with 6 flutes or more excel in optimized roughing and side mill finishing applications, typically taking less than 15% of the diameter radial stepovers. However, these end mills lack the chip spacing for heavy slotting and side milling cuts. The 5-flute ST540 Stabilizer™ falls right in the middle because it takes both roughing and finishing cuts with ease as well as slot milling, helical ramping and face milling cuts. If you are looking for one tool for all square shoulder milling applications, the 5-flute ST540 Stabilizer is the tool for you.

2. VERSATILITY + PERFORMANCE = COST SAVINGS

We are all looking for ways to reduce machining costs. In the fast-paced world of manufacturing, more and more machine shops are having to machine wider ranges of materials utilizing multiple square shoulder milling strategies. This poses a unique challenge for machine shops because not all end mills and materials are created equal. Some end mills are designed for only certain materials and others only work well in certain types of milling applications. Trying to have the right tool for every application and material can cause tooling costs to increase and fluctuate rapidly. Utilizing the ST540 product family helps reduce tooling costs and increase consistent performance due to its unique ability to work in all material types regardless of machining strategy.

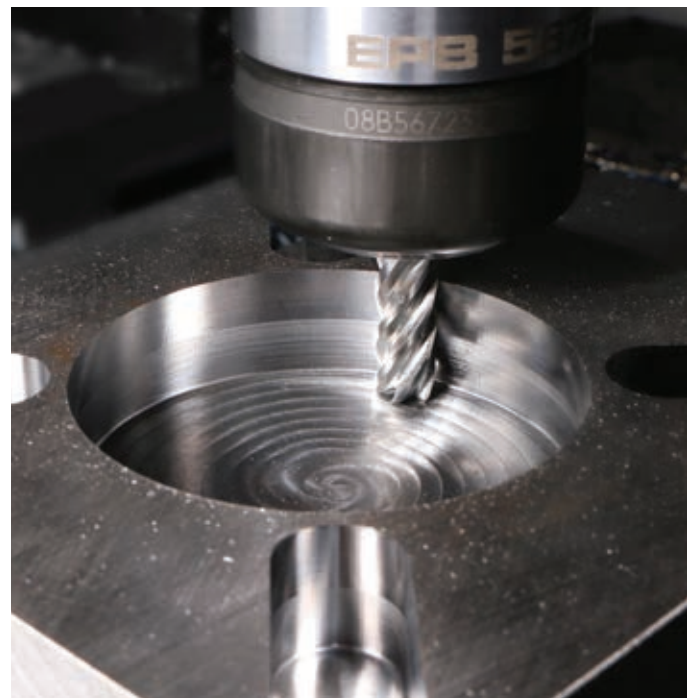
3. BALANCE IS KEY TO SUCCESS

Looking to find balance in your manufacturing processes? Utilizing the 5-flute ST540 Stabilizer product family is a great way to balance tooling cost, performance and versatility. Material type, machining strategy, machine setup and fixture rigidity all play a vital role in the machining process. The variable flute geometry coupled with varied helix angles and edge prep ensure consistent performance and reliable tool life. The break-up of chatter and harmonics results in less cutting edge failure due to micro chipping.

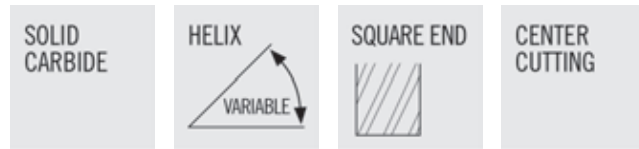
4. THE "BEST" ISN'T ALWAYS THE BEST

When choosing the proper end mill for your machining process, sometimes using the best of the best may not be the best choice. Most end mills designed for high-performance machining strategies require high amounts of horsepower, torque and rigidity. End mills specialized for advanced side milling strategies require newer CNC machining centers with advanced controls to keep up with rapidly changing feed rates and high spindle speeds.

If your machining centers lack any one of these requirements using a more versatile 5-flute geometry like the ST540 can offer high-performance solutions in less than optimal machining conditions. A tough carbide substrate coupled with an advanced coating and edge prep ensure that the ST540 product family maintains consistent quality by protecting the cutting edges from irregular machining conditions.



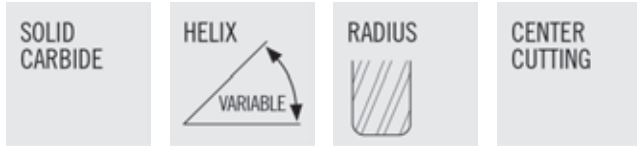
STABILIZER™-STS540 & STS540M



- 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
- Full Eccentric Relief
- Cutting Data STS540 - Page 50 - 53
- Tolerance Specs STS540 - Page 323
- Cutting Data STS540M - Page 56 - 59
- Tolerance Specs STS540M - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
03257826	STS540-0.125-D2-S.0-Z5	1/8	1/8	1/4	1-1/2	5	ALCRN	CYLINDRICAL
03257828	STS540-0.125-D4-S.0-Z5	1/8	1/8	1/2	1-1/2	5	ALCRN	CYLINDRICAL
03257830	STS540-0.156-F2-S.0-Z5	5/32	3/16	5/16	2	5	ALCRN	CYLINDRICAL
03257832	STS540-0.156-F4-S.0-Z5	5/32	3/16	9/16	2	5	ALCRN	CYLINDRICAL
03257834	STS540-0.188-D2-S.0-Z5	3/16	3/16	5/16	2	5	ALCRN	CYLINDRICAL
03257836	STS540-0.188-D3-S.0-Z5	3/16	3/16	9/16	2	5	ALCRN	CYLINDRICAL
03257838	STS540-0.219-F2-S.0-Z5	7/32	1/4	3/8	2	5	ALCRN	CYLINDRICAL
03257840	STS540-0.219-F3-S.0-Z5	7/32	1/4	3/4	2-1/2	5	ALCRN	CYLINDRICAL
03257842	STS540-0.250-D1-S.0-Z5	1/4	1/4	3/8	2	5	ALCRN	CYLINDRICAL
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
03257857	STS540-0.375-D1-S.0-Z5	3/8	3/8	1/2	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
03257880	STS540-0.500-D1-S.0-Z5	1/2	1/2	5/8	3	5	ALCRN	CYLINDRICAL
03257881	STS540-0.500-D1-S.3-Z5	1/2	1/2	5/8	3	5	ALCRN	WELDON
03257889	STS540-0.500-D2-S.0-Z5	1/2	1/2	1	3	5	ALCRN	CYLINDRICAL
03257890	STS540-0.500-D2-S.3-Z5	1/2	1/2	1	3	5	ALCRN	WELDON
N68628	STS540-0.500-D3-S.0-Z5	1/2	1/2	1-1/4	3	5	ALCRN	CYLINDRICAL
03257919	STS540-0.625-D1-S.0-Z5	5/8	5/8	3/4	3	5	ALCRN	CYLINDRICAL
03257920	STS540-0.625-D1-S.3-Z5	5/8	5/8	3/4	3	5	ALCRN	WELDON
N68629	STS540-0.625-D2-S.0-Z5	5/8	5/8	1-1/4	3-1/2	5	ALCRN	CYLINDRICAL
03257927	STS540-0.625-D4-S.0-Z5	5/8	5/8	1-5/8	3-1/2	5	ALCRN	CYLINDRICAL
03257929	STS540-0.625-D5-S.0-Z5	5/8	5/8	2-1/8	4	5	ALCRN	CYLINDRICAL
03257940	STS540-0.750-D1-S.0-Z5	3/4	3/4	7/8	3	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

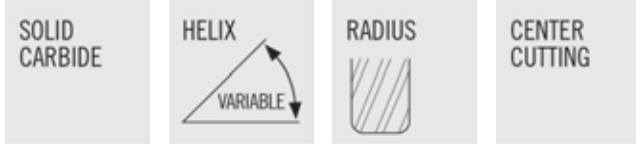
STABILIZER™-STR540



- 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
- Full Eccentric Relief
- Cutting Data STR540 - Page 50 - 53
- Tolerance Specs STR540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
03257827	STR540-0.125-D2-R010.0-Z5	1/8	1/8	1/4	1-1/2	5	ALCRN	0.010	CYLINDRICAL
03257829	STR540-0.125-D4-R010.0-Z5	1/8	1/8	1/2	1-1/2	5	ALCRN	0.010	CYLINDRICAL
03257831	STR540-0.156-F2-R010.0-Z5	5/32	3/16	5/16	2	5	ALCRN	0.010	CYLINDRICAL
03257833	STR540-0.156-F4-R010.0-Z5	5/32	3/16	9/16	2	5	ALCRN	0.010	CYLINDRICAL
03257835	STR540-0.188-D2-R010.0-Z5	3/16	3/16	5/16	2	5	ALCRN	0.010	CYLINDRICAL
03257837	STR540-0.188-D3-R010.0-Z5	3/16	3/16	9/16	2	5	ALCRN	0.010	CYLINDRICAL
03257839	STR540-0.219-F2-R010.0-Z5	7/32	1/4	3/8	2	5	ALCRN	0.010	CYLINDRICAL
03257841	STR540-0.219-F3-R010.0-Z5	7/32	1/4	3/4	2-1/2	5	ALCRN	0.010	CYLINDRICAL
03257843	STR540-0.250-D1-R015.0-Z5	1/4	1/4	3/8	2	5	ALCRN	0.015	CYLINDRICAL
03257844	STR540-0.250-D1-R030.0-Z5	1/4	1/4	3/8	2	5	ALCRN	0.030	CYLINDRICAL
03257845	STR540-0.250-D1-R045.0-Z5	1/4	1/4	3/8	2	5	ALCRN	0.045	CYLINDRICAL
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
03257846	STR540-0.250-D4-R015.0-Z5	1/4	1/4	1	3	5	ALCRN	0.015	CYLINDRICAL
N68633	STR540-0.313-D2-R015.0-Z5	5/16	5/16	3/4	2-1/2	5	ALCRN	0.015	CYLINDRICAL
03257858	STR540-0.375-D1-R015.0-Z5	3/8	3/8	1/2	2-1/2	5	ALCRN	0.015	CYLINDRICAL
03257859	STR540-0.375-D1-R030.0-Z5	3/8	3/8	1/2	2-1/2	5	ALCRN	0.030	CYLINDRICAL
03257860	STR540-0.375-D1-R045.0-Z5	3/8	3/8	1/2	2-1/2	5	ALCRN	0.045	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
03257861	STR540-0.375-D2-R060.0-Z5	3/8	3/8	7/8	2-1/2	5	ALCRN	0.060	CYLINDRICAL
03257862	STR540-0.375-D3-R030.0-Z5	3/8	3/8	1-1/4	3	5	ALCRN	0.030	CYLINDRICAL
03257863	STR540-0.375-D4-R030.0-Z5	3/8	3/8	1-1/2	4	5	ALCRN	0.030	CYLINDRICAL
03257882	STR540-0.500-D1-R015.0-Z5	1/2	1/2	5/8	3	5	ALCRN	0.015	CYLINDRICAL
03257883	STR540-0.500-D1-R030.0-Z5	1/2	1/2	5/8	3	5	ALCRN	0.030	CYLINDRICAL
03257884	STR540-0.500-D1-R030.3-Z5	1/2	1/2	5/8	3	5	ALCRN	0.030	WELDON
03257885	STR540-0.500-D1-R045.0-Z5	1/2	1/2	5/8	3	5	ALCRN	0.045	CYLINDRICAL
03257886	STR540-0.500-D1-R060.0-Z5	1/2	1/2	5/8	3	5	ALCRN	0.060	CYLINDRICAL
03257887	STR540-0.500-D1-R060.3-Z5	1/2	1/2	5/8	3	5	ALCRN	0.060	WELDON
03257888	STR540-0.500-D1-R120.0-Z5	1/2	1/2	5/8	3	5	ALCRN	0.120	CYLINDRICAL
03257891	STR540-0.500-D2-R015.0-Z5	1/2	1/2	1	3	5	ALCRN	0.015	CYLINDRICAL
03257892	STR540-0.500-D2-R030.0-Z5	1/2	1/2	1	3	5	ALCRN	0.030	CYLINDRICAL
03257893	STR540-0.500-D2-R030.3-Z5	1/2	1/2	1	3	5	ALCRN	0.030	WELDON
03257894	STR540-0.500-D2-R060.0-Z5	1/2	1/2	1	3	5	ALCRN	0.060	CYLINDRICAL
03257895	STR540-0.500-D2-R060.3-Z5	1/2	1/2	1	3	5	ALCRN	0.060	WELDON

STABILIZER™-STR540 (CON'T)

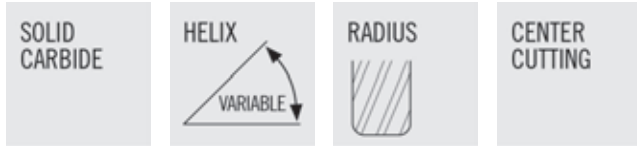


- Asymmetrical flute geometry
- US Patent # 6,991,409
- Ideal for profiling, high speed and trochoidal milling, stainless, titanium, high temperature alloys, carbon, alloy and tool steels
- Full Eccentric Relief

- Cutting Data STR540 - Page 50 - 53
- Tolerance Specs STR540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
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
03257896	STR540-0.500-D4-R030.0-Z5	1/2	1/2	1-5/8	4	5	ALCRN	0.030	CYLINDRICAL
03257897	STR540-0.500-D4-R030.3-Z5	1/2	1/2	1-5/8	4	5	ALCRN	0.030	WELDON
03257898	STR540-0.500-D5-R030.0-Z5	1/2	1/2	2	4	5	ALCRN	0.030	CYLINDRICAL
03257899	STR540-0.500-D5-R030.3-Z5	1/2	1/2	2	4	5	ALCRN	0.030	WELDON
03257921	STR540-0.625-D1-R015.0-Z5	5/8	5/8	3/4	3	5	ALCRN	0.015	CYLINDRICAL
03257922	STR540-0.625-D1-R030.0-Z5	5/8	5/8	3/4	3	5	ALCRN	0.030	CYLINDRICAL
03257923	STR540-0.625-D1-R030.3-Z5	5/8	5/8	3/4	3	5	ALCRN	0.030	WELDON
03257924	STR540-0.625-D1-R060.0-Z5	5/8	5/8	3/4	3	5	ALCRN	0.060	CYLINDRICAL
03257925	STR540-0.625-D1-R060.3-Z5	5/8	5/8	3/4	3	5	ALCRN	0.060	WELDON
03257926	STR540-0.625-D1-R120.0-Z5	5/8	5/8	3/4	3	5	ALCRN	0.120	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
03257928	STR540-0.625-D4-R030.3-Z5	5/8	5/8	1-5/8	3-1/2	5	ALCRN	0.030	WELDON
03257930	STR540-0.625-D5-R030.3-Z5	5/8	5/8	2-1/8	4	5	ALCRN	0.030	WELDON
03257941	STR540-0.750-D1-R030.0-Z5	3/4	3/4	7/8	3	5	ALCRN	0.030	CYLINDRICAL
03257942	STR540-0.750-D1-R060.0-Z5	3/4	3/4	7/8	3	5	ALCRN	0.060	CYLINDRICAL
03257943	STR540-0.750-D1-R120.0-Z5	3/4	3/4	7/8	3	5	ALCRN	0.120	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
03257944	STR540-0.750-D3-R030.0-Z5	3/4	3/4	1-5/8	4	5	ALCRN	0.030	CYLINDRICAL
03257945	STR540-0.750-D3-R030.3-Z5	3/4	3/4	1-5/8	4	5	ALCRN	0.030	WELDON
03257946	STR540-0.750-D4-R030.0-Z5	3/4	3/4	2-1/4	5	5	ALCRN	0.030	CYLINDRICAL
03257947	STR540-0.750-D5-R030.0-Z5	3/4	3/4	2-3/4	5	5	ALCRN	0.030	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

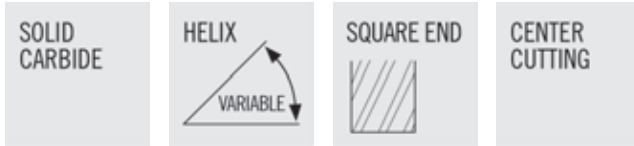
STABILIZER™-STR540M



- 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
- Full Eccentric Relief
- Cutting Data STR540M - Page 56 - 59
- Tolerance Specs STR540M - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
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

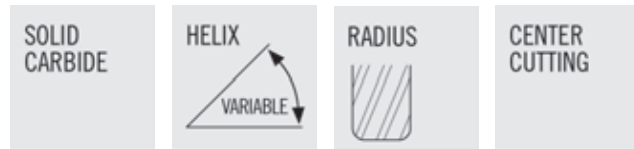
STABILIZER™-STSN540



- 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
- Full Eccentric Relief
- Cutting Data STSN540 - Page 50 - 55
- Tolerance Specs STSN540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	SHANK TYPE
03257848	STSN540-0.250-E4-S.0-Z5	1/4	1/4	1/2	3	0.240	1	5	ALCRN	CYLINDRICAL
03257851	STSN540-0.250-E5-S.0-Z5	1/4	1/4	1/2	4	0.240	1-1/4	5	ALCRN	CYLINDRICAL
03257854	STSN540-0.250-E8-S.0-Z5	1/4	1/4	1/2	4	0.240	2-1/8	5	ALCRN	CYLINDRICAL
03257865	STSN540-0.375-E4-S.0-Z5	3/8	3/8	3/4	3	0.360	1-1/2	5	ALCRN	CYLINDRICAL
03257870	STSN540-0.375-E5-S.0-Z5	3/8	3/8	1/2	4	0.360	2-1/8	5	ALCRN	CYLINDRICAL
03257875	STSN540-0.375-E8-S.0-Z5	3/8	3/8	1/2	6	0.360	3-1/8	5	ALCRN	CYLINDRICAL
03257904	STSN540-0.500-E4-S.0-Z5	1/2	1/2	1	4	0.480	2	5	ALCRN	CYLINDRICAL
03257909	STSN540-0.500-E6-S.0-Z5	1/2	1/2	5/8	5	0.480	3-1/8	5	ALCRN	CYLINDRICAL
03257914	STSN540-0.500-E8-S.0-Z5	1/2	1/2	5/8	6	0.480	4-1/8	5	ALCRN	CYLINDRICAL
03257934	STSN540-0.625-E4-S.0-Z5	5/8	5/8	1-1/4	5	0.600	2-1/2	5	ALCRN	CYLINDRICAL
03257937	STSN540-0.625-E5-S.0-Z5	5/8	5/8	3/4	6	0.600	3-3/8	5	ALCRN	CYLINDRICAL
03257951	STSN540-0.750-E3-S.0-Z5	3/4	3/4	1-1/8	5	0.720	2-1/2	5	ALCRN	CYLINDRICAL
03257955	STSN540-0.750-E4-S.0-Z5	3/4	3/4	1-1/2	5	0.720	3	5	ALCRN	CYLINDRICAL
03257959	STSN540-0.750-E5-S.0-Z5	3/4	3/4	1-1/8	6	0.720	4-1/8	5	ALCRN	CYLINDRICAL

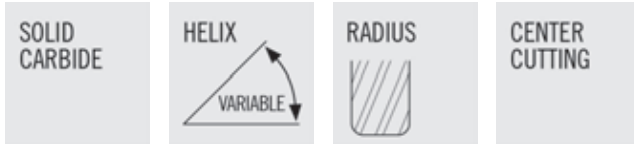
STABILIZER™ - STRN540



- 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
- Full Eccentric Relief
- Cutting Data STRN540 - Page 50 - 55
- Tolerance Specs STRN540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	RADIUS	SHANK TYPE
03257849	STRN540-0.250-E4-R015.0-Z5	1/4	1/4	1/2	3	0.240	1	5	ALCRN	0.015	CYLINDRICAL
03257850	STRN540-0.250-E4-R030.0-Z5	1/4	1/4	1/2	3	0.240	1	5	ALCRN	0.030	CYLINDRICAL
03257852	STRN540-0.250-E5-R015.0-Z5	1/4	1/4	1/2	4	0.240	1-1/4	5	ALCRN	0.015	CYLINDRICAL
03257853	STRN540-0.250-E5-R030.0-Z5	1/4	1/4	1/2	4	0.240	1-1/4	5	ALCRN	0.030	CYLINDRICAL
03257855	STRN540-0.250-E8-R015.0-Z5	1/4	1/4	1/2	4	0.240	2-1/8	5	ALCRN	0.015	CYLINDRICAL
03257856	STRN540-0.250-E8-R030.0-Z5	1/4	1/4	1/2	4	0.240	2-1/8	5	ALCRN	0.030	CYLINDRICAL
03257866	STRN540-0.375-E4-R015.0-Z5	3/8	3/8	3/4	3	0.360	1-1/2	5	ALCRN	0.015	CYLINDRICAL
03257867	STRN540-0.375-E4-R030.0-Z5	3/8	3/8	3/4	3	0.360	1-1/2	5	ALCRN	0.030	CYLINDRICAL
03257868	STRN540-0.375-E4-R045.0-Z5	3/8	3/8	3/4	3	0.360	1-1/2	5	ALCRN	0.045	CYLINDRICAL
03257869	STRN540-0.375-E4-R060.0-Z5	3/8	3/8	3/4	3	0.360	1-1/2	5	ALCRN	0.060	CYLINDRICAL
03257871	STRN540-0.375-E5-R015.0-Z5	3/8	3/8	1/2	4	0.360	2-1/8	5	ALCRN	0.015	CYLINDRICAL
03257872	STRN540-0.375-E5-R030.0-Z5	3/8	3/8	1/2	4	0.360	2-1/8	5	ALCRN	0.030	CYLINDRICAL
03257873	STRN540-0.375-E5-R045.0-Z5	3/8	3/8	1/2	4	0.360	2-1/8	5	ALCRN	0.045	CYLINDRICAL
03257874	STRN540-0.375-E5-R060.0-Z5	3/8	3/8	1/2	4	0.360	2-1/8	5	ALCRN	0.060	CYLINDRICAL
03257876	STRN540-0.375-E8-R015.0-Z5	3/8	3/8	1/2	6	0.360	3-1/8	5	ALCRN	0.015	CYLINDRICAL
03257877	STRN540-0.375-E8-R030.0-Z5	3/8	3/8	1/2	6	0.360	3-1/8	5	ALCRN	0.030	CYLINDRICAL
03257878	STRN540-0.375-E8-R045.0-Z5	3/8	3/8	1/2	6	0.360	3-1/8	5	ALCRN	0.045	CYLINDRICAL
03257879	STRN540-0.375-E8-R060.0-Z5	3/8	3/8	1/2	6	0.360	3-1/8	5	ALCRN	0.060	CYLINDRICAL
03257910	STRN540-0.500-E6-R015.0-Z5	1/2	1/2	5/8	5	0.480	3-1/8	5	ALCRN	0.015	CYLINDRICAL
03257911	STRN540-0.500-E6-R030.0-Z5	1/2	1/2	5/8	5	0.480	3-1/8	5	ALCRN	0.030	CYLINDRICAL
03257912	STRN540-0.500-E6-R060.0-Z5	1/2	1/2	5/8	5	0.480	3-1/8	5	ALCRN	0.060	CYLINDRICAL
03257913	STRN540-0.500-E6-R120.0-Z5	1/2	1/2	5/8	5	0.480	3-1/8	5	ALCRN	0.120	CYLINDRICAL
03257915	STRN540-0.500-E8-R015.0-Z5	1/2	1/2	5/8	6	0.480	4-1/8	5	ALCRN	0.015	CYLINDRICAL
03257916	STRN540-0.500-E8-R030.0-Z5	1/2	1/2	5/8	6	0.480	4-1/8	5	ALCRN	0.030	CYLINDRICAL
03257917	STRN540-0.500-E8-R060.0-Z5	1/2	1/2	5/8	6	0.480	4-1/8	5	ALCRN	0.060	CYLINDRICAL
03257918	STRN540-0.500-E8-R120.0-Z5	1/2	1/2	5/8	6	0.480	4-1/8	5	ALCRN	0.120	CYLINDRICAL
03257905	STRN540-0.500-E4-R015.0-Z5	1/2	1/2	1	4	0.480	2	5	ALCRN	0.015	CYLINDRICAL
03257906	STRN540-0.500-E4-R030.0-Z5	1/2	1/2	1	4	0.480	2	5	ALCRN	0.030	CYLINDRICAL
03257907	STRN540-0.500-E4-R060.0-Z5	1/2	1/2	1	4	0.480	2	5	ALCRN	0.060	CYLINDRICAL
03257908	STRN540-0.500-E4-R120.0-Z5	1/2	1/2	1	4	0.480	2	5	ALCRN	0.120	CYLINDRICAL
03257938	STRN540-0.625-E5-R030.0-Z5	5/8	5/8	3/4	6	0.600	3-3/8	5	ALCRN	0.030	CYLINDRICAL
03257939	STRN540-0.625-E5-R060.0-Z5	5/8	5/8	3/4	6	0.600	3-3/8	5	ALCRN	0.060	CYLINDRICAL
03257935	STRN540-0.625-E4-R030.0-Z5	5/8	5/8	1-1/4	5	0.600	2-1/2	5	ALCRN	0.030	CYLINDRICAL
03257936	STRN540-0.625-E4-R060.0-Z5	5/8	5/8	1-1/4	5	0.600	2-1/2	5	ALCRN	0.060	CYLINDRICAL

STABILIZER™ - STRN540 (CON'T)

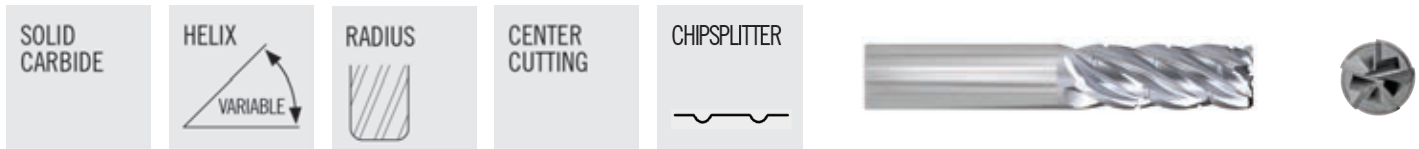


- Asymmetrical cutting edges
- US Patent # 6,991,409
- Ideal for profiling, high speed and trochoidal milling, stainless, titanium, high temperature alloys, carbon, alloy and tool steels
- Full Eccentric Relief

- Cutting Data STRN540 - Page 50 - 55
- Tolerance Specs STRN540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	RADIUS	SHANK TYPE
03257952	STRN540-0.750-E3-R030.0-Z5	3/4	3/4	1-1/8	5	0.720	2-1/2	5	ALCRN	0.030	CYLINDRICAL
03257953	STRN540-0.750-E3-R060.0-Z5	3/4	3/4	1-1/8	5	0.720	2-1/2	5	ALCRN	0.060	CYLINDRICAL
03257954	STRN540-0.750-E3-R120.0-Z5	3/4	3/4	1-1/8	5	0.720	2-1/2	5	ALCRN	0.120	CYLINDRICAL
03257960	STRN540-0.750-E5-R030.0-Z5	3/4	3/4	1-1/8	6	0.720	4-1/8	5	ALCRN	0.030	CYLINDRICAL
03257961	STRN540-0.750-E5-R060.0-Z5	3/4	3/4	1-1/8	6	0.720	4-1/8	5	ALCRN	0.060	CYLINDRICAL
03257962	STRN540-0.750-E5-R120.0-Z5	3/4	3/4	1-1/8	6	0.720	4-1/8	5	ALCRN	0.120	CYLINDRICAL
03257956	STRN540-0.750-E4-R030.0-Z5	3/4	3/4	1-1/2	5	0.720	3	5	ALCRN	0.030	CYLINDRICAL
03257957	STRN540-0.750-E4-R060.0-Z5	3/4	3/4	1-1/2	5	0.720	3	5	ALCRN	0.060	CYLINDRICAL
03257958	STRN540-0.750-E4-R120.0-Z5	3/4	3/4	1-1/2	5	0.720	3	5	ALCRN	0.120	CYLINDRICAL
03257963	STRN540-1.000-E3-R030.0-Z5	1	1	1-1/4	6	0.960	3-1/2	5	ALCRN	0.030	CYLINDRICAL
03257964	STRN540-1.000-E3-R060.0-Z5	1	1	1-1/4	6	0.960	3-1/2	5	ALCRN	0.060	CYLINDRICAL
03257965	STRN540-1.000-E3-R120.0-Z5	1	1	1-1/4	6	0.960	3-1/2	5	ALCRN	0.120	CYLINDRICAL

STABILIZER™ - STRCS540



- 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
- Full Eccentric Relief
- Advanced chip splitter design for increased chip control and management
- Cutting Data STRCS540 - Page 60
- Tolerance Specs STRCS540 - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
03257847	STRCS540-0.250-D3-R015.0-Z5	1/4	1/4	3/4	2-1/2	5	ALCRN	0.015	CYLINDRICAL
03257864	STRCS540-0.375-D3-R030.0-Z5	3/8	3/8	1-1/4	3	5	ALCRN	0.030	CYLINDRICAL
03257900	STRCS540-0.500-D3-R030.0-Z5	1/2	1/2	1-1/4	3	5	ALCRN	0.030	CYLINDRICAL
03257901	STRCS540-0.500-D3-R030.3-Z5	1/2	1/2	1-1/4	3	5	ALCRN	0.030	WELDON
03257902	STRCS540-0.500-D4-R030.0-Z5	1/2	1/2	1-5/8	4	5	ALCRN	0.030	CYLINDRICAL
03257903	STRCS540-0.500-D4-R030.3-Z5	1/2	1/2	1-5/8	4	5	ALCRN	0.030	WELDON
03257931	STRCS540-0.625-D3-R030.0-Z5	5/8	5/8	1-3/8	3-1/2	5	ALCRN	0.030	CYLINDRICAL
03257932	STRCS540-0.625-D5-R030.0-Z5	5/8	5/8	2-1/8	4	5	ALCRN	0.030	CYLINDRICAL
03257933	STRCS540-0.625-D5-R030.3-Z5	5/8	5/8	2-1/8	4	5	ALCRN	0.030	WELDON
03257948	STRCS540-0.750-D3-R030.0-Z5	3/4	3/4	1-5/8	4	5	ALCRN	0.030	CYLINDRICAL
03257949	STRCS540-0.750-D3-R030.3-Z5	3/4	3/4	1-5/8	4	5	ALCRN	0.030	WELDON
03257950	STRCS540-0.750-D4-R030.0-Z5	3/4	3/4	2-1/4	5	5	ALCRN	0.030	CYLINDRICAL

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

ISO GROUP	SMG	a _p x D _c (max)	a _e x D _c (max)	v _c (sf / min)		SLOTING														
						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

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



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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	29.5	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	22.3	22.4	22.3	22.3	22.4	22.3
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	45.7	45.6
	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	39.2
	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	32.2	32.1	32.2	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
				325 - 525	vf [in/min]	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
	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
				350 - 450	vf [in/min]	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
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	
			330 - 370	vf [in/min]	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	
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
				280 - 420	vf [in/min]	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4
	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
				285 - 365	vf [in/min]	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9
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
				400 - 600	vf [in/min]	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1

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
				325 - 525	vf [in/min]	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7
	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
				350 - 450	vf [in/min]	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
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	
			330 - 370	vf [in/min]	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
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
				280 - 420	vf [in/min]	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
	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
				285 - 365	vf [in/min]	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4
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
				400 - 600	vf [in/min]	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9



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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	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	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	
					165 - 205	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	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	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	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	
					165 - 205	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	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 Dc (max)	a _e x Dc (max)	SLOTTING														
				v _c (sf / min)		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		
	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		
	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		
	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		
	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		
					v _c (sf / min)	165	205	14.0	14.0	14.1	14.0	14.0	14.0	14.1	14.0	14.0	14.0	14.0

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

ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	SIDE MILLING ROUGHING														
				v _c (sf / min)		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		
	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		
	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		
	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		
	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		
					v _c (sf / min)	165	205	16.8	16.9	16.9	16.8	16.9	16.8	16.9	16.8	16.8	16.8	16.8



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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, STSN540, STRN540 - SLOTTING - INCH - UP TO 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	a _p x D _c	a _e x D _c	v _c (sf / min)	SLOTTING											
					Zn = 5											
					1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	E 1 - 2	1.00 x D _c	1.00 x D _c	425 n (min-1) 319 - 531	fz (in)	12988	10390	8659	7422	6494	5195	4329	3247	2598	2165	1624
					vf (in/min)	0.0006	0.0007	0.00084	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
					n (min-1)	12224	9779	8149	6985	6112	4890	4075	3056	2445	2037	1528
	A / E 3 - 4	1.00 x D _c	1.00 x D _c	400 n (min-1) 300 - 500	fz (in)	0.0005	0.0006	0.00075	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf (in/min)	31	31	31	31	31	31	31	31	31	31	31
					n (min-1)	10696	8557	7131	6112	5348	4278	3565	2674	2139	1783	1337
A / E 5 - 6	1.00 x D _c	1.00 x D _c	350 n (min-1) 263 - 438	fz (in)	0.0004	0.0005	0.00066	0.0008	0.0009	0.0011	0.0013	0.0018	0.0022	0.0026	0.0035	
				vf (in/min)	23	23	23	23	23	23	23	23	23	23	23	
				n (min-1)	8404	6723	5603	4802	4202	3362	2801	2101	1681	1401	1051	
H	M / A 7 (48-56 HRc)	0.50 x D _c	1.00 x D _c	275 n (min-1) 206 - 344	fz (in)	0.00025	0.0003	0.00038	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0020
					vf (in/min)	11	11	11	11	11	11	11	11	11	11	11
					n (min-1)	9932	7946	6621	5675	4966	3973	3311	2483	1986	1655	1242
M	E 8 - 9	0.50 x D _c	1.00 x D _c	325 n (min-1) 244 - 406	fz (in)	0.0003	0.0004	0.00047	0.0005	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019	0.0025
					vf (in/min)	16	16	16	16	16	16	16	16	16	16	16
					n (min-1)	8404	6723	5603	4802	4202	3362	2801	2101	1681	1401	1051
K	E 10 - 11	0.50 x D _c	1.00 x D _c	275 n (min-1) 206 - 344	fz (in)	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0020
					vf (in/min)	11	11	11	11	11	11	11	11	11	11	11
					n (min-1)	12224	9779	8149	6985	6112	4890	4075	3056	2445	2037	1528
K	E 12 - 13	1.00 x D _c	1.00 x D _c	400 n (min-1) 300 - 500	fz (in)	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
					vf (in/min)	34	34	34	34	34	34	34	34	34	34	34
					n (min-1)	9932	7946	6621	5675	4966	3973	3311	2483	1986	1655	1242
K	E 14 - 15	0.50 x D _c	1.00 x D _c	325 n (min-1) 244 - 406	fz (in)	0.00038	0.0005	0.00056	0.0007	0.0008	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030
					vf (in/min)	19	19	19	19	19	19	19	19	19	19	19
					n (min-1)	2750	2200	1834	1572	1375	1100	917	688	550	458	344
S	E 19	0.50 x D _c	1.00 x D _c	90 n (min-1) 68 - 113	fz (in)	0.00028	0.0003	0.00041	0.0005	0.0006	0.0007	0.0008	0.0011	0.0014	0.0017	0.0022
					vf (in/min)	4	4	4	4	4	4	4	4	4	4	4
					n (min-1)	2292	1834	1528	1310	1146	917	764	573	458	382	287
	E 20	0.25 x D _c	1.00 x D _c	75 n (min-1) 56 - 94	fz (in)	0.00025	0.00031	0.00038	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0020
					vf (in/min)	3	3	3	3	3	3	3	3	3	3	3
					n (min-1)	1986	1589	1324	1135	993	795	662	497	397	331	248
E 21	0.25 x D _c	1.00 x D _c	65 n (min-1) 49 - 81	fz (in)	0.00025	0.00031	0.00038	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0020	
				vf (in/min)	2	2	2	2	2	2	2	2	2	2	2	
				n (min-1)	5195	4156	3463	2969	2598	2078	1732	1299	1039	866	649	
E 22	0.50 x D _c	1.00 x D _c	170 n (min-1) 128 - 213	fz (in)	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030	
				vf (in/min)	10	10	10	10	10	10	10	10	10	10	10	
				n (min-1)	12988	10390	8659	7422	6494	5195	4329	3247	2598	2165	1624	



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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 - 5 FLUTE STABILIZER

STS540, STR540, STSN540, STRN540 - SIDE MILLING LIGHT ROUGHING - INCH - UP TO 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	a _p x D _c	a _e x D _c	v _c (sf / min)	SIDE MILLING - LIGHT ROUGHING											
					Zn = 5											
					1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	E 1 - 2	2.00	0.15	600	n [min-1]	18336	14669	12224	10478	9168	7334	6112	4584	3667	3056	2292
					fz [in]	0.0010	0.0013	0.0015	0.0018	0.0020	0.0025	0.0030	0.0040	0.0050	0.0060	0.0080
					450 - 750	vf [in/min]	92	92	92	92	92	92	92	92	92	92
	A / E 3 - 4	2.00	0.15	550	n [min-1]	16808	13446	11205	9605	8404	6723	5603	4202	3362	2801	2101
					fz [in]	0.0010	0.0013	0.0015	0.0018	0.0020	0.0025	0.0030	0.0040	0.0050	0.0060	0.0080
					413 - 688	vf [in/min]	84	84	84	84	84	84	84	84	84	84
A / E 5 - 6	2.00	0.12	450	n [min-1]	13752	11002	9168	7858	6876	5501	4584	3438	2750	2292	1719	
				fz [in]	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0033	0.0041	0.0049	0.0065	
				338 - 563	vf [in/min]	56	56	56	56	56	56	56	56	56	56	56
H	M / A 7 (48-56 HRc)	2.00	0.08	200	n [min-1]	6112	4890	4075	3493	3056	2445	2037	1528	1222	1019	764
					fz [in]	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
					150 - 250	vf [in/min]	17	17	17	17	17	17	17	17	17	17
M	E 8 - 9	2.00	0.15	510	n [min-1]	15586	12468	10390	8906	7793	6234	5195	3896	3117	2598	1948
					fz [in]	0.0009	0.0012	0.0014	0.0016	0.0019	0.0023	0.0028	0.0038	0.0047	0.0056	0.0075
					383 - 638	vf [in/min]	73	73	73	73	73	73	73	73	73	73
	A / E 10 - 11	2.00	0.12	480	n [min-1]	14669	11735	9779	8382	7334	5868	4890	3667	2934	2445	1834
					fz [in]	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0033	0.0041	0.0049	0.0065
					250 - 600	vf [in/min]	60	60	60	60	60	60	60	60	60	60
K	E 12 - 13	2.00	0.12	420	n [min-1]	12835	10268	8557	7334	6418	5134	4278	3209	2567	2139	1604
					fz [in]	0.0009	0.0011	0.0013	0.0015	0.0018	0.0022	0.0026	0.0035	0.0044	0.0053	0.0070
					315 - 525	vf [in/min]	56	56	56	56	56	56	56	56	56	56
	E 14 - 15	2.00	0.12	360	n [min-1]	11002	8801	7334	6287	5501	4401	3667	2750	2200	1834	1375
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					270 - 450	vf [in/min]	34	34	34	34	34	34	34	34	34	34
S	E 19	2.00	0.12	130	n [min-1]	3973	3178	2649	2270	1986	1589	1324	993	795	662	497
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
	E 20	2.00	0.10	100	n [min-1]	3056	2445	2037	1746	1528	1222	1019	764	611	509	382
					fz [in]	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
	E 21	2.00	0.10	85	n [min-1]	2598	2078	1732	1484	1299	1039	866	649	520	433	325
					fz [in]	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
	E 22	2.00	0.15	230	n [min-1]	7029	5623	4686	4016	3514	2812	2343	1757	1406	1171	879
					fz [in]	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0033	0.0041	0.0049	0.0065
				173 - 288	vf [in/min]	29	29	29	29	29	29	29	29	29	29	

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, STSN540, STRN540 - SIDE MILLING HEAVY ROUGHING - INCH - UP TO 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	a _p x D _c	a _e x D _c	v _c (sf / min)	SIDE MILLING - HEAVY ROUGHING											
					Zn = 5											
					1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	E 1 - 2	2.00	0.40	510	n [min-1]	15586	12468	10390	8906	7793	6234	5195	3896	3117	2598	1948
					fz [in]	0.0009	0.0011	0.0013	0.0015	0.0018	0.0022	0.0026	0.0035	0.0044	0.0053	0.0070
					vf [in/min]	68	68	68	68	68	68	68	68	68	68	68
	A / E 3 - 4	2.00	0.40	460	n [min-1]	14058	11246	9372	8033	7029	5623	4686	3514	2812	2343	1757
					fz [in]	0.0009	0.0011	0.0013	0.0015	0.0018	0.0022	0.0026	0.0035	0.0044	0.0053	0.0070
					vf [in/min]	62	62	62	62	62	62	62	62	62	62	62
A / E 5 - 6	2.00	0.30	380	n [min-1]	11613	9290	7742	6636	5806	4645	3871	2903	2323	1935	1452	
				fz [in]	0.0008	0.0009	0.0011	0.0013	0.0015	0.0019	0.0023	0.0030	0.0038	0.0045	0.0060	
				vf [in/min]	44	44	44	44	44	44	44	44	44	44	44	44
H	M / A 7 (48-56 HRC)	2.00	0.15	150	n [min-1]	4584	3667	3056	2619	2292	1834	1528	1146	917	764	573
					fz [in]	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0013	0.0018	0.0022	0.0026	0.0035
					vf [in/min]	10	10	10	10	10	10	10	10	10	10	10
M	E 8 - 9	2.00	0.30	430	n [min-1]	13141	10513	8761	7509	6570	5256	4380	3285	2628	2190	1643
					fz [in]	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	0.0045
					vf [in/min]	37	37	37	37	37	37	37	37	37	37	37
	A / E 10 - 11	2.00	0.25	400	n [min-1]	12224	9779	8149	6985	6112	4890	4075	3056	2445	2037	1528
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	31	31	31	31	31	31	31	31	31	31	31
K	E 12 - 13	2.00	0.30	350	n [min-1]	10696	8557	7131	6112	5348	4278	3565	2674	2139	1783	1337
					fz [in]	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0033	0.0041	0.0049	0.0065
					vf [in/min]	43	43	43	43	43	43	43	43	43	43	43
	E 14 - 15	2.00	0.25	300	n [min-1]	9168	7334	6112	5239	4584	3667	3056	2292	1834	1528	1146
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	29	29	29	29	29	29	29	29	29	29	29
S	E 19	2.00	0.20	110	n [min-1]	3362	2689	2241	1921	1681	1345	1121	840	672	560	420
					fz [in]	0.0006	0.0007	0.0008	0.0010	0.0011	0.0014	0.0017	0.0022	0.0028	0.0033	0.0044
					vf [in/min]	9	9	9	9	9	9	9	9	9	9	9
	E 20	2.00	0.20	85	n [min-1]	2598	2078	1732	1484	1299	1039	866	649	520	433	325
					fz [in]	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0013	0.0018	0.0022	0.0026	0.0035
					vf [in/min]	6	6	6	6	6	6	6	6	6	6	6
	E 21	2.00	0.20	70	n [min-1]	2139	1711	1426	1222	1070	856	713	535	428	357	267
					fz [in]	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0013	0.0018	0.0022	0.0026	0.0035
					vf [in/min]	5	5	5	5	5	5	5	5	5	5	5
	E 22	2.00	0.40	190	n [min-1]	5806	4645	3871	3318	2903	2323	1935	1452	1161	968	726
					fz [in]	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0033	0.0041	0.0049	0.0065
					vf [in/min]	24	24	24	24	24	24	24	24	24	24	24



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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, STSN540, STRN540 - SIDE MILLING FINISHING - INCH - UP TO 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	a _p x D _c	a _e x D _c	v _c (sf / min)	SIDE MILLING - FINISHING											
					Zn = 5											
					1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	E 1 - 2	2.00	0.02	750	n [min-1]	22920	18336	15280	13097	11460	9168	7640	5730	4584	3820	2865
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	72	72	72	72	72	72	72	72	72	72	72
	A / E 3 - 4	2.00	0.02	680	n [min-1]	20781	16625	13854	11875	10390	8312	6927	5195	4156	3463	2598
					fz [in]	0.0006	0.0008	0.0009	0.0011	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	65	65
A / E 5 - 6	2.00	0.02	560	n [min-1]	17114	13691	11409	9779	8557	6845	5705	4278	3423	2852	2139	
				fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050	
				vf [in/min]	53	53	53	53	53	53	53	53	53	53	53	53
H	M / A 7 (48-56 HRC)	2.00	0.02	250	n [min-1]	7640	6112	5093	4366	3820	3056	2547	1910	1528	1273	955
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	19	19	19	19	19	19	19	19	19	19	19
M	E 8 - 9	2.00	0.02	630	n [min-1]	19253	15402	12835	11002	9626	7701	6418	4813	3851	3209	2407
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	60	60	60	60	60	60	60	60	60	60	60
	A / E 10 - 11	2.00	0.02	600	n [min-1]	18336	14669	12224	10478	9168	7334	6112	4584	3667	3056	2292
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	57	57	57	57	57	57	57	57	57	57	57
K	E 12 - 13	2.00	0.02	520	n [min-1]	15891	12713	10594	9081	7946	6356	5297	3973	3178	2649	1986
					fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	50	50	50	50	50	50	50	50	50	50	50
	E 14 - 15	2.00	0.02	450	n [min-1]	13752	11002	9168	7858	6876	5501	4584	3438	2750	2292	1719
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	34	34	34	34	34	34	34	34	34	34	34
S	E 19	2.00	0.02	160	n [min-1]	4890	3912	3260	2794	2445	1956	1630	1222	978	815	611
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	12	12	12	12	12	12	12	12	12	12	12
					120 - 200											
	E 20	2.00	0.02	125	n [min-1]	3820	3056	2547	2183	1910	1528	1273	955	764	637	478
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	10	10	10	10	10	10	10	10	10	10	10
					94 - 156											
	E 21	2.00	0.02	100	n [min-1]	3056	2445	2037	1746	1528	1222	1019	764	611	509	382
					fz [in]	0.0005	0.0006	0.0008	0.0009	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	8	8	8	8	8	8	8	8	8	8	8
					75 - 125											
E 22	2.00	0.02	270	n [min-1]	8251	6601	5501	4715	4126	3300	2750	2063	1650	1375	1031	
				fz [in]	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0025	0.0031	0.0038	0.0050	
				vf [in/min]	26	26	26	26	26	26	26	26	26	26	26	
				203 - 338												

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.

STSN540, STRN540 - SIDE MILLING FINISHING - INCH - OVER 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	a _p X D _c	a _e X D _c	v _c (sf / min)	SIDE MILLING - FINISHING							
					1/4	3/8	1/2	5/8	3/4	1		
P	E 1 - 2	1.00	0.01	750	n [min-1]	11460	7640	5730	4584	3820	2865	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				563 - 938	vf [in/min]	72	72	72	72	72	72	
	A / E 3 - 4	1.00	0.01	680	n [min-1]	10390	6927	5195	4156	3463	2598	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				510 - 850	vf [in/min]	65	65	65	65	65	65	
A / E 5 - 6	1.00	0.01	560	n [min-1]	8557	5705	4278	3423	2852	2139		
				fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050		
			420 - 700	vf [in/min]	53	53	53	53	53	53		
H	M / A 7 (48-56 HRC)	1.00	0.01	250	n [min-1]	3820	2547	1910	1528	1273	955	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
				188 - 313	vf [in/min]	19	19	19	19	19	19	
M	E 8 - 9	1.00	0.01	630	n [min-1]	9626	6418	4813	3851	3209	2407	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				473 - 788	vf [in/min]	60	60	60	60	60	60	
	A / E 10 - 11	1.00	0.01	600	n [min-1]	9168	6112	4584	3667	3056	2292	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				250 - 750	vf [in/min]	57	57	57	57	57	57	
K	E 12 - 13	1.00	0.01	525	n [min-1]	8022	5348	4011	3209	2674	2006	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				394 - 656	vf [in/min]	50	50	50	50	50	50	
E 14 - 15	1.00	0.01	450	n [min-1]	6876	4584	3438	2750	2292	1719		
				fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040		
			338 - 563	vf [in/min]	34	34	34	34	34	34		
S	E 19	1.00	0.01	160	n [min-1]	2445	1630	1222	978	815	611	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
	E 20	1.00	0.01	125	n [min-1]	1910	1273	955	764	637	478	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
	E 21	1.00	0.01	105	n [min-1]	1604	1070	802	642	535	401	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
	E 22	1.00	0.01	290	n [min-1]	4431	2954	2216	1772	1477	1108	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
					218 - 363	vf [in/min]	28	28	28	28	28	28



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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 - 5 FLUTE STABILIZER

STSN540, STRN540 - SIDE MILLING LIGHT ROUGHING - INCH - OVER 4 X DIAMETER REACH LENGTH - START VALUES

ISO GROUP	SMG	$a_p \times D_c$	$a_e \times D_c$	v_c (sf / min)	SIDE MILLING - LIGHT ROUGHING							
							1/4	3/8	1/2	5/8	3/4	1
					n [min-1]	fz [in]						
P	E 1 - 2	0.50	0.10	600	n [min-1]	9168	6112	4584	3667	3056	2292	
					fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	
				450 - 750	vf [in/min]	69	69	69	69	69	69	
	A / E 3 - 4	0.50	0.10	550	n [min-1]	8404	5603	4202	3362	2801	2101	
					fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	
				413 - 688	vf [in/min]	63	63	63	63	63	63	
A / E 5 - 6	0.50	0.08	450	n [min-1]	6876	4584	3438	2750	2292	1719		
				fz [in]	0.0011	0.0017	0.0023	0.0028	0.0034	0.0045		
			338 - 563	vf [in/min]	39	39	39	39	39	39		
H	M / A 7 (48-56 HRC)	0.50	0.05	200	n [min-1]	3056	2037	1528	1222	1019	764	
					fz [in]	0.0009	0.0013	0.0018	0.0022	0.0026	0.0035	
				150 - 250	vf [in/min]	13	13	13	13	13	13	
M	E 8 - 9	0.50	0.10	510	n [min-1]	7793	5195	3896	3117	2598	1948	
					fz [in]	0.0014	0.0021	0.0028	0.0034	0.0041	0.0055	
				383 - 638	vf [in/min]	54	54	54	54	54	54	
	A / E 10 - 11	0.50	0.08	480	n [min-1]	7334	4890	3667	2934	2445	1834	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				250 - 600	vf [in/min]	46	46	46	46	46	46	
K	E 12 - 13	0.50	0.08	420	n [min-1]	6418	4278	3209	2567	2139	1604	
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				315 - 525	vf [in/min]	40	40	40	40	40	40	
	E 14 - 15	0.50	0.08	360	n [min-1]	5501	3667	2750	2200	1834	1375	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
				270 - 450	vf [in/min]	28	28	28	28	28	28	
S	E 19	0.50	0.08	130	n [min-1]	1986	1324	993	795	662	497	
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040	
				98 - 163	vf [in/min]	10	10	10	10	10	10	
				100	n [min-1]	1528	1019	764	611	509	382	
	E 20	0.50	0.06	0.06	75 - 125	vf [in/min]	7	7	7	7	7	7
					85	n [min-1]	1299	866	649	520	433	325
						fz [in]	0.0009	0.0013	0.0018	0.0022	0.0026	0.0035
					64 - 106	vf [in/min]	6	6	6	6	6	6
	E 22	0.50	0.10	0.10	230	n [min-1]	3514	2343	1757	1406	1171	879
						fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
					173 - 288	vf [in/min]	22	22	22	22	22	22

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
 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 - SLOTTING - METRIC - START VALUES

ISO GROUP	SMG	a _p x D _c	a _e x D _c	SLOTTING								
				v _c (sf / min)			Zn = 5					
							6	8	10	12	16	
P	E 1 - 2	1.00 x D _c	1.00 x D _c	425			n (min-1)	6873	5155	4124	3436	2577
							fz (in)	0.0011	0.0014	0.0018	0.0021	0.0028
				319 - 531			vf (in/min)	37	37	37	37	37
	A / E 3 - 4	1.00 x D _c	1.00 x D _c				400			n (min-1)	6469	4851
				fz (in)	0.0009	0.0013				0.0016	0.0019	0.0025
				300 - 500			vf (in/min)	31	31	31	31	31
A / E 5 - 6	1.00 x D _c	1.00 x D _c	350				n (min-1)	5660	4245	3396	2830	2122
						fz (in)	0.0008	0.0011	0.0014	0.0017	0.0022	
			263 - 438			vf (in/min)	23	23	23	23	23	
H	M / A 7 (48-56 HRC)	0.50 x D _c				1.00 x D _c	275			n (min-1)	4447	3335
			fz (in)	0.0005	0.0006					0.0008	0.0009	0.0013
			206 - 344				vf (in/min)	11	11	11	11	11
M	E 8 - 9	0.50 x D _c				1.00 x D _c	325			n (min-1)	5256	3942
			fz (in)	0.0006	0.0008					0.0010	0.0012	0.0016
			244 - 406				vf (in/min)	16	16	16	16	16
	A / E 10 - 11	0.50 x D _c				1.00 x D _c	275			n (min-1)	4447	3335
			fz (in)	0.0005	0.0006					0.0008	0.0009	0.0013
			206 - 344				vf (in/min)	11	11	11	11	11
K	E 12 - 13	1.00 x D _c				1.00 x D _c	400			n (min-1)	6469	4851
			fz (in)	0.0011	0.0014					0.0018	0.0021	0.0028
			300 - 500				vf (in/min)	34	34	34	34	34
	E 14 - 15	0.50 x D _c				1.00 x D _c	325			n (min-1)	5256	3942
			fz (in)	0.0007	0.0009					0.0012	0.0014	0.0019
			244 - 406				vf (in/min)	19	19	19	19	19
S	E 19	0.50 x D _c				1.00 x D _c	90			n (min-1)	1455	1092
			fz (in)	0.0005	0.0007					0.0009	0.0010	0.0014
			68 - 113				vf (in/min)	4	4	4	4	4
	E 20	0.25 x D _c				1.00 x D _c	75			n (min-1)	1213	910
			fz (in)	0.0005	0.0006					0.0008	0.0009	0.0013
			56 - 94				vf (in/min)	3	3	3	3	3
	E 21	0.25 x D _c				1.00 x D _c	65			n (min-1)	1051	788
			fz (in)	0.0005	0.0006					0.0008	0.0009	0.0013
			49 - 81				vf (in/min)	2	2	2	2	2
	E 22	0.50 x D _c				1.00 x D _c	170			n (min-1)	2749	2062
			fz (in)	0.0007	0.0009					0.0012	0.0014	0.0019
			128 - 213				vf (in/min)	10	10	10	10	10

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 - 5 FLUTE STABILIZER

STS540M, STR540M - SIDE MILLING LIGHT ROUGHING - METRIC - START VALUES

ISO GROUP	SMG	$a_p \times D_c$	$a_e \times D_c$	SIDE MILLING - LIGHT ROUGHING							
				v_c (sf / min)		Zn = 5					
						6	8	10	12	16	
P	E 1 - 2	2.00	0.15	600		n [min-1]	9703	7277	5822	4851	3639
				450 - 750		fz [in]	0.0019	0.0025	0.0031	0.0038	0.0050
						vf [in/min]	92	92	92	92	92
	A / E 3 - 4	2.00	0.15	550		n [min-1]	8894	6671	5337	4447	3335
				413 - 688		fz [in]	0.0019	0.0025	0.0031	0.0038	0.0050
						vf [in/min]	84	84	84	84	84
A / E 5 - 6	2.00	0.12	450		n [min-1]	7277	5458	4366	3639	2729	
			338 - 563		fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041	
					vf [in/min]	56	56	56	56	56	
H	M / A 7 (48-56 HRc)	2.00	0.08	200		n [min-1]	3234	2426	1941	1617	1213
				150 - 250		fz [in]	0.0011	0.0014	0.0018	0.0021	0.0028
						vf [in/min]	17	17	17	17	17
M	E 8 - 9	2.00	0.15	510		n [min-1]	8247	6186	4948	4124	3093
				383 - 638		fz [in]	0.0018	0.0024	0.0030	0.0035	0.0047
						vf [in/min]	73	73	73	73	73
	A / E 10 - 11	2.00	0.12	480		n [min-1]	7762	5822	4657	3881	2911
				250 - 600		fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041
						vf [in/min]	60	60	60	60	60
K	E 12 - 13	2.00	0.12	420		n [min-1]	6792	5094	4075	3396	2547
				315 - 525		fz [in]	0.0017	0.0022	0.0028	0.0033	0.0044
						vf [in/min]	56	56	56	56	56
	E 14 - 15	2.00	0.12	360		n [min-1]	5822	4366	3493	2911	2183
				270 - 450		fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
						vf [in/min]	34	34	34	34	34
S	E 19	2.00	0.12	130		n [min-1]	2102	1577	1261	1051	788
				98 - 163		fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
						vf [in/min]	12	12	12	12	12
						n [min-1]	1617	1213	970	809	606
	E 20	2.00	0.10	100		fz [in]	0.0011	0.0014	0.0018	0.0021	0.0028
				75 - 125		vf [in/min]	9	9	9	9	9
						n [min-1]	1375	1031	825	687	515
						fz [in]	0.0011	0.0014	0.0018	0.0021	0.0028
	E 21	2.00	0.10	85		vf [in/min]	7	7	7	7	7
				64 - 106		n [min-1]	3719	2790	2232	1860	1395
						fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041
						vf [in/min]	29	29	29	29	29
E 22	2.00	0.15	230		n [min-1]	3719	2790	2232	1860	1395	
			173 - 288		fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041	
					vf [in/min]	29	29	29	29	29	
					n [min-1]	3719	2790	2232	1860	1395	

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
 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 - SIDE MILLING HEAVY ROUGHING - METRIC - START VALUES

ISO GROUP	SMG	$a_p \times D_c$	$a_e \times D_c$	SIDE MILLING - HEAVY ROUGHING								
				v_c (sf / min)			Zn = 5					
							6	8	10	12	16	
P	E 1 - 2	2.00	0.40	510			n [min-1]	8247	6186	4948	4124	3093
				383 - 638			fz [in]	0.0017	0.0022	0.0028	0.0033	0.0044
							vf [in/min]	68	68	68	68	68
	A / E 3 - 4	2.00	0.40	460			n [min-1]	7439	5579	4463	3719	2790
				345 - 575			fz [in]	0.0017	0.0022	0.0028	0.0033	0.0044
							vf [in/min]	62	62	62	62	62
A / E 5 - 6	2.00	0.30	380			n [min-1]	6145	4609	3687	3073	2304	
			285 - 475			fz [in]	0.0014	0.0019	0.0024	0.0028	0.0038	
						vf [in/min]	44	44	44	44	44	
H	M / A 7 (48-56 HRC)	2.00	0.15	150			n [min-1]	2426	1819	1455	1213	910
				113 - 188			fz [in]	0.0008	0.0011	0.0014	0.0017	0.0022
							vf [in/min]	10	10	10	10	10
M	E 8 - 9	2.00	0.30	430			n [min-1]	6954	5215	4172	3477	2608
				323 - 538			fz [in]	0.0011	0.0014	0.0018	0.0021	0.0028
	A / E 10 - 11	2.00	0.25	400			n [min-1]	6469	4851	3881	3234	2426
				250 - 500			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
K	E 12 - 13	2.00	0.30	350			n [min-1]	5660	4245	3396	2830	2122
				263 - 438			fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041
	E 14 - 15	2.00	0.25	300			n [min-1]	4851	3639	2911	2426	1819
				225 - 375			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
S	E 19	2.00	0.20	110			n [min-1]	1779	1334	1067	889	667
				83 - 138			fz [in]	0.0010	0.0014	0.0017	0.0021	0.0028
	E 20	2.00	0.20	85			n [min-1]	1375	1031	825	687	515
				64 - 106			fz [in]	0.0008	0.0011	0.0014	0.0017	0.0022
	E 21	2.00	0.20	70			n [min-1]	1132	849	679	566	424
				53 - 88			fz [in]	0.0008	0.0011	0.0014	0.0017	0.0022
	E 22	2.00	0.40	190			n [min-1]	3073	2304	1844	1536	1152
				143 - 238			fz [in]	0.0015	0.0020	0.0026	0.0031	0.0041
							vf [in/min]	24	24	24	24	24

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
 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 - 5 FLUTE STABILIZER

STS540M, STR540M - SIDE MILLING FINISHING - METRIC - START VALUES

ISO GROUP	SMG	$a_p \times D_c$	$a_e \times D_c$	SIDE MILLING - FINISHING								
				v_c (sf / min)			Zn = 5					
							6	8	10	12	16	
P	E 1 - 2	2.00	0.02	750			n [min-1]	12129	9096	7277	6064	4548
				563 - 938			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
							vf [in/min]	72	72	72	72	72
	A / E 3 - 4	2.00	0.02	680			n [min-1]	10997	8247	6598	5498	4124
				510 - 850			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
							vf [in/min]	65	65	65	65	65
A / E 5 - 6	2.00	0.02	560			n [min-1]	9056	6792	5434	4528	3396	
			420 - 700			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031	
						vf [in/min]	53	53	53	53	53	
H	M / A 7 (48-56 HRC)	2.00	0.02	250			n [min-1]	4043	3032	2426	2021	1516
				188 - 313			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
							vf [in/min]	19	19	19	19	19
M	E 8 - 9	2.00	0.02	630			n [min-1]	10188	7641	6113	5094	3820
				473 - 788			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
	A / E 10 - 11	2.00	0.02	600			n [min-1]	9703	7277	5822	4851	3639
				450 - 750			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
K	E 12 - 13	2.00	0.02	520			n [min-1]	8409	6307	5045	4205	3153
				390 - 650			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
	E 14 - 15	2.00	0.02	450			n [min-1]	7277	5458	4366	3639	2729
				338 - 563			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
S	E 19	2.00	0.02	160			n [min-1]	2587	1941	1552	1294	970
				120 - 200			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
	E 20	2.00	0.02	125			n [min-1]	2021	1516	1213	1011	758
				94 - 156			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
	E 21	2.00	0.02	100			n [min-1]	1617	1213	970	809	606
				75 - 125			fz [in]	0.0009	0.0013	0.0016	0.0019	0.0025
	E 22	2.00	0.02	270			n [min-1]	4366	3275	2620	2183	1637
				203 - 338			fz [in]	0.0012	0.0016	0.0020	0.0024	0.0031
							vf [in/min]	26	26	26	26	26

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.

STRCS540 - SIDE MILLING SEMI ROUGHING - INCH - START VALUES

ISO GROUP	SMG	a _p X D _c	a _e X D _c	v _c (sf / min)	SIDE MILLING - SEMI ROUGHING						
					1/4	3/8	1/2	5/8	3/4	1	
P	E 1 - 2	3.00	0.10	700	n [min-1]	10696	7131	5348	4278	3565	2674
					fz [in]	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
				525 - 875	vf [in/min]	107	107	107	107	107	107
	A / E 3 - 4	3.00	0.10	645	n [min-1]	9856	6570	4928	3942	3285	2464
					fz [in]	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080
				484 - 806	vf [in/min]	99	99	99	99	99	99
A / E 5 - 6	3.00	0.08	525	n [min-1]	8022	5348	4011	3209	2674	2006	
				fz [in]	0.0016	0.0024	0.0033	0.0041	0.0049	0.0065	
			394 - 656	vf [in/min]	65	65	65	65	65	65	
H	M / A 7 (48-56 HRC)	3.00	0.04	220	n [min-1]	3362	2241	1681	1345	1121	840
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
				165 - 275	vf [in/min]	17	17	17	17	17	17
M	E 8 - 9	3.00	0.10	600	n [min-1]	9168	6112	4584	3667	3056	2292
					fz [in]	0.0019	0.0028	0.0038	0.0047	0.0056	0.0075
				450 - 750	vf [in/min]	86	86	86	86	86	86
	A / E 10 - 11	3.00	0.08	565	n [min-1]	8633	5755	4317	3453	2878	2158
					fz [in]	0.0016	0.0024	0.0033	0.0041	0.0049	0.0065
				250 - 706	vf [in/min]	70	70	70	70	70	70
K	E 12 - 13	3.00	0.08	495	n [min-1]	7564	5042	3782	3025	2521	1891
					fz [in]	0.0018	0.0026	0.0035	0.0044	0.0053	0.0070
				371 - 619	vf [in/min]	66	66	66	66	66	66
	E 14 - 15	3.00	0.08	430	n [min-1]	6570	4380	3285	2628	2190	1643
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				323 - 538	vf [in/min]	41	41	41	41	41	41
S	E 19	3.00	0.06	150	n [min-1]	2292	1528	1146	917	764	573
					fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				113 - 188	vf [in/min]	14	14	14	14	14	14
				E 20	3.00	0.05	120	n [min-1]	1834	1222	917
	fz [in]	0.0012	0.0017					0.0023	0.0029	0.0035	0.0046
	90 - 150	vf [in/min]	11				11	11	11	11	11
	E 21	3.00	0.05				100	n [min-1]	1528	1019	764
				fz [in]	0.0012	0.0017		0.0023	0.0029	0.0035	0.0046
				75 - 125	vf [in/min]	9	9	9	9	9	9
				E 22	3.00	0.08	270	n [min-1]	4126	2750	2063
	fz [in]	0.0016	0.0024					0.0033	0.0041	0.0049	0.0065
	203 - 338	vf [in/min]	34				34	34	34	34	34



DOWNLOAD THE "SOLID MILLING" APP FREE ON GOOGLE PLAY & THE APP STORE.
GET CUTTING DATA RECOMMENDATIONS/CALCULATIONS, TIPS & TRICKS, TECHNICAL VIDEOS, AND MORE!

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.



ACHIEVE EFFICIENT OPTIMIZED ROUGHING MULTI FLUTE

Reducing cycle times, increasing throughput and extending tool life have never been easier with the Niagara Cutter™ Multi Flute family of end mills. 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 these products is the advanced chip splitter design. This innovative engineering allows for unsurpassed chip control in applications requiring depths of cut up to 3 times the diameter of the tool.

RANGE OVERVIEW

S638/S638R - 6-FLUTE - 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 - 6-FLUTE - 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 - 6-FLUTE - 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 - 7-FLUTE - 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"

S938/S938R - 7-FLUTE - 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"

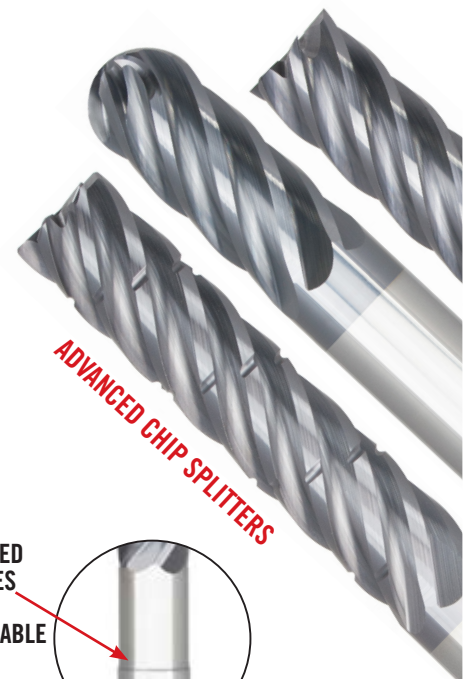
SCS638/SCS638R, SCS738R, SCS938R - 9-FLUTE - ADVANCED CHIP SPLITTERS

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

MATERIAL GROUPS
Steel 1-6
Stainless Steel 8-11
Cast Iron 12-15
Superalloys 19-22

YOUR 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



NECKED
SERIES
ALSO
AVAILABLE

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

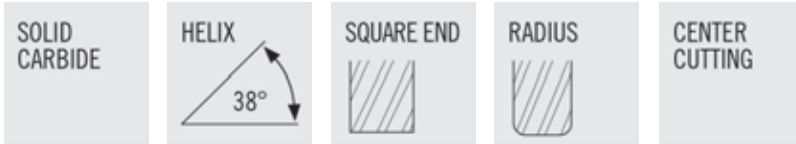
Take advantage of the full flute length of the tool selected for the specific application. Maximizing depth of cuts above 2 times the diameter of the tool is common when optimized roughing. Smaller radial step-overs make such depths of the cut possible. A larger step-over would increase the amount of 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

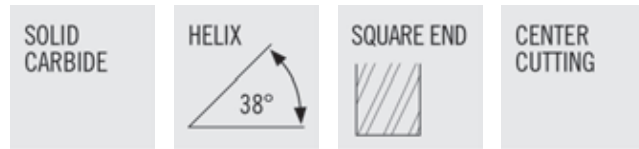


- Eccentric O.D. relief creating a stronger cutting edge
 - Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
 - Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
 - Excellent in high speed milling and optimized roughing techniques
 - Designed for increased radial depths as compared to the S738 and S938
 - High performance with minimal deflection
- Cutting Data - Page 71-73
 - Tolerance Specs - Page 323

PRODUCT NUMBER	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

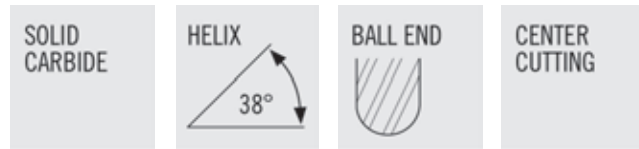
MULTI FLUTE-SN638 & SN638R



- 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 71-73
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	RADIUS	SHANK TYPE
N15397	SN638-0.375-E3-S.0-Z6	3/8	3/8	1	3	0.360	1-1/2	6	ALTIN	-	CYLINDRICAL
N15398	SN638R-0.375-E3-R015.0-Z6	3/8	3/8	1	3	0.360	1-1/2	6	ALTIN	0.015	CYLINDRICAL
N15399	SN638R-0.375-E3-R030.0-Z6	3/8	3/8	1	3	0.360	1-1/2	6	ALTIN	0.030	CYLINDRICAL
N15406	SN638-0.500-E2-S.0-Z6	1/2	1/2	1-1/8	4	0.480	2	6	ALTIN	-	CYLINDRICAL
N15407	SN638R-0.500-E2-R030.0-Z6	1/2	1/2	1-1/8	4	0.480	2	6	ALTIN	0.030	CYLINDRICAL
N15408	SN638R-0.500-E2-R060.0-Z6	1/2	1/2	1-1/8	4	0.480	2	6	ALTIN	0.060	CYLINDRICAL
N15409	SN638R-0.500-E2-R120.0-Z6	1/2	1/2	1-1/8	4	0.480	2	6	ALTIN	0.120	CYLINDRICAL
N15418	SN638-0.625-E2-S.0-Z6	5/8	5/8	1-3/8	5	0.600	2-1/2	6	ALTIN	-	CYLINDRICAL
N15419	SN638R-0.625-E2-R015.0-Z6	5/8	5/8	1-3/8	5	0.600	2-1/2	6	ALTIN	0.015	CYLINDRICAL
N15420	SN638R-0.625-E2-R030.0-Z6	5/8	5/8	1-3/8	5	0.600	2-1/2	6	ALTIN	0.030	CYLINDRICAL
N15421	SN638R-0.625-E2-R060.0-Z6	5/8	5/8	1-3/8	5	0.600	2-1/2	6	ALTIN	0.060	CYLINDRICAL
N15430	SN638-0.750-E2-S.0-Z6	3/4	3/4	1-3/4	6	0.720	3	6	ALTIN	-	CYLINDRICAL
N15431	SN638R-0.750-E2-R030.0-Z6	3/4	3/4	1-3/4	6	0.720	3	6	ALTIN	0.030	CYLINDRICAL
N15432	SN638R-0.750-E2-R060.0-Z6	3/4	3/4	1-3/4	6	0.720	3	6	ALTIN	0.060	CYLINDRICAL
N15433	SN638R-0.750-E2-R120.0-Z6	3/4	3/4	1-3/4	6	0.720	3	6	ALTIN	0.120	CYLINDRICAL
N15441	SN638R-1.000-E2-R030.0-Z6	1	1	2-1/4	7	0.960	4-1/8	6	ALTIN	0.030	CYLINDRICAL
N15442	SN638R-1.000-E2-R060.0-Z6	1	1	2-1/4	7	0.960	4-1/8	6	ALTIN	0.060	CYLINDRICAL
N15443	SN638R-1.000-E2-R090.0-Z6	1	1	2-1/4	7	0.960	4-1/8	6	ALTIN	0.090	CYLINDRICAL
N15444	SN638R-1.000-E2-R120.0-Z6	1	1	2-1/4	7	0.960	4-1/8	6	ALTIN	0.120	CYLINDRICAL
N15445	SN638R-1.000-E2-R250.0-Z6	1	1	2-1/4	7	0.960	4-1/8	6	ALTIN	0.250	CYLINDRICAL

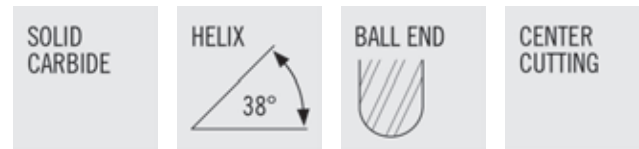
MULTI FLUTE-SB638



- 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 73-75
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



- 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 73-75
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.240	3/4	6	ALTIN	CYLINDRICAL
N15393	SBN638-0.313-E1-B.0-Z6	5/16	5/16	5/16	2-1/2	0.300	1	6	ALTIN	CYLINDRICAL
N15396	SBN638-0.375-E1-B.0-Z6	3/8	3/8	3/8	2-1/2	0.360	1-1/4	6	ALTIN	CYLINDRICAL
N15405	SBN638-0.500-E1-B.0-Z6	1/2	1/2	1/2	3	0.480	1-1/2	6	ALTIN	CYLINDRICAL
N15417	SBN638-0.625-E1-B.0-Z6	5/8	5/8	5/8	4	0.600	1-7/8	6	ALTIN	CYLINDRICAL
N15429	SBN638-0.750-E1-B.0-Z6	3/4	3/4	3/4	5	0.720	2-1/4	6	ALTIN	CYLINDRICAL
N15440	SBN638-1.000-E1-B.0-Z6	1	1	1	6	0.960	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 76
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

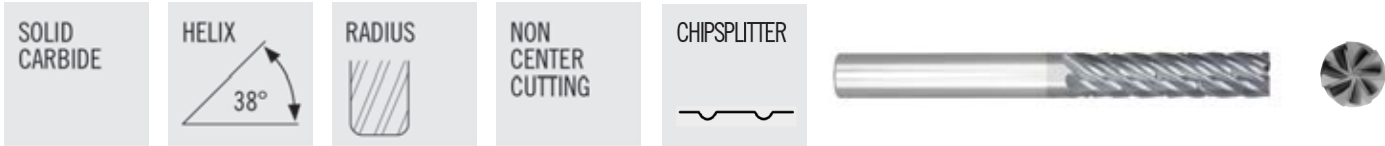


- Eccentric O.D. relief creating a stronger cutting edge
- Variable indexing to reduce harmonics providing smoother cutting and improved surface finish
- Designed for peripheral roughing and finishing for stainless steel, titanium, and high temperature alloys
- Excellent in high speed milling and optimized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

- Cutting Data - Page 77-78
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 79
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 77-78
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 77-78
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 79
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 / 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								
						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	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	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	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	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	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	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	$a_p \times D_c$ (max)	$a_e \times D_c$ (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
					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
					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
					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	vf [in/min]	103	103	103	103	103
					n [min-1]	5755	4317	3453	2878	2158
					fz [in]	0.0024	0.0033	0.0041	0.0049	0.0065
					vf [in/min]	84	84	84	84	84
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	vf [in/min]	79	79	79	79	79
					n [min-1]	4380	3285	2628	2190	1643
S	E 19	2.00	0.05	150	fz [in]	0.0019	0.0025	0.0031	0.0038	0.0050
					vf [in/min]	17	17	17	17	17
					n [min-1]	1528	1146	917	764	573
	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
					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
					vf [in/min]	11	11	11	11	11
					n [min-1]	2750	2063	1650	1375	1031
E 22	2.00	0.07	270	fz [in]	0.0024	0.0033	0.0041	0.0049	0.0065	
				vf [in/min]	40	40	40	40	40	
				n [min-1]	203	338				



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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
 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	
	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
					E 12 - 13	0.05	0.05	900	n [min-1]	13752	11002	9168	6876
fz [in]	0.0028	0.0034	0.0041	0.0055					0.0069	0.0083	0.0110		
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		
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



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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	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	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	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	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	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	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
	450 - 750		vf [in/min]	103	103	103	103	103			
	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
	424 - 706		vf [in/min]	84	84	84	84	84			
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
	371 - 619		vf [in/min]	79	79	79	79	79			
	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	
323 - 538		vf [in/min]	49	49	49	49	49				
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				



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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	
				600 - 1000			fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	
							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	
				555 - 925			fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	
							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	
				454 - 756			fz [in]	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	
							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	
				510 - 850			fz [in]	0.0020	0.0030	0.0040	0.0056	0.0068	0.0090	
	E 10 - 11	2.0	0.06	630			n [rev/min]	9626	6418	4813	3851	3209	2407	
				473 - 788			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	
				413 - 688			fz [in]	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	
	E 14 - 15	2.0	0.06	490			n [rev/min]	7487	4991	3744	2995	2496	1872	
				368 - 613			fz [in]	0.0018	0.0026	0.0035	0.0044	0.0053	0.0070	
S	E 19	2.0	0.04	170			n [rev/min]	2598	1732	1299	1039	866	649	
				128 - 213			fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	
	E 20	2.0	0.04	135			n [rev/min]	2063	1375	1031	825	688	516	
				101 - 169			fz [in]	0.0014	0.0021	0.0028	0.0034	0.0041	0.0055	
	E 21	2.0	0.04	115			n [rev/min]	1757	1171	879	703	586	439	
				86 - 144			fz [in]	0.0014	0.0021	0.0028	0.0034	0.0041	0.0055	
	E 22	2.0	0.06	310			n [rev/min]	4737	3158	2368	1895	1579	1184	
				233 - 388			fz [in]	0.0015	0.0023	0.0030	0.0041	0.0049	0.0065	
								vf [in/min]	50	50	50	69	69	69

SMG = Seco Material Group
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fz [in] = Feed/tooth
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 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
					fz [in]	0.0010	0.0015	0.0020	0.0025	0.0030	0.0040
					vf [in/min]	17	17	17	21	21	21
	E 21	2.00	0.02	132	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
E 22	2.00	0.02	357	fz [in]	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
				vf [in/min]	48	48	48	61	61	61	



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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	
	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	
S	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

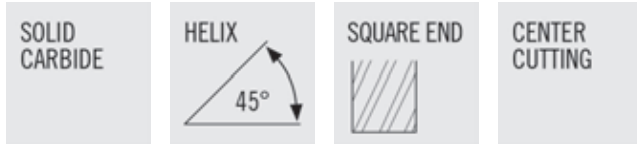
NOTE: Optimized roughing is an excellent strategy for achieving quality parts and extending tool life, but requires use of the right equipment and cutting parameters. If you are having problems implementing the approach or want to learn more about how to use the strategy to process a part, contact the 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
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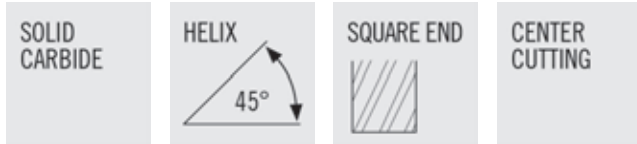
A245



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting in aluminum and non-ferrous materials
- Cutting Data - Page 105
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

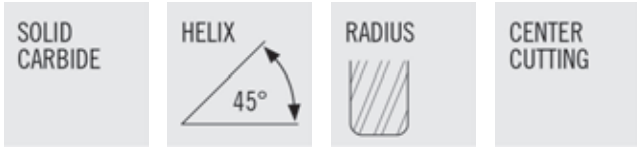
A245 (CON'T)



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for slotting in aluminum and non-ferrous materials
- Cutting Data - Page 105
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

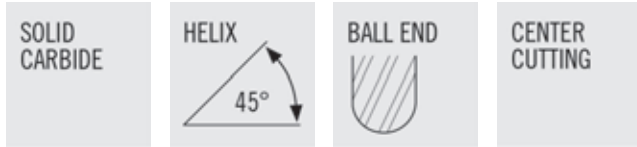
A245R



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials
- Cutting Data - Page 105
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for aluminum and non-ferrous materials

- Cutting Data - Page 105
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



REACH PEAK METAL REMOVAL RATES IN HIGH-VELOCITY ALUMINUM MILLING

AN230 & AN335

Achieve exceptional material removal rates for aerospace slotting and profiling applications in aluminum with the high-performance AN230 and AN335 solid carbide end mills from Niagara Cutter™. Designed to minimize deflection and vibrations with its advanced geometry, these end mills can keep up with any high-velocity spindle without sacrificing surface finish or tool life.

MATERIAL GROUPS

Non-ferrous 16-17

For modern machine tools equipped with spindles capable of 16,000 rpm or more, avoiding vibrations is critical to securing processes and preventing damage to the spindle. For the highest level of process security, the AN230 and AN335 end mills can spend days in cut with ease thanks to innovative engineering.

These end mills have been optimized with K-lands that enable reduced frictional forces and contact with the chip as well as smoother cutting thanks to the avoidance of material adhesion. Axial coolant holes in the 3-flute configuration further improve performance and chip control.

KEY BENEFITS

- Push your machine to its limits without sacrificing surface finish, tool life or process security
- Increase chip evacuation and reduce friction and heat with specially designed axial coolant holes
- Avoid deflection and chatter with advanced tool geometry
- Get customized tool designs according to your specific needs

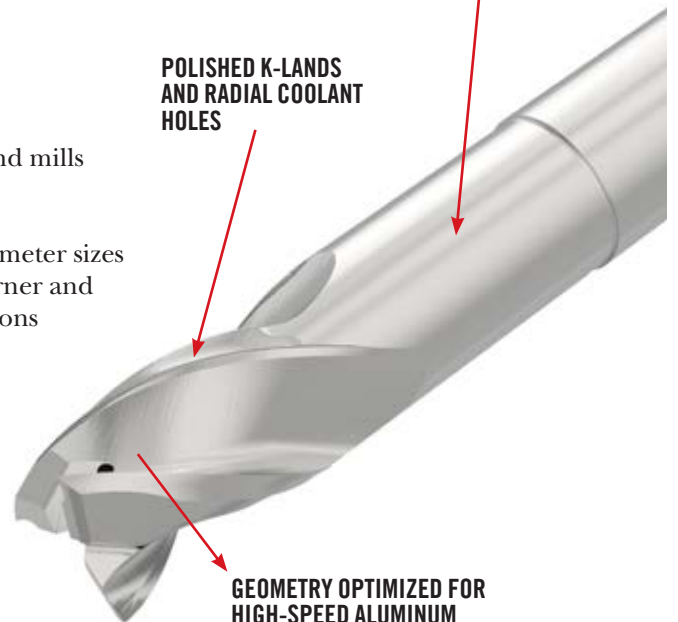
RANGE OVERVIEW

- 94 uncoated inch end mills (AN230/AN230R) (AN335/AN335R)
- 0.5", 0.75", 1.00" diameter sizes
- Standard square corner and aerospace radii options

COATING AND GEOMETRY MODIFICATIONS AVAILABLE

POLISHED K-LANDS AND RADIAL COOLANT HOLES

GEOMETRY OPTIMIZED FOR HIGH-SPEED ALUMINUM MACHINING



4 THINGS TO KNOW

TO GET THE MOST OUT OF ALUMINUM MILLING WITH THE AN230 AND AN335

1. WHY WAS THIS PRODUCT DEVELOPED?

The Niagara Cutter AN230 and AN335 are designed for high speed / high velocity aluminum milling applications. These two series of end mills meet the design requirements established by industry leading CNC machine tool builders to be run in milling machines utilizing 80kw and 120kw spindles. The flexibility of the AN230 and AN335 can also be used in mid-range to high performance milling machines found in many Aerospace machine shops.

2. WHAT CAN NIAGARA CUTTER OFFER?

A consistent and reliable high level of performance for each and every tool, standard or special. This is delivered from the engineered flute shape, to polishing of the K-land to provide a strong and homogenous cutting edge.

AN230 & AN335 offers:

- Square end and standard Aerospace corner radius sizes
- Unequal flute spacing to eliminate harmonics
- Polished Rake Face K-Land to reduce friction and chip to flute contact
- Stabilization land to eliminate harmonics
- Available in multiple reach lengths to accommodate shallow and deep pockets
- Shank lengths optimized for shrink fit toolholder clamping depths
- Internal Y coolant channels available as standards on the AN335 series

3. APPLICATION AREAS

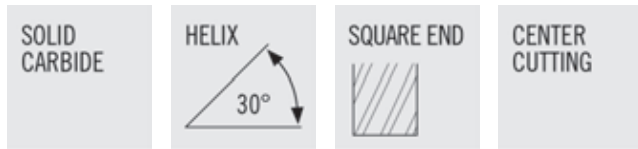
High velocity slotting and profiling milling aluminum up to 1 x diameter depth of cut. High pressure flood coolant and thru the spindle coolant (AN335) is recommended to ensure proper chip evacuation. Balanced tool holder assemblies are highly recommended per the machine tool builder requirements.

4. INDUSTRY REQUIREMENTS AND NEEDS

- 80 kw and up for AN230 geometry
- 120kw spindles for AN335 geometry
- High rpm applications require balanced toolholder assemblies
- High precision holders that ensure minimal run-out as well as good clamping and transmittable torque are highly recommended when high velocity milling, such as:
 - Heavy duty reinforced Shrinkfit holders
 - Power Milling chucks
 - High precision collet chucks
 - Weldon holders
- Anti-pullout protection such as Haimer Safe-Lock or weldon
- Programming “lead in” and “lead outs” to ensure smooth transitions into and exiting the workpiece



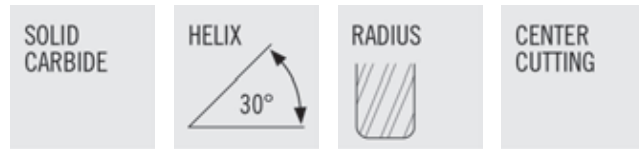
AN230



- Polished K-land to increase cutting edge strength
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- Cutting Data - Page 103
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	SHANK TYPE
03302585	AN230-0.500-E2-S.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	CYLINDRICAL
03302588	AN230-0.500-E3-S.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	CYLINDRICAL
03302591	AN230-0.500-E4-S.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	CYLINDRICAL
03302594	AN230-0.500-E5-S.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	CYLINDRICAL
03302597	AN230-0.750-E2-S.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	CYLINDRICAL
03302602	AN230-0.750-E3-S.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	CYLINDRICAL
03302607	AN230-0.750-E4-S.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	CYLINDRICAL
03302612	AN230-0.750-E5-S.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	CYLINDRICAL
03302617	AN230-1.000-E2-S.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	CYLINDRICAL
03302622	AN230-1.000-E3-S.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	CYLINDRICAL
03302627	AN230-1.000-E4-S.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	CYLINDRICAL

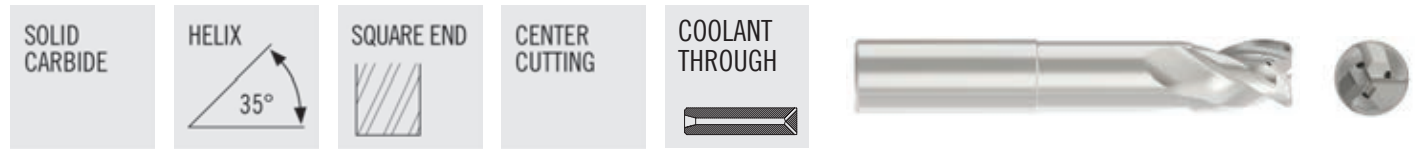
AN230R



- Polished K-land to increase cutting edge strength
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- With corner radius for strength
- Cutting Data - Page 103
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	RADIUS	SHANK TYPE
03302586	AN230R-0.500-E2-R030.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	0.030	CYLINDRICAL
03302587	AN230R-0.500-E2-R060.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	0.060	CYLINDRICAL
03302589	AN230R-0.500-E3-R030.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	0.030	CYLINDRICAL
03302590	AN230R-0.500-E3-R060.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	0.060	CYLINDRICAL
03302592	AN230R-0.500-E4-R030.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	0.030	CYLINDRICAL
03302593	AN230R-0.500-E4-R060.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	0.060	CYLINDRICAL
03302595	AN230R-0.500-E5-R030.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	0.030	CYLINDRICAL
03302596	AN230R-0.500-E5-R060.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	0.060	CYLINDRICAL
03302598	AN230R-0.750-E2-R030.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.030	CYLINDRICAL
03302599	AN230R-0.750-E2-R060.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.060	CYLINDRICAL
03302600	AN230R-0.750-E2-R090.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.090	CYLINDRICAL
03302601	AN230R-0.750-E2-R120.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.120	CYLINDRICAL
03302603	AN230R-0.750-E3-R030.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.030	CYLINDRICAL
03302604	AN230R-0.750-E3-R060.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.060	CYLINDRICAL
03302605	AN230R-0.750-E3-R090.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.090	CYLINDRICAL
03302606	AN230R-0.750-E3-R120.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.120	CYLINDRICAL
03302608	AN230R-0.750-E4-R030.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.030	CYLINDRICAL
03302609	AN230R-0.750-E4-R060.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.060	CYLINDRICAL
03302610	AN230R-0.750-E4-R090.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.090	CYLINDRICAL
03302611	AN230R-0.750-E4-R120.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.120	CYLINDRICAL
03302613	AN230R-0.750-E5-R030.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.030	CYLINDRICAL
03302614	AN230R-0.750-E5-R060.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.060	CYLINDRICAL
03302615	AN230R-0.750-E5-R090.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.090	CYLINDRICAL
03302616	AN230R-0.750-E5-R120.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.120	CYLINDRICAL
03302618	AN230R-1.000-E2-R030.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.030	CYLINDRICAL
03302619	AN230R-1.000-E2-R060.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.060	CYLINDRICAL
03302620	AN230R-1.000-E2-R090.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.090	CYLINDRICAL
03302621	AN230R-1.000-E2-R120.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.120	CYLINDRICAL
03302623	AN230R-1.000-E3-R030.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.030	CYLINDRICAL
03302624	AN230R-1.000-E3-R060.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.060	CYLINDRICAL
03302625	AN230R-1.000-E3-R090.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.090	CYLINDRICAL
03302626	AN230R-1.000-E3-R120.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.120	CYLINDRICAL
03302628	AN230R-1.000-E4-R030.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.030	CYLINDRICAL
03302629	AN230R-1.000-E4-R060.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.060	CYLINDRICAL
03302630	AN230R-1.000-E4-R090.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.090	CYLINDRICAL
03302631	AN230R-1.000-E4-R120.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.120	CYLINDRICAL

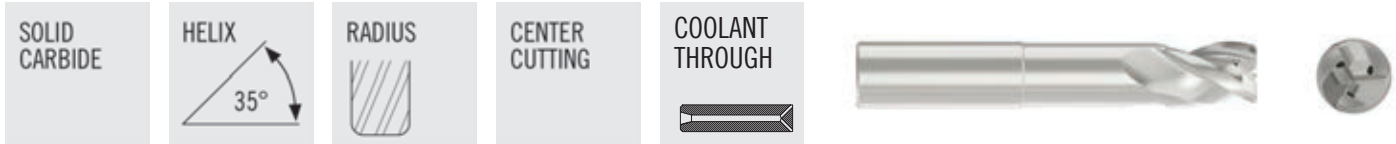
AN335



- Polished K-land to increase cutting edge strength
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- Y-Channel coolant through
- Cutting Data - Page 104
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	SHANK TYPE
03302634	AN335-0.500-E2-S.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	CYLINDRICAL
03302637	AN335-0.500-E3-S.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	CYLINDRICAL
03302640	AN335-0.500-E4-S.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	CYLINDRICAL
03302643	AN335-0.500-E5-S.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	CYLINDRICAL
03302646	AN335-0.750-E2-S.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	CYLINDRICAL
03302651	AN335-0.750-E3-S.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	CYLINDRICAL
03302656	AN335-0.750-E4-S.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	CYLINDRICAL
03302662	AN335-0.750-E5-S.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	CYLINDRICAL
03302667	AN335-1.000-E2-S.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	CYLINDRICAL
03302672	AN335-1.000-E3-S.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	CYLINDRICAL
03302677	AN335-1.000-E4-S.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	CYLINDRICAL

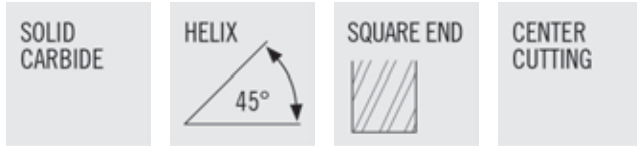
AN335R



- Polished K-land to increase cutting edge strength
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- With corner radius for strength
- Y-Channel coolant through
- Cutting Data - Page 104
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	RADIUS	SHANK TYPE
03302635	AN335R-0.500-E2-R030.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	0.030	CYLINDRICAL
03302636	AN335R-0.500-E2-R060.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	0.060	CYLINDRICAL
03302638	AN335R-0.500-E3-R030.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	0.030	CYLINDRICAL
03302639	AN335R-0.500-E3-R060.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	0.060	CYLINDRICAL
03302641	AN335R-0.500-E4-R030.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	0.030	CYLINDRICAL
03302642	AN335R-0.500-E4-R060.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	0.060	CYLINDRICAL
03302644	AN335R-0.500-E5-R030.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	0.030	CYLINDRICAL
03302645	AN335R-0.500-E5-R060.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	0.060	CYLINDRICAL
03302647	AN335R-0.750-E2-R030.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.030	CYLINDRICAL
03302648	AN335R-0.750-E2-R060.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.060	CYLINDRICAL
03302649	AN335R-0.750-E2-R090.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.090	CYLINDRICAL
03302650	AN335R-0.750-E2-R120.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.120	CYLINDRICAL
03302652	AN335R-0.750-E3-R030.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.030	CYLINDRICAL
03302653	AN335R-0.750-E3-R060.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.060	CYLINDRICAL
03302654	AN335R-0.750-E3-R090.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.090	CYLINDRICAL
03302655	AN335R-0.750-E3-R120.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.120	CYLINDRICAL
03302657	AN335R-0.750-E4-R030.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.030	CYLINDRICAL
03302658	AN335R-0.750-E4-R060.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.060	CYLINDRICAL
03302659	AN335R-0.750-E4-R090.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.090	CYLINDRICAL
03302660	AN335R-0.750-E4-R120.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.120	CYLINDRICAL
03302663	AN335R-0.750-E5-R030.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.030	CYLINDRICAL
03302664	AN335R-0.750-E5-R060.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.060	CYLINDRICAL
03302665	AN335R-0.750-E5-R090.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.090	CYLINDRICAL
03302666	AN335R-0.750-E5-R120.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.120	CYLINDRICAL
03302668	AN335R-1.000-E2-R030.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.030	CYLINDRICAL
03302669	AN335R-1.000-E2-R060.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.060	CYLINDRICAL
03302670	AN335R-1.000-E2-R090.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.090	CYLINDRICAL
03302671	AN335R-1.000-E2-R120.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.120	CYLINDRICAL
03302673	AN335R-1.000-E3-R030.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.030	CYLINDRICAL
03302674	AN335R-1.000-E3-R060.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.060	CYLINDRICAL
03302675	AN335R-1.000-E3-R090.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.090	CYLINDRICAL
03302676	AN335R-1.000-E3-R120.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.120	CYLINDRICAL
03302678	AN335R-1.000-E4-R030.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.030	CYLINDRICAL
03302679	AN335R-1.000-E4-R060.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.060	CYLINDRICAL
03302680	AN335R-1.000-E4-R090.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.090	CYLINDRICAL
03302681	AN335R-1.000-E4-R120.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.120	CYLINDRICAL

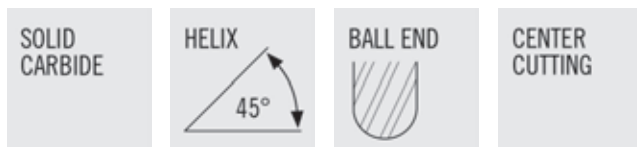
AN245



- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Designed for aluminum and non-ferrous materials
- Cutting Data - Page 105
- Tolerance Specs - Page 323

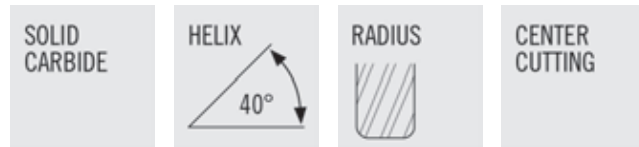
PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	SHANK TYPE
N57993	AN245-0.375-E5-S.0-Z2	3/8	3/8	1/2	4	0.360	2-1/8	2	TICN	CYLINDRICAL
N57996	AN245-0.500-E7-S.0-Z2	1/2	1/2	5/8	4	0.480	2-1/8	2	TICN	CYLINDRICAL
N57998	AN245-0.500-E8-S.0-Z2	1/2	1/2	5/8	8	0.480	6	2	TICN	CYLINDRICAL
N57999	AN245-0.500-E10-S.0-Z2	1/2	1/2	3/4	6	0.480	4	2	TICN	CYLINDRICAL
N57997	AN245-0.500-E9-S.0-Z2	1/2	1/2	3/4	6	0.480	3-3/8	2	TICN	CYLINDRICAL
N58001	AN245-0.625-E7-S.0-Z2	5/8	5/8	3/4	5	0.600	2-3/8	2	TICN	CYLINDRICAL
N58006	AN245-0.750-E9-S.0-Z2	3/4	3/4	1	5	0.720	2-1/2	2	TICN	CYLINDRICAL
N58009	AN245-0.750-E11-S.0-Z2	3/4	3/4	1	6	0.720	4	2	TICN	CYLINDRICAL
N58010	AN245-0.750-E12-S.0-Z2	3/4	3/4	1	8	0.720	6	2	TICN	CYLINDRICAL

ANB245



PRODUCT NUMBER	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	0.360	2-1/8	2	UNCOATED	CYLINDRICAL
N58033	ANB245-0.375-E2-B.0-Z2	3/8	3/8	3/4	4	0.360	2-1/8	2	TICN	CYLINDRICAL
N58029	ANB245-0.500-E2-B.0-Z2	1/2	1/2	1	6	0.480	4-1/8	2	UNCOATED	CYLINDRICAL
N58034	ANB245-0.500-E2-B.0-Z2	1/2	1/2	1	6	0.480	4-1/8	2	TICN	CYLINDRICAL
N58030	ANB245-0.625-E2-B.0-Z2	5/8	5/8	1-1/4	6	0.600	4	2	UNCOATED	CYLINDRICAL
N58035	ANB245-0.625-E2-B.0-Z2	5/8	5/8	1-1/4	6	0.600	4	2	TICN	CYLINDRICAL

AN340

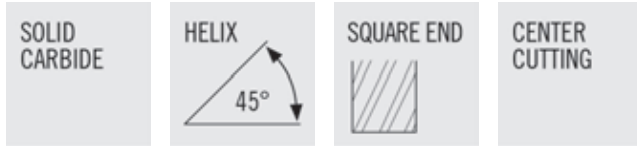


- Cylindrical land to eliminate chatter
- Form ground flute shape
- Eccentric primary relief
- Ideal for high volume material removal in aluminum and non-ferrous materials
- With corner radius for strength
- Wiper flat to improve floor finish on the workpiece

- Cutting Data - Page 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.178	9/16	3	UNCOATED	0.010	CYLINDRICAL
N57910	AN340-0.188-E1-R010.0-Z3	3/16	3/16	1/4	2	0.178	9/16	3	TICN	0.010	CYLINDRICAL
N57882	AN340-0.188-E2-R010.0-Z3	3/16	3/16	1/4	3	0.178	1-9/16	3	UNCOATED	0.010	CYLINDRICAL
N57911	AN340-0.188-E2-R010.0-Z3	3/16	3/16	1/4	3	0.178	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	0.240	3/4	3	UNCOATED	0.010	CYLINDRICAL
N57913	AN340-0.250-E1-R010.0-Z3	1/4	1/4	5/16	2-1/2	0.240	3/4	3	TICN	0.010	CYLINDRICAL
N57885	AN340-0.250-E2-R010.0-Z3	1/4	1/4	5/16	3-1/4	0.240	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	0.240	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	0.360	7/8	3	UNCOATED	0.015	CYLINDRICAL
N57917	AN340-0.375-E1-R015.0-Z3	3/8	3/8	1/2	2-1/2	0.360	7/8	3	TICN	0.015	CYLINDRICAL
N57889	AN340-0.375-E2-R015.0-Z3	3/8	3/8	1/2	3	0.360	1-3/8	3	UNCOATED	0.015	CYLINDRICAL
N57918	AN340-0.375-E2-R015.0-Z3	3/8	3/8	1/2	3	0.360	1-3/8	3	TICN	0.015	CYLINDRICAL
N57890	AN340-0.375-E3-R015.0-Z3	3/8	3/8	1/2	4	0.360	2-3/8	3	UNCOATED	0.015	CYLINDRICAL
N57919	AN340-0.375-E3-R015.0-Z3	3/8	3/8	1/2	4	0.360	2-3/8	3	TICN	0.015	CYLINDRICAL
N57893	AN340-0.500-E1-R020.0-Z3	1/2	1/2	5/8	3	0.480	1-1/8	3	UNCOATED	0.020	CYLINDRICAL
N57922	AN340-0.500-E1-R020.0-Z3	1/2	1/2	5/8	3	0.480	1-1/8	3	TICN	0.020	CYLINDRICAL
N57894	AN340-0.500-E2-R020.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	UNCOATED	0.020	CYLINDRICAL
N57923	AN340-0.500-E2-R020.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.020	CYLINDRICAL
N57895	AN340-0.500-E3-R020.0-Z3	1/2	1/2	5/8	5	0.480	3-1/8	3	UNCOATED	0.020	CYLINDRICAL
N57924	AN340-0.500-E3-R020.0-Z3	1/2	1/2	5/8	5	0.480	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	0.600	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	0.600	1-1/2	3	TICN	0.025	CYLINDRICAL
N57901	AN340-0.750-E1-R030.0-Z3	3/4	3/4	1	4	0.720	1-7/8	3	UNCOATED	0.030	CYLINDRICAL
N57930	AN340-0.750-E1-R030.0-Z3	3/4	3/4	1	4	0.720	1-7/8	3	TICN	0.030	CYLINDRICAL
N57902	AN340-0.750-E2-R030.0-Z3	3/4	3/4	1	5	0.720	2-7/8	3	UNCOATED	0.030	CYLINDRICAL
N57931	AN340-0.750-E2-R030.0-Z3	3/4	3/4	1	5	0.720	2-7/8	3	TICN	0.030	CYLINDRICAL
N57903	AN340-0.750-E3-R030.0-Z3	3/4	3/4	1	6	0.720	3-7/8	3	UNCOATED	0.030	CYLINDRICAL
N57932	AN340-0.750-E3-R030.0-Z3	3/4	3/4	1	6	0.720	3-7/8	3	TICN	0.030	CYLINDRICAL
N57906	AN340-1.000-E1-R040.0-Z3	1	1	1-1/4	4	0.960	1-5/8	3	UNCOATED	0.040	CYLINDRICAL
N57935	AN340-1.000-E1-R040.0-Z3	1	1	1-1/4	4	0.960	1-5/8	3	TICN	0.040	CYLINDRICAL

A345

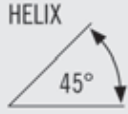


- Cylindrical land to eliminate chatter
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- Eccentric primary relief
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- Wiper flat to improve floor finish on the workpiece
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- Cutting Data - Page 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



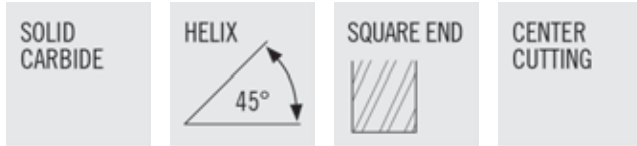
CENTER
CUTTING



- Cylindrical land to eliminate chatter
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- Wiper flat to improve floor finish on the workpiece
- Open end tooth gashing design to permit increased chip evacuation
- Cutting Data - Page 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

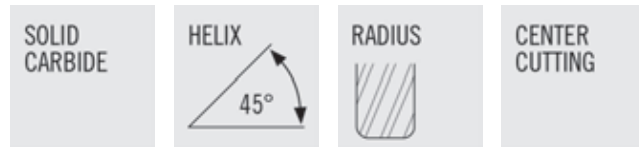
A345M



- Cylindrical land to eliminate chatter
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- Cutting Data - Page 108
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

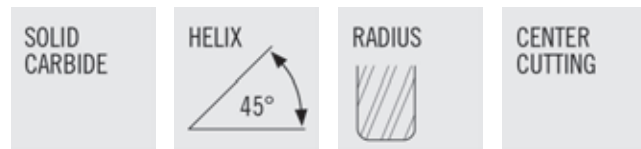
A345R



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- Cutting Data - Page 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

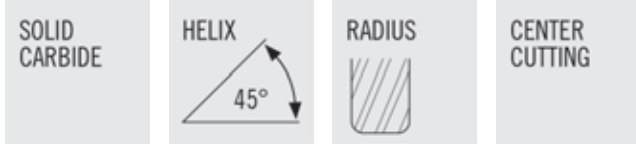
A345R (CON'T)



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- Cutting Data - Page 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

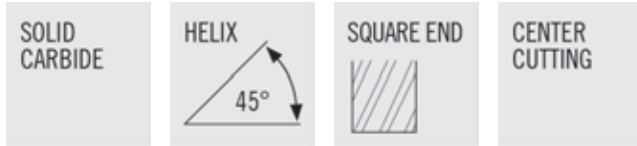
A345R (CON'T)



- 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 106
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

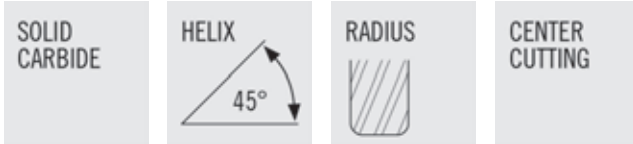


- Cylindrical land to eliminate chatter
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- Ideal for slotting, pocketing and long reach peripheral milling in aluminum
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- Cutting Data - Page 107
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.240	2-1/8	3	UNCOATED	CYLINDRICAL
N57938	AN345-0.250-E3-S.0-Z3	1/4	1/4	1/2	3	0.240	1	3	UNCOATED	CYLINDRICAL
N57939	AN345-0.250-E4-S.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	UNCOATED	CYLINDRICAL
N18598	AN345-0.313-E1-S.0-Z3	5/16	5/16	7/16	4	0.300	2-1/8	3	UNCOATED	CYLINDRICAL
N18599	AN345-0.375-E1-S.0-Z3	3/8	3/8	3/8	2-1/2	0.360	1-1/8	3	UNCOATED	CYLINDRICAL
N18600	AN345-0.375-E2-S.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	UNCOATED	CYLINDRICAL
N18601	AN345-0.375-E3-S.0-Z3	3/8	3/8	1/2	6	0.360	4-1/8	3	UNCOATED	CYLINDRICAL
N57940	AN345-0.375-E4-S.0-Z3	3/8	3/8	3/4	4	0.360	2	3	UNCOATED	CYLINDRICAL
N57941	AN345-0.375-E5-S.0-Z3	3/8	3/8	3/4	5	0.360	3	3	UNCOATED	CYLINDRICAL
N18603	AN345-0.500-E2-S.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	UNCOATED	CYLINDRICAL
N57942	AN345-0.500-E4-S.0-Z3	1/2	1/2	5/8	5	0.480	3	3	UNCOATED	CYLINDRICAL
N18604	AN345-0.500-E3-S.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	UNCOATED	CYLINDRICAL
N18606	AN345-0.625-E2-S.0-Z3	5/8	5/8	3/4	6	0.600	4	3	UNCOATED	CYLINDRICAL
N18609	AN345-0.750-E3-S.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	UNCOATED	CYLINDRICAL
N18610	AN345-0.750-E4-S.0-Z3	3/4	3/4	1	7	0.720	4-1/8	3	UNCOATED	CYLINDRICAL
N18612	AN345-1.000-E2-S.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	UNCOATED	CYLINDRICAL

AN345R

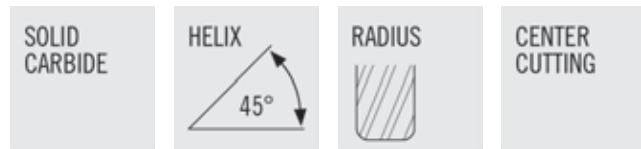


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- Cutting Data - Page 107
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.240	2-1/8	3	TICN	0.010	CYLINDRICAL
N90255	AN345R-0.250-E2-R020.0-Z3	1/4	1/4	3/8	4	0.240	2-1/8	3	TICN	0.020	CYLINDRICAL
N90289	AN345R-0.250-E2-R030.0-Z3	1/4	1/4	3/8	4	0.240	2-1/8	3	TICN	0.030	CYLINDRICAL
N90290	AN345R-0.250-E2-R045.0-Z3	1/4	1/4	3/8	4	0.240	2-1/8	3	TICN	0.045	CYLINDRICAL
N90291	AN345R-0.250-E2-R060.0-Z3	1/4	1/4	3/8	4	0.240	2-1/8	3	TICN	0.060	CYLINDRICAL
N90489	AN345R-0.250-E3-R010.0-Z3	1/4	1/4	1/2	3	0.240	1	3	TICN	0.010	CYLINDRICAL
N90279	AN345R-0.250-E3-R020.0-Z3	1/4	1/4	1/2	3	0.240	1	3	TICN	0.020	CYLINDRICAL
N90490	AN345R-0.250-E3-R030.0-Z3	1/4	1/4	1/2	3	0.240	1	3	TICN	0.030	CYLINDRICAL
N90491	AN345R-0.250-E3-R045.0-Z3	1/4	1/4	1/2	3	0.240	1	3	TICN	0.045	CYLINDRICAL
N90492	AN345R-0.250-E3-R060.0-Z3	1/4	1/4	1/2	3	0.240	1	3	TICN	0.060	CYLINDRICAL
N90497	AN345R-0.250-E4-R010.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	TICN	0.010	CYLINDRICAL
N90281	AN345R-0.250-E4-R020.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	TICN	0.020	CYLINDRICAL
N90498	AN345R-0.250-E4-R030.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	TICN	0.030	CYLINDRICAL
N90499	AN345R-0.250-E4-R045.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	TICN	0.045	CYLINDRICAL
N90500	AN345R-0.250-E4-R060.0-Z3	1/4	1/4	1/2	4	0.240	1-1/2	3	TICN	0.060	CYLINDRICAL
N90262	AN345R-0.313-E1-R020.0-Z3	5/16	5/16	7/16	4	0.300	2-1/8	3	TICN	0.020	CYLINDRICAL
N90292	AN345R-0.313-E1-R010.0-Z3	5/16	5/16	7/16	4	0.300	2-1/8	3	TICN	0.010	CYLINDRICAL
N90293	AN345R-0.313-E1-R030.0-Z3	5/16	5/16	7/16	4	0.300	2-1/8	3	TICN	0.030	CYLINDRICAL
N90294	AN345R-0.313-E1-R045.0-Z3	5/16	5/16	7/16	4	0.300	2-1/8	3	TICN	0.045	CYLINDRICAL
N90295	AN345R-0.313-E1-R060.0-Z3	5/16	5/16	7/16	4	0.300	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	0.360	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	0.360	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	0.360	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	0.360	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	0.360	1-1/8	3	TICN	0.060	CYLINDRICAL
N90301	AN345R-0.375-E2-R010.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	TICN	0.010	CYLINDRICAL
N90265	AN345R-0.375-E2-R020.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	TICN	0.020	CYLINDRICAL
N90302	AN345R-0.375-E2-R030.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	TICN	0.030	CYLINDRICAL
N90303	AN345R-0.375-E2-R045.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	TICN	0.045	CYLINDRICAL
N90306	AN345R-0.375-E2-R060.0-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	TICN	0.060	CYLINDRICAL
N90307	AN345R-0.375-E3-R010.0-Z3	3/8	3/8	1/2	6	0.360	4-1/8	3	TICN	0.010	CYLINDRICAL
N90266	AN345R-0.375-E3-R020.0-Z3	3/8	3/8	1/2	6	0.360	4-1/8	3	TICN	0.020	CYLINDRICAL
N90308	AN345R-0.375-E3-R030.0-Z3	3/8	3/8	1/2	6	0.360	4-1/8	3	TICN	0.030	CYLINDRICAL

AN345R (CONT'D)

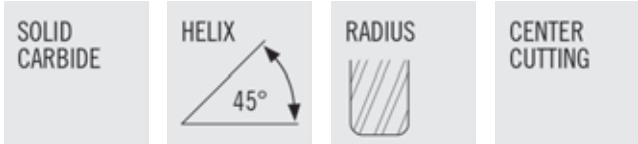


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- Cutting Data - Page 107
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.360	4-1/8	3	TICN	0.045	CYLINDRICAL
N90310	AN345R-0.375-E3-R060.0-Z3	3/8	3/8	1/2	6	0.360	4-1/8	3	TICN	0.060	CYLINDRICAL
N90501	AN345R-0.375-E4-R010.0-Z3	3/8	3/8	3/4	4	0.360	2	3	TICN	0.010	CYLINDRICAL
N90282	AN345R-0.375-E4-R020.0-Z3	3/8	3/8	3/4	4	0.360	2	3	TICN	0.020	CYLINDRICAL
N90506	AN345R-0.375-E4-R030.0-Z3	3/8	3/8	3/4	4	0.360	2	3	TICN	0.030	CYLINDRICAL
N90510	AN345R-0.375-E4-R045.0-Z3	3/8	3/8	3/4	4	0.360	2	3	TICN	0.045	CYLINDRICAL
N90514	AN345R-0.375-E4-R060.0-Z3	3/8	3/8	3/4	4	0.360	2	3	TICN	0.060	CYLINDRICAL
N90515	AN345R-0.375-E5-R010.0-Z3	3/8	3/8	3/4	5	0.360	3	3	TICN	0.010	CYLINDRICAL
N90283	AN345R-0.375-E5-R020.0-Z3	3/8	3/8	3/4	5	0.360	3	3	TICN	0.020	CYLINDRICAL
N90516	AN345R-0.375-E5-R030.0-Z3	3/8	3/8	3/4	5	0.360	3	3	TICN	0.030	CYLINDRICAL
N90517	AN345R-0.375-E5-R045.0-Z3	3/8	3/8	3/4	5	0.360	3	3	TICN	0.045	CYLINDRICAL
N90518	AN345R-0.375-E5-R060.0-Z3	3/8	3/8	3/4	5	0.360	3	3	TICN	0.060	CYLINDRICAL
N90341	AN345R-0.500-E2-R010.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.010	CYLINDRICAL
N90268	AN345R-0.500-E2-R020.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.020	CYLINDRICAL
N90342	AN345R-0.500-E2-R030.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.030	CYLINDRICAL
N90343	AN345R-0.500-E2-R045.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.045	CYLINDRICAL
N90344	AN345R-0.500-E2-R060.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.060	CYLINDRICAL
N90346	AN345R-0.500-E2-R090.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.090	CYLINDRICAL
N90347	AN345R-0.500-E2-R125.0-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	TICN	0.125	CYLINDRICAL
N90519	AN345R-0.500-E3-R010.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.010	CYLINDRICAL
N90286	AN345R-0.500-E3-R020.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.020	CYLINDRICAL
N90520	AN345R-0.500-E3-R030.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.030	CYLINDRICAL
N90521	AN345R-0.500-E3-R045.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.045	CYLINDRICAL
N90522	AN345R-0.500-E3-R060.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.060	CYLINDRICAL
N90523	AN345R-0.500-E3-R090.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.090	CYLINDRICAL
N90524	AN345R-0.500-E3-R125.0-Z3	1/2	1/2	5/8	5	0.480	3	3	TICN	0.125	CYLINDRICAL
N90348	AN345R-0.500-E4-R010.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.010	CYLINDRICAL
N90269	AN345R-0.500-E4-R020.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.020	CYLINDRICAL
N90350	AN345R-0.500-E4-R030.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.030	CYLINDRICAL
N90351	AN345R-0.500-E4-R045.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.045	CYLINDRICAL
N90352	AN345R-0.500-E4-R060.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.060	CYLINDRICAL
N90353	AN345R-0.500-E4-R090.0-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	TICN	0.090	CYLINDRICAL
N90354	AN345R-0.500-E4-R125.0-Z3	1/2	1/2	5/8	6	0.480	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 107
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.600	4	3	TICN	0.010	CYLINDRICAL
N90271	AN345R-0.625-E2-R020.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.020	CYLINDRICAL
N90362	AN345R-0.625-E2-R030.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.030	CYLINDRICAL
N90363	AN345R-0.625-E2-R045.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.045	CYLINDRICAL
N90364	AN345R-0.625-E2-R060.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.060	CYLINDRICAL
N90365	AN345R-0.625-E2-R090.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.090	CYLINDRICAL
N90366	AN345R-0.625-E2-R125.0-Z3	5/8	5/8	3/4	6	0.600	4	3	TICN	0.125	CYLINDRICAL
N90380	AN345R-0.750-E3-R010.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.010	CYLINDRICAL
N90274	AN345R-0.750-E3-R020.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.020	CYLINDRICAL
N90382	AN345R-0.750-E3-R030.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.030	CYLINDRICAL
N90383	AN345R-0.750-E3-R045.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.045	CYLINDRICAL
N90384	AN345R-0.750-E3-R060.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.060	CYLINDRICAL
N90385	AN345R-0.750-E3-R090.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.090	CYLINDRICAL
N90386	AN345R-0.750-E3-R125.0-Z3	3/4	3/4	1	6	0.720	3-1/2	3	TICN	0.125	CYLINDRICAL
N90399	AN345R-1.000-E2-R010.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.010	CYLINDRICAL
N90277	AN345R-1.000-E2-R020.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.020	CYLINDRICAL
N90401	AN345R-1.000-E2-R030.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.030	CYLINDRICAL
N90402	AN345R-1.000-E2-R045.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.045	CYLINDRICAL
N90403	AN345R-1.000-E2-R060.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.060	CYLINDRICAL
N90404	AN345R-1.000-E2-R090.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.090	CYLINDRICAL
N90441	AN345R-1.000-E2-R125.0-Z3	1	1	1-1/4	6	0.960	3-1/2	3	TICN	0.125	CYLINDRICAL

AR330



- Form ground flute shape
- Ideal for aluminum and non-ferrous materials
- Reduced radial pressure
- Cutting Data - Page 107
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

AN230 / AN230R E2 LENGTH - START VALUES

SLOT MILLING									
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)					
							1/2	3/4	1
N	E 16 Alum (Si<9%)	1.00 x Dc	1.00 x Dc	3300		n (min-1)	25212	16808	12606
						fz (in)	0.0041	0.0061	0.0081
						vf (in/min)	205	205	205
	E 17 Alum (9%<Si<16%)	0.80 x Dc	1.00 x Dc	2700		n (min-1)	20628	13752	10314
						fz (in)	0.0032	0.0047	0.0063
						vf (in/min)	130	130	130
				1650	-	4950			
				1350	-	4050			

AN230 / AN230R E2 LENGTH - START VALUES

SIDE MILLING - ROUGHING									
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)					
							1/2	3/4	1
N	E 16 Alum (Si<9%)	1.30 x Dc	0.25 x Dc	4000		n (min-1)	30560	20373	15280
						fz (in)	0.0059	0.0088	0.0118
						vf (in/min)	360	360	360
	E 17 Alum (9%<Si<16%)	1.30 x Dc	0.25 x Dc	3300		n (min-1)	25212	16808	12606
						fz (in)	0.0044	0.0065	0.0087
						vf (in/min)	220	220	220
				2000	-	6000			
				1650	-	4950			

AN230 / AN230R E2 LENGTH - START VALUES

SIDE MILLING - FINISHING									
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)					
							1/2	3/4	1
N	E 16 Alum (Si<9%)	1.00 x Dc	0.02 x Dc	5000		n (min-1)	38200	25467	19100
						fz (in)	0.0025	0.0037	0.0050
						vf (in/min)	190	190	190
	E 17 Alum (9%<Si<16%)	1.00 x Dc	0.02 x Dc	4100		n (min-1)	31324	20883	15662
						fz (in)	0.0025	0.0037	0.0050
						vf (in/min)	155	155	155
				2500	-	7500			
				2050	-	6150			

SMG = Seco Material Group

n (min-1) = RPM

fz (in) = Feed/tooth

vf (in/min) = Feed rate

v_c (sf/min) = Surface feet/min

$a_p \times D_c$ = % of diameter

$a_e \times D_c$ = % of diameter

All cutting data are start values

All cutting data is in inch values

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.

AN335 / AN335R E2 LENGTH - START VALUES

SLOT MILLING										
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)						
							1/2	3/4	1	
N	E 16 Alum (Si<9%)	0.50 x Dc	1.00 x Dc	3300			n (min-1)	25212	16808	12606
							fz (in)	0.0032	0.0049	0.0065
				1650 - 4950			vf (in/min)	245	245	245
	E 17 Alum (9%<Si<16%)	0.40 x Dc	1.00 x Dc				2700			n (min-1)
				fz (in)	0.0024	0.0036				0.0049
				1350 - 4050			vf (in/min)	150	150	150

AN335 / AN335R E2 LENGTH - START VALUES

SIDE MILLING - ROUGHING										
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)						
							1/2	3/4	1	
N	E 16 Alum (Si<9%)	1.30 x Dc	0.25 x Dc	4000			n (min-1)	30560	20373	15280
							fz (in)	0.0044	0.0065	0.0087
				2000 - 6000			vf (in/min)	400	400	400
	E 17 Alum (9%<Si<16%)	1.20 x Dc	0.25 x Dc				3300			n (min-1)
				fz (in)	0.0033	0.0050				0.0066
				1650 - 4950			vf (in/min)	250	250	250

AN335 / AN335R E2 LENGTH - START VALUES

SIDE MILLING - FINISHING										
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)						
							1/2	3/4	1	
N	E 16 Alum (Si<9%)	1.00 x Dc	0.02 x Dc	5000			n (min-1)	38200	25467	19100
							fz (in)	0.0025	0.0037	0.0050
				2500 - 7500			vf (in/min)	190	190	190
	E 17 Alum (9%<Si<16%)	1.00 x Dc	0.02 x Dc				4100			(min-1)
				fz (in)	0.0025	0.0037				0.0050
				2050 - 6150			vf (in/min)	155	155	155

SMG = Seco Material Group

n (min-1) = RPM

fz (in) = Feed/tooth

vf (in/min) = Feed rate

v_c (sf/min) = Surface feet/min

$a_p \times D_c$ = % of diameter

$a_e \times D_c$ = % of diameter

All cutting data are start values

All cutting data is in inch values



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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 A SERIES HIGH PERFORMANCE

A245 / A245R / AB245 - START VALUES

		SLOTTING										
ISO GROUP	SMG	a _D x D _c (max)	a _E x 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)	47	47	47	47	47	47	47

		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)	59	59	59	59	59	59	59

AN245 / ANB245 - START VALUES

		SLOTTING										
ISO GROUP	SMG	a _D x D _c (max)	a _E x 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)	30	30	30	30	30	30	30

		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)	38	38	38	38	38	38	38

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.

AN340 - START VALUES

		SLOTTING										
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)	$Z_n = 3$							
					n (rev/min)	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)	172	172	172	172	172	172	172

		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)	258	258	258	258	258	258	258

A345 / A345R - START VALUES

		SLOTTING										
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)	$Z_n = 3$							
					n (rev/min)	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	70	70	70	70	70	70

		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	88	88	88	88	88	88



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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)	45	45	45	45	45	45

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)	57	57	57	57	57	57

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	55	55	55	55	55

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)	106	106	106	106	106	106

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	$a_p \times D_c$ (max)	$a_e \times D_c$ (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	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	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)	71	71	71	71	71	71	71	71	71	71	71
N	E 16	2.0	0.40	1000	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	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	88	88	88	88	88	88	88	88	88	88

SIDE MILLING - ROUGHING

		SIDE MILLING - ROUGHING														
ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)	$Z_n = 3$											
					3	4	5	6	8	10	12	14	16	20	25	
N	E 16	2.0	0.40	1000	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	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	88	88	88	88	88	88	88	88	88	88

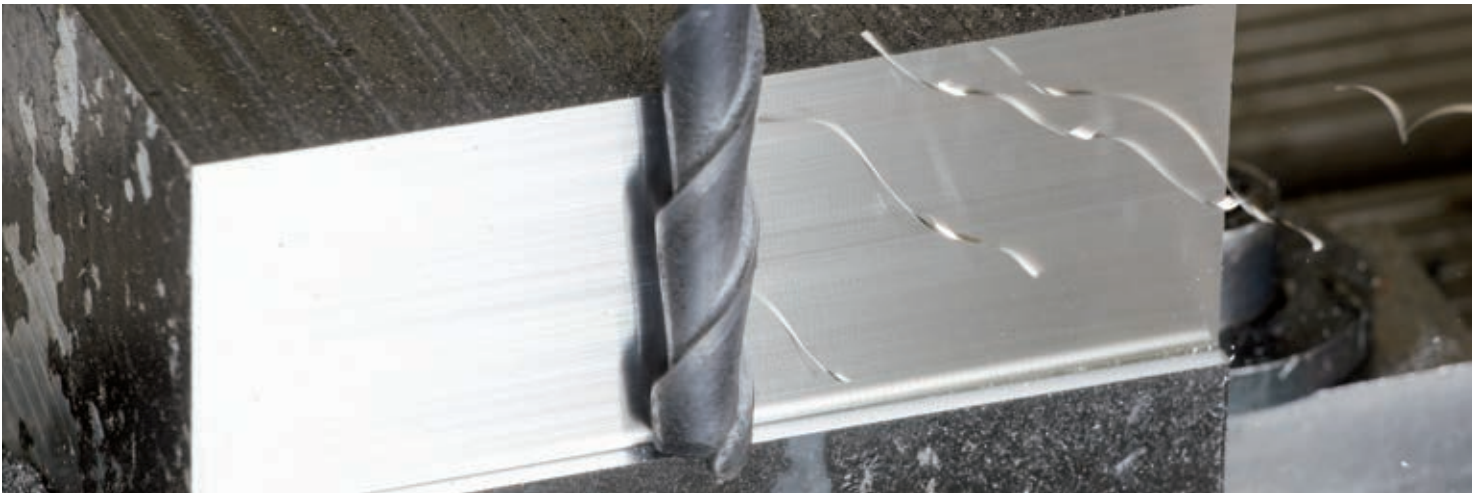


DOWNLOAD THE "SOLID MILLING" APP FREE ON GOOGLE PLAY & THE APP STORE.
GET CUTTING DATA RECOMMENDATIONS/CALCULATIONS, TIPS & TRICKS, TECHNICAL VIDEOS, AND MORE!

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.



ONE PASS, HIGH PRECISION 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.

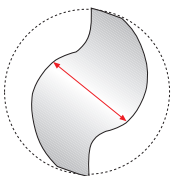
The Niagara long flute finishers are offered with a 5xD depth of cut as standard, ranging in diameters from 1/4" to 1 1/4" with various radii available.

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.

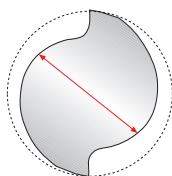
PRODUCT OVERVIEW

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

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.

YOUR BENEFITS

- 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

MATERIAL GROUPS

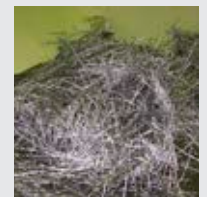
Steel 1-6
Stainless Steel 8-11
Cast Iron 12-15
Non-ferrous 16-18
Superalloys 19-22

COMMON APPLICATION AREAS

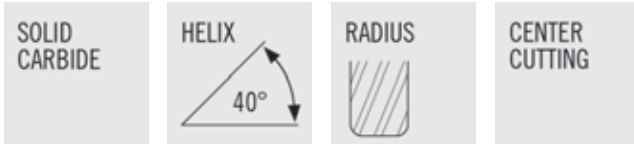
- Aerospace: wing parts, body and floor panels, engine casings, brackets

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



NS240R

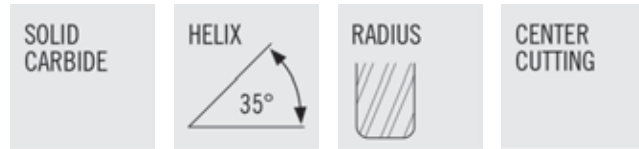


- Rigid design to minimize tool deflection
- Designed for peripheral finish milling of aerospace parts requiring long axial engagement in materials such as titanium, stainless steels, and superalloys.
- Cutting Data - Page 123
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

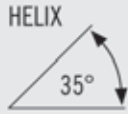


- Ideal for slotting in steel, stainless steel, titanium, and high temperature alloys
- Large area for chip evacuation
- Cutting Data - Page 124-125
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



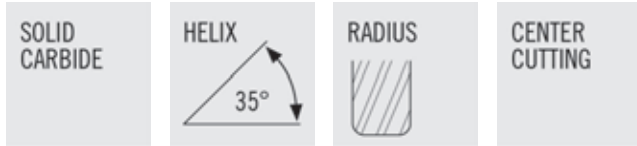
CENTER
CUTTING



- Ideal for slotting in steel, stainless steel, titanium and high temperature alloys
- Large area for chip evacuation
- Cutting Data - Page 126-127
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

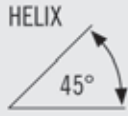


- Ideal for slotting, pocketing and long reach peripheral milling in steel, stainless steel, titanium, and exotic alloys
- Cutting Data - Page 128-129
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.240	2-1/8	3	ALTIN	0.020	CYLINDRICAL
N18650	SN335-0.375-E1-R020.3-Z3	3/8	3/8	1/2	4	0.360	2-1/8	3	ALTIN	0.020	WELDON
N18651	SN335-0.375-E2-R020.3-Z3	3/8	3/8	1/2	6	0.360	3-3/8	3	ALTIN	0.020	WELDON
N18654	SN335-0.500-E1-R030.3-Z3	1/2	1/2	5/8	4	0.480	2-1/8	3	ALTIN	0.030	WELDON
N18655	SN335-0.500-E2-R030.3-Z3	1/2	1/2	5/8	5	0.480	3-1/8	3	ALTIN	0.030	WELDON
N18656	SN335-0.500-E3-R030.3-Z3	1/2	1/2	5/8	6	0.480	4-1/8	3	ALTIN	0.030	WELDON
N18657	SN335-0.625-E1-R030.3-Z3	5/8	5/8	3/4	4	0.600	2-1/8	3	ALTIN	0.030	WELDON
N18659	SN335-0.625-E3-R030.3-Z3	5/8	5/8	3/4	6	0.600	4	3	ALTIN	0.030	WELDON
N18661	SN335-0.750-E2-R030.3-Z3	3/4	3/4	1	5	0.720	3	3	ALTIN	0.030	WELDON

S545

SOLID CARBIDE



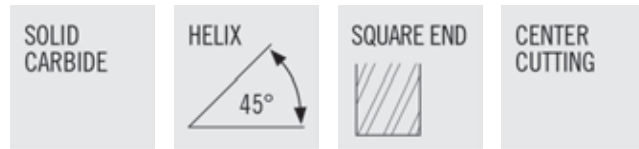
CENTER CUTTING



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 130
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

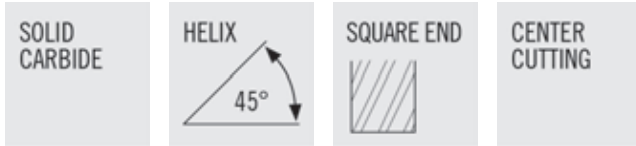
S545 (CON'T)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 130
- Tolerance Specs - Page 323

PRODUCT NUMBER	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)

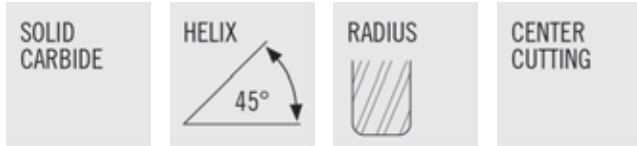


- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys

- Cutting Data S545 - Page 130
- Tolerance Specs S545 - Page 323
- Cutting Data S545M - Page 130
- Tolerance Specs S545M - Page 323

PRODUCT NUMBER	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

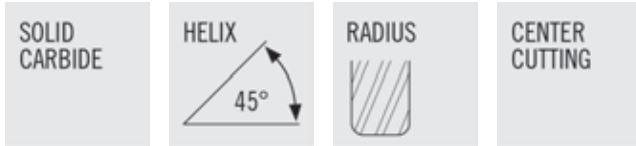
S545R



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 130
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

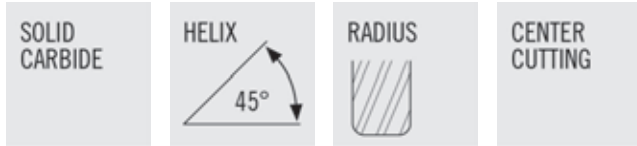
S545R (CONT'D)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 130
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

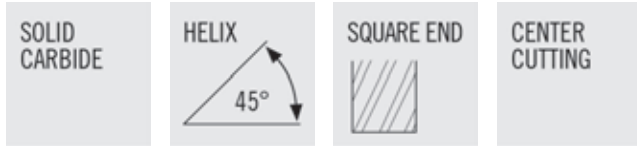
S545R (CONT'D)



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 130
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

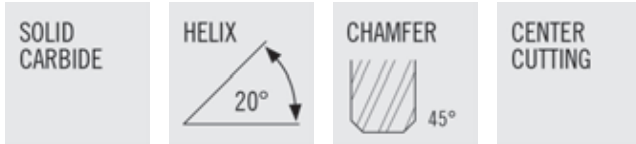
S645M



- Eccentric primary relief
- Ideal for peripheral finish milling in steel, stainless steel, titanium and high temperature alloys
- Cutting Data - Page 133
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

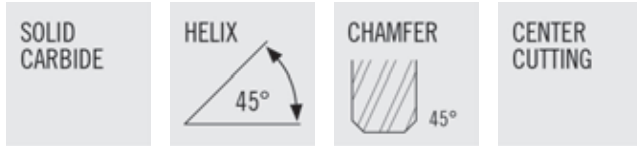
SR420 & SR420M



- Fine-pitch knuckle form
- Designed for steels, stainless steel, and cast iron
- Cutting Data SR420 - Page 131
- Tolerance Specs SR420 - Page 323
- Cutting Data SR420M - Page 134-135
- Tolerance Specs SR420M - Page 323

PRODUCT NUMBER	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 132
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	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	
				330 - 460	v _f (in/min)	29.8	29.8	29.8	29.8	29.8	29.9	29.8	29.8
	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	
				260 - 390	v _f (in/min)	25.2	25.2	25.2	25.2	25.3	25.2	25.2	25.3
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	
				2300 - 2950	v _f (in/min)	200.2	200.2	200.2	200.2	200.1	200.1	200.2	200.3
	E / M / A 17	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	
				2300 - 2950	v _f (in/min)	200.2	200.2	200.2	200.2	200.1	200.1	200.2	200.3
E / M / A 18	5	0.02	1310	n (rev/min)	20020	16010	13340	10010	8010	6670	5000	4000	
			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	
				130 - 200	v _f (in/min)	8.5	8.6	8.6	8.5	8.6	8.5	8.5	8.6
	E / M / A 20	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	
				130 - 200	v _f (in/min)	8.5	8.6	8.6	8.5	8.6	8.5	8.5	8.6
	E / M / A 21	5	0.02	130	n (rev/min)	1990	1590	1320	990	790	660	500	400
				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	
				260 - 390	v _f (in/min)	25.2	25.2	25.2	25.2	25.3	25.2	25.2	25.3
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		
			2950 - 3610	v _f (in/min)	250.6	250.6	250.6	250.6	250.6	250.7	250.6	250.5	
A / D PLASTIC (SOFT)	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		
			2950 - 3610	v _f (in/min)	250.6	250.6	250.6	250.6	250.6	250.7	250.6	250.5	
A / D PLASTIC (HARD)	5	0.02	1970	n (rev/min)	30100	24080	20070	15050	12040	10030	7530	6020	
			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
					v _f (in/min)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	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	



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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
					v _f (in/min)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	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	
v _f (in/min)					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.

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	
					85	-	205	v _f (in/min)	3.8	3.8	3.8	3.8	3.8



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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	
					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	
					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	
					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	
					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	
					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	
					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	
					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	
	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	
	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	
	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

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



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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 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	1.0	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
					60 - 120								
	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
					60 - 120								
	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
					60 - 120								
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	
				100 - 180									



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CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

SR420 - 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
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	$a_p \times D_c$ (max)	$a_e \times D_c$ (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
					v_f (in/min)	22.3	22.3	22.3	22.3	22.3	22.3
	E 3 - 4	1.00	0.30	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)	12.9	12.9	12.9	12.9	12.9	12.9
E 5 - 6	1.00	0.30	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)	7.4	7.4	7.4	7.4	7.4	7.4	
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
					v_f (in/min)	19.6	19.6	19.6	19.6	19.6	19.6
	E 10 - 11	1.00	0.25	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)	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
					v_f (in/min)	42.1	42.1	42.1	42.1	42.1	42.1
	E 14 - 15	1.00	0.25	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)	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
					v_f (in/min)	17.9	17.9	17.9	17.9	17.9	17.9



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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



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

ISO GROUP	SMG	$a_p \times D_c$ (max)	$a_e \times D_c$ (max)	v_c (sf / min)	SLOTTING							
					$Z_n = 4$							
					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



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CUTTING DATA - ELITE S SERIES HIGH PERFORMANCE

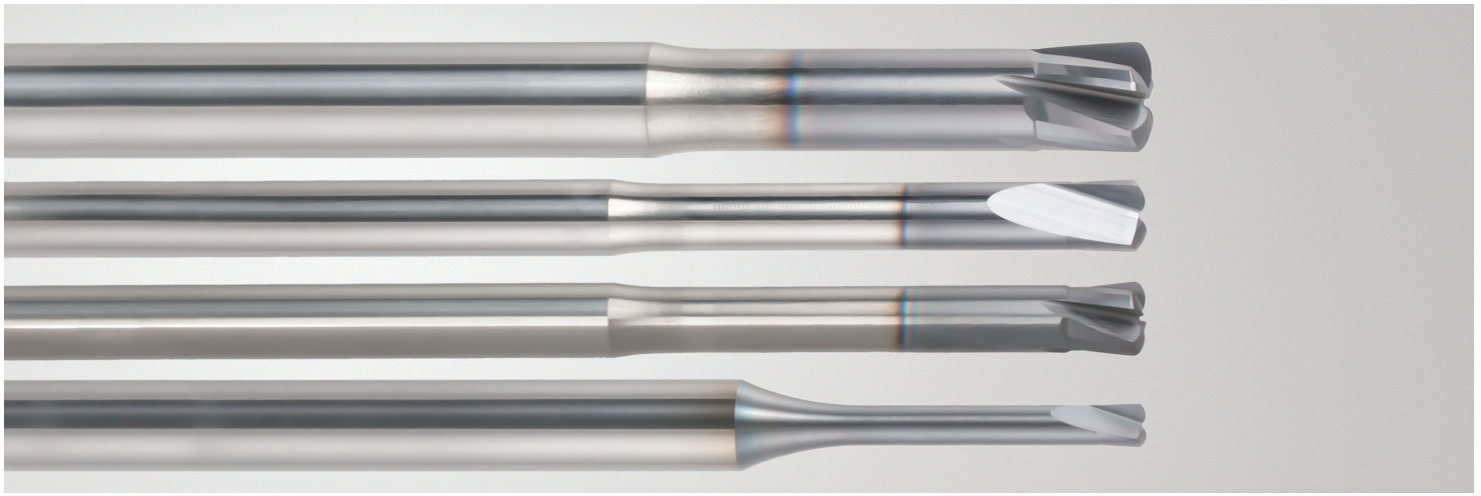
SR420M - START VALUES

		SIDE MILLING - ROUGHING										
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	
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

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 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
- Modifications on shank only

YOUR BENEFITS

- Long tool overhang for deep cavity milling
- Axially directed cutting forces
- High heat and abrasion resistant
- Reduced cycle time, higher metal removal rates
- 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

MATERIAL GROUPS
Steel 1-6
Hardened steel 7a
Stainless steel 8-11
Cast Iron 12-15
Superalloys 19-22

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

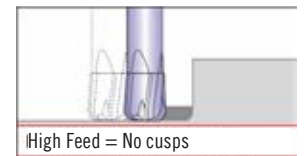
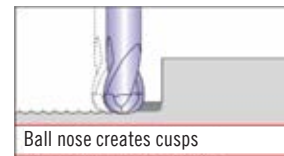
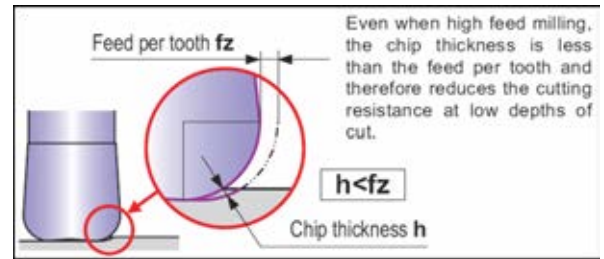
HOW DOES HIGH FEED MILLING WORK?

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.

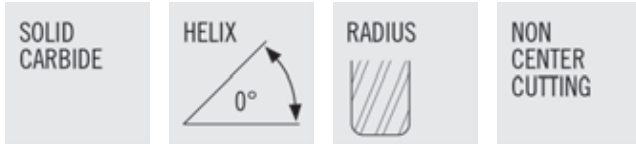


High feed directs force upwards, minimizing chatter.

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 - 2 mm - 12 mm - 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



- 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 140-144
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	.109	.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

HELIX
0°

RADIUS

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 140-144
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

HELIX
0°

RADIUS

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 140-144
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	ae (Max)	vc (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	75
	E/M/A 10 - 11	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
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



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

ISO GROUP	SMG	a _e (Max)	v _c (sf / min)	SLOT MILLING										
				n [rev/min]	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
	M/A/D 3 - 4	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 5 - 6	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
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
M	E/M/A 8 - 9	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
	E/M/A 10 - 11	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
K	E/M/A 12 - 13	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
	E/M/A 14 - 15	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
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
	E 20	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 21	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
	E 22	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		
					ap max**	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200		
			M/A/D 3 - 4	0.30 x DCX	738	n [rev/min]	45118	30079	22559	18047	15039	11280	9024	7520	5640	
						fz [in]	0.0031	0.0047	0.0063	0.0078	0.0094	0.0125	0.0156	0.0188	0.0250	
	656	820			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	656			n [rev/min]	35092	23395	17546	14036	11697	8773	7018	5849	4386		
					fz [in]	0.0028	0.0042	0.0056	0.0070	0.0084	0.0113	0.0141	0.0169	0.0225		
	vf [in/min]	197	197	197	197	197	197	197	197	197	197					
	ap max**	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200						
H	M/A/D 7a	0.30 x DCX	312	n [rev/min]	19050	12700	9525	7620	6350	4762	3810	3175	2381			
				fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	0.0125	0.0150	0.0200			
			262	361	vf [in/min]	95	95	95	95	95	95	95	95	95		
					ap max**	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160		
			M	E/M/A 8 - 9	0.30 x DCX	410	n [rev/min]	25066	16710	12533	10026	8355	6266	5013	4178	3133
							fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	0.0125	0.0150	0.0200
361	459	vf [in/min]				125	125	125	125	125	125	125	125	125		
		ap max**				0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160		
E/M/A 10 - 11	0.30 x DCX	459				n [rev/min]	28073	18716	14037	11229	9358	7018	5615	4679	3509	
						fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	0.0125	0.0150	0.0200	
		262		361	vf [in/min]	140	140	140	140	140	140	140	140	140		
					ap max**	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160		
		574		656	n [rev/min]	35092	23395	17546	14036	11697	8773	7018	5849	4386		
					fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	0.0125	0.0150	0.0200		
vf [in/min]	175	175		175	175	175	175	175	175	175	175					
ap max**	0.0040	0.0060		0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200						
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]	0.0019	0.0028	0.0038	0.0047	0.0056	0.0075	0.0094	0.0113	0.0150			
			328	492	vf [in/min]	94	94	94	94	94	94	94	94	94		
					ap max**	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200		
			574	656	n [rev/min]	35092	23395	17546	14036	11697	8773	7018	5849	4386		
					fz [in]	0.0025	0.0038	0.0050	0.0063	0.0075	0.0100	0.0125	0.0150	0.0200		
vf [in/min]	175	175	175	175	175	175	175	175	175	175						
ap max**	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200							
S	E 19	0.30 x DCX	164	n [rev/min]	10026	6684	5013	4010	3342	2507	2005	1671	1253			
				fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090	0.0120			
			131	197	vf [in/min]	30	30	30	30	30	30	30	30	30		
					ap max**	0.0020	0.0030	0.0040	0.0050	0.0060	0.0070	0.0080	0.0090	0.0100		
			E 20	0.30 x DCX	164	n [rev/min]	10026	6684	5013	4010	3342	2507	2005	1671	1253	
						fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090	0.0120	
	131	197			vf [in/min]	30	30	30	30	30	30	30	30			
					ap max**	0.0020	0.0030	0.0040	0.0050	0.0060	0.0070	0.0080	0.0090	0.0100		
	E 21	0.30 x DCX			98	n [rev/min]	6016	4010	3008	2406	2005	1504	1203	1003	752	
						fz [in]	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090	0.0120	
			66	131	vf [in/min]	18	18	18	18	18	18	18	18	18		
					ap max**	0.0020	0.0030	0.0040	0.0050	0.0060	0.0070	0.0080	0.0090	0.0100		
			E 22	0.30 x DCX	377	n [rev/min]	23060	15374	11530	9224	7687	5765	4612	3843	2883	
						fz [in]	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0109	0.0131	0.0175	
	328	427			vf [in/min]	101	101	101	101	101	101	101	101	101		
					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



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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 SIDE MILLING - START VALUES

SIDE MILLING																
ISO GROUP	SMG	a _e (Max)	v _c (sf / min)		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			
			492	656	vf [in/min]	395	395	395	395	395	395	395	493	493		
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	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	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	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	11
M			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	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	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	

***pd: plunge depth



DOWNLOAD THE "SOLID MILLING" APP FREE ON GOOGLE & APPLE STORES.
GET CUTTING DATA RECOMMENDATIONS/CALCULATIONS, TIPS & TRICKS, TECHNICAL VIDEOS, AND MORE!

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.



REDUCE CYCLE TIMES WITH HARD MILLING MBZ & MZN

Gain the ability to rough and finish in a single process with Niagara Cutter's MBZ215 and MZN410R for hard milling applications. Instead of traditional methods that require multiple setups, including in some cases Electrical Discharge Machining (EDM), hard milling helps reduce lead times and increase productivity by eliminating multiple setups and difficult polishing processes.

With the increase in Mold and Die manufacturing in the North American market, there is a growing need for a full metric range of MBZ215 and MZN410R/510R products from Niagara Cutter™. Because of this, we have expanded the range to include ball nose end mills from 0.5 mm up to 12 mm in diameter and high feed end mills from 2 mm up to 12 mm in diameter. Both of these product families are effective in hardened steels from 48-65 HRC, cast irons and nickel-based superalloys. With these recent additions, the product family's versatility has now reached new heights in the high speed hard milling sector.

RANGE OVERVIEW

MBZ215M - 2-FLUTE, BALL NOSE

- 0.5 - 12 mm diameters, 1 x dia. flute length, 2 and 4 x dia. straight reach length, 6 x dia. 0.9° tapered reach length, 11 - 37 x dia. long tapered reach, cylindrical shank

MZN410RM - 4-FLUTE, HIGH FEED

- 2 - 12 mm diameters, 0.25 x dia. flute length, 2 and 4 x dia. reach length, cylindrical shank, standard radii available (0.5 mm, 0.75 mm, 1 mm, 1.5 mm, 2 mm and 3 mm)

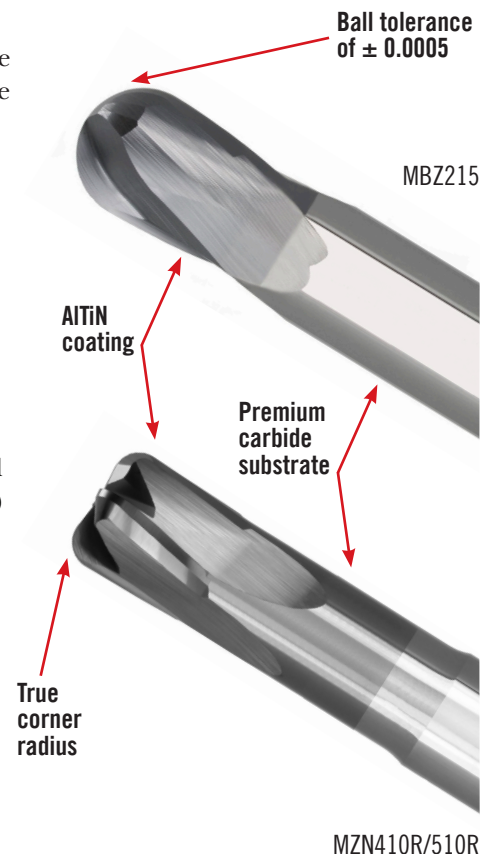
MZN510RM - 5-FLUTE, HIGH FEED

- 10 - 12 mm diameters, 0.25 x dia. flute length, 2 x dia. reach length, cylindrical shank, standard radii available (2 and 3 mm)

INDUSTRY APPLICATIONS

- **MOLD & DIE** - With the increase in difficult to machine hardened tool steels, the MZN410RM torical high feed end mill helps reduce semi-finishing and finishing cycle times. With a true radius the MZN410RM can rough closer to near net shape than a true high feed design tool which in turn reduces and sometimes eliminates semi-finishing operations.

MATERIAL GROUPS
Hardened Steels 48-65 HRC
Steel 5-6
Cast Iron 12-15
Superalloys 21



6 TIPS

HARD MILLING

Hard milling can be a highly effective strategy for machining complex 2D and 3D part features such as mold cavities, gates, heat-sinks and even die pockets in tool steel above 48 HRC. However, hard milling requires the utmost attention to detail to achieve maximum performance, tool life and tight tolerances down to .0001".

1. MAINTAINING A CONSTANT CHIP LOAD/FEED RATE

One of the most overlooked concepts when it comes to hard milling is maintaining a constant chip load/feed rate. Complex surfaces and cutter paths used in the mold and die industry cause machine tools to rapidly fluctuate feed rates resulting in a drastic loss of tool life. Feed rates will always fluctuate unless machining in a straight line. When machining complex surfaces, one must take into consideration that machine tools do not reduce rpm in conjunction with feed rate reductions. A good rule of thumb is if the programmed feed rates cannot be maintained for 80% of the time, the average feed rates need to be reduced. Subsequently, feed rates and rpm need to be reduced in the program. For example: programmed rpm is 30,000 and feed rate is 150 ipm. However, the average maintained feed rate is only 75 ipm. Thus, the rpm needs to be reduced to 15,000. This reduction in rpm can increase the tool life upwards of 50% while having a negligible impact on cycle time.

2. DON'T LEAVE TOO MUCH STOCK FOR FINISHING

When machining tool steels above 48 HRC, leaving too much finish stock will not only reduce output but also wreak havoc on surface finishes and tool life. A general guideline for finish stock allowance is 1%-2% of the finish cutter diameter. Most cutting tool manufacturers base their finishing cutting data on 1%-2% of the tooling diameter engagement. Leaving more than this will result in lost productivity. For example: When using a 1/2" diameter tool it is best to not leave more than 0.005"- 0.010" of finish stock.

3. LEAVE CONSISTENT STOCK ON ALL SURFACES FOR MAXIMUM TOOL LIFE

Leaving too much finish stock is bad for tool life and surface finishes. Leaving inconsistent stock for finishing is also bad, if not worse. After a complex surface has been roughed, it is important to run a "rest-rough" and even a "semi-finish" tool path, to ensure a consistent finish stock on all surfaces. Take this example into consideration: A complex 3D surface has just been roughed out with a 12 mm ball nose end mill with an intended finish cutter diameter of 8 mm. A safe practice would be to "rest-rough" with a 10 mm ball nose end mill. Then, "semi-finish" with an 8 mm ball nose ensuring there is only 0.003"- 0.006" of stock on all surfaces. Finally, finish mill with a new 8 mm ball nose end mill to achieve a consistent surface finish as well as extend the life of the finish tool. This strategy may even lend itself to using the finish ball nose end mill as a "semi-finish" tool once the finish tool life has been met.



4. NOT ALL HARDENED TOOL STEELS ARE CREATED EQUAL

Some common hardened tool steels in the Mold and Die industry present unique challenges. Take for example D2 tool steel that can be heat treated to 60-62 HRC. Because of the added Chromium content, this tool steel is not only hard, but also tough. Furthermore, it machines similar to tool steel that is 62-65 HRC. 420 stainless steel is also very common in the mold industry because it is wear resistant and can be polished to a mirror finish. Although this material is typically heat treated to 48-52 HRC, it still retains its sticky stainless steel properties. This material is prone to causing Built Up Edge (BUE) making running the proper surface feet per minute crucial. Utilizing air/oil mist will also help reduce BUE when machining this material.

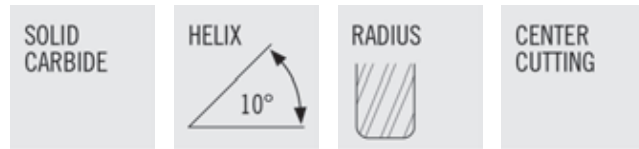
5. USE RIGID HOLDERS

To achieve maximum tool life, high-precision holders are crucial to hard milling. Run-out needs to be kept to less than 0.0004". This type of precision can be achieved by most shrink fit holders, milling chucks, high precision collet chucks and select manufactures end mill holders. A precise holder also ensures the accuracy of the process, whereas a less secure holder may cause unpredictable tool life and produce surfaces that are out of tolerance.

6. FOLLOW RECOMMENDED CUTTING PARAMETERS

Through meticulous research and years of first-hand experience, we have developed specific recommended cutting parameters. Cutting data is optimized per the tool's design, specifications and for specific material groups. These specifications should always be used as a starting point. Modifications can be made depending on the application.

MZN410R / MZN510R



- Strong end tooth design
- Hardened steels (>48 Rc) and nickel based superalloys such as Inconel 718
- 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 148-154
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.112	0.375	4	ALTIN	0.030	CYLINDRICAL
N00001	MZN410R-0.125-J2-R030.0-Z4	1/8	1/4	0.030	2-1/2	0.112	0.625	4	ALTIN	0.030	CYLINDRICAL
N00002	MZN410R-0.188-J1-R050.0-Z4	3/16	1/4	0.050	2-1/2	0.172	0.562	4	ALTIN	0.050	CYLINDRICAL
N00003	MZN410R-0.188-J2-R050.0-Z4	3/16	1/4	0.050	2-1/2	0.172	0.937	4	ALTIN	0.050	CYLINDRICAL
N00004	MZN410R-0.250-E1-R060.0-Z4	1/4	1/4	0.060	2-1/2	0.230	0.750	4	ALTIN	0.060	CYLINDRICAL
N00005	MZN410R-0.250-E2-R060.0-Z4	1/4	1/4	0.060	2-1/2	0.230	1.250	4	ALTIN	0.060	CYLINDRICAL
N00006	MZN410R-0.313-G1-R080.0-Z4	5/16	3/8	0.080	3	0.290	0.750	4	ALTIN	0.080	CYLINDRICAL
N00007	MZN410R-0.313-G2-R080.0-Z4	5/16	3/8	0.080	3	0.290	1.250	4	ALTIN	0.080	CYLINDRICAL
N00008	MZN410R-0.375-E1-R080.0-Z4	3/8	3/8	0.080	3	0.348	1.125	4	ALTIN	0.080	CYLINDRICAL
N00009	MZN510R-0.375-E1-R080.0-Z5	3/8	3/8	0.080	3	0.348	1.125	5	ALTIN	0.080	CYLINDRICAL
N00010	MZN410R-0.375-E3-R080.0-Z4	3/8	3/8	0.080	3	0.348	1.875	4	ALTIN	0.080	CYLINDRICAL
N00011	MZN410R-0.500-E1-R120.0-Z4	1/2	1/2	0.120	4	0.468	1.500	4	ALTIN	0.120	CYLINDRICAL
N00012	MZN510R-0.500-E1-R120.0-Z5	1/2	1/2	0.120	4	0.468	1.500	5	ALTIN	0.120	CYLINDRICAL
N00013	MZN510R-0.625-E1-R120.0-Z5	5/8	5/8	0.120	4	0.584	1.875	5	ALTIN	0.120	CYLINDRICAL
METRIC - MZN410RM / MZN510RM											
03169565	MZN410RM-020-G2-R050.0-Z4	2mm	6mm	0.5mm	50mm	1.8mm	4mm	4	ALTIN	0.50MM	CYLINDRICAL
03169566	MZN410RM-030-G2-R075.0-Z4	3mm	6mm	0.75mm	50mm	2.7mm	6mm	4	ALTIN	0.75MM	CYLINDRICAL
03169567	MZN410RM-040-G2-R100.0-Z4	4mm	6mm	1mm	50mm	3.6mm	8mm	4	ALTIN	1.00MM	CYLINDRICAL
03169568	MZN410RM-060-E2-R150.0-Z4	6mm	6mm	1.5mm	55mm	5.4mm	12mm	4	ALTIN	1.50MM	CYLINDRICAL
03169569	MZN410RM-080-E2-R200.0-Z4	8mm	8mm	2mm	60mm	7.3mm	16mm	4	ALTIN	2.00MM	CYLINDRICAL
03169570	MZN410RM-100-E2-R200.0-Z4	10mm	10mm	2mm	70mm	9.2mm	20mm	4	ALTIN	2.00MM	CYLINDRICAL
03169571	MZN510RM-100-E2-R200.0-Z5	10mm	10mm	2mm	70mm	9.2mm	20mm	5	ALTIN	2.00MM	CYLINDRICAL
03169572	MZN510RM-120-E2-R300.0-Z5	12mm	12mm	3mm	75mm	11mm	24mm	5	ALTIN	3.00MM	CYLINDRICAL
03169573	MZN410RM-020-G4-R050.0-Z4	2mm	6mm	0.5mm	55mm	1.8mm	8mm	4	ALTIN	0.50MM	CYLINDRICAL
03169574	MZN410RM-030-G4-R075.0-Z4	3mm	6mm	0.75mm	55mm	2.7mm	12mm	4	ALTIN	0.75MM	CYLINDRICAL
03169575	MZN410RM-040-G4-R100.0-Z4	4mm	6mm	1mm	65mm	3.6mm	16mm	4	ALTIN	1.00MM	CYLINDRICAL
03169576	MZN410RM-060-E4-R150.0-Z4	6mm	6mm	1.5mm	65mm	5.4mm	24mm	4	ALTIN	1.50MM	CYLINDRICAL
03169577	MZN410RM-080-E4-R200.0-Z4	8mm	8mm	2mm	75mm	7.3mm	32mm	4	ALTIN	2.00MM	CYLINDRICAL
03169578	MZN410RM-100-E4-R200.0-Z4	10mm	10mm	2mm	100mm	9.2mm	40mm	4	ALTIN	2.00MM	CYLINDRICAL
03169579	MZN410RM-120-E4-R300.0-Z4	12mm	12mm	3mm	100mm	11mm	48mm	4	ALTIN	3.00MM	CYLINDRICAL

MZN410R / MZN510R - 2 X D START VALUES - Inch

ISO GROUP	SMG	$a_e \times D_c$ (max)	v_c (sf / min)		SLOTTING								
					$Z_n = 4$						$Z_n = 5$		
					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	11307	9046	7538	5654	4523	5654	4523
				f_z (in)	0.0031	0.0047	0.0063	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 Ap	0.008	0.012	0.014	0.018	0.020	0.022	0.024	0.022	0.024
H	M / A / D 7a (48-56 HRC)	1.00	440	n (rev/min)	13446	8964	6723	5379	4482	3362	2689	3362	2689
				f_z (in)	0.0031	0.0047	0.0063	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 Ap	0.008	0.012	0.014	0.018	0.020	0.022	0.024	0.022	0.024	
	M / A / D 7b (56-62 HRC)	1.00	230	n (rev/min)	7029	4686	3514	2812	2343	1757	1406	1757	1406
				f_z (in)	0.0025	0.0038	0.005	0.0063	0.0075	0.01	0.0125	0.01	0.0125
		200 - 260	v_f (in/min)	70	70	70	70	70	70	70	88	88	
			Max Ap	0.004	0.004	0.007	0.007	0.010	0.011	0.012	0.011	0.012	
K	E / M / A 12 - 13	1.00	570	n (rev/min)	17419	11613	8710	6968	5806	4355	3484	4355	3484
				f_z (in)	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120	0.0150	0.0120	0.0150
		490 - 650	v_f (in/min)	209	209	209	209	209	209	209	261	261	
	Max Ap		0.008	0.012	0.014	0.016	0.018	0.020	0.022	0.020	0.022		
	E / M / A 14 - 15		1.00	410	n (rev/min)	12530	8353	6265	5012	4177	3132	2506	3132
		f_z (in)			0.0023	0.0034	0.0045	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 Ap	0.008	0.012	0.014	0.016	0.018	0.020	0.022	0.020	0.022			
	S	E 21	1.00	100	n (rev/min)	3056	2037	1528	1222	1019	764	611	764
f_z (in)					0.0010	0.0015	0.0021	0.0026	0.0031	0.0041	0.0051	0.0041	0.0051
90 - 110			v_f (in/min)	13	13	13	13	13	13	13	16	16	
			Max Ap	0.004	0.006	0.007	0.008	0.010	0.015	0.015	0.015	0.015	



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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 - 2 X D START VALUES - Inch

SIDE MILLING															
ISO GROUP	SMG	$a_e \times D_c$ (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	0.50	825		n (rev/min)	25212	16808	12606	10085	8404	6303	5042	6303	5042	
					f_z (in)	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0200	0.0250	
			770	-	880	v_f (in/min)	504	504	504	504	504	504	504	630	630
						Max A_p	0.005	0.006	0.008	0.001	0.013	0.014	0.016	0.017	0.017
H	M / A / D 7a (48-56 HRC)	0.50	480		n (rev/min)	14669	9779	7334	5868	4890	3667	2934	3667	2934	
					f_z (in)	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0200	0.0250	
			430	-	530	v_f (in/min)	293	293	293	293	293	293	293	367	367
						Max A_p	0.005	0.006	0.008	0.001	0.013	0.014	0.016	0.017	0.017
	M / A / D 7b (56-62 HRC)	0.50	260		n (rev/min)	7946	5297	3973	3178	2649	1986	1589	1986	1589	
					f_z (in)	0.0038	0.0056	0.0075	0.0094	0.0113	0.0150	0.0188	0.0150	0.0188	
			230	-	290	v_f (in/min)	119	119	119	119	119	119	119	149	149
						Max A_p	0.004	0.006	0.007	0.009	0.011	0.015	0.019	0.015	0.019
K	E / M / A 12 - 13	0.50	570		n (rev/min)	17419	11613	8710	6968	5806	4355	3484	4355	3484	
					f_z (in)	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0200	0.0250	
			490	-	650	v_f (in/min)	348	348	348	348	348	348	348	435	435
	Max A_p	0.006				0.008	0.010	0.014	0.016	0.018	0.020	0.022	0.022		
	E / M / A 14 - 15	0.50	410		n (rev/min)	12530	8353	6265	5012	4177	3132	2506	3132	2506	
					f_z (in)	0.0038	0.0056	0.0075	0.0094	0.0113	0.0150	0.0188	0.0150	0.0188	
330			-	490	v_f (in/min)	188	188	188	188	188	188	188	235	235	
	Max A_p	0.006			0.008	0.010	0.014	0.016	0.018	0.020	0.022	0.022			
S	E 21	0.50	100		n (rev/min)	3056	2037	1528	1222	1019	764	611	764	611	
					f_z (in)	0.0026	0.0039	0.0052	0.0065	0.0078	0.0104	0.0130	0.0104	0.0130	
			90	-	110	v_f (in/min)	32	32	32	32	32	32	32	40	40
						Max A_p	0.004	0.005	0.007	0.008	0.010	0.015	0.015	0.015	0.015

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	max (a_p)			0.0059	0.0079	0.0098	0.0138	0.0157	0.0177	0.0197	0.0217
	410			n (rev/min)	12530	8353	6630	5012	4177	3132	2506	3132	2506
					490	f_z (in)	0.0038	0.0056	0.0071	0.0094	0.0113	0.0150	0.0188
	330	max (a_p)	0.0059	0.0079			0.0098	0.0138	0.0157	0.0177	0.0197	0.0217	0.0217
100			n (rev/min)	3056	2037	1617	1222	1019	764	611	764	611	
				110	f_z (in)	0.0026	0.0039	0.0049	0.0065	0.0078	0.0105	0.0130	0.0105
90	v_f (in/min)	32	32			32	32	32	32	32	40	40	
		110	max (a_p)	0.0038	0.0050	0.0070	0.0077	0.0100	0.0150	0.0150	0.0150	0.0150	
S	E 21			0.30	90	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	40	
		110	max (a_p)	0.0038	0.0050	0.0070	0.0077	0.0100	0.0150	0.0150	0.0150	0.0150	



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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.

MZN410RM / MZN510RM - 2 X D START VALUES - Inch

ISO GROUP	SMG	$a_e \times D_c$ (max)	v_c (sf / min)		SLOTTING								
					$Z_n = 4$						$Z_n = 5$		
					2	3	4	6	8	10	12	10	12
P	E / M / A 5 - 6	1.00	740	n (rev/min)	35900	23934	17950	11967	8975	7180	5983	7180	5983
				f_z (in)	0.0020	0.0030	0.0039	0.0059	0.0079	0.0098	0.0118	0.0098	0.0118
			690 - 790	v_f (in/min)	283	283	283	283	283	283	283	353	353
				Max Ap	0.006	0.008	0.010	0.014	0.019	0.020	0.022	0.020	0.022
H	M / A / D 7a (48-56 HRC)	1.00	440	n (rev/min)	21346	14231	10673	7115	5337	4269	3558	4269	3558
				f_z (in)	0.0020	0.0030	0.0039	0.0059	0.0079	0.0098	0.0118	0.0098	0.0118
		390 - 490	v_f (in/min)	168	168	168	168	168	168	168	210	210	
			Max Ap	0.006	0.008	0.010	0.014	0.019	0.020	0.022	0.020	0.022	
	M / A / D 7b (56-62 HRC)	1.00	230	n (rev/min)	11158	7439	5579	3719	2790	2232	1860	2232	1860
				f_z (in)	0.0016	0.0024	0.0031	0.0047	0.0063	0.0079	0.0094	0.0079	0.0094
		200 - 260	v_f (in/min)	70	70	70	70	70	70	70	88	88	
			Max Ap	0.003	0.004	0.005	0.007	0.009	0.010	0.011	0.010	0.011	
K	E / M / A 12 - 13	1.00	570	n (rev/min)	27653	18435	13826	9218	6913	5531	4609	5531	4609
				f_z (in)	0.0019	0.0028	0.0038	0.0057	0.0076	0.0094	0.0113	0.0094	0.0113
		490 - 650	v_f (in/min)	209	209	209	209	209	209	209	261	261	
	Max Ap		0.006	0.008	0.010	0.014	0.016	0.018	0.020	0.018	0.020		
	E / M / A 14 - 15		1.00	410	n (rev/min)	19891	13260	9945	6630	4973	3978	3315	3978
		f_z (in)			0.0014	0.0021	0.0028	0.0043	0.0057	0.0071	0.0085	0.0071	0.0085
330 - 490		v_f (in/min)	113	113	113	113	113	113	113	141	141		
	Max Ap	0.006	0.008	0.010	0.014	0.016	0.018	0.020	0.018	0.020			
	S	E 21	1.00	100	n (rev/min)	4851	3234	2426	1617	1213	970	809	970
f_z (in)					0.0006	0.0010	0.0013	0.0019	0.0026	0.0032	0.0039	0.0032	0.0039
90 - 110			v_f (in/min)	13	13	13	13	13	13	13	16	16	
			Max Ap	0.003	0.004	0.005	0.008	0.010	0.010	0.015	0.010	0.015	

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.

MZN410RM / MZN510RM - 2 X D START VALUES - Inch

ISO GROUP	SMG	$a_e \times D_c$ (max)	v_c (sf / min)		SIDE MILLING								
					$Z_n = 4$						$Z_n = 5$		
					2	3	4	6	8	10	12	10	12
P	E / M / A 5 - 6	0.50	825	n (rev/min)	40024	26683	20012	13341	10006	8005	6671	8005	6671
				f_z (in)	0.0031	0.0047	0.0063	0.0094	0.0126	0.0157	0.0189	0.0157	0.0189
			770 - 880	v_f (in/min)	504	504	504	504	504	504	630	630	
				Max Ap	0.006	0.008	0.010	0.014	0.019	0.020	0.022	0.020	0.022
H	M / A / D 7a (48-56 HRC)	0.50	480	n (rev/min)	23287	15524	11643	7762	5822	4657	3881	4657	3881
				f_z (in)	0.0031	0.0047	0.0063	0.0094	0.0126	0.0157	0.0189	0.0157	0.0189
			430 - 530	v_f (in/min)	293	293	293	293	293	293	367	367	
				Max Ap	0.006	0.008	0.010	0.014	0.019	0.020	0.022	0.020	0.022
	M / A / D 7b (56-62 HRC)	0.50	260	n (rev/min)	12614	8409	6307	4205	3153	2523	2102	2523	2102
				f_z (in)	0.0024	0.0035	0.0047	0.0071	0.0094	0.0118	0.0142	0.0118	0.0142
			230 - 290	v_f (in/min)	119	119	119	119	119	119	149	149	
				Max Ap	0.003	0.004	0.005	0.007	0.009	0.010	0.011	0.010	0.011
K	E / M / A 12 - 13	0.50	570	n (rev/min)	27653	18435	13826	9218	6913	5531	4609	5531	4609
				f_z (in)	0.0031	0.0047	0.0063	0.0094	0.0126	0.0157	0.0189	0.0157	0.0189
			490 - 650	v_f (in/min)	348	348	348	348	348	348	435	435	
	Max Ap	0.006		0.008	0.010	0.014	0.016	0.018	0.020	0.018	0.020		
	E / M / A 14 - 15	0.50		410	n (rev/min)	19891	13260	9945	6630	4973	3978	3315	3978
			f_z (in)		0.0024	0.0035	0.0047	0.0071	0.0094	0.0118	0.0142	0.0118	0.0142
330 - 490			v_f (in/min)	188	188	188	188	188	188	235	235		
	Max Ap	0.006	0.008	0.010	0.014	0.016	0.018	0.020	0.018	0.020			
S	E 21	0.50	100	n (rev/min)	4851	3234	2426	1617	1213	970	809	970	809
				f_z (in)	0.0016	0.0025	0.0033	0.0049	0.0066	0.0082	0.0098	0.0082	0.0098
			90 - 110	v_f (in/min)	32	32	32	32	32	32	40	40	
				Max Ap	0.003	0.004	0.005	0.008	0.010	0.010	0.015	0.010	0.015



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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.

MZN410RM / MZN510RM - 4 X D START VALUES - Inch

ISO GROUP	SMG	$a_e \times D_c$ (max)	v_c (sf / min)		SLOTTING								
					$Z_n = 4$						$Z_n = 5$		
					2	3	4	6	8	10	12	10	12
P	E / M / A 5 - 6	1.00	740	n (rev/min)	35900	23934	17950	11967	8975	7180	5983	7180	5983
				f_z (in)	0.0017	0.0025	0.0033	0.0050	0.0067	0.0084	0.0100	0.0084	0.0100
			690 - 790	v_f (in/min)	240	240	240	240	240	240	300	300	
				Max Ap	0.005	0.006	0.008	0.011	0.015	0.016	0.018	0.016	0.018
H	M / A / D 7a (48-56 HRC)	1.00	440	n (rev/min)	21346	14231	10673	7115	5337	4269	3558	4269	3558
				f_z (in)	0.0017	0.0025	0.0033	0.0050	0.0067	0.0084	0.0100	0.0084	0.0100
		390 - 490	v_f (in/min)	143	143	143	143	143	143	179	179		
			Max Ap	0.005	0.006	0.008	0.011	0.015	0.016	0.018	0.016	0.018	
	M / A / D 7b (56-62 HRC)	1.00	230	n (rev/min)	11158	7439	5579	3719	2790	2232	1860	2232	1860
				f_z (in)	0.0013	0.0020	0.0027	0.0040	0.0054	0.0067	0.0080	0.0067	0.0080
		200 - 260	v_f (in/min)	60	60	60	60	60	60	75	75		
			Max Ap	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.008	0.009	
K	E / M / A 12 - 13	1.00	570	n (rev/min)	27653	18435	13826	9218	6913	5531	4609	5531	4609
				f_z (in)	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096	0.0080	0.0096
		490 - 650	v_f (in/min)	178	178	178	178	178	178	222	222		
	Max Ap		0.005	0.006	0.008	0.011	0.013	0.014	0.016	0.014	0.016		
	E / M / A 14 - 15		1.00	410	n (rev/min)	19891	13260	9945	6630	4973	3978	3315	3978
		f_z (in)			0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	0.0060	0.0072
330 - 490		v_f (in/min)	96	96	96	96	96	96	120	120			
	Max Ap	0.005	0.006	0.008	0.011	0.013	0.014	0.016	0.014	0.016			
	S	E 21	1.00	100	n (rev/min)	4851	3234	2426	1617	1213	970	809	970
f_z (in)					0.0005	0.0008	0.0011	0.0016	0.0022	0.0027	0.0033	0.0027	0.0033
90 - 110			v_f (in/min)	11	11	11	11	11	11	13	13		
			Max Ap	0.002	0.003	0.004	0.006	0.008	0.008	0.012	0.008	0.012	

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.

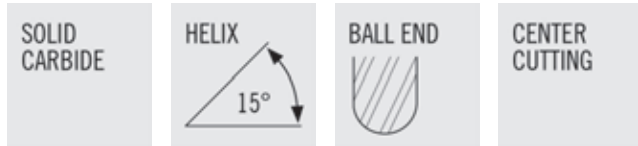
MZN410RM / MZN510RM - 4 X D START VALUES - Inch

SIDE MILLING													
ISO GROUP	SMG	a _e x Dc (max)	v _c (sf / min)		Z _n = 4						Z _n = 5		
					2	3	4	6	8	10	12	10	12
P	E / M / A 5 - 6	0.50	825	n (rev/min)	40024	26683	20012	13341	10006	8005	6671	8005	6671
				f _z (in)	0.0027	0.0040	0.0054	0.0080	0.0107	0.0134	0.0161	0.0134	0.0161
			770 - 880	v _f (in/min)	429	429	429	429	429	429	429	536	536
				Max Ap	0.005	0.006	0.008	0.011	0.015	0.016	0.018	0.016	0.018
H	M / A / D 7a (48-56 HRC)	0.50	480	n (rev/min)	23287	15524	11643	7762	5822	4657	3881	4657	3881
				f _z (in)	0.0027	0.0040	0.0054	0.0080	0.0107	0.0134	0.0161	0.0134	0.0161
			430 - 530	v _f (in/min)	249	249	249	249	249	249	249	312	312
				Max Ap	0.005	0.006	0.008	0.011	0.015	0.016	0.018	0.016	0.018
	M / A / D 7b (56-62 HRC)	0.50	260	n (rev/min)	12614	8409	6307	4205	3153	2523	2102	2523	2102
				f _z (in)	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120	0.0100	0.0120
			230 - 290	v _f (in/min)	101	101	101	101	101	101	101	127	127
				Max Ap	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.008	0.009
K	E / M / A 12 - 13	0.50	570	n (rev/min)	27653	18435	13826	9218	6913	5531	4609	5531	4609
				f _z (in)	0.0027	0.0040	0.0054	0.0080	0.0107	0.0134	0.0161	0.0134	0.0161
			490 - 650	v _f (in/min)	296	296	296	296	296	296	296	370	370
	Max Ap	0.005		0.006	0.008	0.011	0.013	0.014	0.016	0.014	0.016		
	E / M / A 14 - 15	0.50		410	n (rev/min)	19891	13260	9945	6630	4973	3978	3315	3978
			f _z (in)		0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120	0.0100	0.0120
330 - 490			v _f (in/min)	160	160	160	160	160	160	160	200	200	
	Max Ap	0.005	0.006	0.008	0.011	0.013	0.014	0.016	0.014	0.016			
S	E 21	0.50	100	n (rev/min)	4851	3234	2426	1617	1213	970	809	970	809
				f _z (in)	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.007	0.008
			90 - 110	v _f (in/min)	27	27	27	27	27	27	27	34	34
				Max Ap	0.002	0.003	0.004	0.006	0.008	0.008	0.012	0.008	0.012


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MB215 & MB215M

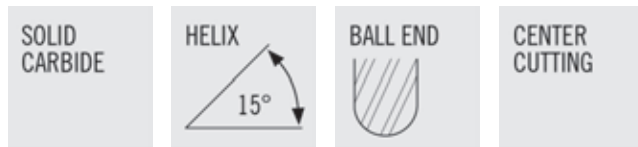


- Cylindrical Shank
- 7° Draft Angle
- Ideal for milling hardened mold and die steels up to 52HRc
- Rough and finish milling of contours and complex shapes

- Cutting Data MB215 - Page 162
- Tolerance Specs MB215 - Page 323
- Cutting Data MB215M - Page 162
- Tolerance Specs MB215M - Page 323

PRODUCT NUMBER	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	0.059	1/8	2	ALTIN
N76673	MB215-0.125-G1-B.0-Z2	1/8	1/4	1/8	3	0.121	1/4	2	ALTIN
N76675	MB215-0.250-E1-B.0-Z2	1/4	1/4	1/4	3	0.246	1/2	2	ALTIN
N76677	MB215-0.375-E1-B.0-Z2	3/8	3/8	3/8	3	0.367	3/4	2	ALTIN
N76679	MB215-0.500-E1-B.0-Z2	1/2	1/2	1/2	4	0.492	1	2	ALTIN
METRIC - MB215M									
N76660	MB215M-010-G1-B.0-Z2	1mm	6mm	1mm	64mm	0.9mm	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

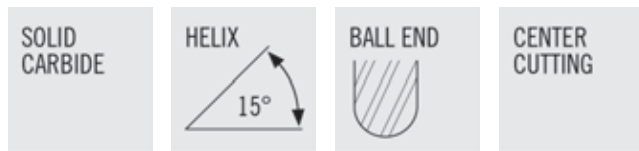


- Cylindrical Shank
- 7° Draft Angle
- Ideal for milling hardened mold and die steels up to 62HRc
- Rough and finish milling of contours and complex shapes

- Cutting Data - Page 163
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.059	1/8	2	ALTIN
N76693	MBZ215-0.125-G1-B.0-Z2	1/8	1/4	1/8	3	0.121	1/4	2	ALTIN
N76695	MBZ215-0.250-E1-B.0-Z2	1/4	1/4	1/4	3	0.246	1/2	2	ALTIN
N76697	MBZ215-0.375-E1-B.0-Z2	3/8	3/8	3/8	3	0.367	3/4	2	ALTIN
N76699	MBZ215-0.500-E1-B.0-Z2	1/2	1/2	1/2	4	0.492	1	2	ALTIN

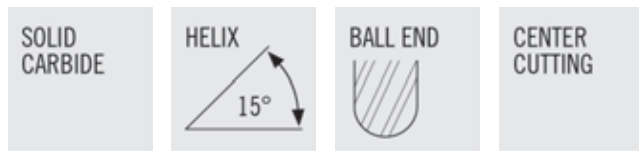
MBZ215M



- 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 - Pages 159-161
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	SHANK TYPE
03180803	MBZ215M-005-G2-B.0-Z2	.5mm	6mm	0.5mm	60mm	0.45mm	1mm	2	ALTIN	CYLINDRICAL
03180804	MBZ215M-005-G4-B.0-Z2	.5mm	6mm	0.5mm	60mm	0.45mm	2mm	2	ALTIN	CYLINDRICAL
03180805	MBZ215M-005-J6-B.0-Z2	.5mm	6mm	0.5mm	60mm	0.45mm	3mm	2	ALTIN	CYLINDRICAL
03180806	MBZ215M-008-G2-B.0-Z2	.8mm	6mm	.8mm	60mm	0.75mm	1.6mm	2	ALTIN	CYLINDRICAL
03180807	MBZ215M-008-G4-B.0-Z2	.8mm	6mm	.8mm	60mm	0.75mm	3.2mm	2	ALTIN	CYLINDRICAL
03180808	MBZ215M-008-J6-B.0-Z2	.8mm	6mm	.8mm	60mm	0.75mm	4.8mm	2	ALTIN	CYLINDRICAL
03180809	MBZ215M-010-G2-B.0-Z2	1mm	6mm	1mm	60mm	0.95mm	2mm	2	ALTIN	CYLINDRICAL
03180810	MBZ215M-010-G4-B.0-Z2	1mm	6mm	1mm	60mm	0.95mm	4mm	2	ALTIN	CYLINDRICAL
03180811	MBZ215M-010-J6-B.0-Z2	1mm	6mm	1mm	60mm	0.95mm	6mm	2	ALTIN	CYLINDRICAL
03180812	MBZ215M-010-J37-B.0-Z2	1mm	6mm	1mm	80mm	0.95mm	37.2mm	2	ALTIN	CYLINDRICAL
03180813	MBZ215M-015-G2-B.0-Z2	1.5mm	6mm	1.5mm	60mm	1.4mm	3mm	2	ALTIN	CYLINDRICAL
03180814	MBZ215M-015-G4-B.0-Z2	1.5mm	6mm	1.5mm	60mm	1.4mm	6mm	2	ALTIN	CYLINDRICAL
03180815	MBZ215M-015-J6-B.0-Z2	1.5mm	6mm	1.5mm	60mm	1.4mm	9mm	2	ALTIN	CYLINDRICAL
03180816	MBZ215M-020-G2-B.0-Z2	2mm	6mm	2mm	60mm	1.9mm	4mm	2	ALTIN	CYLINDRICAL
03180817	MBZ215M-020-G4-B.0-Z2	2mm	6mm	2mm	60mm	1.9mm	8mm	2	ALTIN	CYLINDRICAL
03180818	MBZ215M-020-J6-B.0-Z2	2mm	6mm	2mm	60mm	1.9mm	12mm	2	ALTIN	CYLINDRICAL
03180819	MBZ215M-020-J19-B.0-Z2	2mm	6mm	2mm	80mm	1.9mm	37.2mm	2	ALTIN	CYLINDRICAL
03180820	MBZ215M-025-G2-B.0-Z2	2.5mm	6mm	2.5mm	60mm	2.4mm	5mm	2	ALTIN	CYLINDRICAL
03180821	MBZ215M-025-G4-B.0-Z2	2.5mm	6mm	2.5mm	60mm	2.4mm	10mm	2	ALTIN	CYLINDRICAL
03180822	MBZ215M-025-J6-B.0-Z2	2.5mm	6mm	2.5mm	60mm	2.4mm	15mm	2	ALTIN	CYLINDRICAL
03180823	MBZ215M-030-G2-B.0-Z2	3mm	6mm	3mm	60mm	2.8mm	6mm	2	ALTIN	CYLINDRICAL
03180824	MBZ215M-030-G4-B.0-Z2	3mm	6mm	3mm	60mm	2.8mm	12mm	2	ALTIN	CYLINDRICAL
03180825	MBZ215M-030-J6-B.0-Z2	3mm	6mm	3mm	65mm	2.8mm	18mm	2	ALTIN	CYLINDRICAL
03180826	MBZ215M-030-J13-B.0-Z2	3mm	6mm	3mm	80mm	2.8mm	39.6mm	2	ALTIN	CYLINDRICAL
03180827	MBZ215M-040-G2-B.0-Z2	4mm	6mm	4mm	60mm	3.7mm	8mm	2	ALTIN	CYLINDRICAL
03180828	MBZ215M-040-G4-B.0-Z2	4mm	6mm	4mm	65mm	3.7mm	16mm	2	ALTIN	CYLINDRICAL
03180829	MBZ215M-040-J6-B.0-Z2	4mm	6mm	4mm	65mm	3.7mm	24mm	2	ALTIN	CYLINDRICAL
03180830	MBZ215M-040-J12-B.0-Z2	4mm	6mm	4mm	100mm	3.7mm	47.8mm	2	ALTIN	CYLINDRICAL
03180831	MBZ215M-050-G2-B.0-Z2	5mm	6mm	5mm	60mm	4.6mm	10mm	2	ALTIN	CYLINDRICAL
03180832	MBZ215M-050-G4-B.0-Z2	5mm	6mm	5mm	65mm	4.6mm	20mm	2	ALTIN	CYLINDRICAL
03180833	MBZ215M-050-J6-B.0-Z2	5mm	6mm	5mm	75mm	4.6mm	30mm	2	ALTIN	CYLINDRICAL
03180834	MBZ215M-050-J11-B.0-Z2	5mm	8mm	5mm	100mm	4.6mm	56.8mm	2	ALTIN	CYLINDRICAL
03180835	MBZ215M-060-D1-B.0-Z2	6mm	6mm	6mm	50mm	-	-	2	ALTIN	CYLINDRICAL
03180836	MBZ215M-060-D2-B.0-Z2	6mm	6mm	6mm	75mm	-	-	2	ALTIN	CYLINDRICAL
03180837	MBZ215M-060-J6-B.0-Z2	6mm	8mm	6mm	75mm	5.6mm	36mm	2	ALTIN	CYLINDRICAL
03180838	MBZ215M-060-J9-B.0-Z2	6mm	8mm	6mm	100mm	5.6mm	51.7mm	2	ALTIN	CYLINDRICAL

MBZ215M (CON'T)



- 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 159-161
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	COATING	SHANK TYPE
03180839	MBZ215M-080-D1-B.0-Z2	8mm	8mm	8mm	60mm	-	-	2	ALTIN	CYLINDRICAL
03180840	MBZ215M-080-D2-B.0-Z2	8mm	8mm	8mm	75mm	-	-	2	ALTIN	CYLINDRICAL
03180841	MBZ215M-080-J6-B.0-Z2	8mm	10mm	8mm	100mm	7.4mm	48mm	2	ALTIN	CYLINDRICAL
03180842	MBZ215M-080-J7-B.0-Z2	8mm	10mm	8mm	125mm	7.4mm	57.5mm	2	ALTIN	CYLINDRICAL
03180843	MBZ215M-100-D1-B.0-Z2	10mm	10mm	10mm	70mm	-	-	2	ALTIN	CYLINDRICAL
03180844	MBZ215M-100-D2-B.0-Z2	10mm	10mm	10mm	85mm	-	-	2	ALTIN	CYLINDRICAL
03180845	MBZ215M-100-J6-B.0-Z2	10mm	12mm	10mm	125mm	9.4mm	60mm	2	ALTIN	CYLINDRICAL
03180846	MBZ215M-120-D1-B.0-Z2	12mm	12mm	12mm	75mm	-	-	2	ALTIN	CYLINDRICAL
03180847	MBZ215M-120-D2-B.0-Z2	12mm	12mm	12mm	100mm	-	-	2	ALTIN	CYLINDRICAL

MZ645 / MZ645R



- Cylindrical Shank
- Ideal for peripheral milling of hard steels up to 62HRC
- Cutting Data - Page 163
- Tolerance Specs - Page 323

ORDER NO.	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS
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	-
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

MBZ215 - START VALUES - Inch

COPY MILLING - ROUGHING											
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	V _c (sf / min)		Z _n = 2					
						1/16	1/8	3/16	1/4	3/8	1/2
H	M / A / D 7a (48-56 HRC)	0.10	0.30	560	n (rev/min)	33960	17110	11380	8560	5700	4280
					f _z (in)	0.0012	0.0024	0.0036	0.0048	0.0071	0.0095
					V _f (in/min)	81	81	81	81	81	81
	M / A / D 7b (56-62 HRC)	0.07	0.25	390	n (rev/min)	23650	11920	7920	5960	3970	2980
					f _z (in)	0.0009	0.0019	0.0028	0.0038	0.0056	0.0075
					V _f (in/min)	45	45	45	45	45	45
	M / A / D 7c (62-65 HRC)	0.05	0.20	260	n (rev/min)	15770	7950	5280	3970	2650	1990
					f _z (in)	0.0008	0.0016	0.0024	0.0033	0.0049	0.0065
					V _f (in/min)	26	26	26	26	26	26
	M / A / D 7d (>65 HRC)	0.04	0.15	160	n (rev/min)	9700	4890	3250	2440	1630	1220
					f _z (in)	0.0007	0.0014	0.0021	0.0028	0.0041	0.0055
					V _f (in/min)	13	13	13	13	13	13
K	E 12 - 13	0.15	0.30	820	n (rev/min)	49720	25060	16660	12530	8350	6260
					f _z (in)	0.0008	0.0016	0.0024	0.0033	0.0049	0.0065
					V _f (in/min)	81	81	81	81	81	81
	E 14 - 15	0.14	0.20	660	n (rev/min)	40020	20170	13410	10080	6720	5040
					f _z (in)	0.0008	0.0015	0.0023	0.0030	0.0045	0.0060
					V _f (in/min)	61	61	61	61	61	61

COPY MILLING - FINISHING											
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	V _c (sf / min)		Z _n = 2					
						1/16	1/8	3/16	1/4	3/8	1/2
H	M / A / D 7a (48-56 HRC)	0.02	0.01	920	n (rev/min)	55780	28120	18690	14060	9370	7030
					f _z (in)	0.0008	0.0016	0.0024	0.0033	0.0049	0.0065
					V _f (in/min)	91	91	91	91	91	91
	M / A / D 7b (56-62 HRC)	0.02	0.01	560	n (rev/min)	33960	17110	11380	8560	5700	4280
					f _z (in)	0.0008	0.0015	0.0023	0.0030	0.0045	0.0060
					V _f (in/min)	51	51	51	51	51	51
	M / A / D 7c (62-65 HRC)	0.01	0.01	360	n (rev/min)	21830	11000	7310	5500	3670	2750
					f _z (in)	0.0006	0.0013	0.0019	0.0025	0.0038	0.0050
					V _f (in/min)	28	28	28	28	28	28
	M / A / D 7d (>65 HRC)	0.01	0.01	260	n (rev/min)	15770	7950	5280	3970	2650	1990
					f _z (in)	0.0006	0.0013	0.0019	0.0025	0.0038	0.0050
					V _f (in/min)	20	20	20	20	20	20
K	E 12 - 13	0.03	0.02	1130	n (rev/min)	68520	34530	22960	17270	11510	8630
					f _z (in)	0.0009	0.0019	0.0028	0.0038	0.0056	0.0075
					V _f (in/min)	129	129	129	129	129	129
	E 14 - 15	0.02	0.02	950	n (rev/min)	57600	29030	19300	14520	9680	7260
					f _z (in)	0.0009	0.0018	0.0026	0.0035	0.0053	0.0070
					V _f (in/min)	102	102	102	102	102	102



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MBZ215M - UP TO 4 X D - START VALUES - Inch

COPY MILLING - ROUGHING																			
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (sf / min)		Z _n = 2													
						0.5	0.8	1	1.5	2	2.5	3	3.5	4	5	6	8	10	12
H	M / A / D 7a (48-56 HRC)	0.10	0.30	560	n (rev/min)	108663	67914	54332	36221	27166	21733	18111	15523	13583	10866	9055	6791	5433	4528
					f _z (in)	0.0004	0.0006	0.0007	0.0011	0.0015	0.0019	0.0022	0.0026	0.0030	0.0037	0.0045	0.0060	0.0075	0.0090
					v _f (in/min)	81	81	81	81	81	81	81	81	81	81	81	81	81	81
	M / A / D 7b (56-62 HRC)	0.07	0.25	390	n (rev/min)	75676	47298	37838	25225	18919	15135	12613	10811	9460	7568	6306	4730	3784	3153
					f _z (in)	0.0003	0.0005	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0030	0.0035	0.0047	0.0059	0.0071
					v _f (in/min)	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	M / A / D 7c (62-65 HRC)	0.05	0.20	260	n (rev/min)	50451	31532	25225	16817	12613	10090	8408	7207	6306	5045	4204	3153	2523	2102
					f _z (in)	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0026	0.0031	0.0041	0.0051	0.0061
					v _f (in/min)	26	26	26	26	26	26	26	26	26	26	26	26	26	26
	M / A / D 7d (>65 HRC)	0.04	0.15	160	n (rev/min)	31047	19404	15523	10349	7762	6209	5174	4435	3881	3105	2587	1940	1552	1294
					f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0017	0.0022	0.0026	0.0035	0.0043	0.0052
					v _f (in/min)	13	13	13	13	13	13	13	13	13	13	13	13	13	13
K	E 12 - 13	0.15	0.30	820	n (rev/min)	159114	99446	79557	53038	39778	31823	26519	22731	19889	15911	13259	9945	7956	6630
					f _z (in)	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0026	0.0031	0.0041	0.0051	0.0061
					v _f (in/min)	81	81	81	81	81	81	81	81	81	81	81	81	81	81
	E 14 - 15	0.14	0.20	660	n (rev/min)	128067	80042	64034	42689	32017	25613	21345	18295	16008	12807	10672	8004	6403	5336
					f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0024	0.0028	0.0038	0.0047	0.0057
					v _f (in/min)	61	61	61	61	61	61	61	61	61	61	61	61	61	61

COPY MILLING - FINISHING																			
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (sf / min)		Z _n = 2													
						0.5	0.8	1	1.5	2	2.5	3	3.5	4	5	6	8	10	12
H	M / A / D 7a (48-56 HRC)	0.02	0.01	920	n (rev/min)	178518	111574	89259	59506	44629	35704	29753	25503	22315	17852	14876	11157	8926	7438
					f _z (in)	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0026	0.0031	0.0041	0.0051	0.0061
					v _f (in/min)	91	91	91	91	91	91	91	91	91	91	91	91	91	91
	M / A / D 7b (56-62 HRC)	0.02	0.01	560	n (rev/min)	108663	67914	54332	36221	27166	21733	18111	15523	13583	10866	9055	6791	5433	4528
					f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0024	0.0028	0.0038	0.0047	0.0057
					v _f (in/min)	51	51	51	51	51	51	51	51	51	51	51	51	51	51
	M / A / D 7c (62-65 HRC)	0.01	0.01	360	n (rev/min)	69855	43659	34927	23285	17464	13971	11642	9979	8732	6985	5821	4366	3493	2911
					f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0031	0.0039	0.0047
					v _f (in/min)	28	28	28	28	28	28	28	28	28	28	28	28	28	28
	M / A / D 7d (>65 HRC)	0.01	0.01	260	n (rev/min)	50451	31532	25225	16817	12613	10090	8408	7207	6306	5045	4204	3153	2523	2102
					f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0020	0.0024	0.0031	0.0039	0.0047
					v _f (in/min)	20	20	20	20	20	20	20	20	20	20	20	20	20	20
K	E 12 - 13	0.03	0.02	1130	n (rev/min)	219267	137042	109633	73089	54817	43853	36544	31324	27408	21927	18272	13704	10963	9136
					f _z (in)	0.0003	0.0005	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0030	0.0035	0.0047	0.0059	0.0071
					v _f (in/min)	129	129	129	129	129	129	129	129	129	129	129	129	129	129
	E 14 - 15	0.02	0.02	950	n (rev/min)	184339	115212	92170	61446	46085	36868	30723	26334	23042	18434	15362	11521	9217	7681
					f _z (in)	0.0003	0.0004	0.0006	0.0008	0.0011	0.0014	0.0017	0.0019	0.0022	0.0028	0.0033	0.0044	0.0055	0.0066
					v _f (in/min)	102	102	102	102	102	102	102	102	102	102	102	102	102	102

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.

MBZ215M - 6 X D - START VALUES - Inch

COPY MILLING - ROUGHING																					
ISO GROUP	SMG	a _D x Dc (max)	a _E x Dc (max)	v _C (sf / min)		Z _n = 2															
						0.5	0.8	1	1.5	2	2.5	3	4	5	6	8	10				
H	M / A / D 7a (48-56 HRC)	0.04	0.23	560	n (rev/min)	108663	67914	54332	36221	27166	21733	18111	13583	10866	9055	6791	5433				
					f _z (in)	0.0003	0.0005	0.0007	0.0010	0.0013	0.0017	0.0020	0.0027	0.0034	0.0040	0.0054	0.0067				
					v _f (in/min)	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	
					460 - 660																
					M / A / D 7b (56-62 HRC)	0.03	0.19	390	n (rev/min)	75676	47298	37838	25225	18919	15135	12613	9460	7568	6306	4730	3784
									f _z (in)	0.0003	0.0004	0.0005	0.0008	0.0011	0.0013	0.0016	0.0021	0.0027	0.0032	0.0043	0.0053
	M / A / D 7c (62-65 HRC)	0.02	0.15	260	n (rev/min)	50451	31532	25225	16817	12613	10090	8408	6306	5045	4204	3153	2523				
					f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0018	0.0023	0.0028	0.0037	0.0046				
	M / A / D 7d (>65 HRC)	0.016	0.11	160	n (rev/min)	31047	19404	15523	10349	7762	6209	5174	3881	3105	2587	1940	1552				
					f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0016	0.0019	0.0023	0.0031	0.0039				
	K	E 12 - 13	0.06	0.23	820	n (rev/min)	159114	99446	79557	53038	39778	31823	26519	19889	15911	13259	9945	7956			
						f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0018	0.0023	0.0028	0.0037	0.0046			
v _f (in/min)						73	73	73	73	73	73	73	73	73	73	73	73	73			
660 - 980																					
E 14 - 15						0.05	0.15	660	n (rev/min)	128067	80042	64034	42689	32017	25613	21345	16008	12807	10672	8004	6403
									f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0017	0.0021	0.0026	0.0034	0.0043
				490 - 820	v _f (in/min)	54	54	54	54	54	54	54	54	54	54	54	54				

COPY MILLING - FINISHING																					
ISO GROUP	SMG	a _D x Dc (max)	a _E x Dc (max)	v _C (sf / min)		Z _n = 2															
						0.5	0.8	1	1.5	2	2.5	3	4	5	6	8	10				
H	M / A / D 7a (48-56 HRC)	0.01	0.01	920	n (rev/min)	178518	111574	89259	59506	44629	35704	29753	22315	17852	14876	11157	8926				
					f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0018	0.0023	0.0028	0.0037	0.0046				
					v _f (in/min)	82	82	82	82	82	82	82	82	82	82	82	82	82			
					690 - 1150																
					M / A / D 7b (56-62 HRC)	0.01	0.01	560	n (rev/min)	108663	67914	54332	36221	27166	21733	18111	13583	10866	9055	6791	5433
									f _z (in)	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0017	0.0021	0.0026	0.0034	0.0043
	M / A / D 7c (62-65 HRC)	0.01	0.01	360	n (rev/min)	69855	43659	34927	23285	17464	13971	11642	8732	6985	5821	4366	3493				
					f _z (in)	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0021	0.0028	0.0035				
	M / A / D 7d (>65 HRC)	0.01	0.01	260	n (rev/min)	50451	31532	25225	16817	12613	10090	8408	6306	5045	4204	3153	2523				
					f _z (in)	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0021	0.0028	0.0035				
	K	E 12 - 13	0.01	0.02	1130	n (rev/min)	219267	137042	109633	73089	54817	43853	36544	27408	21927	18272	13704	10963			
						f _z (in)	0.0003	0.0004	0.0005	0.0008	0.0011	0.0013	0.0016	0.0021	0.0027	0.0032	0.0043	0.0053			
v _f (in/min)						117	117	117	117	117	117	117	117	117	117	117	117	117			
1050 - 1210																					
E 14 - 15						0.01	0.02	950	n (rev/min)	184339	115212	92170	61446	46085	36868	30723	23042	18434	15362	11521	9217
									f _z (in)	0.0002	0.0004	0.0005	0.0007	0.0010	0.0012	0.0015	0.0020	0.0025	0.0030	0.0040	0.0050
				870 - 1030	v _f (in/min)	91	91	91	91	91	91	91	91	91	91	91	91				



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MBZ215M - GREATER THAN 6 X D - START VALUES - Inch

COPY 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	
H	M / A / D 7a (48-56 HRC)	0.01	0.17	560	n (rev/min)	54332	27166	18111	13583	10866	9055	6791	
					f _z (in)	0.0006	0.0012	0.0018	0.0024	0.0030	0.0036	0.0048	
					v _f (in/min)	66	66	66	66	66	66	66	
					460 - 660	n (rev/min)	37838	18919	12613	9460	7568	6306	4730
						f _z (in)	0.0005	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038
						v _f (in/min)	36	36	36	36	36	36	36
	M / A / D 7b (56-62 HRC)	0.007	0.14	390	n (rev/min)	25225	12613	8408	6306	5045	4204	3153	
					f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033	
					v _f (in/min)	21	21	21	21	21	21	21	
					200 - 330	n (rev/min)	15523	7762	5174	3881	3105	2587	1940
						f _z (in)	0.0004	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028
						v _f (in/min)	11	11	11	11	11	11	11
M / A / D 7c (62-65 HRC)	0.005	0.11	260	n (rev/min)	79557	39778	26519	19889	15911	13259	9945		
				f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033		
				v _f (in/min)	66	66	66	66	66	66	66		
				660 - 980	n (rev/min)	64034	32017	21345	16008	12807	10672	8004	
					f _z (in)	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0031	
					v _f (in/min)	49	49	49	49	49	49	49	
M / A / D 7d (>65 HRC)	0.004	0.08	160	n (rev/min)	79557	39778	26519	19889	15911	13259	9945		
				f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033		
				v _f (in/min)	66	66	66	66	66	66	66		
				130 - 200	n (rev/min)	64034	32017	21345	16008	12807	10672	8004	
					f _z (in)	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0031	
					v _f (in/min)	49	49	49	49	49	49	49	
K	E 12 - 13	0.015	0.17	820	n (rev/min)	79557	39778	26519	19889	15911	13259	9945	
					f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033	
					v _f (in/min)	66	66	66	66	66	66	66	
					660 - 980	n (rev/min)	64034	32017	21345	16008	12807	10672	8004
						f _z (in)	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0031
						v _f (in/min)	49	49	49	49	49	49	49
K	E 14 - 15	0.014	0.11	660	n (rev/min)	79557	39778	26519	19889	15911	13259	9945	
					f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033	
					v _f (in/min)	66	66	66	66	66	66	66	
					490 - 820	n (rev/min)	64034	32017	21345	16008	12807	10672	8004
						f _z (in)	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0031
						v _f (in/min)	49	49	49	49	49	49	49

COPY 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	2	3	4	5	6	8	
H	M / A / D 7a (48-56 HRC)	0.010	0.010	920	n (rev/min)	89259	44629	29753	22315	17852	14876	11157	
					f _z (in)	0.0004	0.0008	0.0012	0.0017	0.0021	0.0025	0.0033	
					v _f (in/min)	74	74	74	74	74	74	74	
					690 - 1150	n (rev/min)	54332	27166	18111	13583	10866	9055	6791
						f _z (in)	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0031
						v _f (in/min)	42	42	42	42	42	42	42
	M / A / D 7b (56-62 HRC)	0.010	0.010	560	n (rev/min)	34927	17464	11642	8732	6985	5821	4366	
					f _z (in)	0.0003	0.0006	0.0010	0.0013	0.0016	0.0019	0.0026	
					v _f (in/min)	22	22	22	22	22	22	22	
					300 - 430	n (rev/min)	25225	12613	8408	6306	5045	4204	3153
						f _z (in)	0.0003	0.0006	0.0010	0.0013	0.0016	0.0019	0.0026
						v _f (in/min)	16	16	16	16	16	16	16
M / A / D 7c (62-65 HRC)	0.010	0.010	360	n (rev/min)	109633	54817	36544	27408	21927	18272	13704		
				f _z (in)	0.0005	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038		
				v _f (in/min)	105	105	105	105	105	105	105		
				1050 - 1210	n (rev/min)	92170	46085	30723	23042	18434	15362	11521	
					f _z (in)	0.0004	0.0009	0.0013	0.0018	0.0022	0.0027	0.0036	
					v _f (in/min)	82	82	82	82	82	82	82	
M / A / D 7d (>65 HRC)	0.010	0.010	260	n (rev/min)	109633	54817	36544	27408	21927	18272	13704		
				f _z (in)	0.0005	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038		
				v _f (in/min)	105	105	105	105	105	105	105		
				230 - 300	n (rev/min)	92170	46085	30723	23042	18434	15362	11521	
					f _z (in)	0.0004	0.0009	0.0013	0.0018	0.0022	0.0027	0.0036	
					v _f (in/min)	82	82	82	82	82	82	82	
K	E 12 - 13	0.030	0.020	1130	n (rev/min)	109633	54817	36544	27408	21927	18272	13704	
					f _z (in)	0.0005	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038	
					v _f (in/min)	105	105	105	105	105	105	105	
					1050 - 1210	n (rev/min)	92170	46085	30723	23042	18434	15362	11521
						f _z (in)	0.0004	0.0009	0.0013	0.0018	0.0022	0.0027	0.0036
						v _f (in/min)	82	82	82	82	82	82	82
K	E 14 - 15	0.020	0.020	950	n (rev/min)	109633	54817	36544	27408	21927	18272	13704	
					f _z (in)	0.0005	0.0010	0.0014	0.0019	0.0024	0.0029	0.0038	
					v _f (in/min)	105	105	105	105	105	105	105	
					870 - 1030	n (rev/min)	92170	46085	30723	23042	18434	15362	11521
						f _z (in)	0.0004	0.0009	0.0013	0.0018	0.0022	0.0027	0.0036
						v _f (in/min)	82	82	82	82	82	82	82

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.

MB215 - START VALUES - Inch

COPY MILLING - ROUGHING											
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (sf / min)		1/16	1/8	3/16	1/4	3/8	1/2
						P	E 5 - 6	0.11	0.31	710	n (rev/min)
f _z (in)	0.0011	0.0023	0.0034	0.0045	0.0068						0.0090
v _f (in/min)	98	98	98	98	98						98
H	M / A / D 7a (48-52 HRC)	0.10	0.30	560	n (rev/min)	33960	17110	11380	8560	5700	4280
					f _z (in)	0.0012	0.0024	0.0036	0.0048	0.0071	0.0095
					v _f (in/min)	81	81	81	81	81	81

COPY MILLING - FINISHING											
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (sf / min)		1/16	1/8	3/16	1/4	3/8	1/2
						P	E 5 - 6	0.02	0.02	1070	n (rev/min)
f _z (in)	0.0008	0.0016	0.0024	0.0033	0.0049						0.0065
v _f (in/min)	106	106	106	106	106						106
H	M / A / D 7a (48-52 HRC)	0.02	0.01	920	n (rev/min)	55780	28120	18690	14060	9370	7030
					f _z (in)	0.0008	0.0016	0.0024	0.0033	0.0049	0.0065
					v _f (in/min)	91	91	91	91	91	91

MB215M - START VALUES - Inch

COPY MILLING - ROUGHING														
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (m / min)		Z _n = 2								
						1	2	3	4	5	6	8	10	12
P	E 5 - 6	0.10	0.30	710	n (rev/min)	68885	34442	22962	17221	13777	11481	8611	6888	5740
					f _z (in)	0.0007	0.0014	0.0021	0.0028	0.0035	0.0043	0.0057	0.0071	0.0085
					v _f (in/min)	98	98	98	98	98	98	98	98	98
H	M / A / D 7a (48-52HRC)	0.10	0.30	560	n (rev/min)	54332	27166	18111	13583	10866	9055	6791	5433	4528
					f _z (in)	0.0007	0.0015	0.0022	0.0030	0.0037	0.0045	0.0060	0.0075	0.0090
					v _f (in/min)	81	81	81	81	81	81	81	81	81

COPY MILLING - FINISHING														
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (m / min)		Z _n = 2								
						1	2	3	4	5	6	8	10	12
P	E 5 - 6	0.02	0.02	1070	n (rev/min)	103812	51906	34604	25953	20762	17302	12977	10381	8651
					f _z (in)	0.0005	0.0010	0.0015	0.0020	0.0026	0.0031	0.0041	0.0051	0.0061
					v _f (in/min)	106	106	106	106	106	106	106	106	106
H	M / A / D 7a (48-52HRC)	0.02	0.01	920	n (rev/min)	89259	44629	29753	22315	17852	14876	11157	8926	7438
					f _z (in)	0.0005	0.0010	0.0015	0.0020	0.0026	0.0031	0.0041	0.0051	0.0061
					v _f (in/min)	91	91	91	91	91	91	91	91	91



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MBZ215 - START VALUES

SIDE MILLING - ROUGHING																	
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (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																	
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 - Inch

SIDE MILLING - ROUGHING																
ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (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)	62	62	62	62	62	62					
H	M / A / D 7a (48-56HRc)	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	46	46	46	46	46					
	M / A / D 7b (56-62HRc)	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	29	29	29	29	29					

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, 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 BENEFITS

- 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 sizes available
- Wide range of geometries available
- Specials available upon request

PREFERRED MATERIAL GROUPS

Graphite
Plastic
Thermoplast
Thermoset

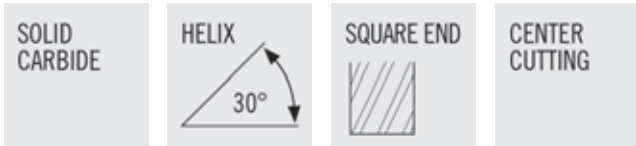
INDUSTRY TARGETS

- 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



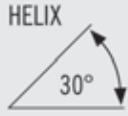
- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIA230 - Page 178-179
- Tolerance Specs DIA230 - Page 323

PRODUCT NUMBER	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

DIAB230 & DIAB230M

SOLID
CARBIDE



CENTER
CUTTING

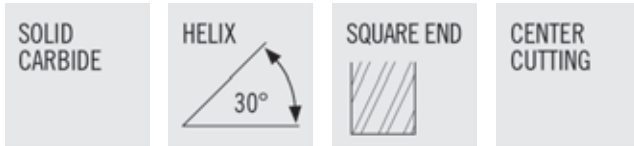


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIAB230 - Page 178-179
- Tolerance Specs DIAB230 - Page 323
- Cutting Data DIAB230M - Page 180-181
- Tolerance Specs DIAB230M - Page 323

PRODUCT NUMBER	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

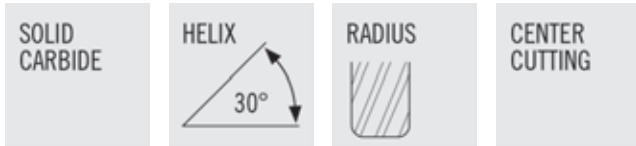


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data DIA430 - Page 182-183
- Tolerance Specs DIA430 - Page 323
- Cutting Data DIA430M - Page 186-187
- Tolerance Specs DIA430M - Page 323

PRODUCT NUMBER	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

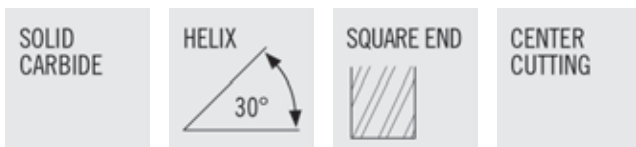


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 182-183
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 184-185
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 182-183
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



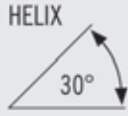
- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green Ceramics

- Cutting Data - Page 184-185
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

SOLID CARBIDE



CENTER CUTTING



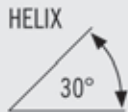
- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 184-185
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.028	3/8	4	CVDDIA
N18686	DIAXRB430-0.031-G5-B.0-Z4	1/32	1/8	3/32	3	0.028	1/2	4	CVDDIA
N18682	DIAXRB430-0.047-G3-B.0-Z4	3/64	1/8	9/64	3	0.043	9/16	4	CVDDIA
N18687	DIAXRB430-0.047-G4-B.0-Z4	3/64	1/8	9/64	3	0.043	3/4	4	CVDDIA
N18683	DIAXRB430-0.063-G4-B.0-Z4	1/16	1/8	3/16	3	0.057	3/4	4	CVDDIA
N18688	DIAXRB430-0.063-G5-B.0-Z4	1/16	1/8	3/16	3	0.057	1	4	CVDDIA
N18684	DIAXRB430-0.094-G3-B.0-Z4	3/32	1/8	9/32	3	0.086	1	4	CVDDIA
N18689	DIAXRB430-0.094-G4-B.0-Z4	3/32	1/8	9/32	3	0.086	1-1/2	4	CVDDIA
N18685	DIAXRB430-0.125-E3-B.0-Z4	1/8	1/8	3/8	3	0.115	1-1/2	4	CVDDIA
N18690	DIAXRB430-0.125-E4-B.0-Z4	1/8	1/8	3/8	3	0.115	2	4	CVDDIA
STUB LENGTH - DIAXS430									
N77214	DIAXS430-0.063-G1-B.0-Z4	1/16	1/8	1/16	3	0.057	5/16	4	CVDDIA
N77216	DIAXS430-0.125-E1-B.0-Z4	1/8	1/8	1/8	3	0.115	5/8	4	CVDDIA
N77218	DIAXS430-0.250-E1-B.0-Z4	1/4	1/4	1/4	4	0.240	3/4	4	CVDDIA

DIAXRR430

SOLID CARBIDE



CENTER CUTTING

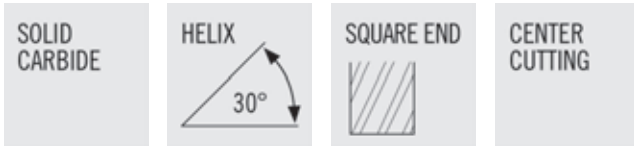


- Cylindrical Shank
- General purpose geometry designed for carbon fiber, composite applications, graphite and green ceramics

- Cutting Data - Page 184-185
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.028	3/8	4	CVDDIA	0.005
N18676	DIAXRR430-0.031-G4-R005.0-Z4	1/32	1/8	3/32	3	0.028	1/2	4	CVDDIA	0.005
N18672	DIAXRR430-0.047-G3-R010.0-Z4	3/64	1/8	9/64	3	0.043	9/16	4	CVDDIA	0.010
N18677	DIAXRR430-0.047-G4-R010.0-Z4	3/64	1/8	9/64	3	0.043	3/4	4	CVDDIA	0.010
N18673	DIAXRR430-0.063-G4-R010.0-Z4	1/16	1/8	3/16	3	0.057	3/4	4	CVDDIA	0.010
N18678	DIAXRR430-0.063-G5-R010.0-Z4	1/16	1/8	3/16	3	0.057	1	4	CVDDIA	0.010
N18674	DIAXRR430-0.094-G3-R010.0-Z4	3/32	1/8	9/32	3	0.086	1	4	CVDDIA	0.010
N18679	DIAXRR430-0.094-G4-R010.0-Z4	3/32	1/8	9/32	3	0.086	1-1/2	4	CVDDIA	0.010
N18675	DIAXRR430-0.125-E3-R010.0-Z4	1/8	1/8	3/8	3	0.115	1-1/2	4	CVDDIA	0.010
N77253	DIAXRR430-0.125-E6-R030.0-Z4	1/8	1/8	3/4	3	0.115	1-1/2	4	CVDDIA	0.030

DIACC



- 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 188-189
- Tolerance Specs - Page 323

COARSE PITCH

PRODUCT NUMBER	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

PRODUCT NUMBER	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



PUSH YOUR CFRP MACHINING OPERATIONS DIAMOND ROUTER

Overcome the challenges of machining CFRP (carbon fiber reinforced plastic) materials with Niagara Cutter's new DIARTRBE and DIARTREM end mills. Designed to push rather than pull when slot and side milling (routing) large, thick panel forms, the cutter directs cutting forces downward into the workpiece preventing parts from being pulled loose from their fixturing, while also minimizing chatter and material delamination.

Achieve the highest possible CFRP material machining process reliability – even when using gantry machines and vacuum clamping – thanks to the innovative designs of the DIARTRBE and DIARTREM end mills.

In addition to their left-hand helix/right-hand cut geometry that directs cutting forces downward, the cutters feature edge serrations, an optimized coating and a compact design that minimizes overall tool length. This combination of features minimizes tool overhang and maximizes stability to ensure quality surface finishes and long tool life.

YOUR BENEFITS

- Fast and efficient cutting
- Prevention of delamination and part distortion
- Reduced part costs through longer tool life
- High process predictability and reliability
- Reduced chatter
- Maximum stability
- High quality surface finishes
- Less scrap

RANGE OVERVIEW

DIARTREM END MILL STYLE, 2-FLUTES

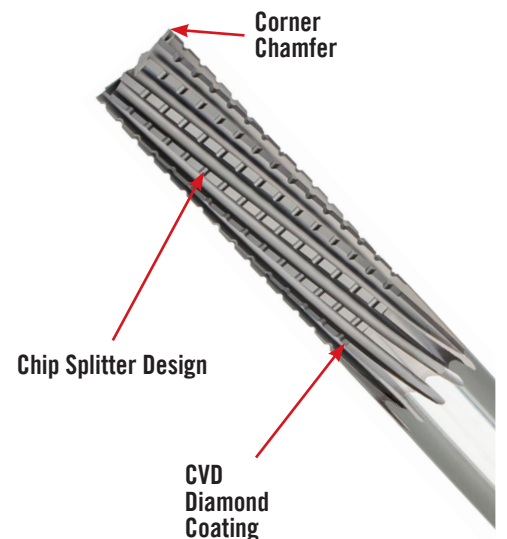
DIARTRBE BURR END STYLE, 3- TO 7-FLUTES

- Inch (1/8" - 1/2") diameters
- 10° Left-hand helix
- Right hand cut
- Chip splitters
- CVD Diamond coated

MATERIAL GROUPS
Thermoset Carbon & Glass Fiber (CFRP/CRP)
Thermoplast Carbon & Glass Fiber (CFRP/CRP)

INDUSTRY APPLICATIONS

- **Aerospace:** Many components such as panels, nose cones and internal structural pieces are now made from composite materials. These new materials push the limits of manufacturing. Combat this with the DIARTR range of routers, eliminating un-cut fibers with ease, and providing unsurpassed tool life in trimming and slot milling.



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 190
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 190
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 191-193
- Tolerance Specs - Page 323

COARSE PITCH

- Can be utilized up to 100% radial engagement



PRODUCT NUMBER	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



PRODUCT NUMBER	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 191-193
- Tolerance Specs - Page 323

COARSE PITCH

- Can be utilized up to 100% radial engagement



PRODUCT NUMBER	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



PRODUCT NUMBER	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 191-193
- Tolerance Specs - Page 323

COARSE PITCH



PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	COATING
N68085	DIAPPB-0.125-D1-C017.0-Z	1/8	1/8	1/2	1-1/2	CVDDIA
N68086	DIAPPB-0.250-D1-C033.0-Z	1/4	1/4	3/4	2-1/2	CVDDIA
N68087	DIAPPB-0.250-D3-C033.0-Z	1/4	1/4	1-3/8	3	CVDDIA
N68088	DIAPPB-0.250-D5-C033.0-Z	1/4	1/4	2	4	CVDDIA

FINE PITCH

- Improved surface finish as compared to coarse pitch



PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	COATING
N68180	DIAPPB-0.125-D2-C017.0-Z	1/8	1/8	1/2	1-1/2	CVDDIA
N68181	DIAPPB-0.250-D2-C033.0-Z	1/4	1/4	3/4	2-1/2	CVDDIA
N68182	DIAPPB-0.250-D4-C033.0-Z	1/4	1/4	1-3/8	3	CVDDIA
N68183	DIAPPB-0.250-D6-C033.0-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
						n (rev/min)	43548	29032	21774	17419	14516	10887	8710	7258
			1125	-	1725	f _z (in)	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0023	0.0027
						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	39.5
						n (rev/min)	43548	29032	21774	17419	14516	10887	8710	7258
			1125	-	1725	f _z (in)	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0023	0.0027
						v _f (in/min)	39.5	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	39.5
						n (rev/min)	40110	26740	20055	16044	13370	10028	8022	6685
			1163	-	1463	f _z (in)	0.0005	0.0007	0.0010	0.0012	0.0015	0.0020	0.0025	0.0030
						v _f (in/min)	39.7	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	86.2
						n (rev/min)	40110	26740	20055	16044	13370	10028	8022	6685
			1162.5	-	1462.5	f _z (in)	0.0005	0.0007	0.0010	0.0012	0.0015	0.0020	0.0025	0.0030
						v _f (in/min)	39.7	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	86.2
						n (rev/min)	40110	26740	20055	16044	13370	10028	8022	6685
			1162.5	-	1462.5	f _z (in)	0.0005	0.0007	0.0010	0.0012	0.0015	0.0020	0.0025	0.0030
						v _f (in/min)	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7



DOWNLOAD THE "SOLID MILLING" APP FREE ON GOOGLE & APPLE STORES.
 GET CUTTING DATA RECOMMENDATIONS/CALCULATIONS, TIPS & TRICKS, TECHNICAL VIDEOS, AND MORE!

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.

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			
			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
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			
THERMOPLAST	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			
			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
THERMOSET	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			
			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



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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.

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	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	
			1600 - 2200	vf (in/min)	79.8	79.8	79.8	79.8	79.8	79.8	79.8	79.8	79.8
PLASTIC (SOFT)	1.00	0.40	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	
			1600 - 2200	vf (in/min)	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
PLASTIC (HARD)	1.00	0.40	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	
			1600 - 2200	vf (in/min)	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
THERMOPLAST	CFRP	1.00	0.40	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
				1600 - 1900	vf (in/min)	53.5	53.5	53.5	53.5	53.5	53.5	53.5	53.5
	GRP	1.00	0.40	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
				1810 - 1990	vf (in/min)	114.7	114.7	114.7	114.7	114.7	114.7	114.7	114.7
THERMOSET	CFRP	1.00	0.40	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
				1600 - 1900	vf (in/min)	53.5	53.5	53.5	53.5	53.5	53.5	53.5	53.5
	GRP	1.00	0.40	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
				1810 - 1990	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	



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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	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	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)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
						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		
						v _f (in/min)	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		
						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)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
						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		
						v _f (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		
						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)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
						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		
						v _f (in/min)	47.7	47.7	47.7	47.6	47.7	47.7	47.7	47.7		
THERMOPLAST	CFRP	1.00	1.00	1050	-	1200	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)	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5
							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	
							v _f (in/min)	47.7	47.7	47.7	47.6	47.7	47.7	47.7	47.7	
THERMOSET	CFRP	1.00	1.00	1050	-	1200	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)	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5
							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	
							v _f (in/min)	47.7	47.7	47.7	47.6	47.7	47.7	47.7	47.7	



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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 / 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	
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
				n (rev/min)	46451	30967	23226	18580	15484	11613	9290	7742	
			1520	f _z (in)	0.0005	0.0008	0.0010	0.0013	0.0015	0.0021	0.0026	0.0031	
				v _f (in/min)	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	
				n (rev/min)	46451	30967	23226	18580	15484	11613	9290	7742	
			1520	f _z (in)	0.0005	0.0008	0.0010	0.0013	0.0015	0.0021	0.0026	0.0031	
				v _f (in/min)	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	
				n (rev/min)	42784	28523	21392	17114	14261	10696	8557	7131	
			1400	f _z (in)	0.0006	0.0008	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	
				v _f (in/min)	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	
THERMOPLAST	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	
				n (rev/min)	42784	28523	21392	17114	14261	10696	8557	7131	
			1400	f _z (in)	0.0006	0.0008	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	
				v _f (in/min)	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	
THERMOSET	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	
				n (rev/min)	42784	28523	21392	17114	14261	10696	8557	7131	
			1400	f _z (in)	0.0006	0.0008	0.0011	0.0014	0.0017	0.0023	0.0028	0.0034	
				v _f (in/min)	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	

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.

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			



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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

SLOTING										
SMG	a _p x D _c (max)	a _e x 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			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	
			1125	-	1725					
PLASTIC (SOFT)	1.00	1.00	1425			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	
			1125	-	1725					
PLASTIC (HARD)	1.00	1.00	1425			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	
			1125	-	1725					
THERMOPLAST	CFRP	1.00	1.00	1313		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	
				1163	-	1463				
	GRP	0.80	1.00	1425			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	
			1335	-	1515					
THERMOSET	CFRP	1.00	1.00	1313		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	
				1162.5	-	1462.5				
	GRP	0.80	1.00	1425			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	
			1335	-	1515					

SIDE MILLING - ROUGHING										
GRAPHITE	2.00	0.40	1900			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	
			1600	-	2200					
PLASTIC (SOFT)	2.00	0.40	1900			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	
			1600	-	2200					
PLASTIC (HARD)	2.00	0.40	1900			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	
			1600	-	2200					
THERMOPLAST	CFRP	2.00	0.40	1750		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	
				1600	-	1900				
	GRP	2.00	0.40	1900			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	
			1810	-	1990					
THERMOSET	CFRP	2.00	0.40	1750		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	
				1600	-	1900				
	GRP	2.00	0.40	1900			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	
			1810	-	1990					



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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



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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	
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	
			1600	-	2000	v _f (in/min)	32.9	32.9	32.9	32.9	32.9	32.9	32.9
						n (rev/min)	55008	36672	27504	22003	18336	13752	
			1800	-	2000	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	
			1600	-	2000	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	
			1800	-	2000	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	
			1600	-	2000	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	
			1800	-	2000	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	
			1600	-	2000	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	
			1800	-	2000	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	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	
			1600	-	2000	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	
			1800	-	2000	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	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	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	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	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	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	55.0	



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 GET CUTTING DATA RECOMMENDATIONS/CALCULATIONS, TIPS & TRICKS, TECHNICAL VIDEOS, AND MORE!

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

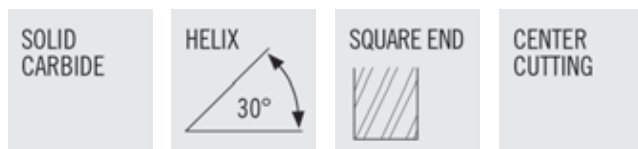
SIDE MILLING - ROUGHING											
SMG	a _p x D _c (max)	a _e x D _c (max)	v _c (sf / min)			1/8	1/4	3/8	1/2		
						n (rev/min)	f _z (in)	v _f (in/min)	n (rev/min)	f _z (in)	v _f (in/min)
GRAPHITE	2.00	0.25	2100	-	2700	n (rev/min)	73344	36672	24448	18336	
						f _z (in)	0.0009	0.0018	0.0027	0.0036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

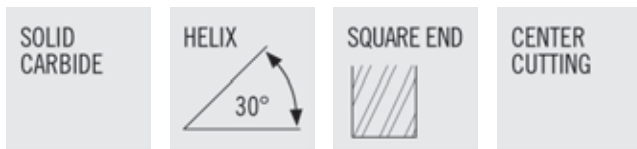
C230



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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
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

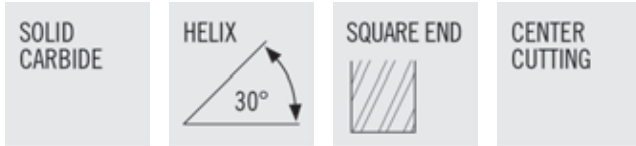
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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
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
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
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
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
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
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

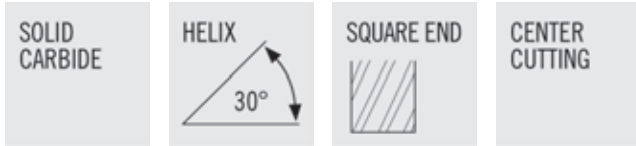
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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
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
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
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

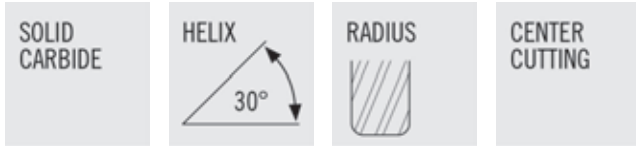
C230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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

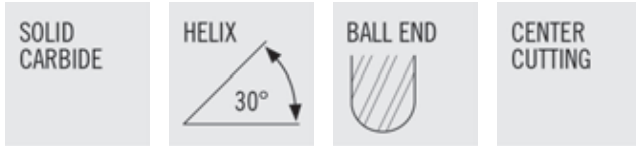
C230R



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	RADIUS	SHANK TYPE
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
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

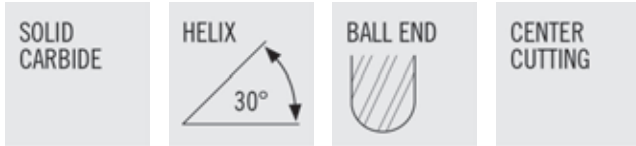
CB230



- General Purpose
- General machining of most material types
- Cutting Data - Page 226-227
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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

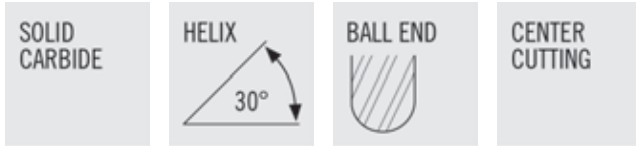
CB230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 226-227
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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
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
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
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

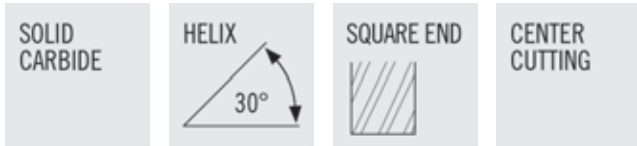
CB230 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 226-227
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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
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

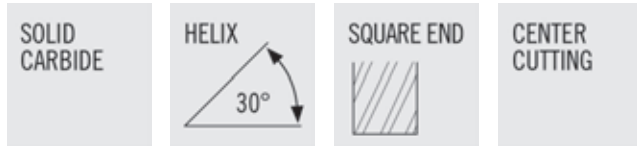
CD230



- General Purpose
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

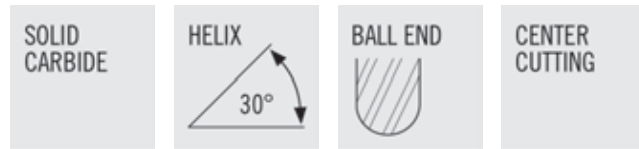
CSD230



- General Purpose
- Stub Length
- General Machining for most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N89653	CSD230-0.031-XF2-S.0-Z2	1/32	1/8	1/16	1-1/2	2	TIALN	CYLINDRICAL
N89657	CSD230-0.047-XF2-S.0-Z2	3/64	1/8	3/32	1-1/2	2	TIALN	CYLINDRICAL
N89661	CSD230-0.063-XF2-S.0-Z2	1/16	1/8	1/8	1-1/2	2	TIALN	CYLINDRICAL
N89665	CSD230-0.078-XF2-S.0-Z2	5/64	1/8	1/8	1-1/2	2	TIALN	CYLINDRICAL
N89669	CSD230-0.094-XF2-S.0-Z2	3/32	1/8	3/16	1-1/2	2	TIALN	CYLINDRICAL
N89677	CSD230-0.125-XD2-S.0-Z2	1/8	1/8	1/4	1-1/2	2	TIALN	CYLINDRICAL
N89693	CSD230-0.188-XD2-S.0-Z2	3/16	3/16	3/8	2	2	TIALN	CYLINDRICAL
N89709	CSD230-0.250-XD2-S.0-Z2	1/4	1/4	1/2	2-1/2	2	TIALN	CYLINDRICAL
N89717	CSD230-0.313-XD2-S.0-Z2	5/16	5/16	1/2	2-1/2	2	TIALN	CYLINDRICAL
N89725	CSD230-0.375-XD2-S.0-Z2	3/8	3/8	9/16	2-1/2	2	TIALN	CYLINDRICAL
N89733	CSD230-0.500-XD1-S.0-Z2	1/2	1/2	5/8	3	2	TIALN	CYLINDRICAL

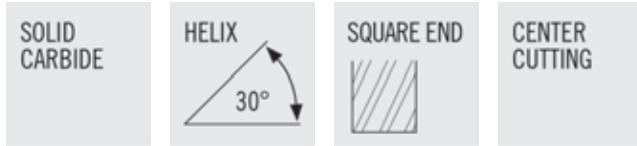
CSDB230



- General Purpose Stub Length
- General machining of most material types
- Cutting Data - Page 226-227
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N89737	CSDB230-0.031-XF2-B.0-Z2	1/32	1/8	1/16	1-1/2	2	TIALN	CYLINDRICAL
N89741	CSDB230-0.047-XF2-B.0-Z2	3/64	1/8	3/32	1-1/2	2	TIALN	CYLINDRICAL
N89745	CSDB230-0.063-XF2-B.0-Z2	1/16	1/8	1/8	1-1/2	2	TIALN	CYLINDRICAL
N89749	CSDB230-0.078-XF2-B.0-Z2	5/64	1/8	1/8	1-1/2	2	TIALN	CYLINDRICAL
N89753	CSDB230-0.094-XF2-B.0-Z2	3/32	1/8	3/16	1-1/2	2	TIALN	CYLINDRICAL
N89761	CSDB230-0.125-XD2-B.0-Z2	1/8	1/8	1/4	1-1/2	2	TIALN	CYLINDRICAL
N89777	CSDB230-0.188-XD2-B.0-Z2	3/16	3/16	3/8	2	2	TIALN	CYLINDRICAL
N89793	CSDB230-0.250-XD2-B.0-Z2	1/4	1/4	1/2	2-1/2	2	TIALN	CYLINDRICAL
N89801	CSDB230-0.313-XD2-B.0-Z2	5/16	5/16	1/2	2-1/2	2	TIALN	CYLINDRICAL
N89809	CSDB230-0.375-XD2-B.0-Z2	3/8	3/8	9/16	2-1/2	2	TIALN	CYLINDRICAL
N89817	CSDB230-0.500-XD1-B.0-Z2	1/2	1/2	5/8	3	2	TIALN	CYLINDRICAL

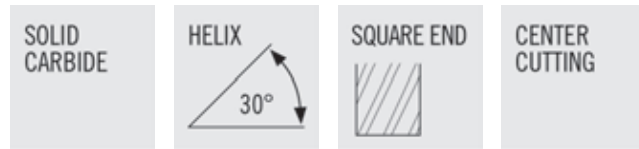
CNC230



- General Purpose
- NC Tolerance
- General machining of most material types
- Cutting Data - Page 224-225
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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

C330

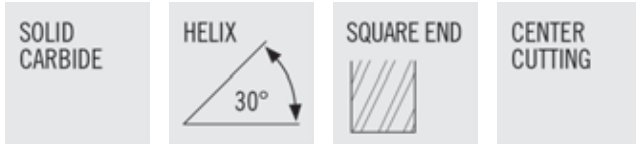


- General Purpose
- General machining (slotting/pocketing/profiling) of most material types

- Cutting Data - Page 228-229
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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
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
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

C330 (CONT'D)

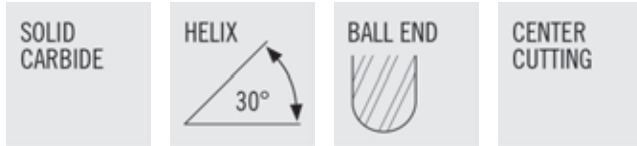


- Cutting Data C330 - Page 228-229
- Tolerance Specs C330 - Page 323

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

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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

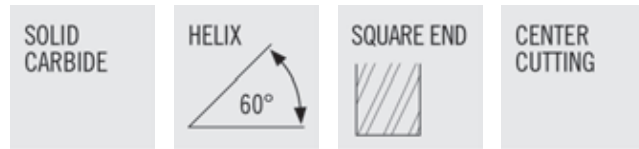
CB330



- General Purpose
- General machining (slotting/pocketing/profiling) of most material types
- Cutting Data - Page 230-231
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N86110	CB330-0.016-F2-B.0-Z3	1/64	1/8	1/32	1-1/2	3	TIALN	CYLINDRICAL
N86111	CB330-0.031-F3-B.0-Z3	1/32	1/8	5/64	1-1/2	3	TIALN	CYLINDRICAL
N86113	CB330-0.063-F3-B.0-Z3	1/16	1/8	3/16	1-1/2	3	TIALN	CYLINDRICAL
N86115	CB330-0.094-F3-B.0-Z3	3/32	1/8	9/32	1-1/2	3	TIALN	CYLINDRICAL
N86117	CB330-0.125-D4-B.0-Z3	1/8	1/8	1/2	1-1/2	3	TIALN	CYLINDRICAL
N86119	CB330-0.156-F3-B.0-Z3	5/32	3/16	1/2	2	3	TIALN	CYLINDRICAL
N86121	CB330-0.188-D3-B.0-Z3	3/16	3/16	5/8	2	3	TIALN	CYLINDRICAL
N86123	CB330-0.219-F3-B.0-Z3	7/32	1/4	5/8	2-1/2	3	TIALN	CYLINDRICAL
N86125	CB330-0.250-D3-B.0-Z3	1/4	1/4	3/4	2-1/2	3	TIALN	CYLINDRICAL
N86133	CB330-0.375-D3-B.0-Z3	3/8	3/8	1	2-1/2	3	TIALN	CYLINDRICAL
N86141	CB330-0.500-D2-B.0-Z3	1/2	1/2	1	3	3	TIALN	CYLINDRICAL
N86142	CB330-0.563-D2-B.0-Z3	9/16	9/16	1-1/8	3-1/2	3	TIALN	CYLINDRICAL
N86143	CB330-0.625-D2-B.0-Z3	5/8	5/8	1-1/4	3-1/2	3	TIALN	CYLINDRICAL
N86145	CB330-0.750-D2-B.0-Z3	3/4	3/4	1-1/2	4	3	TIALN	CYLINDRICAL

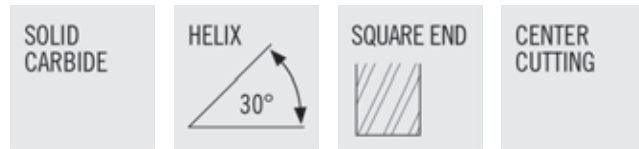
C360



- General Purpose
- General machining of most material types
- Cutting Data - Page 232
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

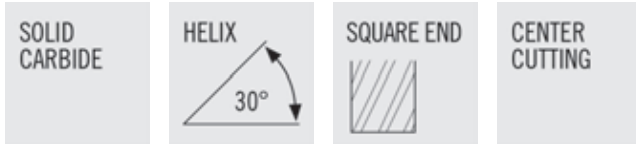
C430



- General Purpose
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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
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

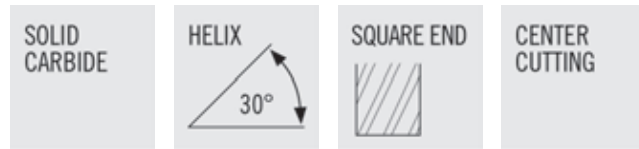
C430 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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

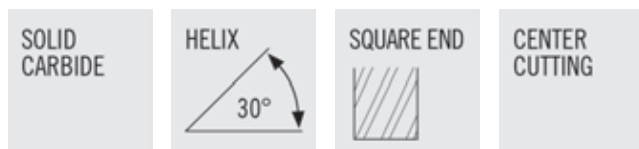
C430 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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

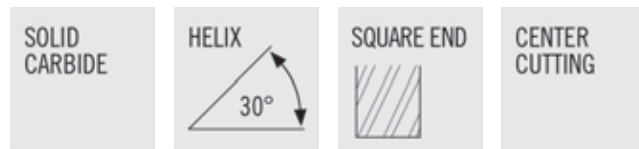
C430 (CONT'D)



- General Purpose
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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

C430 (CONT'D)

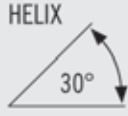


- General Purpose
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
INCH - C430 (CONT'D)								
N55702	C430-0.750-D6-S.0-Z4	3/4	3/4	4	6	4	UNCOATED	CYLINDRICAL

C430 (CONT'D) & C430M

SOLID CARBIDE



CENTER CUTTING



- General Purpose
- General machining of most material types

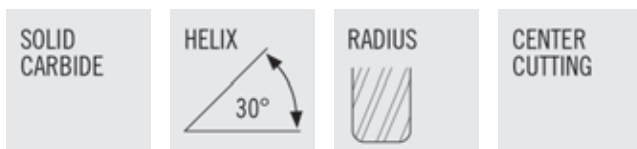
- Cutting Data C430 - Page 233-234
- Tolerance Specs C430 - Page 323
- Cutting Data C430M - Page 237-238
- Tolerance Specs C430M - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
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
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

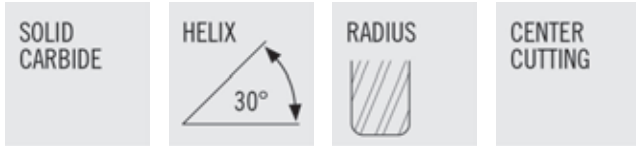
C430R



- General Purpose
- Standard with radius
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

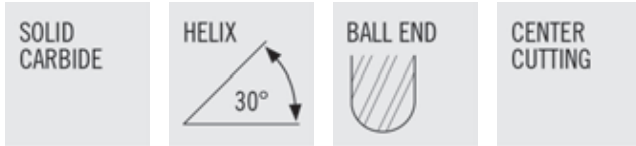
C430R (CONT'D)



- General Purpose
- Standard with radius
- General machining of most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	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
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

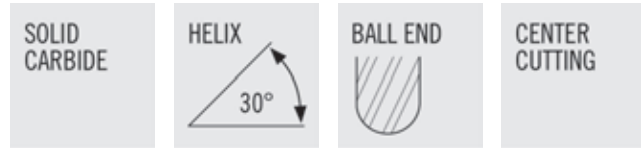
CB430



- General Purpose
- General machining for most material types
- Cutting Data - Page 235-236
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N86340	CB430-0.016-F2-B.0-Z4	1/64	1/8	1/32	1-1/2	4	TIALN	CYLINDRICAL
N86341	CB430-0.031-F3-B.0-Z4	1/32	1/8	5/64	1-1/2	4	TIALN	CYLINDRICAL
N56014	CB430-0.031-F4-B.0-Z4	1/32	1/8	3/32	1-1/2	4	TIALN	CYLINDRICAL
N86342	CB430-0.047-F2-B.0-Z4	3/64	1/8	7/64	1-1/2	4	TIALN	CYLINDRICAL
N56015	CB430-0.047-F3-B.0-Z4	3/64	1/8	1/8	1-1/2	4	TIALN	CYLINDRICAL
N56016	CB430-0.063-F2-B.0-Z4	1/16	1/8	1/8	1-1/2	4	TIALN	CYLINDRICAL
N86343	CB430-0.063-F3-B.0-Z4	1/16	1/8	3/16	1-1/2	4	TIALN	CYLINDRICAL
N56017	CB430-0.063-F4-B.0-Z4	1/16	1/8	1/4	1-1/2	4	TIALN	CYLINDRICAL
N56018	CB430-0.063-F8-B.0-Z4	1/16	1/8	1	3	4	TIALN	CYLINDRICAL
N86344	CB430-0.078-F2-B.0-Z4	5/64	1/8	3/16	1-1/2	4	TIALN	CYLINDRICAL
N56020	CB430-0.078-F3-B.0-Z4	5/64	1/8	1/4	1-1/2	4	TIALN	CYLINDRICAL
N56021	CB430-0.094-F2-B.0-Z4	3/32	1/8	3/16	1-1/2	4	TIALN	CYLINDRICAL
N86345	CB430-0.094-F3-B.0-Z4	3/32	1/8	9/32	1-1/2	4	TIALN	CYLINDRICAL
N56022	CB430-0.094-F4-B.0-Z4	3/32	1/8	3/8	1-1/2	4	TIALN	CYLINDRICAL
N56023	CB430-0.094-F8-B.0-Z4	3/32	1/8	1	3	4	TIALN	CYLINDRICAL
N86346	CB430-0.109-F3-B.0-Z4	7/64	1/8	3/8	1-1/2	4	TIALN	CYLINDRICAL
N56025	CB430-0.125-D2-B.0-Z4	1/8	1/8	1/4	1-1/2	4	TIALN	CYLINDRICAL
N86347	CB430-0.125-D4-B.0-Z4	1/8	1/8	1/2	1-1/2	4	TIALN	CYLINDRICAL
N56026	CB430-0.125-D5-B.0-Z4	1/8	1/8	5/8	2	4	TIALN	CYLINDRICAL
N56027	CB430-0.125-D6-B.0-Z4	1/8	1/8	3/4	3	4	TIALN	CYLINDRICAL
N56028	CB430-0.125-D7-B.0-Z4	1/8	1/8	1	3	4	TIALN	CYLINDRICAL
N56029	CB430-0.125-D8-B.0-Z4	1/8	1/8	1	4	4	TIALN	CYLINDRICAL
N86348	CB430-0.141-F4-B.0-Z4	9/64	3/16	1/2	2	4	TIALN	CYLINDRICAL
N56030	CB430-0.156-F2-B.0-Z4	5/32	3/16	5/16	2	4	TIALN	CYLINDRICAL
N86349	CB430-0.156-F3-B.0-Z4	5/32	3/16	1/2	2	4	TIALN	CYLINDRICAL
N86350	CB430-0.172-F4-B.0-Z4	11/64	3/16	5/8	2	4	TIALN	CYLINDRICAL
N56031	CB430-0.188-D2-B.0-Z4	3/16	3/16	3/8	2	4	TIALN	CYLINDRICAL
N86351	CB430-0.188-D3-B.0-Z4	3/16	3/16	5/8	2	4	TIALN	CYLINDRICAL
N56032	CB430-0.188-D4-B.0-Z4	3/16	3/16	1	3	4	TIALN	CYLINDRICAL
N56033	CB430-0.188-D5-B.0-Z4	3/16	3/16	1	4	4	TIALN	CYLINDRICAL
N53972	CB430-0.188-D6-B.0-Z4	3/16	3/16	1-1/8	3	4	TIALN	CYLINDRICAL
N86352	CB430-0.203-F3-B.0-Z4	13/64	1/4	5/8	2-1/2	4	TIALN	CYLINDRICAL
N86353	CB430-0.219-F3-B.0-Z4	7/32	1/4	5/8	2-1/2	4	TIALN	CYLINDRICAL
N86354	CB430-0.234-F3-B.0-Z4	15/64	1/4	3/4	2-1/2	4	TIALN	CYLINDRICAL
N53974	CB430-0.250-D2-B.0-Z4	1/4	1/4	1/2	2	4	TIALN	CYLINDRICAL
N86355	CB430-0.250-D3-B.0-Z4	1/4	1/4	3/4	2-1/2	4	TIALN	CYLINDRICAL
N53975	CB430-0.250-D4-B.0-Z4	1/4	1/4	1	3	4	TIALN	CYLINDRICAL
N53976	CB430-0.250-D5-B.0-Z4	1/4	1/4	1	4	4	TIALN	CYLINDRICAL
N53977	CB430-0.250-D6-B.0-Z4	1/4	1/4	1-1/2	4	4	TIALN	CYLINDRICAL
N53978	CB430-0.250-D7-B.0-Z4	1/4	1/4	1-1/2	6	4	TIALN	CYLINDRICAL

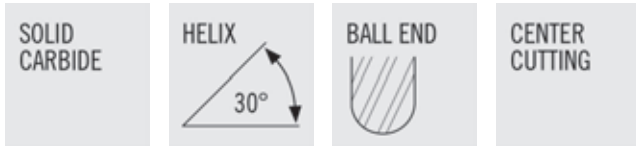
CB430 (CONT'D)



- General Purpose
- General machining for most material types
- Cutting Data - Page 235-236
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N86357	CB430-0.281-F3-B.0-Z4	9/32	5/16	3/4	2-1/2	4	TIALN	CYLINDRICAL
N53979	CB430-0.313-D2-B.0-Z4	5/16	5/16	1/2	2	4	TIALN	CYLINDRICAL
N86359	CB430-0.313-D3-B.0-Z4	5/16	5/16	13/16	2-1/2	4	TIALN	CYLINDRICAL
N53980	CB430-0.313-D4-B.0-Z4	5/16	5/16	1	3	4	TIALN	CYLINDRICAL
N53982	CB430-0.313-D6-B.0-Z4	5/16	5/16	1-1/2	6	4	TIALN	CYLINDRICAL
N86360	CB430-0.328-F3-B.0-Z4	21/64	3/8	1	2-1/2	4	TIALN	CYLINDRICAL
N86361	CB430-0.344-F3-B.0-Z4	11/32	3/8	1	2-1/2	4	TIALN	CYLINDRICAL
N53984	CB430-0.375-D2-B.0-Z4	3/8	3/8	5/8	2	4	TIALN	CYLINDRICAL
N86363	CB430-0.375-D3-B.0-Z4	3/8	3/8	1	2-1/2	4	TIALN	CYLINDRICAL
N53985	CB430-0.375-D4-B.0-Z4	3/8	3/8	1	3	4	TIALN	CYLINDRICAL
N53986	CB430-0.375-D5-B.0-Z4	3/8	3/8	1	4	4	TIALN	CYLINDRICAL
N53987	CB430-0.375-D6-B.0-Z4	3/8	3/8	1-1/2	6	4	TIALN	CYLINDRICAL
N53988	CB430-0.375-D7-B.0-Z4	3/8	3/8	2	4	4	TIALN	CYLINDRICAL
N53989	CB430-0.375-D8-B.0-Z4	3/8	3/8	3	6	4	TIALN	CYLINDRICAL
N86365	CB430-0.406-F2-B.0-Z4	13/32	7/16	1	2-3/4	4	TIALN	CYLINDRICAL
N86367	CB430-0.438-D2-B.0-Z4	7/16	7/16	1	2-3/4	4	TIALN	CYLINDRICAL
N53991	CB430-0.438-D3-B.0-Z4	7/16	7/16	1	4	4	TIALN	CYLINDRICAL
N86369	CB430-0.469-F2-B.0-Z4	15/32	1/2	1	3	4	TIALN	CYLINDRICAL
N53995	CB430-0.500-D1-B.0-Z4	1/2	1/2	5/8	2-1/2	4	TIALN	CYLINDRICAL
N86371	CB430-0.500-D2-B.0-Z4	1/2	1/2	1	3	4	TIALN	CYLINDRICAL
N53996	CB430-0.500-D3-B.0-Z4	1/2	1/2	1	4	4	TIALN	CYLINDRICAL
N53997	CB430-0.500-D4-B.0-Z4	1/2	1/2	1-1/2	6	4	TIALN	CYLINDRICAL
N53998	CB430-0.500-D5-B.0-Z4	1/2	1/2	2	4	4	TIALN	CYLINDRICAL
N53999	CB430-0.500-D6-B.0-Z4	1/2	1/2	3	6	4	TIALN	CYLINDRICAL
N86372	CB430-0.563-D2-B.0-Z4	9/16	9/16	1-1/8	3-1/2	4	TIALN	CYLINDRICAL
N54002	CB430-0.625-D1-B.0-Z4	5/8	5/8	3/4	3	4	TIALN	CYLINDRICAL
N86373	CB430-0.625-D2-B.0-Z4	5/8	5/8	1-1/4	3-1/2	4	TIALN	CYLINDRICAL
N54003	CB430-0.625-D3-B.0-Z4	5/8	5/8	2	6	4	TIALN	CYLINDRICAL
N54004	CB430-0.625-D5-B.0-Z4	5/8	5/8	3	6	4	TIALN	CYLINDRICAL
N54005	CB430-0.750-D1-B.0-Z4	3/4	3/4	1	3	4	TIALN	CYLINDRICAL
N86375	CB430-0.750-D2-B.0-Z4	3/4	3/4	1-1/2	4	4	TIALN	CYLINDRICAL
N54006	CB430-0.750-D3-B.0-Z4	3/4	3/4	2	6	4	TIALN	CYLINDRICAL
N54007	CB430-0.750-D4-B.0-Z4	3/4	3/4	3	6	4	TIALN	CYLINDRICAL
N54008	CB430-0.750-D5-B.0-Z4	3/4	3/4	4	6	4	TIALN	CYLINDRICAL
N86376	CB430-0.875-D2-B.0-Z4	7/8	7/8	1-1/2	4	4	TIALN	CYLINDRICAL
N86377	CB430-1.000-D2-B.0-Z4	1	1	1-1/2	4	4	TIALN	CYLINDRICAL
N54009	CB430-1.000-D3-B.0-Z4	1	1	2	6	4	TIALN	CYLINDRICAL
N54010	CB430-1.000-D4-B.0-Z4	1	1	3	6	4	TIALN	CYLINDRICAL
N54011	CB430-1.000-D5-B.0-Z4	1	1	4	7	4	TIALN	CYLINDRICAL

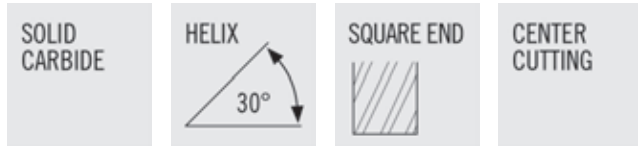
CB430M



- General Purpose
- General machining for most material types
- Cutting Data - Page 239-240
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	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

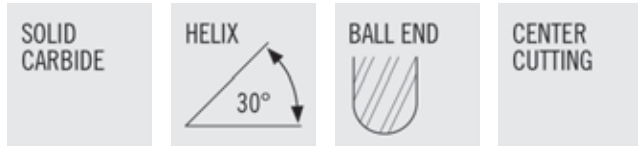


- General Purpose
- General machining for most material types
- Cutting Data - Page 233-234
- Tolerance Specs - Page 323

PRODUCT NUMBER	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 235-236
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	FLUTES	COATING	SHANK TYPE
N89905	CSDB430-0.031-XF2-B.0-Z4	1/32	1/8	1/16	1-1/2	4	TIALN	CYLINDRICAL
N89909	CSDB430-0.047-XF2-B.0-Z4	3/64	1/8	3/32	1-1/2	4	TIALN	CYLINDRICAL
N89913	CSDB430-0.063-XF2-B.0-Z4	1/16	1/8	1/8	1-1/2	4	TIALN	CYLINDRICAL
N89917	CSDB430-0.078-XF2-B.0-Z4	5/64	1/8	1/8	1-1/2	4	TIALN	CYLINDRICAL
N89921	CSDB430-0.094-XF2-B.0-Z4	3/32	1/8	3/16	1-1/2	4	TIALN	CYLINDRICAL
N89929	CSDB430-0.125-XD2-B.0-Z4	1/8	1/8	1/4	1-1/2	4	TIALN	CYLINDRICAL
N89937	CSDB430-0.156-XF2-B.0-Z4	5/32	3/16	5/16	2	4	TIALN	CYLINDRICAL
N89941	CSDB430-0.172-XF2-B.0-Z4	11/64	3/16	5/16	2	4	TIALN	CYLINDRICAL
N89945	CSDB430-0.188-XD2-B.0-Z4	3/16	3/16	3/8	2	4	TIALN	CYLINDRICAL
N89961	CSDB430-0.250-XD2-B.0-Z4	1/4	1/4	1/2	2-1/2	4	TIALN	CYLINDRICAL
N89969	CSDB430-0.313-XD2-B.0-Z4	5/16	5/16	1/2	2-1/2	4	TIALN	CYLINDRICAL
N89977	CSDB430-0.375-XD2-B.0-Z4	3/8	3/8	9/16	2-1/2	4	TIALN	CYLINDRICAL
N89985	CSDB430-0.500-XD1-B.0-Z4	1/2	1/2	5/8	3	4	TIALN	CYLINDRICAL

CUTTING DATA - GENERAL PURPOSE SOLID CARBIDE

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	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)	13.8	13.8	13.8	13.8	13.8	13.8
	E 3 - 4	1.00	0.25	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)	4.3	4.3	4.3	4.3	4.3	4.3
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)	1.8	1.8	1.8	1.8	1.8	1.8	1.8
M	E 8 - 9	0.50	0.20	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)	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	
	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)	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	
K	E 12 - 13	1.00	0.25	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)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
	E 14 - 15	0.50	0.25	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)	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	
N	E / M / A 16	2.00	0.05	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)	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	
	E / M / A 17	2.00	0.05	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)	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	
S	E 19	0.20	0.05	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)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
	E 20	0.20	0.05	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)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
	E 21	0.20	0.05	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)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8		
E 22	0.30	0.15	140	n (rev/min)	8557	4278	2139	1426	1070	856	713	535	
				f _z (in)	0.0002	0.0004	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028	
80	-	200	v _f (in/min)	3.0	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 / 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
	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
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
	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
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
	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
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
	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 / 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
				260 - 380	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
				100 - 220	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
				20 - 140	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
				226 - 286	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
				170 - 230	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
				156 - 276	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
				56 - 176	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
				260 - 860	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
				260 - 860	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
				40 - 100	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
				40 - 100	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
				40 - 100	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
				52 - 172	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



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	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)	16.5	16.5	16.5	16.5	16.5	16.5
	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)	5.1	5.1	5.1	5.1	5.1	5.1
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)	2.2	2.2	2.2	2.2	2.2	2.2	2.2
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)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
	E 10-11	0.40	1.00	290	n (rev/min)	17725	8862	4431	2954	2216	1772	1477	1108
f _z (in)					0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0016	
260	-	320	v _f (in/min)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	
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)	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	
	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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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)	57.8	57.8	57.8	57.8	57.8	57.8	57.8	57.8	
	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)	57.8	57.8	57.8	57.8	57.8	57.8	57.8	57.8	57.8	
S	E 19	0.20	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)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
	E 20	0.20	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)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
	E 21	0.20	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)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
E 22	0.30	1.00	130	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	
70	-	190	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.

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	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
	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
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
	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
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
	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
	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
	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.

CB330 - START VALUES

SLOTTING															
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	0.30	1.00	320	-	380	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
				v _f (in/min)	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2		
	E 3-4	0.20	1.00	150	-	210	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
				v _f (in/min)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9		
	E 5-6	0.20	1.00	80	-	140	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
				v _f (in/min)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8		
M	E 8-9	0.60	1.00	240	-	270	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
				v _f (in/min)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8		
	E 10-11	0.30	1.00	200	-	230	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
				v _f (in/min)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7		
K	E 12-13	0.40	1.00	200	-	260	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
				v _f (in/min)	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6		
	E 14-15	0.20	1.00	120	-	180	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
				v _f (in/min)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7		
N	E / M / A 16	0.20	1.00	400	-	700	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
				v _f (in/min)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0		
	E / M / A 17	0.20	1.00	400	-	700	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
				v _f (in/min)	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0		
S	E 19	0.10	1.00	60	-	90	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
				v _f (in/min)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7		
	E 20	0.10	1.00	60	-	90	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
				v _f (in/min)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7		
	E 21	0.10	1.00	60	-	90	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
				v _f (in/min)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7		
	E 22	0.10	1.00	100	-	160	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	
v _f (in/min)				2.6	2.6	2.6	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)		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	0.30	320	-	380	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
	E 3 - 4	1.00	0.30	150	-	210	v _f (in/min)	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
							n (rev/min)	9168	4584	2292	1528	1146	917	764	573
	E 5 - 6	1.00	0.20	80	-	140	f _z (in)	0.0002	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0024
							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	-	270	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
	E 10 - 11	1.00	0.20	200	-	230	v _f (in/min)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
							n (rev/min)	12224	6112	3056	2037	1528	1222	1019	764
K	E 12 - 13	1.00	0.40	200	-	260	f _z (in)	0.0004	0.0007	0.0015	0.0022	0.0029	0.0036	0.0044	0.0058
							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	-	180	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
	E 16 - 17	2.00	0.70	400	-	700	v _f (in/min)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
							n (rev/min)	24448	12224	6112	4075	3056	2445	2037	1528
E 18 - 19	2.00	0.70	400	-	700	f _z (in)	0.0006	0.0011	0.0023	0.0034	0.0045	0.0056	0.0068	0.0090	
						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	-	90	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
	E 20	0.50	0.30	60	-	90	v _f (in/min)	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3
							n (rev/min)	3667	1834	917	611	458	367	306	229
	E 21	0.50	0.30	60	-	90	f _z (in)	0.0002	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0030
							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	-	160	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
E 23 - 24	0.50	0.20	100	-	160	v _f (in/min)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
						n (rev/min)	6112	3056	1528	1019	764	611	509	382	
E 25 - 26	0.50	0.20	100	-	160	f _z (in)	0.0002	0.0004	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028	
						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)			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
							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
							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	
						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	
						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	
						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)	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	
						n (rev/min)	8862	4431	2216	1477	1108	886	739	554	
E 18 - 19	0.20	0.15	80	-	110	v _f (in/min)	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	
						n (rev/min)	42784	21392	10696	7131	5348	4278	3565	2674	
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	
						f _z (in)	0.0006	0.0011	0.0023	0.0034	0.0045	0.0056	0.0068	0.0090	
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	
						n (rev/min)	42784	21392	10696	7131	5348	4278	3565	2674	
E 24 - 25	0.20	0.15	80	-	110	v _f (in/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	
						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	
						f _z (in)	0.0002	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0030	
E 30 - 31	0.30	0.15	130	-	190	v _f (in/min)	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
						n (rev/min)	7946	3973	1986	1324	993	795	662	497	
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	
						f _z (in)	0.0002	0.0004	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028	

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.

CB430 / 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	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	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	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	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	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	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	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	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	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	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.

CB430 / 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	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	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	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	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	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	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	
				90 - 150	vf (in/min)	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8	111.8
					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				
	90 - 150	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	4.4	4.4	4.4			
		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				
	90 - 150	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	4.4	4.4				
		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 - 140	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	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.

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	
	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	
	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	
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	
	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
	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
	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
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
	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
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
	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
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
					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.

CM260

SOLID CARBIDE	HELIX 	CHAMFER 	CENTER CUTTING
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- Cylindrical Shank
- General Purpose
- Cutting Data - Page 243-244
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	HELIX 	CHAMFER 	CENTER CUTTING
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- Cylindrical Shank
- General Purpose
- Cutting Data - Page 243-244
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



- Cylindrical Shank
- General Purpose

- Cutting Data - Page 245-246
- Tolerance Specs - Page 323

PRODUCT NUMBER	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



- Cylindrical Shank
- General Purpose

- Cutting Data - Page 245-246
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	400	-	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	200	-	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	100	-	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	70	-	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	320	-	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	250	-	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	270	-	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	145	-	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	340	-	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	140	-	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	40	-	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	55	-	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	290	-	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	220	-	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	210	-	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	85	-	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
				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
				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
				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
				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
				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
				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
				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
				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.

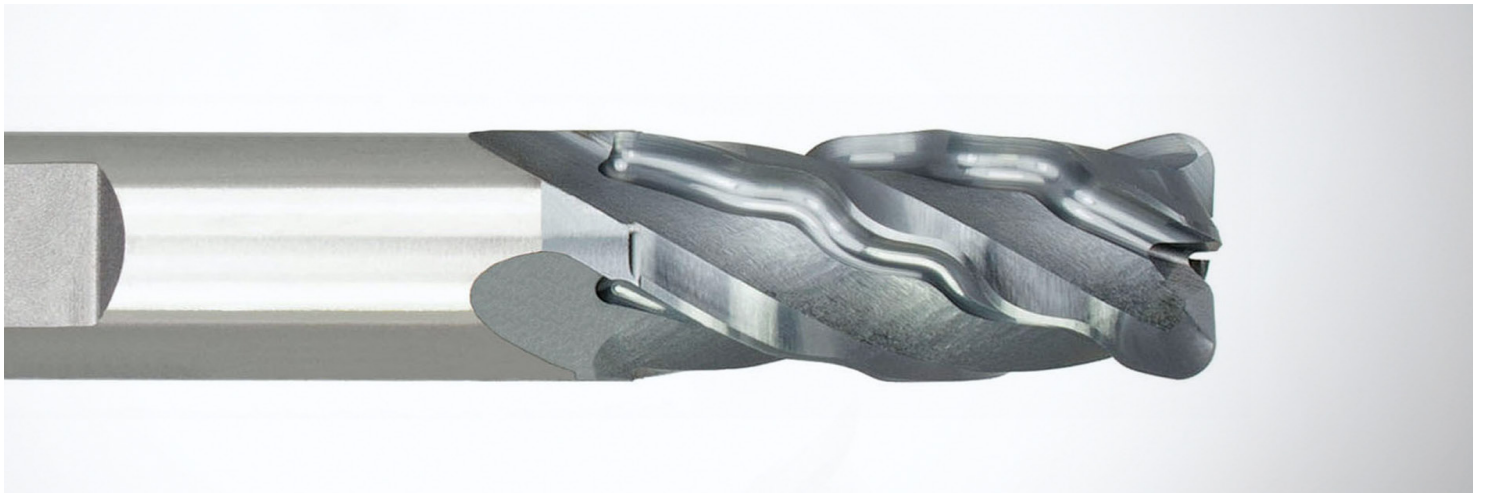
CM460 / CM490 - START VALUES

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.



SHEAR MORE METAL

VFP

The VFP (Variable Face Profile) 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. While this product family is specifically designed for application in titanium we also recommend using it for similar applications in ISO-M materials.

The new aero radii additions add commonly produced specials to this product family and also come standard with AlCrN coating.

YOUR BENEFITS

- AlCrN coating for heat and abrasion resistance
- Extended tool life
- Increased metal shearing
- Improved surface finish
- Polished rake face
- Weldon flat standard
- M42 Cobalt
- Reduced horsepower requirements compared to standard end mills

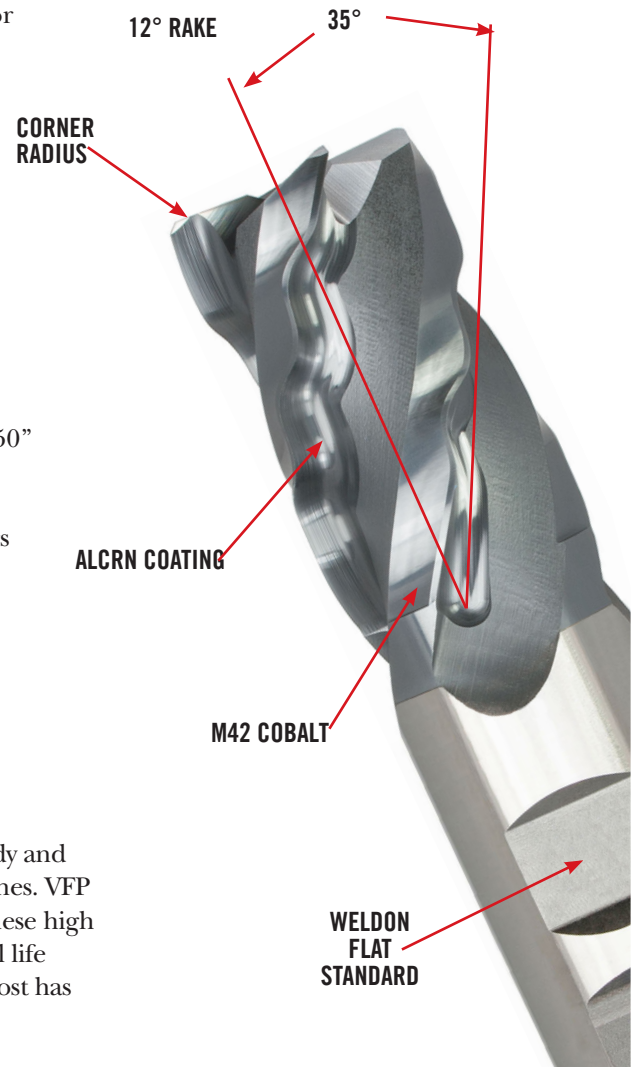
RANGE OVERVIEW

- Chamfer and standard 0.120", 0.156" and 0.250" corner radii
- 4- and 6-flutes
- 1.125" and 2" diameters
- Variable helix

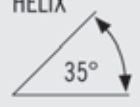

INDUSTRY APPLICATIONS

- **Aerospace:** Many large titanium aerospace components, such as side-a-body and wing spars are produced on large triple-spindle gantry-style milling machines. VFP style cutters, designed for taking large depths of cut, are a perfect fit for these high horsepower machines. The new VFP coated series offer an increase in tool life of over 50% when compared to an uncoated end mill. Reducing tooling cost has never been easier when machining large titanium aerospace components.

MATERIAL GROUPS
Stainless 8-11
Titanium 22



VFP435 / VFP635

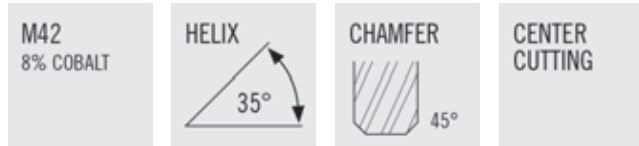
M42 8% COBALT	HELIX  35°	CHAMFER  45°	CENTER CUTTING
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- Optimal chip formation and evacuation
 - Polished rake face
 - Weldon flat standard
 - Up to .156" Corner Radius through modification
 - Designed for stainless steel and titanium
- Cutting Data - Page 300
 - Tolerance Specs - Page 324

PRODUCT NUMBER	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

SHORT BLOCK-VFP435SB / VFP635SB



- 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 300
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

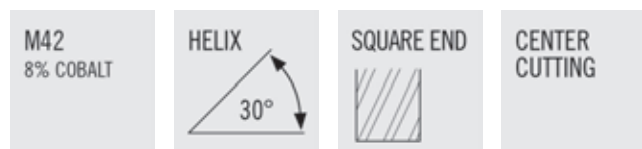


- Optimal chip formation and evacuation
 - Polished rake face
 - Weldon flat standard
 - AlCrN coated for increased performance and tool life
 - Specifically engineered for titanium and stainless steel
 - Available with chamfer or corner radius
- Cutting Data - Page 300
 - Tolerance Specs - Page 324

PRODUCT NUMBER	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

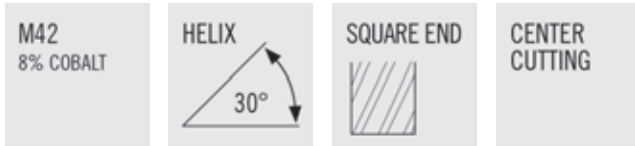
SP205



- Weldon flat standard
- Designed for pocketing and slotting in all materials including high temperature alloys
- Cutting Data - Page 277-278
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)

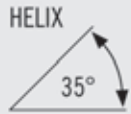


- Weldon flat standard
- Designed for pocketing and slotting in all materials including high temperature alloys
- Cutting Data - Page 277-278
- Tolerance Specs - Page 324

PRODUCT NUMBER	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 279-280
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

HELIX

SQUARE END

CENTER CUTTING



- Weldon flat standard
- Cutting Data - Page 279-280
- Form ground flutes
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

HELIX

SQUARE END

CENTER CUTTING



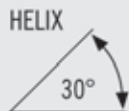
- Weldon flat standard
- Cutting Data - Page 281-283
- Designed for profiling in all materials
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

DISCOUNT CODE D40

SPC408 (CONT'D)

M42
8% COBALT



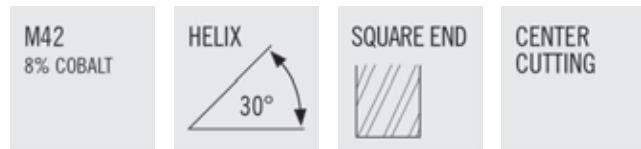
CENTER
CUTTING



- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 281-283
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 281-283
- Tolerance Specs - Page 324

PRODUCT NUMBER	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  30°	SQUARE END 	CENTER CUTTING
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- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 281-283
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



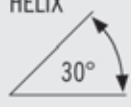
- Weldon flat standard
- Designed for profiling in all materials
- Cutting Data - Page 281-283
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

HELIX
30°



SQUARE END



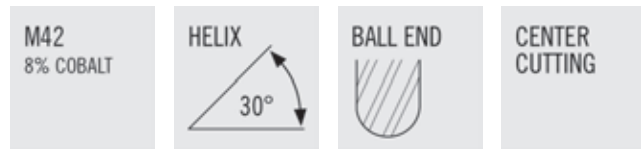
CENTER CUTTING



- Weldon flat standard
- Metric flute
- Inch shank
- Designed for profiling in all materials
- Cutting Data - Page 284-285
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and contouring in all materials
- Cutting Data - Page 281-283
- Tolerance Specs - Page 324

PRODUCT NUMBER	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
30°

BALL END

CENTER CUTTING



- Weldon flat standard
- Cutting Data - Page 281-283
- Designed for profiling and contouring in all materials
- Tolerance Specs - Page 324

PRODUCT NUMBER	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
36°

CHAMFER
45°

CENTER CUTTING

COARSE PITCH



- Weldon flat standard
- Cutting Data - Page 286
- Designed for profiling and slotting in all materials
- Tolerance Specs - Page 324

PRODUCT NUMBER	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 288-289
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and slotting in aluminum and non-ferrous materials
- Cutting Data - Page 287
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and slotting in aluminum and non-ferrous materials
- Cutting Data - Page 287
- Tolerance Specs - Page 324

PRODUCT NUMBER	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	0.850	4	3	UNCOATED	0.040
N89112	RHLC754-1.000-E2-C040.3-Z3	1	1	2-1/2	6-1/2	0.850	4	3	TICN	0.040
N75425	RHLC754-1.000-E3-C040.3-Z3	1	1	2-1/2	8-1/2	0.850	6	3	UNCOATED	0.040
N89113	RHLC754-1.000-E3-C040.3-Z3	1	1	2-1/2	8-1/2	0.850	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



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

DISCOUNT CODE D41

REM710 - (CONT'D)



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling, slotting and contouring in all materials
- Cutting Data - Page 290-291
- Tolerance Specs - Page 324

PRODUCT NUMBER	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		
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- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 292
- Tolerance Specs - Page 324

PRODUCT NUMBER	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	0.850	4	5	UNCOATED	0.030
N89100	RXC753-1.000-E2-C030.3-Z5	1	1	2-1/2	6-1/2	0.850	4	5	TICN	0.030
N75345	RXC753-1.000-E3-C030.3-Z5	1	1	2-1/2	8-1/2	0.850	6	5	UNCOATED	0.030
N89101	RXC753-1.000-E3-C030.3-Z5	1	1	2-1/2	8-1/2	0.850	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		
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- Weldon flat standard
- Designed for pocketing, profiling and slotting applications
- Cutting Data - Page 293-294
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for pocketing, profiling and slotting applications
- Cutting Data - Page 293-294
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 295-296
- Tolerance Specs - Page 324

PRODUCT NUMBER	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)



- Weldon flat standard
- Designed for profiling and slotting in all materials including high temperature alloys
- Cutting Data - Page 295-296
- Tolerance Specs - Page 324

PRODUCT NUMBER	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 295-296
- Tolerance Specs - Page 324

PRODUCT NUMBER	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 295-296
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling, slotting and contouring in all materials including high temperature alloys
- Cutting Data - Page 295-296
- Tolerance Specs - Page 324

PRODUCT NUMBER	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



- Weldon flat standard
- Designed for profiling and slotting in all materials
- Cutting Data - Page 297-299
- Tolerance Specs - Page 324

PRODUCT NUMBER	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

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

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
					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
					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
					v _f (in/min)	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
					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
					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
	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
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
					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
	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	v _f (in/min)	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.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

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

		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	
	E 3 - 4	1.00	1.00	50	v _f (in/min)	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
					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)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
E 8 - 9	1.00	1.00	40 - 60	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	30 - 50	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	
				n (rev/min)	611	407	306	244	204	153	122	102	87	76		
E 12 - 13	1.00	1.00	40 - 60	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	1.8	
E 14 - 15	1.00	1.00	30 - 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		
E 18	1.00	1.00	200 - 280	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	
				n (rev/min)	611	407	306	244	204	153	122	102	87	76		
E 20	1.00	1.00	6 - 10	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	2.1	
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	20 - 60	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	
				n (rev/min)	122	81	61	49	41	31	24	20	17	15		
E 20	1.00	1.00	6 - 10	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	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		
E 22	1.00	1.00	40	v _f (in/min)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
				n (rev/min)	611	407	306	244	204	153	122	102	87	76		
E 22	1.00	1.00	20 - 60	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	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.

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
					v _f (in/min)	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
	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)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	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)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
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
					v _f (in/min)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	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)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
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)	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	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)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
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
					v _f (in/min)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	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)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	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)	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.

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 = 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
				40 - 80	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

ISO GROUP	SMG	a _p x D _c (max)	a _e x D _c (max)	v _c (m / min)		SLOTTING											
						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	
	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	
	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	
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	
	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	
	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
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	
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
	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	
	S	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
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	vf (in/min)	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

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.

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.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

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
					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	587	489	367	293
					f _z (in)	0.0014	0.0018	0.0023	0.0029	0.0035	0.0047	0.0059
					v _f (in/min)	6.0	5.2	5.2	5.2	5.2	5.2	5.2
	E 10 - 11	1.50	0.25	72	n (rev/min)	1100	733	550	440	367	275	220
					f _z (in)	0.0012	0.0018	0.0023	0.0029	0.0035	0.0047	0.0059
					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	477	397	298	238
					f _z (in)	0.0014	0.0021	0.0027	0.0034	0.0041	0.0055	0.0068
					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	73	61	46	37
					f _z (in)	0.0006	0.0009	0.0012	0.0015	0.0018	0.0023	0.0029
					v _f (in/min)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	E 21	1.50	0.25	14	n (rev/min)	220	147	110	88	73	55	44
					f _z (in)	0.0010	0.0015	0.0020	0.0024	0.0029	0.0039	0.0049
					v _f (in/min)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	E 22	1.50	0.25	72	n (rev/min)	1100	733	550	440	367	275	220
					f _z (in)	0.0014	0.0021	0.0027	0.0034	0.0041	0.0055	0.0068
					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 D _c (max)	a _e x D _c (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.

CUTTING DATA - GENERAL PURPOSE COBALT END MILLS

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
						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)		n (rev/min)	f _z (in)	v _f (in/min)		n (rev/min)	f _z (in)	v _f (in/min)		
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													
					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													
					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													
					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													
					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														
				v _f (in/min)	4.8	4.8	4.8	4.8	6.0	7.2	7.2	9.6														
				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 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 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 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 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 = 4												Z _n = 5			Z _n = 6			Z _n = 8		Z _n = 10
						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 - START VALUES

ISO GROUP	SMG	a _p x Dc (max)	a _e x Dc (max)	v _c (sf / min)	SLOTTING									
					n (rev/min)	Z _n = 4					Z _n = 5	Z _n = 6		
						f _z (in)	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2
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
				122 - 142	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
				50 - 70	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
				32 - 52	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
				86 - 106	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
				62 - 82	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
				50 - 70	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
				38 - 58	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
				286 - 290	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
				8 - 12	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
				8 - 12	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
				38 - 58	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 - 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
 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 - 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.

VFP435 / VFP635 / 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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	DESCRIPTION	THREAD SIZE	THREADS PER INCH	CUTTER DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	CUTTING TEETH	COATING	DRILL SIZE 50%	DRILL SIZE 75%
N68746	NTM100-NR.2X56UN-.125	2	56	0.065	1/8	0.1250	2	3	ALCRN	49	50
N68748	NTM100-NR.4X40UN-.125	4	40	0.085	1/8	0.1750	2	3	ALCRN	41	43
N68750	NTM100-NR.6X32UN-.125	6	32	0.100	1/8	0.2180	2	3	ALCRN	32	36
N68752	NTM100-NR.8X32UN-.125	8	32	0.115	1/8	0.2500	2	3	ALCRN	27	29
N68754	NTM100-NR.10X24UN-.187	10	24	0.134	3/16	0.3130	2	3	ALCRN	20	25
N68756	NTM100-NR.12X28UN-.187	10	28	0.134	3/16	0.3130	2	3	ALCRN	19	23
N68758	NTM100-NR.10X32UN-.187	10	32	0.134	3/16	0.3130	2	3	ALCRN	18	21
N68760	NTM100-1/4X20UN-.187	1/4	20	0.180	3/16	0.5000	2-1/2	3	ALCRN	7/32	7
N68762	NTM100-1/4X28UN-.187	1/4	28	0.180	3/16	0.5000	2-1/2	3	ALCRN	1	3
N68764	NTM100-1/4X32UN-.187	1/4	32	0.180	3/16	0.5000	2-1/2	3	ALCRN	1	7/32
N68766	NTM100-5/16X18UN-.250	5/16	18	0.235	1/4	0.6250	2-1/2	3	ALCRN	J	F
N68768	NTM100-5/16X24UN-.250	5/16	24	0.235	1/4	0.6250	2-1/2	3	ALCRN	9/32	I
N68770	NTM100-5/16X32UN-.250	5/16	32	0.235	1/4	0.6250	2-1/2	3	ALCRN	L	9/32
N68772	NTM100-3/8X16UN-.312	3/8	16	0.285	5/16	0.7500	3	3	ALCRN	Q	5/16
N68774	NTM100-3/8X24UN-.312	3/8	24	0.285	5/16	0.7500	3	3	ALCRN	S	Q
N68776	NTM100-7/16X14UN-.312	7/16	14	0.305	5/16	0.8750	3	3	ALCRN	25/64	U
N68778	NTM100-7/16X20UN-.312	7/16	20	0.305	5/16	0.8750	3	3	ALCRN	13/32	25/64
N68780	NTM100-1/2X13UN-.375	1/2	13	0.350	3/8	0.8750	3-1/2	3	ALCRN	29/64	27/64
N68782	NTM100-1/2X20UN-.375	1/2	20	0.350	3/8	0.8750	3-1/2	3	ALCRN	15/32	29/64
N68784	NTM100-1/2X28UN-.375	1/2	28	0.350	3/8	0.8750	3-1/2	3	ALCRN	15/32	15/32
N68786	NTM100-9/16X12UN-.375	9/16	12	0.370	3/8	0.8750	3-1/2	4	ALCRN	33/64	31/64
N68788	NTM100-9/16X18UN-.375	9/16	18	0.370	3/8	0.8750	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
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

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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.3130	2	3	ALCRN	20	25
N34480	NTM120-NR.10X32UN-.187	10	32	0.134	3/16	0.3130	2	3	ALCRN	18	21
N34481	NTM120-1/4X20UN-.187	1/4	20	0.180	3/16	0.5000	2-1/2	3	ALCRN	7/32	7
N34482	NTM120-1/4X28UN-.187	1/4	28	0.180	3/16	0.5000	2-1/2	3	ALCRN	1	3
N34483	NTM120-5/16X18UN-.250	5/16	18	0.235	1/4	0.6250	2-1/2	3	ALCRN	J	F
N34484	NTM120-5/16X24UN-.250	5/16	24	0.235	1/4	0.6250	2-1/2	3	ALCRN	9/32	I
N34485	NTM120-3/8X16UN-.312	3/8	16	0.285	5/16	0.7500	3	3	ALCRN	Q	5/16
N34486	NTM120-3/8X24UN-.312	3/8	24	0.285	5/16	0.7500	3	3	ALCRN	S	Q
N34487	NTM120-7/16X14UN-.312	7/16	14	0.305	5/16	0.8750	3	3	ALCRN	25/64	U
N34488	NTM120-7/16X20UN-.312	7/16	20	0.305	5/16	0.8750	3	3	ALCRN	13/32	25/64
N34489	NTM120-1/2X13UN-.375	1/2	13	0.350	3/8	0.8750	3-1/2	3	ALCRN	29/64	27/64
N34490	NTM120-1/2X20UN-.375	1/2	20	0.350	3/8	0.8750	3-1/2	3	ALCRN	15/32	29/64
N34491	NTM120-9/16X12UN-.375	9/16	12	0.370	3/8	0.8750	3-1/2	4	ALCRN	33/64	31/64
N34492	NTM120-9/16X18UN-.375	9/16	18	0.370	3/8	0.8750	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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.1000	2	3	ALCRN	.500	18	21
N34569	NTM160-NR.10X28UN-.187	10	28	0.134	3/16	0.1100	2	3	ALCRN	.400	19	23
N34568	NTM160-NR.10X24UN-.187	10	24	0.134	3/16	0.1250	2	3	ALCRN	.300	20	25
N34573	NTM160-1/4X32UN-.187	1/4	32	0.180	3/16	0.1000	2-1/2	3	ALCRN	.950	1	7/32
N34572	NTM160-1/4X28UN-.187	1/4	28	0.180	3/16	0.1100	2-1/2	3	ALCRN	.875	1	3
N34571	NTM160-1/4X20UN-.187	1/4	20	0.180	3/16	0.1500	2-1/2	3	ALCRN	.670	7/32	7
N34576	NTM160-5/16X32UN-.250	5/16	32	0.235	1/4	0.1000	2-1/2	3	ALCRN	1.375	L	9/32
N34575	NTM160-5/16X24UN-.250	5/16	24	0.235	1/4	0.1250	2-1/2	3	ALCRN	1.250	9/32	I
N34574	NTM160-5/16X18UN-.250	5/16	18	0.235	1/4	0.1700	2-1/2	3	ALCRN	1	J	F
N34578	NTM160-3/8X24UN-.312	3/8	24	0.285	5/16	0.1250	3	3	ALCRN	1.625	S	Q
N34577	NTM160-3/8X16UN-.312	3/8	16	0.285	5/16	0.1880	3	3	ALCRN	1.350	Q	5/16
N34580	NTM160-7/16X20UN-.312	7/16	20	0.305	5/16	0.1500	3	3	ALCRN	1.670	13/32	25/64
N34579	NTM160-7/16X14UN-.312	7/16	14	0.305	5/16	0.2150	3	3	ALCRN	1.375	25/64	U
N34583	NTM160-1/2X28UN-.375	1/2	28	0.350	3/8	0.1100	4	3	ALCRN	2.250	15/32	15/32
N34582	NTM160-1/2X20UN-.375	1/2	20	0.350	3/8	0.1500	4	3	ALCRN	1.250	15/32	29/64
N34581	NTM160-1/2X13UN-.375	1/2	13	0.350	3/8	0.2300	4	3	ALCRN	1.670	29/64	27/64
N34584	NTM160-9/16X12UN-.375	9/16	12	0.370	3/8	0.2500	4	4	ALCRN	1.725	33/64	31/64
N34585	NTM160-9/16X18UN-.375	9/16	18	0.370	3/8	0.1700	4	4	ALCRN	2.100	17/32	33/64
N34588	NTM160-5/8X18UN-.500	5/8	18	0.470	1/2	0.1700	4-1/2	4	ALCRN	2.900	19/32	37/64
N34587	NTM160-5/8X12UN-.500	5/8	12	0.470	1/2	0.2500	4-1/2	4	ALCRN	2.525	9/16	35/64
N34586	NTM160-5/8X11UN-.500	5/8	11	0.470	1/2	0.2750	4-1/2	4	ALCRN	2.400	9/16	17/32
N34592	NTM160-3/4X20UN-.500	3/4	20	0.495	1/2	0.1500	5	4	ALCRN	3.188	23/32	45/64
N34591	NTM160-3/4X16UN-.500	3/4	16	0.495	1/2	0.1880	5	4	ALCRN	3.000	45/64	11/16
N34590	NTM160-3/4X12UN-.500	3/4	12	0.495	1/2	0.2500	5	4	ALCRN	2.750	11/16	43/64
N34589	NTM160-3/4X10UN-.500	3/4	10	0.495	1/2	0.3000	5	4	ALCRN	2.500	11/16	21/32
N34597	NTM160-7/8X20UN-.625	7/8	20	0.620	5/8	0.1500	6	4	ALCRN	4.188	27/32	53/64
N34596	NTM160-7/8X16UN-.625	7/8	16	0.620	5/8	0.1880	6	4	ALCRN	4.000	53/64	13/16
N34595	NTM160-7/8X14UN-.625	7/8	14	0.620	5/8	0.2150	6	4	ALCRN	3.900	53/64	13/16
N34594	NTM160-7/8X12UN-.625	7/8	12	0.620	5/8	0.2500	6	4	ALCRN	3.725	13/16	51/64
N34593	NTM160-7/8X9UN-.625	7/8	9	0.620	5/8	0.3300	6	4	ALCRN	3.300	51/64	49/64
N34600	NTM160-1X16UN-.625	1	16	0.620	5/8	0.1880	6	4	ALCRN	4.000	61/64	15/16
N34599	NTM160-1X12UN-.625	1	12	0.620	5/8	0.2500	6	4	ALCRN	3.725	61/64	15/16
N34598	NTM160-1X8UN-.625	1	8	0.620	5/8	0.3750	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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.1780	2	3	ALCRN	39
N68852	NTM400-M3.5X.6ISO-.125	M3.5	0.6	0.095	1/8	0.2350	2	3	ALCRN	32
N68854	NTM400-M4X.7ISO-.125	M4	0.7	0.115	1/8	0.2760	2	3	ALCRN	30
N68856	NTM400-M4.5X.75ISO-.187	M4.5	0.75	0.134	3/16	0.3130	2	3	ALCRN	19
N68858	NTM400-M5-X.8ISO-.187	M5	0.8	0.134	3/16	0.3130	2	3	ALCRN	19
N68860	NTM400-M6X1.0ISO-.187	M6	1	0.170	3/16	0.5000	2-1/2	3	ALCRN	8
N68862	NTM400-M8X1.0ISO-.250	M8	1	0.235	1/4	0.6250	2-1/2	3	ALCRN	J
N68864	NTM400-M8X1.25ISO-.250	M8	1.25	0.235	1/4	0.6250	2-1/2	3	ALCRN	H
N68866	NTM400-M10X1.25ISO-.312	M10	1.25	0.300	5/16	0.7500	3	3	ALCRN	11/32
N68868	NTM400-M10X1.5ISO-.312	M10	1.5	0.300	5/16	0.7500	3	3	ALCRN	R
N68870	NTM400-M12X1.25ISO-.375	M12	1.25	0.360	3/8	0.8750	3-1/2	3	ALCRN	27/64
N68872	NTM400-M12X1.75ISO-.375	M12	1.75	0.360	3/8	0.8750	3-1/2	3	ALCRN	13/32
N68874	NTM400-M14X1.25ISO-.375	M14	1.25	0.370	3/8	0.8750	3-1/2	4	ALCRN	1/2
N68876	NTM400-M14X1.5ISO-.375	M14	1.5	0.370	3/8	0.8750	3-1/2	4	ALCRN	1/2
N68878	NTM400-M14X2.0ISO-.375	M14	2	0.370	3/8	0.8750	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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.4375	2-1/2	3	ALCRN	B
N68822	NTM200-1/8X27NPT-.250	1/8	27	0.245	1/4	0.4375	2-1/2	3	ALCRN	21/64
N68824	NTM200-1/4X18NPT-.312	1/4	18	0.312	5/16	0.6250	3	3	ALCRN	27/64
N68826	NTM200-3/8X18NPT-.312	3/8	18	0.312	5/16	0.6250	3	3	ALCRN	9/16
N68828	NTM200-1/2X14NPT-.500	1/2	14	0.495	1/2	0.8750	4	4	ALCRN	11/16
N68830	NTM200-3/4X14NPT-.500	3/4	14	0.495	1/2	0.8750	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 306-307
- Tolerance Specs - Page 323

PRODUCT NUMBER	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	0.4375	2-1/2	3	ALCRN	B
N68838	NTM300-1/8X27NPTF-.250	1/8	27	0.245	1/4	0.4375	2-1/2	3	ALCRN	21/64
N68840	NTM300-1/4X18NPTF-.312	1/4	18	0.305	5/16	0.6250	3	3	ALCRN	27/64
N68842	NTM300-3/8X18NPTF-.312	3/8	18	0.305	5/16	0.6250	3	3	ALCRN	9/16
N68844	NTM300-1/2X14NPTF-.500	1/2	14	0.495	1/2	0.8750	4	4	ALCRN	11/16
N68846	NTM300-3/4X14NPTF-.500	3/4	14	0.495	1/2	0.8750	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	
	E 3 - 4	350	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 5 - 6	275	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	
H	M / A 7 >45HRc	150	n (rev/min)	4584	3056	2292	1834	1528	1146	917	764	573	
			f _Z (in)	0.0002	0.0003	0.0005	0.0006	0.0007	0.0009	0.0011	0.0014	0.0018	
M	E 8 - 9	350	v _f (in/min)	3.1	3.1	3.1	3.1	3.1	3.1	4.1	4.1	4.1	
			n (rev/min)	10696	7131	5348	4278	3565	2674	2139	1783	1337	
	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)	12.0	12.0	12.0	12.0	12.0	12.0	16.0	16.0	16.0	
	K	E 12 - 13	500	n (rev/min)	7640	5093	3820	3056	2547	1910	1528	1273	955
				f _Z (in)	0.0004	0.0006	0.0008	0.0009	0.0011	0.0015	0.0019	0.0023	0.0030
E 14 - 15	425	v _f (in/min)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	11.5	11.5	11.5	
		n (rev/min)	15280	10187	7640	6112	5093	3820	3056	2547	1910		
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)	28.7	28.7	28.7	28.7	28.7	28.7	38.2	38.2	38.2	
	E 17	600	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	
	E 18	600	v _f (in/min)	17.5	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	
S	E 20	100	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	
	E 21	100	n (rev/min)	18336	12224	9168	7334	6112	4584	3667	3056	2292	
			f _Z (in)	0.0005	0.0008	0.0010	0.0013	0.0015	0.0020	0.0025	0.0030	0.0040	
	E 22	350	v _f (in/min)	27.5	27.5	27.5	27.5	27.5	27.5	36.7	36.7	36.7	
			n (rev/min)	3056	2037	1528	1222	1019	764	611	509	382	
GRAPHITE	300	f _Z (in)	0.0003	0.0005	0.0006	0.0008	0.0009	0.0012	0.0015	0.0018	0.0024		
		v _f (in/min)	2.8	2.8	2.8	2.8	2.8	2.8	3.7	3.7	3.7		
GRAPHITE	250	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		
GRAPHITE	330	v _f (in/min)	10696	7131	5348	4278	3565	2674	2139	1783	1337		
		n (rev/min)	10696	7131	5348	4278	3565	2674	2139	1783	1337		
GRAPHITE	300	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		
GRAPHITE	250	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		
GRAPHITE	350	v _f (in/min)	9.6	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	vf [in/min]	14.4	14.4	14.4	14.4	14.4	14.4	14.4	19.3	19.3	19.3	19.3	19.3	
				n [min-1]	8894	6671	5337	4447	3335	2668	2224	1906	1668	1482	1334	1112	
H	M / A 7 >45HRc	150	fz [in]	.0004	.0005	.0006	.0007	.0009	.0012	.0014	.0017	.0019	.0021	.0024	.0028		
			250 - 300	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	12.6	
M	E 8 - 9	350	n [min-1]	4851	3639	2911	2426	1819	1455	1213	1040	910	809	728	606		
			fz [in]	.0002	.0003	.0004	.0004	.0006	.0007	.0009	.0010	.0011	.0013	.0014	.0017		
	E 10 - 11	250	125 - 175	vf [in/min]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	4.1	4.1	4.1	4.1		
			n [min-1]	11320	8490	6792	5660	4245	3396	2830	2426	2122	1887	1698	1415		
	E 12 - 13	500	300 - 1310	fz [in]	.0004	.0005	.0006	.0007	.0009	.0012	.0014	.0017	.0019	.0021	.0024	.0028	
				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	
K	E 12 - 13	450	n [min-1]	8086	6064	4851	4043	3032	2426	2021	1733	1516	1348	1213	1011		
			fz [in]	.0004	.0005	.0006	.0007	.0009	.0012	.0014	.0017	.0019	.0021	.0024	.0028		
	E 14 - 15	425	200 - 300	vf [in/min]	8.6	8.6	8.6	8.6	8.6	8.6	8.6	11.5	11.5	11.5	11.5		
				n [min-1]	16171	12129	9703	8086	6064	4851	4043	3465	3032	2695	2426	2021	
	E 16	600	450 - 550	fz [in]	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0028	.0031	.0035	.0039	.0047	
				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	38.2	
N	E 17	600	n [min-1]	13746	10309	8247	6873	5155	4124	3436	2945	2577	2291	2062	1718		
			fz [in]	.0004	.0006	.0007	.0009	.0011	.0014	.0017	.0020	.0023	.0026	.0028	.0034		
	E 18	600	375 - 475	vf [in/min]	17.5	17.5	17.5	17.5	17.5	17.5	17.5	23.4	23.4	23.4	23.4		
				n [min-1]	19406	14554	11643	9703	7277	5822	4851	4158	3639	3234	2911	2426	
	E 20	100	550 - 650	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	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]	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0028	.0031	.0035	.0039	.0047		
	E 22	350	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	
	GRAPHITE	300	80 - 120	fz [in]	.0005	.0006	.0008	.0009	.0013	.0016	.0019	.0022	.0025	.0028	.0031	.0038	
				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	36.7	
E 20	100	80 - 120	n [min-1]	3234	2426	1941	1617	1213	970	809	693	606	539	485	404		
			fz [in]	.0003	.0004	.0005	.0006	.0008	.0009	.0011	.0013	.0015	.0017	.0019	.0023		
E 21	100	80 - 120	vf [in/min]	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.7	3.7	3.7	3.7			
			n [min-1]	3234	2426	1941	1617	1213	970	809	693	606	539	485	404		
E 22	350	330 - 370	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	3.7	3.7	3.7	3.7	3.7		
GRAPHITE	300	250 - 350	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		
GRAPHITE	300	250 - 350	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]	9703	7277	5822	4851	3639	2911	2426	2079	1819	1617	1455	1213		
GRAPHITE	300	250 - 350	fz [in]	.0003	.0004	.0006	.0007	.0009	.0011	.0013	.0015	.0018	.0020	.0022	.0026		
			vf [in/min]	9.6	9.6	9.6	9.6	9.6	9.6	9.6	12.8	12.8	12.8	12.8	12.8		

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

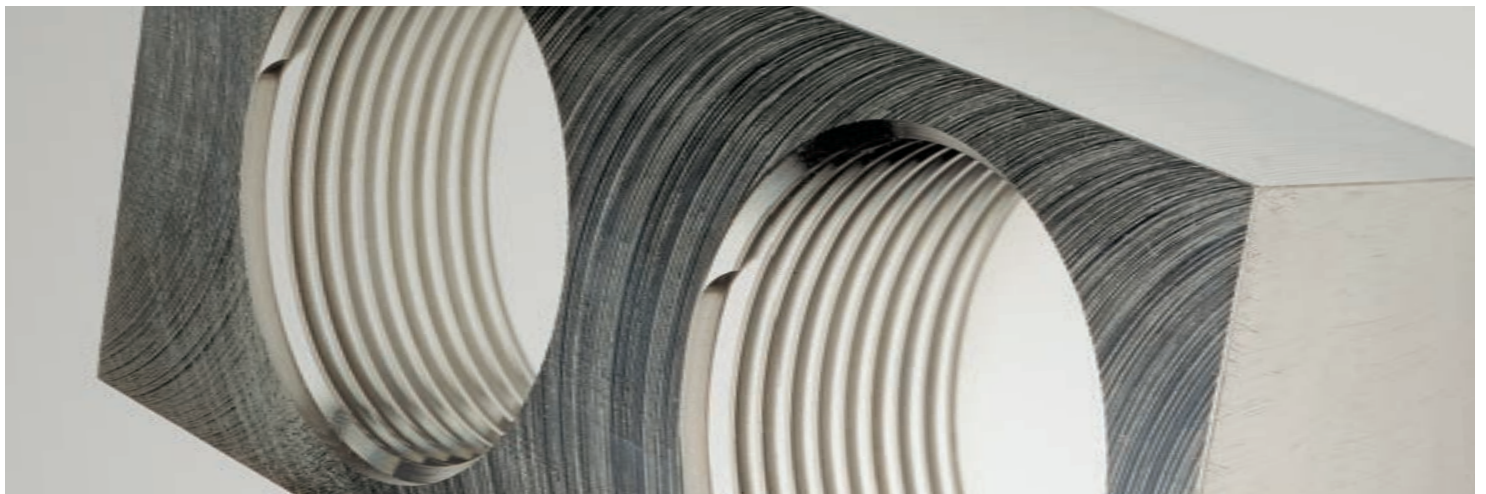
Standard Niagara Cutter Thread Mills - Thread Form Styles

	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.

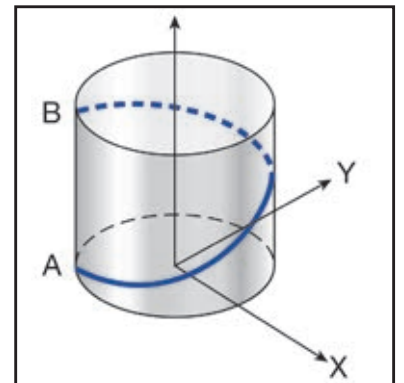
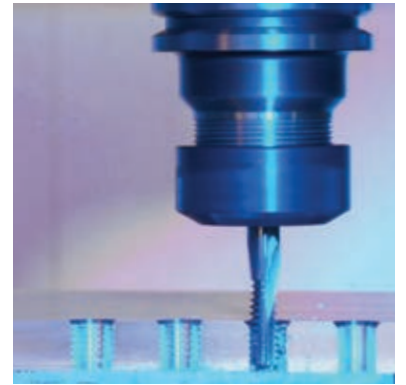
Note: When machining a right-hand thread you will be machining from bottom-to-top for climb cutting. If machining a left-hand thread you will start from top-to-bottom with a right-hand helix tool.

Left-hand threads can be climb cut with a left-hand helix tool starting from the bottom-to-top.

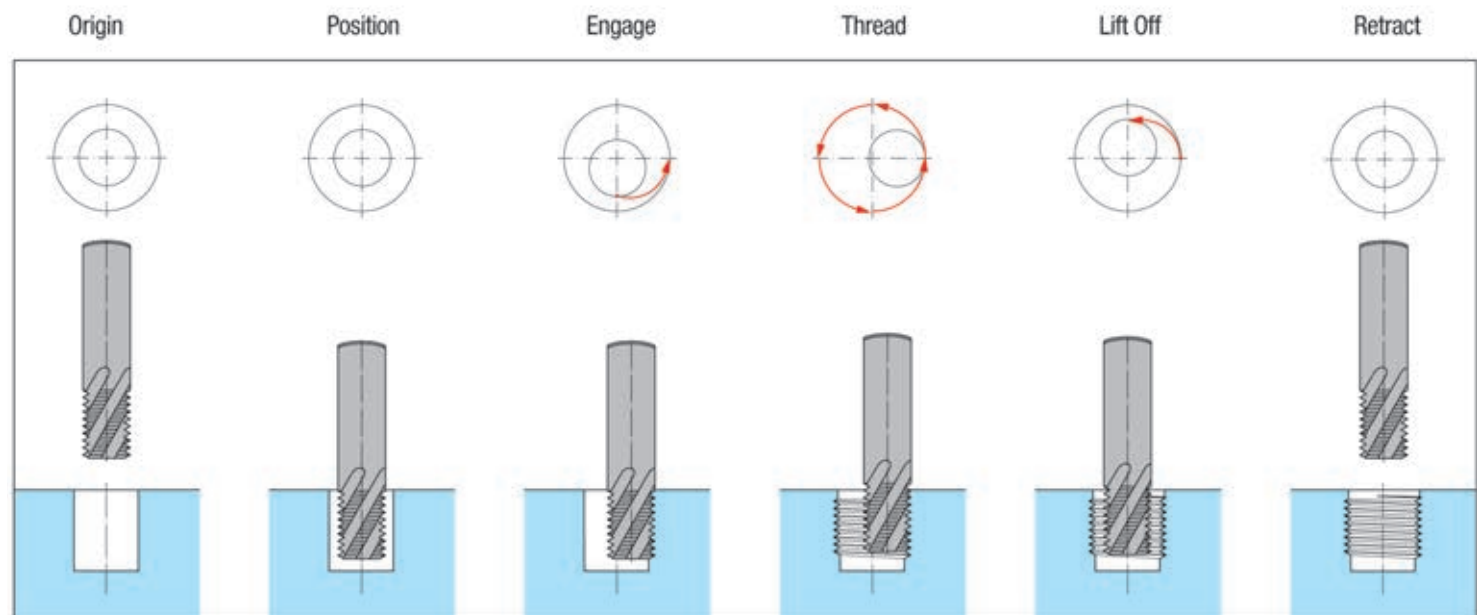
- Climb milling is the preferred method
- Start from the bottom of the hole to avoid re-cutting any chips
- Offset tool from center of the hole to allow a smooth start into the thread
- For difficult materials it may be necessary to make multiple passes

EXTENDED TOOL LIFE ON THREADMILLS

- Run-out on Threadmill in holder should not exceed .00015"
- Shrinkfit best method to hold cutter
- Arc in at 180 degrees on holes smaller than .375
- Initially use two passes to achieve correct gauge thread then try one pass



TOOL PATH DURING THREADMILLING



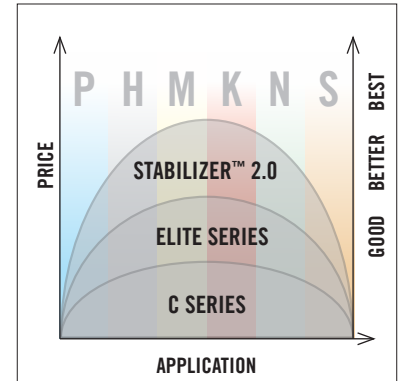
We can help you to increase your productivity, enhance your performance and reduce your costs with the range of products we offer that cover the full spectrum of application and performance requirements. Although every situation is different, we can make some general suggestions on tool selection, per 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.



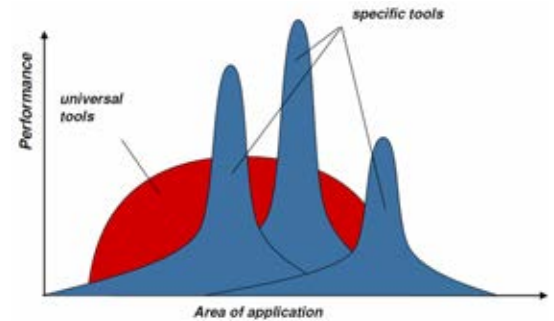
RECOMMENDED TOOLING

ISO GROUP	SELECTION	SLOTTING		PROFILING		COPY MILLING	
		PRODUCT FAMILY	RANGE	PRODUCT FAMILY	RANGE	PRODUCT FAMILY	RANGE
P	1ST CHOICE	STR430.2	1/8 - 1"	ST540	1/8 - 1"	STB430.2	1/8 - 1"
	2ND CHOICE	ST540	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	ST540	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

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.

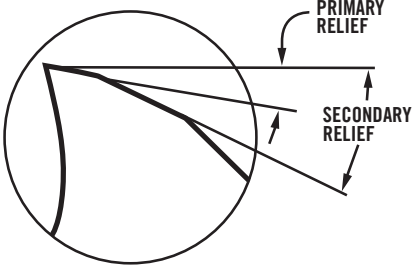
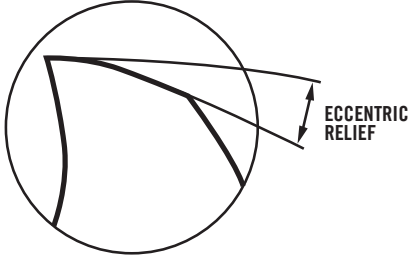
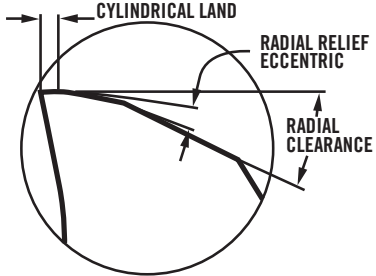
FLUTE NUMBERS

2 & 3 FLUTE	4 FLUTE	5 FLUTE	6 FLUTE
<ul style="list-style-type: none"> • For slotting • Maximum chip evacuation • Preferred for softer materials 	<ul style="list-style-type: none"> • For slotting and profiling • Transitional tool between 3 flute and Multi Flute 	<ul style="list-style-type: none"> • For profiling • More teeth in cut for greater stability 	<ul style="list-style-type: none"> • Profiling in hard milling • Reduced chip loads • Larger core diameter for greatest rigidity 

END MILL CORNER DESIGN

SQUARE	CORNER RADIUS / CORNER CHAMFER	BALL NOSE
<p>Designed for general machining at a true square angle.</p> 	<p>For general machining. Creates corner protection for increased tool life. Good in roughing operations.</p> 	<p>Designed for molds and dies, especially finishing 3d parts. There is zero cutting speed at center.</p> 

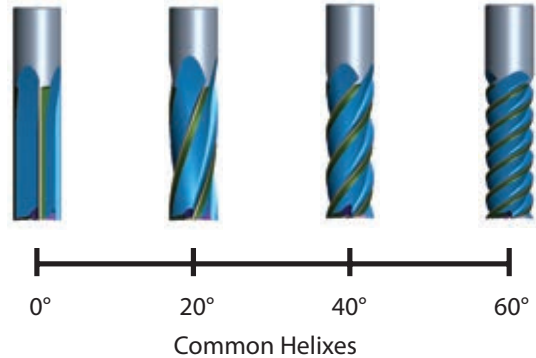
RADIAL RELIEF

STANDARD	ECCENTRIC	CYLINDRICAL LAND
<p>The most common type of radial relief. Regrind primary relief to sharpen cutting edge (caution: radial rake can be affected).</p> 	<p>Stronger cutting edge than standard relief. Easier to regrind (face regrind). Constant relief angle.</p> 	<p>Balances the cutting edge in the cut. Best in aluminum applications. Reduced chatter and vibration. Eccentric relief strengthens the tooth.</p> 

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, Super Alloys

COARSE PITCH



- Higher chip loads
- General purpose

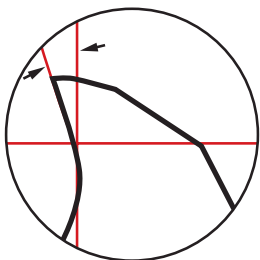
APPLICATION AREAS

Plastics, Wood, Aluminum Alloys, Copper Alloys, Lead, Tin, Zinc, Carbon Steel, Gray Cast Iron

RAKE ANGLE

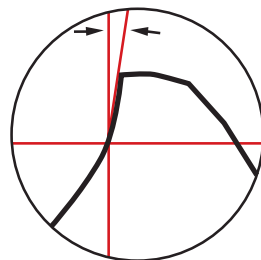
POSITIVE RAKE ANGLE

Allows for freer machining and reduced cutting pressure. It is effective in softer and ferrous materials such as steels and stainless steels.

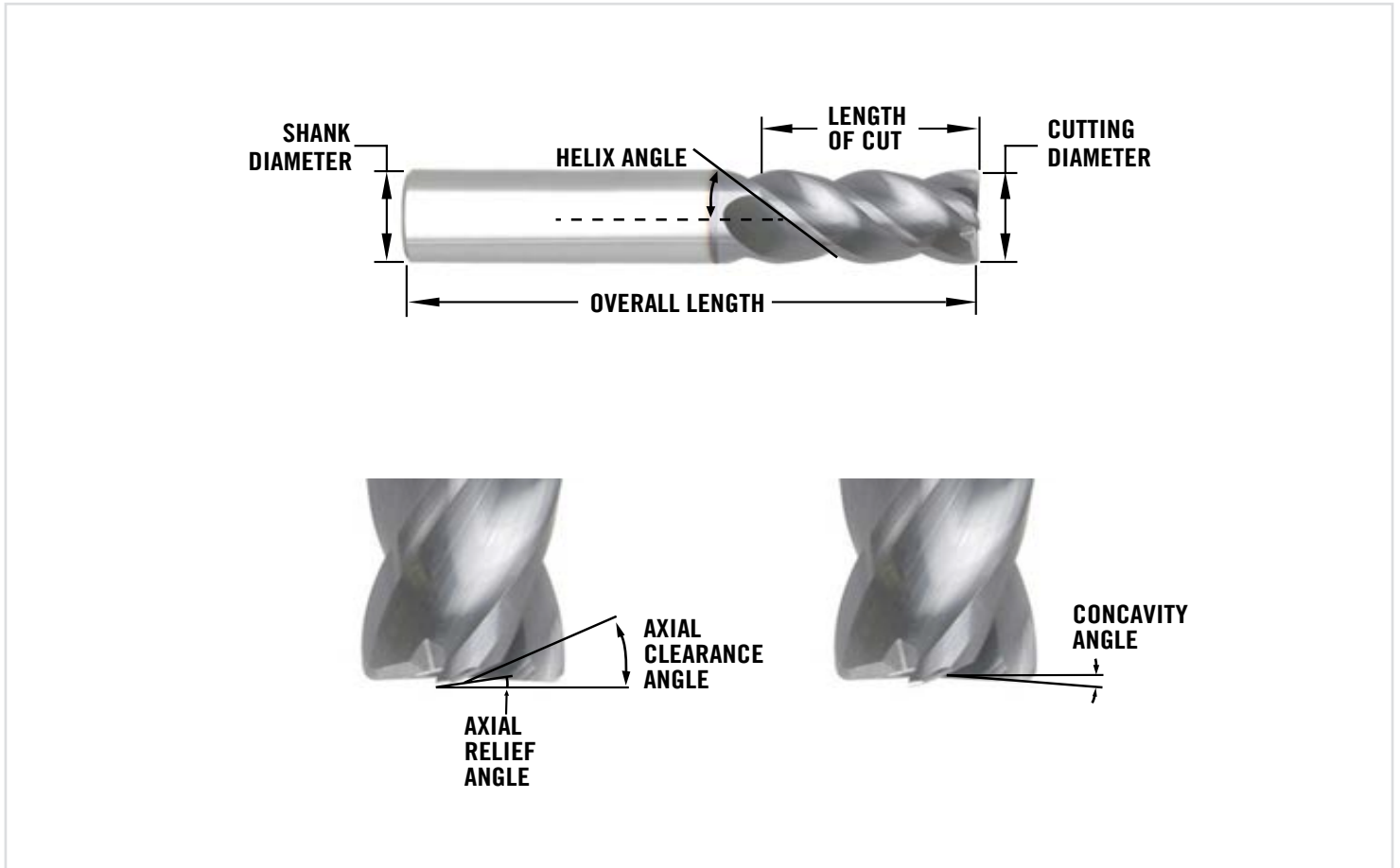


NEGATIVE RAKE ANGLE

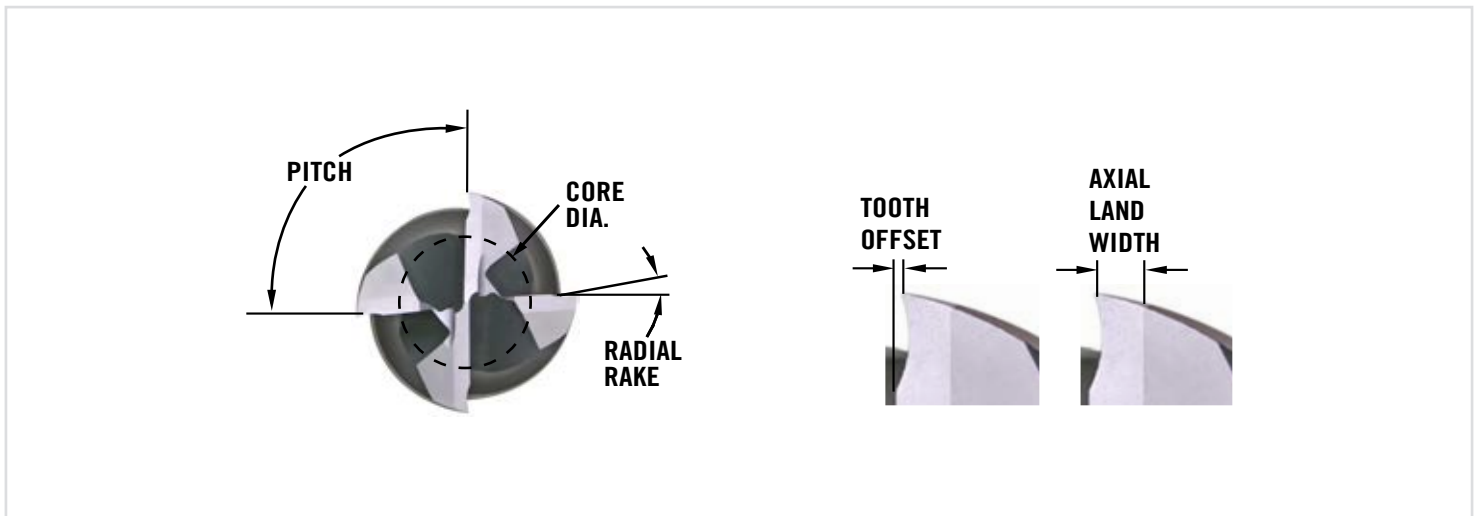
Creates stronger cutting edges optimal for harder to machine materials such as tool steels and hardened steels.



SIDE VIEW



END VIEW

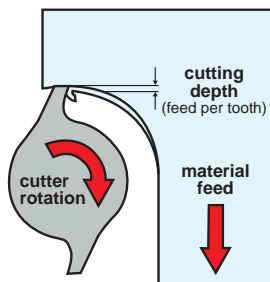


CLIMB MILLING VS. CONVENTIONAL MILLING

CLIMB MILLING (1ST CHOICE)

The tooth meets the work at the top of the cut, producing the thickest part of the chip first.

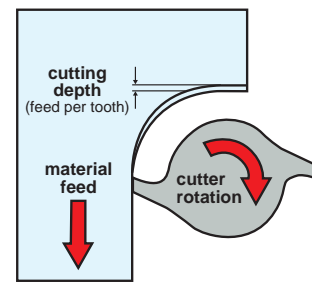
- Efficient cutting
- Long and reliable tool life
- Better surface finish, especially with stainless steels, aluminum or titanium alloys
- Risk tool breakage due to sudden machining backlash if the machine lacks rigidity



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.



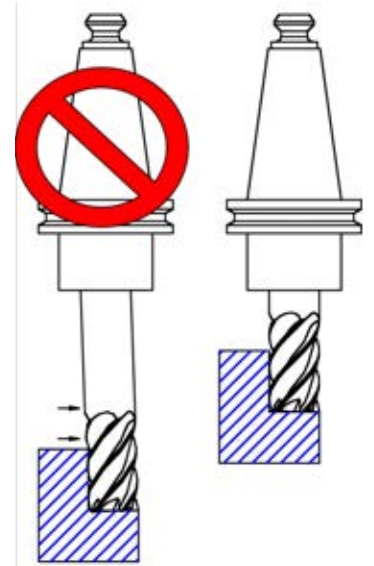
Caution!

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

$$n = \frac{v_c \cdot 12}{\pi \cdot D_c} \quad \text{or} \quad \frac{v_c \cdot 3.82}{D_c} \quad (\text{rev/min})$$

CUTTING SPEED

$$v_c = \frac{n \cdot \pi \cdot D_c}{12} \quad \text{or} \quad \frac{n \cdot D_c}{3.82} \quad (\text{sf/min})$$

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

$$v_c = \frac{n \cdot \pi \cdot D_w}{12} \quad \text{or} \quad \frac{n \cdot D_w}{3.82} \quad (\text{sf/min})$$

$$n = \frac{v_c \cdot 12}{\pi \cdot D_w} \quad \text{or} \quad \frac{v_c \cdot 3.82}{D_w} \quad (\text{RPM})$$

$$D_w = 2 \cdot \sqrt{a_p (D_c - a_p)} \quad (\text{inch})$$

CALCULATION OF a_p VS. OVERHANG LENGTH:

If the overhang length (XS) is longer than 4 x 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 (µm)

D_c	Pitch a_p (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

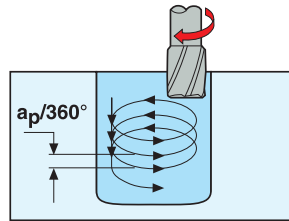
- a_p = Depth of cut mm/axial depth of cut (in)
- a_e = Width of cut mm/radial depth of cut (in)
- D_c = Cutter diameter
- f = Feed per revolution (in/rev)
- f_z = Feed per tooth (in/tooth)
- z_n = No. of teeth
- n = RPM (rev/min)
- Q = Material removal rate (in³/min)
- v_c = Cutting speed (sf/min)
- 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	$1.15 \times D_c$

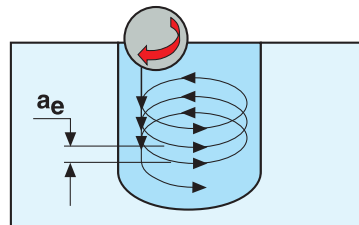


TROCHOIDAL METHOD

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	$1.2 \times D_c$



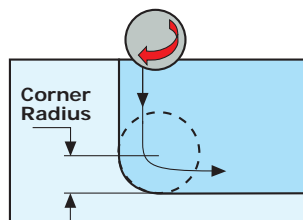
CORNER CONTACT

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, STSN540, STRN540, STRCS540, STR540M, A245, A245R, AB245, AN230, AN230R, AN335, AN335R, 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, C430M, CB430M, 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, C430M, CB430M
HIGH FEED (FLUTE DIA < 1/8")	2	+ / - .0005	SN200R
SINGLE-END FINISHERS NC TOLERANCE	2 & 4	+ .001 / - .000	CNC230, CNC430
SINGLE-END ROUGHERS	3, 4 & 5	+ .000 / - .003	AR330, SR420, SR545, SR420M
THREAD MILLS	ALL	+ .000 / - .002	NTM100UN, NTM120UN, NTM160UN, NTM200NPT, NTM300NPT, 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, DIAXS430, DIA230M, DIAB230M, DIA430M
MOLD AND DIE	6	+ .000 / - .002	MZ645, MZ645R, MZN410R, MZN510R, MZN410RM, MZN510RM
MOLD AND DIE (FLUTE DIA < SHANK DIA)	2	+ / - .0005	MB215, MB215M, MBZ215, MBZ215M
MOLD AND DIE (FLUTE DIA = SHANK DIA)	2	+ .000 / - .001	MB215, MB215M, MBZ215, MBZ215M
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	+ .030 / - 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

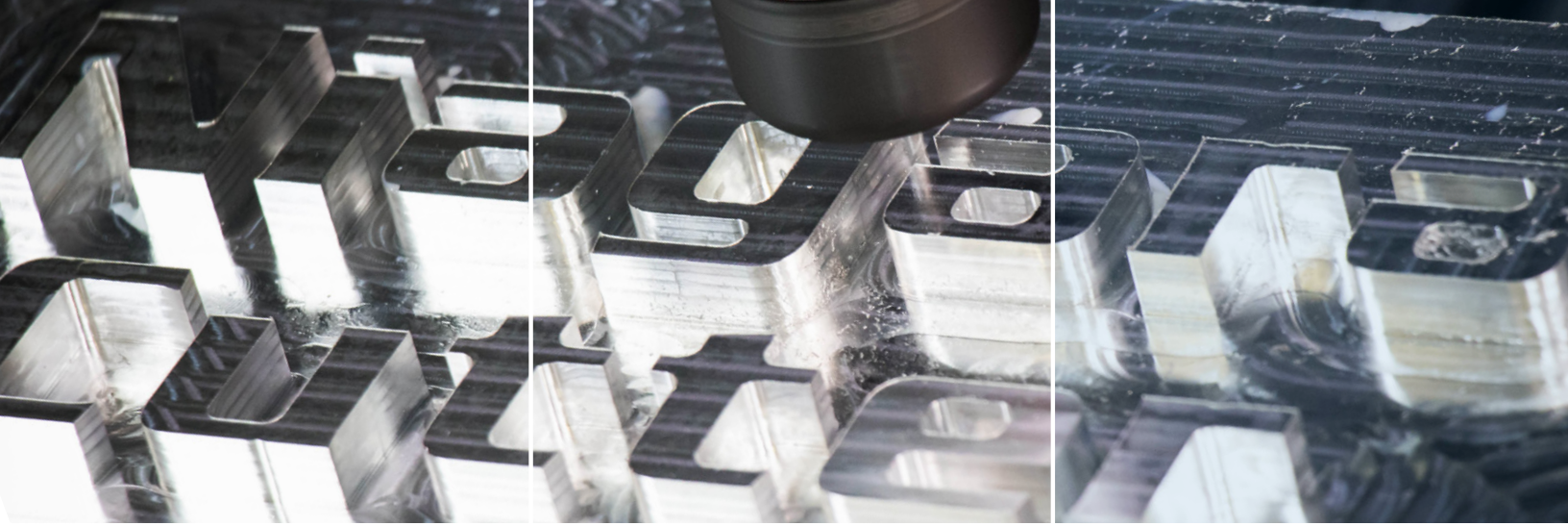
Niagara Cutter will buy back solid carbide tools for recycling. Solid carbide tools should be separated from other metal waste (steel, aluminium, copper etc). All packing material is fully recyclable.

This work is published with the understanding that Seco Tools and its editors are supplying information aimed to present a general orientation and direction of metal cutting and related sciences. If professional services are required for specific applications, the assistance of an appropriate professional should be acquired.

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The information provided herein is for reference purposes only. Actual prices, specifications, and product descriptions are finalized at the time of sale and may vary by location. The information provided herein is subject to change without prior notice.



CUSTOMIZED TOOLING

A significant portion of Niagara Cutter'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 Cutter'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 Cutter 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.

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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:
1-248-528-5220

For technical assistance, call:
1-800-TEC-TEAM (1-800-832-8326)

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