CARBIDE • HIGH SPEED STEEL • COBALT

Made in the USA

KTI

Cutting Tools Inc.

KTI CUTTING TOOLS, Inc.
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Fort Wayne, IN 46885

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ktitools.com

ISO 9001 AND MBE CERTIFIED

END MILLS
THREAD MILLS
MICRO END MILLS
TAPS & DIES · BURS

2020
PRODUCT CATALOG

DRILL MILLS
COUNTERSINKS
CHAMFER MILLS
REAMERS · DRILLS

MADE IN
THE USA

Made Right. Made Here.

We believe in American manufacturing and the American worker. That's why great care is taken to ensure that every step of production, from grinding to coating, on every one of the over 13,000 tools in this catalog is done right here in the USA.

The result is a premium quality tool that you can be as proud to run in your facility, as we are to offer it.

ADVANCED DISTRIBUTION FACILITIES ENSURE RELIABLE RESULTS

100% Order Fulfillment

Our advanced distribution facility is an industry leader in fast accurate order fulfillment. We work hard to maintain an on-shelf, ready-to-ship inventory of all 13,000 plus tools offered in this catalog.

Exceptional Quality Control

Orders are barcoded upon receipt, and tracked at every step through the fulfillment center. Before boxing, all orders are subject to the scrutiny of our quality control personnel.

STAINLESS STEEL

TITANIUM ALLOYS

HIGH TEMP ALLOYS

NICKEL BASE ALLOYS

ALLOY STEELS

INCONEL

EXOCTICS

TOP PERFORMANCE IN THE TOUGHEST MATERIALS

Everything about the **VI-PRO®** from its harmonic-shifting flute configuration to its polished, ultra-hard AlCrO-MAX PVD coating is designed to run smoothly in the most demanding conditions in a range of applications and hard materials.

When your project calls for uncompromising performance in tough to machine materials, **VI-PRO®** High-Performance end mills are the only serious choice.

Speaking of choices - the full line of **VI-PRO®** tools begins on page 16.

VI-PRO®

VARIABLE INDEX GEOMETRY

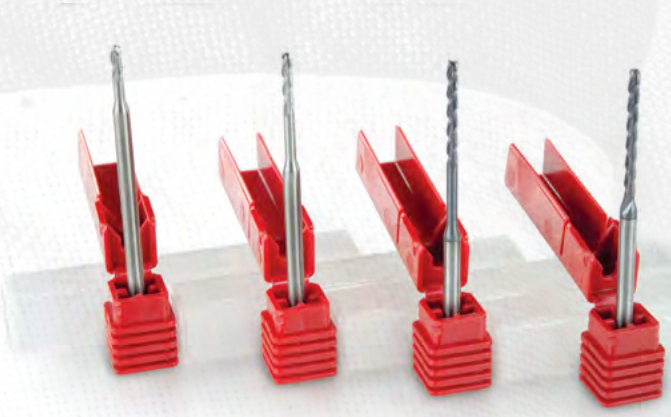
FAST ORDER FULLFILLMENT
EASY SHIPPING POLICIES

Same Day Shipping

Inspected orders are processed and shipped the same day before 6pm EST, so whether you're across the street or across the country, your tools will reach you quickly.

No minimum order requirements.

We appreciate your business and treat every order - large or small - with the same urgency and integrity.



THE FUTURE IS MADE OF ALUMINUM

FORTUNATELY THIS CATALOG HAS SOME OF THE HIGHEST QUALITY GENERAL PURPOSE CARBIDE TOOLS FOR MACHINING ALUMINUM

With aerospace, medical, and other high tech industries making more products and components out of Aluminum than ever in our history; if you're not machining it yet- you will be.

We're proud to offer some of the finest American-Made tooling specifically for the Aluminum working industry.

Check out our Aluminum cutting 2 and 3 flute end mills starting on **page 38**. These tools all come standard with our ZRN coating for unmatched performance in the general purpose category.

We also offer many of our popular bur shapes in an Aluminum Cut throughout our Deburring section which starts on **page 212**.

Why coated tools?

A PVD coating is the best way to customize a cutting tool to the material it's machining. The right coating will let the tool run faster and extend its life. This combination of longer life and greater production will typically more than offset the cost of the coated tool and can contribute significant cost savings on the project at hand.

Physical Vapor Deposition - PVD

There are several methods of PVD, all the coated tools in this offering will acheive their coating by cathodic arc deposition or Arc-PVD. In this process, an electric arc is used to vaporize material from a solid cathode target. The vaporized material then condenses on the tools, forming the even, uniform coatings that you see in the following pages.

The microscopically precise control of the coating thickness on our cutting tools ensures the tools gain the properties of the coating material, without negatively impacting the cutting edge. PVD coatings are harder and more corrosion resistant than other coating and plating processes and also have higher heat tolerances and abrasion resistance.

AlCrO-MAX

AlCrO-MAX is a high performance Coating from the PLATIT coatings family. It is based on AlCrN with a titanium addition. Triple coatings are deposited with 3 sections freely programmed in one batch. AlCrO-MAX has been engineered to give an optimum balance between the toughness of the core layer and the abrasion resistance of the top nano-layer. Titanium's addition reduces the adhesive wear compared to conventional AlCrN coatings, also increasing the micro-hardness upto 3500Hv and stops the crack propagation through the coating. After the coating is applied, it receives a post-polish treatment to smooth out the coating to maximize chip evacuation at even higher speeds and feeds.

Our case histories have shown AlCrO-MAX out performs ALTIN in multiple applications. AlCrO-MAX is recommended for a wider range of materials and exotics including high temp alloys, stainless steels, alloy steels, cast iron, high temp nickel base alloys, titanium alloys, hardened tool steel up to 54 HRc, and inconel. This coating has an excellent thermal and chemical stability. Which means it keeps its mechanical properties at very high temperatures up to 950°C. AlCrO-MAX has the best overall properties of any coating we offer and outperforms all generic coatings available on the market.

Post Polish Treatment

We've adapted a post-coating polish system that polishes our premium AlCrO-MAX coating to a microscopically smooth finish to allow cooler temperatures at higher speeds with better chip evacuation. What does all this mean? A longer lasting, better cutting tool.

Applicable Materials

- Stainless Steels
- Hardened Tool Steels
- Alloyed Steels
- Superalloys
- High Temp Alloys
- Nickel Base Alloys
- Titanium Alloys
- Cast Iron
- Inconel

AlTiN

AlTiN is a high performance coating for milling, drilling, and tapping. This coating works well in a wide range of materials and exoctics including high temp alloys, stainless steels, alloy steels, cast iron, high temp nickel base alloys, titanium alloys, and inconel. AlTiN is extremely heat resistant and can be used with or without coolant. It is exceptional in difficult to machine materials where adhesive wear is particularly high.

Applicable Materials

- Stainless Steels
- Alloyed Steels
- Superalloys
- High Temp Alloys
- Nickel Base Alloys
- Titanium Alloys
- Cast Iron
- Inconel

TiCN

TiCN is a general purpose coating used for milling, drilling, and tapping in all stainless steels, as well as a wide variety of other materials. This would be an option when AlTiN cannot be used, as in applications that cannot generate the speeds and feeds required for higher cutting temperatures.

Applicable Materials

- Steels
- AlloyedSteels
- Superalloys
- Cast Iron
- Aluminium
- Copper
- Bronze
- Brass
- Plastics

ZrN

ZrN is a high performance coating for milling, tapping, and drilling non-ferrous materials such as aluminum, brass, and bronze applications. It prevents edge build up that is typical in soft and sticky materials. This coating allows for higher speed and feed rates as well as prolonged tool life. ZrN does not have an affinity for aluminum.

Applicable Materials

Aluminium
Copper
Bronze
Brass
Plastics

TiN

TiN is a general purpose coating for drilling and tapping in a wide variety of materials. This coating is generally used in applications with lower cutting speeds.

Applicable Materials

Steels
Cast Iron
Copper
Bronze
Brass
Plastics

MILLING

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HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

VI-PRO® is a High Performance, carbide end mill, that incorporates the ultimate in variable index geometry. It's flute configuration produces a harmonics shift, resulting in minimal chatter and an exceptional finish.

- Post polished **AlCrO-MAX** coating covers a wide range of materials
- Made in the USA from premium micrograin carbide
- Used in all slotting, roughing, profiling and finishing applications
- High Performance, chatter free machining provides versatility in use for all ferrous materials
- Designed for use in Alloy Steels, Inconel, Cast Iron, Titanium, Stainless Steel, High Temp and all other exotic materials up to 50HRc
- Enables higher SFM and heavier chip loads
- Eccentric Relief on the cutting edge provides enhanced edge strength
- Available in 4, 5 & 6 Flute - Stub, Regular,Long & Extra Long Lengths
- Available in Square End, Ball Nose and various CR Corner Radius sizes
- Recommended for slotting up to 1 x Diameter

Outperform Under Budget with CR Corner Radius VI-PRO®

The sharp corner of an end mill is the weakest point on the tool. The corner radius design eliminates this vulnerability which reduces chipping and provides longer tool life. VI-PRO™ tools are available with corner radiuses starting at .010 all the way up to .250. Longer tool life means increased productivity which has real impact on your bottom line.

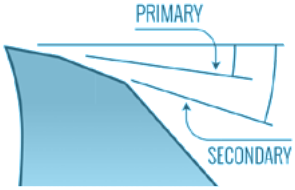
4 on-site Otec Post Polish and Edge Prep machines

Benefits of Post Polishing

AlCrO-MAX by nature of the coating process leaves tiny "droplets"of the coating on the surface of the tool. Proven results have shown that the removal of these droplets provide a smoother tool surface which results in a better cut. Perhaps the most important benefit, is that the tool is able to run at faster feed rates due to the smoothness of the flute area. This results in better chip evacuation and cooler temperatures resulting in longer tool life.

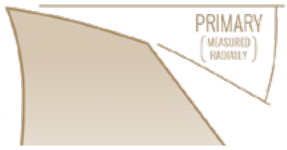
High-Performance VI-PRO® carbide end mills utilize an Eccentric Relief on the cutting edge to provide enhanced edge strength and a smoother cutting action.

GENERAL PURPOSE STANDARD RELIEF



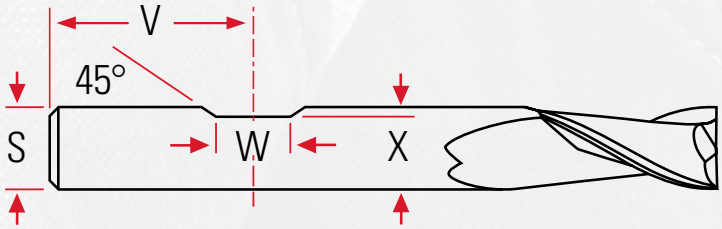
Most common relief for non-ferrous alloys. Includes a primary and secondary relief angle.

VI-PRO® ECCENTRIC RELIEF



A powerful edge design for ferrous and tough material cutting. This design includes a primary relief measured radially along its edge.

VI-PRO® Weldon Flat Specifications



STUB LENGTH

S SHANK DIAMETER	V	W MIN	W MAX	X
1/2"	.750"	.330"	.332"	.440"
5/8"	.750"	.400"	.402"	.560"
3/4"	.750"	.455"	.457"	.675"

REGULAR LENGTH

S SHANK DIAMETER	V	W MIN	W MAX	X
1/2" (1-1/4" LOC)	.750"	.330"	.332"	.440"
1/2"	.875"	.330"	.332"	.440"
5/8"	.875"	.400"	.402"	.560"
3/4"	.875"	.455"	.457"	.675"
1"	.875"	.515"	.517"	.925"

LONG LENGTH

S SHANK DIAMETER	V	W MIN	W MAX	X
1/2" (2" LOC)	.875"	.330"	.332"	.440"
1/2"	1.250"	.330"	.332"	.440"
5/8"	1.250"	.400"	.402"	.560"
3/4"	1.250"	.455"	.457"	.675"
1"	1.250"	.515"	.517"	.925"

EXTRA LONG LENGTH

S SHANK DIAMETER	V	W MIN	W MAX	X
1/2"	1.5"	.330"	.332"	.440"
5/8"	1.5"	.400"	.402"	.560"
3/4"	1.5"	.455"	.457"	.675"
1"	1.5"	.515"	.517"	.925"
–	–	–	–	–

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

4 FLUTE - STUB LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	4	257338	30.34	–	–
3/16	3/16	3/8	2	4	257349	39.04	–	–
1/4	1/4	3/8	2	4	245942	44.18	–	–
5/16	5/16	7/16	2	4	245953	64.26	–	–
3/8	3/8	1/2	2	4	245964	71.24	–	–
7/16	7/16	5/8	2-1/2	4	257360	92.80	–	–
1/2	1/2	5/8	2-1/2	4	245975	106.52	246008	112.58
5/8	5/8	3/4	3	4	245986	209.71	246019	215.77
3/4	3/4	1	3	4	245997	276.58	246030	282.64

4 FLUTE - REGULAR LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/2	2	4	257426	36.25	–	–
3/16	3/16	9/16	2	4	257437	41.44	–	–
1/4	1/4	3/4	2-1/2	4	246426	52.60	–	–
5/16	5/16	13/16	2-1/2	4	246437	69.66	–	–
3/8	3/8	1	2-1/2	4	246448	81.60	–	–
7/16	7/16	1	2-3/4	4	257448	101.20	–	–
1/2	1/2	1	3	4	246459	122.41	246514	128.47
1/2	1/2	1-1/4	3	4	246470	122.41	246525	128.47
5/8	5/8	1-5/8	3-1/2	4	246481	221.59	246536	227.65
3/4	3/4	1-5/8	4	4	246492	306.17	246547	312.23
1	1	2	4	4	246503	571.53	246558	577.59

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

4 FLUTE - LONG LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	4	247944	59.90	–	–
5/16	5/16	1-1/8	3	4	247955	82.88	–	–
3/8	3/8	1-1/4	3	4	247966	111.31	–	–
7/16	7/16	2	4	4	257602	141.19	–	–
1/2	1/2	1-1/2	4	4	247977	153.69	248032	159.75
1/2	1/2	2	4	4	247988	170.42	248043	176.48
5/8	5/8	2-1/4	5	4	247999	316.96	248054	323.02
3/4	3/4	2-1/4	5	4	248010	383.53	248065	389.59
1	1	2-1/4	5	4	248021	632.10	248076	638.16

4 FLUTE - EXTRA LONG LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	4	248813	71.56	–	–
3/8	3/8	2	4	4	248824	125.44	–	–
7/16	7/16	3	6	4	257668	205.68	–	–
1/2	1/2	3	6	4	248835	240.33	248901	246.39
5/8	5/8	3	6	4	248846	341.81	248912	347.88
3/4	3/4	3	6	4	248857	451.19	248923	457.25
3/4	3/4	4	7	4	248868	740.92	248934	746.98
1	1	3	6	4	248879	735.59	248945	741.65
1	1	4-1/4	7	4	248890	1085.87	248956	1092.38

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

4 FLUTE - STUB LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	4	0.010	257382	34.97	–	–
3/16	3/16	3/8	2	4	0.010	257393	43.67	–	–
1/4	1/4	3/8	2	4	0.015	246162	51.48	–	–
5/16	5/16	7/16	2	4	0.015	246173	69.30	–	–
3/8	3/8	1/2	2	4	0.015	246184	76.27	–	–
7/16	7/16	5/8	2-1/2	4	0.030	257404	97.73	–	–
1/2	1/2	5/8	2-1/2	4	0.030	246195	116.59	246228	122.65
5/8	5/8	3/4	3	4	0.030	246206	219.77	246239	225.84
3/4	3/4	1	3	4	0.030	246217	286.64	246250	292.71

All of our tools are 100% Made in the USA

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 38° HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/2	2	4	0.010	257492	40.88	–	–
1/8	1/8	1/2	2	4	0.020	257503	40.88	–	–
1/8	1/8	1/2	2	4	0.030	257514	40.88	–	–
3/16	3/16	9/16	2	4	0.010	257525	46.07	–	–
3/16	3/16	9/16	2	4	0.020	257536	46.07	–	–
3/16	3/16	9/16	2	4	0.030	257547	46.07	–	–
1/4	1/4	3/4	2-1/2	4	0.015	247218	57.23	–	–
1/4	1/4	3/4	2-1/2	4	0.030	247229	57.23	–	–
1/4	1/4	3/4	2-1/2	4	0.060	247240	57.23	–	–
5/16	5/16	13/16	2-1/2	4	0.015	247251	73.72	–	–
5/16	5/16	13/16	2-1/2	4	0.030	247262	73.72	–	–
5/16	5/16	13/16	2-1/2	4	0.060	247273	73.72	–	–
3/8	3/8	1	2-1/2	4	0.015	247284	86.09	–	–
3/8	3/8	1	2-1/2	4	0.030	247295	86.09	–	–
3/8	3/8	1	2-1/2	4	0.060	247306	86.09	–	–
7/16	7/16	1	2-3/4	4	0.015	257558	112.35	–	–
7/16	7/16	1	2-3/4	4	0.030	257569	112.35	–	–
7/16	7/16	1	2-3/4	4	0.060	257580	112.35	–	–
1/2	1/2	1	3	4	0.015	247317	137.54	247559	144.41
1/2	1/2	1	3	4	0.030	247328	137.54	247570	144.41
1/2	1/2	1	3	4	0.060	247339	137.54	247581	144.41
1/2	1/2	1	3	4	0.090	247350	137.54	247592	144.41
1/2	1/2	1	3	4	0.120	247361	137.54	247603	144.41
1/2	1/2	1-1/4	3	4	0.015	247372	137.54	247614	144.41
1/2	1/2	1-1/4	3	4	0.030	247383	137.54	247625	144.41
1/2	1/2	1-1/4	3	4	0.060	247394	137.54	247636	144.41
1/2	1/2	1-1/4	3	4	0.090	247405	137.54	247647	144.41
1/2	1/2	1-1/4	3	4	0.120	247416	137.54	247658	144.41
5/8	5/8	1-5/8	3-1/2	4	0.030	247427	231.72	247669	237.78
5/8	5/8	1-5/8	3-1/2	4	0.060	247438	231.72	247680	237.78
5/8	5/8	1-5/8	3-1/2	4	0.090	247449	231.72	247691	237.78
5/8	5/8	1-5/8	3-1/2	4	0.120	247460	231.72	247702	237.78
3/4	3/4	1-5/8	4	4	0.030	247471	321.32	247713	327.39
3/4	3/4	1-5/8	4	4	0.060	247482	321.32	247724	327.39
3/4	3/4	1-5/8	4	4	0.090	247493	321.32	247735	327.39
3/4	3/4	1-5/8	4	4	0.120	247504	321.32	247746	327.39
3/4	3/4	1-5/8	4	4	0.190	262070	321.32	262114	327.38
3/4	3/4	1-5/8	4	4	0.250	262081	321.32	262125	327.38
1	1	2	4	4	0.030	247515	586.69	247757	592.75
1	1	2	4	4	0.060	247526	586.69	247768	592.75
1	1	2	4	4	0.090	247537	586.69	247779	592.75
1	1	2	4	4	0.120	247548	586.69	247790	592.75
1	1	2	4	4	0.190	262092	586.69	262136	592.75
1	1	2	4	4	0.250	262103	586.69	262147	592.75

For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

4 FLUTE - LONG LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	4	0.015	248373	64.53	–	–
1/4	1/4	1-1/8	3	4	0.030	248384	64.53	–	–
5/16	5/16	1-1/8	3	4	0.015	248395	87.91	–	–
5/16	5/16	1-1/8	3	4	0.030	248406	87.91	–	–
3/8	3/8	1-1/4	3	4	0.030	248417	116.34	–	–
3/8	3/8	1-1/4	3	4	0.060	248428	116.34	–	–
7/16	7/16	2	4	4	0.030	257635	149.43	–	–
7/16	7/16	2	4	4	0.060	257646	149.43	–	–
1/2	1/2	1-1/2	4	4	0.030	248439	163.75	248549	169.82
1/2	1/2	1-1/2	4	4	0.060	248450	163.75	248560	169.82
1/2	1/2	2	4	4	0.030	248461	180.49	248571	186.55
1/2	1/2	2	4	4	0.060	248472	180.49	248582	186.55
5/8	5/8	2-1/4	5	4	0.030	248483	327.02	248593	333.08
5/8	5/8	2-1/4	5	4	0.060	248494	327.02	248604	333.08
3/4	3/4	2-1/4	5	4	0.030	248505	411.81	248615	419.69
3/4	3/4	2-1/4	5	4	0.060	248516	411.81	248626	419.69
1	1	2-1/4	5	4	0.030	248527	642.16	248637	648.22
1	1	2-1/4	5	4	0.060	248538	642.16	248648	648.22

PVD coatings increase cutting tool performance and tool life

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

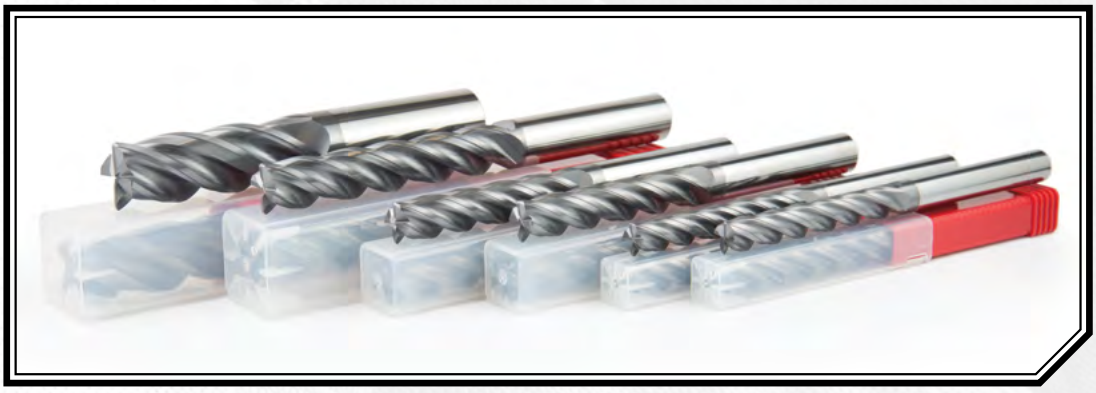
For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

4 FLUTE - EXTRA LONG LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	4	0.015	249275	78.53	–	–
1/4	1/4	1-1/2	4	4	0.030	249286	78.53	–	–
3/8	3/8	2	4	4	0.030	249297	133.02	–	–
3/8	3/8	2	4	4	0.060	249308	133.02	–	–
7/16	7/16	3	6	4	0.030	257701	210.67	–	–
7/16	7/16	3	6	4	0.060	257712	210.67	–	–
1/2	1/2	3	6	4	0.030	249319	247.90	249451	253.97
1/2	1/2	3	6	4	0.060	249330	247.90	249462	253.97
5/8	5/8	3	6	4	0.030	249341	349.33	249473	355.39
5/8	5/8	3	6	4	0.060	249352	349.33	249484	355.39
3/4	3/4	3	6	4	0.030	249363	461.25	249495	467.31
3/4	3/4	3	6	4	0.060	249374	461.25	249506	467.31
3/4	3/4	4	7	4	0.030	249385	750.99	249517	757.05
3/4	3/4	4	7	4	0.060	249396	750.99	249528	757.05
1	1	3	6	4	0.030	249407	754.99	249539	761.05
1	1	3	6	4	0.060	249418	754.99	249550	761.05
1	1	4-1/4	7	4	0.030	249429	1096.28	249561	1102.78
1	1	4-1/4	7	4	0.060	249440	1096.28	249572	1102.78



All high-performance tools ship in premium packaging

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 78-79, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

4 FLUTE - STUB LENGTH - BALL NOSE - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	4	257734	35.01	–	–
3/16	3/16	3/8	2	4	257745	50.02	–	–
1/4	1/4	3/8	2	4	254918	56.85	–	–
5/16	5/16	7/16	2	4	254929	74.16	–	–
3/8	3/8	1/2	2	4	254940	82.20	–	–
7/16	7/16	5/8	2-1/2	4	257756	110.66	–	–
1/2	1/2	5/8	2-1/2	4	254951	122.91	254984	129.90
5/8	5/8	3/4	3	4	254962	241.97	254995	248.97
3/4	3/4	1	3	4	254973	319.13	255006	326.12

4 FLUTE - REGULAR LENGTH - BALL NOSE - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/2	2	4	257778	49.80	–	–
3/16	3/16	9/16	2	4	257789	55.04	–	–
1/4	1/4	3/4	2-1/2	4	255182	66.42	–	–
5/16	5/16	13/16	2-1/2	4	255193	80.38	–	–
3/8	3/8	1	2-1/2	4	255204	94.16	–	–
7/16	7/16	1	2-3/4	4	257800	128.79	–	–
1/2	1/2	1	3	4	255215	141.24	255270	148.24
1/2	1/2	1-1/4	3	4	255226	141.24	255281	148.24
5/8	5/8	1-5/8	3-1/2	4	255237	255.69	255292	262.68
3/4	3/4	1-5/8	4	4	255248	353.27	255303	360.26
1	1	2	4	4	255259	659.46	255314	666.45

The VI-PRO performs very well in a wide range of materials including:

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TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

4 FLUTE - LONG LENGTH - BALL NOSE - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	4	255468	69.11	–	–
5/16	5/16	1-1/8	3	4	255479	95.63	–	–
3/8	3/8	1-1/4	3	4	255490	128.43	–	–
7/16	7/16	2	4	4	257822	160.06	–	–
1/2	1/2	1-1/2	4	4	255501	177.33	255556	184.32
1/2	1/2	2	4	4	255512	196.64	255567	203.63
5/8	5/8	2-1/4	5	4	255523	365.72	255578	372.71
3/4	3/4	2-1/4	5	4	255534	442.53	255589	449.52
1	1	2-1/4	5	4	255545	729.34	255600	736.33

4 FLUTE - EXTRA LONG LENGTH - BALL NOSE - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	4	255765	99.86	–	–
3/8	3/8	2	4	4	255776	144.74	–	–
7/16	7/16	3	6	4	257844	237.34	–	–
1/2	1/2	3	6	4	255787	277.30	255853	284.29
5/8	5/8	3	6	4	255798	394.40	255864	401.40
3/4	3/4	3	6	4	255809	520.60	255875	527.60
3/4	3/4	4	7	4	255820	854.90	255886	861.91
1	1	3	6	4	255831	848.75	255897	855.74
1	1	4-1/4	7	4	255842	1252.93	255908	1260.43

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TOLERANCES	DIAMETER	SHANK
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

5 FLUTE - STUB LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	5	257855	33.37	–	–
3/16	3/16	3/8	2	5	257866	42.94	–	–
1/4	1/4	3/8	2	5	256040	48.59	–	–
5/16	5/16	7/16	2	5	256051	70.69	–	–
3/8	3/8	1/2	2	5	256062	78.36	–	–
1/2	1/2	5/8	2-1/2	5	256073	117.17	256106	123.84
5/8	5/8	3/4	3	5	256084	230.68	256117	237.35
3/4	3/4	1	3	5	256095	304.24	256128	310.90

5 FLUTE - REGULAR LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/2	2	5	257877	39.88	–	–
3/16	3/16	9/16	2	5	257888	45.59	–	–
1/4	1/4	3/4	2-1/2	5	256304	57.87	–	–
5/16	5/16	13/16	2-1/2	5	256315	76.64	–	–
3/8	3/8	1	2-1/2	5	256326	89.77	–	–
1/2	1/2	1	3	5	256337	134.65	256392	141.32
1/2	1/2	1-1/4	3	5	256348	134.65	256403	141.32
5/8	5/8	1-5/8	3-1/2	5	256359	243.76	256414	250.43
3/4	3/4	1-5/8	4	5	256370	336.78	256425	343.45
1	1	2	4	5	256381	628.69	256436	635.36

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

5 FLUTE - LONG LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	5	256590	65.89	–	–
5/16	5/16	1-1/8	3	5	256601	91.16	–	–
3/8	3/8	1-1/4	3	5	256612	122.44	–	–
1/2	1/2	1-1/2	4	5	256623	169.06	256678	175.72
1/2	1/2	2	4	5	256634	187.47	256689	194.13
5/8	5/8	2-1/4	5	5	256645	348.65	256700	355.32
3/4	3/4	2-1/4	5	5	256656	421.88	256711	428.55
1	1	2-1/4	5	5	256667	695.31	256722	701.97

5 FLUTE - EXTRA LONG LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	5	256887	78.72	–	–
3/8	3/8	2	4	5	256898	137.99	–	–
1/2	1/2	3	6	5	256909	264.35	256975	271.03
5/8	5/8	3	6	5	256920	375.99	256986	382.67
3/4	3/4	3	6	5	256931	496.32	256997	502.97
3/4	3/4	4	7	5	256942	815.00	257008	821.69
1	1	3	6	5	256953	809.14	257019	815.81
1	1	4-1/4	7	5	256964	1194.46	257030	1201.61

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

5 FLUTE - STUB LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	5	0.010	257899	38.47	–	–
3/16	3/16	3/8	2	5	0.010	257910	48.04	–	–
1/4	1/4	3/8	2	5	0.015	257162	56.63	–	–
5/16	5/16	7/16	2	5	0.015	257173	76.23	–	–
3/8	3/8	1/2	2	5	0.015	257184	83.90	–	–
1/2	1/2	5/8	2-1/2	5	0.030	257195	128.24	257228	134.91
5/8	5/8	3/4	3	5	0.030	257206	241.75	257239	248.42
3/4	3/4	1	3	5	0.030	257217	315.31	257250	321.98

The VI-PRO 5 Flute Stub Length is stocked in 3 radius sizes; 0.010, 0.015, 0.030

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

5 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/8	1/8	1/2	2	5	0.010	250154	45.97	–	–
1/8	1/8	1/2	2	5	0.020	250156	45.97	–	–
1/8	1/8	1/2	2	5	0.030	250158	45.97	–	–
3/16	3/16	9/16	2	5	0.010	250160	54.47	–	–
3/16	3/16	9/16	2	5	0.020	250162	54.47	–	–
3/16	3/16	9/16	2	5	0.030	250164	54.47	–	–
1/4	1/4	3/4	2-1/2	5	0.015	250166	62.95	–	–
1/4	1/4	3/4	2-1/2	5	0.030	250177	62.95	–	–
1/4	1/4	3/4	2-1/2	5	0.060	250188	62.95	–	–
5/16	5/16	13/16	2-1/2	5	0.015	250199	81.09	–	–
5/16	5/16	13/16	2-1/2	5	0.030	250210	81.09	–	–
5/16	5/16	13/16	2-1/2	5	0.060	250221	81.09	–	–
3/8	3/8	1	2-1/2	5	0.015	250232	94.70	–	–
3/8	3/8	1	2-1/2	5	0.030	250243	94.70	–	–
3/8	3/8	1	2-1/2	5	0.060	250254	94.70	–	–
1/2	1/2	1	3	5	0.015	250265	151.29	250507	158.86
1/2	1/2	1	3	5	0.030	250276	151.29	250518	158.86
1/2	1/2	1	3	5	0.060	250287	151.29	250529	158.86
1/2	1/2	1	3	5	0.090	250298	151.29	250540	158.86
1/2	1/2	1	3	5	0.120	250309	151.29	250551	158.86
1/2	1/2	1-1/4	3	5	0.015	250320	151.29	250562	158.86
1/2	1/2	1-1/4	3	5	0.030	250331	151.29	250573	158.86
1/2	1/2	1-1/4	3	5	0.060	250342	151.29	250584	158.86
1/2	1/2	1-1/4	3	5	0.090	250353	151.29	250595	158.86
1/2	1/2	1-1/4	3	5	0.120	250364	151.29	250606	158.86
5/8	5/8	1-5/8	3-1/2	5	0.030	250375	254.89	250617	261.56
5/8	5/8	1-5/8	3-1/2	5	0.060	250386	254.89	250628	261.56
5/8	5/8	1-5/8	3-1/2	5	0.090	250397	254.89	250639	261.56
5/8	5/8	1-5/8	3-1/2	5	0.120	250408	254.89	250650	261.56
3/4	3/4	1-5/8	4	5	0.030	250419	353.45	250661	360.12
3/4	3/4	1-5/8	4	5	0.060	250430	353.45	250672	360.12
3/4	3/4	1-5/8	4	5	0.090	250441	353.45	250683	360.12
3/4	3/4	1-5/8	4	5	0.120	250452	353.45	250694	360.12
3/4	3/4	1-5/8	4	5	0.190	264512	353.45	264556	360.12
3/4	3/4	1-5/8	4	5	0.250	264523	353.45	264567	360.12
1	1	2	4	5	0.030	250463	645.36	250705	652.02
1	1	2	4	5	0.060	250474	645.36	250716	652.02
1	1	2	4	5	0.090	250485	645.36	250727	652.02
1	1	2	4	5	0.120	250496	645.36	250738	652.02
1	1	2	4	5	0.190	264534	645.36	264578	652.02
1	1	2	4	5	0.250	264545	645.36	264589	652.02

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

5 FLUTE - LONG LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	5	0.015	250991	70.99	–	–
1/4	1/4	1-1/8	3	5	0.030	251002	70.99	–	–
5/16	5/16	1-1/8	3	5	0.015	251013	96.70	–	–
5/16	5/16	1-1/8	3	5	0.030	251024	96.70	–	–
3/8	3/8	1-1/4	3	5	0.030	251035	127.98	–	–
3/8	3/8	1-1/4	3	5	0.060	251046	127.98	–	–
1/2	1/2	2	4	5	0.030	251057	198.53	251145	205.20
1/2	1/2	2	4	5	0.060	251068	198.53	251156	205.20
5/8	5/8	2-1/4	5	5	0.030	251079	359.72	251167	366.39
5/8	5/8	2-1/4	5	5	0.060	251090	359.72	251178	366.39
3/4	3/4	2-1/4	5	5	0.030	251101	452.99	251189	461.66
3/4	3/4	2-1/4	5	5	0.060	251112	452.99	251200	461.66
1	1	2-1/4	5	5	0.030	251123	706.38	251211	713.04
1	1	2-1/4	5	5	0.060	251134	706.38	251222	713.04

Prepared tools in our advanced PVD Coating Facility

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

5 FLUTE - EXTRA LONG LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	5	0.015	251541	86.39	–	–
1/4	1/4	1-1/2	4	5	0.030	251552	86.39	–	–
3/8	3/8	2	4	5	0.030	251563	146.32	–	–
3/8	3/8	2	4	5	0.060	251574	146.32	–	–
1/2	1/2	3	6	5	0.030	251585	272.69	251717	279.36
1/2	1/2	3	6	5	0.060	251596	272.69	251728	279.36
5/8	5/8	3	6	5	0.030	251607	384.27	251739	390.93
5/8	5/8	3	6	5	0.060	251618	384.27	251750	390.93
3/4	3/4	3	6	5	0.030	251629	507.37	251761	514.04
3/4	3/4	3	6	5	0.060	251640	507.37	251772	514.04
3/4	3/4	4	7	5	0.030	251651	826.08	251783	832.75
3/4	3/4	4	7	5	0.060	251662	826.08	251794	832.75
1	1	3	6	5	0.030	251673	830.49	251805	837.15
1	1	3	6	5	0.060	251684	830.49	251816	837.15
1	1	4-1/4	7	5	0.030	251695	1205.90	251827	1213.06
1	1	4-1/4	7	5	0.060	251706	1205.90	251838	1213.06

Over 13,000 items in stock and ready to ship

For coating information see pages 6-9. For VI-PRO technical information, please see pages 80-81, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

High Efficiency Milling and High Speed Machining are machining techniques aimed at maximizing metal removal rates (MRR) with the use of technology advancements in machines, software and end mill geometries. Both methods have the simple principle of increasing the metal removal rates (MRR).

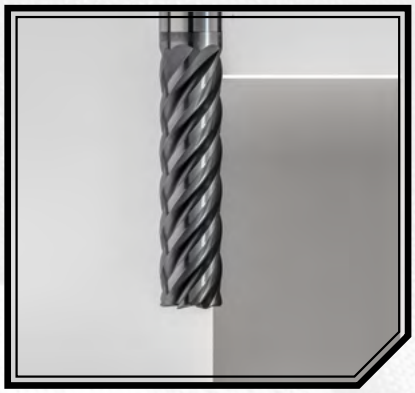
HIGH SPEED MACHINING • HSM

High Speed Machining is based on a very light axial depth of cut, while allowing for maximum radial engagement of the end mill. This combination, along with very high spindle speed, allows for an extremely high feed rate and greatly increased metal removal rates (MRR). HSM can be used in a wide range of applications and has many benefits.

- Used in applications ranging from simple slotting to complex 5 axis contouring
- Final result is achieved with quick light cuts, which allows for an extremely smooth finish in a roughing application
- Flexibility to use higher flute counts to achieve the best finish with the least production time

High Speed Machining is a high demand application where the VI Pro End Mill and Alcro-Max coating excel to give the absolute best results in High Performance applications.

HIGH EFFICIENCY MILLING • HEM



High Efficiency Milling is based on radial chip thinning with the basic idea of keeping the end mill cutting at an ideal chip load. The stepover is substantially reduced from the typical 50% of tool diameter, while the feed rate is greatly increased to maintain the correct chip load. There are multiple benefits to the process in the correct applications.

- Reduced spindle load due to low percentage of tool diameter being engaged in the work material.
- Allows for increased axial depth of cuts using the entire LOC on extra length end mills allowing for even tool wear and increased tool life.
- HEM tool paths allow for high flute count tools with heavier core, such as our 6 flute VI Pro, to be used which also means increased tool life as well as better finish on parts.

Today's advancements in CAM software technology have paved the way for HEM to be incorporated in many applications. In combination with a High Performance VI Pro 6 flute End Mill High Efficiency Machining can increase metal removal rates by 50% or more versus conventional roughing applications, all while extending tool life and machine life together.

6 FLUTE - STUB LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	3/8	2	6	251954	51.82	–	–
5/16	5/16	7/16	2	6	251956	77.10	–	–
3/8	3/8	1/2	2	6	251958	85.47	–	–
1/2	1/2	5/8	2-1/2	6	251960	126.74	251966	135.08
5/8	5/8	3/4	3	6	251962	243.14	251968	251.95
3/4	3/4	1	3	6	251964	316.88	251970	324.07

6 FLUTE - STUB LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	3/8	2	6	0.015	251984	62.32	–	–
5/16	5/16	7/16	2	6	0.015	251986	83.16	–	–
3/8	3/8	1/2	2	6	0.015	251988	91.54	–	–
1/2	1/2	5/8	2-1/2	6	0.030	251990	139.89	251996	147.16
5/8	5/8	3/4	3	6	0.030	251992	257.30	251998	263.50
3/4	3/4	1	3	6	0.030	251994	333.39	252000	339.45

The VI-PRO performs very well in a wide range of materials including:

HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
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For coating information see pages 6-9. For VI-PRO technical information, please see see pages 82-83, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

HIGH PERFORMANCE SOLID CARBIDE END MILLS

VI-PRO® VARIABLE INDEX GEOMETRY

6 FLUTE - REGULAR LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	3/4	2-1/2	6	252267	102.84	–	–
5/16	5/16	13/16	2-1/2	6	252278	122.14	–	–
3/8	3/8	1	2-1/2	6	252289	131.62	–	–
1/2	1/2	1-1/4	3	6	252300	175.99	252344	184.78
5/8	5/8	1-5/8	3-1/2	6	252311	293.28	252355	302.06
3/4	3/4	1-5/8	4	6	252322	368.14	252366	379.16
1	1	2	4	6	252333	563.84	252377	575.10

6 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	3/4	2-1/2	6	0.015	252388	114.79	–	–
5/16	5/16	13/16	2-1/2	6	0.015	252399	136.39	–	–
3/8	3/8	1	2-1/2	6	0.015	252410	147.00	–	–
1/2	1/2	1-1/4	3	6	0.030	252421	196.50	252465	206.31
5/8	5/8	1-5/8	3-1/2	6	0.030	252432	313.21	252476	322.59
3/4	3/4	1-5/8	4	6	0.060	252443	393.16	252487	404.94
1	1	2	4	6	0.060	252454	602.14	252498	620.21

The VI-PRO performs very well in a wide range of materials including:

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CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see see pages 82-83, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

6 FLUTE - LONG LENGTH - SQUARE END - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★				ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	6	252146	113.37	–	–
5/16	5/16	1-1/8	3	6	252157	132.29	–	–
3/8	3/8	1-1/4	3	6	252168	150.34	–	–
1/2	1/2	2	4	6	252179	233.84	252223	245.52
5/8	5/8	2-1/4	5	6	252190	363.25	252234	374.16
3/4	3/4	2-1/4	5	6	252201	453.64	252245	467.25
1	1	3	6	6	252212	919.44	252256	937.82

6 FLUTE - LONG LENGTH CR CORNER RADIUS - 38º HELIX

ALCRO-MAX COATED

VI-PRO	★★★ TOOL ATTRIBUTES ★★★					ROUND SHANK		WELDON FLAT	
DIAMETER	SHANK	LOC	OAL	# OF FLUTES	RAD	ITEM#	LIST PRICE	ITEM#	LIST PRICE
1/4	1/4	1-1/8	3	6	0.015	252025	126.61	–	–
5/16	5/16	1-1/8	3	6	0.015	252036	147.71	–	–
3/8	3/8	1-1/4	3	6	0.015	252047	167.88	–	–
1/2	1/2	2	4	6	0.030	252058	261.07	252102	274.11
5/8	5/8	2-1/4	5	6	0.030	252069	387.94	252113	399.59
3/4	3/4	2-1/4	5	6	0.060	252080	484.47	252124	499.02
1	1	3	6	6	0.060	252091	981.89	252135	1001.55

The VI-PRO performs very well in a wide range of materials including:

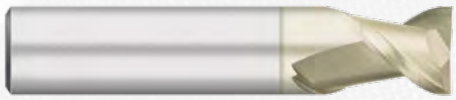
HIGH TEMP ALLOYS • STAINLESS STEELS • ALLOY STEELS • INCONEL
CAST IRON • HIGH TEMP NICKEL BASE ALLOYS • TITANIUM ALLOYS • EXOTICS

For coating information see pages 6-9. For VI-PRO technical information, please see see pages 82-83, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

2 FLUTE - STUB LENGTH - SQUARE END - 45º HELIX



ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	149000	21.53
3/16	3/16	3/8	2	149002	31.86
1/4	1/4	1/2	2	149004	45.71
5/16	5/16	1/2	2	149006	55.22
3/8	3/8	5/8	2	149008	60.58
1/2	1/2	5/8	2-1/2	149010	102.13
5/8	5/8	3/4	3	149012	205.69
3/4	3/4	1	3	149014	310.22
1	1	1-1/4	3-1/2	149016	520.23

2 FLUTE - STUB LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	0.010	149400	26.48
3/16	3/16	3/8	2	0.010	149402	38.31
1/4	1/4	1/2	2	0.020	149404	53.82
5/16	5/16	1/2	2	0.020	149406	62.71
3/8	3/8	5/8	2	0.020	149408	67.20
1/2	1/2	5/8	2-1/2	0.040	149410	108.89
5/8	5/8	3/4	3	0.040	149412	216.56
3/4	3/4	1	3	0.040	149414	320.42
1	1	1-1/4	3-1/2	0.040	149416	535.68

These 2 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

2 FLUTE - REGULAR LENGTH - SQUARE END - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	149638	29.88
3/16	3/16	5/8	2	149640	41.66
1/4	1/4	3/4	2-1/2	149642	58.13
5/16	5/16	13/16	2-1/2	149653	68.65
3/8	3/8	1	2-1/2	149664	72.65
1/2	1/2	1-1/4	3	149675	115.38
5/8	5/8	1-5/8	3-1/2	149686	230.62
3/4	3/4	1-3/4	4	149697	331.21
1	1	1-3/4	4	149708	545.21

2 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.010	150430	35.72
3/16	3/16	5/8	2	0.010	150432	48.98
1/4	1/4	3/4	2-1/2	0.020	150434	64.88
5/16	5/16	13/16	2-1/2	0.020	150445	76.66
3/8	3/8	1	2-1/2	0.020	150456	81.12
1/2	1/2	1-1/4	3	0.040	150467	128.80
5/8	5/8	1-5/8	3-1/2	0.040	150478	246.28
3/4	3/4	1-3/4	4	0.040	150489	353.74
1	1	1-3/4	4	0.040	150500	582.26

These 2 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

2 FLUTE - LONG LENGTH - SQUARE END - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	3/4	2-1/4	149946	50.74
3/16	3/16	3/4	2-1/2	149948	58.51
1/4	1/4	1-1/4	3	149950	79.74
5/16	5/16	1-3/8	3	149961	108.48
3/8	3/8	1-1/2	4	149972	129.41
1/2	1/2	2	4	149983	181.79
5/8	5/8	2-3/8	5	149994	395.63
3/4	3/4	2-1/2	5	150005	427.57
1	1	2-1/4	5	150016	673.28

2 FLUTE - LONG LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	3/4	2-1/4	0.010	150584	60.88
3/16	3/16	3/4	2-1/2	0.010	150586	70.21
1/4	1/4	1-1/4	3	0.020	150588	89.04
5/16	5/16	1-3/8	3	0.020	150599	121.10
3/8	3/8	1-1/2	4	0.020	150610	144.51
1/2	1/2	2	4	0.040	150621	202.98
5/8	5/8	2-3/8	5	0.040	150632	422.50
3/4	3/4	2-1/2	5	0.040	150643	456.62
1	1	2-1/4	5	0.040	150654	719.06

These 2 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

3 FLUTE - STUB LENGTH - SQUARE END - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	149436	21.53
3/16	3/16	3/8	2	149438	31.86
1/4	1/4	1/2	2	149440	45.71
5/16	5/16	1/2	2	149442	55.22
3/8	3/8	5/8	2	149444	60.58
1/2	1/2	5/8	2-1/2	149446	102.13
5/8	5/8	3/4	3	149448	205.69
3/4	3/4	1	3	149450	310.22
1	1	1-1/4	3-1/2	149452	520.23

3 FLUTE - STUB LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	0.010	149454	26.48
3/16	3/16	3/8	2	0.010	149456	38.31
1/4	1/4	1/2	2	0.020	149458	53.82
5/16	5/16	1/2	2	0.020	149460	62.71
3/8	3/8	5/8	2	0.020	149462	67.20
1/2	1/2	5/8	2-1/2	0.040	149464	108.89
5/8	5/8	3/4	3	0.040	149466	216.56
3/4	3/4	1	3	0.040	149468	320.42
1	1	1-1/4	3-1/2	0.040	149470	535.68

These 3 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

3 FLUTE - REGULAR LENGTH - SQUARE END - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	149792	29.88
3/16	3/16	5/8	2	149794	41.66
1/4	1/4	3/4	2-1/2	149796	58.13
5/16	5/16	13/16	2-1/2	149807	68.65
3/8	3/8	1	2-1/2	149818	72.65
1/2	1/2	1-1/4	3	149829	115.38
5/8	5/8	1-5/8	3-1/2	149840	230.62
3/4	3/4	1-3/4	4	149851	331.21
1	1	1-3/4	4	149862	545.21

3 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.010	150738	35.72
3/16	3/16	5/8	2	0.010	150740	48.98
1/4	1/4	3/4	2-1/2	0.020	150742	64.88
5/16	5/16	13/16	2-1/2	0.020	150753	76.66
3/8	3/8	1	2-1/2	0.020	150764	81.12
1/2	1/2	1-1/4	3	0.040	150775	128.80
5/8	5/8	1-5/8	3-1/2	0.040	150786	246.28
3/4	3/4	1-3/4	4	0.040	150797	353.74
1	1	1-3/4	4	0.040	150808	582.26

These 3 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ALUMINUM END MILLS

3 FLUTE - LONG LENGTH - SQUARE END - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	3/4	2-1/4	150100	50.62
3/16	3/16	3/4	2-1/2	150102	58.51
1/4	1/4	1-1/4	3	150104	79.74
5/16	5/16	1-3/8	3	150115	108.48
3/8	3/8	1-1/2	4	150126	129.41
1/2	1/2	2	4	150137	181.79
5/8	5/8	2-3/8	5	150148	395.63
3/4	3/4	2-1/2	5	150159	427.57
1	1	2-1/4	5	150170	673.28

3 FLUTE - LONG LENGTH CR CORNER RADIUS - 45º HELIX

ZRN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	3/4	2-1/4	0.010	150892	60.88
3/16	3/16	3/4	2-1/2	0.010	150894	70.21
1/4	1/4	1-1/4	3	0.020	150896	89.04
5/16	5/16	1-3/8	3	0.020	150907	121.10
3/8	3/8	1-1/2	4	0.020	150918	144.51
1/2	1/2	2	4	0.040	150929	202.98
5/8	5/8	2-3/8	5	0.040	150940	422.50
3/4	3/4	2-1/2	5	0.040	150951	456.62
1	1	2-1/4	5	0.040	150962	719.06

These 3 flute end mills are designed specifically for high speed machining in Aluminum. This tool will plunge, slot and profile in all non-ferrous materials. Our ZrN coating allows for higher speed rates and prolonged tool life and does not have an affinity for Aluminum.

WORKS WELL IN ALL NON-FERROUS MATERIALS APPLICATIONS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE ROUGHING END MILLS

4 FLUTE - STUB LENGTH - FINE PITCH - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/4	1/4	3/8	2	257921	62.76
5/16	5/16	1/2	2	257932	88.13
3/8	3/8	9/16	2	257943	102.79
1/2	1/2	5/8	2-1/2	257954	128.47
5/8	5/8	3/4	3	257965	277.56
3/4	3/4	1	3	257976	333.12

AlTiN coating extends tool life and improves performance

Our fine pitch rougher is designed to remove maximum material with minimum vibration or chatter, while milling faster than conventional finishing end mills. Excellent for:

HARDENED STEELS • TITANIUM • INCONEL • SPACE AGE MATERIALS

For coating information see pages 6-9. For technical information, please see pages 84, 91-93.

TOLERANCES	DIAMETER	SHANK
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE ROUGHING END MILLS

4 FLUTE - REGULAR LENGTH - FINE PITCH - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/4	1/4	3/4	2-1/2	142833	70.39
5/16	5/16	13/16	2-1/2	142844	97.92
3/8	3/8	7/8	2-1/2	142855	114.21
1/2	1/2	1-1/4	3	142866	144.12
5/8	5/8	1-5/8	3-1/2	142877	308.39
3/4	3/4	1-5/8	4	142888	373.65
1	1	2	4	142899	687.25

4 FLUTE - LONG LENGTH - FINE PITCH - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/4	1/4	1-1/2	4	218645	100.80
5/16	5/16	1-1/2	4	218656	129.25
3/8	3/8	1-3/4	4	218667	161.59
1/2	1/2	2	4	218678	186.75
5/8	5/8	2-1/2	5	218689	439.35
3/4	3/4	2-1/2	5	218700	527.71
1	1	2-1/2	5	218711	900.46

Our fine pitch rougher is designed to remove maximum material with minimum vibration or chatter, while milling faster than conventional finishing end mills. Excellent for:

HARDENED STEELS • TITANIUM • INCONEL • SPACE AGE MATERIALS

For coating information see pages 6-9. For technical information, please see pages 84, 91-93.

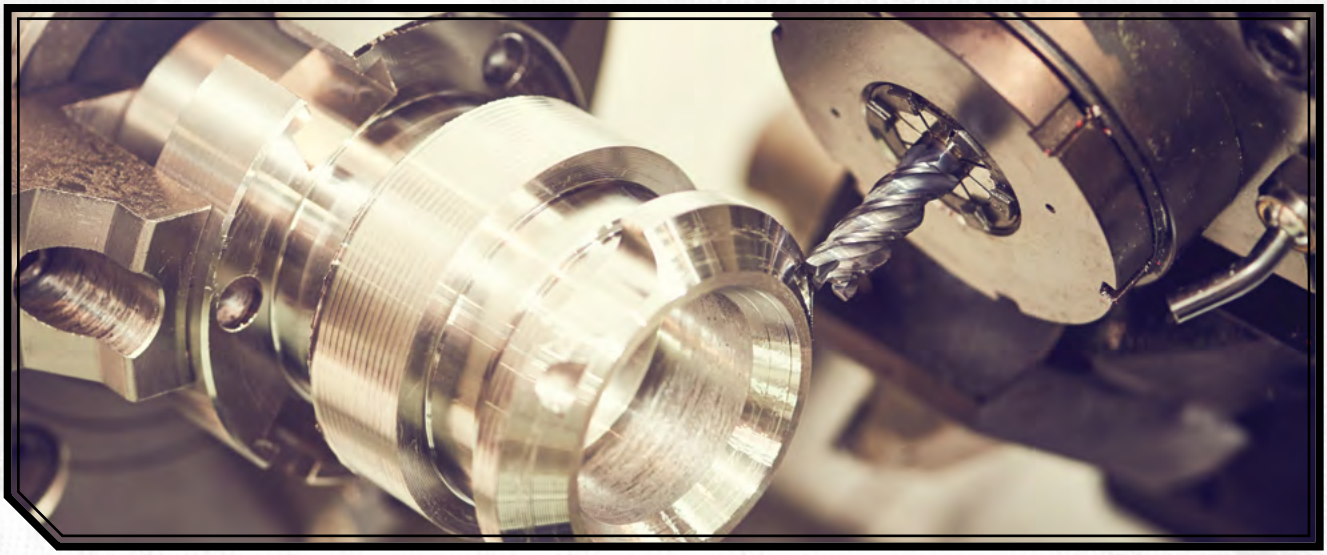
TOLERANCES	DIAMETER	SHANK
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE ROUGHING END MILLS

4 FLUTE - REGULAR LENGTH - FINE PITCH - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/4	1/4	3/4	2-1/2	262158	88.20
5/16	5/16	7/8	2-1/2	262169	113.39
3/8	3/8	1	2-1/2	262180	144.89
1/2	1/2	1-1/4	3	262191	199.07
5/8	5/8	1-5/8	3-1/2	262202	347.74
3/4	3/4	1-5/8	4	262213	485.07
1	1	2	4	262224	787.46



Huge inventory in-stock ready to ship same day

Our fine pitch rougher is designed to remove maximum material with minimum vibration or chatter, while milling faster than conventional finishing end mills. Excellent for:

HARDENED STEELS • TITANIUM • INCONEL • SPACE AGE MATERIALS

For coating information see pages 6-9. For technical information, please see pages 84, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/4" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

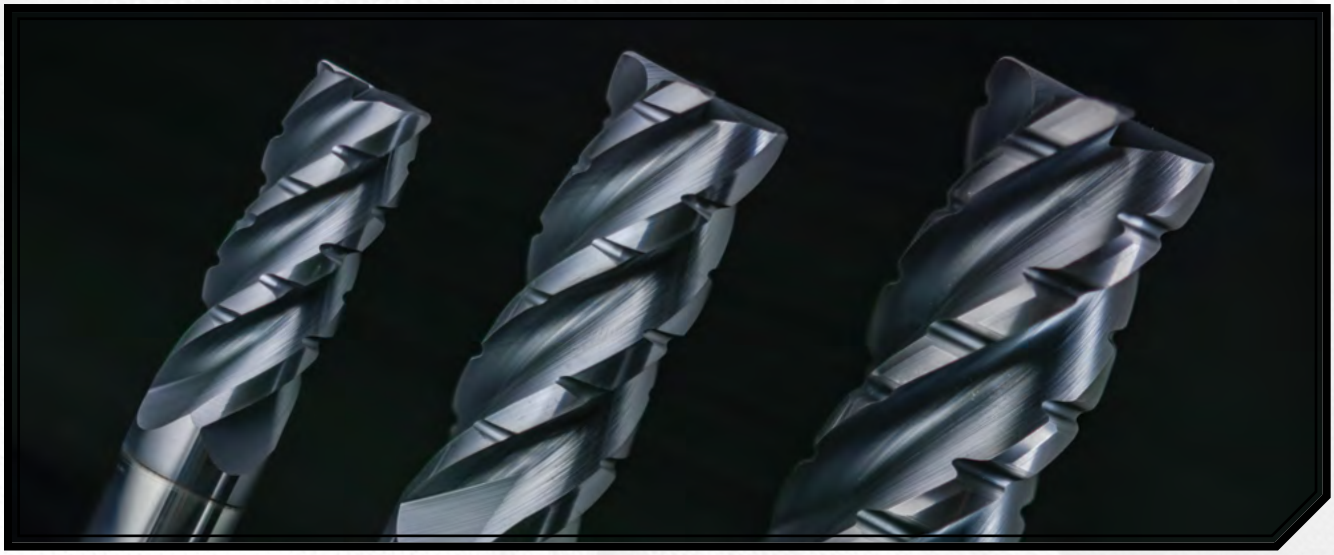
GENERAL PURPOSE SOLID CARBIDE ROUGHER - FINISHER END MILLS

4 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 40º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/4	1/4	3/4	2-1/2	0.020	142987	121.94
5/16	5/16	13/16	2-1/2	0.020	142998	132.05
3/8	3/8	7/8	2-1/2	0.020	143009	143.50
1/2	1/2	1-1/4	3	0.040	143020	165.89
* 5/8	5/8	1-5/8	3-1/2	0.040	143031	330.28
* 3/4	3/4	1-5/8	4	0.040	143042	441.28
* 1	1	1-5/8	4	0.040	143053	720.13

*** Weldon Flats**



High material removal rate (MRR) with excellent surface finish

The radius chipbreakers in this high performance tool allow for higher feed rates than a finishing end mill yet does not appreciably degrade the finish that the tool produces.

WORKS WELL IN HARD TO MACHINE MATERIALS SUCH AS STAINLESS STEEL AND TITANIUM.

For coating information see pages 6-9. For technical information, please see pages 84, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
ALL SIZES	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE
SOLID CARBIDE END MILLS

2 FLUTE - STUB LENGTH - SQUARE END - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216577	27.85
1/32	1/8	1/16	1-1/2	130381	17.15
3/64	1/8	3/32	1-1/2	130392	17.15
1/16	1/8	1/8	1-1/2	130403	12.83
5/64	1/8	1/8	1-1/2	216588	21.70
3/32	1/8	3/16	1-1/2	130414	12.83
1/8	1/8	1/4	1-1/2	130425	12.25
5/32	3/16	5/16	2	130436	20.41
3/16	3/16	3/8	2	130447	19.16

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7/32	1/4	7/16	2	130458	25.75
1/4	1/4	1/2	2	130469	22.59
5/16	5/16	1/2	2	130480	30.52
3/8	3/8	5/8	2	130491	39.39
7/16	7/16	5/8	2-1/2	130502	49.14
1/2	1/2	5/8	2-1/2	130513	62.07
5/8	5/8	3/4	3	130524	131.39
3/4	3/4	1	3	130535	183.92

2 FLUTE - STUB LENGTH - SQUARE END - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216687	34.80
1/32	1/8	1/16	1-1/2	132449	22.23
3/64	1/8	3/32	1-1/2	132460	22.23
1/16	1/8	1/8	1-1/2	132471	16.75
5/64	1/8	1/8	1-1/2	216698	27.13
3/32	1/8	3/16	1-1/2	132482	16.75
1/8	1/8	1/4	1-1/2	132493	16.00
5/32	3/16	5/16	2	132504	25.22
3/16	3/16	3/8	2	132515	23.75

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7/32	1/4	7/16	2	132526	31.95
1/4	1/4	1/2	2	132537	28.07
5/16	5/16	1/2	2	132548	39.70
3/8	3/8	5/8	2	132559	48.79
7/16	7/16	5/8	2-1/2	132570	61.00
1/2	1/2	5/8	2-1/2	132581	77.08
5/8	5/8	3/4	3	132592	155.23
3/4	3/4	1	3	132603	227.59

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

2 FLUTE - STUB LENGTH - BALL NOSE - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216599	34.75
1/32	1/8	1/16	1-1/2	130546	22.32
3/64	1/8	3/32	1-1/2	130557	22.32
1/16	1/8	1/8	1-1/2	130568	16.80
5/64	1/8	1/8	1-1/2	216610	27.18
3/32	1/8	3/16	1-1/2	130579	16.80
1/8	1/8	1/4	1-1/2	130590	15.91
5/32	3/16	5/16	2	130601	26.51
3/16	3/16	3/8	2	130612	24.86

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7/32	1/4	7/16	2	130623	33.42
1/4	1/4	1/2	2	130634	29.27
5/16	5/16	1/2	2	130645	39.61
3/8	3/8	5/8	2	130656	51.15
7/16	7/16	5/8	2-1/2	130667	63.98
1/2	1/2	5/8	2-1/2	130678	80.60
5/8	5/8	3/4	3	130689	153.94
3/4	3/4	1	3	130700	234.05

2 FLUTE - STUB LENGTH - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216709	43.44
1/32	1/8	1/16	1-1/2	132614	28.56
3/64	1/8	3/32	1-1/2	132625	28.56
1/16	1/8	1/8	1-1/2	132636	21.48
5/64	1/8	1/8	1-1/2	216720	33.95
3/32	1/8	3/16	1-1/2	132647	21.48
1/8	1/8	1/4	1-1/2	132658	20.41
5/32	3/16	5/16	2	132669	33.95
3/16	3/16	3/8	2	132680	31.81

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7/32	1/4	7/16	2	132691	42.77
1/4	1/4	1/2	2	132702	37.47
5/16	5/16	1/2	2	132713	50.70
3/8	3/8	5/8	2	132724	62.38
7/16	7/16	5/8	2-1/2	132735	78.02
1/2	1/2	5/8	2-1/2	132746	103.15
5/8	5/8	3/4	3	132757	188.47
3/4	3/4	1	3	132768	299.59

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

2 FLUTE - REGULAR LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/64	1/8	1/32	1-1/2	129567	29.32	129974	39.29	163447	39.29
1/32	1/8	1/8	1-1/2	129578	19.65	129985	26.55	163458	26.55
3/64	1/8	1/8	1-1/2	129589	16.79	129996	22.62	163469	22.62
1/16	1/8	1/4	1-1/2	129600	16.75	130007	19.23	163480	19.23
5/64	1/8	1/4	1-1/2	129611	17.29	130018	23.33	163491	23.33
3/32	1/8	3/8	1-1/2	129622	15.22	130029	19.23	163502	19.23
7/64	1/8	3/8	1-1/2	129633	15.88	130040	21.42	163513	21.42
1/8	1/8	1/2	1-1/2	129644	14.60	130051	17.87	163524	17.87
9/64	3/16	9/16	2	129655	21.38	130062	28.87	163535	28.87
5/32	3/16	9/16	2	129666	21.51	130073	24.94	163546	24.94
11/64	3/16	5/8	2	129677	20.43	130084	27.63	163557	27.63
3/16	3/16	5/8	2	129688	19.89	130095	24.94	163568	24.94
13/64	1/4	5/8	2-1/2	129699	29.03	130106	38.05	163579	38.05
7/32	1/4	5/8	2-1/2	129710	29.65	130117	34.45	163590	34.45
15/64	1/4	3/4	2-1/2	129721	33.50	130128	43.18	163601	43.18
1/4	1/4	3/4	2-1/2	129732	24.57	130139	34.45	163612	34.45
17/64	5/16	3/4	2-1/2	129743	44.30	130150	56.91	163623	56.91
9/32	5/16	3/4	2-1/2	129754	44.30	130161	56.91	163634	56.91
19/64	5/16	13/16	2-1/2	129765	44.30	130172	56.91	163645	56.91
5/16	5/16	13/16	2-1/2	129776	31.97	130183	41.24	163656	41.24
21/64	3/8	1	2-1/2	129787	49.67	130194	63.86	163667	63.86
11/32	3/8	1	2-1/2	129798	49.67	130205	63.86	163678	63.86
23/64	3/8	1	2-1/2	129809	49.67	130216	63.86	163689	63.86
3/8	3/8	1	2-1/2	129820	38.13	130227	47.15	163700	47.15
25/64	7/16	1	2-3/4	129831	65.02	130238	83.92	163711	83.92
13/32	7/16	1	2-3/4	129842	65.02	130249	83.92	163722	83.92
27/64	7/16	1	2-3/4	129853	67.13	130260	86.69	163733	86.69
7/16	7/16	1	2-3/4	129864	58.52	130271	72.05	163744	72.05
29/64	1/2	1	3	129875	96.62	130282	123.66	163755	123.66
15/32	1/2	1	3	129886	96.62	130293	123.66	163766	123.66
31/64	1/2	1	3	129897	96.62	130304	123.66	163777	123.66
1/2	1/2	1	3	129908	70.27	130315	87.68	163788	87.68
9/16	9/16	1-1/4	3-1/2	129919	132.80	130326	175.36	163799	175.36
5/8	5/8	1-1/4	3-1/2	129930	134.33	130337	171.27	163810	171.27
3/4	3/4	1-1/2	4	129941	188.68	130348	243.03	163821	243.03
7/8	7/8	1-1/2	4	129952	345.10	130359	436.79	163832	436.79
1	1	1-1/2	4	129963	308.66	130370	394.82	163843	394.82

2 FLUTE 30° HELIX
4 FLUTE 30° HELIX
3 FLUTE 45° HELIX
3 FLUTE 60° HELIX
5 FLUTE 45° HELIX
TECHNICAL

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 7/64"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
9/16" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE
SOLID CARBIDE END MILLS

2 FLUTE - LONG LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	3/4	2-1/4	136134	23.57	136288	30.32	165097	30.32
3/16	3/16	3/4	2-1/2	136145	27.67	136299	35.57	165108	35.57
1/4	1/4	1-1/8	3	136156	39.62	136310	51.08	165119	51.08
1/4	1/4	1	4	136167	41.73	136321	53.81	165130	53.81
5/16	5/16	1-1/8	3	136178	44.71	136332	60.34	165141	60.34
3/8	3/8	1-1/8	3	136189	51.29	136343	69.24	165152	69.24
3/8	3/8	1	4	136200	59.89	136354	77.05	165163	77.05
7/16	7/16	2	4	136211	80.82	136365	105.09	165174	105.09
1/2	1/2	1	4	136222	87.52	136376	112.70	165185	112.70
1/2	1/2	2	4	136233	92.69	136387	118.95	165196	118.95
5/8	5/8	2-1/4	5	136244	207.17	136398	256.39	165207	256.39
3/4	3/4	2-1/4	5	136255	286.12	136409	369.17	165218	369.17
7/8	7/8	2-1/4	5	136266	542.30	136420	640.90	165229	640.90
1	1	2-1/4	5	136277	391.71	136431	505.58	165240	505.58

2 FLUTE - EXTRA LONG LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

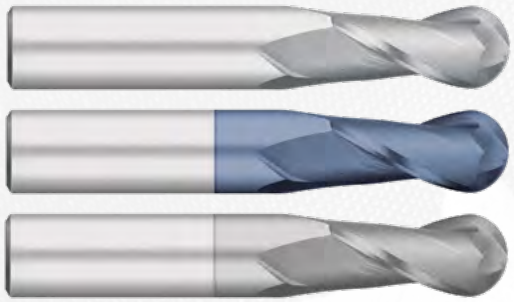
DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	1	3	137366	26.35	137520	35.57	165713	35.57
3/16	3/16	1-1/8	3	137377	28.66	137531	36.81	165724	36.81
1/4	1/4	1-1/2	4	137388	42.92	137542	55.28	165735	55.28
1/4	1/4	1-1/2	6	137399	54.76	137553	70.43	165746	70.43
5/16	5/16	1-5/8	4	137410	55.26	137564	71.30	165757	71.30
3/8	3/8	1-3/4	4	137421	62.74	137575	80.36	165768	80.36
3/8	3/8	1-1/2	6	137432	95.00	137586	122.46	165779	122.46
7/16	7/16	3	6	137443	127.97	137597	164.07	165790	164.07
1/2	1/2	1-1/2	6	137454	144.59	137608	179.46	165801	179.46
1/2	1/2	3	6	137465	151.79	137619	186.65	165812	186.65
5/8	5/8	3	6	137476	223.55	137630	274.83	165823	274.83
3/4	3/4	3	6	137487	332.24	137641	408.13	165834	408.13
7/8	7/8	3	6	137498	591.60	137652	739.54	165845	739.54
1	1	3	6	137509	564.02	137663	693.10	165856	693.10

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

2 FLUTE - REGULAR LENGTH - BALL NOSE - 30º HELIX



DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/64	1/8	1/32	1-1/2	131635	32.84	132042	44.01	164283	44.01
1/32	1/8	1/8	1-1/2	131646	21.01	132053	27.30	164294	27.30
3/64	1/8	1/8	1-1/2	131657	21.01	132064	27.30	164305	27.30
1/16	1/8	1/4	1-1/2	131668	19.48	132075	26.30	164316	26.30
5/64	1/8	1/4	1-1/2	131679	19.48	132086	26.30	164327	26.30
3/32	1/8	3/8	1-1/2	131690	20.43	132097	27.63	164338	27.63
7/64	1/8	3/8	1-1/2	131701	20.43	132108	27.63	164349	27.63
1/8	1/8	1/2	1-1/2	131712	18.74	132119	25.31	164360	25.31
9/64	3/16	9/16	2	131723	27.46	132130	37.10	164371	37.10
5/32	3/16	9/16	2	131734	27.46	132141	37.10	164382	37.10
11/64	3/16	5/8	2	131745	27.46	132152	37.10	164393	37.10
3/16	3/16	5/8	2	131756	24.69	132163	33.34	164404	33.34
13/64	1/4	5/8	2-1/2	131767	35.94	132174	45.37	164415	45.37
7/32	1/4	5/8	2-1/2	131778	35.94	132185	45.37	164426	45.37
15/64	1/4	3/4	2-1/2	131789	35.94	132196	45.37	164437	45.37
1/4	1/4	3/4	2-1/2	131800	34.73	132207	43.22	164448	43.22
17/64	5/16	3/4	2-1/2	131811	45.37	132218	58.36	164459	58.36
9/32	5/16	3/4	2-1/2	131822	45.45	132229	58.44	164470	58.44
19/64	5/16	13/16	2-1/2	131833	49.38	132240	64.81	164481	64.81
5/16	5/16	13/16	2-1/2	131844	41.81	132251	53.77	164492	53.77
21/64	3/8	1	2-1/2	131855	57.45	132262	77.55	164503	77.55
11/32	3/8	1	2-1/2	131866	60.30	132273	77.55	164514	77.55
23/64	3/8	1	2-1/2	131877	57.45	132284	77.55	164525	77.55
3/8	3/8	1	2-1/2	131888	44.75	132295	63.24	164536	63.24
25/64	7/16	1	2-3/4	131899	77.80	132306	100.25	164547	100.25
13/32	7/16	1	2-3/4	131910	77.80	132317	100.25	164558	100.25
27/64	7/16	1	2-3/4	131921	77.80	132328	100.25	164569	100.25
7/16	7/16	1	2-3/4	131932	66.22	132339	85.37	164580	85.37
29/64	1/2	1	3	131943	102.57	132350	132.27	164591	132.27
15/32	1/2	1	3	131954	102.57	132361	132.27	164602	132.27
31/64	1/2	1	3	131965	102.57	132372	132.27	164613	132.27
1/2	1/2	1	3	131976	90.82	132383	117.05	164624	117.05
9/16	9/16	1-1/4	3-1/2	131987	138.43	132394	170.36	164635	170.36
5/8	5/8	1-1/4	3-1/2	131998	146.87	132405	189.30	164646	189.30
3/4	3/4	1-1/2	4	132009	216.39	132416	281.99	164657	281.99
7/8	7/8	1-1/2	4	132020	419.05	132427	532.46	164668	532.46
1	1	1-1/2	4	132031	386.50	132438	498.05	164679	498.05

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK RAD
1/64" - 7/64"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
9/16" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

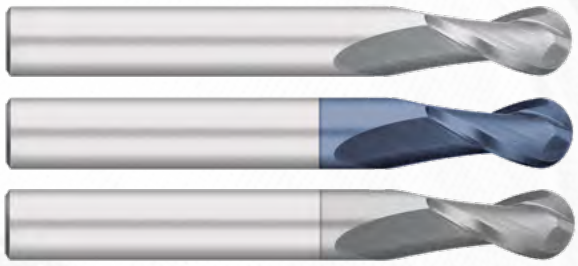
GENERAL PURPOSE SOLID CARBIDE END MILLS

2 FLUTE - LONG LENGTH - BALL NOSE - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED



DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	3/4	2-1/4	136750	28.04	136904	36.07	165405	36.07
3/16	3/16	3/4	2-1/2	136761	32.26	136915	41.44	165416	41.44
1/4	1/4	1-1/8	3	136772	45.37	136926	58.40	165427	58.40
1/4	1/4	1	4	136783	50.09	136937	64.56	165438	64.56
5/16	5/16	1-1/8	3	136794	53.35	136948	72.01	165449	72.01
3/8	3/8	1-1/8	3	136805	61.58	136959	83.17	165460	83.17
3/8	3/8	1	4	136816	75.44	136970	98.02	165471	98.02
7/16	7/16	2	4	136827	103.15	136981	134.13	165482	134.13
1/2	1/2	1	4	136838	105.63	136992	134.33	165493	134.33
1/2	1/2	2	4	136849	106.67	137003	135.37	165504	135.37
5/8	5/8	2-1/4	5	136860	243.03	137014	308.66	165515	308.66
3/4	3/4	2-1/4	5	136871	338.40	137025	428.65	165526	428.65
7/8	7/8	2-1/4	5	136882	581.76	137036	714.89	165537	714.89
1	1	2-1/4	5	136893	669.61	137047	823.46	165548	823.46

2 FLUTE - EXTRA LONG LENGTH - BALL NOSE - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	1	3	138026	31.39	138180	42.35	166021	42.35
3/16	3/16	1-1/8	3	138037	37.62	138191	44.21	166032	44.21
1/4	1/4	1-1/2	4	138048	55.16	138202	61.38	166043	61.38
1/4	1/4	1-1/2	6	138059	63.39	138213	72.09	166054	72.09
5/16	5/16	1-5/8	4	138070	66.67	138224	86.07	166065	86.07
3/8	3/8	1-3/4	4	138081	71.76	138235	91.73	166076	91.73
3/8	3/8	1-1/2	6	138092	101.12	138246	124.12	166087	124.12
7/16	7/16	3	6	138103	151.79	138257	194.84	166098	194.84
1/2	1/2	1-1/2	6	138114	161.01	138268	206.13	166109	206.13
1/2	1/2	3	6	138125	162.00	138279	207.17	166120	207.17
5/8	5/8	3	6	138136	255.35	138290	313.79	166131	313.79
3/4	3/4	3	6	138147	362.10	138301	488.82	166142	488.82
7/8	7/8	3	6	138158	640.90	138312	798.69	166153	798.69
1	1	3	6	138169	646.03	138323	831.73	166164	831.73

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE
SOLID CARBIDE END MILLS

4 FLUTE - STUB LENGTH - SQUARE END - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE	DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216621	27.85	7/32	1/4	7/16	2	131217	25.75
1/32	1/8	1/16	1-1/2	131140	17.15	1/4	1/4	1/2	2	131228	22.59
3/64	1/8	3/32	1-1/2	131151	17.15	5/16	5/16	1/2	2	131239	30.52
1/16	1/8	1/8	1-1/2	131162	12.83	3/8	3/8	5/8	2	131250	39.39
5/64	1/8	1/8	1-1/2	216632	21.70	7/16	7/16	5/8	2-1/2	131261	49.14
3/32	1/8	3/16	1-1/2	131173	12.83	1/2	1/2	5/8	2-1/2	131272	62.07
1/8	1/8	1/4	1-1/2	131184	12.25	5/8	5/8	3/4	3	131283	131.39
5/32	3/16	5/16	2	131195	20.41	3/4	3/4	1	3	131294	183.92
3/16	3/16	3/8	2	131206	19.16	1	1	1-1/4	3-1/2	259505	303.10

4 FLUTE - STUB LENGTH - SQUARE END - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE	DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216665	34.80	7/32	1/4	7/16	2	131547	31.95
1/32	1/8	1/16	1-1/2	131470	22.23	1/4	1/4	1/2	2	131558	28.07
3/64	1/8	3/32	1-1/2	131481	22.23	5/16	5/16	1/2	2	131569	39.70
1/16	1/8	1/8	1-1/2	131492	16.75	3/8	3/8	5/8	2	131580	48.79
5/64	1/8	1/8	1-1/2	216676	27.13	7/16	7/16	5/8	2-1/2	131591	61.00
3/32	1/8	3/16	1-1/2	131503	16.75	1/2	1/2	5/8	2-1/2	131602	77.30
1/8	1/8	1/4	1-1/2	131514	16.00	5/8	5/8	3/4	3	131613	155.28
5/32	3/16	5/16	2	131525	25.22	3/4	3/4	1	3	131624	227.59
3/16	3/16	3/8	2	131536	23.75	1	1	1-1/4	3-1/2	259527	377.98

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - STUB LENGTH - BALL NOSE - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE	DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216643	34.75	7/32	1/4	7/16	2	131382	33.42
1/32	1/8	1/16	1-1/2	131305	22.32	1/4	1/4	1/2	2	131393	31.77
3/64	1/8	3/32	1-1/2	131316	22.32	5/16	5/16	1/2	2	131404	39.61
1/16	1/8	1/8	1-1/2	131327	16.80	3/8	3/8	5/8	2	131415	51.15
5/64	1/8	1/8	1-1/2	216654	27.18	7/16	7/16	5/8	2-1/2	131426	63.98
3/32	1/8	3/16	1-1/2	131338	16.80	1/2	1/2	5/8	2-1/2	131437	80.60
1/8	1/8	1/4	1-1/2	131349	15.91	5/8	5/8	3/4	3	131448	153.94
5/32	3/16	5/16	2	131360	26.51	3/4	3/4	1	3	131459	234.05
3/16	3/16	3/8	2	131371	24.86	1	1	1-1/4	3-1/2	259516	362.53

4 FLUTE - STUB LENGTH - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE	DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/64	1/8	0.023	1-1/2	216731	43.44	7/32	1/4	7/16	2	133670	42.77
1/32	1/8	1/16	1-1/2	133593	28.56	1/4	1/4	1/2	2	133681	41.22
3/64	1/8	3/32	1-1/2	133604	28.56	5/16	5/16	1/2	2	133692	50.70
1/16	1/8	1/8	1-1/2	133615	21.48	3/8	3/8	5/8	2	133703	62.38
5/64	1/8	1/8	1-1/2	216742	33.95	7/16	7/16	5/8	2-1/2	133714	78.02
3/32	1/8	3/16	1-1/2	133626	21.48	1/2	1/2	5/8	2-1/2	133725	103.15
1/8	1/8	1/4	1-1/2	133637	20.41	5/8	5/8	3/4	3	133736	188.47
5/32	3/16	5/16	2	133648	33.95	3/4	3/4	1	3	133747	299.59
3/16	3/16	3/8	2	133659	31.81	1	1	1-1/4	3-1/2	259538	445.73

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE
SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/64	1/8	1/32	1-1/2	130711	29.32	166329	39.29	163854	39.29
1/32	1/8	1/8	1-1/2	130722	19.65	166340	26.55	163865	26.55
3/64	1/8	1/8	1-1/2	130733	16.79	166351	22.62	163876	22.62
1/16	1/8	1/4	1-1/2	130744	16.75	166362	19.23	163887	19.23
5/64	1/8	1/4	1-1/2	130755	17.29	166373	23.33	163898	23.33
3/32	1/8	3/8	1-1/2	130766	15.22	166384	19.23	163909	19.23
7/64	1/8	3/8	1-1/2	130777	15.88	166395	21.42	163920	21.42
1/8	1/8	1/2	1-1/2	130788	14.60	166406	17.87	163931	17.87
9/64	3/16	9/16	2	130799	21.38	166417	28.87	163942	28.87
5/32	3/16	9/16	2	130810	21.51	166428	24.94	163953	24.94
11/64	3/16	5/8	2	130821	20.43	166439	27.63	163964	27.63
3/16	3/16	5/8	2	130832	19.89	166450	24.94	163975	24.94
13/64	1/4	5/8	2-1/2	130843	29.03	166461	38.05	163986	38.05
7/32	1/4	5/8	2-1/2	130854	29.65	166472	34.45	163997	34.45
15/64	1/4	3/4	2-1/2	130865	33.50	166483	43.18	164008	43.18
1/4	1/4	3/4	2-1/2	130876	24.57	166494	34.45	164019	34.45
17/64	5/16	3/4	2-1/2	130887	44.30	166505	56.91	164030	56.91
9/32	5/16	3/4	2-1/2	130898	44.30	166516	56.91	164041	56.91
19/64	5/16	13/16	2-1/2	130909	44.30	166527	56.91	164052	56.91
5/16	5/16	13/16	2-1/2	130920	31.97	166538	41.24	164063	41.24
21/64	3/8	1	2-1/2	130931	49.67	166549	63.86	164074	63.86
11/32	3/8	1	2-1/2	130942	49.67	166560	63.86	164085	63.86
23/64	3/8	1	2-1/2	130953	49.67	166571	63.86	164096	63.86
3/8	3/8	1	2-1/2	130964	38.13	166582	47.15	164107	47.15
25/64	7/16	1	2-3/4	130975	65.02	166593	83.92	164118	83.92
13/32	7/16	1	2-3/4	130986	65.02	166604	83.92	164129	83.92
27/64	7/16	1	2-3/4	130997	67.13	166615	86.69	164140	86.69
7/16	7/16	1	2-3/4	131008	58.52	166626	72.05	164151	72.05
29/64	1/2	1	3	131019	96.62	166637	123.66	164162	123.66
15/32	1/2	1	3	131030	96.62	166648	123.66	164173	123.66
31/64	1/2	1	3	131041	96.62	166659	123.66	164184	123.66
1/2	1/2	1	3	131052	70.27	166670	87.68	164195	87.68
1/2	1/2	1-1/4	3	131063	70.27	166681	87.68	164206	87.68
9/16	9/16	1-1/4	3-1/2	131074	132.80	166692	175.36	164217	175.36
5/8	5/8	1-1/4	3-1/2	131085	134.33	166703	171.27	164228	171.27
3/4	3/4	1-1/2	4	131096	188.68	166714	243.03	164239	243.03
7/8	7/8	1-1/2	4	131107	345.10	166725	436.79	164250	436.79
1	1	1-1/2	4	131118	317.65	166736	406.31	164261	406.31
1-1/4	1-1/4	2	4-1/2	131129	1084.65	166747	1232.55	164272	1232.55

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 7/64"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
9/16" - 1-1/4"	+.000, -.003	-.0001, -.0004 ISO H6

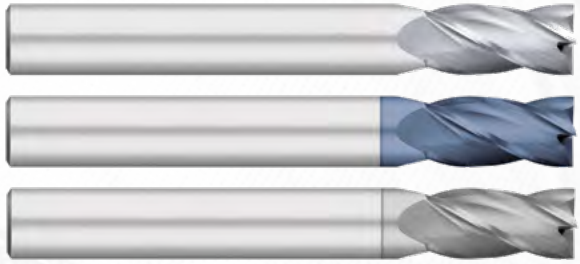
GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - LONG LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED



DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	3/4	2-1/4	136442	23.57	136596	30.32	165251	30.32
3/16	3/16	3/4	2-1/2	136453	29.58	136607	35.57	165262	35.57
1/4	1/4	1-1/8	3	136464	39.62	136618	51.08	165273	51.08
1/4	1/4	1	4	136475	41.73	136629	53.81	165284	53.81
5/16	5/16	1-1/8	3	136486	44.71	136640	60.34	165295	60.34
3/8	3/8	1-1/8	3	136497	51.29	136651	69.24	165306	69.24
3/8	3/8	1	4	136508	59.89	136662	77.05	165317	77.05
7/16	7/16	2	4	136519	80.82	136673	105.09	165328	105.09
1/2	1/2	1	4	136530	90.07	136684	115.99	165339	115.99
1/2	1/2	2	4	136541	95.39	136695	122.41	165350	122.41
5/8	5/8	2-1/4	5	136552	207.17	136706	256.39	165361	256.39
3/4	3/4	2-1/4	5	136563	286.12	136717	346.36	165372	346.36
7/8	7/8	2-1/4	5	136574	542.30	136728	640.90	165383	640.90
1	1	2-1/4	5	136585	391.71	136739	505.58	165394	505.58

4 FLUTE - EXTRA LONG LENGTH - SQUARE END - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	1	3	137674	26.35	137850	35.57	165867	35.57
3/16	3/16	1-1/8	3	137685	28.66	137861	36.81	165878	36.81
1/4	1/4	1-1/2	4	137696	40.49	137872	52.15	165889	52.15
1/4	1/4	1-1/2	6	137707	54.76	137883	70.43	165900	70.43
5/16	5/16	1-5/8	4	137718	55.26	137894	71.30	165911	71.30
3/8	3/8	1-3/4	4	137729	62.74	137905	80.36	165922	80.36
3/8	3/8	1-1/2	6	137740	95.00	137916	122.46	165933	122.46
7/16	7/16	3	6	137751	127.97	137927	164.07	165944	164.07
1/2	1/2	1-1/2	6	137762	144.59	137938	179.46	165955	179.46
1/2	1/2	3	6	137773	151.79	137949	186.65	165966	186.65
5/8	5/8	3	6	137784	223.55	137960	274.83	165977	274.83
3/4	3/4	3	6	137795	332.24	137971	390.14	165988	390.14
3/4	3/4	4	7	137806	570.18	137982	646.37	165993	646.37
7/8	7/8	3	6	137817	591.60	137993	739.54	165999	739.54
1	1	3	6	137828	564.02	138004	629.64	166010	629.64
1	1	4	7	137839	739.38	138015	907.55	166013	907.55

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH - BALL NOSE - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/64	1/8	1/32	1-1/2	132779	32.84	133186	44.01	164690	44.01
1/32	1/8	1/8	1-1/2	132790	21.01	133197	27.30	164701	27.30
3/64	1/8	1/8	1-1/2	132801	21.01	133208	27.30	164712	27.30
1/16	1/8	1/4	1-1/2	132812	19.48	133219	26.30	164723	26.30
5/64	1/8	1/4	1-1/2	132823	19.48	133230	26.30	164734	26.30
3/32	1/8	3/8	1-1/2	132834	20.43	133241	27.63	164745	27.63
7/64	1/8	3/8	1-1/2	132845	20.43	133252	27.63	164756	27.63
1/8	1/8	1/2	1-1/2	132856	18.74	133263	25.31	164767	25.31
9/64	3/16	9/16	2	132867	27.46	133274	37.10	164778	37.10
5/32	3/16	9/16	2	132878	27.46	133285	37.10	164789	37.10
11/64	3/16	5/8	2	132889	27.46	133296	37.10	164800	37.10
3/16	3/16	5/8	2	132900	24.69	133307	33.34	164811	33.34
13/64	1/4	5/8	2-1/2	132911	35.62	133318	45.37	164822	45.37
7/32	1/4	5/8	2-1/2	132922	35.62	133329	45.37	164833	45.37
15/64	1/4	3/4	2-1/2	132933	35.62	133340	45.37	164844	45.37
1/4	1/4	3/4	2-1/2	132944	33.54	133351	43.22	164855	43.22
17/64	5/16	3/4	2-1/2	132955	45.37	133362	58.36	164866	58.36
9/32	5/16	3/4	2-1/2	132966	45.45	133373	58.44	164877	58.44
19/64	5/16	13/16	2-1/2	132977	49.38	133384	64.81	164888	64.81
5/16	5/16	13/16	2-1/2	132988	41.81	133395	53.77	164899	53.77
21/64	3/8	1	2-1/2	132999	57.45	133406	77.55	164910	77.55
11/32	3/8	1	2-1/2	133010	60.30	133417	77.55	164921	77.55
23/64	3/8	1	2-1/2	133021	57.45	133428	77.55	164932	77.55
3/8	3/8	1	2-1/2	133032	44.75	133439	63.24	164943	63.24
25/64	7/16	1	2-3/4	133043	77.80	133450	100.25	164954	100.25
13/32	7/16	1	2-3/4	133054	77.80	133461	100.25	164965	100.25
27/64	7/16	1	2-3/4	133065	77.80	133472	100.25	164976	100.25
7/16	7/16	1	2-3/4	133076	66.22	133483	85.37	164987	85.37
29/64	1/2	1	3	133087	102.57	133494	132.27	164998	132.27
15/32	1/2	1	3	133098	102.57	133505	132.27	165009	132.27
31/64	1/2	1	3	133109	102.57	133516	132.27	165020	132.27
1/2	1/2	1	3	133120	90.82	133527	117.05	165031	117.05
9/16	9/16	1-1/4	3-1/2	133131	138.43	133538	170.36	165042	170.36
5/8	5/8	1-1/4	3-1/2	133142	146.87	133549	189.30	165053	189.30
3/4	3/4	1-1/2	4	133153	216.39	133560	281.99	165064	281.99
7/8	7/8	1-1/2	4	133164	419.05	133571	532.46	165075	532.46
1	1	1-1/2	4	133175	386.50	133582	498.05	165086	498.05

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/64" - 7/64"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
9/16" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

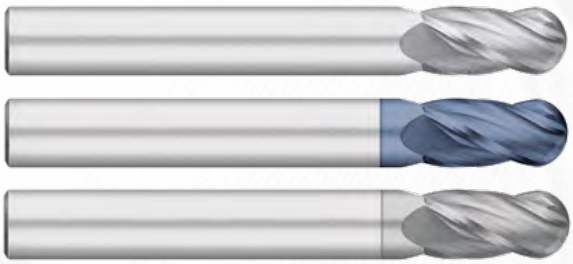
GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - LONG LENGTH - BALL NOSE - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED



DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	3/4	2-1/4	137058	28.04	137212	36.07	165559	36.07
3/16	3/16	3/4	2-1/2	137069	32.26	137223	41.44	165570	41.44
1/4	1/4	1-1/8	3	137080	45.37	137234	58.40	165581	58.40
1/4	1/4	1	4	137091	50.09	137245	64.56	165592	64.56
5/16	5/16	1-1/8	3	137102	53.35	137256	72.01	165603	72.01
3/8	3/8	1-1/8	3	137113	61.58	137267	83.17	165614	83.17
3/8	3/8	1	4	137124	75.44	137278	98.02	165625	98.02
7/16	7/16	2	4	137135	103.15	137289	134.13	165636	134.13
1/2	1/2	1	4	137146	105.63	137300	134.33	165647	134.33
1/2	1/2	2	4	137157	106.67	137311	135.37	165658	135.37
5/8	5/8	2-1/4	5	137168	243.03	137322	308.66	165669	308.66
3/4	3/4	2-1/4	5	137179	338.40	137333	428.65	165680	428.65
7/8	7/8	2-1/4	5	137190	581.76	137344	714.89	165691	714.89
1	1	2-1/4	5	137201	669.61	137355	823.46	165702	823.46

4 FLUTE - EXTRA LONG LENGTH - BALL NOSE - 30º HELIX

UNCOATED

ALTIN COATED

TICN COATED

DIA	SHANK	LOC	OAL	UNCOATED	LIST PRICE	AlTiN	LIST PRICE	TiCN	LIST PRICE
1/8	1/8	1	3	138334	31.39	138510	42.35	166175	42.35
3/16	3/16	1-1/8	3	138345	37.81	138521	44.21	166186	44.21
1/4	1/4	1-1/2	4	138356	55.14	138532	61.38	166197	61.38
1/4	1/4	1-1/2	6	138367	64.84	138543	76.32	166208	76.32
5/16	5/16	1-5/8	4	138378	66.67	138554	86.07	166219	86.07
3/8	3/8	1-3/4	4	138389	71.76	138565	91.73	166230	91.73
3/8	3/8	1-1/2	6	138400	101.12	138576	126.15	166241	126.15
7/16	7/16	3	6	138411	151.79	138587	194.84	166252	194.84
1/2	1/2	1-1/2	6	138422	161.01	138598	206.13	166263	206.13
1/2	1/2	3	6	138433	162.00	138609	209.20	166274	209.20
5/8	5/8	3	6	138444	255.35	138620	313.79	166285	313.79
3/4	3/4	3	6	138455	362.10	138631	488.82	166296	488.82
3/4	3/4	4	7	138466	596.23	138642	754.06	166303	754.06
7/8	7/8	3	6	138477	640.90	138653	798.69	166307	798.69
1	1	3	6	138488	646.03	138664	831.73	166318	831.73
1	1	4	7	138499	781.40	138675	930.62	166323	930.62

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE
SOLID CARBIDE END MILLS

4 FLUTE - STUB LENGTH CR CORNER RADIUS - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	0.015	152450	29.22
1/8	1/8	1/4	1-1/2	0.020	152452	29.22
1/8	1/8	1/4	1-1/2	0.030	152454	29.22
3/16	3/16	3/8	2	0.015	152456	35.51
3/16	3/16	3/8	2	0.020	152458	35.51
3/16	3/16	3/8	2	0.030	152460	35.51
1/4	1/4	1/2	2	0.015	152462	41.48
1/4	1/4	1/2	2	0.020	152464	41.48
1/4	1/4	1/2	2	0.030	152466	41.48
1/4	1/4	1/2	2	0.045	152468	41.48
1/4	1/4	1/2	2	0.060	152470	41.48
5/16	5/16	1/2	2	0.015	152472	57.68
5/16	5/16	1/2	2	0.020	152474	57.68
5/16	5/16	1/2	2	0.030	152476	57.68
5/16	5/16	1/2	2	0.045	152478	57.68
5/16	5/16	1/2	2	0.060	152480	57.68
3/8	3/8	5/8	2	0.015	152482	71.76
3/8	3/8	5/8	2	0.020	152484	71.76
3/8	3/8	5/8	2	0.030	152486	71.76
3/8	3/8	5/8	2	0.045	152488	71.76
3/8	3/8	5/8	2	0.060	152490	71.76
1/2	1/2	5/8	2-1/2	0.015	152492	111.00
1/2	1/2	5/8	2-1/2	0.020	152494	111.00
1/2	1/2	5/8	2-1/2	0.030	152496	111.00

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/2	1/2	5/8	2-1/2	0.045	152498	111.00
1/2	1/2	5/8	2-1/2	0.060	152500	111.00
1/2	1/2	5/8	2-1/2	0.090	152502	111.00
1/2	1/2	5/8	2-1/2	0.125	152504	111.00
5/8	5/8	3/4	3	0.015	152506	181.53
5/8	5/8	3/4	3	0.020	152508	181.53
5/8	5/8	3/4	3	0.030	152510	181.53
5/8	5/8	3/4	3	0.045	152512	181.53
5/8	5/8	3/4	3	0.060	152514	181.53
5/8	5/8	3/4	3	0.090	152516	181.53
3/4	3/4	1	3	0.015	152518	253.68
3/4	3/4	1	3	0.020	152520	253.68
3/4	3/4	1	3	0.030	152522	253.68
3/4	3/4	1	3	0.045	152524	253.68
3/4	3/4	1	3	0.060	152526	253.68
3/4	3/4	1	3	0.090	152528	253.68
3/4	3/4	1	3	0.125	152530	253.68
1	1	1-1/4	3-1/2	0.015	152532	488.39
1	1	1-1/4	3-1/2	0.020	152534	488.39
1	1	1-1/4	3-1/2	0.030	152536	488.39
1	1	1-1/4	3-1/2	0.045	152538	488.39
1	1	1-1/4	3-1/2	0.060	152540	488.39
1	1	1-1/4	3-1/2	0.090	152542	488.39
1	1	1-1/4	3-1/2	0.125	152544	488.39

Radius tools stocked in Stub, Regular, Long, and Extra Long lengths

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

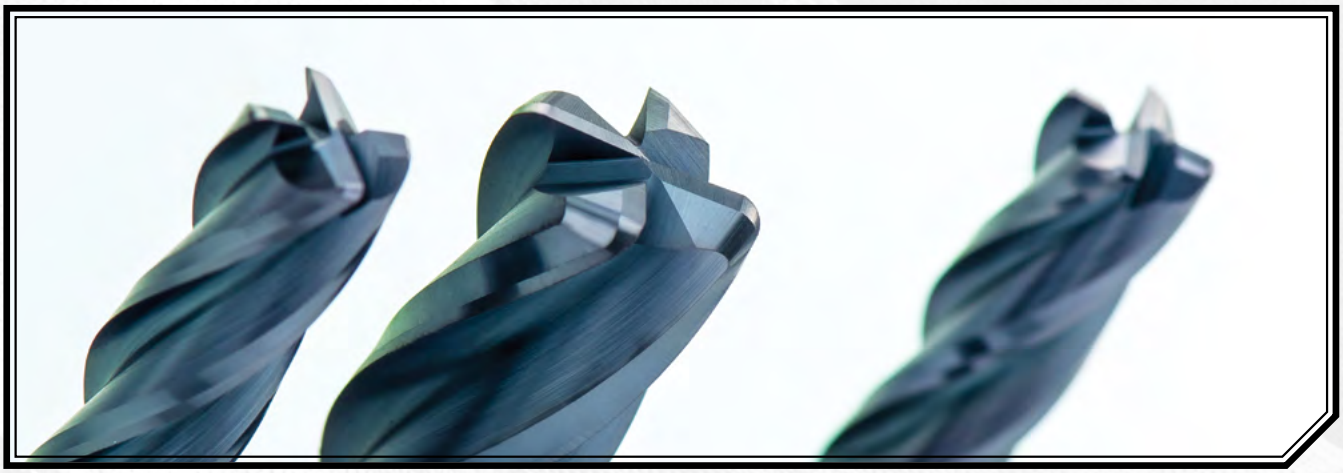
GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.015	152557	33.80
1/8	1/8	1/2	1-1/2	0.020	152568	33.80
1/8	1/8	1/2	1-1/2	0.030	152579	33.80
3/16	3/16	5/8	2	0.015	152590	39.73
3/16	3/16	5/8	2	0.020	152601	39.73
3/16	3/16	5/8	2	0.030	152612	39.73
1/4	1/4	3/4	2-1/2	0.015	152623	46.44
1/4	1/4	3/4	2-1/2	0.020	152634	46.44
1/4	1/4	3/4	2-1/2	0.030	152645	46.44
1/4	1/4	3/4	2-1/2	0.045	152656	46.44
1/4	1/4	3/4	2-1/2	0.060	152667	46.44
5/16	5/16	13/16	2-1/2	0.015	152678	62.28
5/16	5/16	13/16	2-1/2	0.020	152689	62.28
5/16	5/16	13/16	2-1/2	0.030	152700	62.28
5/16	5/16	13/16	2-1/2	0.045	152711	62.28
5/16	5/16	13/16	2-1/2	0.060	152722	62.28
3/8	3/8	1	2-1/2	0.015	152733	78.18
3/8	3/8	1	2-1/2	0.020	152744	78.18
3/8	3/8	1	2-1/2	0.030	152755	78.18
3/8	3/8	1	2-1/2	0.045	152766	78.18
3/8	3/8	1	2-1/2	0.060	152777	78.18
1/2	1/2	1	3	0.015	152788	117.93
1/2	1/2	1	3	0.020	152799	117.93
1/2	1/2	1	3	0.030	152810	117.93

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/2	1/2	1	3	0.045	152821	117.93
1/2	1/2	1	3	0.060	152832	117.93
1/2	1/2	1	3	0.090	152843	117.93
1/2	1/2	1	3	0.125	152854	117.93
5/8	5/8	1-1/4	3-1/2	0.015	152865	192.14
5/8	5/8	1-1/4	3-1/2	0.020	152876	192.14
5/8	5/8	1-1/4	3-1/2	0.030	152887	192.14
5/8	5/8	1-1/4	3-1/2	0.045	152898	192.14
5/8	5/8	1-1/4	3-1/2	0.060	152909	192.14
5/8	5/8	1-1/4	3-1/2	0.090	152920	192.14
3/4	3/4	1-1/2	4	0.015	152931	263.70
3/4	3/4	1-1/2	4	0.020	152942	263.70
3/4	3/4	1-1/2	4	0.030	152953	263.70
3/4	3/4	1-1/2	4	0.045	152964	263.70
3/4	3/4	1-1/2	4	0.060	152975	263.70
3/4	3/4	1-1/2	4	0.090	152986	263.70
3/4	3/4	1-1/2	4	0.125	152997	263.70
1	1	1-1/2	4	0.015	153008	511.06
1	1	1-1/2	4	0.020	153019	511.06
1	1	1-1/2	4	0.030	153030	511.06
1	1	1-1/2	4	0.045	153041	511.06
1	1	1-1/2	4	0.060	153052	511.06
1	1	1-1/2	4	0.090	153063	511.06
1	1	1-1/2	4	0.125	153074	511.06



Radius options stocked from 0.015" through 0.125"

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

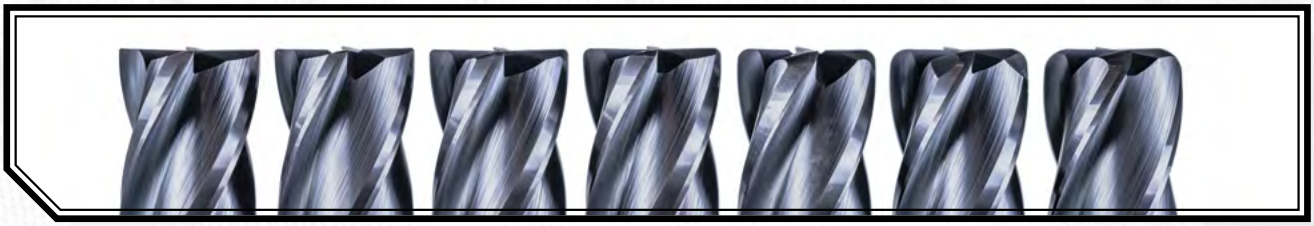
GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - LONG LENGTH CR CORNER RADIUS - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	3/4	2-1/4	0.015	153800	37.14
1/8	1/8	3/4	2-1/4	0.020	153811	37.14
1/8	1/8	3/4	2-1/4	0.030	153822	37.14
3/16	3/16	3/4	2-1/2	0.015	153833	43.17
3/16	3/16	3/4	2-1/2	0.020	153844	43.17
3/16	3/16	3/4	2-1/2	0.030	153855	43.17
1/4	1/4	1-1/8	3	0.015	153866	60.23
1/4	1/4	1-1/8	3	0.020	153877	60.23
1/4	1/4	1-1/8	3	0.030	153888	60.23
1/4	1/4	1-1/8	3	0.045	153899	60.23
1/4	1/4	1-1/8	3	0.060	153910	60.23
1/4	1/4	1	4	0.015	153921	63.24
1/4	1/4	1	4	0.020	153932	63.24
1/4	1/4	1	4	0.030	153943	63.24
1/4	1/4	1	4	0.045	153954	63.24
1/4	1/4	1	4	0.060	153965	63.24
5/16	5/16	1-1/8	3	0.015	153976	68.26
5/16	5/16	1-1/8	3	0.020	153987	68.26
5/16	5/16	1-1/8	3	0.030	153998	68.26
5/16	5/16	1-1/8	3	0.045	154009	68.26
5/16	5/16	1-1/8	3	0.060	154020	68.26
3/8	3/8	1-1/8	3	0.015	154031	86.13
3/8	3/8	1-1/8	3	0.020	154042	86.13
3/8	3/8	1-1/8	3	0.030	154053	86.13
3/8	3/8	1-1/8	3	0.045	154064	86.13
3/8	3/8	1-1/8	3	0.060	154075	86.13
3/8	3/8	1	4	0.015	154086	107.33
3/8	3/8	1	4	0.020	154097	107.33
3/8	3/8	1	4	0.030	154108	107.33
3/8	3/8	1	4	0.045	154119	107.33
3/8	3/8	1	4	0.060	154130	107.33
1/2	1/2	1	4	0.015	154141	148.41
1/2	1/2	1	4	0.020	154152	148.41

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/2	1/2	1	4	0.030	154163	148.41
1/2	1/2	1	4	0.045	154174	148.41
1/2	1/2	1	4	0.060	154185	148.41
1/2	1/2	1	4	0.090	154196	148.41
1/2	1/2	1	4	0.125	154207	148.41
1/2	1/2	2	4	0.015	154218	157.69
1/2	1/2	2	4	0.020	154229	157.69
1/2	1/2	2	4	0.030	154240	157.69
1/2	1/2	2	4	0.045	154251	157.69
1/2	1/2	2	4	0.060	154262	157.69
1/2	1/2	2	4	0.090	154273	157.69
1/2	1/2	2	4	0.125	154284	157.69
5/8	5/8	2-1/4	5	0.015	154295	285.10
5/8	5/8	2-1/4	5	0.020	154306	285.10
5/8	5/8	2-1/4	5	0.030	154317	285.10
5/8	5/8	2-1/4	5	0.045	154328	285.10
5/8	5/8	2-1/4	5	0.060	154339	285.10
5/8	5/8	2-1/4	5	0.090	154350	285.10
3/4	3/4	2-1/4	5	0.015	154361	371.03
3/4	3/4	2-1/4	5	0.020	154372	371.03
3/4	3/4	2-1/4	5	0.030	154383	371.03
3/4	3/4	2-1/4	5	0.045	154394	371.03
3/4	3/4	2-1/4	5	0.060	154405	371.03
3/4	3/4	2-1/4	5	0.090	154416	371.03
3/4	3/4	2-1/4	5	0.125	154427	371.03
1	1	2-1/4	5	0.015	154438	583.04
1	1	2-1/4	5	0.020	154449	583.04
1	1	2-1/4	5	0.030	154460	583.04
1	1	2-1/4	5	0.045	154471	583.04
1	1	2-1/4	5	0.060	154482	583.04
1	1	2-1/4	5	0.090	154493	583.04
1	1	2-1/4	5	0.125	154504	583.04



For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - EXTRA LONG LENGTH CR CORNER RADIUS - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1	3	0.015	155384	42.16
1/8	1/8	1	3	0.020	155395	42.16
1/8	1/8	1	3	0.030	155406	42.16
3/16	3/16	1-1/8	3	0.015	155417	46.18
3/16	3/16	1-1/8	3	0.020	155428	46.18
3/16	3/16	1-1/8	3	0.030	155439	46.18
1/4	1/4	1-1/2	4	0.015	155450	64.25
1/4	1/4	1-1/2	4	0.020	155461	64.25
1/4	1/4	1-1/2	4	0.030	155472	64.25
1/4	1/4	1-1/2	4	0.045	155483	64.25
1/4	1/4	1-1/2	4	0.060	155494	64.25
1/4	1/4	1-1/2	6	0.015	155505	86.33
1/4	1/4	1-1/2	6	0.020	155516	86.33
1/4	1/4	1-1/2	6	0.030	155527	86.33
1/4	1/4	1-1/2	6	0.045	155538	86.33
1/4	1/4	1-1/2	6	0.060	155549	86.33
5/16	5/16	1-5/8	4	0.015	155560	88.34
5/16	5/16	1-5/8	4	0.020	155571	88.34
5/16	5/16	1-5/8	4	0.030	155582	88.34
5/16	5/16	1-5/8	4	0.045	155593	88.34
5/16	5/16	1-5/8	4	0.060	155604	88.34
3/8	3/8	1-3/4	4	0.015	155615	96.37
3/8	3/8	1-3/4	4	0.020	155626	96.37
3/8	3/8	1-3/4	4	0.030	155637	96.37
3/8	3/8	1-3/4	4	0.045	155648	96.37
3/8	3/8	1-3/4	4	0.060	155659	96.37
3/8	3/8	1-1/2	6	0.015	155670	136.53
3/8	3/8	1-1/2	6	0.020	155681	136.53
3/8	3/8	1-1/2	6	0.030	155692	136.53
3/8	3/8	1-1/2	6	0.045	155703	136.53
3/8	3/8	1-1/2	6	0.060	155714	136.53
1/2	1/2	1-1/2	6	0.015	155725	206.80
1/2	1/2	1-1/2	6	0.020	155736	206.80
1/2	1/2	1-1/2	6	0.030	155747	206.80
1/2	1/2	1-1/2	6	0.045	155758	206.80
1/2	1/2	1-1/2	6	0.060	155769	206.80
1/2	1/2	1-1/2	6	0.090	155780	206.80
1/2	1/2	1-1/2	6	0.125	155791	206.80
1/2	1/2	3	6	0.015	155802	216.83
1/2	1/2	3	6	0.020	155813	216.83

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/2	1/2	3	6	0.030	155824	216.83
1/2	1/2	3	6	0.045	155835	216.83
1/2	1/2	3	6	0.060	155846	216.83
1/2	1/2	3	6	0.090	155857	216.83
1/2	1/2	3	6	0.125	155868	216.83
5/8	5/8	3	6	0.015	155879	305.18
5/8	5/8	3	6	0.020	155890	305.18
5/8	5/8	3	6	0.030	155901	305.18
5/8	5/8	3	6	0.045	155912	305.18
5/8	5/8	3	6	0.060	155923	305.18
5/8	5/8	3	6	0.090	155934	305.18
3/4	3/4	3	6	0.015	155945	418.73
3/4	3/4	3	6	0.020	155956	418.73
3/4	3/4	3	6	0.030	155967	418.73
3/4	3/4	3	6	0.045	155978	418.73
3/4	3/4	3	6	0.060	155989	418.73
3/4	3/4	3	6	0.090	156000	418.73
3/4	3/4	3	6	0.125	156011	418.73
3/4	3/4	4	7	0.015	156022	687.73
3/4	3/4	4	7	0.020	156033	687.73
3/4	3/4	4	7	0.030	156044	687.73
3/4	3/4	4	7	0.045	156055	687.73
3/4	3/4	4	7	0.060	156066	687.73
3/4	3/4	4	7	0.090	156077	687.73
3/4	3/4	4	7	0.125	156088	687.73
1	1	3	6	0.015	156099	682.43
1	1	3	6	0.020	156110	682.43
1	1	3	6	0.030	156121	682.43
1	1	3	6	0.045	156132	682.43
1	1	3	6	0.060	156143	682.43
1	1	3	6	0.090	156154	682.43
1	1	3	6	0.125	156165	682.43
1	1	4	7	0.015	156176	983.79
1	1	4	7	0.020	156187	983.79
1	1	4	7	0.030	156198	983.79
1	1	4	7	0.045	156209	983.79
1	1	4	7	0.060	156220	983.79
1	1	4	7	0.090	156231	983.79
1	1	4	7	0.125	156242	983.79

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 1"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE
SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH - SQUARE END - 30º HELIX - METRIC

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1.0	3	3	38	216753	24.67
1.5	3	4.5	38	133758	24.67
2.0	3	6.3	38	133769	24.67
2.5	3	9.5	38	133780	24.67
3.0	3	12	38	133791	24.67
3.5	4	12	50	133802	30.39
4.0	4	14	50	133813	30.39
4.5	6	16	50	133824	37.16
5.0	6	16	50	133835	37.16
5.5	6	16	50	259549	37.16
6.0	6	19	50	133846	38.84
6.5	8	19	63	259560	42.25

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7.0	8	19	63	133857	42.25
7.5	8	19	63	259571	43.93
8.0	8	20	63	133868	43.93
9.0	10	22	75	133879	64.19
10.0	10	22	75	133890	81.09
11.0	12	25	75	133901	89.54
12.0	12	25	75	133912	92.90
14.0	14	32	89	133923	157.13
16.0	16	32	89	133934	179.08
18.0	18	38	100	133945	244.99
20.0	20	38	100	133956	388.59
25.0	25	38	100	133967	506.84

4 FLUTE - REGULAR LENGTH - SQUARE END - 30º HELIX - METRIC

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1.0	3	3	38	216764	30.80
1.5	3	4.5	38	133978	30.80
2.0	3	6.3	38	133989	30.80
2.5	3	9.5	38	134000	30.80
3.0	3	12	38	134011	30.80
3.5	4	12	50	134022	38.02
4.0	4	14	50	134033	38.02
4.5	6	16	50	134044	46.47
5.0	6	16	50	134055	46.47
5.5	6	16	50	259582	46.47
6.0	6	19	50	134066	48.56
6.5	8	19	63	259593	52.79

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7.0	8	19	63	134077	52.79
7.5	8	19	63	259604	54.92
8.0	8	20	63	134088	54.92
9.0	10	22	75	134099	80.23
10.0	10	22	75	134110	101.35
11.0	12	25	75	134121	111.93
12.0	12	25	75	134132	116.16
14.0	14	32	89	134143	196.43
16.0	16	32	89	134154	223.87
18.0	18	38	100	134165	306.23
20.0	20	38	100	134176	485.71
25.0	25	38	100	134187	633.58

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.00, -.05	-.0025, -.01

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH - BALL NOSE - 30º HELIX - METRIC

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1.0	3	3	38	249700	28.01
1.5	3	4.5	38	249702	28.01
2.0	3	6.3	38	249704	28.01
2.5	3	9.5	38	249706	28.01
3.0	3	12	38	249708	28.01
3.5	4	12	50	249710	34.52
4.0	4	14	50	249712	34.52
4.5	6	16	50	249714	42.20
5.0	6	16	50	249716	42.20
5.5	6	16	50	249718	42.20
6.0	6	19	50	249720	44.11
6.5	8	19	63	249722	50.14

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7.0	8	19	63	249724	50.14
7.5	8	19	63	249726	52.05
8.0	8	20	63	249728	52.05
9.0	10	22	75	249730	72.90
10.0	10	22	75	249732	95.33
11.0	12	25	75	249734	101.69
12.0	12	25	75	249736	105.51
14.0	14	32	89	249738	178.46
16.0	16	32	89	249740	203.38
18.0	18	38	100	249742	278.24
20.0	20	38	100	249744	441.32
25.0	25	38	100	249746	575.62

4 FLUTE - REGULAR LENGTH - BALL NOSE - 30º HELIX - METRIC

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1.0	3	3	38	259879	35.66
1.5	3	4.5	38	259890	35.66
2.0	3	6.3	38	259901	35.66
2.5	3	9.5	38	259912	35.66
3.0	3	12	38	259923	35.66
3.5	4	12	50	259934	44.02
4.0	4	14	50	259945	44.02
4.5	6	16	50	259956	53.80
5.0	6	16	50	259967	53.80
5.5	6	16	50	259978	53.80
6.0	6	19	50	259989	56.22
6.5	8	19	63	260000	61.11

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
7.0	8	19	63	260011	61.11
7.5	8	19	63	260022	63.58
8.0	8	20	63	260033	63.59
9.0	10	22	75	260044	92.88
10.0	10	22	75	260055	117.34
11.0	12	25	75	260066	129.59
12.0	12	25	75	260077	134.48
14.0	14	32	89	260088	227.41
16.0	16	32	89	260099	259.18
18.0	18	38	100	260110	354.53
20.0	20	38	100	260121	562.33
25.0	25	38	100	260132	733.52

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.00, -.05	-.0025, -.01

GENERAL PURPOSE SOLID CARBIDE END MILLS

3 FLUTE - REGULAR LENGTH - SQUARE END - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	143592	33.33
3/16	3/16	5/8	2	143603	39.92
1/4	1/4	3/4	2-1/2	143614	42.80
5/16	5/16	13/16	2-1/2	143625	51.78
3/8	3/8	1	2-1/2	143636	69.32
1/2	1/2	1-1/4	3	143647	118.27
5/8	5/8	1-5/8	3-1/2	143658	235.36
3/4	3/4	1-5/8	4	143669	330.29

3 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.010	143680	37.21
3/16	3/16	5/8	2	0.010	143691	44.56
1/4	1/4	3/4	2-1/2	0.020	143702	47.77
5/16	5/16	13/16	2-1/2	0.020	143713	57.80
3/8	3/8	1	2-1/2	0.020	143724	77.42
1/2	1/2	1-1/4	3	0.040	143735	132.01
5/8	5/8	1-5/8	3-1/2	0.040	143746	251.36
3/4	3/4	1-5/8	4	0.040	143757	352.75

These 3 flute 45º tools are designed to slot and profile at higher speeds and feeds while providing a shearing action that produces excellent finishes.

WORKS WELL IN STAINLESS STEELS AND OTHER SIMILAR ALLOYS

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE END MILLS

3 FLUTE - REGULAR LENGTH - SQUARE END - 60º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	143240	33.33
3/16	3/16	5/8	2	143251	39.92
1/4	1/4	3/4	2-1/2	143262	42.80
5/16	5/16	13/16	2-1/2	143273	51.78
3/8	3/8	1	2-1/2	143284	69.32
1/2	1/2	1-1/4	3	143295	118.27
5/8	5/8	1-5/8	3-1/2	143306	235.36
3/4	3/4	1-5/8	4	143317	330.29

3 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 60º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.010	143328	37.21
3/16	3/16	5/8	2	0.010	143339	44.56
1/4	1/4	3/4	2-1/2	0.020	143350	47.77
5/16	5/16	13/16	2-1/2	0.020	143361	57.80
3/8	3/8	1	2-1/2	0.020	143372	77.42
1/2	1/2	1-1/4	3	0.040	143383	132.01
5/8	5/8	1-5/8	3-1/2	0.040	143394	251.36
3/4	3/4	1-5/8	4	0.040	143405	352.75

These 3 flute 60º tools are designed to machine all high temperature alloys. This high shear design geometry will slot and profile while giving excellent surface finishes.

WORKS WELL IN HIGH TEMPERATURE ALLOYS SUCH AS INCONELS, HASTALLOY, WASPALLOY AND TITANIUM.

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE END MILLS

5 FLUTE - STUB LENGTH - SQUARE END - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	149092	18.24
3/16	3/16	3/8	2	149103	27.40
1/4	1/4	1/2	2	149114	32.78
5/16	5/16	1/2	2	149125	41.43
3/8	3/8	5/8	2	149136	64.90
7/16	7/16	5/8	2-1/2	149147	74.21
1/2	1/2	5/8	2-1/2	149158	85.78
5/8	5/8	3/4	3	149169	154.81
3/4	3/4	1	3	149180	212.69

5 FLUTE - STUB LENGTH CR CORNER RADIUS - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/4	1-1/2	0.010	149290	20.24
3/16	3/16	3/8	2	0.010	149301	30.61
1/4	1/4	1/2	2	0.020	149312	36.62
5/16	5/16	1/2	2	0.020	149323	46.23
3/8	3/8	5/8	2	0.020	149334	72.45
7/16	7/16	5/8	2-1/2	0.020	149345	82.90
1/2	1/2	5/8	2-1/2	0.040	149356	95.76
5/8	5/8	3/4	3	0.040	149367	165.29
3/4	3/4	1	3	0.040	149378	227.14

Designed for profiling and finishing, the 5 flute 45º geometry to this tool allows it to be run 20 - 40% faster than general purpose end mills while providing an excellent finish.

WORKS WELL IN EXOTIC MATERIALS, STAINLESS STEEL, CARBON STEELS AND OTHER SIMILAR MATERIALS.

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE END MILLS

5 FLUTE - REGULAR LENGTH - SQUARE END - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	149477	34.79
3/16	3/16	3/4	2	149488	41.72
1/4	1/4	3/4	2-1/2	149499	44.89
5/16	5/16	7/8	2-1/2	149510	54.04
3/8	3/8	1	2-1/2	149521	72.50
1/2	1/2	1-1/4	3	149532	141.32
5/8	5/8	1-5/8	3-1/2	149543	273.24
3/4	3/4	1-5/8	4	149554	371.50

5 FLUTE - REGULAR LENGTH CR CORNER RADIUS - 45º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	RAD	ITEM#	LIST PRICE
1/8	1/8	1/2	1-1/2	0.010	150269	38.84
3/16	3/16	3/4	2	0.010	150280	46.56
1/4	1/4	3/4	2-1/2	0.020	150291	50.07
5/16	5/16	7/8	2-1/2	0.020	150302	60.34
3/8	3/8	1	2-1/2	0.020	150313	80.93
1/2	1/2	1-1/4	3	0.040	150324	157.77
5/8	5/8	1-5/8	3-1/2	0.040	150335	291.82
3/4	3/4	1-5/8	4	0.040	150346	396.73

Designed for profiling and finishing, the 5 flute 45º geometry to this tool allows it to be run 20 - 40% faster than general purpose end mills while providing an excellent finish.

WORKS WELL IN EXOTIC MATERIALS, STAINLESS STEEL, CARBON STEELS AND OTHER SIMILAR MATERIALS.

For coating information see pages 6-9. For technical information, please see pages 86-87, 91-93.

TOLERANCES	DIAMETER	SHANK	RADIUS
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6	+.001, -.001
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6	+.001, -.001

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - STUB LENGTH - DOUBLE END - SQUARE END - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/16	1/8	1/8	1-1/2	136013	35.37
3/32	1/8	3/16	1-1/2	136024	36.45
1/8	1/8	1/4	1-1/2	136035	29.38
5/32	3/16	5/16	2	136046	39.54
3/16	3/16	3/8	2	136057	39.54
7/32	1/4	1/2	2-1/2	136068	54.25
1/4	1/4	1/2	2-1/2	136079	54.25
5/16	5/16	1/2	2-1/2	136090	66.66
3/8	3/8	9/16	2-1/2	136101	73.53
7/16	7/16	9/16	2-3/4	136112	103.95
1/2	1/2	5/8	3	136123	139.90

4 FLUTE - STUB LENGTH - DOUBLE END - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/16	1/8	1/8	1-1/2	135771	44.25
3/32	1/8	3/16	1-1/2	135782	45.52
1/8	1/8	1/4	1-1/2	135793	36.74
5/32	3/16	5/16	2	135804	49.40
3/16	3/16	3/8	2	135815	49.40
7/32	1/4	1/2	2-1/2	135826	67.79
1/4	1/4	1/2	2-1/2	135837	67.79
5/16	5/16	1/2	2-1/2	135848	83.29
3/8	3/8	9/16	2-1/2	135859	91.93
7/16	7/16	9/16	2-3/4	135870	129.94
1/2	1/2	5/8	3	135881	174.93

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.000, -.002	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE END MILLS

4 FLUTE - REGULAR LENGTH - DOUBLE END - SQUARE END - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	3/8	3/8	3-1/8	134561	121.89
5/32	3/8	7/16	3-1/4	134572	121.90
3/16	3/8	1/2	3-1/4	134583	121.90
7/32	3/8	9/16	3-1/2	134594	124.69
1/4	3/8	5/8	3-1/2	134605	124.69
9/32	3/8	11/16	3-1/2	134616	133.82
5/16	3/8	3/4	3-1/2	134627	133.82
11/32	3/8	3/4	3-1/2	134638	133.82
3/8	3/8	3/4	3-1/2	134649	133.82
7/16	1/2	7/8	4	134660	199.10
1/2	1/2	1	4	134671	223.67

NOTE: ALL TOOLS HAVE WELDON FLATS

4 FLUTE - REGULAR LENGTH - DOUBLE END - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/8	3/8	3/8	3-1/8	135045	144.97
5/32	3/8	7/16	3-1/4	135056	144.97
3/16	3/8	1/2	3-1/4	135067	144.97
7/32	3/8	9/16	3-1/2	135078	149.77
1/4	3/8	5/8	3-1/2	135089	149.77
9/32	3/8	11/16	3-1/2	135100	166.48
5/16	3/8	3/4	3-1/2	135111	166.48
11/32	3/8	3/4	3-1/2	135122	166.48
3/8	3/8	3/4	3-1/2	135133	166.48
7/16	1/2	7/8	4	135144	226.58
1/2	1/2	1	4	135155	246.28

NOTE: ALL TOOLS HAVE WELDON FLATS

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.000, -.002	-.0001, -.0004 ISO H6

GENERAL PURPOSE
M42 COBALT END MILLS

COARSE PITCH - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM #	LIST PRICE
1/4	3/8	5/8	2-7/16	4	167385	110.04
5/16	3/8	3/4	2-1/2	4	167396	120.18
3/8	3/8	3/4	2-1/2	4	167407	125.54
7/16	3/8	1	2-11/16	4	167418	126.28
1/2	1/2	1	3	4	167429	128.57
1/2	1/2	1-1/4	3-1/4	4	167440	132.97
5/8	5/8	1-5/8	3-3/4	4	167451	169.21
* 3/4	3/4	1-5/8	3-7/8	4	167462	186.23
* 7/8	3/4	1-7/8	4-1/8	5	167473	258.06
* 1	1	2	4-1/2	5	167484	249.44
* 1-1/8	1	2	4-1/2	6	167495	387.36
* 1-1/4	1-1/4	2	4-1/2	6	167506	420.39
* 1-1/2	1-1/4	2	4-1/2	6	167517	493.04
* 2	1-1/4	2	4-1/2	8	167539	685.10

*** Non Center Cutting**

FINE PITCH - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM #	LIST PRICE
1/4	3/8	5/8	2-7/16	4	168518	110.04
5/16	3/8	3/4	2-1/2	4	168529	120.18
3/8	3/8	3/4	2-1/2	4	168540	126.28
7/16	3/8	1	2-11/16	4	168551	126.92
1/2	1/2	1-1/4	3-1/4	4	168562	128.57
5/8	5/8	1-5/8	3-3/4	4	168573	169.21
* 3/4	3/4	1-5/8	3-7/8	4	168584	186.23
* 7/8	3/4	1-7/8	4-1/8	5	168595	243.61
* 1	1	2	4-1/2	5	168606	249.62
* 1-1/8	1	2	4-1/2	6	168617	413.83
* 1-1/4	1-1/4	2	4-1/2	6	168628	420.39
* 1-1/2	1-1/4	2	4-1/2	6	168639	519.47
* 2	1-1/4	2	4-1/2	8	168661	732.25

*** Non Center Cutting**

For coating information see pages 6-9. For technical information please see pages 85, 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.005, -.005	+.0000, -.0005

GENERAL PURPOSE
M42 COBALT END MILLS

2 FLUTE - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/8	3/8	3/8	2-5/16	2	232549	52.59
3/16	3/8	7/16	2-5/16	2	232571	52.59
1/4	3/8	1/2	2-5/16	2	232593	52.59
5/16	3/8	9/16	2-5/16	2	232615	52.59
3/8	3/8	9/16	2-5/16	2	232626	52.59
7/16	3/8	13/16	2-1/2	2	232637	72.66
1/2	3/8	13/16	2-1/2	2	232648	72.66
1/2	1/2	1	3	2	232659	76.87
9/16	1/2	1-1/8	3-1/8	2	232670	86.50
5/8	1/2	1-1/8	3-1/8	2	232681	96.85
5/8	5/8	1-5/16	3-7/16	2	232692	98.38
3/4	1/2	1-5/16	3-5/16	2	232703	112.58
3/4	5/8	1-5/16	3-7/16	2	232714	112.58
3/4	3/4	1-5/16	3-9/16	2	232725	112.58
13/16	5/8	1-1/2	3-5/8	2	232736	138.24
13/16	3/4	1-1/2	3-3/4	2	232747	138.73
7/8	3/4	1-1/2	3-3/4	2	232769	154.07
7/8	7/8	1-1/2	3-3/4	2	232780	154.07
15/16	5/8	1-1/2	3-5/8	2	232791	167.44
15/16	3/4	1-1/2	3-3/4	2	232802	177.41
1	3/4	1-1/2	3-3/4	2	232835	156.78
1	1	1-5/8	4-1/8	2	232857	178.52
1-1/8	1	1-5/8	4-1/8	2	232879	261.09
1-1/4	1	1-5/8	4-1/8	2	232901	291.05
1-1/2	1-1/4	1-5/8	4-1/8	2	232945	348.12

All M42 Cobalt End Mills are PVD coated with AlTiN

For coating information please see pages 6-9.. For technical information please see pages 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.003, -.0000	+.0000, -.0004

GENERAL PURPOSE
M42 COBALT END MILLS

4 & 6 FLUTE - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/8	3/8	3/8	2-5/16	4	230800	53.67
5/32	3/8	7/16	2-5/16	4	230811	73.52
3/16	3/8	1/2	2-3/8	4	230822	53.67
7/32	3/8	1/2	2-3/8	4	230833	73.52
1/4	3/8	5/8	2-7/16	4	230844	53.67
9/32	3/8	11/16	2-1/2	4	230855	73.52
5/16	3/8	3/4	2-1/2	4	230866	53.67
11/32	3/8	3/4	2-1/2	4	230877	75.09
3/8	3/8	3/4	2-1/2	4	230888	53.67
13/32	3/8	11/16	2-1/2	4	230899	109.73
7/16	3/8	1	2-11/16	4	230910	72.53
15/32	3/8	1	2-11/16	4	230921	115.80
1/2	3/8	1	2-11/16	4	230932	72.53
1/2	1/2	1-1/4	3-1/4	4	230943	72.53
17/32	1/2	1-3/8	3-3/8	4	230954	135.91
9/16	1/2	1-3/8	3-3/8	4	230965	86.99
5/8	1/2	1-3/8	3-3/8	4	230976	94.72
5/8	5/8	1-5/8	3-3/4	4	230987	105.23
11/16	1/2	1-5/8	3-5/8	4	230998	109.80
11/16	5/8	1-5/8	3-3/4	4	231009	111.89
3/4	1/2	1-5/8	3-5/8	4	231020	133.21
3/4	5/8	1-5/8	3-3/4	4	231031	133.21
3/4	3/4	1-5/8	3-7/8	4	231042	133.21
13/16	3/4	1-7/8	4-1/8	4	231053	150.38
7/8	3/4	1-7/8	4-1/8	4	231064	149.85
7/8	7/8	1-7/8	4-1/8	4	231075	149.85
15/16	3/4	1-7/8	4-1/8	4	231086	192.41
1	3/4	1-7/8	4-1/8	4	231097	170.52
1	1	2	4-1/2	4	231119	180.57
1-1/8	3/4	1-5/8	3-7/8	6	231130	256.90
1-1/4	1	2	4-1/2	6	231141	276.17
1-1/4	1-1/4	2	4-1/2	6	231152	281.50
1-3/8	3/4	2	4-1/4	6	231163	382.96
1-1/2	1	2	4-1/2	6	231174	430.22
1-1/2	1-1/4	2	4-1/2	4	231185	352.66
1-5/8	1-1/4	2	4-1/2	6	231196	561.10
2	1-1/4	2	4-1/2	6	231207	636.28

For coating information please see pages 6-9.. For technical information please see pages 91-93.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.003, -.0000	+.0000, -.0004

GENERAL PURPOSE
M42 COBALT END MILLS

2 FLUTE - DOUBLE END - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/8	3/8	3/8	3-1/16	2	231449	80.46
5/32	3/8	7/16	3-1/8	2	231460	85.41
3/16	3/8	7/16	3-1/8	2	231471	80.50
7/32	3/8	1/2	3-1/8	2	231482	85.45
1/4	3/8	1/2	3-1/8	2	231493	80.50
9/32	3/8	9/16	3-1/8	2	231504	85.45
5/16	3/8	9/16	3-1/8	2	231515	80.50
11/32	3/8	9/16	3-1/8	2	231526	85.45
3/8	3/8	9/16	3-1/8	2	231537	80.50
13/32	1/2	13/16	3-3/4	2	231548	55.90
7/16	1/2	13/16	3-3/4	2	231559	122.44
1/2	1/2	13/16	3-3/4	2	231581	122.44
9/16	5/8	1-1/8	4-1/2	2	231592	153.66
5/8	5/8	1-1/8	4-1/2	2	231603	153.66
3/4	3/4	1-5/16	5	2	231625	193.55
7/8	7/8	1-9/16	5-1/2	2	231647	243.47
1	1	1-5/8	5-7/8	2	231669	299.47

4 FLUTE - DOUBLE END - CENTER CUTTING - 30º HELIX

ALTIN COATED

DIA	SHANK	LOC	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/8	3/8	3/8	3-1/16	4	231911	81.28
5/32	3/8	7/16	3-1/8	4	231922	85.83
3/16	3/8	1/2	3-1/8	4	231933	81.28
7/32	3/8	9/16	3-1/4	4	231944	85.83
1/4	3/8	5/8	3-3/8	4	231955	81.28
9/32	3/8	11/16	3-3/8	4	231966	85.83
5/16	3/8	3/4	3-1/2	4	231977	81.28
11/32	3/8	3/4	3-1/2	4	231988	85.83
3/8	3/8	3/4	3-1/2	4	231999	81.28
13/32	1/2	1	4-1/8	4	232010	126.16
7/16	1/2	1	4-1/8	4	232021	122.73
1/2	1/2	1	4-1/8	4	232043	122.73
9/16	5/8	1-3/8	5	4	232054	151.07
5/8	5/8	1-3/8	5	4	232065	151.07
3/4	3/4	1-5/8	5-5/8	4	232087	190.28
7/8	7/8	1-7/8	6-1/8	4	232109	254.05
1	1	1-7/8	6-3/8	4	232131	294.79

For coating information please see pages 6-9.. For technical information please see pages 91-93.

TOLERANCES	DIAMETER IF SIZE & SHANK DIA. ARE NOT THE SAME	DIAMETER IF SIZE & SHANK DIA. ARE THE SAME	SHANK
ALL SIZES	+.0000, -.0015	+.0000, -.0025	+.0001, -.0005

GENERAL PURPOSE
SOLID CARBIDE DRILL MILLS

2 FLUTE - 60º POINT - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	242034	27.21
1/16	1/8	3/16	1-1/2	242045	27.21
3/32	1/8	3/8	1-1/2	242056	27.21
1/8	1/8	1/2	1-1/2	242067	26.10
3/16	3/16	5/8	2	242078	36.75
1/4	1/4	3/4	2-1/2	242089	45.99
5/16	5/16	13/16	2-1/2	242100	57.10
3/8	3/8	1	2-1/2	242111	71.75
7/16	7/16	1	2-3/4	242122	96.99
1/2	1/2	1	3	242133	118.92
5/8	5/8	1-1/4	3-1/2	242144	227.07
3/4	3/4	1-1/2	4	242155	334.46

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	242166	34.02
1/16	1/8	3/16	1-1/2	242177	34.02
3/32	1/8	3/8	1-1/2	242188	34.02
1/8	1/8	1/2	1-1/2	242199	32.66
3/16	3/16	5/8	2	242210	45.94
1/4	1/4	3/4	2-1/2	242221	57.48
5/16	5/16	13/16	2-1/2	242232	71.36
3/8	3/8	1	2-1/2	242243	89.71
7/16	7/16	1	2-3/4	242254	121.27
1/2	1/2	1	3	242265	148.69
5/8	5/8	1-1/4	3-1/2	242276	283.87
3/4	3/4	1-1/2	4	242287	418.08

2 FLUTE - 90º POINT - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	241545	27.21
1/16	1/8	3/16	1-1/2	241550	27.21
3/32	1/8	3/8	1-1/2	241561	27.21
1/8	1/8	1/2	1-1/2	241572	26.10
3/16	3/16	5/8	2	241583	36.75
1/4	1/4	3/4	2-1/2	241594	45.99
5/16	5/16	13/16	2-1/2	241605	57.10
3/8	3/8	1	2-1/2	241616	71.75
7/16	7/16	1	2-3/4	241627	96.99
1/2	1/2	1	3	241638	118.92
5/8	5/8	1-1/4	3-1/2	241649	227.07
3/4	3/4	1-1/2	4	241660	334.46

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	241668	34.02
1/16	1/8	3/16	1-1/2	241671	34.02
3/32	1/8	3/8	1-1/2	241682	34.02
1/8	1/8	1/2	1-1/2	241693	32.66
3/16	3/16	5/8	2	241704	45.94
1/4	1/4	3/4	2-1/2	241715	57.48
5/16	5/16	13/16	2-1/2	241726	71.36
3/8	3/8	1	2-1/2	241737	89.71
7/16	7/16	1	2-3/4	241748	121.27
1/2	1/2	1	3	241759	148.69
5/8	5/8	1-1/4	3-1/2	241770	283.87
3/4	3/4	1-1/2	4	241781	418.08

Drill mills are very popular in job shop environments because of their versatility in performing a wide range of machining operations:

THE FOLLOWING APPLICATIONS CAN BE PERFORMED WITH DRILL MILLS:
DRILLING • CHAMFERING • COUNTERSINKING • SPOTTING • PROFILE MILLING

For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/32" - 3/32"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE SOLID CARBIDE DRILL MILLS

4 FLUTE - 60º POINT - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	242628	27.21
1/16	1/8	3/16	1-1/2	242639	27.21
3/32	1/8	3/8	1-1/2	242650	27.21
1/8	1/8	1/2	1-1/2	242661	26.10
3/16	3/16	5/8	2	242672	36.75
1/4	1/4	3/4	2-1/2	242683	45.99
5/16	5/16	13/16	2-1/2	242694	57.10
3/8	3/8	1	2-1/2	242705	71.75
7/16	7/16	1	2-3/4	242716	96.99
1/2	1/2	1	3	242727	118.92
5/8	5/8	1-1/4	3-1/2	242738	227.07
3/4	3/4	1-1/2	4	242749	334.46

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	242760	34.02
1/16	1/8	3/16	1-1/2	242771	34.02
3/32	1/8	3/8	1-1/2	242782	34.02
1/8	1/8	1/2	1-1/2	242793	32.66
3/16	3/16	5/8	2	242804	45.94
1/4	1/4	3/4	2-1/2	242815	57.48
5/16	5/16	13/16	2-1/2	242826	71.36
3/8	3/8	1	2-1/2	242837	89.71
7/16	7/16	1	2-3/4	242848	121.27
1/2	1/2	1	3	242859	148.69
5/8	5/8	1-1/4	3-1/2	242870	283.87
3/4	3/4	1-1/2	4	242881	418.08

4 FLUTE - 90º POINT - 30º HELIX

UNCOATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	241785	27.21
1/16	1/8	3/16	1-1/2	241792	27.21
3/32	1/8	3/8	1-1/2	241803	27.21
1/8	1/8	1/2	1-1/2	241814	26.10
3/16	3/16	5/8	2	241825	36.75
1/4	1/4	3/4	2-1/2	241836	45.99
5/16	5/16	13/16	2-1/2	241847	57.10
3/8	3/8	1	2-1/2	241858	71.75
7/16	7/16	1	2-3/4	241869	96.99
1/2	1/2	1	3	241880	118.92
5/8	5/8	1-1/4	3-1/2	241891	227.07
3/4	3/4	1-1/2	4	241902	334.46

ALTIN COATED

DIA	SHANK	LOC	OAL	ITEM#	LIST PRICE
1/32	1/8	1/8	1-1/2	241908	34.02
1/16	1/8	3/16	1-1/2	241913	34.02
3/32	1/8	3/8	1-1/2	241924	34.02
1/8	1/8	1/2	1-1/2	241935	32.66
3/16	3/16	5/8	2	241946	45.94
1/4	1/4	3/4	2-1/2	241957	57.48
5/16	5/16	13/16	2-1/2	241968	71.36
3/8	3/8	1	2-1/2	241979	89.71
7/16	7/16	1	2-3/4	241990	121.27
1/2	1/2	1	3	242001	148.69
5/8	5/8	1-1/4	3-1/2	242012	283.87
3/4	3/4	1-1/2	4	242023	418.08

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For coating information see pages 6-9. For technical information, please see pages 88-89, 91-93.

TOLERANCES	DIAMETER	SHANK
1/32" - 3/32"	+.000, -.001	-.0001, -.0004 ISO H6
1/8" - 1/2"	+.000, -.002	-.0001, -.0004 ISO H6
5/8" - 3/4"	+.000, -.003	-.0001, -.0004 ISO H6

GENERAL PURPOSE
SOLID CARBIDE CHAMFER MILLS

2 FLUTE - SINGLE END
60° • 82° • 90° • 100° • 120°
UNCOATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	1-1/2	1	252509	252553	252597	252641	252685	23.30
1/4	1/4	2-1/2	1	252520	252564	252608	252652	252696	41.03
3/8	3/8	2-1/2	1	252531	252575	252619	252663	252707	64.00
1/2	1/2	3	1	252542	252586	252630	252674	252718	105.95

2 FLUTE - SINGLE END
60° • 82° • 90° • 100° • 120°
ALTIN COATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	1-1/2	1	252729	252773	252817	252861	252905	29.14
1/4	1/4	2-1/2	1	252740	252784	252828	252872	252916	51.20
3/8	3/8	2-1/2	1	252751	252795	252839	252883	252927	80.02
1/2	1/2	3	1	252762	252806	252850	252894	252938	132.53

2 FLUTE - DOUBLE END
60° • 82° • 90° • 100° • 120°
UNCOATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	2	1	253389	253455	253521	253587	253653	41.94
3/16	3/16	2-1/2	1	253400	253466	253532	253598	253664	57.76
1/4	1/4	2-1/2	1	253411	253477	253543	253609	253675	73.85
5/16	5/16	2-1/2	1	253422	253488	253554	253620	253686	94.52
3/8	3/8	2-1/2	1	253433	253499	253565	253631	253697	115.20
1/2	1/2	3	1	253444	253510	253576	253642	253708	190.70

2 FLUTE - DOUBLE END
60° • 82° • 90° • 100° • 120°
ALTIN COATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	2	1	253719	253785	253851	253917	253983	52.46
3/16	3/16	2-1/2	1	253730	253796	253862	253928	253994	72.21
1/4	1/4	2-1/2	1	253741	253807	253873	253939	254005	92.16
5/16	5/16	2-1/2	1	253752	253818	253884	253950	254016	118.09
3/8	3/8	2-1/2	1	253763	253829	253895	253961	254027	144.15
1/2	1/2	3	1	253774	253840	253906	253972	254038	238.61

TOLERANCES	SHANK
ALL SIZES	-.0001, -.0004 ISO H6

For coating information see pages 6-9. For technical information, please see pages 90 -

GENERAL PURPOSE
SOLID CARBIDE CHAMFER MILLS

4 FLUTE - SINGLE END
60° • 82° • 90° • 100° • 120°
UNCOATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	1-1/2	1	252949	252993	253037	253081	253125	23.30
1/4	1/4	2-1/2	1	252960	253004	253048	253092	253136	41.03
3/8	3/8	2-1/2	1	252971	253015	253059	253103	253147	64.00
1/2	1/2	3	1	252982	253026	253070	253114	253158	105.95

4 FLUTE - SINGLE END
60° • 82° • 90° • 100° • 120°
ALTIN COATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	1-1/2	1	253169	253213	253257	253301	253345	29.14
1/4	1/4	2-1/2	1	253180	253224	253268	253312	253356	51.20
3/8	3/8	2-1/2	1	253191	253235	253279	253323	253367	80.02
1/2	1/2	3	1	253202	253246	253290	253334	253378	132.53

4 FLUTE - DOUBLE END
60° • 82° • 90° • 100° • 120°
UNCOATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	2	1	254049	254115	254181	254247	254313	41.94
3/16	3/16	2-1/2	1	254060	254126	254192	254258	254324	57.76
1/4	1/4	2-1/2	1	254071	254137	254203	254269	254335	73.85
5/16	5/16	2-1/2	1	254082	254148	254214	254280	254346	94.52
3/8	3/8	2-1/2	1	254093	254159	254225	254291	254357	115.20
1/2	1/2	3	1	254104	254170	254236	254302	254368	190.70

4 FLUTE - DOUBLE END
60° • 82° • 90° • 100° • 120°
ALTIN COATED

DIA	SHANK	OAL	PKG. QTY.	60°- ITEM#	82°- ITEM#	90°- ITEM#	100°- ITEM#	120°- ITEM#	LIST PRICE
1/8	1/8	2	1	254379	254445	254511	254577	254643	52.46
3/16	3/16	2-1/2	1	254390	254456	254522	254588	254654	72.21
1/4	1/4	2-1/2	1	254401	254467	254533	254599	254665	92.16
5/16	5/16	2-1/2	1	254412	254478	254544	254610	254676	118.09
3/8	3/8	2-1/2	1	254423	254489	254555	254621	254687	144.15
1/2	1/2	3	1	254434	254500	254566	254632	254698	238.61

TOLERANCES	SHANK
ALL SIZES	-.0001, -.0004 ISO H6

For coating information see pages 6-9. For technical information, please see pages 90 -

VI-PRO®
VARIABLE INDEX GEOMETRY

4 FLUTE

SFM					
MATERIAL / TYPE	**Rc HARDNESS**	**4 FLUTE STUB LENGTH**	**4 FLUTE REG LENGTH**	**4 FLUTE LONG LENGTH**	**4 FLUTE EXTRA LONG**
COBALT BASE ALLOYS					
STELLITE, HS-21,	UNDER 32	275 - 350	275 - 350	200 - 275	200 - 275
HAYNES 25/188, X-40, L-605	OVER 32	175 - 250	175 - 250	125 - 175	125 - 175
NICKEL BASE ALLOYS					
INCONEL-625/718, WASPALLOY,	UNDER 32	200 - 300	200 - 300	150 - 200	150 - 200
RENE, HASTELLOY	OVER 32	125 - 200	125 - 200	90 - 125	90 - 125
IRON BASE ALLOYS					
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	250 - 350	250 - 350	200 - 300	200 - 300
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	200 - 250	200 - 250	150 - 200	150 - 200
MONEL					
MONEL-65% NICKEL	–	275 - 350	275 - 350	200 - 300	200 - 300
TITANIUM ALLOYS					
COMMERCIALLY PURE, 6Al-4V,	–	–	–	–	–
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	250 - 400	250 - 400	150 - 300	150 - 300
STAINLESS STEEL (PRECIPITATION)					
12/8, 15/5, 17/4, AM-350/355	UNDER 32	250 - 300	250 - 300	175 - 210	175 - 210
	OVER 32	200 - 250	200 - 250	140 - 175	140 - 175
STAINLESS STEEL (AUSTENITIC)					
200 SERIES, 302, 303, 304, 316	–	290 - 375	290 - 375	200 - 260	200 - 260
STAINLESS STEEL (AUSTENITIC)					
304L, 316L	UNDER 32	250 - 300	250 - 300	175 - 210	175 - 210
	OVER 32	200 - 250	200 - 250	140 - 175	140 - 175
STAINLESS STEEL (MARTENSITIC)					
403, 410, 416, 440	–	250 - 300	250 - 300	175 - 210	175 - 210
HIGH STRENGTH TOOL STEELS					
4140, 4340, 6150, 5210, A2,	UNDER 32	250 - 350	250 - 350	175 - 210	175 - 210
D2, P20, H11, H13, S2, 01	OVER 32	150 - 200	150 - 200	100 - 140	100 - 140
CARBON STEELS					
1000's, 1100's, 1300'S	–	560 - 595	560 - 595	300 - 500	300 - 500
DUCTILE					
DUCTILE CAST IRONS	–	560 - 595	560 - 595	400 - 500	400 - 500
CAST IRONS					
GRAY CAST IRONS	–	560 - 595	560 - 595	400 - 500	400 - 500

Speed and feed chart parameters are for 4 flute full diameter slotting

Recommended slotting up to 1 x Diameter
Tool holding important for maximizing tool life. Minimize TIR
Max ramp angle recommended 3° or less

4 FLUTE

I.P.T. (INCH PER TOOTH)										
MATERIAL / TYPE	**1/8"**	**3/16"**	**1/4"**	**5/16"**	**3/8"**	**7/16"**	**1/2"**	**5/8"**	**3/4"**	**1"**
COBALT BASE ALLOYS										
STELLITE, HS-21, HAYNES 25/188, X-40, L-605	.0004 - .0008	.0005 -.0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS										
INCONEL-625/718, WASPALLOY, RENE, HASTELLOY	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS										
INCOLOY 800-802, MULTIMET N-155, TIMKIN 16-25-6, CARPENTER 22-b3	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL										
MONEL-65% NICKEL	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS										
COMMERCIALLY PURE, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)										
12/8, 15/5, 17/4, AM-350/355	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)										
200 SERIES, 302, 303, 304, 316	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)										
304L, 316L	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)										
403, 410, 416, 440	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS										
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, 01	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS										
1000's, 1100's, 1300'S	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE										
DUCTILE CAST IRONS	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS										
GRAY CAST IRONS	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

Chip Thinning recommended for 4 Flute to optimize tool life:

5% of Diameter Radial engaged: Multiply Feed 3X
10% of Diameter Radial engaged: Multiply Feed 2X
20% of Diameter Radial engaged: Multiply Feed 1.5X

VI-PRO®
VARIABLE INDEX GEOMETRY

5 FLUTE

SFM SEMI-ROUGHING & FINISH PASSES, UP TO 25% OF DIAMETER					
MATERIAL / TYPE	**Rc HARDNESS**	**5 FLUTE STUB LENGTH**	**5 FLUTE REG LENGTH**	**5 FLUTE LONG LENGTH**	**5 FLUTE EXTRA LONG**
COBALT BASE ALLOYS					
STELLITE, HS-21,	UNDER 32	550 - 570	550 - 570	385 - 400	385 - 400
HAYNES 25/188, X-40, L-605	OVER 32	200 - 225	200 - 225	140 - 160	140 - 160
NICKEL BASE ALLOYS					
INCONEL-625/718, WASPALLOY,	UNDER 32	550 - 570	550 - 570	385 - 400	385 - 400
RENE, HASTELLOY	OVER 32	200 - 225	200 - 225	140 - 160	140 - 160
IRON BASE ALLOYS					
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	550 - 570	550 - 570	385 - 400	385 - 400
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	200 - 225	200 - 225	140 - 160	140 - 160
MONEL					
MONEL-65% NICKEL	–	550 - 570	550 - 570	385 - 400	385 - 400
TITANIUM ALLOYS					
COMMERCIALLY PURE, 6Al-4V,	–	–	–	–	–
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	550 - 570	550 - 570	385 - 400	385 - 400
STAINLESS STEEL (PRECIPITATION)					
12/8, 15/5, 17/4, AM-350/355	UNDER 32	600 - 625	600 - 625	420 - 440	420 - 440
	OVER 32	550 - 570	550 - 570	385 - 400	385 - 400
STAINLESS STEEL (AUSTENITIC)					
200 SERIES, 302, 303, 304, 316	–	600 - 625	600 - 625	420 - 440	420 - 440
STAINLESS STEEL (AUSTENITIC)					
304L, 316L	UNDER 32	600 - 625	600 - 625	420 - 440	420 - 440
	OVER 32	550 - 570	550 - 570	385 - 400	385 - 400
STAINLESS STEEL (MARTENSITIC)					
403, 410, 416, 440	–	600 - 625	600 - 625	420 - 440	420 - 440
HIGH STRENGTH TOOL STEELS					
4140, 4340, 6150, 5210, A2,	UNDER 32	600 - 625	600 - 625	420 - 440	420 - 440
D2, P20, H11, H13, S2, 01	OVER 32	550 - 570	550 - 570	385 - 400	385 - 400
CARBON STEELS					
1000's, 1100's, 1300'S	–	800 - 850	800 - 850	560 - 595	560 - 595
DUCTILE					
DUCTILE CAST IRONS	–	800 - 850	800 - 850	560 - 595	560 - 595
CAST IRONS					
GRAY CAST IRONS	–	800 - 850	800 - 850	560 - 595	560 - 595

5 FLUTE

I.P.T. (INCH PER TOOTH)										
MATERIAL / TYPE	**1/8"**	**3/16"**	**1/4"**	**5/16"**	**3/8"**	**7/16"**	**1/2"**	**5/8"**	**3/4"**	**1"**
COBALT BASE ALLOYS										
STELLITE, HS-21, HAYNES 25/188, X-40, L-605	.0004 - .0008	.0005 -.0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS										
INCONEL-625/718, WASPALLOY, RENE, HASTELLOY	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS										
INCOLOY 800-802, MULTIMET N-155, TIMKIN 16-25-6, CARPENTER 22-b3	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL										
MONEL-65% NICKEL	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS										
COMMERCIALLY PURE, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)										
12/8, 15/5, 17/4, AM-350/355	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)										
200 SERIES, 302, 303, 304, 316	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)										
304L, 316L	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)										
403, 410, 416, 440	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS										
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, 01	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS										
1000's, 1100's, 1300'S	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE										
DUCTILE CAST IRONS	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS										
GRAY CAST IRONS	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

Chip Thinning recommended for optimized tool life:

5% of Diameter Radial engaged: Multiply Feed 3X
10% of Diameter Radial engaged: Multiply Feed 2X

VI-PRO®
VARIABLE INDEX GEOMETRY

6 FLUTE

SFM FINISHING PASSES ONLY, UP TO 10% OF DIAMETER			
MATERIAL / TYPE	**Rc HARDNESS**	**6 FLUTE REG LENGTH**	**6 FLUTE LONG LENGTH**
COBALT BASE ALLOYS			
STELLITE, HS-21,	UNDER 32	550 - 570	385 - 400
HAYNES 25/188, X-40, L-605	OVER 32	200 - 225	140 - 160
NICKEL BASE ALLOYS			
INCONEL-625/718, WASPALLOY,	UNDER 32	550 - 570	385 - 400
RENE, HASTELLOY	OVER 32	200 - 225	140 - 160
IRON BASE ALLOYS			
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	550 - 570	385 - 400
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	200 - 225	140 - 160
MONEL			
MONEL-65% NICKEL	–	550 - 570	385 - 400
TITANIUM ALLOYS			
COMMERCIALLY PURE, 6Al-4V,	–	–	–
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	550 - 570	385 - 400
STAINLESS STEEL (PRECIPITATION)			
12/8, 15/5, 17/4, AM-350/355	UNDER 32	600 - 625	420 - 440
	OVER 32	550 - 570	385 - 400
STAINLESS STEEL (AUSTENITIC)			
200 SERIES, 302, 303, 304, 316	–	600 - 625	420 - 440
STAINLESS STEEL (AUSTENITIC)			
304L, 316L	UNDER 32	600 - 625	420 - 440
	OVER 32	550 - 570	385 - 400
STAINLESS STEEL (MARTENSITIC)			
403, 410, 416, 440	–	600 - 625	420 - 440
HIGH STRENGTH TOOL STEELS			
4140, 4340, 6150, 5210, A2,	UNDER 32	600 - 625	420 - 440
D2, P20, H11, H13, S2, 01	OVER 32	550 - 570	385 - 400
CARBON STEELS			
1000's, 1100's, 1300'S	–	800 - 850	560 - 595
DUCTILE			
DUCTILE CAST IRONS	–	800 - 850	560 - 595
CAST IRONS			
GRAY CAST IRONS	–	800 - 850	560 - 595

6 FLUTE

I.P.T. (INCH PER TOOTH)							
MATERIAL / TYPE	**1/4"**	**5/16"**	**3/8"**	**1/2"**	**5/8"**	**3/4"**	**1"**
COBALT BASE ALLOYS							
STELLITE, HS-21, HAYNES 25/188, X-40, L-605	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS							
INCONEL-625/718, WASPALLOY, RENE, HASTELLOY	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS							
INCOLOY 800-802, MULTIMET N-155, TIMKIN 16-25-6, CARPENTER 22-b3	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL							
MONEL-65% NICKEL	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS							
COMMERCIALLY PURE, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)							
12/8, 15/5, 17/4, AM-350/355	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)							
200 SERIES, 302, 303, 304, 316	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)							
304L, 316L	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)							
403, 410, 416, 440	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS							
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, 01	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS							
1000's, 1100's, 1300'S	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE							
DUCTILE CAST IRONS	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS							
GRAY CAST IRONS	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

Chip Thinning recommended for optimized tool life:

5% of Diameter Radial engaged: Multiply Feed 3X
10% of Diameter Radial engaged: Multiply Feed 2X

ROUGHING END MILLS - CARBIDE TECHNICAL INFORMATION

MATERIAL	GRADES	STUB & REGULAR		LONG LENGTH		1/4	3/8	1/2	5/8	3/4	1
		SFM	SFM	SFM	SFM	(.2500)	(.3750)	(.5000)	(.0625)	(.7500)	(1.000)
		UNCOATED	ALTIN	UNCOATED	ALTIN	IPT	IPT	IPT	IPT	IPT	IPT
ALLOYS											
COBALT BASE	STELLITE, HS-21, HAYNES 25/188	25-45	45-75	20-35	35-60	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
COBALT BASE >32HRC	X40, L605	25-45	45-75	20-35	35-60	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
IRON BASE	INCOLOY 800-802, MULTMET N-155	25-45	45-75	20-35	35-60	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
IRON BASE >32HRC	TIMKIN 16-25-6, CARPENTER 22-B3	25-45	45-75	20-35	35-60	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
NICKEL BASE	INCONEL 625/718, INCO 700, 713C, 718	40-85	65-145	30-65	50-115	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
NICKEL BASE >32HRC	MONEL 400-401, 404, K401, RENE,RENE 41 & 95 HASTELLOY, WASPOLOY, UDIMET 500 & 700	30-65	55-110	25-50	45-90	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
TITANIUM	COMMERCIALLY PURE, 6AL-4VASTM 1/2/3, 6AL-25N-4ZR-2MO-SITI-8AL-1MO, TI-8AL-4MO	75-130	125-215	60-100	100-170	.0009-.0012	.0012-.0015	.0015-.0018	.0018-.0021	.0021-.0025	.0025-.0027
ALUMINUM											
ALUMINUM ALLOYS		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HIGH SILICON		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BRASS/BRONZE											
	ALUMINUM BRONZE, LOW SILICON BRONZE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CAST IRON											
DUCTILE	A536, J434, 60-40-18	200-250	300-350	140-175	210-250	.0005-.0015	.0015-.002	.002-.0025	.0025-.003	.003-.0035	.0035-.004
GRAY	A48, A436, A319, CLASS 20, G4000	250-300	450-500	175-210	315-350	.0005-.0015	.0015-.002	.002-.0025	.0025-.003	.003-.0035	.0035-.004
MALLEABLE	A220, A602, J158	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COMPOSITES											
	G-10, FIBERGLASS, GRAPHITE, GRAPHITE EPOXY, PLASTICS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER											
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MAGNESIUM											
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STAINLESS STEEL											
AUSTENITIC	301-304L, 310, 316L, 321, 347	150-300	250-500	120-240	200-400	.0010-.0015	.0015-.0020	.0020-.0025	.0025-.0030	.0030-.0035	.0035-.0040
MARTENSITIC	403, 410, 416, 420, 430,	135-255	225-430	110-200	180-340	.0015-.0020	.0020-.0030	.0030-.0035	.0035-.0040	.0038-.0042	.0040-.0045
PRECIPITATION HARDENING	12/8, 15/5, 17/4, AM-350/355/363, PH13-8MO, PH14-8/MO	135-255	225-430	110-200	180-340	.0015-.0020	.0020-.0030	.0030-.0035	.0035-.0040	.0038-.0042	.0040-.0045
STEELALLOY											
HIGH STRENGTH TOOL STEEL	A2, D2, P20, H11, H13,	200-230	250-320	140-160	180-210	.0003-.001	.001-.0015	.0015-.002	.002-.003	.003-.0035	.0035-.004
HIGH STRENGTH TOOL STEEL >32 HRC		180-220	240-280	130-150	170-190	.0003-.001	.001-.0015	.0015-.002	.002-.003	.003-.0035	.0035-.004
LOW CARBON	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	210-345	350-575	165-275	280-460	.0015-.0020	.0020-.0030	.0030-.0035	.0035-.0040	.0038-.0042	.0040-.0045
LOW CARBON >32HRC		125-190	210-320	100-150	165-255	.0011-.0015	.0015-.0020	.0020-.0025	.0023-.0025	.0025-.0030	.0028-.0032
MEDIUM CARBON	1040-1095, 1140-1151, 1330-1345, 1520-1572, 4023-4063, 4120-4161, 4330-4340, 4620-4640, 8620-8660, 8740-8750, 6150, 51000, 52100	210-345	350-575	165-275	280-460	.0015-.0020	.0020-.0030	.0030-.0035	.0035-.0040	.0038-.0042	.0040-.0045
MEDIUM CARBON >32 HRC		180-220	240-280	130-150	170-190	.0003-.001	.001-.0015	.0015-.002	.002-.003	.003-.0035	.0035-.004

ROUGHING END MILLS - M42 COBALT TECHNICAL INFORMATION

SFM & I.P.T. (INCH PER TOOTH)

MATERIAL / TYPE	CONDITIONS	STARTING SFM ALTIN	DIAMETER RANGE - SUGGESTED CHIP LOAD PER TOOTH						
			1/4″	1/2″	3/4″	1″	1-1/4″	1-1/2″	2″
STAINLESS STEELS									
PRECIPITATION 13-8, 15-5, 17-4PH	Slotting Axial 1 x D	100-150	.0015″	.0020″	.0026″	.0036″	.0046″	.0054″	.0070″
	Heavy Profiling		.0015″	.0020″	.0029″	.0040″	.0050″	.0060″	.0075″
AUSTENITIC 302, 303, 304L, 316L	Slotting 1 x D	100-150	.0015″	.0020″	.0030″	.0045″	.0056″	.0067″	.0090″
	Heavy Profiling		.0019″	.0025″	.0034″	.0049″	.0061″	.0074″	.0098″
MARTENSITIC 403, 410, 416	Slotting Axial 1 x D	100-170	.0015″	.0020″	.0030″	.0045″	.0056″	.0067″	.0090″
	Heavy Profiling		.0019″	.0025″	.0034″	.0049″	.0061″	.0074″	.0098″
HIGH TEMP ALLOYS									
COBALT BASE Stellite, Haynes 25, 188, X-40, L-605	Slotting 1 x D	10-40	.0011″	.0014″	.0018″	.0026″	.0033″	.0040″	.0053″
	Heavy Profiling		.0011″	.0014″	.0020″	.0029″	.0037″	.0045″	.0059″
NICKEL BASE Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel PermaNickel 300, Incoly 600	Slotting Axial 1 x D	20-40	.0011″	.0014″	.0018″	.0026″	.0033″	.0040″	.0053″
	Heavy Profiling		.0011″	.0014″	.0020″	.0029″	.0037″	.0045″	.0059″
IRON BASE Incoly 800-802, Multimet N-155, Timken 16-26-6	Slotting 1 x D	30-80	.0011″	.0014″	.0018″	.0026″	.0033″	.0040″	.0053″
	Heavy Profiling		.0011″	.0014″	.0020″	.0029″	.0037″	.0045″	.0059″
STEELS									
HIGH STRENGTH STEELS 4140, 4340, 52100	Slotting Axial 1 x D	100-150	.0015″	.0020″	.0025″	.0035″	.0045″	.0053″	.0071″
	Heavy Profiling		.0015″	.0020″	.0028″	.0039″	.0050″	.0059″	.0079″
HIGH ALLOY STEELS MOLD & DIE A-2, P20, 01, 02, D2, H-13	Slotting 1 x D	80-115	.0015″	.0020″	.0025″	.0035″	.0045″	.0053″	.0071″
	Heavy Profiling		.0015″	.0020″	.0028″	.0039″	.0050″	.0059″	.0079″
MEDIUM ALLOY STEELS 200, 250, 300	Slotting Axial 1 x D	100-180	.0016″	.0023″	.0033″	.0050″	.0032″	.0075″	.0093″
	Heavy Profiling		.0020″	.0027″	.0040″	.0054″	.0070″	.0082″	.0110″
LOW ALLOY STEELS MARAGING 10XX, 11XX, 13XX	Slotting 1 x D	130-200	.0018″	.0025″	.0037″	.0053″	.0068″	.0080″	.0100″
	Heavy Profiling		.0022″	.0029″	.0042″	.0059″	.0074″	.0090″	.0115″
CAST IRONS									
DUCTILE IRON Ductile Cast Iron	Slotting Axial 1 x D	70-130	.0015″	.0019″	.0030″	.0042″	.0056″	.0065″	.0087″
	Heavy Profiling		.0018″	.0024″	.0034″	.0048″	.0061″	.0073″	.0093″
CAST IRON Gray Cast Iron	Slotting 1 x D	120-200	.0014″	.0018″	.0024″	.0034″	.0044″	.0053″	.0070″
	Heavy Profiling		.0014″	.0018″	.0027″	.0038″	.0050″	.0058″	.0078″
TITANIUMS									
TITANIUM ALLOYS 6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM & IPM 25%	Slotting Axial 1 x D	75-150	.0015″	.0020″	.0028″	.0040″	.0052″	.0062″	.0080″
	Heavy Profiling		.0017″	.0022″	.0030″	.0045″	.0057″	.0067″	.0090″
ALUMINUM									
ALUMINUM ALLOYS 6061-T6, 7075	Slotting Axial 1 x D	650-950	.0024″	.0058″	.0067″	.0103″	.0112″	.0180″	.0210″
	Heavy Profiling		.0027″	.0058″	.0076″	.0110″	.0120″	.0205″	.0260″

SPEED & FEED CALCULATION FORMULAS

RPM = (3.82 x SFM) ÷ Dia.	**IPR = IPM ÷ RPM**	**SFM = (RPM x Dia.) ÷ 3.82**
IPM = IPT(chip load) x No. of Teeth x RPM	**IPT(chip load) = IPM ÷ (No. of teeth x RPM)**	

45°& 60° HELIX END MILLS - CARBIDE TECHNICAL INFORMATION

THESE VALUES ARE FOR UNCOATED TOOLS
FOR COATED TOOLS INCREASE SFM: ZRN = +30% ALTIN = +40%

SFM FOR GENERAL PURPOSE CARBIDE END MILLS

MATERIAL / TYPE	Rc HARDNESS	2 Fl, 3 Fl 45° Helix Aluminum	3 Flute 45° & 60° Helix	5 Flute 45° Helix
COBALT BASE ALLOYS				
STELLITE, HS-21, HAYNES 25/188, X-40, L-605	UNDER 32 OVER 32	– –	200 - 275 125 - 175	250 - 300 150 - 200
NICKEL BASE ALLOYS				
INCONEL-625/718, WASPALLOY, RENE, HASTELLOY	UNDER 32 OVER 32	– –	150 - 200 90 - 125	250 - 300 150 - 200
IRON BASE ALLOYS				
INCOLOY 800-802, MULTIMET N-155, TIMKIN 16-25-6, CARPENTER 22-b3	UNDER 32 OVER 32	– –	250 - 300 150 - 200	250 - 300 150 - 200
MONEL				
MONEL-65% NICKEL	–	–	200 - 300	225 - 350
TITANIUM ALLOYS				
COMMERCIALLY PURE, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	– –	500 min. –	250 - 400 –	250 - 400 –
STAINLESS STEEL (PRECIPITATION)				
12/8, 15/5, 17/4, AM-350/355	UNDER 32 OVER 32	– –	200 - 350 150 - 250	200 - 350 150 - 250
STAINLESS STEEL (AUSTENITIC)				
200 SERIES, 302, 303, 304, 316	UNDER 32 OVER 32	– –	250 - 350 175 - 275	250 - 350 175 - 275
STAINLESS STEEL (AUSTENITIC)				
304L, 316L	UNDER 32 OVER 32	– –	125 - 200 90 - 125	125 - 200 90 - 125
STAINLESS STEEL (MARTENSITIC)				
403, 410, 416, 440	UNDER 32 OVER 32	– –	200 - 350 150 - 250	200 - 350 150 - 250
HIGH STRENGTH TOOL STEELS				
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, 01	UNDER 32 OVER 32	– –	225 - 300 125 - 200	225 - 300 125 - 200
MEDIUM ALLOY STEELS				
200, 250, 300	UNDER 32 OVER 32	– –	250 - 350 150 - 200	250 - 350 150 - 200
CARBON STEELS				
1000's, 1100's, 1300's	UNDER 32 OVER 32	– –	250 - 350 150 - 200	250 - 350 150 - 200
DUCTILE				
DUCTILE CAST IRONS	–	–	350 - 450	300 - 400
CAST IRONS				
GRAY CAST IRONS	–	–	300 - 400	250 - 350
ALUMINUM				
2014, 2024, 6061-(T1-T6) 7075, DIE CAST, EXTRUDED	– –	500 min. –	500 min. –	500 min. –
MAGNESIUM				
	–	500 min.	500 min.	500 min.
COPPER, COPPER ALLOYS				
	–	400 - 500	400 - 500	250 - 350
BRASS BRONZE				
BRASS, ALUM/BRONZE, LOW SILICON BRONZE	– –	300 - 400 –	300 - 400 –	– –
COMPOSITES				
G-10 FIBERGLASS, GRAPHITE, GRAPHITE/EPOXY, PLASTICS	– –	250 - 1000 –	– –	– –

45°& 60° HELIX END MILLS - CARBIDE TECHNICAL INFORMATION

I.P.T. (INCH PER TOOTH)					
MATERIAL / TYPE	**Rc HARDNESS**	**1/8″**	**1/8″ - 1/4″**	**1/4″ - 1/2″**	**1/2″ - 1″**
COBALT BASE ALLOYS					
STELLITE, HS-21,	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
HAYNES 25/188, X-40, L-605	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
NICKEL BASE ALLOYS					
INCONEL-625/718, WASPALLOY,	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
RENE, HASTELLOY	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
IRON BASE ALLOYS					
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
MONEL					
MONEL-65% NICKEL	–	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0030″-.0050″
TITANIUM ALLOYS					
COMMERCIALLY PURE, 6Al-4V,	–	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0030″-.0050″
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	–	–	–	–
STAINLESS STEEL (PRECIPITATION)					
12/8, 15/5, 17/4, AM-350/355	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
STAINLESS STEEL (AUSTENITIC)					
200 SERIES, 302, 303, 304, 316	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
STAINLESS STEEL (AUSTENITIC)					
304L, 316L	UNDER 32	.0005″-.0008″	.0005″-.0008″	.0008″-.0015″	.0015″-.0030″
	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0010″	.0010″-.0020″
STAINLESS STEEL (MARTENSITIC)					
403, 410, 416, 440	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
HIGH STRENGTH TOOL STEELS					
4140, 4340, 6150, 5210, A2,	UNDER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
D2, P20, H11, H13, S2, 01	OVER 32	.0003″-.0005″	.0003″-.0005″	.0005″-.0015″	.0010″-.0030″
MEDIUM ALLOY STEELS					
200, 250, 300	UNDER 32	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0030″-.0050″
	OVER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
CARBON STEELS					
1000's, 1100's, 1300's	UNDER 32	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0030″-.0050″
	OVER 32	.0005″-.0010″	.0005″-.0010″	.0008″-.0020″	.0020″-.0040″
DUCTILE					
DUCTILE CAST IRONS	–	.0010″-.0020″	.0010″-.0020″	.0015″-.0040″	.0030″-.0100″
CAST IRONS					
GRAY CAST IRONS	–	.0010″-.0020″	.0010″-.0020″	.0015″-.0040″	.0030″-.0100″
ALUMINUM					
2014, 2024, 6061-(T1-T6)	–	.0010″-.0020″	.0010″-.0020″	.0015″-.0040″	.0030″-.0150″
7075, DIE CAST, EXTRUDED	–	–	–	–	–
MAGNESIUM					
	–	.0010″-.0020″	.0010″-.0020″	.0015″-.0040″	.0030″-.0100″
COPPER, COPPER ALLOYS					
	–	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0020″-.0080″
BRASS BRONZE					
BRASS, ALUM/BRONZE,	–	.0007″-.0015″	.0007″-.0015″	.0010″-.0025″	.0020″-.0080″
LOW SILICON BRONZE	–	–	–	–	–
COMPOSITES					
G-10 FIBERGLASS, GRAPHITE,	–	.0010″-.0020″	.0010″-.0020″	.0015″-.0040″	.0030″-.0100″
GRAPHITE/EPOXY, PLASTICS	–	–	–	–	–

30° HELIX END MILLS - CARBIDE TECHNICAL INFORMATION

THESE SFM VALUES ARE FOR UNCOATED TOOLS.
FOR COATED TOOLS INCREASE SFM: TICN = +25% ALTIN = +40%

SFM FOR GENERAL PURPOSE CARBIDE END MILLS

MATERIAL / TYPE	Rc HARDNESS	2 Flute 30° Helix Stub, Reg	2 Flute 30° Helix Long, X-Long	4 Flute 30° Helix Stub, Reg	4 Flute 30° Helix Long, X-Long
COBALT BASE ALLOYS					
STELLITE, HS-21,	UNDER 32	–	–	175 - 225	150 - 200
HAYNES 25/188, X-40, L-605	OVER 32	–	–	125 - 175	100 - 150
NICKEL BASE ALLOYS					
INCONEL-625/718, WASPALLOY,	UNDER 32	–	–	125 - 175	100 - 150
RENE, HASTELLOY	OVER 32	–	–	70 - 115	70 - 100
IRON BASE ALLOYS					
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	–	–	175 - 225	150 - 200
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	–	–	125 - 175	100 - 150
MONEL					
MONEL-65% NICKEL	–	175 - 300	125 - 175	175 - 300	125 - 175
TITANIUM ALLOYS					
COMMERCIALLY PURE, 6Al-4V,	–	200 - 300	125 - 250	200 - 300	125 - 250
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	–	–	–	–
STAINLESS STEEL (PRECIPITATION)					
12/8, 15/5, 17/4, AM-350/355	UNDER 32	–	–	150 - 250	100 - 150
	OVER 32	–	–	125 - 175	80 - 150
STAINLESS STEEL (AUSTENITIC)					
200 SERIES, 302, 303, 304, 316	UNDER 32	–	–	200 - 250	125 - 175
	OVER 32	–	–	150 - 200	100 - 150
STAINLESS STEEL (AUSTENITIC)					
304L, 316L	UNDER 32	–	–	90 - 125	80 - 120
	OVER 32	–	–	75 - 110	60 - 90
STAINLESS STEEL (MARTENSITIC)					
403, 410, 416, 440	UNDER 32	–	–	150 - 250	100 - 150
	OVER 32	–	–	125 - 175	80 - 150
HIGH STRENGTH TOOL STEELS					
4140, 4340, 6150, 5210, A2,	UNDER 32	–	–	150 - 225	125 - 175
D2, P20, H11, H13, S2, 01	OVER 32	–	–	60 - 125	80 - 120
MEDIUM ALLOY STEELS					
200, 250, 300	UNDER 32	–	–	200 - 250	150 - 200
	OVER 32	–	–	125 - 175	100 - 150
CARBON STEELS					
1000's, 1100's, 1300's	UNDER 32	–	–	200 - 250	150 - 200
	OVER 32	–	–	125 - 175	100 - 150
DUCTILE					
DUCTILE CAST IRONS	–	250 - 350	200 - 300	300 - 400	200 - 300
CAST IRONS					
GRAY CAST IRONS	–	225 - 325	175 - 250	250 - 350	175 - 250
ALUMINUM					
2014, 2024, 6061-(T1-T6)	–	500 min.	500 min.	500 min.	500 min.
7075, DIE CAST, EXTRUDED	–	–	–	–	–
MAGNESIUM					
	–	500 min.	500 min.	500 min.	500 min.
COPPER, COPPER ALLOYS					
	–	400 - 500	400 - 500	300 - 400	250 - 350
BRASS BRONZE					
BRASS, ALUM/BRONZE,	–	300 - 400	300 - 400	250 - 350	200 - 300
LOW SILICON BRONZE	–	–	–	–	–
COMPOSITES					
G-10 FIBERGLASS, GRAPHITE,	–	250 - 1000	250 - 1000	250 - 1000	250 - 1000
GRAPHITE/EPOXY, PLASTICS	–	–	–	–	–

30° HELIX END MILLS - CARBIDE TECHNICAL INFORMATION

I.P.T. (INCH PER TOOTH) FOR GENERAL PURPOSE CARBIDE END MILLS

MATERIAL / TYPE	Rc HARDNESS	UP TO 1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"	1" - 1-1/4"
COBALT BASE ALLOYS						
STELLITE, HS-21,	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
HAYNES 25/188, X-40, L-605	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
NICKEL BASE ALLOYS						
INCONEL-625/718, WASPALLOY,	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
RENE, HASTELLOY	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
IRON BASE ALLOYS						
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
MONEL						
MONEL-65% NICKEL	–	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0030"-.0050"	.0040"-.0060"
TITANIUM ALLOYS						
COMMERCIALLY PURE, 6Al-4V,	–	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0030"-.0050"	.0040"-.0060"
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	–	–	–	–	–
STAINLESS STEEL (PRECIPITATION)						
12/8, 15/5, 17/4, AM-350/355	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
STAINLESS STEEL (AUSTENITIC)						
200 SERIES, 302, 303, 304, 316	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
STAINLESS STEEL (AUSTENITIC)						
304L, 316L	UNDER 32	.0005"-.0008"	.0005"-.0008"	.0008"-.0015"	.0015"-.0030"	.0020"-.0040"
	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0010"	.0010"-.0020"	.0015"-.0030"
STAINLESS STEEL (MARTENSITIC)						
403, 410, 416, 440	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
HIGH STRENGTH TOOL STEELS						
4140, 4340, 6150, 5210, A2,	UNDER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
D2, P20, H11, H13, S2, 01	OVER 32	.0003"-.0005"	.0003"-.0005"	.0005"-.0015"	.0010"-.0030"	.0020"-.0040"
MEDIUM ALLOY STEELS						
200, 250, 300	UNDER 32	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0030"-.0050"	.0040"-.0060"
	OVER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
CARBON STEELS						
1000's, 1100's, 1300's	UNDER 32	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0030"-.0050"	.0040"-.0060"
	OVER 32	.0005"-.0010"	.0005"-.0010"	.0008"-.0020"	.0020"-.0040"	.0030"-.0050"
DUCTILE						
DUCTILE CAST IRONS	–	.0010"-.0020"	.0010"-.0020"	.0015"-.0040"	.0030"-.0100"	.0050"-.0100"
CAST IRONS						
GRAY CAST IRONS	–	.0010"-.0020"	.0010"-.0020"	.0015"-.0040"	.0030"-.0100"	.0050"-.0100"
ALUMINUM						
2014, 2024, 6061-(T1-T6)	–	.0010"-.0020"	.0010"-.0020"	.0015"-.0040"	.0030"-.0150"	.0050"-.0150"
7075, DIE CAST, EXTRUDED	–	–	–	–	–	–
MAGNESIUM						
	–	.0010"-.0020"	.0010"-.0020"	.0015"-.0040"	.0030"-.0100"	.0050"-.0100"
COPPER, COPPER ALLOYS						
	–	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0020"-.0080"	.0040"-.0100"
BRASS BRONZE						
BRASS, ALUM/BRONZE,	–	.0007"-.0015"	.0007"-.0015"	.0010"-.0025"	.0020"-.0080"	.0040"-.0100"
LOW SILICON BRONZE	–	–	–	–	–	–
COMPOSITES						
G-10 FIBERGLASS, GRAPHITE,	–	.0010"-.0020"	.0010"-.0020"	.0015"-.0040"	.0030"-.0100"	.0050"-.0100"
GRAPHITE/EPOXY, PLASTICS	–	–	–	–	–	–

GENERAL PURPOSE CHAMFER MILLS - CARBIDE TECHNICAL INFORMATION

THESE VALUES ARE A STARTING POINT BASED ON A UNCOATED TOOL.
FOR AlTiN COATED TOOLS INCREASE VALUES BY UP TO +40%

SFM & I.P.T. (INCH PER TOOTH)

MATERIAL TYPE (<32 HRc)	SFM	SUGGESTED CHIP LOAD PER TOOTH					
		1/8"	3/16"	1/4"	5/16"	3/8"	1/2"
NON FERROUS							
ALUMINUM ALLOYS — 2024-T4/T6, 2014, 6061-T6/T651, 7075-T68	500 - 1000	.001	.002	.002	.002	.003	.004
COPPER — YELLOW BRASS, HIGH LEAD BRASS, RED BRASS	400 - 750	.001	.001	.002	.002	.0025	.003
COPPER ALLOYS — ALUM/BRONZE, LOW SILICON BRONZE	400 - 500	.001	.001	.002	.002	.0025	.003
MAGNESIUM — DE-CAT, EXTRUDED	450 - 650	.001	.002	.002	.002	.003	.004
PLASTICS, ACRYLICS, PHENOLICS — POLYSULFONE	100 - 300	.001	.002	.003	.003	.004	.006
CARBON, GRAPHITES	100 - 200	.040	.040	.060	.060	.080	.010
STAINLESS STEEL							
PRECIPITATION — 13/8, 15/5, AM-350/355	40 - 125	.0005	.0005	.001	.001	.001	.002
AUSTENIC — 200 SERIES, 302, 303, 304L, 316L	50 - 175	.0001	.0002	.0005	.0005	.001	.0015
MARTENSITIC — 403, 410, 416	50 - 125	.0001	.0002	.0005	.0005	.0005	.001
HIGH TEMP ALLOYS							
COBALT BASE — STELLITE, HS-21, HAYNES25/188, X-40, L-605	30 - 50	.0004	.0005	.001	.001	.001	.001
IRON BASE — INCOLY 600-802, MULTIMET N-155, TIMKIN 16-25-6	40 - 65	.0005	.0005	.001	.001	.0015	.002
TITANIUM ALLOYS — 6AL-4V, ASTM 1/2/3, 6 AL-25N-4ZR-2MO-SI	25 - 125	.0005	.0005	.0005	.0005	.001	.001
STEEL							
HIGH STRENGTH STEELS — 4340, 6150, 52100, H-11, H-13	25 - 125	.0005	.0005	.001	.001	.001	.001
HIGH ALLOY STEELS — A-2/6/10, P-3/10, 01, 02, 06	50 - 150	.0005	.0005	.001	.001	.001	.001
MEDIUM ALLOY STEELS — 200, 250, 300	75 - 175	.0005	.0005	.001	.001	.002	.0025
LOW ALLOY STEELS MARAGING — 10XX, 11XX, 13XX	50 - 200	.0005	.001	.0015	.0015	.002	.003
CAST IRON							
DUCTILE IRON — DUCTILE CAST IRON	50 - 200	.0005	.001	.0015	.0015	.002	.002
CAST IRON — GRAY CAST IRON	50 - 200	.0005	.001	.002	.002	.003	.004

CHAMFER MILL FLAT DIMMENSIONS

SIZE	FLUTES	FLAT WIDTH	DISTANCE TO THEORETICAL POINT				
			60°	82°	90°	100°	120°
1/8	2	0.018	0.0156	0.0104	0.0090	0.0076	0.0052
1/8	4	0.020	0.0173	0.0115	0.0100	0.0084	0.0058
3/16	2	0.028	0.0242	0.0161	0.0140	0.0117	0.0081
3/16	4	0.030	0.0260	0.0173	0.0150	0.0126	0.0087
1/4	2 & 4	0.044	0.0381	0.0253	0.0220	0.0185	0.0127
5/16	2 & 4	0.060	0.0450	0.0300	0.0260	0.0220	0.0150
3/8	2 & 4	0.060	0.0520	0.0350	0.0300	0.0250	0.0170
1/2	2 & 4	0.080	0.0690	0.0460	0.0400	0.0340	0.0230

Milling Trouble Shooting Guide

PROBLEM	CAUSE	SOLUTION
Premature Wear	• Cutting speed is too fast • Hard/Abrasive work-piece material • Speed and/or feed is too light • Helix angle is incorrect for application • Re-cutting chips	• Decrease spindle speed • Use coatings (TiCN, AlTiN) • Increase speed and/or feed • Select tool with appropriate helix angle • Adjust speed & feed, axial and/or radial D.O.C., Increase coolant pressure and/or air to clear chips.
Edge Chipping	• Feed rate too aggressive • Feed rate too aggressive on initial cut • D.O.C. too aggressive • Tool rigidity • Work-piece rigidity • Machine tool rigidity	• Reduce feed rate • Reduce feed rate on initial pass • Decrease axial and/or radial D.O.C. • Change tool holder, hold shank deeper and/or use shorter tool • Re-fixture work-piece and/or improve setup • Check spindle for run-out
Breakage	• Feed rate too aggressive • D.O.C. too aggressive • Excessive tool overhang • Chip packing • Excessive wear	• Reduce feed rate • Reduce axial and/or radial D.O.C. • Hold shank deeper, use shorter endmill • Adjust speed and/or feed, select endmill with fewer flutes, increase coolant pressure and/or air • Re-grind tool sooner
Chip Packing	• Speed and/or feed too aggressive • Flute gullet too small for chips • Insufficient coolant volume and/or pressure	• Reduce speed and/or feed • Use endmill with less flutes • Increase coolant and/or air pressure, reposition nozzle to point of cut
Chattering	• Speed and/or feed too aggressive • Tool rigidity • Work-piece rigidity • Machine tool rigidity • D.O.C. too aggressive • Wrong tool geometry	• Reduce speed and/or feed • Change tool holder, hold shank deeper and/or use shorter tool • Re-fixture work-piece and/or improve setup • Check spindle for run-out • Reduce axial and/or radial D.O.C.
Burs	• Incorrect speed & feed • Helix angle is incorrect for application • Primary cutting edge(s) are dull	• Adjust speed & feed • Change to correct helix angle, use climb milling • Re-grind tool sooner
Poor Finish	• Feed rate too aggressive • Speed is too slow • D.O.C. too aggressive • Excessive wear	• Reduce feed rate • Increase spindle speed (RPM) • Reduce axial and/or radial D.O.C. • Re-grind tool sooner
Poor Dimensional Accuracy	• D.O.C. too aggressive • Tool Rigidity • Machine tool rigidity	• Reduce axial and/or radial D.O.C. • Use tool with more flutes • Check, inspect & repair machine tool, tool holder and fixtures

END MILL GEOMETRY

Core Diameter: The diameter measured tangent from bottom of all flutes. This diameter dictates the strength of your end mill.

Cutting Diameter: Measured from margin-to-margin on cutting end of tool. An even number of flutes can be measured 180° apart.

Dish Angle: Angle perpendicular to centerline of tool and allows proper end cut characteristics and reduces full diameter contact.

Flute Wash: Amount of non-cutting flute area past the length of cut.

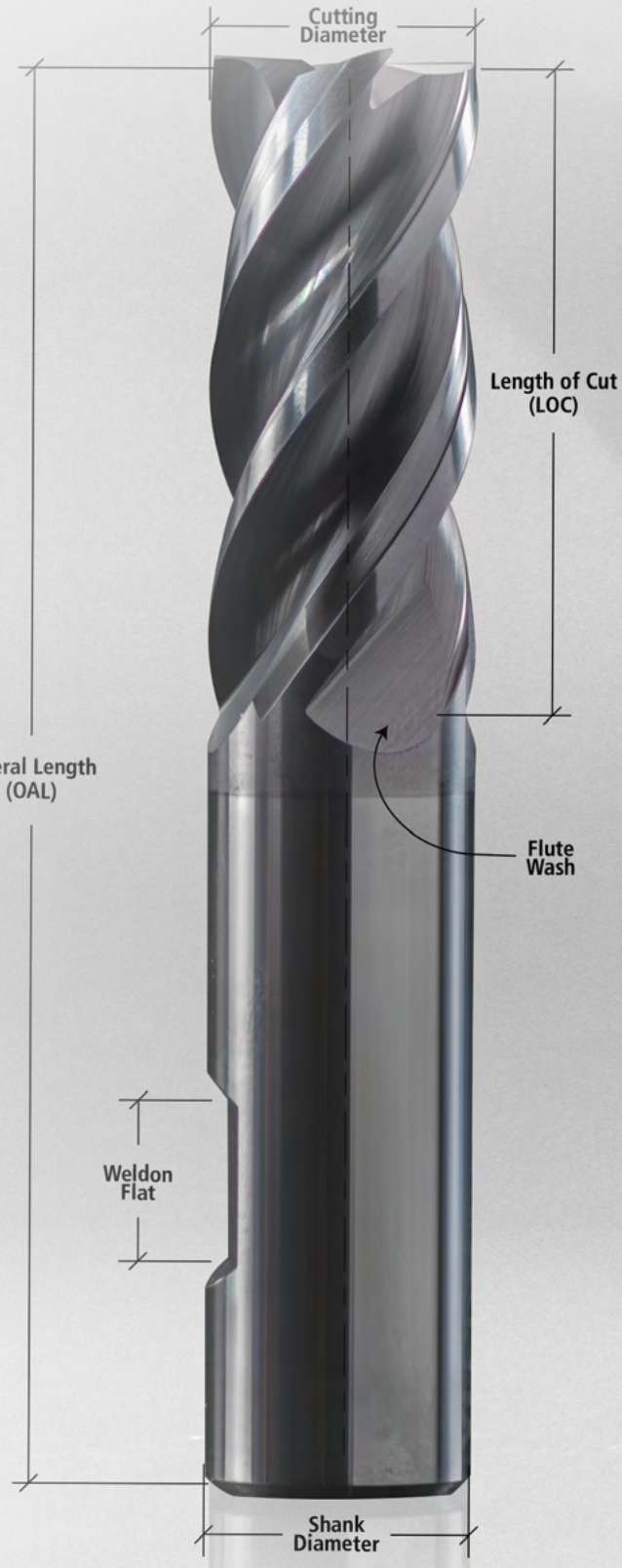
Gash Angle: The secondary cuts on a tool to provide chip space at corners and ends. The space forming the end cutting edge, which is used when feeding axially.

Helix Angle: This is the angle formed by a line tangent to the angle of the flute grind and parallel to the centerline of the tool.

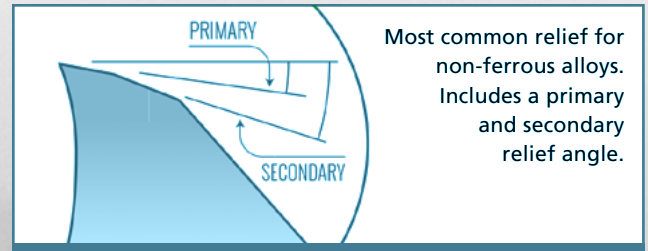
Land: The narrow surface of a profile sharpened cutter tooth immediately behind the cutting edge.

Length of Cut (LOC): This is the actual cutting depth of the tool in the axial direction.

Overall Length (OAL): A measurement taken from end-to-end of the tool.

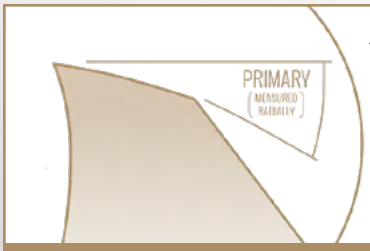


END MILL GEOMETRY



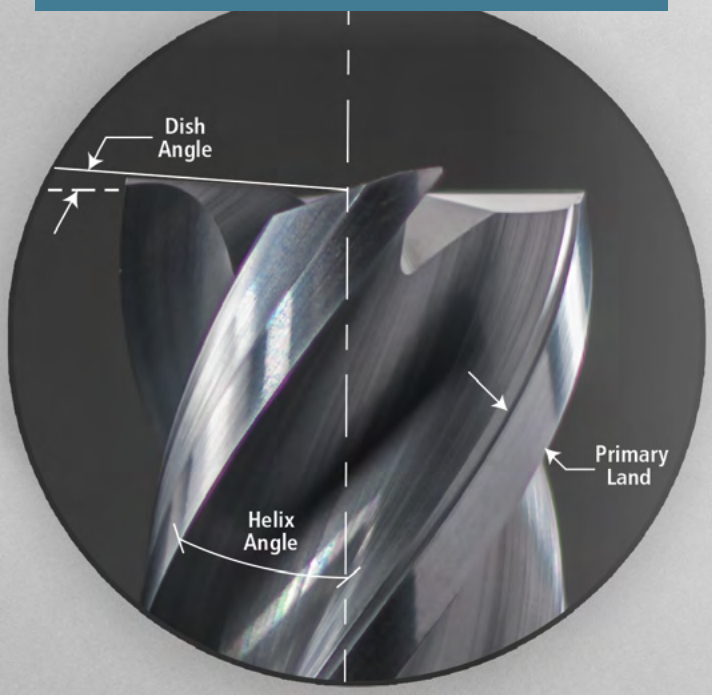
Most common relief for non-ferrous alloys. Includes a primary and secondary relief angle.

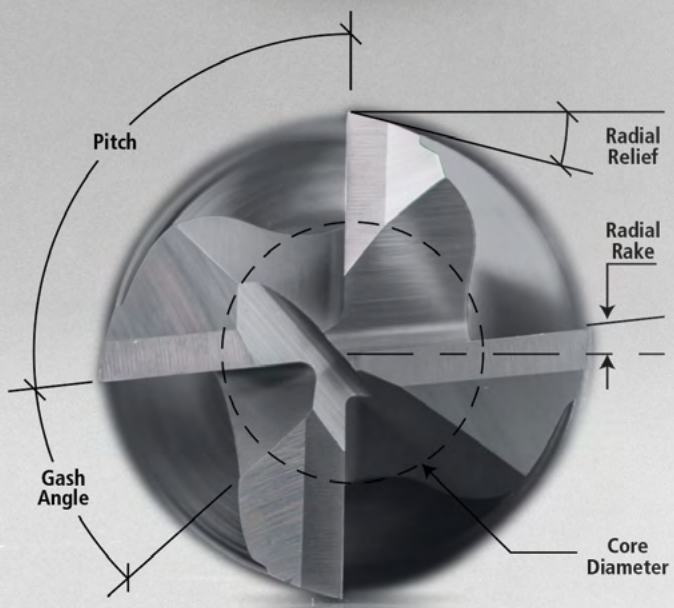
GENERAL PURPOSE - STANDARD RELIEF



A powerful edge design for ferrous and tough material cutting. This design includes a primary relief measured radially along its edge.

HIGH PERFORMANCE - ECCENTRIC RELIEF





Radial Relief: Area where cutting face is relieved behind the cutting edge in order to avoid rubbing while maintaining maximum edge strength. We offer 2 types of Radial Relief:

1. *Standard Relief*- General purpose relief shape consisting of a primary and secondary grind behind the cutting edge.
2. *Eccentric Relief* - A strong high performance edge design for ferrous and tough material cutting consisting of a primary relief measured radially along its edge.

Pitch: This is an equal angular measurement from flute-to-flute. If the tool is a variable index style then this spacing is unequal.

Radial Rake: The angle of the rake face measured from center of the tool.

Shank Diameter: The end of the tool that is held in the holder and requires a high degree of accuracy and concentricity.

Weldon Flat: The flat on the shank provides positive driving surface for the end mill.

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

Our selection of Micro End Mills covers a wide range of profiles. Choose from 2, 3 and 4 Flute, Square, Ball, Corner Radius, and Stub, Regular, Long Flute lengths and Long Reaches. All micro tools stocked uncoated, and Altin coated for optimum tool performance. All tools are stocked and ready to ship. Order today, and we'll ship today!

Micro End Mills are stocked in sizes from 0.005" to 0.120" in the following:

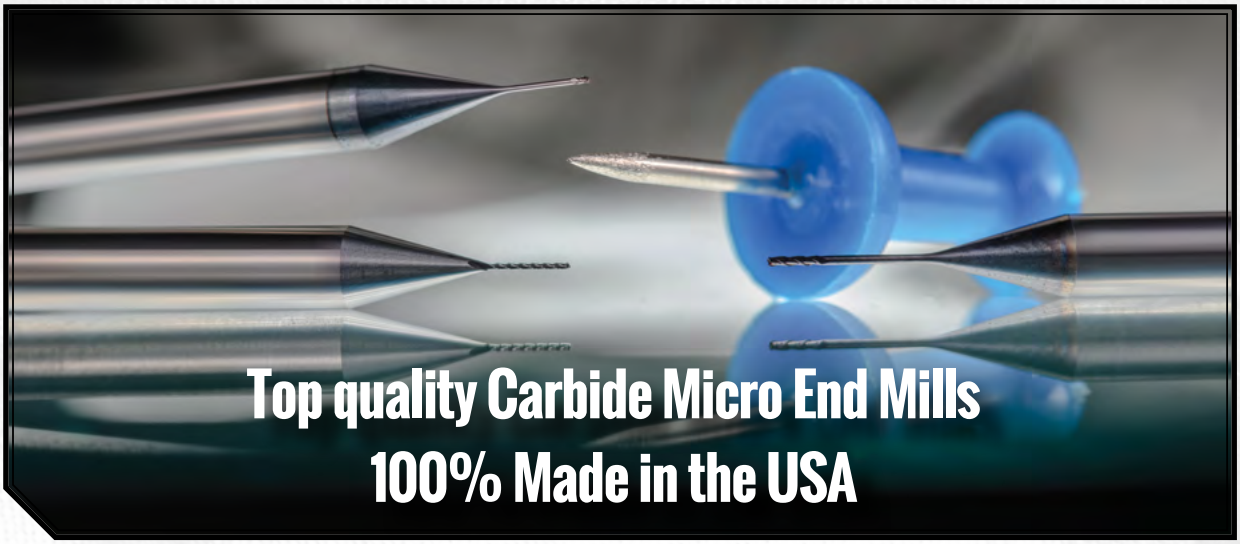
Regular Length
- 1.5" O.A.L.
- 2 & 4 Flute
- Square End, Ball Nose, Corner Radius
- Uncoated, ALTIN Coated

→ STUB FLUTE L.O.C = 1.5 x Dia. → REACH = 3 x Dia., 5 x Dia., 8 x Dia., 12 x Dia.

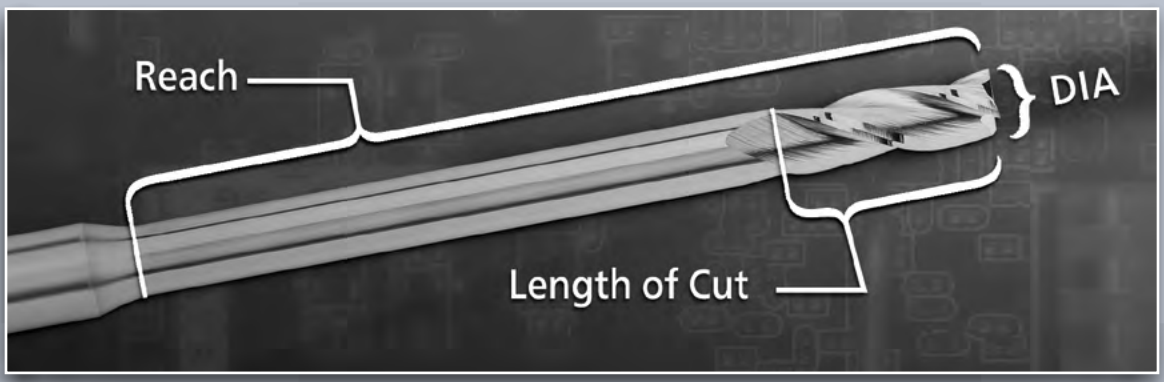
→ REGULAR FLUTE L.O.C = 3 x Dia. → REACH = 5 x Dia., 8 x Dia., 9 x Dia., 12 x Dia.

Long Length
- 2.5" O.A.L.
- 3 Flute
- Square End, Ball Nose
- Uncoated, ALTIN Coated

→ LONG REACH → LONG FLUTE L.O.C = 5 x Dia. → REACH = 8 x Dia., 10 x Dia., 12 x Dia., 13 x Dia., 14 x Dia., 15 x Dia., 16 x Dia.



GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS



Reach and Length of Cut are measured as multiples of the cutting Diameter

Long Reaches of 3x, 5x, 8x, 9x, 10x, 12x, 13x, 14x, 15x and 16x Dia.
Lengths of Cut of 1.5x, 3x, 5x, 8x, 12x and 15x Dia.

- REGULAR LENGTH - STUB FLUTE
  2FL & 4FL • Square End, Ball Nose & R Corner Radius

- REGULAR LENGTH - REGULAR FLUTE
  2FL & 4FL • Square End, Ball Nose & R Corner Radius

- LONG REACH - STUB FLUTE
  3FL • Square End & Ball Nose

- LONG REACH - REGULAR FLUTE
  3FL • Square End & Ball Nose

- LONG REACH - LONG FLUTE
  3FL • Square End & Ball Nose

- LONG LENGTH - LONG FLUTE
  3FL • Square End & Ball Nose

With over 2400 carbide Micro End Mills in stock and ready to ship, We are committed to providing you with the highest quality, American-made Micro End Mills in your choice of uncoated or AlTiN coated.

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

2 FLUTE - STUB FLUTE - SQUARE END - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.008	220526	67.37
0.010	0.015	220537	60.38
0.015	0.023	220548	37.78
0.020	0.030	220559	34.35
0.025	0.038	220570	34.35
0.030	0.045	220581	32.24
0.031	0.047	220592	30.21
0.035	0.053	220603	30.21
0.040	0.060	220614	30.21
0.045	0.068	220625	29.47
0.047	0.071	220636	29.47
0.050	0.075	220647	29.47
0.055	0.083	220658	29.47

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	220669	29.47
0.062	0.093	220680	29.47
0.065	0.098	220691	29.47
0.070	0.105	220702	29.47
0.075	0.113	220713	29.47
0.078	0.117	220724	29.47
0.080	0.120	220735	29.47
0.085	0.128	220746	29.47
0.090	0.135	220757	29.47
0.093	0.140	220768	29.47
0.095	0.143	220779	29.47
0.100	0.150	220790	29.47

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.008	220801	80.84
0.010	0.015	220812	72.44
0.015	0.023	220823	45.36
0.020	0.030	220834	41.22
0.025	0.038	220845	41.22
0.030	0.045	220856	38.68
0.031	0.047	220867	36.22
0.035	0.053	220878	36.22
0.040	0.060	220889	36.22
0.045	0.068	220900	35.36
0.047	0.071	220911	35.36
0.050	0.075	220922	35.36
0.055	0.083	220933	35.36

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	220944	35.36
0.062	0.093	220955	35.36
0.065	0.098	220966	35.36
0.070	0.105	220977	35.36
0.075	0.113	220988	35.36
0.078	0.117	220999	35.36
0.080	0.120	221010	35.36
0.085	0.128	221021	35.36
0.090	0.135	221032	35.36
0.093	0.140	221043	35.36
0.095	0.143	221054	35.36
0.100	0.150	221065	35.36

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

2 FLUTE - STUB FLUTE - BALL NOSE - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.008	221076	84.19
0.010	0.015	221087	75.49
0.015	0.023	221098	47.23
0.020	0.030	221109	42.94
0.025	0.038	221120	42.94
0.030	0.045	221131	40.28
0.031	0.047	221142	37.78
0.035	0.053	221153	37.78
0.040	0.060	221164	37.78
0.045	0.068	221175	36.85
0.047	0.071	221186	36.85
0.050	0.075	221197	36.85
0.055	0.083	221208	36.85

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	221219	36.85
0.062	0.093	221230	36.85
0.065	0.098	221241	36.85
0.070	0.105	221252	36.85
0.075	0.113	221263	36.85
0.078	0.117	221274	36.85
0.080	0.120	221285	36.85
0.085	0.128	221296	36.85
0.090	0.135	221307	36.85
0.093	0.140	221318	36.85
0.095	0.143	221329	36.85
0.100	0.150	221340	36.85

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.008	221351	101.05
0.010	0.015	221362	90.55
0.015	0.023	221373	56.67
0.020	0.030	221384	51.52
0.025	0.038	221395	51.52
0.030	0.045	221406	48.32
0.031	0.047	221417	45.36
0.035	0.053	221428	45.36
0.040	0.060	221439	45.36
0.045	0.068	221450	44.26
0.047	0.071	221461	44.26
0.050	0.075	221472	44.26
0.055	0.083	221483	44.26

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	221494	44.26
0.062	0.093	221505	44.26
0.065	0.098	221516	44.26
0.070	0.105	221527	44.26
0.075	0.113	221538	44.26
0.078	0.117	221549	44.26
0.080	0.120	221560	44.26
0.085	0.128	221571	44.26
0.090	0.135	221582	44.26
0.093	0.140	221593	44.26
0.095	0.143	221604	44.26
0.100	0.150	221615	44.26

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

2 FLUTE - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.015	143768	58.59
0.006	0.018	143779	58.59
0.007	0.021	143790	58.59
0.008	0.024	143801	58.59
0.009	0.027	143812	52.50
0.010	0.030	143823	52.50
0.011	0.033	143834	46.99
0.012	0.036	143845	46.99
0.013	0.039	143856	38.88
0.014	0.042	143867	38.88
0.015	0.045	143878	32.87
0.016	0.048	143889	32.87
0.017	0.051	143900	32.87
0.018	0.054	143911	32.87
0.019	0.057	143922	32.87
0.020	0.060	143933	29.86
0.021	0.063	143944	29.86
0.022	0.066	143955	29.86
0.023	0.069	143966	29.86
0.024	0.072	143977	29.86
0.025	0.075	143988	29.86
0.026	0.078	143999	28.02
0.027	0.081	144010	28.02
0.028	0.084	144021	28.02
0.029	0.087	144032	28.02
0.030	0.090	144043	28.02
0.031	0.093	144054	26.27
0.032	0.096	144065	26.27
0.033	0.099	144076	26.27
0.034	0.102	144087	26.27
0.035	0.105	144098	26.27
0.036	0.108	144109	26.27
0.037	0.111	144120	26.27
0.038	0.114	144131	26.27
0.039	0.117	144142	26.27
0.040	0.120	144153	26.27

DIA	LOC	ITEM#	LIST PRICE
0.041	0.123	144164	26.27
0.042	0.126	144175	26.27
0.043	0.129	144186	26.27
0.044	0.132	144197	25.61
0.045	0.135	144208	25.61
0.046	0.138	144219	25.61
0.047	0.141	144230	25.61
0.048	0.144	144241	25.61
0.049	0.147	144252	25.61
0.050	0.150	144263	25.61
0.051	0.153	144274	25.61
0.052	0.156	144285	25.61
0.053	0.159	144296	25.61
0.054	0.162	144307	25.61
0.055	0.165	144318	25.61
0.056	0.168	144329	25.61
0.057	0.171	144340	25.61
0.058	0.174	144351	25.61
0.059	0.177	144362	25.61
0.060	0.180	144373	25.61
0.061	0.183	144384	25.61
0.062	0.186	144395	25.61
0.063	0.189	144406	25.61
0.064	0.192	144417	25.61
0.065	0.195	144428	25.61
0.066	0.198	144439	25.61
0.067	0.201	144450	25.61
0.068	0.204	144461	25.61
0.069	0.207	144472	25.61
0.070	0.210	144483	25.61
0.071	0.213	144494	25.61
0.072	0.216	144505	25.61
0.073	0.219	144516	25.61
0.074	0.222	144527	25.61
0.075	0.225	144538	25.61
0.076	0.228	144549	25.61

DIA	LOC	ITEM#	LIST PRICE
0.077	0.231	144560	25.61
0.078	0.234	144571	25.61
0.079	0.237	144582	25.61
0.080	0.240	144593	25.61
0.081	0.243	144604	25.61
0.082	0.246	144615	25.61
0.083	0.249	144626	25.61
0.084	0.252	144637	25.61
0.085	0.255	144648	25.61
0.086	0.258	144659	25.61
0.087	0.261	144670	25.61
0.088	0.264	144681	25.61
0.089	0.267	144692	25.61
0.090	0.270	144703	25.61
0.091	0.273	144714	25.61
0.092	0.276	144725	25.61
0.093	0.279	144736	25.61
0.094	0.282	144747	25.61
0.095	0.285	144758	25.61
0.096	0.288	144769	25.61
0.097	0.291	144780	25.61
0.098	0.294	144791	25.61
0.099	0.297	144802	25.61
0.100	0.300	144813	25.61
0.101	0.303	144824	25.61
0.102	0.306	144835	25.61
0.103	0.309	144846	25.61
0.104	0.312	144857	25.61
0.105	0.315	144868	25.61
0.106	0.318	144879	25.61
0.107	0.321	144890	25.61
0.108	0.324	144901	25.61
0.109	0.327	144912	25.61
0.110	0.330	144923	25.61
0.115	0.345	144934	25.61
0.120	0.360	144945	25.61

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

2 FLUTE - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.015	222682	70.30
0.006	0.018	222693	70.30
0.007	0.021	222704	70.30
0.008	0.024	222715	70.30
0.009	0.027	222726	63.00
0.010	0.030	222737	63.00
0.011	0.033	222748	56.40
0.012	0.036	222759	56.40
0.013	0.039	222770	46.64
0.014	0.042	222781	46.64
0.015	0.045	222792	39.42
0.016	0.048	222803	39.42
0.017	0.051	222814	39.42
0.018	0.054	222825	39.42
0.019	0.057	222836	39.42
0.020	0.060	222847	35.83
0.021	0.063	222858	35.83
0.022	0.066	222869	35.83
0.023	0.069	222880	35.83
0.024	0.072	222891	35.83
0.025	0.075	222902	35.83
0.026	0.078	222913	33.65
0.027	0.081	222924	33.65
0.028	0.084	222935	33.65
0.029	0.087	222946	33.65
0.030	0.090	222957	33.65
0.031	0.093	222968	31.50
0.032	0.096	222979	31.50
0.033	0.099	222990	31.50
0.034	0.102	223001	31.50
0.035	0.105	223012	31.50
0.036	0.108	223023	31.50
0.037	0.111	223034	31.50
0.038	0.114	223045	31.50
0.039	0.117	223056	31.50
0.040	0.120	223067	31.50

DIA	LOC	ITEM#	LIST PRICE
0.041	0.123	223078	31.50
0.042	0.126	223089	31.50
0.043	0.129	223100	31.50
0.044	0.132	223111	30.76
0.045	0.135	223122	30.76
0.046	0.138	223133	30.76
0.047	0.141	223144	30.76
0.048	0.144	223155	30.76
0.049	0.147	223166	30.76
0.050	0.150	223177	30.76
0.051	0.153	223188	30.76
0.052	0.156	223199	30.76
0.053	0.159	223210	30.76
0.054	0.162	223221	30.76
0.055	0.165	223232	30.76
0.056	0.168	223243	30.76
0.057	0.171	223254	30.76
0.058	0.174	223265	30.76
0.059	0.177	223276	30.76
0.060	0.180	223287	30.76
0.061	0.183	223298	30.76
0.062	0.186	223309	30.76
0.063	0.189	223320	30.76
0.064	0.192	223331	30.76
0.065	0.195	223342	30.76
0.066	0.198	223353	30.76
0.067	0.201	223364	30.76
0.068	0.204	223375	30.76
0.069	0.207	223386	30.76
0.070	0.210	223397	30.76
0.071	0.213	223408	30.76
0.072	0.216	223419	30.76
0.073	0.219	223430	30.76
0.074	0.222	223441	30.76
0.075	0.225	223452	30.76
0.076	0.228	223463	30.76

DIA	LOC	ITEM#	LIST PRICE
0.077	0.231	223474	30.76
0.078	0.234	223485	30.76
0.079	0.237	223496	30.76
0.080	0.240	223507	30.76
0.081	0.243	223518	30.76
0.082	0.246	223529	30.76
0.083	0.249	223540	30.76
0.084	0.252	223551	30.76
0.085	0.255	223562	30.76
0.086	0.258	223573	30.76
0.087	0.261	223584	30.76
0.088	0.264	223595	30.76
0.089	0.267	223606	30.76
0.090	0.270	223617	30.76
0.091	0.273	223628	30.76
0.092	0.276	223639	30.76
0.093	0.279	223650	30.76
0.094	0.282	223661	30.76
0.095	0.285	223672	30.76
0.096	0.288	223683	30.76
0.097	0.291	223694	30.76
0.098	0.294	223705	30.76
0.099	0.297	223716	30.76
0.100	0.300	223727	30.76
0.101	0.303	223738	30.76
0.102	0.306	223749	30.76
0.103	0.309	223760	30.76
0.104	0.312	223771	30.76
0.105	0.315	223782	30.76
0.106	0.318	223793	30.76
0.107	0.321	223804	30.76
0.108	0.324	223815	30.76
0.109	0.327	223826	30.76
0.110	0.330	223837	30.76
0.115	0.345	223848	30.76
0.120	0.360	223859	30.76

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

2 FLUTE - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.015	144956	73.22
0.006	0.018	144967	73.22
0.007	0.021	144978	73.22
0.008	0.024	144989	73.22
0.009	0.027	145000	65.65
0.010	0.030	145011	65.65
0.011	0.033	145022	58.74
0.012	0.036	145033	58.74
0.013	0.039	145044	48.67
0.014	0.042	145055	48.67
0.015	0.045	145066	41.06
0.016	0.048	145077	41.06
0.017	0.051	145088	41.06
0.018	0.054	145099	41.06
0.019	0.057	145110	41.06
0.020	0.060	145121	37.35
0.021	0.063	145132	37.35
0.022	0.066	145143	37.35
0.023	0.069	145154	37.35
0.024	0.072	145165	37.35
0.025	0.075	145176	37.35
0.026	0.078	145187	35.05
0.027	0.081	145198	35.05
0.028	0.084	145209	35.05
0.029	0.087	145220	35.05
0.030	0.090	145231	35.05
0.031	0.093	145242	32.87
0.032	0.096	145253	32.87
0.033	0.099	145264	32.87
0.034	0.102	145275	32.87
0.035	0.105	145286	32.87
0.036	0.108	145297	32.87
0.037	0.111	145308	32.87
0.038	0.114	145319	32.87
0.039	0.117	145330	32.87
0.040	0.120	145341	32.87

DIA	LOC	ITEM#	LIST PRICE
0.041	0.123	145352	32.87
0.042	0.126	145363	32.87
0.043	0.129	145374	32.87
0.044	0.132	145385	32.05
0.045	0.135	145396	32.05
0.046	0.138	145407	32.05
0.047	0.141	145418	32.05
0.048	0.144	145429	32.05
0.049	0.147	145440	32.05
0.050	0.150	145451	32.05
0.051	0.153	145462	32.05
0.052	0.156	145473	32.05
0.053	0.159	145484	32.05
0.054	0.162	145495	32.05
0.055	0.165	145506	32.05
0.056	0.168	145517	32.05
0.057	0.171	145528	32.05
0.058	0.174	145539	32.05
0.059	0.177	145550	32.05
0.060	0.180	145561	32.05
0.061	0.183	145572	32.05
0.062	0.186	145583	32.05
0.063	0.189	145594	32.05
0.064	0.192	145605	32.05
0.065	0.195	145616	32.05
0.066	0.198	145627	32.05
0.067	0.201	145638	32.05
0.068	0.204	145649	32.05
0.069	0.207	145660	32.05
0.070	0.210	145671	32.05
0.071	0.213	145682	32.05
0.072	0.216	145693	32.05
0.073	0.219	145704	32.05
0.074	0.222	145715	32.05
0.075	0.225	145726	32.05
0.076	0.228	145737	32.05

DIA	LOC	ITEM#	LIST PRICE
0.077	0.231	145748	32.05
0.078	0.234	145759	32.05
0.079	0.237	145770	32.05
0.080	0.240	145781	32.05
0.081	0.243	145792	32.05
0.082	0.246	145803	32.05
0.083	0.249	145814	32.05
0.084	0.252	145825	32.05
0.085	0.255	145836	32.05
0.086	0.258	145847	32.05
0.087	0.261	145858	32.05
0.088	0.264	145869	32.05
0.089	0.267	145880	32.05
0.090	0.270	145891	32.05
0.091	0.273	145902	32.05
0.092	0.276	145913	32.05
0.093	0.279	145924	32.05
0.094	0.282	145935	32.05
0.095	0.285	145946	32.05
0.096	0.288	145957	32.05
0.097	0.291	145968	32.05
0.098	0.294	145979	32.05
0.099	0.297	145990	32.05
0.100	0.300	146001	32.05
0.101	0.303	146012	32.05
0.102	0.306	146023	32.05
0.103	0.309	146034	32.05
0.104	0.312	146045	32.05
0.105	0.315	146056	32.05
0.106	0.318	146067	32.05
0.107	0.321	146078	32.05
0.108	0.324	146089	32.05
0.109	0.327	146100	32.05
0.110	0.330	146111	32.05
0.115	0.345	146122	32.05
0.120	0.360	146133	32.05

All regular length Micro End Mills are 1/8” shank, 1-1/2” OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

2 FLUTE - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.005	0.015	223870	87.86
0.006	0.018	223881	87.86
0.007	0.021	223892	87.86
0.008	0.024	223903	87.86
0.009	0.027	223914	78.77
0.010	0.030	223925	78.77
0.011	0.033	223936	70.53
0.012	0.036	223947	70.53
0.013	0.039	223958	58.39
0.014	0.042	223969	58.39
0.015	0.045	223980	49.26
0.016	0.048	223991	49.26
0.017	0.051	224002	49.26
0.018	0.054	224013	49.26
0.019	0.057	224024	49.26
0.020	0.060	224035	44.81
0.021	0.063	224046	44.81
0.022	0.066	224057	44.81
0.023	0.069	224068	44.81
0.024	0.072	224079	44.81
0.025	0.075	224090	44.81
0.026	0.078	224101	42.04
0.027	0.081	224112	42.04
0.028	0.084	224123	42.04
0.029	0.087	224134	42.04
0.030	0.090	224145	42.04
0.031	0.093	224156	39.42
0.032	0.096	224167	39.42
0.033	0.099	224178	39.42
0.034	0.102	224189	39.42
0.035	0.105	224200	39.42
0.036	0.108	224211	39.42
0.037	0.111	224222	39.42
0.038	0.114	224233	39.42
0.039	0.117	224244	39.42
0.040	0.120	224255	39.42

DIA	LOC	ITEM#	LIST PRICE
0.041	0.123	224266	39.42
0.042	0.126	224277	39.42
0.043	0.129	224288	39.42
0.044	0.132	224299	38.49
0.045	0.135	224310	38.49
0.046	0.138	224321	38.49
0.047	0.141	224332	38.49
0.048	0.144	224343	38.49
0.049	0.147	224354	38.49
0.050	0.150	224365	38.49
0.051	0.153	224376	38.49
0.052	0.156	224387	38.49
0.053	0.159	224398	38.49
0.054	0.162	224409	38.49
0.055	0.165	224420	38.49
0.056	0.168	224431	38.49
0.057	0.171	224442	38.49
0.058	0.174	224453	38.49
0.059	0.177	224464	38.49
0.060	0.180	224475	38.49
0.061	0.183	224486	38.49
0.062	0.186	224497	38.49
0.063	0.189	224508	38.49
0.064	0.192	224519	38.49
0.065	0.195	224530	38.49
0.066	0.198	224541	38.49
0.067	0.201	224552	38.49
0.068	0.204	224563	38.49
0.069	0.207	224574	38.49
0.070	0.210	224585	38.49
0.071	0.213	224596	38.49
0.072	0.216	224607	38.49
0.073	0.219	224618	38.49
0.074	0.222	224629	38.49
0.075	0.225	224640	38.49
0.076	0.228	224651	38.49

DIA	LOC	ITEM#	LIST PRICE
0.077	0.231	224662	38.49
0.078	0.234	224673	38.49
0.079	0.237	224684	38.49
0.080	0.240	224695	38.49
0.081	0.243	224706	38.49
0.082	0.246	224717	38.49
0.083	0.249	224728	38.49
0.084	0.252	224739	38.49
0.085	0.255	224750	38.49
0.086	0.258	224761	38.49
0.087	0.261	224772	38.49
0.088	0.264	224783	38.49
0.089	0.267	224794	38.49
0.090	0.270	224805	38.49
0.091	0.273	224816	38.49
0.092	0.276	224827	38.49
0.093	0.279	224838	38.49
0.094	0.282	224849	38.49
0.095	0.285	224860	38.49
0.096	0.288	224871	38.49
0.097	0.291	224882	38.49
0.098	0.294	224893	38.49
0.099	0.297	224904	38.49
0.100	0.300	224915	38.49
0.101	0.303	224926	38.49
0.102	0.306	224937	38.49
0.103	0.309	224948	38.49
0.104	0.312	224959	38.49
0.105	0.315	224970	38.49
0.106	0.318	224981	38.49
0.107	0.321	224992	38.49
0.108	0.324	225003	38.49
0.109	0.327	225014	38.49
0.110	0.330	225025	38.49
0.115	0.345	225036	38.49
0.120	0.360	225047	38.49

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

4 FLUTE - STUB FLUTE - SQUARE END - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.015	221626	60.38
0.015	0.023	221637	37.78
0.020	0.030	221648	34.35
0.025	0.038	221659	34.35
0.030	0.045	221670	32.24
0.031	0.047	221681	30.21
0.035	0.053	221692	30.21
0.040	0.060	221703	30.21
0.045	0.068	221714	29.47
0.047	0.071	221725	29.47
0.050	0.075	221736	29.47
0.055	0.083	221747	29.47

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	221758	29.47
0.062	0.093	221769	29.47
0.065	0.098	221780	29.47
0.070	0.105	221791	29.47
0.075	0.113	221802	29.47
0.078	0.117	221813	29.47
0.080	0.120	221824	29.47
0.085	0.128	221835	29.47
0.090	0.135	221846	29.47
0.093	0.140	221857	29.47
0.095	0.143	221868	29.47
0.100	0.150	221879	29.47

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.015	221890	72.44
0.015	0.023	221901	45.36
0.020	0.030	221912	41.22
0.025	0.038	221923	41.22
0.030	0.045	221934	38.68
0.031	0.047	221945	36.22
0.035	0.053	221956	36.22
0.040	0.060	221967	36.22
0.045	0.068	221978	35.36
0.047	0.071	221989	35.36
0.050	0.075	222000	35.36
0.055	0.083	222011	35.36

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	222022	35.36
0.062	0.093	222033	35.36
0.065	0.098	222044	35.36
0.070	0.105	222055	35.36
0.075	0.113	222066	35.36
0.078	0.117	222077	35.36
0.080	0.120	222088	35.36
0.085	0.128	222099	35.36
0.090	0.135	222110	35.36
0.093	0.140	222121	35.36
0.095	0.143	222132	35.36
0.100	0.150	222143	35.36

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

4 FLUTE - STUB FLUTE - BALL NOSE - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.015	222154	65.65
0.015	0.023	222165	41.06
0.020	0.030	222176	37.35
0.025	0.038	222187	37.35
0.030	0.045	222198	35.05
0.031	0.047	222209	32.87
0.035	0.053	222220	32.87
0.040	0.060	222231	32.87
0.045	0.068	222242	32.05
0.047	0.071	222253	32.05
0.050	0.075	222264	32.05
0.055	0.083	222275	32.05

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	222286	32.05
0.062	0.093	222297	32.05
0.065	0.098	222308	32.05
0.070	0.105	222319	32.05
0.075	0.113	222330	32.05
0.078	0.117	222341	32.05
0.080	0.120	222352	32.05
0.085	0.128	222363	32.05
0.090	0.135	222374	32.05
0.093	0.140	222385	32.05
0.095	0.143	222396	32.05
0.100	0.150	222407	32.05

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.015	222418	90.55
0.015	0.023	222429	56.67
0.020	0.030	222440	51.52
0.025	0.038	222451	51.52
0.030	0.045	222462	48.32
0.031	0.047	222473	45.36
0.035	0.053	222484	45.36
0.040	0.060	222495	45.36
0.045	0.068	222506	44.26
0.047	0.071	222517	44.26
0.050	0.075	222528	44.26
0.055	0.083	222539	44.26

DIA	LOC	ITEM#	LIST PRICE
0.060	0.090	222550	44.26
0.062	0.093	222561	44.26
0.065	0.098	222572	44.26
0.070	0.105	222583	44.26
0.075	0.113	222594	44.26
0.078	0.117	222605	44.26
0.080	0.120	222616	44.26
0.085	0.128	222627	44.26
0.090	0.135	222638	44.26
0.093	0.140	222649	44.26
0.095	0.143	222660	44.26
0.100	0.150	222671	44.26

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

4 FLUTE - STUB FLUTE CR CORNER RADIUS - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	RAD	ITEM#	LIST PRICE
0.015	0.023	0.003	218722	79.90
0.020	0.030	0.005	218733	74.59
0.025	0.038	0.005	218744	74.59
0.030	0.045	0.005	218755	53.28
0.030	0.045	0.010	218766	53.28
0.031	0.047	0.005	218777	53.28
0.031	0.047	0.010	218788	53.28
0.035	0.053	0.005	218799	53.28
0.035	0.053	0.010	218810	53.28
0.040	0.060	0.005	218821	53.28
0.040	0.060	0.010	218832	53.28
0.045	0.068	0.005	218843	53.28
0.045	0.068	0.010	218854	53.28
0.045	0.068	0.015	218865	53.28

DIA	LOC	RAD	ITEM#	LIST PRICE
0.047	0.071	0.005	218876	53.28
0.047	0.071	0.010	218887	53.28
0.047	0.071	0.015	218898	53.28
0.050	0.075	0.005	218909	53.28
0.050	0.075	0.010	218920	53.28
0.050	0.075	0.015	218931	53.28
0.060	0.090	0.005	218942	53.28
0.060	0.090	0.010	218953	53.28
0.060	0.090	0.015	218964	53.28
0.062	0.093	0.005	218975	53.28
0.062	0.093	0.010	218986	53.28
0.062	0.093	0.015	218997	53.28
0.075	0.113	0.005	219008	53.28
0.075	0.113	0.010	219019	53.28

DIA	LOC	RAD	ITEM#	LIST PRICE
0.075	0.113	0.015	219030	53.28
0.078	0.117	0.005	219041	53.28
0.078	0.117	0.010	219052	53.28
0.078	0.117	0.015	219063	53.28
0.090	0.135	0.005	219074	53.28
0.090	0.135	0.010	219085	53.28
0.090	0.135	0.015	219096	53.28
0.093	0.140	0.005	219107	53.28
0.093	0.140	0.010	219118	53.28
0.093	0.140	0.015	219129	53.28
0.100	0.150	0.005	219140	53.28
0.100	0.150	0.010	219151	53.28
0.100	0.150	0.015	219162	53.28

ALTIN COATED

DIA	LOC	RAD	ITEM#	LIST PRICE
0.015	0.023	0.003	219173	99.06
0.020	0.030	0.005	219184	92.47
0.025	0.038	0.005	219195	92.47
0.030	0.045	0.005	219206	66.04
0.030	0.045	0.010	219217	66.04
0.031	0.047	0.005	219228	66.04
0.031	0.047	0.010	219239	66.04
0.035	0.053	0.005	219250	66.04
0.035	0.053	0.010	219261	66.04
0.040	0.060	0.005	219272	66.04
0.040	0.060	0.010	219283	66.04
0.045	0.068	0.005	219294	66.04
0.045	0.068	0.010	219305	66.04
0.045	0.068	0.015	219316	66.04

DIA	LOC	RAD	ITEM#	LIST PRICE
0.047	0.071	0.005	219327	66.04
0.047	0.071	0.010	219338	66.04
0.047	0.071	0.015	219349	66.04
0.050	0.075	0.005	219360	66.04
0.050	0.075	0.010	219371	66.04
0.050	0.075	0.015	219382	66.04
0.060	0.090	0.005	219393	66.04
0.060	0.090	0.010	219404	66.04
0.060	0.090	0.015	219415	66.04
0.062	0.093	0.005	219426	66.04
0.062	0.093	0.010	219437	66.04
0.062	0.093	0.015	219448	66.04
0.075	0.113	0.005	219459	66.04
0.075	0.113	0.010	219470	66.04

DIA	LOC	RAD	ITEM#	LIST PRICE
0.075	0.113	0.015	219481	66.04
0.078	0.117	0.005	219492	66.04
0.078	0.117	0.010	219503	66.04
0.078	0.117	0.015	219514	66.04
0.090	0.135	0.005	219525	66.04
0.090	0.135	0.010	219536	66.04
0.090	0.135	0.015	219547	66.04
0.093	0.140	0.005	219558	66.04
0.093	0.140	0.010	219569	66.04
0.093	0.140	0.015	219580	66.04
0.100	0.150	0.005	219591	66.04
0.100	0.150	0.010	219602	66.04
0.100	0.150	0.015	219613	66.04

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	RADIUS
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.0002, -.0002

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

4 FLUTE - REGULAR FLUTE CR CORNER RADIUS - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	RAD	ITEM#	LIST PRICE
0.015	0.045	0.003	219624	79.90
0.020	0.060	0.005	219635	74.59
0.025	0.075	0.005	219646	74.59
0.030	0.090	0.005	219657	53.28
0.030	0.090	0.010	219668	53.28
0.031	0.093	0.005	219679	53.28
0.031	0.093	0.010	219690	53.28
0.035	0.105	0.005	219701	53.28
0.035	0.105	0.010	219712	53.28
0.040	0.120	0.005	219723	53.28
0.040	0.120	0.010	219734	53.28
0.045	0.135	0.005	219745	53.28
0.045	0.135	0.010	219756	53.28
0.045	0.135	0.015	219767	53.28

DIA	LOC	RAD	ITEM#	LIST PRICE
0.047	0.141	0.005	219778	53.28
0.047	0.141	0.010	219789	53.28
0.047	0.141	0.015	219800	53.28
0.050	0.150	0.005	219811	53.28
0.050	0.150	0.010	219822	53.28
0.050	0.150	0.015	219833	53.28
0.060	0.180	0.005	219844	53.28
0.060	0.180	0.010	219855	53.28
0.060	0.180	0.015	219866	53.28
0.062	0.186	0.005	219877	53.28
0.062	0.186	0.010	219888	53.28
0.062	0.186	0.015	219899	53.28
0.075	0.225	0.005	219910	53.28
0.075	0.225	0.010	219921	53.28

DIA	LOC	RAD	ITEM#	LIST PRICE
0.075	0.225	0.015	219932	53.28
0.078	0.234	0.005	219943	53.28
0.078	0.234	0.010	219954	53.28
0.078	0.234	0.015	219965	53.28
0.090	0.270	0.005	219976	53.28
0.090	0.270	0.010	219987	53.28
0.090	0.270	0.015	219998	53.28
0.093	0.279	0.005	220009	53.28
0.093	0.279	0.010	220020	53.28
0.093	0.279	0.015	220031	53.28
0.100	0.300	0.005	220042	53.28
0.100	0.300	0.010	220053	53.28
0.100	0.300	0.015	220064	53.28

ALTIN COATED

DIA	LOC	RAD	ITEM#	LIST PRICE
0.015	0.045	0.003	220075	99.06
0.020	0.060	0.005	220086	92.47
0.025	0.075	0.005	220097	92.47
0.030	0.090	0.005	220108	66.04
0.030	0.090	0.010	220119	66.04
0.031	0.093	0.005	220130	66.04
0.031	0.093	0.010	220141	66.04
0.035	0.105	0.005	220152	66.04
0.035	0.105	0.010	220163	66.04
0.040	0.120	0.005	220174	66.04
0.040	0.120	0.010	220185	66.04
0.045	0.135	0.005	220196	66.04
0.045	0.135	0.010	220207	66.04
0.045	0.135	0.015	220218	66.04

DIA	LOC	RAD	ITEM#	LIST PRICE
0.047	0.141	0.005	220229	66.04
0.047	0.141	0.010	220240	66.04
0.047	0.141	0.015	220251	66.04
0.050	0.150	0.005	220262	66.04
0.050	0.150	0.010	220273	66.04
0.050	0.150	0.015	220284	66.04
0.060	0.180	0.005	220295	66.04
0.060	0.180	0.010	220306	66.04
0.060	0.180	0.015	220317	66.04
0.062	0.186	0.005	220328	66.04
0.062	0.186	0.010	220339	66.04
0.062	0.186	0.015	220350	66.04
0.075	0.225	0.005	220361	66.04
0.075	0.225	0.010	220372	66.04

DIA	LOC	RAD	ITEM#	LIST PRICE
0.075	0.225	0.015	220383	66.04
0.078	0.234	0.005	220394	66.04
0.078	0.234	0.010	220405	66.04
0.078	0.234	0.015	220416	66.04
0.090	0.270	0.005	220427	66.04
0.090	0.270	0.010	220438	66.04
0.090	0.270	0.015	220449	66.04
0.093	0.279	0.005	220460	66.04
0.093	0.279	0.010	220471	66.04
0.093	0.279	0.015	220482	66.04
0.100	0.300	0.005	220493	66.04
0.100	0.300	0.010	220504	66.04
0.100	0.300	0.015	220515	66.04

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	RADIUS
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.0002, -.0002

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

4 FLUTE - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.030	146144	52.50
0.011	0.033	146155	46.99
0.012	0.036	146166	46.99
0.013	0.039	146177	38.88
0.014	0.042	146188	38.88
0.015	0.045	146199	32.87
0.016	0.048	146210	32.87
0.017	0.051	146221	32.87
0.018	0.054	146232	32.87
0.019	0.057	146243	32.87
0.020	0.060	146254	29.86
0.021	0.063	146265	29.86
0.022	0.066	146276	29.86
0.023	0.069	146287	29.86
0.024	0.072	146298	29.86
0.025	0.075	146309	29.86
0.026	0.078	146320	28.02
0.027	0.081	146331	28.02
0.028	0.084	146342	28.02
0.029	0.087	146353	28.02
0.030	0.090	146364	28.02
0.031	0.093	146375	26.27
0.032	0.096	146386	26.27
0.033	0.099	146397	26.27
0.034	0.102	146408	26.27
0.035	0.105	146419	26.27
0.036	0.108	146430	26.27
0.037	0.111	146441	26.27
0.038	0.114	146452	26.27
0.039	0.117	146463	26.27
0.040	0.120	146474	26.27
0.041	0.123	146485	26.27
0.042	0.126	146496	26.27
0.043	0.129	146507	26.27
0.044	0.132	146518	25.61

DIA	LOC	ITEM#	LIST PRICE
0.045	0.135	146529	25.61
0.046	0.138	146540	25.61
0.047	0.141	146551	25.61
0.048	0.144	146562	25.61
0.049	0.147	146573	25.61
0.050	0.150	146584	25.61
0.051	0.153	146595	25.61
0.052	0.156	146606	25.61
0.053	0.159	146617	25.61
0.054	0.162	146628	25.61
0.055	0.165	146639	25.61
0.056	0.168	146650	25.61
0.057	0.171	146661	25.61
0.058	0.174	146672	25.61
0.059	0.177	146683	25.61
0.060	0.180	146694	25.61
0.061	0.183	146705	25.61
0.062	0.186	146716	25.61
0.063	0.189	146727	25.61
0.064	0.192	146738	25.61
0.065	0.195	146749	25.61
0.066	0.198	146760	25.61
0.067	0.201	146771	25.61
0.068	0.204	146782	25.61
0.069	0.207	146793	25.61
0.070	0.210	146804	25.61
0.071	0.213	146815	25.61
0.072	0.216	146826	25.61
0.073	0.219	146837	25.61
0.074	0.222	146848	25.61
0.075	0.225	146859	25.61
0.076	0.228	146870	25.61
0.077	0.231	146881	25.61
0.078	0.234	146892	25.61
0.079	0.237	146903	25.61

DIA	LOC	ITEM#	LIST PRICE
0.080	0.240	146914	25.61
0.081	0.243	146925	25.61
0.082	0.246	146936	25.61
0.083	0.249	146947	25.61
0.084	0.252	146958	25.61
0.085	0.255	146969	25.61
0.086	0.258	146980	25.61
0.087	0.261	146991	25.61
0.088	0.264	147002	25.61
0.089	0.267	147013	25.61
0.090	0.270	147024	25.61
0.091	0.273	147035	25.61
0.092	0.276	147046	25.61
0.093	0.279	147057	25.61
0.094	0.282	147068	25.61
0.095	0.285	147079	25.61
0.096	0.288	147090	25.61
0.097	0.291	147101	25.61
0.098	0.294	147112	25.61
0.099	0.297	147123	25.61
0.100	0.300	147134	25.61
0.101	0.303	147145	25.61
0.102	0.306	147156	25.61
0.103	0.309	147167	25.61
0.104	0.312	147178	25.61
0.105	0.315	147189	25.61
0.106	0.318	147200	25.61
0.107	0.321	147211	25.61
0.108	0.324	147222	25.61
0.109	0.327	147233	25.61
0.110	0.330	147244	25.61
0.115	0.345	147255	25.61
0.120	0.360	147266	25.61

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

4 FLUTE - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.030	225058	63.00
0.011	0.033	225069	56.40
0.012	0.036	225080	56.40
0.013	0.039	225091	46.64
0.014	0.042	225102	46.64
0.015	0.045	225113	39.42
0.016	0.048	225124	39.42
0.017	0.051	225135	39.42
0.018	0.054	225146	39.42
0.019	0.057	225157	39.42
0.020	0.060	225168	35.83
0.021	0.063	225179	35.83
0.022	0.066	225190	35.83
0.023	0.069	225201	35.83
0.024	0.072	225212	35.83
0.025	0.075	225223	35.83
0.026	0.078	225234	33.65
0.027	0.081	225245	33.65
0.028	0.084	225256	33.65
0.029	0.087	225267	33.65
0.030	0.090	225278	33.65
0.031	0.093	225289	31.50
0.032	0.096	225300	31.50
0.033	0.099	225311	31.50
0.034	0.102	225322	31.50
0.035	0.105	225333	31.50
0.036	0.108	225344	31.50
0.037	0.111	225355	31.50
0.038	0.114	225366	31.50
0.039	0.117	225377	31.50
0.040	0.120	225388	31.50
0.041	0.123	225399	31.50
0.042	0.126	225410	31.50
0.043	0.129	225421	31.50
0.044	0.132	225432	30.76
0.045	0.135	225443	30.76
0.046	0.138	225454	30.76
0.047	0.141	225465	30.76
0.048	0.144	225476	30.76
0.049	0.147	225487	30.76
0.050	0.150	225498	30.76
0.051	0.153	225509	30.76
0.052	0.156	225520	30.76
0.053	0.159	225531	30.76
0.054	0.162	225542	30.76
0.055	0.165	225553	30.76
0.056	0.168	225564	30.76
0.057	0.171	225575	30.76
0.058	0.174	225586	30.76
0.059	0.177	225597	30.76
0.060	0.180	225608	30.76
0.061	0.183	225619	30.76
0.062	0.186	225630	30.76
0.063	0.189	225641	30.76
0.064	0.192	225652	30.76
0.065	0.195	225663	30.76
0.066	0.198	225674	30.76
0.067	0.201	225685	30.76
0.068	0.204	225696	30.76
0.069	0.207	225707	30.76
0.070	0.210	225718	30.76
0.071	0.213	225729	30.76
0.072	0.216	225740	30.76
0.073	0.219	225751	30.76
0.074	0.222	225762	30.76
0.075	0.225	225773	30.76
0.076	0.228	225784	30.76
0.077	0.231	225795	30.76
0.078	0.234	225806	30.76
0.079	0.237	225817	30.76
0.080	0.240	225828	30.76
0.081	0.243	225839	30.76
0.082	0.246	225850	30.76
0.083	0.249	225861	30.76
0.084	0.252	225872	30.76
0.085	0.255	225883	30.76
0.086	0.258	225894	30.76
0.087	0.261	225905	30.76
0.088	0.264	225916	30.76
0.089	0.267	225927	30.76
0.090	0.270	225938	30.76
0.091	0.273	225949	30.76
0.092	0.276	225960	30.76
0.093	0.279	225971	30.76
0.094	0.282	225982	30.76
0.095	0.285	225993	30.76
0.096	0.288	226004	30.76
0.097	0.291	226015	30.76
0.098	0.294	226026	30.76
0.099	0.297	226037	30.76
0.100	0.300	226048	30.76
0.101	0.303	226059	30.76
0.102	0.306	226070	30.76
0.103	0.309	226081	30.76
0.104	0.312	226092	30.76
0.105	0.315	226103	30.76
0.106	0.318	226114	30.76
0.107	0.321	226125	30.76
0.108	0.324	226136	30.76
0.109	0.327	226147	30.76
0.110	0.330	226158	30.76
0.115	0.345	226169	30.76
0.120	0.360	226180	30.76

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

4 FLUTE - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.030	147277	65.65
0.011	0.033	147288	58.74
0.012	0.036	147299	58.74
0.013	0.039	147310	48.67
0.014	0.042	147321	48.67
0.015	0.045	147332	41.06
0.016	0.048	147343	41.06
0.017	0.051	147354	41.06
0.018	0.054	147365	41.06
0.019	0.057	147376	41.06
0.020	0.060	147387	37.35
0.021	0.063	147398	37.35
0.022	0.066	147409	37.35
0.023	0.069	147420	37.35
0.024	0.072	147431	37.35
0.025	0.075	147442	37.35
0.026	0.078	147453	35.05
0.027	0.081	147464	35.05
0.028	0.084	147475	35.05
0.029	0.087	147486	35.05
0.030	0.090	147497	35.05
0.031	0.093	147508	32.87
0.032	0.096	147519	32.87
0.033	0.099	147530	32.87
0.034	0.102	147541	32.87
0.035	0.105	147552	32.87
0.036	0.108	147563	32.87
0.037	0.111	147574	32.87
0.038	0.114	147585	32.87
0.039	0.117	147596	32.87
0.040	0.120	147607	32.87
0.041	0.123	147618	32.87
0.042	0.126	147629	32.87
0.043	0.129	147640	32.87
0.044	0.132	147651	32.05

DIA	LOC	ITEM#	LIST PRICE
0.045	0.135	147662	32.05
0.046	0.138	147673	32.05
0.047	0.141	147684	32.05
0.048	0.144	147695	32.05
0.049	0.147	147706	32.05
0.050	0.150	147717	32.05
0.051	0.153	147728	32.05
0.052	0.156	147739	32.05
0.053	0.159	147750	32.05
0.054	0.162	147761	32.05
0.055	0.165	147772	32.05
0.056	0.168	147783	32.05
0.057	0.171	147794	32.05
0.058	0.174	147805	32.05
0.059	0.177	147816	32.05
0.060	0.180	147827	32.05
0.061	0.183	147838	32.05
0.062	0.186	147849	32.05
0.063	0.189	147860	32.05
0.064	0.192	147871	32.05
0.065	0.195	147882	32.05
0.066	0.198	147893	32.05
0.067	0.201	147904	32.05
0.068	0.204	147915	32.05
0.069	0.207	147926	32.05
0.070	0.210	147937	32.05
0.071	0.213	147948	32.05
0.072	0.216	147959	32.05
0.073	0.219	147970	32.05
0.074	0.222	147981	32.05
0.075	0.225	147992	32.05
0.076	0.228	148003	32.05
0.077	0.231	148014	32.05
0.078	0.234	148025	32.05
0.079	0.237	148036	32.05

DIA	LOC	ITEM#	LIST PRICE
0.080	0.240	148047	32.05
0.081	0.243	148058	32.05
0.082	0.246	148069	32.05
0.083	0.249	148080	32.05
0.084	0.252	148091	32.05
0.085	0.255	148102	32.05
0.086	0.258	148113	32.05
0.087	0.261	148124	32.05
0.088	0.264	148135	32.05
0.089	0.267	148146	32.05
0.090	0.270	148157	32.05
0.091	0.273	148168	32.05
0.092	0.276	148179	32.05
0.093	0.279	148190	32.05
0.094	0.282	148201	32.05
0.095	0.285	148212	32.05
0.096	0.288	148223	32.05
0.097	0.291	148234	32.05
0.098	0.294	148245	32.05
0.099	0.297	148256	32.05
0.100	0.300	148267	32.05
0.101	0.303	148278	32.05
0.102	0.306	148289	32.05
0.103	0.309	148300	32.05
0.104	0.312	148311	32.05
0.105	0.315	148322	32.05
0.106	0.318	148333	32.05
0.107	0.321	148344	32.05
0.108	0.324	148355	32.05
0.109	0.327	148366	32.05
0.110	0.330	148377	32.05
0.115	0.345	148388	32.05
0.120	0.360	148399	32.05

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

4 FLUTE - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	ITEM#	LIST PRICE
0.010	0.030	226191	78.77
0.011	0.033	226202	70.53
0.012	0.036	226213	70.53
0.013	0.039	226224	58.39
0.014	0.042	226235	58.39
0.015	0.045	226246	49.26
0.016	0.048	226257	49.26
0.017	0.051	226268	49.26
0.018	0.054	226279	49.26
0.019	0.057	226290	49.26
0.020	0.060	226301	44.81
0.021	0.063	226312	44.81
0.022	0.066	226323	44.81
0.023	0.069	226334	44.81
0.024	0.072	226345	44.81
0.025	0.075	226356	44.81
0.026	0.078	226367	42.04
0.027	0.081	226378	42.04
0.028	0.084	226389	42.04
0.029	0.087	226400	42.04
0.030	0.090	226411	42.04
0.031	0.093	226422	39.42
0.032	0.096	226433	39.42
0.033	0.099	226444	39.42
0.034	0.102	226455	39.42
0.035	0.105	226466	39.42
0.036	0.108	226477	39.42
0.037	0.111	226488	39.42
0.038	0.114	226499	39.42
0.039	0.117	226510	39.42
0.040	0.120	226521	39.42
0.041	0.123	226532	39.42
0.042	0.126	226543	39.42
0.043	0.129	226554	39.42
0.044	0.132	226565	38.49
0.045	0.135	226576	38.49
0.046	0.138	226587	38.49
0.047	0.141	226598	38.49
0.048	0.144	226609	38.49
0.049	0.147	226620	38.49
0.050	0.150	226631	38.49
0.051	0.153	226642	38.49
0.052	0.156	226653	38.49
0.053	0.159	226664	38.49
0.054	0.162	226675	38.49
0.055	0.165	226686	38.49
0.056	0.168	226697	38.49
0.057	0.171	226708	38.49
0.058	0.174	226719	38.49
0.059	0.177	226730	38.49
0.060	0.180	226741	38.49
0.061	0.183	226752	38.49
0.062	0.186	226763	38.49
0.063	0.189	226774	38.49
0.064	0.192	226785	38.49
0.065	0.195	226796	38.49
0.066	0.198	226807	38.49
0.067	0.201	226818	38.49
0.068	0.204	226829	38.49
0.069	0.207	226840	38.49
0.070	0.210	226851	38.49
0.071	0.213	226862	38.49
0.072	0.216	226873	38.49
0.073	0.219	226884	38.49
0.074	0.222	226895	38.49
0.075	0.225	226906	38.49
0.076	0.228	226917	38.49
0.077	0.231	226928	38.49
0.078	0.234	226939	38.49
0.079	0.237	226950	38.49
0.080	0.240	226961	38.49
0.081	0.243	226972	38.49
0.082	0.246	226983	38.49
0.083	0.249	226994	38.49
0.084	0.252	227005	38.49
0.085	0.255	227016	38.49
0.086	0.258	227027	38.49
0.087	0.261	227038	38.49
0.088	0.264	227049	38.49
0.089	0.267	227060	38.49
0.090	0.270	227071	38.49
0.091	0.273	227082	38.49
0.092	0.276	227093	38.49
0.093	0.279	227104	38.49
0.094	0.282	227115	38.49
0.095	0.285	227126	38.49
0.096	0.288	227137	38.49
0.097	0.291	227148	38.49
0.098	0.294	227159	38.49
0.099	0.297	227170	38.49
0.100	0.300	227181	38.49
0.101	0.303	227192	38.49
0.102	0.306	227203	38.49
0.103	0.309	227214	38.49
0.104	0.312	227225	38.49
0.105	0.315	227236	38.49
0.106	0.318	227247	38.49
0.107	0.321	227258	38.49
0.108	0.324	227269	38.49
0.109	0.327	227280	38.49
0.110	0.330	227291	38.49
0.115	0.345	227302	38.49
0.120	0.360	227313	38.49

All regular length Micro End Mills are 1/8" shank, 1-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - STUB FLUTE - SQUARE END - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.010	0.015	3	0.030	264895	83.31
0.010	0.015	5	0.050	264906	83.31
0.010	0.015	8	0.080	264917	83.31
0.010	0.015	12	0.125	264928	87.90
0.015	0.022	3	0.045	264939	69.10
0.015	0.022	5	0.078	264950	69.10
0.015	0.022	8	0.125	264961	69.10
0.015	0.022	12	0.187	264972	71.50
0.020	0.030	3	0.060	264983	66.26
0.020	0.030	5	0.100	264994	66.26
0.020	0.030	8	0.160	265005	66.26
0.020	0.030	12	0.250	265016	68.88
0.025	0.037	3	0.075	265027	63.63
0.025	0.037	5	0.125	265038	63.63
0.025	0.037	8	0.203	265049	63.63
0.025	0.037	12	0.312	265060	65.82
0.030	0.045	3	0.090	265071	63.63
0.030	0.045	5	0.156	265082	63.63
0.030	0.045	8	0.250	265093	63.63
0.030	0.045	12	0.375	265104	65.82
0.031	0.046	3	0.093	265115	63.63
0.031	0.046	5	0.156	265126	63.63
0.031	0.046	8	0.250	265137	63.63
0.031	0.046	12	0.375	265148	65.82
0.035	0.052	3	0.105	265159	63.63
0.035	0.052	5	0.187	265170	63.63
0.035	0.052	8	0.281	265181	63.63
0.035	0.052	12	0.425	265192	65.82
0.040	0.060	3	0.120	265203	63.63
0.040	0.060	5	0.203	265214	63.63
0.040	0.060	8	0.325	265225	63.63
0.040	0.060	12	0.480	265236	65.82

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.045	0.067	3	0.135	265247	62.32
0.045	0.067	5	0.225	265258	62.32
0.045	0.067	8	0.375	265269	62.32
0.045	0.067	12	0.550	265280	64.29
0.047	0.070	3	0.141	265291	62.32
0.047	0.070	5	0.250	265302	62.32
0.047	0.070	8	0.375	265313	62.32
0.047	0.070	12	0.570	265324	64.29
0.050	0.075	3	0.150	265335	62.32
0.050	0.075	5	0.250	265346	62.32
0.050	0.075	8	0.400	265357	62.32
0.050	0.075	12	0.600	265368	64.29
0.055	0.082	3	0.165	265379	62.32
0.055	0.082	5	0.275	265390	62.32
0.055	0.082	8	0.450	265401	62.32
0.055	0.082	12	0.660	265412	64.29
0.060	0.090	3	0.180	265423	62.32
0.060	0.090	5	0.312	265434	62.32
0.060	0.090	8	0.500	265445	62.32
0.060	0.090	12	0.720	265456	64.29
0.062	0.093	3	0.186	265467	62.32
0.062	0.093	5	0.312	265478	62.32
0.062	0.093	8	0.500	265489	62.32
0.062	0.093	12	0.750	265500	64.29
0.065	0.097	3	0.195	265511	62.32
0.065	0.097	5	0.325	265522	62.32
0.065	0.097	8	0.530	265533	62.32
0.065	0.097	12	0.800	265544	64.29
0.070	0.105	3	0.210	265555	62.32
0.070	0.105	5	0.375	265566	62.32
0.070	0.105	8	0.570	265577	62.32
0.070	0.105	12	0.850	265588	64.29

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.075	0.112	3	0.225	265599	62.32
0.075	0.112	5	0.375	265610	62.32
0.075	0.112	8	0.625	265621	62.32
0.075	0.112	12	0.900	265632	64.29
0.078	0.117	3	0.234	265643	62.32
0.078	0.117	5	0.406	265654	62.32
0.078	0.117	8	0.625	265665	62.32
0.078	0.117	12	0.940	265676	64.29
0.080	0.120	3	0.240	265687	62.32
0.080	0.120	5	0.406	265698	62.32
0.080	0.120	8	0.650	265709	62.32
0.080	0.120	12	0.960	265720	64.29
0.085	0.127	3	0.255	265731	62.32
0.085	0.127	5	0.425	265742	62.32
0.085	0.127	8	0.700	265753	62.32
0.085	0.127	12	1.020	265764	64.29
0.090	0.135	3	0.270	265775	62.32
0.090	0.135	5	0.450	265786	62.32
0.090	0.135	8	0.750	265797	62.32
0.090	0.135	12	1.080	265808	64.29
0.093	0.139	3	0.279	265819	62.32
0.093	0.139	5	0.500	265830	62.32
0.093	0.139	8	0.750	265841	62.32
0.093	0.139	12	1.125	265852	64.29
0.095	0.142	3	0.285	265863	62.32
0.095	0.142	5	0.500	265874	62.32
0.095	0.142	8	0.750	265885	62.32
0.095	0.142	12	1.150	265896	64.29
0.100	0.150	3	0.300	265907	62.32
0.100	0.150	5	0.500	265918	62.32
0.100	0.150	8	0.800	265929	62.32
0.100	0.150	12	1.200	265940	64.29

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - STUB FLUTE - SQUARE END - 30º HELIX
LOC = 1.5 X DIA

ALTIN COATED

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.010	0.015	3	0.030	272287	99.97
0.010	0.015	5	0.050	272298	99.97
0.010	0.015	8	0.080	272309	99.97
0.010	0.015	12	0.125	272320	105.48
0.015	0.022	3	0.045	272331	82.92
0.015	0.022	5	0.078	272342	82.92
0.015	0.022	8	0.125	272353	82.92
0.015	0.022	12	0.187	272364	85.80
0.020	0.030	3	0.060	272375	79.51
0.020	0.030	5	0.100	272386	79.51
0.020	0.030	8	0.160	272397	79.51
0.020	0.030	12	0.250	272408	82.66
0.025	0.037	3	0.075	272419	76.36
0.025	0.037	5	0.125	272430	76.36
0.025	0.037	8	0.203	272441	76.36
0.025	0.037	12	0.312	272452	78.98
0.030	0.045	3	0.090	272463	76.36
0.030	0.045	5	0.156	272474	76.36
0.030	0.045	8	0.250	272485	76.36
0.030	0.045	12	0.375	272496	78.98
0.031	0.046	3	0.093	272507	76.36
0.031	0.046	5	0.156	272518	76.36
0.031	0.046	8	0.250	272529	76.36
0.031	0.046	12	0.375	272540	78.98
0.035	0.052	3	0.105	272551	76.36
0.035	0.052	5	0.187	272562	76.36
0.035	0.052	8	0.281	272573	76.36
0.035	0.052	12	0.425	272584	78.98
0.040	0.060	3	0.120	272595	76.36
0.040	0.060	5	0.203	272606	76.36
0.040	0.060	8	0.325	272617	76.36
0.040	0.060	12	0.480	272628	78.98

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.045	0.067	3	0.135	272639	74.78
0.045	0.067	5	0.225	272650	74.78
0.045	0.067	8	0.375	272661	74.78
0.045	0.067	12	0.550	272672	77.15
0.047	0.070	3	0.141	272683	74.78
0.047	0.070	5	0.250	272694	74.78
0.047	0.070	8	0.375	272705	74.78
0.047	0.070	12	0.570	272716	77.15
0.050	0.075	3	0.150	272727	74.78
0.050	0.075	5	0.250	272738	74.78
0.050	0.075	8	0.400	272749	74.78
0.050	0.075	12	0.600	272760	77.15
0.055	0.082	3	0.165	272771	74.78
0.055	0.082	5	0.275	272782	74.78
0.055	0.082	8	0.450	272793	74.78
0.055	0.082	12	0.660	272804	77.15
0.060	0.090	3	0.180	272815	74.78
0.060	0.090	5	0.312	272826	74.78
0.060	0.090	8	0.500	272837	74.78
0.060	0.090	12	0.720	272848	77.15
0.062	0.093	3	0.186	272859	74.78
0.062	0.093	5	0.312	272870	74.78
0.062	0.093	8	0.500	272881	74.78
0.062	0.093	12	0.750	272892	77.15
0.065	0.097	3	0.195	272903	74.78
0.065	0.097	5	0.325	272914	74.78
0.065	0.097	8	0.530	272925	74.78
0.065	0.097	12	0.800	272936	77.15
0.070	0.105	3	0.210	272947	74.78
0.070	0.105	5	0.375	272958	74.78
0.070	0.105	8	0.570	272969	74.78
0.070	0.105	12	0.850	272980	77.15

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.075	0.112	3	0.225	272991	74.78
0.075	0.112	5	0.375	273002	74.78
0.075	0.112	8	0.625	273013	74.78
0.075	0.112	12	0.900	273024	77.15
0.078	0.117	3	0.234	273035	74.78
0.078	0.117	5	0.406	273046	74.78
0.078	0.117	8	0.625	273057	74.78
0.078	0.117	12	0.940	273068	77.15
0.080	0.120	3	0.240	273079	74.78
0.080	0.120	5	0.406	273090	74.78
0.080	0.120	8	0.650	273101	74.78
0.080	0.120	12	0.960	273112	77.15
0.085	0.127	3	0.255	273123	74.78
0.085	0.127	5	0.425	273134	74.78
0.085	0.127	8	0.700	273145	74.78
0.085	0.127	12	1.020	273156	77.15
0.090	0.135	3	0.270	273167	74.78
0.090	0.135	5	0.450	273178	74.78
0.090	0.135	8	0.750	273189	74.78
0.090	0.135	12	1.080	273200	77.15
0.093	0.139	3	0.279	273211	74.78
0.093	0.139	5	0.500	273222	74.78
0.093	0.139	8	0.750	273233	74.78
0.093	0.139	12	1.125	273244	77.15
0.095	0.142	3	0.285	273255	74.78
0.095	0.142	5	0.500	273266	74.78
0.095	0.142	8	0.750	273277	74.78
0.095	0.142	12	1.150	273288	77.15
0.100	0.150	3	0.300	273299	74.78
0.100	0.150	5	0.500	273310	74.78
0.100	0.150	8	0.800	273321	74.78
0.100	0.150	12	1.200	273332	77.15

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - STUB FLUTE - BALL NOSE - 30º HELIX
LOC = 1.5 X DIA

UNCOATED

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.010	0.015	3	0.030	267007	104.52
0.010	0.015	5	0.050	267018	104.52
0.010	0.015	8	0.080	267029	109.11
0.010	0.015	12	0.125	267040	122.67
0.015	0.022	3	0.045	267051	89.43
0.015	0.022	5	0.078	267062	89.43
0.015	0.022	8	0.125	267073	89.43
0.015	0.022	12	0.187	267084	91.62
0.020	0.030	3	0.060	267095	86.59
0.020	0.030	5	0.100	267106	86.59
0.020	0.030	8	0.160	267117	86.59
0.020	0.030	12	0.250	267128	89.00
0.025	0.037	3	0.075	267139	74.78
0.025	0.037	5	0.125	267150	74.78
0.025	0.037	8	0.203	267161	74.78
0.025	0.037	12	0.312	267172	76.97
0.030	0.045	3	0.090	267183	74.78
0.030	0.045	5	0.156	267194	74.78
0.030	0.045	8	0.250	267205	74.78
0.030	0.045	12	0.375	267216	76.97
0.031	0.046	3	0.093	267227	74.78
0.031	0.046	5	0.156	267238	74.78
0.031	0.046	8	0.250	267249	74.78
0.031	0.046	12	0.375	267260	76.97
0.035	0.052	3	0.105	267271	74.78
0.035	0.052	5	0.187	267282	74.78
0.035	0.052	8	0.281	267293	74.78
0.035	0.052	12	0.425	267304	76.97
0.040	0.060	3	0.120	267315	74.78
0.040	0.060	5	0.203	267326	74.78
0.040	0.060	8	0.325	267337	74.78
0.040	0.060	12	0.480	267348	76.97
0.045	0.067	3	0.135	267359	73.03
0.045	0.067	5	0.225	267370	73.03
0.045	0.067	8	0.375	267381	73.03
0.045	0.067	12	0.550	267392	75.00
0.047	0.070	3	0.141	267403	73.03
0.047	0.070	5	0.250	267414	73.03
0.047	0.070	8	0.375	267425	73.03
0.047	0.070	12	0.570	267436	75.00
0.050	0.075	3	0.150	267447	73.03
0.050	0.075	5	0.250	267458	73.03
0.050	0.075	8	0.400	267469	73.03
0.050	0.075	12	0.600	267480	75.00
0.055	0.082	3	0.165	267491	73.03
0.055	0.082	5	0.275	267502	73.03
0.055	0.082	8	0.450	267513	73.03
0.055	0.082	12	0.660	267524	75.00
0.060	0.090	3	0.180	267535	73.03
0.060	0.090	5	0.312	267546	73.03
0.060	0.090	8	0.500	267557	73.03
0.060	0.090	12	0.720	267568	75.00
0.062	0.093	3	0.186	267579	73.03
0.062	0.093	5	0.312	267590	73.03
0.062	0.093	8	0.500	267601	73.03
0.062	0.093	12	0.750	267612	75.00
0.065	0.097	3	0.195	267623	73.03
0.065	0.097	5	0.325	267634	73.03
0.065	0.097	8	0.530	267645	73.03
0.065	0.097	12	0.780	267656	75.00
0.070	0.105	3	0.210	267667	73.03
0.070	0.105	5	0.375	267678	73.03
0.070	0.105	8	0.570	267689	73.03
0.070	0.105	12	0.840	267700	75.00
0.075	0.112	3	0.225	267711	73.03
0.075	0.112	5	0.375	267722	73.03
0.075	0.112	8	0.625	267733	73.03
0.075	0.112	12	0.900	267744	75.00
0.078	0.117	3	0.234	267755	73.03
0.078	0.117	5	0.406	267766	73.03
0.078	0.117	8	0.625	267777	73.03
0.078	0.117	12	0.940	267788	75.00
0.080	0.120	3	0.240	267799	73.03
0.080	0.120	5	0.406	267810	73.03
0.080	0.120	8	0.650	267821	73.03
0.080	0.120	12	0.960	267832	75.00
0.085	0.127	3	0.255	267843	73.03
0.085	0.127	5	0.425	267854	73.03
0.085	0.127	8	0.700	267865	73.03
0.085	0.127	12	1.020	267876	75.00
0.090	0.135	3	0.270	267887	73.03
0.090	0.135	5	0.450	267898	73.03
0.090	0.135	8	0.750	267909	73.03
0.090	0.135	12	1.080	267920	75.00
0.093	0.139	3	0.279	267931	73.03
0.093	0.139	5	0.500	267942	73.03
0.093	0.139	8	0.750	267953	73.03
0.093	0.139	12	1.125	267964	75.00
0.095	0.142	3	0.285	267975	73.03
0.095	0.142	5	0.500	267986	73.03
0.095	0.142	8	0.750	267997	73.03
0.095	0.142	12	1.150	268008	75.00
0.100	0.150	3	0.300	268019	73.03
0.100	0.150	5	0.500	268030	73.03
0.100	0.150	8	0.800	268041	73.03
0.100	0.150	12	1.200	268052	75.00

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - STUB FLUTE - BALL NOSE - 30º HELIX
LOC = 1.5 X DIA

ALTIN COATED

DIA	LOC	xDIA	REACH	ITEM#	LIST PRICE
0.010	0.015	3	0.030	268063	125.43
0.010	0.015	5	0.050	268074	125.43
0.010	0.015	8	0.080	268085	130.94
0.010	0.015	12	0.125	268096	147.21
0.015	0.022	3	0.045	268107	107.32
0.015	0.022	5	0.078	268118	107.32
0.015	0.022	8	0.125	268129	107.32
0.015	0.022	12	0.187	268140	109.95
0.020	0.030	3	0.060	268151	103.91
0.020	0.030	5	0.100	268162	103.91
0.020	0.030	8	0.160	268173	103.91
0.020	0.030	12	0.250	268184	106.80
0.025	0.037	3	0.075	268195	89.74
0.025	0.037	5	0.125	268206	89.74
0.025	0.037	8	0.203	268217	89.74
0.025	0.037	12	0.312	268228	92.36
0.030	0.045	3	0.090	268239	89.74
0.030	0.045	5	0.156	268250	89.74
0.030	0.045	8	0.250	268261	89.74
0.030	0.045	12	0.375	268272	92.36
0.031	0.046	3	0.093	268283	89.74
0.031	0.046	5	0.156	268294	89.74
0.031	0.046	8	0.250	268305	89.74
0.031	0.046	12	0.375	268316	92.36
0.035	0.052	3	0.105	268327	89.74
0.035	0.052	5	0.187	268338	89.74
0.035	0.052	8	0.281	268349	89.74
0.035	0.052	12	0.425	268360	92.36
0.040	0.060	3	0.120	268371	89.74
0.040	0.060	5	0.203	268382	89.74
0.040	0.060	8	0.325	268393	89.74
0.040	0.060	12	0.480	268404	92.36
0.045	0.067	3	0.135	268415	87.64
0.045	0.067	5	0.225	268426	87.64
0.045	0.067	8	0.375	268437	87.64
0.045	0.067	12	0.550	268448	90.00
0.047	0.070	3	0.141	268459	87.64
0.047	0.070	5	0.250	268470	87.64
0.047	0.070	8	0.375	268481	87.64
0.047	0.070	12	0.570	268492	90.00
0.050	0.075	3	0.150	268503	87.64
0.050	0.075	5	0.250	268514	87.64
0.050	0.075	8	0.400	268525	87.64
0.050	0.075	12	0.600	268536	90.00
0.055	0.082	3	0.165	268547	87.64
0.055	0.082	5	0.275	268558	87.64
0.055	0.082	8	0.450	268569	87.64
0.055	0.082	12	0.660	268580	90.00
0.060	0.090	3	0.180	268591	87.64
0.060	0.090	5	0.312	268602	87.64
0.060	0.090	8	0.500	268613	87.64
0.060	0.090	12	0.720	268624	90.00
0.062	0.093	3	0.186	268635	87.64
0.062	0.093	5	0.312	268646	87.64
0.062	0.093	8	0.500	268657	87.64
0.062	0.093	12	0.750	268668	90.00
0.065	0.097	3	0.195	268679	87.64
0.065	0.097	5	0.325	268690	87.64
0.065	0.097	8	0.530	268701	87.64
0.065	0.097	12	0.780	268712	90.00
0.070	0.105	3	0.210	268723	87.64
0.070	0.105	5	0.375	268734	87.64
0.070	0.105	8	0.570	268745	87.64
0.070	0.105	12	0.840	268756	90.00
0.075	0.112	3	0.225	268767	87.64
0.075	0.112	5	0.375	268778	87.64
0.075	0.112	8	0.625	268789	87.64
0.075	0.112	12	0.900	268800	90.00
0.078	0.117	3	0.234	268811	87.64
0.078	0.117	5	0.406	268822	87.64
0.078	0.117	8	0.625	268833	87.64
0.078	0.117	12	0.940	268844	90.00
0.080	0.120	3	0.240	268855	87.64
0.080	0.120	5	0.406	268866	87.64
0.080	0.120	8	0.650	268877	87.64
0.080	0.120	12	0.960	268888	90.00
0.085	0.127	3	0.255	268899	87.64
0.085	0.127	5	0.425	268910	87.64
0.085	0.127	8	0.700	268921	87.64
0.085	0.127	12	1.020	268932	90.00
0.090	0.135	3	0.270	268943	87.64
0.090	0.135	5	0.450	268954	87.64
0.090	0.135	8	0.750	268965	87.64
0.090	0.135	12	1.080	268976	90.00
0.093	0.139	3	0.279	268987	87.64
0.093	0.139	5	0.500	268998	87.64
0.093	0.139	8	0.750	269009	87.64
0.093	0.139	12	1.125	269020	90.00
0.095	0.142	3	0.285	269031	87.64
0.095	0.142	5	0.500	269042	87.64
0.095	0.142	8	0.750	269053	87.64
0.095	0.142	12	1.150	269064	90.00
0.100	0.150	3	0.300	269075	87.64
0.100	0.150	5	0.500	269086	87.64
0.100	0.150	8	0.800	269097	87.64
0.100	0.150	12	1.200	269108	90.00

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.030	5	0.050	269119	83.31
0.010	0.030	8	0.080	269130	83.31
0.010	0.030	12	0.125	269141	87.90
0.015	0.045	5	0.078	269152	69.10
0.015	0.045	8	0.128	269163	69.10
0.015	0.045	12	0.187	269174	71.50
0.020	0.060	5	0.100	269185	66.26
0.020	0.060	8	0.170	269196	66.26
0.020	0.060	12	0.250	269207	68.88
0.025	0.075	5	0.125	269218	63.63
0.025	0.075	8	0.213	269229	63.63
0.025	0.075	12	0.312	269240	66.04
0.030	0.090	5	0.156	269251	63.63
0.030	0.090	9	0.270	269262	63.63
0.030	0.090	12	0.375	269273	65.82
0.031	0.093	5	0.156	269284	63.63
0.031	0.093	9	0.279	269295	63.63
0.031	0.093	12	0.375	269306	65.82
0.035	0.105	5	0.175	269317	63.63
0.035	0.105	9	0.315	269328	63.63
0.035	0.105	12	0.420	269339	65.82
0.040	0.120	5	0.203	269350	63.63
0.040	0.120	9	0.360	269361	63.63
0.040	0.120	12	0.480	269372	65.82
0.045	0.135	5	0.225	269383	62.32
0.045	0.135	9	0.405	269394	62.32
0.045	0.135	12	0.540	269405	65.82
0.047	0.141	5	0.250	269416	62.32
0.047	0.141	9	0.423	269427	62.32
0.047	0.141	12	0.570	269438	64.29
0.050	0.150	5	0.250	269449	62.32
0.050	0.150	8	0.400	269460	62.32
0.050	0.150	12	0.600	269471	64.29
0.055	0.165	5	0.275	269482	62.32
0.055	0.165	8	0.440	269493	62.32
0.055	0.165	12	0.660	269504	64.29

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.180	5	0.312	269515	62.32
0.060	0.180	8	0.500	269526	62.32
0.060	0.180	12	0.720	269537	64.29
0.062	0.186	5	0.312	269548	62.32
0.062	0.186	8	0.500	269559	62.32
0.062	0.186	12	0.750	269570	64.29
0.065	0.195	5	0.325	269581	62.32
0.065	0.195	8	0.500	269592	62.32
0.065	0.195	12	0.780	269603	64.29
0.070	0.210	5	0.350	269614	62.32
0.070	0.210	8	0.560	269625	62.32
0.070	0.210	12	0.850	269636	64.29
0.075	0.225	5	0.375	269647	62.32
0.075	0.225	8	0.600	269658	62.32
0.075	0.225	12	0.900	269669	64.29
0.078	0.234	5	0.390	269680	62.32
0.078	0.234	8	0.624	269691	62.32
0.078	0.234	12	0.940	269702	64.29
0.080	0.240	5	0.400	269713	62.32
0.080	0.240	8	0.640	269724	62.32
0.080	0.240	12	0.960	269735	64.29
0.085	0.255	5	0.425	269746	62.32
0.085	0.255	8	0.680	269757	62.32
0.085	0.255	12	1.020	269768	64.29
0.090	0.270	5	0.450	269779	62.32
0.090	0.270	8	0.720	269790	62.32
0.090	0.270	12	1.080	269801	64.29
0.093	0.279	5	0.500	269812	62.32
0.093	0.279	8	0.744	269823	62.32
0.093	0.279	12	1.125	269834	64.29
0.095	0.285	5	0.475	269845	62.32
0.095	0.285	8	0.760	269856	62.32
0.095	0.285	12	1.140	269867	64.29
0.100	0.300	5	0.500	269878	62.32
0.100	0.300	8	0.800	269889	62.32
0.100	0.300	12	1.200	269900	64.29

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - REGULAR FLUTE - SQUARE END - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.030	5	0.050	269911	99.97
0.010	0.030	8	0.080	269922	99.97
0.010	0.030	12	0.125	269933	105.48
0.015	0.045	5	0.078	269944	82.92
0.015	0.045	8	0.128	269955	82.92
0.015	0.045	12	0.187	269966	85.80
0.020	0.060	5	0.100	269977	79.51
0.020	0.060	8	0.170	269988	79.51
0.020	0.060	12	0.250	269999	82.66
0.025	0.075	5	0.125	270010	76.36
0.025	0.075	8	0.213	270021	76.36
0.025	0.075	12	0.312	270032	79.24
0.030	0.090	5	0.156	270043	76.36
0.030	0.090	9	0.270	270054	76.36
0.030	0.090	12	0.375	270065	78.98
0.031	0.093	5	0.156	270076	76.36
0.031	0.093	9	0.279	270087	76.36
0.031	0.093	12	0.375	270098	78.98
0.035	0.105	5	0.175	270109	76.36
0.035	0.105	9	0.315	270120	76.36
0.035	0.105	12	0.420	270131	78.98
0.040	0.120	5	0.203	270142	76.36
0.040	0.120	9	0.360	270153	76.36
0.040	0.120	12	0.480	270164	78.98
0.045	0.135	5	0.225	270175	74.78
0.045	0.135	9	0.405	270186	74.78
0.045	0.135	12	0.540	270197	78.98
0.047	0.141	5	0.250	270208	74.78
0.047	0.141	9	0.423	270219	74.78
0.047	0.141	12	0.570	270230	77.15
0.050	0.150	5	0.250	270241	74.78
0.050	0.150	8	0.400	270252	74.78
0.050	0.150	12	0.600	270263	77.15
0.055	0.165	5	0.275	270274	74.78
0.055	0.165	8	0.440	270285	74.78
0.055	0.165	12	0.660	270296	77.15

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.180	5	0.312	270307	74.78
0.060	0.180	8	0.500	270318	74.78
0.060	0.180	12	0.720	270329	77.15
0.062	0.186	5	0.312	270340	74.78
0.062	0.186	8	0.500	270351	74.78
0.062	0.186	12	0.750	270362	77.15
0.065	0.195	5	0.325	270373	74.78
0.065	0.195	8	0.500	270384	74.78
0.065	0.195	12	0.780	270395	77.15
0.070	0.210	5	0.350	270406	74.78
0.070	0.210	8	0.560	270417	74.78
0.070	0.210	12	0.850	270428	77.15
0.075	0.225	5	0.375	270439	74.78
0.075	0.225	8	0.600	270450	74.78
0.075	0.225	12	0.900	270461	77.15
0.078	0.234	5	0.390	270472	74.78
0.078	0.234	8	0.624	270483	74.78
0.078	0.234	12	0.940	270494	77.15
0.080	0.240	5	0.400	270505	74.78
0.080	0.240	8	0.640	270516	74.78
0.080	0.240	12	0.960	270527	77.15
0.085	0.255	5	0.425	270538	74.78
0.085	0.255	8	0.680	270549	74.78
0.085	0.255	12	1.020	270560	77.15
0.090	0.270	5	0.450	270571	74.78
0.090	0.270	8	0.720	270582	74.78
0.090	0.270	12	1.080	270593	77.15
0.093	0.279	5	0.500	270604	74.78
0.093	0.279	8	0.744	270615	74.78
0.093	0.279	12	1.125	270626	77.15
0.095	0.285	5	0.475	270637	74.78
0.095	0.285	8	0.760	270648	74.78
0.095	0.285	12	1.140	270659	77.15
0.100	0.300	5	0.500	270670	74.78
0.100	0.300	8	0.800	270681	74.78
0.100	0.300	12	1.200	270692	77.15

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

UNCOATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.030	5	0.050	270703	112.83
0.010	0.030	8	0.080	270714	112.83
0.010	0.030	12	0.125	270725	114.80
0.015	0.045	5	0.078	270736	90.53
0.015	0.045	8	0.128	270747	90.53
0.015	0.045	12	0.187	270758	92.50
0.020	0.060	5	0.100	270769	87.03
0.020	0.060	8	0.170	270780	87.03
0.020	0.060	12	0.250	270791	89.00
0.025	0.075	5	0.125	270802	79.59
0.025	0.075	8	0.213	270813	79.59
0.025	0.075	12	0.312	270824	81.56
0.030	0.090	5	0.156	270835	79.59
0.030	0.090	9	0.270	270846	79.59
0.030	0.090	12	0.375	270857	81.56
0.031	0.093	5	0.156	270868	79.59
0.031	0.093	9	0.279	270879	79.59
0.031	0.093	12	0.375	270890	81.56
0.035	0.105	5	0.175	270901	79.59
0.035	0.105	8	0.280	270912	79.59
0.035	0.105	12	0.420	270923	81.56
0.040	0.120	5	0.200	270934	79.59
0.040	0.120	8	0.320	270945	79.59
0.040	0.120	12	0.480	270956	81.56
0.045	0.135	5	0.225	270967	76.97
0.045	0.135	8	0.360	270978	76.97
0.045	0.135	12	0.540	270989	78.94
0.047	0.141	5	0.250	271000	76.97
0.047	0.141	8	0.376	271011	76.97
0.047	0.141	12	0.570	271022	78.94
0.050	0.150	5	0.250	271033	76.97
0.050	0.150	8	0.400	271044	76.97
0.050	0.150	12	0.600	271055	78.94
0.055	0.165	5	0.275	271066	76.97
0.055	0.165	8	0.440	271077	76.97
0.055	0.165	12	0.660	271088	78.94

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.180	5	0.300	271099	76.97
0.060	0.180	8	0.500	271110	76.97
0.060	0.180	12	0.720	271121	78.94
0.062	0.186	5	0.312	271132	76.97
0.062	0.186	8	0.500	271143	76.97
0.062	0.186	12	0.750	271154	78.94
0.065	0.195	5	0.325	271165	76.97
0.065	0.195	8	0.500	271176	76.97
0.065	0.195	12	0.780	271187	78.94
0.070	0.210	5	0.350	271198	76.97
0.070	0.210	8	0.560	271209	76.97
0.070	0.210	12	0.840	271220	78.94
0.075	0.225	5	0.375	271231	76.97
0.075	0.225	8	0.600	271242	76.97
0.075	0.225	12	0.900	271253	78.94
0.078	0.234	5	0.390	271264	76.97
0.078	0.234	8	0.624	271275	76.97
0.078	0.234	12	0.940	271286	78.94
0.080	0.240	5	0.400	271297	76.97
0.080	0.240	8	0.640	271308	76.97
0.080	0.240	12	0.960	271319	78.94
0.085	0.255	5	0.425	271330	76.97
0.085	0.255	8	0.680	271341	76.97
0.085	0.255	12	1.020	271352	78.94
0.090	0.270	5	0.450	271363	76.97
0.090	0.270	8	0.720	271374	76.97
0.090	0.270	12	1.080	271385	78.94
0.093	0.279	5	0.500	271396	76.97
0.093	0.279	8	0.744	271407	76.97
0.093	0.279	12	1.125	271418	78.94
0.095	0.285	5	0.475	271429	76.97
0.095	0.285	8	0.760	271440	76.97
0.095	0.285	12	1.140	271451	78.94
0.100	0.300	5	0.500	271462	76.97
0.100	0.300	8	0.800	271473	76.97
0.100	0.300	12	1.200	271484	78.94

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - REGULAR FLUTE - BALL NOSE - 30º HELIX
LOC = 3 X DIA

ALTIN COATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.030	5	0.050	271495	135.40
0.010	0.030	8	0.080	271506	135.40
0.010	0.030	12	0.125	271517	137.76
0.015	0.045	5	0.078	271528	108.63
0.015	0.045	8	0.128	271539	108.63
0.015	0.045	12	0.187	271550	110.99
0.020	0.060	5	0.100	271561	104.43
0.020	0.060	8	0.170	271572	104.43
0.020	0.060	12	0.250	271583	106.80
0.025	0.075	5	0.125	271594	95.51
0.025	0.075	8	0.213	271605	95.51
0.025	0.075	12	0.312	271616	97.87
0.030	0.090	5	0.156	271627	95.51
0.030	0.090	9	0.270	271638	95.51
0.030	0.090	12	0.375	271649	97.87
0.031	0.093	5	0.156	271660	95.51
0.031	0.093	9	0.279	271671	95.51
0.031	0.093	12	0.375	271682	97.87
0.035	0.105	5	0.175	271693	95.51
0.035	0.105	8	0.280	271704	95.51
0.035	0.105	12	0.420	271715	97.87
0.040	0.120	5	0.200	271726	95.51
0.040	0.120	8	0.320	271737	95.51
0.040	0.120	12	0.480	271748	97.87
0.045	0.135	5	0.225	271759	92.36
0.045	0.135	8	0.360	271770	92.36
0.045	0.135	12	0.540	271781	94.73
0.047	0.141	5	0.250	271792	92.36
0.047	0.141	8	0.376	271803	92.36
0.047	0.141	12	0.570	271814	94.73
0.050	0.150	5	0.250	271825	92.36
0.050	0.150	8	0.400	271836	92.36
0.050	0.150	12	0.600	271847	94.73
0.055	0.165	5	0.275	271858	92.36
0.055	0.165	8	0.440	271869	92.36
0.055	0.165	12	0.660	271880	94.73

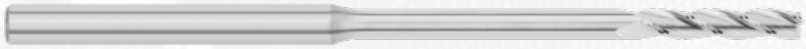
DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.180	5	0.300	271891	92.36
0.060	0.180	8	0.500	271902	92.36
0.060	0.180	12	0.720	271913	94.73
0.062	0.186	5	0.312	271924	92.36
0.062	0.186	8	0.500	271935	92.36
0.062	0.186	12	0.750	271946	94.73
0.065	0.195	5	0.325	271957	92.36
0.065	0.195	8	0.500	271968	92.36
0.065	0.195	12	0.780	271979	94.73
0.070	0.210	5	0.350	271990	92.36
0.070	0.210	8	0.560	272001	92.36
0.070	0.210	12	0.840	272012	94.73
0.075	0.225	5	0.375	272023	92.36
0.075	0.225	8	0.600	272034	92.36
0.075	0.225	12	0.900	272045	94.73
0.078	0.234	5	0.390	272056	92.36
0.078	0.234	8	0.624	272067	92.36
0.078	0.234	12	0.940	272078	94.73
0.080	0.240	5	0.400	272089	92.36
0.080	0.240	8	0.640	272100	92.36
0.080	0.240	12	0.960	272111	94.73
0.085	0.255	5	0.425	272122	92.36
0.085	0.255	8	0.680	272133	92.36
0.085	0.255	12	1.020	272144	94.73
0.090	0.270	5	0.450	272155	92.36
0.090	0.270	8	0.720	272166	92.36
0.090	0.270	12	1.080	272177	94.73
0.093	0.279	5	0.500	272188	92.36
0.093	0.279	8	0.744	272199	92.36
0.093	0.279	12	1.125	272210	94.73
0.095	0.285	5	0.475	272221	92.36
0.095	0.285	8	0.760	272232	92.36
0.095	0.285	12	1.140	272243	94.73
0.100	0.300	5	0.500	272254	92.36
0.100	0.300	8	0.800	272265	92.36
0.100	0.300	12	1.200	272276	94.73

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - LONG FLUTE - SQUARE END - 30º HELIX
LOC = 5 X DIA



UNCOATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.050	10	0.100	265951	84.62
0.010	0.050	15	0.150	265962	104.52
0.015	0.075	10	0.150	265973	70.63
0.015	0.075	15	0.225	265984	89.87
0.020	0.100	10	0.200	265995	68.01
0.020	0.100	15	0.300	266006	86.59
0.025	0.125	10	0.250	266017	65.16
0.025	0.125	15	0.375	266028	83.97
0.030	0.150	10	0.300	266039	65.16
0.030	0.150	15	0.450	266050	83.97
0.031	0.155	10	0.310	266061	65.16
0.031	0.155	15	0.470	266072	83.97
0.035	0.175	10	0.350	266083	65.16
0.035	0.175	15	0.525	266094	83.97
0.040	0.200	10	0.400	266105	65.16
0.040	0.200	15	0.600	266116	83.97
0.045	0.225	10	0.450	266127	63.85
0.045	0.225	15	0.675	266138	79.81
0.047	0.250	10	0.500	266149	63.85
0.047	0.250	15	0.710	266160	79.81
0.050	0.300	10	0.500	266171	63.85
0.050	0.300	15	0.750	266182	79.81
0.055	0.385	10	0.550	266193	63.85
0.055	0.385	15	0.825	266204	79.81

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.312	10	0.625	266215	63.85
0.060	0.500	16	1.000	266226	63.85
0.062	0.312	10	0.625	266237	63.85
0.062	0.500	16	1.000	266248	63.85
0.065	0.325	10	0.650	266259	63.85
0.065	0.500	15	1.000	266270	63.85
0.070	0.350	10	0.700	266281	63.85
0.070	0.500	14	1.000	266292	63.85
0.075	0.375	10	0.750	266303	63.85
0.075	0.500	13	1.000	266314	63.85
0.078	0.406	10	0.800	266325	63.85
0.078	0.406	15	1.187	266336	63.85
0.080	0.400	10	0.800	266347	63.85
0.080	0.750	15	1.250	266358	63.85
0.085	0.425	10	0.850	266369	63.85
0.085	0.750	14	1.250	266380	63.85
0.090	0.450	10	0.900	266391	63.85
0.090	0.750	13	1.250	266402	63.85
0.093	0.500	10	0.950	266413	63.85
0.093	0.500	15	1.400	266424	63.85
0.095	0.500	10	0.950	266435	63.85
0.095	0.750	13	1.250	266446	63.85
0.100	0.500	10	1.000	266457	63.85
0.100	0.750	12	1.250	266468	63.85

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

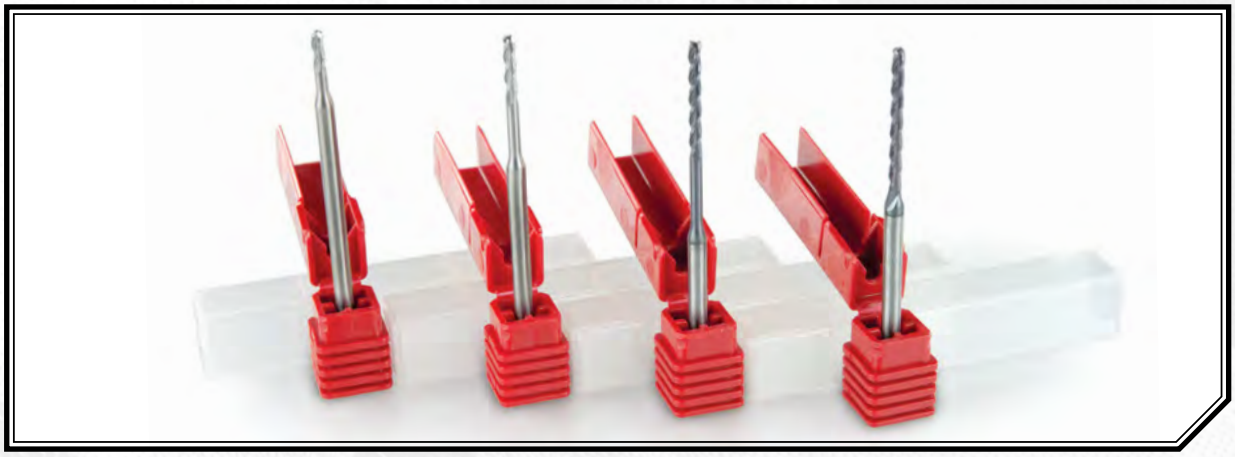
GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - LONG FLUTE - SQUARE END - 30º HELIX
LOC = 5 X DIA

ALTIN COATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.050	10	0.100	266479	101.55
0.010	0.050	15	0.150	266490	125.43
0.015	0.075	10	0.150	266501	84.76
0.015	0.075	15	0.225	266512	107.85
0.020	0.100	10	0.200	266523	81.61
0.020	0.100	15	0.300	266534	103.91
0.025	0.125	10	0.250	266545	78.20
0.025	0.125	15	0.375	266556	100.76
0.030	0.150	10	0.300	266567	78.20
0.030	0.150	15	0.450	266578	100.76
0.031	0.155	10	0.310	266589	78.20
0.031	0.155	15	0.470	266600	100.76
0.035	0.175	10	0.350	266611	78.20
0.035	0.175	15	0.525	266622	100.76
0.040	0.200	10	0.400	266633	78.20
0.040	0.200	15	0.600	266644	100.76
0.045	0.225	10	0.450	266655	76.62
0.045	0.225	15	0.675	266666	95.78
0.047	0.250	10	0.500	266677	76.62
0.047	0.250	15	0.710	266688	95.78
0.050	0.300	10	0.500	266699	76.62
0.050	0.300	15	0.750	266710	95.78
0.055	0.385	10	0.550	266721	76.62
0.055	0.385	15	0.825	266732	95.78

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.312	10	0.625	266743	76.62
0.060	0.500	16	1.000	266754	76.62
0.062	0.312	10	0.625	266765	76.62
0.062	0.500	16	1.000	266776	76.62
0.065	0.325	10	0.650	266787	76.62
0.065	0.500	15	1.000	266798	76.62
0.070	0.350	10	0.700	266809	76.62
0.070	0.500	14	1.000	266820	76.62
0.075	0.375	10	0.750	266831	76.62
0.075	0.500	13	1.000	266842	76.62
0.078	0.406	10	0.800	266853	76.62
0.078	0.406	15	1.187	266864	76.62
0.080	0.400	10	0.800	266875	76.62
0.080	0.750	15	1.250	266886	76.62
0.085	0.425	10	0.850	266897	76.62
0.085	0.750	14	1.250	266908	76.62
0.090	0.450	10	0.900	266919	76.62
0.090	0.750	13	1.250	266930	76.62
0.093	0.500	10	0.950	266941	76.62
0.093	0.500	15	1.400	266952	76.62
0.095	0.500	10	0.950	266963	76.62
0.095	0.750	13	1.250	266974	76.62
0.100	0.500	10	1.000	266985	76.62
0.100	0.750	12	1.250	266996	76.62



All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - LONG FLUTE - BALL NOSE - 30º HELIX
LOC = 5 X DIA

UNCOATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.050	10	0.100	260143	105.83
0.010	0.050	15	0.150	260154	105.83
0.015	0.075	10	0.150	260165	90.75
0.015	0.075	15	0.225	260176	90.75
0.020	0.100	10	0.200	260187	87.90
0.020	0.100	15	0.300	260198	87.90
0.025	0.125	10	0.250	260209	76.10
0.025	0.125	15	0.375	260220	76.10
0.030	0.150	10	0.300	260231	76.10
0.030	0.150	15	0.450	260242	76.10
0.031	0.155	10	0.310	260253	76.10
0.031	0.155	15	0.470	260264	76.10
0.035	0.175	10	0.350	260275	76.10
0.035	0.175	15	0.525	260286	76.10
0.040	0.200	10	0.400	260297	76.10
0.040	0.200	15	0.600	260308	76.10
0.045	0.225	10	0.450	260319	74.13
0.045	0.225	15	0.675	260330	74.13
0.047	0.250	10	0.500	260341	74.13
0.047	0.250	15	0.710	260352	74.13
0.050	0.300	10	0.500	260363	74.13
0.050	0.300	15	0.750	260374	74.13
0.055	0.385	10	0.550	260385	74.13
0.055	0.385	15	0.825	260396	74.13

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.312	10	0.625	260407	74.13
0.060	0.500	16	1.000	260418	74.13
0.062	0.312	10	0.625	260429	74.13
0.062	0.500	16	1.000	260440	74.13
0.065	0.325	10	0.650	260451	74.13
0.065	0.500	15	1.000	260462	74.13
0.070	0.350	10	0.700	260473	74.13
0.070	0.500	14	1.000	260484	74.13
0.075	0.375	10	0.750	260495	74.13
0.075	0.500	13	1.000	260506	74.13
0.078	0.406	10	0.800	260517	74.13
0.078	0.406	15	1.187	260528	74.13
0.080	0.400	10	0.800	260539	74.13
0.080	0.750	15	1.250	260550	74.13
0.085	0.425	10	0.850	260561	74.13
0.085	0.750	14	1.250	260572	74.13
0.090	0.450	10	0.900	260583	74.13
0.090	0.750	13	1.250	260594	74.13
0.093	0.500	10	0.950	260605	74.13
0.093	0.500	15	1.400	260616	74.13
0.095	0.500	10	0.950	260627	74.13
0.095	0.750	13	1.250	260638	74.13
0.100	0.500	10	1.000	260649	74.13
0.100	0.750	12	1.250	260660	74.13

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG REACH - LONG FLUTE - BALL NOSE - 30º HELIX
LOC = 5 X DIA

ALTIN COATED

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.010	0.050	10	0.100	260671	127.00
0.010	0.050	15	0.150	260682	127.00
0.015	0.075	10	0.150	260693	108.90
0.015	0.075	15	0.225	260704	108.90
0.020	0.100	10	0.200	260715	105.48
0.020	0.100	15	0.300	260726	105.48
0.025	0.125	10	0.250	260737	91.31
0.025	0.125	15	0.375	260748	91.31
0.030	0.150	10	0.300	260759	91.31
0.030	0.150	15	0.450	260770	91.31
0.031	0.155	10	0.310	260781	91.31
0.031	0.155	15	0.470	260792	91.31
0.035	0.175	10	0.350	260803	91.31
0.035	0.175	15	0.525	260814	91.31
0.040	0.200	10	0.400	260825	91.31
0.040	0.200	15	0.600	260836	91.31
0.045	0.225	10	0.450	260847	88.95
0.045	0.225	15	0.675	260858	88.95
0.047	0.250	10	0.500	260869	88.95
0.047	0.250	15	0.710	260880	88.95
0.050	0.300	10	0.500	260891	88.95
0.050	0.300	15	0.750	260902	88.95
0.055	0.385	10	0.550	260913	88.95
0.055	0.385	15	0.825	260924	88.95

DIA	LOC	×DIA	REACH	ITEM#	LIST PRICE
0.060	0.312	10	0.625	260935	88.95
0.060	0.500	16	1.000	260946	88.95
0.062	0.312	10	0.625	260957	88.95
0.062	0.500	16	1.000	260968	88.95
0.065	0.325	10	0.650	260979	88.95
0.065	0.500	15	1.000	260990	88.95
0.070	0.350	10	0.700	261001	88.95
0.070	0.500	14	1.000	261012	88.95
0.075	0.375	10	0.750	261023	88.95
0.075	0.500	13	1.000	261034	88.95
0.078	0.406	10	0.800	261045	88.95
0.078	0.406	15	1.187	261056	88.95
0.080	0.400	10	0.800	261067	88.95
0.080	0.750	15	1.250	261078	88.95
0.085	0.425	10	0.850	261089	88.95
0.085	0.750	14	1.250	261100	88.95
0.090	0.450	10	0.900	261111	88.95
0.090	0.750	13	1.250	261122	88.95
0.093	0.500	10	0.950	261133	88.95
0.093	0.500	15	1.400	261144	88.95
0.095	0.500	10	0.950	261155	88.95
0.095	0.750	13	1.250	261166	88.95
0.100	0.500	10	1.000	261177	88.95
0.100	0.750	12	1.250	261188	88.95

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG LENGTH - LONG FLUTE - SQUARE END - 30º HELIX

UNCOATED

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.010	5	0.050	261199	68.01
0.010	8	0.080	261210	114.14
0.010	12	0.120	261221	135.57
0.015	5	0.078	261232	63.19
0.015	8	0.125	261243	109.11
0.015	12	0.187	261254	134.26
0.020	5	0.100	261265	54.23
0.020	8	0.160	261276	98.02
0.020	12	0.250	261287	128.79
0.025	5	0.125	261298	51.82
0.025	8	0.203	261309	98.02
0.025	12	0.312	261320	113.93
0.030	5	0.150	261331	49.86
0.030	8	0.250	261342	84.00
0.030	12	0.375	261353	108.24
0.031	5	0.156	261364	49.86
0.031	8	0.250	261375	80.18
0.031	12	0.375	261386	108.24
0.035	5	0.175	261397	49.86
0.035	8	0.280	261408	80.18
0.035	12	0.425	261419	108.24
0.040	5	0.200	261430	49.86
0.040	8	0.325	261441	80.18
0.040	12	0.480	261452	108.24
0.045	5	0.225	261463	49.86
0.045	8	0.375	261474	80.18
0.045	12	0.550	261485	107.58
0.047	5	0.250	261496	49.86
0.047	8	0.375	261507	80.18
0.047	12	0.570	261518	107.58
0.050	5	0.250	261529	49.86
0.050	8	0.400	261540	80.18
0.050	12	0.600	261551	108.24
0.055	5	0.275	261562	49.86
0.055	8	0.440	261573	80.18
0.055	12	0.660	261584	108.24
0.060	5	0.312	261595	44.39
0.060	8	0.500	261606	49.86
0.060	12	0.720	261617	108.24
0.062	5	0.312	261628	44.39
0.062	8	0.500	261639	49.64
0.062	12	0.750	261650	84.84
0.062	15	0.950	261661	116.11
0.065	5	0.325	261672	44.39
0.065	8	0.500	261683	49.64
0.065	12	0.780	261694	84.84
0.070	5	0.375	261705	44.39
0.070	8	0.560	261716	49.64
0.070	12	0.850	261727	84.84
0.075	5	0.375	261738	44.39
0.075	8	0.625	261749	49.64
0.075	12	0.900	261760	84.84
0.078	5	0.406	261771	44.39
0.078	8	0.625	261782	49.64
0.078	12	0.940	261793	84.84
0.078	15	1.187	261804	116.11
0.080	5	0.406	261815	44.39
0.080	8	0.750	261826	49.64
0.080	12	0.960	261837	84.84
0.085	5	0.425	261848	44.39
0.085	8	0.750	261859	49.64
0.085	12	1.020	261870	84.84
0.090	5	0.450	261881	44.39
0.090	8	0.750	261892	49.64
0.090	12	1.080	261903	84.84
0.093	5	0.500	261914	44.39
0.093	8	0.750	261925	49.64
0.093	12	1.125	261936	84.84
0.093	15	1.400	261947	120.70
0.095	5	0.500	261958	44.39
0.095	8	0.750	261969	49.64
0.095	12	1.140	261980	84.84
0.100	5	0.500	261991	44.39
0.100	8	0.800	262002	49.64
0.100	12	1.200	262013	84.84
0.109	5	0.570	262024	44.39
0.109	8	0.900	262035	49.64
0.109	12	1.320	262046	84.84
0.118	5	0.625	262057	44.39
0.118	8	0.950	262068	49.64
0.118	12	1.375	262079	84.84
0.120	5	0.600	262090	44.39
0.120	8	1.000	262101	49.64
0.120	12	1.500	262112	84.84

All long length Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG LENGTH - LONG FLUTE - SQUARE END - 30º HELIX

ALTIN COATED

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.010	5	0.050	262123	81.61
0.010	8	0.080	262134	136.97
0.010	12	0.120	262145	162.69
0.015	5	0.078	262156	75.83
0.015	8	0.125	262167	130.94
0.015	12	0.187	262178	161.11
0.020	5	0.100	262189	65.08
0.020	8	0.160	262200	117.62
0.020	12	0.250	262211	154.55
0.025	5	0.125	262222	62.19
0.025	8	0.203	262233	117.62
0.025	12	0.312	262244	136.71
0.030	5	0.150	262255	59.83
0.030	8	0.250	262266	100.79
0.030	12	0.375	262277	129.89
0.031	5	0.156	262288	59.83
0.031	8	0.250	262299	96.21
0.031	12	0.375	262310	129.89
0.035	5	0.175	262321	59.83
0.035	8	0.280	262332	96.21
0.035	12	0.425	262343	129.89
0.040	5	0.200	262354	59.83
0.040	8	0.325	262365	96.21
0.040	12	0.480	262376	129.89
0.045	5	0.225	262387	59.83
0.045	8	0.375	262398	96.21
0.045	12	0.550	262409	129.10
0.047	5	0.250	262420	59.83
0.047	8	0.375	262431	96.21
0.047	12	0.570	262442	129.10
0.050	5	0.250	262453	59.83
0.050	8	0.400	262464	96.21
0.050	12	0.600	262475	129.89
0.055	5	0.275	262486	59.83
0.055	8	0.440	262497	96.21
0.055	12	0.660	262508	129.89
0.060	5	0.312	262519	53.27
0.060	8	0.500	262530	59.83
0.060	12	0.720	262541	129.89
0.062	5	0.312	262552	53.27
0.062	8	0.500	262563	59.56
0.062	12	0.750	262574	101.81

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.062	15	0.950	262585	139.33
0.065	5	0.325	262596	53.27
0.065	8	0.500	262607	59.56
0.065	12	0.780	262618	101.81
0.070	5	0.375	262629	53.27
0.070	8	0.560	262640	59.56
0.070	12	0.850	262651	101.81
0.075	5	0.375	262662	53.27
0.075	8	0.625	262673	59.56
0.075	12	0.900	262684	101.81
0.078	5	0.406	262695	53.27
0.078	8	0.625	262706	59.56
0.078	12	0.940	262717	101.81
0.078	15	1.187	262728	139.33
0.080	5	0.406	262739	53.27
0.080	8	0.750	262750	59.56
0.080	12	0.960	262761	101.81
0.085	5	0.425	262772	53.27
0.085	8	0.750	262783	59.56
0.085	12	1.020	262794	101.81
0.090	5	0.450	262805	53.27
0.090	8	0.750	262816	59.56
0.090	12	1.080	262827	101.81
0.093	5	0.500	262838	53.27
0.093	8	0.750	262849	59.56
0.093	12	1.125	262860	101.81
0.093	15	1.400	262871	144.84
0.095	5	0.500	262882	53.27
0.095	8	0.750	262893	59.56
0.095	12	1.140	262904	101.81
0.100	5	0.500	262915	53.27
0.100	8	0.800	262926	59.56
0.100	12	1.200	262937	101.81
0.109	5	0.570	262948	53.27
0.109	8	0.900	262959	59.56
0.109	12	1.320	262970	101.81
0.118	5	0.625	262981	53.27
0.118	8	0.950	262992	59.56
0.118	12	1.375	263003	101.81
0.120	5	0.600	263014	53.27
0.120	8	1.000	263025	59.56
0.120	12	1.500	263036	101.81

All long length Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG LENGTH - LONG FLUTE - BALL NOSE - 30º HELIX

UNCOATED

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.010	5	0.050	263047	77.85
0.010	8	0.080	263058	130.76
0.010	12	0.120	263069	153.07
0.015	5	0.078	263080	72.38
0.015	8	0.125	263091	125.30
0.015	12	0.187	263102	154.82
0.020	5	0.100	263113	62.32
0.020	8	0.160	263124	116.33
0.020	12	0.250	263135	145.41
0.025	5	0.125	263146	59.26
0.025	8	0.203	263157	113.27
0.025	12	0.312	263168	139.95
0.030	5	0.150	263179	57.29
0.030	8	0.250	263190	93.71
0.030	12	0.375	263201	137.76
0.031	5	0.156	263212	57.29
0.031	8	0.250	263223	90.24
0.031	12	0.375	263234	124.20
0.035	5	0.175	263245	57.29
0.035	8	0.281	263256	93.71
0.035	12	0.425	263267	124.20
0.040	5	0.200	263278	57.29
0.040	8	0.325	263289	93.71
0.040	12	0.480	263300	124.20
0.045	5	0.225	263311	57.29
0.045	8	0.375	263322	93.71
0.045	12	0.550	263333	124.20
0.047	5	0.250	263344	57.29
0.047	8	0.375	263355	93.71
0.047	12	0.570	263366	124.20
0.050	5	0.250	263377	57.29
0.050	8	0.400	263388	93.71
0.050	12	0.600	263399	124.20
0.055	5	0.275	263410	50.73
0.055	8	0.440	263421	61.23
0.055	12	0.660	263432	115.89
0.060	5	0.312	263443	50.73
0.060	8	0.500	263454	57.29
0.060	12	0.720	263465	105.40
0.062	5	0.312	263476	50.73
0.062	8	0.500	263487	56.63
0.062	12	0.750	263498	97.31

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.062	15	0.950	263509	133.17
0.065	5	0.325	263520	50.73
0.065	8	0.500	263531	56.63
0.065	12	0.780	263542	97.31
0.070	5	0.375	263553	50.73
0.070	8	0.560	263564	56.63
0.070	12	0.900	263575	97.31
0.075	5	0.375	263586	50.73
0.075	8	0.625	263597	56.63
0.075	12	0.900	263608	97.31
0.078	5	0.406	263619	50.73
0.078	8	0.625	263630	56.63
0.078	12	0.940	263641	97.31
0.078	15	1.187	263652	133.17
0.080	5	0.406	263663	50.73
0.080	8	0.750	263674	56.63
0.080	12	0.960	263685	97.31
0.085	5	0.425	263696	50.73
0.085	8	0.750	263707	56.63
0.085	12	1.020	263718	97.31
0.090	5	0.450	263729	50.73
0.090	8	0.750	263740	56.63
0.090	12	1.080	263751	97.31
0.093	5	0.500	263762	50.73
0.093	8	0.750	263773	56.63
0.093	12	1.125	263784	97.31
0.093	15	1.400	263795	136.01
0.095	5	0.500	263806	50.73
0.095	8	0.750	263817	56.63
0.095	12	1.140	263828	97.31
0.100	5	0.500	263839	50.73
0.100	8	0.800	263850	56.63
0.100	12	1.200	263861	97.31
0.109	5	0.570	263872	50.73
0.109	8	0.900	263883	56.63
0.109	12	1.320	263894	97.31
0.118	5	0.625	263905	50.73
0.118	8	0.950	263916	56.63
0.118	12	1.375	263927	97.31
0.120	5	0.600	263938	50.73
0.120	8	1.000	263949	56.63
0.120	12	1.500	263960	97.31

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

GENERAL PURPOSE
SOLID CARBIDE MICRO END MILLS

3 FLUTE - LONG LENGTH - LONG FLUTE - BALL NOSE - 30º HELIX

ALTIN COATED

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.010	5	0.050	263971	93.41
0.010	8	0.080	263982	156.91
0.010	12	0.120	263993	183.68
0.015	5	0.078	264004	86.85
0.015	8	0.125	264015	150.35
0.015	12	0.187	264026	185.78
0.020	5	0.100	264037	74.78
0.020	8	0.160	264048	139.60
0.020	12	0.250	264059	174.50
0.025	5	0.125	264070	71.11
0.025	8	0.203	264081	135.92
0.025	12	0.312	264092	167.94
0.030	5	0.150	264103	68.75
0.030	8	0.250	264114	112.46
0.030	12	0.375	264125	165.31
0.031	5	0.156	264136	68.75
0.031	8	0.250	264147	108.29
0.031	12	0.375	264158	149.04
0.035	5	0.175	264169	68.75
0.035	8	0.281	264180	112.46
0.035	12	0.425	264191	149.04
0.040	5	0.200	264202	68.75
0.040	8	0.325	264213	112.46
0.040	12	0.480	264224	149.04
0.045	5	0.225	264235	68.75
0.045	8	0.375	264246	112.46
0.045	12	0.550	264257	149.04
0.047	5	0.250	264268	68.75
0.047	8	0.375	264279	112.46
0.047	12	0.570	264290	149.04
0.050	5	0.250	264301	68.75
0.050	8	0.400	264312	112.46
0.050	12	0.600	264323	149.04
0.055	5	0.275	264334	60.88
0.055	8	0.440	264345	73.47
0.055	12	0.660	264356	139.07
0.060	5	0.312	264367	60.88
0.060	8	0.500	264378	68.75
0.060	12	0.720	264389	126.48
0.062	5	0.312	264400	60.88
0.062	8	0.500	264411	67.96
0.062	12	0.750	264422	116.77

DIA	xDIA	LOC	ITEM#	LIST PRICE
0.062	15	0.950	264433	159.80
0.065	5	0.325	264444	60.88
0.065	8	0.500	264455	67.96
0.065	12	0.780	264466	116.77
0.070	5	0.375	264477	60.88
0.070	8	0.560	264488	67.96
0.070	12	0.900	264499	116.77
0.075	5	0.375	264510	60.88
0.075	8	0.625	264521	67.96
0.075	12	0.900	264532	116.77
0.078	5	0.406	264543	60.88
0.078	8	0.625	264554	67.96
0.078	12	0.940	264565	116.77
0.078	15	1.187	264576	159.80
0.080	5	0.406	264587	60.88
0.080	8	0.750	264598	67.96
0.080	12	0.960	264609	116.77
0.085	5	0.425	264620	60.88
0.085	8	0.750	264631	67.96
0.085	12	1.020	264642	116.77
0.090	5	0.450	264653	60.88
0.090	8	0.750	264664	67.96
0.090	12	1.080	264675	116.77
0.093	5	0.500	264686	60.88
0.093	8	0.750	264697	67.96
0.093	12	1.125	264708	116.77
0.093	15	1.400	264719	163.21
0.095	5	0.500	264730	60.88
0.095	8	0.750	264741	67.96
0.095	12	1.140	264752	116.77
0.100	5	0.500	264763	60.88
0.100	8	0.800	264774	67.96
0.100	12	1.200	264785	116.77
0.109	5	0.570	264796	60.88
0.109	8	0.900	264807	67.96
0.109	12	1.320	264818	116.77
0.118	5	0.625	264829	60.88
0.118	8	0.950	264840	67.96
0.118	12	1.375	264851	116.77
0.120	5	0.600	264862	60.88
0.120	8	1.000	264873	67.96
0.120	12	1.500	264884	116.77

All long reach Micro End Mills are 1/8" shank, 2-1/2" OAL.
For coating information see pages 6-9. For technical information, please see page 126.

TOLERANCES	DIAMETER	SHANK	REACH
ALL SIZES	+.0005, -.0005	-.0001, -.0003 ISO H6	+.010, -.000

MICRO END MILLS - CARBIDE TECHNICAL INFORMATION

THESE VALUES ARE FOR UNCOATED TOOLS. FOR ALTIN COATED TOOLS INCREASE SFM +40%

SFM & I.P.T. (INCH PER TOOTH)

MATERIAL / TYPE	CONDITIONS	STARTING SFM	DIAMETER RANGE - SUGGESTED CHIP LOAD PER TOOTH							
			.005-.015	.015-.030	.030-.045	.045-.060	.06-.075	.075-.090	.090-.105	.105-.125
STAINLESS STEELS										
PRECIPITATION 13-8, 15-5, 17-4PH	Slotting @ ≤ 10% of D	90	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 20% of D Radial	250	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
AUSTENITIC 302, 303, 304L, 316L	Slotting @ ≤ 15% of D	100	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 30% of D Radial	250	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
MARTENSITIC 302, 303, 304L, 316L	Slotting @ ≤ 15% of D	100	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 30% of D Radial	250	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
HIGH TEMP ALLOYS										
COBALT BASE Stellite, Haynes 25, 188, X-40, L-605	Slotting @ 7% of D	50	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
	Profiling @ 5% of D Axial/≤ 20% of D Radial	80	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
NICKEL BASE Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel PermaNickel 300, Incoly 600	Slotting @ 7% of D	40	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
	Profiling @ 5% of D Axial/≤ 20% of D Radial	60	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
IRON BASE Incoly 800-802, Multimet N-155, Timken 16-26-6	Slotting @ 7% of D	80	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
	Profiling @ 5% of D Axial/≤ 20% of D Radial	100	.0001"	.0001"	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"
STEELS										
HIGH STRENGTH STEELS 4140, 4340, 52100	Slotting @ ≤ 15% of D	100	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 30% of D Radial	180	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
HIGH ALLOY STEELS MOLD & DIE A-2, P20, 01, 02, D2, H-13	Slotting @ ≤ 10% of D	125	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 20% of D Radial	250	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
MEDIUM ALLOY STEELS 200, 250, 300	Slotting @ ≤ 15% of D	125	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"
	Profiling @ 6% of D Axial/≤ 30% of D Radial	250	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"
LOW ALLOY STEELS MARAGING 10XX, 11XX, 13XX	Slotting @ ≤ 15% of D	150	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"	.0007"	.0007"
	Profiling @ 6% of D Axial/≤ 35% of D Radial	300	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"	.0007"	.0007"
CAST IRONS										
DUCTILE IRON Ductile Cast Iron	Slotting @ ≤ 15% of D	100	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"	.0007"	.0007"
	Profiling @ 10% of D Axial/≤ 25% of D Radial	250	.0004"	.0004"	.0005"	.0005"	.0006"	.0006"	.0007"	.0007"
CAST IRON Gray Cast Iron	Slotting @ ≤ 25% of D	125	.0004"	.0004"	.0005"	.0005"	.0008"	.0008"	.0010"	.0010"
	Profiling @ 10% of D Axial/≤ 35% of D Radial	400	.0004"	.0004"	.0005"	.0005"	.0008"	.0008"	.0010"	.0010"
TITANIUMS										
TITANIUM ALLOYS 6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM & IPM 25%	Slotting @ ≤ 15% of D	125	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
	Profiling @ 6% of D Axial/≤ 20% of D Radial	250	.0002"	.0002"	.0003"	.0003"	.0004"	.0004"	.0005"	.0005"
ALUMINUM										
ALUMINUM ALLOYS 6061-T6, 7075	Slotting @ ≤ 15% of D	650	.0004"	.0004"	.0005"	.0006"	.0008"	.0008"	.0010"	.0010"
	Profiling @ 10% of D Axial/≤ 35% of D Radial	775	.0004"	.0004"	.0005"	.0006"	.0008"	.0008"	.0010"	.0010"

SPEED & FEED CALCULATION FORMULAS

RPM = (3.82 x SFM) ÷ Dia.	**IPR = IPM ÷ RPM**	**SFM = (RPM x Dia.) ÷ 3.82**
IPM = IPT(chip load) x No. of Teeth x RPM	**IPT(chip load) = IPM ÷ (No. of teeth x RPM)**	

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

When producing a range of threads across materials on the same machine, thread mills have a distinct advantage over traditional taps. A single thread mill can produce internal or external threads in a left or right-hand direction, and with single or multiple leads. The same thread mill will work in a full range of materials from soft non-ferrous materials all the way through tough alloys where taps are more prone to breaking. Thread mills also have an advantage when threading pipes since there is no stop line or leftover chips as there would be with traditional tapping.

How it Works

Unlike taps that feed into the part at the rate of the lead thread and use the first chamfer to cut the threads to finished size - thread mills cut all threads at the same time in a single motion. To do this, the thread mill is lowered into a hole to the desired depth and moved to the side wall, then using helical interpolation it moves around the outer wall of the hole and up one thread height until it returns to the first position. From there it returns to center and is removed from the hole.

AlTiN Coated for Better Performance

Our solid carbide thread mills are coated in AlTiN for lasting reliable performance in a wide variety of materials. For a complete speed and feed information, please refer to the technical information at the end of this section.

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

INTERNAL• EXTERNAL - UN THREADS

ALTIN COATED

DIAMETER	SHANK	CUTTiNG DIA	THREAD LENGTH	OAL	# OF FLUTES	ITEM#	LIST PRICE
2-56	1/8	0.065	0.125	2	3	273343	183.26
4-40	1/8	0.085	0.180	2	3	273354	183.26
6 - 32	1/8	0.100	0.218	2	3	156253	196.40
8 - 32	1/8	0.115	0.250	2	3	156264	196.40
8 - 36	1/8	0.115	0.250	2	3	156275	196.40
10 - 24	3/16	0.120	0.312	2	3	156286	196.40
10 - 32	3/16	0.120	0.312	2	3	156297	196.40
1/4 - 20	3/16	0.180	0.500	2-1/2	3	156308	222.14
1/4 - 28	3/16	0.180	0.500	2-1/2	3	156319	222.14
5/16 - 18	1/4	0.240	0.625	2-1/2	3	156330	261.41
5/16 - 24	1/4	0.240	0.625	2-1/2	3	156341	261.41
3/8 - 16	5/16	0.290	0.750	3	4	156352	311.48
3/8 - 24	5/16	0.290	0.750	3	4	156363	311.48
7/16 - 14	3/8	0.340	0.875	3	4	156374	335.89
7/16 - 20	3/8	0.340	0.875	3	4	156385	335.89
1/2 - 13	3/8	0.350	0.875	3-1/2	4	156396	335.89
1/2 - 20	3/8	0.350	0.875	3-1/2	4	156407	335.89
9/16 - 12	1/2	0.370	0.875	3-1/2	4	156418	335.89
9/16 - 18	1/2	0.370	0.875	3-1/2	4	156429	335.89
5/8 - 11	1/2	0.470	1.250	3-1/2	5	156440	419.86
5/8 - 18	1/2	0.470	1.250	3-1/2	5	156451	419.86
3/4 - 10	1/2	0.495	1.250	3-1/2	5	156462	419.86
3/4 - 16	1/2	0.495	1.250	3-1/2	5	156473	419.86
7/8 - 9	5/8	0.620	1.250	3-1/2	5	156484	525.50
7/8 - 14	5/8	0.620	1.250	3-1/2	5	156495	525.50
1 - 8	3/4	0.620	1.375	4	5	156506	525.50
1 - 12	3/4	0.620	1.375	4	5	156517	525.50

Wide assortment of thread mill styles stocked and ready to ship

For coating information see pages 6-9. For technical information please see page 133.

THREAD MILL CUTTING DIAMETER TOLERANCE	+.000, -.002

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

INTERNAL• EXTERNAL - UN THREADS
COOLANT END FED

END VIEW

ALTIN COATED

DIAMETER	SHANK	CUTTiNG DIA	THREAD LENGTH	OAL	# OF FLUTES	ITEM#	LIST PRICE
10 - 32	3/16	0.120	0.312	2	3	262521	227.93
1/4 - 20	3/16	0.180	0.500	2-1/2	3	262532	240.53
1/4 - 28	3/16	0.180	0.500	2-1/2	3	262543	240.53
5/16 - 18	1/4	0.240	0.625	2-1/2	3	262554	297.80
5/16 - 24	1/4	0.240	0.625	2-1/2	3	262565	297.80
3/8 - 16	5/16	0.290	0.750	3	4	262576	368.82
3/8 - 24	5/16	0.290	0.750	3	4	262587	368.82
7/16 - 14	3/8	0.340	0.875	3	4	262598	429.52
7/16 - 20	3/8	0.340	0.875	3	4	262609	429.52
1/2 - 13	3/8	0.350	0.875	3-1/2	4	262620	445.56
1/2 - 20	3/8	0.350	0.875	3-1/2	4	262631	445.56
3/4 - 10	1/2	0.495	1.250	3-1/2	4	262642	571.55
3/4 - 16	1/2	0.495	1.250	3-1/2	4	262653	571.55

Advanced packaging holds tools tight to prevent damage

For coating information see pages 6-9. For technical information please see page 133.

THREAD MILL CUTTING DIAMETER TOLERANCE	+.000, -.002

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

INTERNAL• EXTERNAL - NPT PIPE THREADS

ALTIN COATED

DIAMETER	SHANK	CUTTiNG DIA	THREAD LENGTH	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/16 - 27	1/4	0.245	0.437	2-1/2	3	156528	261.41
1/8 - 27	5/16	0.310	0.437	2-1/2	4	156539	261.41
1/4 - 18	3/8	0.370	0.625	3	4	156550	297.95
3/8 - 18	3/8	0.370	0.625	3	4	156561	297.95
1/2 - 14	1/2	0.495	0.875	3-1/2	4	156572	419.86
3/4 - 14	1/2	0.495	0.875	3-1/2	4	156583	419.86
1 - 11-1/2	3/4	0.620	1.125	4	5	156594	525.50

All items in this catalog are 100% American-Made

For coating information see pages 6-9. For technical information please see page 133.

THREAD MILL CUTTING DIAMETER TOLERANCE	+.000, -.002

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

INTERNAL• EXTERNAL - NPTF PIPE THREADS

ALTIN COATED

DIAMETER	SHANK	CUTTiNG DIA	THREAD LENGTH	OAL	# OF FLUTES	ITEM#	LIST PRICE
1/16 - 27	1/4	0.245	0.437	2-1/2	3	156605	261.41
1/8 - 27	5/16	0.310	0.437	2-1/2	4	156616	261.41
1/4 - 18	3/8	0.370	0.625	3	4	156627	297.95
3/8 - 18	3/8	0.370	0.625	3	4	156638	297.95
1/2 - 14	1/2	0.495	0.875	3-1/2	4	156649	419.86
3/4 - 14	1/2	0.495	0.875	3-1/2	4	156660	419.86
1 - 11-1/2	3/4	0.620	1.125	4	5	156671	525.50

Massive inventory ensures orders are shipped same day

For coating information see pages 6-9. For technical information please see page 133.

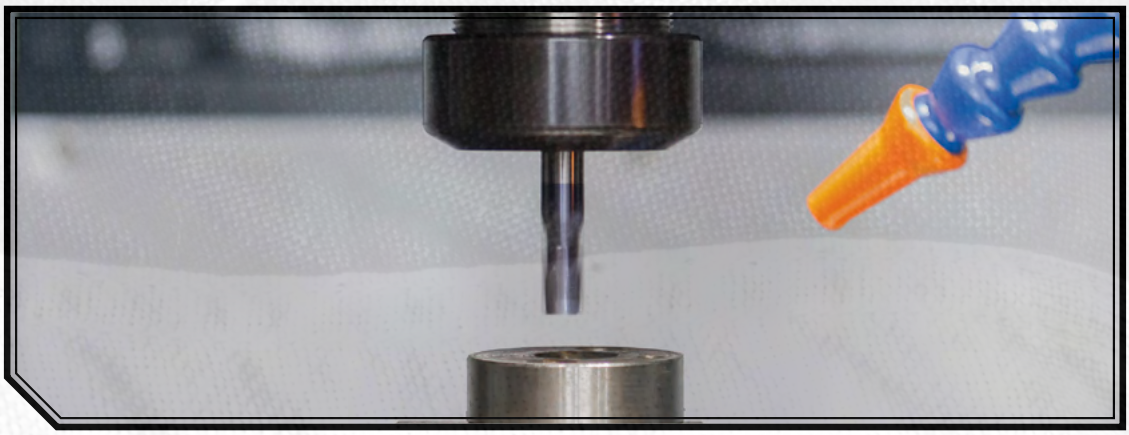
THREAD MILL CUTTING DIAMETER TOLERANCE	+.000, -.002

GENERAL PURPOSE SOLID CARBIDE THREAD MILLS

INTERNAL•EXTERNAL - METRIC THREADS

ALTIN COATED

DIAMETER	SHANK	CUTTiNG DIA	THREAD LENGTH	OAL	# OF FLUTES	ITEM#	LIST PRICE
M4 x 0.70	1/8	0.115	0.250	2	3	156682	200.45
M4.5 x 0.75	1/8	0.120	0.250	2	3	156693	200.45
M5 x 0.80	3/16	0.120	0.312	2	3	156704	200.45
M6 x 1.00	3/16	0.170	0.500	2-1/2	3	156715	220.77
M8 x 0.75	1/4	0.235	0.625	2-1/2	3	156726	261.41
M8 x 1.00	1/4	0.235	0.625	2-1/2	3	156737	261.41
M8 x 1.25	1/4	0.235	0.625	2-1/2	3	156748	261.41
M10 x 1.25	5/16	0.300	0.750	3	4	156759	311.48
M10 x 1.50	5/16	0.300	0.750	3	4	156770	311.48
M12 x 1.00	3/8	0.360	0.875	3-1/2	4	156781	337.22
M12 x 1.25	3/8	0.360	0.875	3-1/2	4	156792	337.22
M12 x 1.75	3/8	0.360	0.875	3-1/2	4	156803	337.22
M14 x 1.50	3/8	0.360	0.875	3-1/2	4	156814	337.22
M16 x 2.00	1/2	0.470	1.250	3-1/2	5	156825	419.86
M18 x 2.50	1/2	0.470	1.250	3-1/2	5	156836	419.86
M20 x 3.00	5/8	0.470	1.250	3-1/2	5	156847	419.86



One Thread Mill can produce internal or external, left or right hand threads

For coating information see pages 6-9. For technical information please see page 133.

THREAD MILL CUTTING DIAMETER TOLERANCE	+.000, -.002

THREAD MILLS - CARBIDE TECHNICAL INFORMATION

MATERIAL	GRADES		1/16	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4
			(.0625)	(.1250)	(.1875)	(.2500)	(.3125)	(.3750)	(.5000)	(.6250)	(.7500)
		SFM	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT
ALLOYS											
COBALT BASE	STELLITE, HS-21, HAYNES 25/188,	50-90	.00015-.00025	.0002-.0005	.0003-.0005	.0004-.0006	.0006-.0009	.0008-.0015	.0010-.0020	.0014-.0028	.0018-.0030
IRON BASE	INCOLOY 800-802, MULTMET N-15, TIMKIN 16-25-6, CARPENTER 22-B3, TIMKIN 16-25-6, CARPENTER 22-B3	50-90	.00015-.00025	.0002-.0005	.0003-.0005	.0004-.0006	.0006-.0009	.0008-.0015	.0010-.0020	.0014-.0028	.0018-.0030
NICKEL BASE	INCONEL 625/718, INCO 700, 713C, 718, MONEL 400-401, 404, K401, RENE, RENE 41 & 95 HASTELLOY, WASPOLOY, UDIMET 500 & 700	60-100	.0002-.0003	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.002-.003	.0025-.0040
TITANIUM	COMMERCIALLY PURE, 6AL-4V, ASTM 1/2/3, 6AL-25N-4ZR-2MO-SI, TI-8AL-1MO, TI-8AL-4MO	80-150	.0002-.0005	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.0025-.0035	.0030-.0045
ALUMINUM											
ALUMINUM ALLOYS	2014, 2024, 6061, 7075	800-1400	.0002-.0004	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.006-.010
HIGH SILICON	A380, A390	475-750	.00015-.00022	.00035-.00040	.00075-.0008	.0010-.0020	.0015-.0025	.0018-.0028	.0023-0.0030	.0028-.0031	.0035-.0050
BRASS/BRONZE											
	ALUMINUM BRONZE, LOW SILICON BRONZE	550-800	.0002-.0005	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.006-.010
CAST IRON											
DUCTILE	A536, J434, 60-40-18	200-300	.00025-.00035	.0003-.0006	.0005-.0010	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0030-.0050
GRAY	A48, A436, A319, CLASS 20, G4000	250-350	.00025-.00035	.0004-.0008	.0007-.0013	.0007-.0013	.0015-.002	.002-.003	.002-.004	.003-.005	.0040-.0060
MALLEABLE	A220, A602, J158	200-300	.00025-.00035	.0003-.0006	.0005-.0010	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0030-.0050
COMPOSITES											
	G-10, FIBERGLASS, GRAPHITE, GRAPHITE EPOXY, PLASTICS	800-1400	.0003-.0005	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.0060-.0100
COPPER											
		450-1000	.00025-.00035	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0035-.0050
MAGNESIUM											
		800-1400	.0003-.0005	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.0060-.0100
STAINLESS STEEL											
AUSTENITIC	301-304L, 310, 316L, 321, 347	100-250	.00015-.00025	.00025-.00055	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0035-.0050
MARTENSITIC	403, 410, 416, 420, 430, 431, 440	150-250	.0002-.0003	.0004-.0008	.0006-.001	.001-.0015	.0015-.002	.0015-.003	.002-.0035	.003-.004	.0030-.0040
PRECIPITATION HARDENING	12/8, 15/5, 17/4, AM-350/355/363, PH13-8MO, PH14-8/MO	100-250	.00015-.00025	.00025-.00055	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0035-.0050
STEELALLOY											
HIGH STRENGTH TOOL STEEL	A2, D2, P20, H11, H13,	250-400	.00015-.0003	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004	.0035-.0050
LOW CARBON	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	350-500	.0002-.0004	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.0060-.0080
MEDIUM CARBON	1040-1095, 1140-1151, 1330-1345	300-450	.0002-.0004	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007	.0060-.0080

HIGH PERFORMANCE SPIRAL POINT TAPS

Predator

PREMIUM POWDERED METAL
ANSI THREADS

UNCOATED

ALTIN COATED

STEAM OXIDE

TICN COATED

SIZE	H LIMIT	# OF FLUTES	UNCOATED	LIST PRICE	STM OXIDE	LIST PRICE	ALTIN	LIST PRICE	TICN	LIST PRICE
2-56	H2	2	263555	40.95	263544	43.32	263566	48.65	263830	48.65
4-40	H2	3	213002	31.62	212793	36.38	213211	48.65	263841	48.65
6-32	H3	3	213013	31.62	212804	36.38	213222	48.65	263852	48.65
8-32	H3	3	213024	31.62	212815	36.38	213233	48.65	263863	48.65
10-24	H3	3	213035	31.62	212826	36.38	213244	48.65	263874	48.65
10-32	H3	3	213046	31.62	212837	36.38	213255	48.65	263885	48.65
1/4-20	H3	3	273519	34.55	273365	39.74	273673	53.15	274443	53.16
1/4-20	H5	3	213057	34.55	212848	39.74	213266	53.15	263896	53.16
1/4-28	H3	3	273530	34.55	273376	39.74	273684	53.15	274454	53.16
1/4-28	H4	3	213068	34.55	212859	39.74	213277	53.15	263907	53.16
5/16-18	H3	3	273541	37.78	273387	43.46	273695	58.13	274465	58.14
5/16-18	H5	3	213079	37.78	212870	43.46	213288	58.13	263918	58.14
5/16-24	H3	3	273552	37.78	273398	43.46	273706	58.13	274476	58.14
5/16-24	H4	3	213090	37.78	212881	43.46	213299	58.13	263929	58.14
3/8-16	H3	3	273563	44.94	273409	51.67	273717	69.14	274487	69.14
3/8-16	H5	3	213101	44.94	212892	51.67	213310	69.14	263940	69.14
3/8-24	H3	3	273574	44.94	273420	51.67	273728	69.14	274498	69.14
3/8-24	H4	3	213112	44.94	212903	51.67	213321	69.14	263951	69.14
7/16-14	H3	3	273585	57.56	273431	66.17	273739	88.53	274509	88.53
7/16-14	H5	3	213123	57.56	212914	66.17	213332	88.53	263962	88.53
7/16-20	H3	3	273596	57.56	273442	66.17	273750	88.53	274520	88.53
7/16-20	H5	3	213134	57.56	212925	66.17	213343	88.53	263973	88.53
1/2-13	H3	4	273607	68.70	273453	79.01	273761	105.69	274531	105.69
1/2-13	H5	4	213145	68.70	212936	79.01	213354	105.69	263984	105.69
1/2-20	H3	4	273618	68.70	273464	79.01	273772	105.69	274542	105.69
1/2-20	H5	4	213156	68.70	212947	79.01	213365	105.69	263995	105.69
5/8-11	H3	4	273629	130.89	273475	150.54	273783	201.38	274553	201.39
5/8-11	H6	4	213167	130.89	212958	150.54	213376	201.38	264006	201.39
5/8-18	H3	4	273640	130.89	273486	150.54	273794	201.38	274564	201.39
5/8-18	H5	4	213178	130.89	212969	150.54	213387	201.38	264017	201.39
3/4-10	H3	4	273662	169.24	273508	194.61	273816	260.34	274586	260.34
3/4-10	H6	4	213189	169.24	212980	194.61	213398	260.34	264028	260.34
3/4-16	H3	4	273651	169.24	273497	194.61	273805	260.34	274575	260.34
3/4-16	H5	4	213200	169.24	212991	194.61	213409	260.34	264039	260.34

All taps sold individually
Predator Tap sizes 3/8"and smaller have male center.
For coating information see pages 6-9. For technical information, please see page 166.

HIGH PERFORMANCE SPIRAL POINT TAPS

PREMIUM POWDERED METAL METRIC THREADS

UNCOATED

ALTIN COATED

STEAM OXIDE

TICN COATED

SIZE	D LIMIT	# OF FLUTES	UNCOATED	LIST PRICE	STM OXIDE	LIST PRICE	ALTIN	LIST PRICE	TICN	LIST PRICE
M2.5 x 0.45	D3	2	264050	35.89	264072	41.29	264094	53.81	264303	53.81
M3 x 0.5	D3	3	214311	35.88	214388	41.29	214465	53.80	264314	53.81
M3.5 x 0.6	D3	3	274597	35.89	274696	41.29	274795	53.81	275290	53.81
M3.5 x 0.6	D4	3	264061	35.89	264083	41.29	264105	53.81	264325	53.81
M4 x 0.7	D3	3	274608	35.88	274707	41.29	274806	53.80	275301	53.81
M4 x 0.7	D4	3	214322	35.88	214399	41.29	214476	53.80	264336	53.81
M5 x 0.8	D3	3	274619	35.88	274718	41.29	274817	53.80	275312	53.81
M5 x 0.8	D4	3	214333	35.88	214410	41.29	214487	53.80	264347	53.81
M6 x 1.0	D3	3	274630	39.43	274729	45.34	274828	59.13	275323	59.13
M6 x 1.0	D5	3	214344	39.43	214421	45.34	214498	59.13	264358	59.13
M8 x 1.25	D3	3	274641	42.90	274740	49.34	274839	64.41	275334	64.41
M8 x 1.25	D5	3	214355	42.90	214432	49.34	214509	64.41	264369	64.41
M10 x 1.5	D3	3	274652	50.95	274751	58.55	274850	75.81	275345	75.81
M10 x 1.5	D6	3	214366	50.95	214443	58.55	214520	75.81	264380	75.81
M12 x 1.75	D3	4	274663	78.08	274762	89.77	274861	116.73	275356	116.73
M12 x 1.75	D6	4	214377	78.08	214454	89.77	214531	116.73	264391	116.73
M14 x 2.0	D3	4	274674	119.04	274773	136.88	274872	160.58	275367	160.58
M14 x 2.0	D7	4	233858	119.04	233880	136.88	233902	160.58	264402	160.58
M16 x 2.0	D3	4	274685	139.81	274784	160.79	274883	188.66	275378	188.66
M16 x 2.0	D7	4	233869	139.81	233891	160.79	233913	188.66	264413	188.66

- CNC STYLE
- SHANK & OAL MANUFACTURED TO ANSI SPECIFICATIONS
- BEST USED FOR THROUGH HOLE TAPPING
- MATERIALS: STEEL, STEEL ALLOYS, STAINLESS STEELS, AND A VARIETY OF OTHER STEELS WITH A MAXIMUM OF RC 32

All taps sold individually
Predator Tap sizes 3/8”and smaller have male center.
For coating information see pages 6-9. For technical information, please see page 166.

HIGH PERFORMANCE SPIRAL FLUTE TAPS

Predator

HIGH VANADIUM POWDERED METAL
ANSI THREADS

UNCOATED

ALTIN COATED

STEAM OXIDE

TICN COATED

SIZE	H LIMIT	# OF FLUTES	UNCOATED	LIST PRICE	STM OXIDE	LIST PRICE	ALTIN	LIST PRICE	TICN	LIST PRICE
2-56	H2	2	263577	48.91	263599	56.25	263588	75.21	263610	75.21
4-40	H2	2	213420	48.91	213838	56.25	213629	75.21	263621	75.21
6-32	H3	3	213431	48.91	213849	56.25	213640	75.21	263632	75.21
8-32	H3	3	213442	48.91	213860	56.25	213651	75.21	263643	75.21
10-24	H3	3	213453	48.91	213871	56.25	213662	75.21	263654	75.21
10-32	H3	3	213464	48.91	213882	56.25	213673	75.21	263665	75.21
1/4-20	H3	3	273827	50.40	274135	57.95	273981	77.52	274289	77.53
1/4-20	H5	3	213475	50.40	213893	57.95	213684	77.52	263676	77.53
1/4-28	H3	3	273838	50.40	274146	57.95	273992	77.52	274300	77.53
1/4-28	H4	3	213486	50.40	213904	57.95	213695	77.52	263687	77.53
5/16-18	H3	3	273849	55.20	274157	63.46	274003	84.90	274311	84.90
5/16-18	H5	3	213497	55.20	213915	63.46	213706	84.90	263698	84.90
5/16-24	H3	3	273860	55.20	274168	63.46	274014	84.90	274322	84.90
5/16-24	H4	3	213508	55.20	213926	63.46	213717	84.90	263709	84.90
3/8-16	H3	3	273871	65.38	274179	75.21	274025	100.62	274333	100.62
3/8-16	H5	3	213519	65.38	213937	75.21	213728	100.62	263720	100.62
3/8-24	H3	3	273882	65.38	274190	75.21	274036	100.62	274344	100.62
3/8-24	H4	3	213530	65.38	213948	75.21	213739	100.62	263731	100.62
7/16-14	H3	3	273893	82.72	274201	95.16	274047	127.26	274355	127.26
7/16-14	H5	3	213541	82.72	213959	95.16	213750	127.26	263742	127.26
7/16-20	H3	3	273904	82.72	274212	95.16	274058	127.26	274366	127.26
7/16-20	H5	3	213552	82.72	213970	95.16	213761	127.26	263753	127.26
1/2-13	H3	3	273915	98.09	274223	112.85	274069	150.94	274377	150.94
1/2-13	H5	3	213563	98.09	213981	112.85	213772	150.94	263764	150.94
1/2-20	H3	3	273926	98.09	274234	112.85	274080	150.94	274388	150.94
1/2-20	H5	3	213574	98.09	213992	112.85	213783	150.94	263775	150.94
5/8-11	H3	4	273937	187.40	274245	215.53	274091	288.33	274399	288.33
5/8-11	H6	4	213585	187.40	214003	215.53	213794	288.33	263786	288.33
5/8-18	H3	4	273948	187.40	274256	215.53	274102	288.33	274410	288.33
5/8-18	H5	4	213596	187.40	214014	215.53	213805	288.33	263797	288.33
3/4-10	H3	4	273959	219.02	274267	251.91	274113	337.03	274421	337.04
3/4-10	H6	4	213607	219.02	214025	251.91	213816	337.03	263808	337.04
3/4-16	H3	4	273970	219.02	274278	251.91	274124	337.03	274432	337.04
3/4-16	H5	4	213618	219.02	214036	251.91	213827	337.03	263819	337.04

All taps sold individually
Predator Tap sizes 3/8"and smaller have male center.
For coating information see pages 6-9. For technical information, please see page 166.

HIGH PERFORMANCE SPIRAL FLUTE TAPS

HIGH VANADIUM POWDERED METAL METRIC THREADS

UNCOATED

ALTIN COATED

STEAM OXIDE

TICN COATED

SIZE	D LIMIT	# OF FLUTES	UNCOATED	LIST PRICE	STM OXIDE	LIST PRICE	ALTIN	LIST PRICE	TICN	LIST PRICE
M2.5 x 0.45	D3	2	264116	55.49	264138	63.80	264160	81.88	264182	81.88
M3 x 0.5	D3	3	214542	55.50	214619	63.80	214696	81.88	264193	81.88
M3.5 x 0.6	D3	3	274894	55.49	274993	63.80	275092	81.88	275191	81.88
M3.5 x 0.6	D4	3	264127	55.49	264149	63.80	264171	81.88	264204	81.88
M4 x 0.7	D3	3	274905	55.50	275004	63.80	275103	81.88	275202	81.88
M4 x 0.7	D4	3	214553	55.50	214630	63.80	214707	81.88	264215	81.88
M5 x 0.8	D3	3	274916	55.50	275015	63.80	275114	81.88	275213	81.88
M5 x 0.8	D4	3	214564	55.50	214641	63.80	214718	81.88	264226	81.88
M6 x 1.0	D3	3	274927	57.15	275026	65.74	275125	84.90	275224	84.90
M6 x 1.0	D5	3	214575	57.15	214652	65.74	214729	84.90	264237	84.90
M8 x 1.25	D3	3	274938	62.76	275037	72.18	275136	93.98	275235	93.97
M8 x 1.25	D5	3	214586	62.76	214663	72.18	214740	93.98	264248	93.97
M10 x 1.5	D3	3	274949	74.20	275048	85.35	275147	110.66	275246	110.66
M10 x 1.5	D6	3	214597	74.20	214674	85.35	214751	110.66	264259	110.66
M12 x 1.75	D3	3	274960	111.36	275059	128.04	275158	166.78	275257	166.77
M12 x 1.75	D6	3	214608	111.36	214685	128.04	214762	166.78	264270	166.77
M14 x 2.0	D3	4	274971	157.82	275070	181.52	275169	213.06	275268	213.06
M14 x 2.0	D7	4	233924	157.82	233946	181.52	233968	213.06	264281	213.06
M16 x 2.0	D3	4	274982	184.66	275081	212.36	275180	249.28	275279	249.28
M16 x 2.0	D7	4	233935	184.66	233957	212.36	233979	249.28	264292	249.28

- CNC STYLE
- 2 - 2½ THREAD CHAMFER
- 45° HELIX - SEMI BOTTOMING
- SHANK & OAL MANUFACTURED TO ANSI SPECIFICATIONS
- MATERIALS: STEEL, STEEL ALLOYS, STAINLESS STEELS, AND A VARIETY OF OTHER STEELS WITH A MAXIMUM OF RC 32
- BEST USED FOR BLIND HOLE TAPPING

All taps sold individually
Predator Tap sizes 3/8"and smaller have male center.
For coating information see pages 6-9. For technical information, please see page 166.

GENERAL PURPOSE HSS HAND TAP SETS

HIGH SPEED STEEL - HAND TAP SETS

	SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
	0-80	H1	2	199549	60.77
	1-72	H1	2	199703	56.51
	2-56	H1	3	199769	52.26
*	2-56	H2	3	199868	48.65
	2-64	H2	3	199945	52.26
	3-48	H2	3	200055	37.42
	3-56	H2	3	200099	42.04
	4-40	H1	3	200154	33.00
*	4-40	H2	3	200275	30.73
	4-48	H2	3	200385	33.00
	5-40	H2	3	200627	30.73
	5-44	H2	3	200737	33.12
	6-32	H1	3	200792	29.03
*	6-32	H2	3	200913	25.01
	6-32	H3	3	200979	23.55
	6-40	H2	3	201122	25.01
	8-32	H1	4	201199	29.03
	8-32	H2	4	201287	25.01
*	8-32	H3	4	201430	24.12
	8-36	H2	4	201584	25.01
	10-24	H1	4	201639	25.74
	10-24	H2	4	201716	25.74
*	10-24	H3	4	201859	25.01
	10-32	H1	4	201980	25.74
	10-32	H2	4	202068	25.74
*	10-32	H3	4	202211	25.01
	12-24	H3	4	202354	26.39
	12-28	H3	4	202464	29.03

	SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
	1/4-20	H1	4	202519	33.57
	1/4-20	H2	4	202574	31.99
*	1/4-20	H3	4	202717	26.88
	1/4-28	H3	4	202948	26.88
	5/16-18	H2	4	203047	37.22
*	5/16-18	H3	4	203190	33.08
	5/16-24	H3	4	203410	33.08
	3/8-16	H2	4	203509	41.88
*	3/8-16	H3	4	203630	37.34
	3/8-24	H3	4	203850	37.34
	7/16-14	H3	4	204026	64.18
	7/16-20	H3	4	204202	64.18
	1/2-13	H3	4	204389	66.93
	1/2-20	H3	4	204576	75.65
	9/16-12	H3	4	204708	112.30
	9/16-18	H3	4	204840	112.30
	5/8-11	H3	4	204983	134.72
	5/8-18	H3	4	205137	134.72
	11/16-11	H3	4	205258	167.35
	11/16-16	H3	4	205357	167.35
	3/4-10	H3	4	205478	188.51
	3/4-16	H3	4	205621	188.51
	7/8-9	H4	4	205753	262.83
	7/8-14	H4	4	205874	262.83
	1-8	H4	4	205995	349.46
	1-12	H4	4	206105	349.46
	1-14	H4	4	206215	349.46

*** Most Popular Size When Multiple Options Are Available**

For technical information, please see pages 167-169.

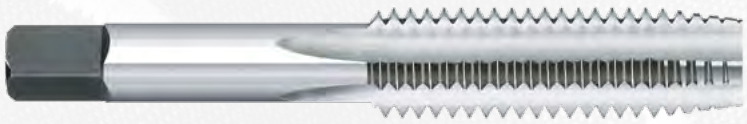
GENERAL PURPOSE HSS HAND TAP SETS

HIGH SPEED STEEL - HAND TAP SETS - METRIC

SIZE	D LIMIT	# OF FLUTES	ITEM#	LIST PRICE
M2 x 0.4	D3	3	211594	81.20
M3 x 0.5	D3	3	211605	41.64
M4 x 0.7	D4	4	211616	34.42
M5 x 0.8	D4	4	211627	34.42
M6 x 1.0	D5	4	211638	36.32
M7 x 1.0	D5	4	211649	36.37
M8 x 1.25	D5	4	211660	36.37
M10 x 1.25	D5	4	211671	74.64
M10 x 1.50	D6	4	211682	74.64
M12 x 1.25	D5	4	211693	87.53
M12 x 1.75	D6	4	211704	87.53
M14 x 1.5	D6	4	211715	130.87
M14 x 2.0	D7	4	211726	130.87
M16 x 1.5	D6	4	211737	159.45
M16 x 2.0	D7	4	211748	159.45
M18 x 1.5	D6	4	211759	214.74
M18 x 2.5	D7	4	211770	214.74
M20 x 2.5	D7	4	211781	277.74
M24 x 3.0	D8	4	211792	406.42

For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS



HIGH SPEED STEEL

	SIZE	H LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
*	0-80	H1	2	199483	199505	199527	20.27
	0-80	H2	2	–	199560	199571	20.27
	1-64	H1	2	–	199604	199626	18.85
*	1-72	H1	2	199670	199681	199692	18.85
	1-72	H2	2	–	199714	199725	18.85
	2-56	H1	3	199736	199747	199758	17.43
	2-56	H2	2	–	199780	199791	17.43
*	2-56	H2	3	199802	199824	199846	16.22
	2-64	H2	3	199879	199901	199923	17.43
	3-48	H2	2	–	199967	–	14.19
*	3-48	H2	3	199989	200011	200033	12.49
	3-56	H2	3	200066	200077	200088	14.03
	4-40	H1	2	–	200110	–	11.47
	4-40	H1	3	200121	200132	200143	11.03
	4-40	H2	2	–	200165	200176	11.03
*	4-40	H2	3	200187	200209	200242	10.26
	4-48	H2	3	200297	200319	200352	11.03
	4-36	H2	3	–	200418	–	11.03
	5-40	H1	3	–	200495	200506	11.03
	5-40	H2	2	–	200517	200528	11.03
*	5-40	H2	3	200539	200561	200594	10.26
	5-44	H2	3	200649	200671	200704	11.03
	6-32	H1	3	200759	200770	200781	9.69
	6-32	H2	2	–	200803	200814	9.69
*	6-32	H2	3	200825	200847	200880	8.31
	6-32	H3	2	–	200924	200935	8.31
	6-32	H3	3	200946	200957	200968	7.86
	6-32	H7	3	–	200990	201001	9.69
	6-40	H2	2	–	201023	–	9.69
*	6-40	H2	3	201034	201056	201089	8.31
	8-32	H1	3	–	201144	201155	9.69
	8-32	H1	4	201166	201177	201188	9.69
	8-32	H2	2	–	201210	201221	9.69
	8-32	H2	3	–	201232	201243	9.69
	8-32	H2	4	201254	201265	201276	8.31
	8-32	H3	2	–	201298	201309	8.31
	8-32	H3	3	–	201320	201331	8.31
*	8-32	H3	4	201342	201364	201397	8.03

*** Most Popular Size When Multiple Options Are Available**

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

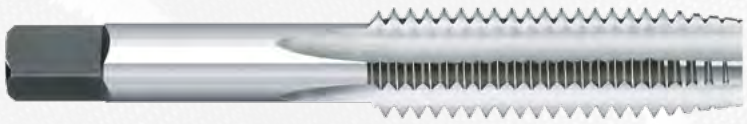
HIGH SPEED STEEL

	SIZE	H LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
	8-32	H7	3	–	201441	201452	9.69
	8-36	H1	4	–	201485	–	9.69
*	8-36	H2	4	201496	201518	201551	8.31
	10-24	H1	3	–	201595	–	9.69
	10-24	H1	4	201606	201617	201628	8.59
	10-24	H2	2	–	201650	201661	9.69
	10-24	H2	3	–	201672	–	9.69
	10-24	H2	4	201683	201694	201705	8.59
	10-24	H3	2	–	201727	201738	8.59
	10-24	H3	3	–	201749	201760	8.59
*	10-24	H3	4	201771	201793	201826	8.31
	10-24	H7	3	–	201870	201881	9.69
	10-24	H7	4	–	201892	201903	9.69
	10-32	H1	2	–	201914	201925	9.69
	10-32	H1	3	–	201936	–	9.69
	10-32	H1	4	201947	201958	201969	8.59
	10-32	H2	2	–	201991	202002	9.69
	10-32	H2	3	–	202013	202024	9.69
	10-32	H2	4	202035	202046	202057	8.59
	10-32	H3	2	–	202079	202090	8.59
	10-32	H3	3	–	202101	202112	8.59
*	10-32	H3	4	202123	202145	202178	8.31
	12-24	H3	4	202266	202288	202321	8.80
	12-28	H3	4	202376	202398	202431	9.69
	1/4-20	H1	3	–	202475	–	11.19
	1/4-20	H1	4	202486	202497	202508	11.19
	1/4-20	H2	3	–	202530	–	11.19
	1/4-20	H2	4	202541	202552	202563	10.66
	1/4-20	H3	2	–	202585	202596	11.19
	1/4-20	H3	3	–	202607	202618	10.66
*	1/4-20	H3	4	202629	202651	202684	8.96
	1/4-20	H5	3	–	202728	202739	11.19
	1/4-20	H5	4	–	202750	202761	10.66
	1/4-28	H1	4	–	202772	202783	10.66
	1/4-28	H2	4	–	202794	202805	11.19
	1/4-28	H3	2	–	202816	202827	11.19
	1/4-28	H3	3	–	202838	202849	11.19
*	1/4-28	H3	4	202860	202882	202915	8.96

*** Most Popular Size When Multiple Options Are Available**

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS



HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
1/4-28	H4	4	–	202959	202970	11.19
5/16-18	H1	4	202981	202992	203003	12.41
5/16-18	H2	4	203014	203025	203036	12.41
5/16-18	H3	2	–	203058	203069	13.95
5/16-18	H3	3	–	203080	203091	12.41
* 5/16-18	H3	4	203102	203124	203157	11.03
5/16-18	H5	3	–	203201	203212	13.95
5/16-18	H5	4	–	203223	203234	12.41
5/16-24	H1	4	–	203256	203267	12.41
5/16-24	H2	4	–	203278	–	12.41
5/16-24	H3	3	–	203300	203311	12.41
* 5/16-24	H3	4	203322	203344	203377	11.03
5/16-24	H4	4	–	203421	203432	12.41
3/8-16	H1	3	–	203443	–	15.89
3/8-16	H2	4	203476	203487	203498	13.95
3/8-16	H3	3	–	203520	203531	13.95
* 3/8-16	H3	4	203542	203564	203597	12.45
3/8-16	H5	3	–	203641	203652	15.89
3/8-16	H5	4	–	203663	203674	13.95
3/8-24	H3	3	–	203740	203751	15.89
* 3/8-24	H3	4	203762	203784	203817	12.45
3/8-24	H4	4	–	203861	203872	13.95
7/16-14	H2	4	–	203905	203916	23.51
7/16-14	H3	3	–	203927	–	23.51
* 7/16-14	H3	4	203938	203960	203993	21.41
7/16-14	H5	4	–	204037	204048	23.51
7/16-20	H2	4	–	204081	204092	23.51
7/16-20	H3	3	–	204103	–	23.51
* 7/16-20	H3	4	204114	204136	204169	21.41
7/16-20	H5	4	–	204213	204224	23.51
1/2-13	H1	4	–	204235	204246	27.45
1/2-13	H2	4	–	204257	204268	27.45
1/2-13	H3	3	–	204279	204290	27.45
* 1/2-13	H3	4	204301	204323	204356	22.30
1/2-13	H5	4	–	204400	204411	27.85
1/2-20	H1	4	204422	204433	204444	27.45
1/2-20	H3	3	–	204477	–	27.45
* 1/2-20	H3	4	204488	204510	204543	25.22
1/2-20	H5	4	–	204587	204598	27.45

*** Most Popular Size When Multiple Options Are Available**

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
9/16-12	H2	4	–	204609	–	40.78
* 9/16-12	H3	4	204620	204642	204675	37.42
9/16-12	H5	4	–	204719	204730	40.78
9/16-18	H2	4	–	204741	–	40.78
* 9/16-18	H3	4	204752	204774	204807	37.42
9/16-18	H5	4	–	204851	204862	40.78
* 5/8-11	H3	4	204895	204917	204950	44.92
5/8-11	H5	4	–	204994	205005	51.65
5/8-18	H2	4	–	205027	205038	51.65
* 5/8-18	H3	4	205049	205071	205104	44.92
11/16-11	H3	4	205170	205192	205225	55.78
11/16-16	H3	4	205269	205291	205324	55.78
3/4-10	H2	4	–	205379	–	67.91
* 3/4-10	H3	4	205390	205412	205445	62.88
3/4-10	H5	4	–	205489	205500	67.91
3/4-16	H2	4	–	205522	–	67.91
* 3/4-16	H3	4	205533	205555	205588	62.88
3/4-16	H5	4	–	205632	205643	67.91
* 7/8-9	H4	4	205665	205687	205720	87.61
7/8-9	H6	4	–	205764	–	91.99
7/8-14	H2	4	–	205775	–	91.99
* 7/8-14	H4	4	205786	205808	205841	87.61
7/8-14	H6	4	–	205885	–	91.99
1-8	H2	4	–	205896	–	119.96
* 1-8	H4	4	205907	205929	205962	116.47
1-8	H6	4	–	206006	–	119.96
1-12	H4	4	206017	206039	206072	116.47
1-14	H2	4	–	206116	–	119.96
* 1-14	H4	4	206127	206149	206182	116.47
1-14	H6	4	206226	206237	206248	119.96
1-1/8-7	H4	4	206259	206281	206314	188.51
1-1/8-12	H4	4	206358	206380	206413	199.66
1-1/4-7	H4	4	206457	206479	206512	247.46
1-1/4-12	H4	6	206556	206578	206611	251.76
1-3/8-6	H4	4	206655	206677	206710	310.91
1-3/8-12	H4	6	206754	206776	206809	313.10
1-1/2-6	H4	4	206853	206875	206908	359.03
1-1/2-12	H4	6	206952	206974	207007	365.64

*** Most Popular Size When Multiple Options Are Available**

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

HIGH SPEED STEEL
STEAM OXIDE

SIZE	H LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
0-80	H1	2	199494	199516	199538	23.31
2-56	H2	3	199813	199835	199857	18.69
3-48	H2	3	200000	200022	200044	14.39
4-40	H2	3	200198	200231	200264	11.80
4-48	H2	3	200308	200341	200374	12.69
5-40	H2	3	200550	200583	200616	11.80
6-32	H2	3	200836	200869	200902	9.61
6-40	H2	3	201045	201078	201111	9.61
8-32	H3	4	201353	201386	201419	9.28
8-36	H2	4	201507	201540	201573	9.61
10-24	H3	4	201782	201815	201848	9.61
10-32	H3	4	202134	202167	202200	9.61
12-24	H3	4	202277	202310	202343	10.14
12-28	H3	4	202387	202420	202453	11.15
1/4-20	H3	4	202640	202673	202706	10.30
1/4-28	H3	4	202871	202904	202937	10.30
5/16-18	H3	4	203113	203146	203179	12.69
5/16-24	H3	4	203333	203366	203399	12.69
3/8-16	H3	4	203553	203586	203619	14.31
3/8-24	H3	4	203773	203806	203839	14.31
7/16-14	H3	4	203949	203982	204015	24.65
7/16-20	H3	4	204125	204158	204191	24.65
1/2-13	H3	4	204312	204345	204378	25.66
1/2-20	H3	4	204499	204532	204565	29.03
9/16-12	H3	4	204631	204664	204697	43.01
9/16-18	H3	4	204763	204796	204829	43.01
5/8-11	H3	4	204906	204939	204972	51.65
5/8-18	H3	4	205060	205093	205126	51.65
3/4-10	H3	4	205401	205434	205467	72.28
3/4-16	H3	4	205544	205577	205610	72.28
7/8-9	H4	4	205676	205709	205742	100.78
7/8-14	H4	4	205797	205830	205863	100.78
1-8	H4	4	205918	205951	205984	133.87
1-12	H4	4	206028	206061	206094	133.87
1-14	H4	4	206138	206171	206204	133.87
1-1/8-7	H4	4	206270	206303	206336	216.77
1-1/8-12	H4	4	206369	206402	206435	229.62
1-1/4-7	H4	4	206468	206501	206534	284.55
1-1/4-12	H4	6	206567	206600	206633	289.50
1-3/8-6	H4	4	206666	206699	206732	357.53
1-3/8-12	H4	6	206765	206798	206831	360.04
1-1/2-6	H4	4	206864	206897	206930	412.87
1-1/2-12	H4	6	206963	206996	207029	420.49

STEAM OXIDE: A BLACK OXIDE TREATMENT OF NON-MEASURABLE THICKNESS IS USED TO INCREASE TAP SURFACE CAPILLARY WHERE LUBRICANT PROPERTIES ARE REQUIRED.

MATERIALS: STEEL, STEEL ALLOYS, STAINLESS STEELS, TITANIUM ALLOYS AND A WIDE RANGE OF FERROUS MATERIALS (IRON BASED).

All taps sold individually.

For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

HIGH SPEED STEEL
NITRIDE & STEAM OXIDE

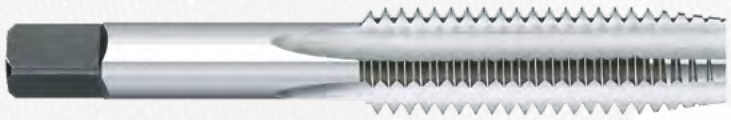
SIZE	H LIMIT	# OF FLUTES	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
4-40	H2	3	200220	200253	11.80
6-32	H2	3	200858	200891	9.61
6-40	H2	3	201067	201100	9.61
8-32	H3	4	201375	201408	9.28
10-24	H3	4	201804	201837	9.61
10-32	H3	4	202156	202189	9.61
1/4-20	H3	4	202662	202695	10.30
1/4-28	H3	4	202893	202926	10.30
5/16-18	H3	4	203135	203168	12.69
3/8-16	H3	4	203575	203608	14.31
3/8-24	H3	4	203795	203828	14.31
7/16-14	H3	4	203971	204004	24.65
7/16-20	H3	4	204147	204180	24.65
1/2-13	H3	4	204334	204367	25.66
1/2-20	H3	4	204521	204554	29.03
9/16-12	H3	4	204653	204686	43.01
9/16-18	H3	4	204785	204818	43.01
5/8-11	H3	4	204928	204961	51.65
5/8-18	H3	4	205082	205115	51.65
3/4-10	H3	4	205423	205456	72.28
3/4-16	H3	4	205566	205599	72.28
7/8-9	H4	4	205698	205731	100.78
7/8-14	H4	4	205819	205852	100.78
1-8	H4	4	205940	205973	133.87
1-1/8-7	H4	4	206292	206325	216.77
1-1/4-7	H4	4	206490	206523	284.55
1-1/4-12	H4	6	206589	206622	289.50
1-1/2-6	H4	4	206886	206919	412.87
1-1/2-12	H4	6	206985	207018	420.49

NITRIDE & STEAM OXIDE: A NITRIDED SURFACE FOLLOWED BY A STEAM OXIDE TREATMENT PROVIDES THE BENEFITS OF WEAR AND DUCTILITY.

MATERIALS: ALL TYPES OF GRAY, DUCTILE AND MALLEABLE CAST IRON FERROUS MATERIALS (IRON BASED).

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS



HIGH SPEED STEEL - METRIC
UNCOATED

SIZE	D LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
M1.6 x 0.35	D3	2	–	210791	–	27.08
M2 x 0.4	D3	3	210802	210813	210824	27.08
M2.5 x 0.45	D3	3	–	210835	–	16.66
M3 x 0.5	D3	3	210846	210857	210868	13.86
M3.5 x 0.6	D4	3	–	210879	–	11.47
M4 x 0.7	D4	4	210890	210901	210912	11.47
M4.5 x 0.75	D4	4	–	210923	–	11.47
M5 x 0.8	D4	4	210934	210945	210956	11.47
M6 x 1.0	D5	4	210967	210978	210989	12.12
M7 x 1.0	D5	4	211000	211011	211022	12.12
M8 x 1.25	D5	4	211033	211044	211055	12.12
M10 x 1.25	D5	4	211066	211077	211088	24.89
M10 x 1.50	D6	4	211099	211110	211121	24.89
M12 x 1.25	D5	4	211132	211143	211154	29.19
M12 x 1.75	D6	4	211165	211176	211187	29.19
M14 x 1.5	D6	4	211198	211209	211220	43.62
M14 x 2.0	D7	4	211231	211242	211253	43.62
M16 x 1.5	D6	4	211264	211275	211286	53.15
M16 x 2.0	D7	4	211297	211308	211319	53.15
M18 x 1.5	D6	4	211330	211341	211352	71.60
M18 x 2.5	D7	4	211363	211374	211385	71.60
M20 x 2.5	D7	4	211396	211407	211418	92.59
M24 x 3.0	D8	4	211429	211440	211451	135.49
M27 x 3.0	D8	4	211462	211473	211484	234.16
M30 x 3.5	D9	4	211495	211506	211517	299.07
M33 x 3.5	D9	4	211528	211539	211550	298.26
M36 x 4.0	D9	4	211561	211572	211583	378.24

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

HIGH SPEED STEEL - METRIC
TIN COATED

SIZE	D LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
M1.6 x 0.35	D3	2	–	243486	–	48.77
M2 x 0.4	D3	3	243497	243508	243519	48.77
M2.5 x 0.45	D3	3	–	243530	–	30.00
M3 x 0.5	D3	3	243541	243552	243563	25.01
M3.5 x 0.6	D4	3	–	243574	–	20.67
M4 x 0.7	D4	4	243585	243596	243607	20.67
M4.5 x 0.75	D4	4	–	243618	–	20.67
M5 x 0.8	D4	4	243629	243640	243651	20.67
M6 x 1.0	D5	4	243662	243673	243684	21.83
M7 x 1.0	D5	4	243695	243706	243717	21.87
M8 x 1.25	D5	4	243728	243739	243750	21.87
M10 x 1.25	D5	4	243761	243772	243783	44.82
M10 x 1.50	D6	4	243794	243805	243816	44.82
M12 x 1.25	D5	4	243827	243838	243849	52.56
M12 x 1.75	D6	4	243860	243871	243882	52.56
M14 x 1.5	D6	4	243893	243904	243915	78.60
M14 x 2.0	D7	4	243926	243937	243948	78.60
M16 x 1.5	D6	4	243959	243970	243981	95.79
M16 x 2.0	D7	4	243992	244003	244014	95.79
M18 x 1.5	D6	4	244025	244036	244047	128.96
M18 x 2.5	D7	4	244058	244069	244080	128.96
M20 x 2.5	D7	4	244091	244102	244113	166.82
M24 x 3.0	D8	4	244124	244135	244146	244.13
M27 x 3.0	D8	4	244157	244168	244179	421.95
M30 x 3.5	D9	4	244190	244201	244212	538.88
M33 x 3.5	D9	4	244223	244234	244245	537.46
M36 x 4.0	D9	4	244256	244267	244278	681.64

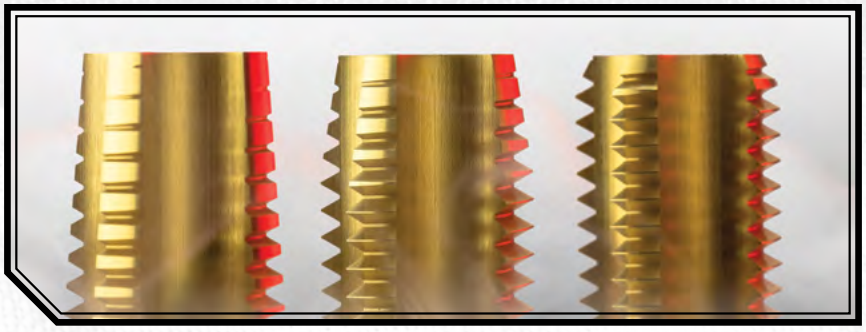
All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE HSS HAND TAPS

HIGH SPEED STEEL
TIN COATED

SIZE	D LIMIT	# OF FLUTES	TAPER ITEM#	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
0 - 80	H1	2	240494	240505	240516	36.48
2 - 56	H2	3	240538	240549	240560	29.22
4 - 40	H2	3	240582	240593	240604	18.44
5 - 40	H2	3	240626	240637	240648	18.44
6 - 32	H3	3	240670	240681	240692	14.14
8 - 32	H3	4	240714	240725	240736	14.48
10 - 24	H3	4	240758	240769	240780	15.00
10 - 32	H3	4	240802	240813	240824	15.00
12 - 24	H3	4	240846	240857	240868	15.86
12 - 28	H3	4	240890	240901	240912	17.45
1/4 - 20	H3	4	240934	240945	240956	16.12
1/4 - 28	H3	4	240978	240989	241000	16.12
5/16 - 18	H3	4	241022	241033	241044	19.90
5/16 - 24	H3	4	241066	241077	241088	19.90
3/8 - 16	H3	4	241110	241121	241132	22.43
3/8 - 24	H3	4	241154	241165	241176	22.43
7/16 - 14	H3	4	241198	241209	241220	38.55
7/16 - 20	H3	4	241242	241253	241264	38.55
1/2 - 13	H3	4	241286	241297	241308	40.18
1/2 - 20	H3	4	241330	241341	241352	45.42
9/16 - 18	H3	4	254709	254720	254731	61.71
5/8 - 11	H3	4	241374	241385	241396	80.96
5/8 - 18	H3	4	241418	241429	241440	80.96
3/4 - 10	H3	4	241462	241473	241484	113.28
3/4 - 16	H3	4	241506	241517	241528	113.28
1 - 8	H4	4	254753	254764	254775	192.22



3 chamfers to choose from - Taper, Plug, & Bottom

All taps sold individually.
For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS SPIRAL POINT PLUG TAPS

HIGH SPEED STEEL
UNCOATED

	SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
	0-80	H1	2	207161	24.97
*	0-80	H2	2	207172	24.97
	1-64	H1	2	207194	22.54
*	1-64	H2	2	207205	22.54
	1-72	H1	2	207227	22.54
*	1-72	H2	2	207238	22.54
	2-56	H1	2	207260	21.45
*	2-56	H2	2	207271	19.14
	2-64	H1	2	207293	21.45
*	2-64	H2	2	207304	21.45
	3-48	H1	2	207326	15.36
*	3-48	H2	2	207337	15.36
	3-56	H1	2	207359	18.81
*	3-56	H2	2	207370	17.11
	4-40	H1	2	207392	14.03
*	4-40	H2	2	207403	12.32
	4-48	H1	2	207436	14.27
*	4-48	H2	2	207447	14.03
	4-36	H2	2	207480	14.03
	5-40	H1	2	207513	14.03
*	5-40	H2	2	207524	12.32
	5-44	H2	2	207557	14.03
	6-32	H1	2	207590	12.32
	6-32	H2	2	207601	10.38
*	6-32	H3	2	207612	10.38
	6-32	H7	2	207645	11.76
	6-40	H1	2	207656	11.76
*	6-40	H2	2	207667	11.76
	8-32	H1	2	207700	11.76
	8-32	H2	2	207711	10.38
*	8-32	H3	2	207722	10.38
	8-32	H7	2	207755	11.76
	8-36	H1	2	207766	11.76

	SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
*	8-36	H2	2	207777	11.76
	10-24	H1	2	207810	12.85
	10-24	H2	2	207821	11.76
*	10-24	H3	2	207832	10.38
	10-24	H7	2	207865	12.85
	10-32	H1	2	207876	11.76
	10-32	H2	2	207887	10.38
*	10-32	H3	2	207898	10.38
	10-32	H7	2	207931	12.85
	12-24	H1	2	207942	11.76
*	12-24	H3	2	207953	11.76
	12-28	H3	2	207986	11.76
	1/4-20	H1	2	207997	11.76
	1/4-20	H2	2	208008	11.76
*	1/4-20	H3	2	208019	10.38
	1/4-20	H3	3	208052	12.85
	1/4-20	H5	2	208063	11.72
	1/4-28	H5	3	208074	12.85
	1/4-28	H1	2	208085	12.85
	1/4-28	H2	2	208096	11.72
	1/4-28	H2	3	208107	12.85
	1/4-28	H3	2	208118	10.38
*	1/4-28	H4	2	208151	12.85
	1/4-28	H4	3	208162	12.85
	5/16-18	H1	2	208173	14.80
	5/16-18	H2	2	208184	12.85
*	5/16-18	H3	2	208195	11.19
	5/16-18	H3	3	208228	14.80
	5/16-18	H5	2	208239	12.85
	5/16-18	H5	3	208250	14.80
	5/16-24	H1	2	208261	14.80
	5/16-24	H2	2	208272	14.80
	5/16-24	H2	3	208283	14.80

	SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
*	5/16-24	H3	2	208294	13.06
	5/16-24	H4	2	208327	14.80
	5/16-24	H4	3	208338	14.80
	3/8-16	H1	3	208349	16.58
	3/8-16	H2	3	208360	15.41
*	3/8-16	H3	3	208371	13.26
	3/8-16	H5	3	208404	16.70
	3/8-24	H1	3	208415	16.82
	3/8-24	H2	3	208426	16.82
*	3/8-24	H3	3	208437	14.27
	3/8-24	H4	3	208470	16.82
	7/16-14	H2	3	208481	24.61
*	7/16-14	H3	3	208492	22.54
	7/16-14	H5	3	208525	24.61
	7/16-20	H2	3	208536	24.61
*	7/16-20	H3	3	208547	22.54
	7/16-20	H5	3	208580	24.61
	1/2-13	H1	3	208591	30.12
	1/2-13	H2	3	208602	30.12
*	1/2-13	H3	3	208613	22.99
	1/2-13	H5	3	208646	27.12
	1/2-20	H1	3	208657	30.12
	1/2-20	H2	3	208668	30.12
*	1/2-20	H3	3	208679	27.00
	1/2-20	H5	3	208712	30.12
	9/16-12	H3	3	208723	37.54
	9/16-18	H3	3	208756	37.54
*	5/8-11	H3	3	208789	51.24
	5/8-11	H5	3	208822	51.24
	5/8-18	H3	3	208833	51.24
*	3/4-10	H3	3	208866	72.28
	3/4-10	H5	3	208899	72.28
	3/4-16	H3	3	208910	72.28

*** Most Popular Size When Multiple Options Are Available**

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS SPIRAL POINT PLUG TAPS

HIGH SPEED STEEL
STEAM OXIDE

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
0-80	H2	2	207183	28.74
1-64	H2	2	207216	25.99
1-72	H2	2	207249	25.99
2-56	H2	2	207282	22.05
2-64	H2	2	207315	24.69
3-48	H2	2	207348	17.68
3-56	H2	2	207381	19.70
4-40	H2	2	207425	14.19
4-48	H2	2	207469	16.18
4-36	H2	2	207502	16.18
5-40	H2	2	207546	14.19
5-44	H2	2	207579	16.18
6-32	H3	2	207634	11.92
6-40	H2	2	207689	13.54
8-32	H3	2	207744	11.92
8-36	H2	2	207799	13.54
10-24	H3	2	207854	11.92
10-32	H3	2	207920	11.92
12-24	H3	2	207975	13.54
1/4-20	H3	2	208041	11.92
1/4-28	H3	2	208140	11.92
5/16-18	H3	2	208217	12.89
5/16-24	H3	2	208316	13.74
3/8-16	H3	3	208393	15.28
3/8-24	H3	3	208459	16.42
7/16-14	H3	3	208514	25.99
7/16-20	H3	3	208569	25.99
1/2-13	H3	3	208635	26.47
1/2-20	H3	3	208701	31.05
9/16-12	H3	3	208745	43.18
9/16-18	H3	3	208778	43.18
5/8-11	H3	3	208811	58.95
5/8-18	H3	3	208855	58.95
3/4-10	H3	3	208888	83.15
3/4-16	H3	3	208932	83.15

STEAM OXIDE: A BLACK OXIDE TREATMENT OF NON-MEASURABLE THICKNESS IS USED TO INCREASE TAP SURFACE CAPILLARY WHERE LUBRICANT PROPERTIES ARE REQUIRED.

MATERIALS: STEEL, STEEL ALLOYS, STAINLESS STEELS, TITANIUM ALLOYS AND A WIDE RANGE OF FERROUS MATERIALS (IRON BASED).

HIGH SPEED STEEL
NITRIDE & STEAM OXIDE

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
4-40	H2	2	207414	14.19
4-48	H2	2	207458	16.18
4-36	H2	2	207491	16.18
5-40	H2	2	207535	14.19
5-44	H2	2	207568	16.18
6-32	H3	2	207623	11.92
6-40	H2	2	207678	13.54
8-32	H3	2	207733	11.92
8-36	H2	2	207788	13.54
10-24	H3	2	207843	11.92
10-32	H3	2	207909	11.92
12-24	H3	2	207964	13.54
1/4-20	H3	2	208030	11.92
1/4-28	H3	2	208129	11.92
5/16-18	H3	2	208206	12.89
5/16-24	H3	2	208305	12.89
3/8-16	H3	3	208382	15.28
3/8-24	H3	3	208448	16.42
7/16-14	H3	3	208503	25.99
7/16-20	H3	3	208558	25.99
1/2-13	H3	3	208624	26.47
1/2-20	H3	3	208690	31.05
9/16-12	H3	3	208734	43.18
9/16-18	H3	3	208767	43.18
5/8-11	H3	3	208800	58.95
5/8-18	H3	3	208844	58.95
3/4-10	H3	3	208877	83.15
3/4-16	H3	3	208921	83.15

NITRIDE & STEAM OXIDE: A NITRIDED SURFACE FOLLOWED BY A STEAM OXIDE TREATMENT PROVIDES THE BENEFITS OF WEAR AND DUCTILITY.

MATERIALS: ALL TYPES OF GRAY, DUCTILE AND MALLEABLE CAST IRON FERROUS MATERIALS (IRON BASED).

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS SPIRAL POINT PLUG TAPS

HIGH SPEED STEEL
TIN COATED

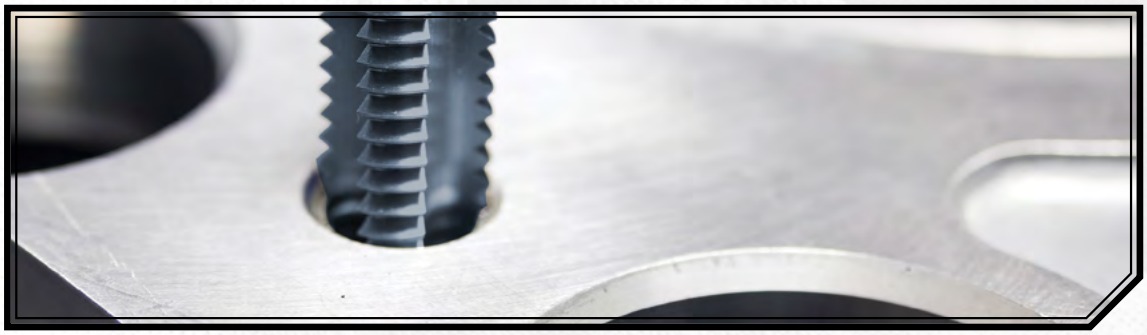
SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
0-80	H2	2	214773	36.96
2-56	H2	2	214784	29.65
4-40	H2	2	214795	20.97
5-40	H2	2	214806	20.97
6-32	H3	2	214817	19.60
8-32	H3	2	214828	19.60
10-24	H3	2	214839	19.60
10-32	H3	2	214850	19.60
12-24	H3	2	214861	21.40
12-28	H3	2	214872	21.40
1/4-20	H3	2	214883	19.60
1/4-28	H3	2	214894	19.60
5/16-18	H3	2	214905	22.64
5/16-24	H3	2	214916	22.64
3/8-16	H3	3	214927	25.18
3/8-24	H3	3	214938	26.47
7/16-14	H3	3	214949	41.64
7/16-20	H3	3	214960	41.64
1/2-13	H3	3	214971	42.20
1/2-20	H3	3	214982	47.14
5/8-11	H3	3	214993	97.55
5/8-18	H3	3	215004	97.55
3/4-10	H3	3	215015	127.37
3/4-16	H3	3	215026	127.37

TiN COATED: AN EXCELLENT GENERAL PURPOSE WEAR COATING WITH GOOD LUBRICITY.

HIGH SPEED STEEL
ALTIN COATED

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
0-80	H2	2	214047	36.96
2-56	H2	2	214058	29.65
4-40	H2	2	214069	20.97
5-40	H2	2	214080	20.97
6-32	H3	2	214091	19.60
8-32	H3	2	214102	19.60
10-24	H3	2	214113	19.60
10-32	H3	2	214124	19.60
12-24	H3	2	214135	21.40
12-28	H3	2	214146	21.40
1/4-20	H3	2	214157	19.60
1/4-28	H3	2	214168	19.60
5/16-18	H3	2	214179	22.64
5/16-24	H3	2	214190	22.64
3/8-16	H3	3	214201	25.18
3/8-24	H3	3	214212	26.47
7/16-14	H3	3	214223	41.64
7/16-20	H3	3	214234	41.64
1/2-13	H3	3	214245	42.20
1/2-20	H3	3	214256	47.14
5/8-11	H3	3	214267	97.55
5/8-18	H3	3	214278	97.55
3/4-10	H3	3	214289	127.37
3/4-16	H3	3	214300	127.37

AlTiN COATED: A MULTI-LAYERED COATING FOR A WIDE RANGE OF HIGH SPEED STEEL APPLICATIONS FOR CAST IRON, STAINLESS STEEL, NICKEL BASED HIGH TEMPERATURE ALLOYS AND TITANIUM ALLOYS.



PVD Coatings like AlTiN enable taps to outlast uncoated taps

All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS SPIRAL POINT PLUG & BOTTOMING TAPS

SPIRAL POINT PLUG

HIGH SPEED STEEL - METRIC
UNCOATED

SIZE	D LIMIT	# OF FLUTES	ITEM#	LIST PRICE
M2 x 0.4	D3	2	211847	27.65
M2.5 x 0.45	D3	2	211858	19.82
M3 x 0.5	D3	2	211869	15.93
M3.5 x 0.6	D4	2	211880	13.74
M4 x 0.7	D4	2	211891	13.74
M4.5 x 0.75	D4	2	211902	13.74
M5 x 0.8	D4	2	211913	13.74
M6 x 1.0	D5	2	211924	13.74
M7 x 1.0	D5	2	211935	15.89
M8 x 1.25	D5	2	211946	15.89
M10 x 1.50	D6	3	211957	26.39
M12 x 1.75	D6	3	211968	33.04
M14 x 2.0	D7	3	211979	51.28
M16 x 2.0	D7	3	211990	58.09
M18 x 2.5	D7	3	212001	85.46
M20 x 2.5	D7	3	212012	112.78

HIGH SPEED STEEL - METRIC
TIN COATED

SIZE	D LIMIT	# OF FLUTES	ITEM#	LIST PRICE
M2 x 0.4	D3	2	233220	38.12
M2.5 x 0.45	D3	2	233231	27.33
M3 x 0.5	D3	2	233242	22.00
M3.5 x 0.6	D4	2	233253	18.95
M4 x 0.7	D4	2	233264	18.95
M4.5 x 0.75	D4	2	233275	18.95
M5 x 0.8	D4	2	233286	18.95
M6 x 1.0	D5	2	233297	18.95
M7 x 1.0	D5	2	233308	21.87
M8 x 1.25	D5	2	233319	21.87
M10 x 1.50	D6	3	233330	36.36
M12 x 1.75	D6	3	233341	45.55
M14 x 2.0	D7	3	233352	70.65
M16 x 2.0	D7	3	233363	80.06
M18 x 2.5	D7	3	233374	117.75
M20 x 2.5	D7	3	233385	155.43

SPIRAL POINT BOTTOMING

HIGH SPEED STEEL
UNCOATED

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
0-80	H2	2	208943	45.98
2-56	H2	2	208954	35.24
3-48	H2	2	208965	28.28
4-40	H2	2	208976	22.69
5-40	H2	2	208987	22.69
6-32	H2	2	208998	19.08
6-32	H3	2	209009	19.08
6-40	H2	2	209020	21.70
8-32	H2	2	209031	19.08
8-32	H3	2	209042	19.08
10-24	H2	2	209053	21.70
10-24	H3	2	209064	19.08
10-32	H2	2	209075	19.08
10-32	H3	2	209086	19.08
12-24	H3	2	209097	21.70
1/4-20	H3	2	209108	19.08
1/4-28	H3	2	209119	19.08
5/16-18	H3	2	209130	20.58
5/16-24	H3	2	209141	20.58

HIGH SPEED STEEL
TIN COATED

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
0-80	H2	2	259263	62.07
2-56	H2	2	259274	47.57
3-48	H2	2	259285	38.17
4-40	H2	2	259296	30.63
5-40	H2	2	259307	30.63
6-32	H2	2	259318	25.76
6-32	H3	2	259329	25.76
6-40	H2	2	259340	29.30
8-32	H2	2	259351	25.76
8-32	H3	2	259362	25.76
10-24	H2	2	259373	29.30
10-24	H3	2	259384	25.76
10-32	H2	2	259395	25.76
10-32	H3	2	259406	25.76
12-24	H3	2	259417	29.30
1/4-20	H3	2	259428	25.76
1/4-28	H3	2	259439	25.76
5/16-18	H3	2	259450	27.79
5/16-24	H3	2	259461	27.79

SPIRAL POINT BOTTOMING TAPS ARE RECOMMENDED FOR USE WHERE CLOSE GAGING IS REQUIRED.

All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS STI TAPS • OVERSIZE TAPS

STI - SPIRAL POINT PLUG

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
4-40	H1	2	209262	30.08
5-40	H1	2	209273	30.08
6-32	H2	2	209284	30.30
6-40	H2	2	209295	30.30
8-32	H2	2	209306	30.60
10-24	H2	2	209317	31.16
10-32	H2	2	209328	31.71
12-24	H2	2	209339	31.71
1/4-20	H2	2	209350	31.71
1/4-28	H2	2	209361	32.23
5/16-18	H3	3	209372	40.74
5/16-24	H2	3	209383	41.25
3/8-16	H3	3	209394	50.15
3/8-24	H2	3	209405	50.75
7/16-14	H3	3	209416	55.01
7/16-20	H3	3	209427	55.01
1/2-13	H3	3	209438	61.24
1/2-20	H3	3	209449	61.24

STI - HAND PLUG & BOTTOMING

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	PLUG ITEM#	BOTTOM ITEM#	LIST PRICE
4-40	H1	3	198933	198944	26.82
5-40	H1	3	198955	198966	26.82
6-32	H2	3	198977	198988	27.29
6-40	H1	3	198999	199010	27.29
8-32	H2	3	199021	199032	27.93
10-24	H2	3	199043	199054	27.93
10-32	H2	3	199065	199076	29.05
12-24	H2	3	199087	199098	29.05
1/4-20	H2	3	199109	199120	29.18
1/4-28	H2	3	199131	199142	29.18
5/16-18	H3	4	199153	199164	31.50
5/16-24	H2	4	199175	199186	31.50
3/8-16	H3	4	199197	199208	34.21
3/8-24	H2	4	199219	199230	34.21
7/16-14	H3	4	199241	199252	47.06
7/16-20	H3	4	199263	199274	47.06
1/2-13	H3	4	199285	199296	52.81
1/2-20	H3	4	199307	199318	52.81

STI TAPS ARE OVERSIZE SO THAT THEY WILL PRODUCE THREADS THAT WILL ACCEPT HELICAL COIL WIRE SCREW THREAD INSERTS THAT HAVE THE SAME SIZE AND PITCH. MATERIALS: ALUMINUM AND NON-FERROUS MATERIALS

+.005 OVERSIZE SPIRAL POINT PLUG

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
6-32	H11	2	209152	15.56
8-32	H11	2	209163	15.56
10-24	H11	2	209174	16.93
10-32	H11	2	209185	16.93
1/4-20	H11	2	209196	19.30
5/16-18	H11	2	209207	22.17
3/8-16	H11	3	209218	25.18
7/16-14	H11	3	209229	37.82
1/2-13	H11	3	209240	46.02
5/8-11	H11	3	209251	78.43

+.005 OVERSIZE HAND PLUG

HIGH SPEED STEEL

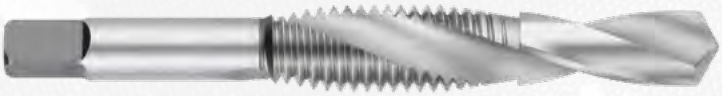
SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
6-32	H11	3	207051	12.93
8-32	H11	4	207062	12.93
10-24	H11	4	207073	14.31
10-32	H11	4	207084	14.31
1/4-20	H11	4	207095	17.06
5/16-18	H11	4	207106	21.49
3/8-16	H11	4	207117	24.67
7/16-14	H11	4	207128	37.15
1/2-13	H11	4	207139	41.90
5/8-11	H11	4	207150	78.90

THESE OVERSIZE TAPS CAN BE USED ON A WIDE RANGE OF MATERIALS.
PRIMARILY USED WHERE PARTS ARE GOING TO BE PLATED AFTER TAPPING.

All taps sold individually.

For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS COMBINATION DRILL & TAPS



HIGH SPEED STEEL

SIZE	SHANK DIAMETER	OVERALL LENGTH	DRILL LENGTH	DRILL SIZE	THREAD LENGTH	# OF FLUTES	ITEM#	LIST PRICE
4-40	.141	1-7/8	1/4	0.0890	3/8	2	198251	46.24
5-40	.141	1-15/16	9/32	0.1015	13/32	2	198262	46.24
6-32	.141	2	5/16	0.1110	7/16	2	198273	46.24
8-32	.168	2-5/32	13/32	0.1360	1/2	2	198284	46.24
10-24	.194	2-13/32	7/16	0.1540	5/8	2	198295	46.24
10-32	.194	2-13/32	7/16	0.1610	5/8	2	198306	46.24
12-24	.220	2-13/32	1/2	0.1800	21/32	2	198317	49.98
1/4-20	.255	2-9/16	9/16	0.2055	25/32	2	198328	46.24
1/4-28	.255	2-9/16	9/16	0.2188	25/32	2	198339	46.24
5/16-18	.318	2-29/32	3/4	0.2660	15/16	2	198350	68.28
5/16-24	.318	2-29/32	3/4	0.2770	15/16	2	198361	68.28
3/8-16	.381	3-15/32	29/32	0.3230	1-1/16	2	198372	82.98
3/8-24	.381	3-15/32	29/32	0.3390	1-1/16	2	198383	82.98
7/16-14	.323	3-27/32	1-3/32	0.3770	1-1/4	2	198394	99.31
7/16-20	.323	3-27/32	1-3/32	0.3937	1-1/4	2	198405	99.31
1/2-13	.367	4-3/16	1-1/4	0.4331	1-3/8	2	198416	112.07
1/2-20	.367	4-3/16	1-1/4	0.4531	1-3/8	2	198427	112.07

PITCH DIAMETER AND THREAD TOLERANCES ARE DESIGNED TO PRODUCE A CLASS 2B FIT.

HIGH SPEED STEEL
METRIC

SIZE	SHANK DIAMETER	OVERALL LENGTH	DRILL LENGTH	DRILL SIZE	THREAD LENGTH	# OF FLUTES	ITEM#	LIST PRICE
M4 x 0.7	.168	2-5/32	13/32	0.1310	1/2	2	198438	50.88
M5 x 0.8	.194	2-13/32	7/16	0.1660	5/8	2	198449	50.88
M6 x 1.0	.255	2-17/32	9/16	0.1980	25/32	2	198460	50.88
M8 x 1.25	.318	2-29/32	3/4	0.2670	15/16	2	198471	92.18
M10 x 1.50	.381	3-15/32	29/32	0.3360	1-1/16	2	198482	105.33
M12 x 1.75	.367	4-3/16	1-1/4	0.4050	1-3/8	2	198493	105.33

PITCH DIAMETER AND THREAD TOLERANCES ARE DESIGNED TO PRODUCE A CLASS 6H FIT.

All taps sold individually.
For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS PULLEY TAPS • EXTENSION TAPS

PULLEY - PLUG

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	OVERALL LENGTH	ITEM#	LIST PRICE
1/4-20	H3	4	6	209460	91.28
1/4-20	H3	4	8	209471	112.85
5/16-18	H3	4	6	209482	96.26
5/16-18	H3	4	8	209493	116.20
3/8-16	H3	4	6	209504	107.86
3/8-16	H3	4	8	209515	129.44
3/8-16	H3	4	10	209526	162.65
7/16-14	H3	4	6	209537	114.52
7/16-14	H3	4	8	209548	149.37
1/2-13	H3	4	6	209559	116.20

SIZE	H LIMIT	# OF FLUTES	OVERALL LENGTH	ITEM#	LIST PRICE
1/2-13	H3	4	8	209570	152.68
1/2-13	H3	4	10	209581	187.53
1/2-13	H3	4	12	209592	230.68
5/8-11	H3	4	6	209603	154.36
5/8-11	H3	4	8	209614	200.81
5/8-11	H3	4	10	209625	252.30
5/8-11	H3	4	12	209636	295.44
3/4-10	H3	4	10	209647	295.44
3/4-10	H3	4	12	209658	351.86

SMALL SHANK EXTENSION - SPIRAL POINT PLUG

HIGH SPEED STEEL

SIZE	H LIMIT	OVERALL LENGTH	NC/NF	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE	# OF FLUTES	ITEM#	LIST PRICE
6-32	H3	6	NC	11/16	3/16	0.097	0.073	2	212485	92.61
8-32	H3	6	NC	3/4	1/4	0.123	0.092	2	212496	90.72
10-24	H3	6	NC	7/8	1/4	0.136	0.102	2	212507	85.04
10-32	H3	6	NF	7/8	1/4	0.136	0.102	2	212518	85.04
1/4-20	H3	6	NC	1	5/16	0.185	0.139	2	212529	116.03
1/4-28	H3	6	NF	1	5/16	0.185	0.139	2	212540	116.03
5/16-18	H3	6	NC	1-1/8	3/8	0.240	0.180	2	212551	121.79
5/16-24	H3	6	NF	1-1/8	3/8	0.240	0.180	2	212562	121.79
3/8-16	H3	6	NC	1-1/4	7/16	0.275	0.206	3	212573	131.20
3/8-24	H3	6	NF	1-1/4	7/16	0.275	0.206	3	212584	131.20
7/16-14	H3	6	NC	1-7/16	13/32	0.323	0.242	3	212595	150.41
7/16-20	H3	6	NF	1-7/16	13/32	0.323	0.242	3	212606	150.41
1/2-13	H3	6	NC	1-21/32	7/16	0.367	0.275	3	212617	157.88
1/2-20	H3	6	NF	1-21/32	7/16	0.367	0.275	3	212628	157.88
5/8-11	H3	6	NC	1-13/16	9/16	0.480	0.360	3	212639	203.99
5/8-18	H3	6	NF	1-13/16	9/16	0.480	0.360	3	212650	203.99
3/4-10	H3	6	NC	2	11/16	0.590	0.442	3	212661	264.93
3/4-16	H3	6	NF	2	11/16	0.590	0.442	3	212672	264.93

SMALL SHANK EXTENSIONS: LONG REACH SMALL SHANKS ALLOW FOR DEEPER TAPPING

All taps sold individually.

For technical information, please see pages 167-169.

GENERAL PURPOSE HSS SPIRAL FLUTE TAPS

52º HELIX - SEMI BOTTOMING

HIGH SPEED STEEL

SIZE	H LIMIT	# OF FLUTES	ITEM#	LIST PRICE
3 -48	H2	2	198504	42.20
3-56	H2	2	198515	42.20
4-40	H2	2	198526	34.72
4-48	H2	2	198537	34.72
5-40	H3	2	198548	34.72
5-44	H3	2	198559	34.72
6-32	H3	2	198570	28.19
6-40	H3	2	198581	28.19
8-32	H3	3	198592	28.19
8-36	H3	3	198603	28.19
10-24	H3	3	198614	28.19
10-32	H3	3	198625	28.19
12-24	H3	3	198636	30.60
12-28	H3	3	198647	30.60
1/4-20	H3	3	198658	30.60
1/4-28	H3	3	198669	30.60
5/16-18	H3	3	198680	37.69
5/16-24	H3	3	198691	37.69
3/8-16	H3	3	198702	43.49
3/8-24	H3	3	198713	43.49
7/16-14	H3	3	198724	65.19
7/16-20	H3	3	198735	65.19
1/2-13	H3	3	198746	78.47
1/2-20	H3	3	198757	78.47
9/16-12	H3	4	198768	130.90
9/16-18	H3	4	198779	130.90
5/8-11	H3	4	198790	170.82
5/8-18	H3	4	198801	170.82
3/4-10	H3	4	198812	218.65
3/4-16	H3	4	198823	218.65

HIGH SPEED STEEL - METRIC

SIZE	D LIMIT	# OF FLUTES	ITEM#	LIST PRICE
M3 x 0.5	D3	2	198834	35.71
M3.5 x 0.6	D4	3	198845	28.92
M4 x 0.7	D4	3	198856	28.92
M4.5 x 0.75	D4	3	198867	28.92
M5 x 0.8	D4	3	198878	28.92
M6 x 1.0	D5	3	198889	31.59
M8 x 1.25	D5	3	198900	38.93
M10 x 1.5	D6	3	198911	67.30
M12 x 1.75	D6	3	198922	81.00

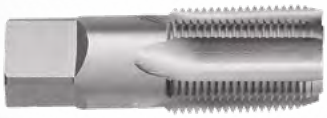
- 2 - 2½ THREAD CHAMFER
- CAN BE USED FOR PLUG OR BOTTOMING APPLICATIONS
- ALLOWS FOR TAPPING CLOSE TO BOTTOM IN BLIND HOLES
- CAN BE USED FOR THROUGH OR BLIND HOLES
- CUTS MORE EFFICIENTLY THAN BOTTOMING TAPS
- SLIGHTLY LONGER CHAMFER DISTRIBUTES CUTTING OVER GREATER NUMBER OF TEETH FOR INCREASED PRODUCTION
- MATERIALS: FOR TAPPING IN RELATIVELY DEEP HOLES IN COPPER, BRASS, ALUMINUM AND OTHER SOFT DUCTILE MATERIALS

Spiral flute taps provide proper chip evacuation in blind holes

All taps sold individually.

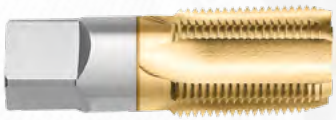
GENERAL PURPOSE
HSS STRAIGHT & TAPER PIPE TAPS

STRAIGHT PIPE - NPS



HIGH SPEED STEEL
UNCOATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
1/8-27	4	212683	63.39
1/4-18	4	212694	70.13
3/8-18	4	212705	92.31
1/2-14	4	212716	146.84
3/4-14	5	212727	205.37
1-11-1/2	5	212738	312.07



HIGH SPEED STEEL
TIN COATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
1/8-27	4	212740	94.97
1/4-18	4	212742	105.07
3/8-18	4	212744	138.29
1/2-14	4	212745	219.94
3/4-14	5	212746	307.64
1-11-1/2	5	212747	467.50

EXTENSION TAPER PIPE - NPT

HIGH SPEED STEEL
UNCOATED

SIZE	OVERALL LENGTH	# OF FLUTES	ITEM#	LIST PRICE
1/8-27	6	4	212749	118.82
1/4-18	6	4	212760	136.96
3/8-18	6	4	212771	185.30
1/2-14	6	4	212782	297.37

EXTENSION TAPER PIPE - NPT

HIGH SPEED STEEL
TIN COATED

SIZE	OVERALL LENGTH	# OF FLUTES	ITEM#	LIST PRICE
1/8-27	6	4	212784	177.99
1/4-18	6	4	212786	205.20
3/8-18	6	4	212788	277.61
1/2-14	6	4	212790	445.46

All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS TAPER PIPE TAPS

NPT

HIGH SPEED STEEL
UNCOATED

HIGH SPEED STEEL
STEAM-OXIDE

HIGH SPEED STEEL
TIN COATED

SIZE	# OF FLUTES	UNCOATED	LIST PRICE	STEAM OXIDE	LIST PRICE	TiN	LIST PRICE
1/16-27	4	212023	39.66	233396	45.64	233407	51.61
* 1/8-27	4	212034	39.66	233418	45.64	233429	51.61
1/8-27	4	212045	39.66	233440	45.64	233451	51.61
1/4-18	4	212056	43.92	233462	50.49	233473	57.11
3/8-18	4	212067	57.80	233484	66.48	233495	75.12
1/2-14	4	212078	91.92	233506	105.71	233517	119.47
3/4-14	5	212089	128.58	233528	147.87	233539	167.17
1-11-1/2	5	212100	195.40	233550	224.66	233561	234.25
1-1/4-11-1/2	5	212111	278.51	233572	320.28	233583	362.05
1-1/2-11-1/2	7	212122	373.57	233594	429.65	233605	485.64
2-11-1/2	7	212133	508.16	233616	584.39	233627	660.63

* Small Shank

NPT - INTERRUPTED

HIGH SPEED STEEL
UNCOATED

HIGH SPEED STEEL
STEAM-OXIDE

HIGH SPEED STEEL
TIN COATED

SIZE	# OF FLUTES	UNCOATED	LIST PRICE	STEAM OXIDE	LIST PRICE	TiN	LIST PRICE
* 1/8-27	5	212144	61.54	233638	70.78	233649	80.02
1/8-27	5	212155	61.54	233660	70.78	233671	80.02
1/4-18	5	212166	68.07	233682	78.25	233693	88.48
3/8-18	5	212177	86.12	233704	99.01	233715	111.94
1/2-14	5	212188	136.96	233726	157.50	233737	178.04
3/4-14	5	212199	199.31	233748	229.18	233759	259.09
1-11-1/2	5	212210	302.87	233770	348.30	233781	393.72
1-1/4-11-1/2	5	212221	428.91	233792	493.25	233803	557.58
1-1/2-11-1/2	7	212232	575.32	233814	661.61	233825	747.90
2-11-1/2	7	212243	777.51	233836	894.14	233847	1010.73

* Small Shank

All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE HSS TAPER PIPE TAPS

NPTF DRYSEAL

HIGH SPEED STEEL
UNCOATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
* 1/16-27	4	212254	43.66
1/8-27	4	212265	43.66
1/8-27	4	212276	43.66
1/4-18	4	212287	48.30
3/8-18	4	212298	63.56
1/2-14	4	212309	101.12
3/4-14	5	212320	141.42
1-11-1/2	5	212331	214.91
1-1/4-11-1/2	5	212342	306.36
1-1/2-11-1/2	7	212353	410.91
2-11-1/2	7	212364	558.99

* Small Shank

HIGH SPEED STEEL
TIN COATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
* 1/16-27	4	245700	65.41
1/8-27	4	245711	65.41
1/8-27	4	245722	65.41
1/4-18	4	245733	72.37
3/8-18	4	245744	95.23
1/2-14	4	245755	151.44
3/4-14	5	245766	211.86
1-11-1/2	5	245777	321.95
1-1/4-11-1/2	5	245788	458.91
1-1/2-11-1/2	7	245799	615.59
2-11-1/2	7	245810	837.37

* Small Shank

NPTF DRYSEAL - INTERRUPTED

HIGH SPEED STEEL
UNCOATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
* 1/8-27	5	212375	67.68
1/8-27	5	212386	67.68
1/4-18	5	212397	74.86
3/8-18	5	212408	94.71
1/2-14	5	212419	150.66
3/4-14	5	212430	219.21
1-11-1/2	5	212441	333.13
1-1/4-11-1/2	5	212452	471.76
1-1/2-11-1/2	7	212463	632.87
2-11-1/2	7	212474	855.25

* Small Shank

HIGH SPEED STEEL
TIN COATED

SIZE	# OF FLUTES	ITEM#	LIST PRICE
* 1/8-27	5	212475	101.42
1/8-27	5	212476	101.42
1/4-18	5	212477	112.16
3/8-18	5	212478	141.90
1/2-14	5	212479	225.65
3/4-14	5	212480	328.40
1-11-1/2	5	212481	499.05
1-1/4-11-1/2	5	212482	706.74
1-1/2-11-1/2	7	212483	947.99
2-11-1/2	7	212484	1281.16

* Small Shank

All taps sold individually.

For coating information see pages 6-9. For technical information, please see pages 167-169.

GENERAL PURPOSE
HSS THREAD FORMING TAPS

HIGH SPEED STEEL
UNCOATED

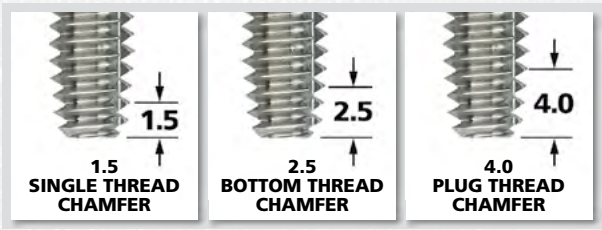
SIZE	H LIMIT	LUBE GROOVES	1.5 ITEM #	2.5 ITEM #	4.0 ITEM #	LIST PRICE
0-80	H2	0	262664	257987	–	33.87
0-80	H3	0	262675	257998	–	33.87
1-64	H3	0	–	258009	–	33.87
1-72	H3	0	262686	258020	–	33.87
2-56	H3	0	262697	258031	–	33.64
2-56	H4	0	262708	258042	–	33.64
2-64	H3	0	–	258064	–	33.64
3-48	H3	0	–	258086	–	33.64
3-56	H3	0	–	258097	–	33.64
3-56	H5	0	–	258108	–	33.64
4-40	H3	0	262719	258130	258119	30.32
4-40	H5	0	262730	258152	258141	30.32
4-48	H4	0	–	258174	–	30.32
5-40	H4	0	–	258218	258207	30.32
5-44	H4	0	–	258262	–	30.32
6-32	H3	1	262741	258306	258295	24.99
6-32	H5	1	262752	258328	258317	24.99
6-40	H4	1	–	258372	258361	24.99
8-32	H3	1	262763	258416	258405	24.99
8-32	H5	1	262774	258438	258427	24.99
8-32	H7	1	–	258460	258449	24.99
8-36	H4	1	–	258482	258471	24.99
10-24	H5	1	–	258504	258493	24.03
10-24	H7	1	–	258526	258515	24.03
10-32	H3	1	262785	258548	258537	24.03
10-32	H5	1	262796	258570	258559	24.03
12-24	H5	2	–	258592	258581	24.03
12-28	H4	2	–	258636	258625	24.03
1/4-20	H5	2	262807	258658	258647	25.52
1/4-20	H8	2	262818	258680	258669	25.52
1/4-28	H4	2	262829	258724	258713	25.52
1/4-28	H6	2	262840	258746	258735	25.52
5/16-18	H8	2	262851	258790	258779	28.34
5/16-18	H5	2	–	258768	258757	28.34
5/16-24	H5	2	262862	258812	258801	28.34
5/16-24	H7	2	262873	258834	258823	28.34
3/8-16	H6	2	262884	258856	258845	32.34
3/8-16	H8	2	262895	258878	258867	32.34
3/8-24	H5	2	262906	258900	258889	32.34
3/8-24	H7	2	262917	258922	258911	32.34
7/16-14	H7	4	–	258944	258933	49.21
7/16-14	H9	4	–	258966	258955	49.21
7/16-20	H5	4	–	258988	258977	49.21
7/16-20	H8	4	–	259010	258999	49.21
1/2-13	H7	6	–	259032	259021	55.04
1/2-13	H10	6	–	259054	259043	55.04
1/2-20	H5	6	–	259076	259065	55.04
1/2-20	H8	6	–	259098	259087	55.04

PLUG TAP SIZES 3/8" AND SMALLER HAVE MALE CENTERS

HIGH SPEED STEEL - METRIC
UNCOATED

SIZE	D LIMIT	LUBE GROOVES	1.5 ITEM #	2.5 ITEM #	4.0 ITEM #	LIST PRICE
M1.6 x 0.35	D5	0	–	263412	–	27.86
M1.7 x 0.35	D5	0	–	263423	–	27.86
M2 x 0.4	D5	0	262928	263434	–	27.86
M2.5 x 0.45	D6	0	262939	263445	–	27.86
M3 x 0.5	D6	0	262950	259120	–	27.86
M3.5 x 0.6	D7	1	262961	263467	263456	25.14
M4 x 0.7	D7	1	262972	259142	259131	25.14
M5 x 0.8	D8	1	262983	259164	259153	25.14
M6 x 1.0	D9	2	262994	259186	259175	26.67
M8 x 1.25	D10	2	263005	259208	259197	30.51
M10 x 1.5	D11	2	263016	259230	259219	34.33
M12 x 1.75	D12	4	263027	259252	259241	59.23

PLUG TAP SIZES M10 AND SMALLER HAVE MALE CENTERS



- SINGLE THREAD – **1.5 Thread Chamfer**
  For maximum thread length in blind holes due to its short chamfer
- BOTTOM – **2.5 Thread Chamfer**
  For blind hole tapping
- PLUG – **4.0 Thread Chamfer**
  For through hole tapping
- THREAD FORMING
  Taps have no flutes or cutting edges & provide chipless tapping
- LUBE GROOVES
  For lubrication & venting in blind holes
- MATERIALS:
  aluminum, brass, copper, zinc, most ductile materials producing stringy chips are great for uncoated thread forming taps

For technical information, please see pages 170, 171.

All taps sold individually

GENERAL PURPOSE
HSS THREAD FORMING TAPS

HIGH SPEED STEEL
TIN COATED

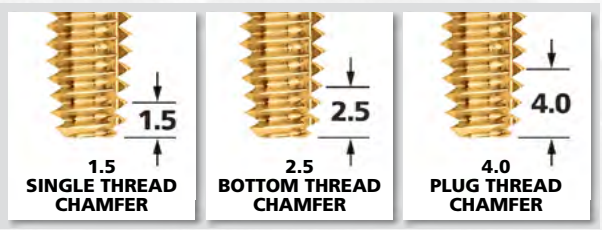
SIZE	H LIMIT	LUBE GROOVES	1.5 ITEM #	2.5 ITEM #	4.0 ITEM #	LIST PRICE
0-80	H2	0	263038	209669	–	42.33
0-80	H3	0	263049	209680	–	42.33
1-64	H3	0	–	209691	–	42.33
1-72	H3	0	263060	209702	–	42.33
2-56	H3	0	263071	209713	–	42.05
2-56	H4	0	263082	209724	–	42.05
2-64	H3	0	–	209746	–	42.05
3-48	H3	0	–	209768	–	42.05
3-56	H3	0	–	209779	–	42.05
3-56	H5	0	–	209790	–	42.05
4-40	H3	0	263093	209812	209801	37.91
4-40	H5	0	263104	209834	209823	37.91
4-48	H4	0	–	209856	–	37.91
5-40	H4	0	–	209900	209889	37.91
5-44	H4	0	–	209944	–	37.91
6-32	H3	1	263115	209988	209977	31.23
6-32	H5	1	263126	210010	209999	31.23
6-40	H4	1	–	210054	210043	31.23
8-32	H3	1	263137	210098	210087	31.23
8-32	H5	1	263148	210120	210109	31.23
8-32	H7	1	–	210142	210131	31.23
8-36	H4	1	–	210164	210153	31.23
10-24	H5	1	–	210186	210175	30.05
10-24	H7	1	–	210208	210197	30.05
10-32	H3	1	263159	210230	210219	30.05
10-32	H5	1	263170	210252	210241	30.05
12-24	H5	2	–	210274	210263	30.05
12-28	H4	2	–	210318	210307	30.05
1/4-20	H5	2	263181	210340	210329	31.91
1/4-20	H8	2	263192	210362	210351	31.91
1/4-28	H4	2	263203	210406	210395	31.91
1/4-28	H6	2	263214	210428	210417	31.91
5/16-18	H8	2	263225	210472	210461	35.43
5/16-18	H5	2	–	210450	210439	35.43
5/16-24	H5	2	263236	210494	210483	35.43
5/16-24	H7	2	263247	210516	210505	35.43
3/8-16	H6	2	263258	–	–	35.42
3/8-16	H8	2	263269	–	–	35.42
3/8-16	H6	2	–	210538	210527	40.43
3/8-16	H8	2	–	210560	210549	40.43
3/8-24	H5	2	263280	210582	210571	40.43
3/8-24	H7	2	263291	210604	210593	40.43
7/16-14	H7	4	–	210626	210615	61.52
7/16-14	H9	4	–	210648	210637	61.52
7/16-20	H5	4	–	210670	210659	61.52
7/16-20	H8	4	–	210692	210681	61.52
1/2-13	H7	6	–	210714	210703	68.80
1/2-13	H10	6	–	210736	210725	68.80
1/2-20	H5	6	–	210758	210747	68.80
1/2-20	H8	6	–	210780	210769	68.80

PLUG TAP SIZES 3/8" AND SMALLER HAVE MALE CENTERS

HIGH SPEED STEEL - METRIC
TIN COATED

SIZE	D LIMIT	LUBE GROOVES	1.5 ITEM #	2.5 ITEM #	4.0 ITEM #	LIST PRICE
M1.6 x 0.35	D5	0	–	263478	–	33.92
M1.7 x 0.35	D5	0	–	263489	–	33.92
M2 x 0.4	D5	0	263302	263500	–	33.92
M2.5 x 0.45	D6	0	263313	263511	–	33.92
M3 x 0.5	D6	0	263324	199340	–	33.92
M3.5 x 0.6	D7	1	263335	263533	263522	31.43
M4 x 0.7	D7	1	263346	199362	199351	31.43
M5 x 0.8	D8	1	263357	199384	199373	31.43
M6 x 1.0	D9	2	263368	199406	199395	33.33
M8 x 1.25	D10	2	263379	199428	199417	38.15
M10 x 1.5	D11	2	263390	199450	199439	42.90
M12 x 1.75	D12	4	263401	199472	199461	74.05

PLUG TAP SIZES M10 AND SMALLER HAVE MALE CENTERS



- SINGLE THREAD – **1.5 Thread Chamfer**
  For maximum thread length in blind holes due to its short chamfer
- BOTTOM – **2.5 Thread Chamfer**
  For blind hole tapping
- PLUG – **4.0 Thread Chamfer**
  For through hole tapping
- THREAD FORMING
  Taps have no flutes or cutting edges & provide chipless tapping
- LUBE GROOVES
  For lubrication & venting in blind holes
- MATERIALS:
  lead, stainless steels, carbon steels, die cast aluminum, most ductile materials producing stringy chips are great for Tin coated forming taps

For technical information, please see pages 170, 171.
For coating information see pages 6-9.

All taps sold individually

GENERAL PURPOSE CARBON STEEL DIES

HEXAGON RETHREADING

CARBON STEEL

SIZE	ACROSS FLATS	THICKNESS	ITEM#	LIST PRICE
1/4-20	19/32	1/4	171037	28.09
1/4-28	19/32	1/4	171048	28.09
5/16-18	11/16	5/16	171059	32.76
5/16-24	11/16	5/16	171070	32.76
3/8-16	25/32	3/8	171081	36.27
3/8-24	25/32	3/8	171092	36.27
7/16-14	7/8	7/16	171103	44.45
7/16-20	7/8	7/16	171114	44.45
1/2-13	1-1/16	1/2	171125	49.16
1/2-20	1-1/16	1/2	171136	49.16
9/16-12	1-1/16	1/2	171147	52.63
9/16-18	1-1/16	1/2	171158	52.63
5/8-11	1-1/4	5/8	171169	54.99
5/8-18	1-1/4	5/8	171180	54.99
11/16-11	1-7/16	3/4	171191	60.85
11/16-16	1-7/16	3/4	171202	60.85

SIZE	ACROSS FLATS	THICKNESS	ITEM#	LIST PRICE
3/4-10	1-7/16	3/4	171213	67.88
3/4-16	1-7/16	3/4	171224	67.88
7/8-9	1-5/8	7/8	171235	73.70
7/8-14	1-5/8	7/8	171246	73.70
1-8	1-13/16	1	171257	83.08
1-12	1-13/16	1	171268	83.08
1-14	1-13/16	1	171279	83.08
1-1/8-7	2	1	171290	95.93
1-1/8-12	2	1	171301	95.93
1-1/4-7	2-3/16	1	171312	105.31
1-1/4-12	2-3/16	1	171323	105.31
1-3/8-6	2-3/8	1	171334	198.92
1-3/8-12	2-3/8	1	171345	198.92
1-1/2-6	2-9/16	1	171356	222.30
1-1/2-12	2-9/16	1	171367	222.30

HEXAGON RETHREADING METRIC

CARBON STEEL

SIZE	ACROSS FLATS	ITEM#	LIST PRICE
M3 x 0.5	1	171378	21.40
M4 x 0.7	1	171389	20.82
M5 x 0.8	1	171400	20.82
M6 x 1.0	1	171411	20.82
M7 x 1.0	1	171422	21.40
M8 x 1.25	1	171433	20.82
M10 x 1.25	1	171444	20.82
M10 x 1.50	1	171455	20.82
M12 x 1.25	1	171466	20.82

SIZE	ACROSS FLATS	ITEM#	LIST PRICE
M12 x 1.75	1	171477	20.82
M14 x 1.50	1-7/16	171488	32.31
M14 x 2.0	1-7/16	171499	32.31
M16 x 1.50	1-7/16	171510	32.31
M16 x 2.0	1-7/16	171521	32.31
M18 x 1.50	1-7/16	171532	32.31
M18 x 2.50	1-7/16	171543	32.31
M20 x 2.5	1-13/16	171554	67.46
M24 x 3.0	1-13/16	171565	67.46

All Dies sold individually.

GENERAL PURPOSE CARBON STEEL DIES

NPT HEXAGON RETHREADING

CARBON STEEL

SIZE	ACROSS FLATS	THICKNESS	ITEM#	LIST PRICE
1/8-27 NPT	1-1/16	3/8	171576	38.83
1/4 - 18 NPT	1-1/4	5/8	171587	43.05
3/8 - 18 NPT	1-7/16	5/8	171598	59.53

SIZE	ACROSS FLATS	THICKNESS	ITEM#	LIST PRICE
1/2 - 14 NPT	1-5/8	3/4	171609	86.01
3/4 - 14 NPT	2	13/16	171620	106.34
1 - 11-1/2 NPT	2-3/8	1	171631	205.86

ADJUSTABLE ROUND SPLIT

CARBON STEEL

SIZE	OUTSIDE DIAMETER	ITEM#	LIST PRICE
6 - 32	1	170377	47.92
8 - 32	1	170410	47.92
10 - 24	1	170443	47.92
10 - 32	1	170465	47.92
1/4 -20	1	170531	47.92
1/4 - 20	1-1/2	170542	78.41
1/4 -28	1	170553	47.92
1/4 - 32	1	170586	47.92
5/16 - 18	1	170597	47.92
5/16 - 18	1-1/2	170608	78.41
5/16 - 24	1	170619	47.92
5/16 - 24	1-1/2	170630	78.41
5/16 - 32	1	170641	47.92

SIZE	OUTSIDE DIAMETER	ITEM#	LIST PRICE
3/8 - 16	1	170652	47.92
3/8 - 16	1-1/2	170663	78.41
3/8 - 24	1	170674	47.92
3/8 - 24	1-1/2	170685	78.41
7/16 - 14	1	170696	47.92
7/16 - 14	1-1/2	170707	78.41
7/16 - 20	1	170718	47.92
1/2 - 13	1-1/2	170740	78.41
1/2 - 20	1-1/2	170751	78.41
9/16 - 12	1-1/2	170762	78.41
9/16 - 18	1-1/2	170773	78.41
5/8 - 11	1-1/2	170784	78.41
5/8 - 18	1-1/2	170806	78.41

All Dies sold individually.

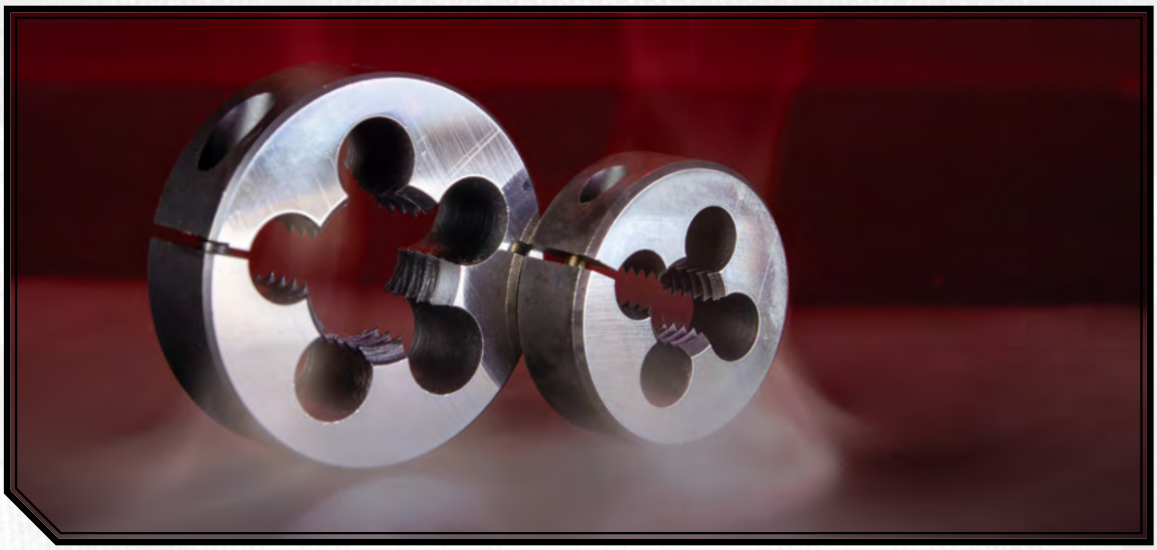
GENERAL PURPOSE HSS DIES

ADJUSTABLE ROUND SPLIT

HIGH SPEED STEEL

SIZE	OUTSIDE DIAMETER	ITEM#	LIST PRICE
4-40	1	171708	89.68
5-40	13/16	171719	60.85
5-44	13/16	171730	60.85
6-32	13/16	171741	60.85
6-32	1	171752	73.70
6-40	13/16	171763	60.85
8-32	13/16	171774	60.85
8-32	1	171785	73.70
10-24	13/16	171796	60.85
10-24	1	171807	73.70
10-32	13/16	171818	60.85
10-32	1	171829	73.70
12-24	13/16	171840	60.85
12-24	1	171851	73.70
12-28	13/16	171862	60.85
1/4-20	13/16	171873	60.85
1/4-20	1	171884	73.70
1/4-20	1-1/2	171895	120.51
1/4-28	13/16	171906	60.85
1/4-28	1	171917	73.70
1/4-28	1-1/2	171928	120.51
5/16-18	13/16	171939	60.85
5/16-18	1	171950	73.70
5/16-18	1-1/2	171961	120.51
5/16-24	13/16	171972	60.85
5/16-24	1	171983	73.70

SIZE	OUTSIDE DIAMETER	ITEM#	LIST PRICE
5/16-24	1-1/2	171994	120.51
3/8-16	1	172005	73.70
3/8-16	1-1/2	172016	120.51
3/8-24	1	172027	73.70
3/8-24	1-1/2	172038	120.51
7/16-14	1	172049	73.70
7/16-14	1-1/2	172060	120.51
7/16-20	1	172071	73.70
7/16-20	1-1/2	172082	120.51
1/2-13	1	172093	73.70
1/2-13	1-1/2	172104	120.51
1/2-20	1	172115	73.70
1/2-20	1-1/2	172126	120.51
9/16-12	1-1/2	172137	120.51
9/16-18	1-1/2	172148	120.51
5/8-11	1-1/2	172159	120.51
5/8-11	2	172170	163.81
5/8-18	1-1/2	172181	120.51
5/8-18	2	172192	163.81
3/4-10	1-1/2	172203	120.51
3/4-10	2	172214	163.81
3/4-16	1-1/2	172225	120.51
3/4-16	2	172236	163.81
7/8-9	2	172247	163.81
7/8-14	2	172258	163.81



All Dies sold individually.

GENERAL PURPOSE
TAP HANDLES & DIE STOCKS

T - HANDLE TAP WRENCHES

SIZE	ITEM#	LIST PRICE
0 - 1/4	170146	17.76
1/4-1/2	170157	26.61

DIE STOCKS

SIZE	ITEM#	LIST PRICE
1 OD	170201	54.86
1-1/2 OD	170212	89.86
2 OD	170223	158.19

All Tools sold individually.

HIGH PERFORMANCE TAPS
TECHNICAL INFORMATION

Predator

SPEED CHART

MATERIAL / TYPE	HARDNESS		CUTTING SPEED (fpm)		CUTTING FLUID*
	Bhn	Rc	SPIRAL POINT	SPIRAL FLUTE	
ALUMINUM ALLOYS					
UNALLOYED - 1000 SERIES	–	–	80	60	WS, CO
CAST - 360, A380	–	–	60	45	WS, CO
WROUGHT - 2000-7000 SERIES	–	–	80	60	WS, CO
BRASS					
HIGH-LEADED, FREE CUTTING - C34000, C36000	–	–	60	45	WS
NAVAL, RED - C46400-C46700, C23000	–	–	60	45	WS
CAST IRON					
PEARLITIC, GRAY CAST IRON, FERRITIC - A48 CLASS 20, CLASS 25, CLASS 40	< 253	< 25	20	15	WS
MALLEABLE - ASTM A47 GRADE 32510, SAE J158 GRADE M3210	< 253	< 25	15	12	CO
NICKEL ALLOYS					
NICKEL BASE ALLOY, WROUGHT & CAST - NICKEL 200, MONEL ALLOY 400	< 253	< 25	15	12	CO
HIGH TEMPERATURE ALLOY, WROUGHT & CAST - INCONEL 600, 718, HASTALLOY B & C	253 - 390	25 - 42	10	10	CO
STEEL					
LOW CARBON - 1010, 1018, 1029, 1513, 1522	< 190	< 10	55	40	WS, CO
MEDIUM CARBON - 1030, 1040, 1045, 1050	< 208	< 15	35	25	WS, CO
HIGH CARBON - 1050, 1070, 1080, 1090, 1561, 1572	< 253	< 25	15	12	CO
HIGH STRENGTH STEEL - 4140, 4340	327 - 390	35 - 42	10	10	CO
STAINLESS STEEL					
AUSTENITIC - SAE (300 SERIES)	< 253	< 25	20	15	CO
MARTENSITIC & FERRITIC - 400 SERIES, 416, 420F, 446	253 - 301	25 - 32	15	12	CO
HARDENED - 15-5PH, 17-4PH, A286	< 327 - 390	< 35 - 42	10	10	CO
TITANIUM ALLOYS					
ALPHA & ALPHA-BETA ALLOYS ANNEALED - Ti-6Al-4V	253 - 301	25 - 32	10	10	CO
ALPHA & ALPHA-BETA ALLOYS SOLUTION TREATED & AGED - Ti-6Al-6V	327 - 390	35 - 42	8	8	CO
TOOL STEEL					
HOT WORK, COLD WORK & MOLD - A2, D2, H10, H14, P2, P13	190 - 253	10 - 25	20	15	CO
HOT WORK, COLD WORK & MOLD - A2, D2, H10, H14, P2, P13	327 - 390	35 - 42	15	12	CO

Your individual manufacturing conditions will greatly influence speeds.

* WS - Water Soluble
  CO - Cutting Oil

In most instances cutting fluid manufacturers recommend specific fluid for different materials.

GENERAL PURPOSE TAPS TECHNICAL INFORMATION

MACHINE SCREW TAPS (NC & NF)

SIZE	OVERALL LENGTH	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE
#0 (.060)	1-5/8	5/16	3/16	.141	.110
#1 (.073)	1-11/16	3/8	3/16	.141	.110
#2 (.066)	1-3/4	7/16	3/16	.141	.110
#3 (.099)	1-13/16	1/2	3/16	.141	.110
#4 (.112)	1-7/8	9/16	3/16	.141	.110
#5 (.125)	1-15/16	5/8	3/16	.141	.110
#6 (.138)	2	11/16	3/16	.141	.110
#8 (.164)	2-1/8	3/4	1/4	.168	.131
#10 (.190)	2-3/8	7/8	1/4	.194	.152
#12 (.216)	2-3/8	15/16	9/32	.220	.165

FRACTIONAL SIZE TAPS (NC & NF)

SIZE	OVERALL LENGTH	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE
1/4	2-1/2	1	5/16	.255	.191
5/16	2-23/32	1-1/8	3/8	.318	.238
3/8	2-15/16	1-1/4	7/16	.381	.286
7/16	3-5/32	1-7/16	13/32	.323	.242
1/2	3-3/8	1-21/32	7/16	.367	.275
9/16	3-19/32	1-21/32	1/2	.429	.322
5/8	3-13/16	1-13/16	9/16	.480	.360
11/16	4-1/32	1-13/16	5/8	.542	.406
3/4	4-1/4	2	11/16	.590	.442
7/8	4-11/16	2-7/32	3/4	.697	.523
1	5-1/8	2-1/2	13/16	.800	.600
1-1/8	5-7/16	2-9/16	7/8	.896	.672
1-1/4	5-3/4	2-9/16	1	1.021	.766
1-3/8	6-1/16	3	1-1/16	1.108	.831
1-1/2	6-3/8	3	1-1/8	1.233	.925

PIPE TAPS - STRAIGHT & TAPER

SIZE	OVERALL LENGTH	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE
1/16 – 27	2-1/8	11/16	3/8	.3125	.234
1/8 – 27	2-1/8	3/4	3/8	.3125(SS)	.234
1/8 – 27	2-1/8	3/4	3/8	.4375(LS)	.328
1/4 – 18	2-7/16	1-1/16	7/16	.5625	.421
3/8 – 18	2-9/16	1-1/16	1/2	.7000	.531
1/2 – 14	3-1/8	1-3/8	5/8	.6875	.515
3/4 – 14	3-1/4	1-3/8	11/16	.9063	.679
1 – 11-1/2	3-3/4	1-3/4	13/16	1.1250	.843
1-1/4 – 11-1/2	4	1-3/4	15/16	1.3125	.984
1-1/2 – 11-1/2	4-1/4	1-3/4	1	1.5000	1.125
2 – 11-1/2	4-1/2	1-3/4	1-1/8	1.8750	1.406

(SS) = SMALL SHANK (LS) = LARGE SHANK

PULLEY TAPS

SIZE	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE	NECK LENGTH	GROUND LENGTH
1/4	1	5/16	.255	.191	3/8	1-1/2
5/16	1-1/8	3/8	.318	.238	3/8	1-9/16
3/8	1-1/4	7/16	.381	.286	3/8	1-5/8
7/16	1-7/16	1/2	.444	.333	7/16	1-11/16
1/2	1-21/32	9/16	.507	.380	1/2	1-11/16
5/8	1-13/16	11/16	.633	.475	5/8	2
3/4	2	3/4	.759	.569	3/4	2-1/4

SEE PAGE 167 FOR OVERALL LENGTHS AVAILABLE.

SMALL SHANK EXTENSION TAPS

SIZE	NC/NF	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE
6 – 32	NC	11/16	3/16	0.097	0.073
8 – 32	NC	3/4	1/4	0.123	0.092
10 – 24	NC	7/8	1/4	0.136	0.102
10 – 32	NF	7/8	1/4	0.136	0.102
1/4 – 20	NC	1	5/16	0.185	0.139
1/4 – 28	NF	1	5/16	0.185	0.139
5/16 – 18	NC	1-1/8	3/8	0.240	0.180
5/16 – 24	NF	1-1/8	3/8	0.240	0.180
3/8 – 16	NC	1-1/4	7/16	0.275	0.206
3/8 – 24	NF	1-1/4	7/16	0.275	0.206
7/16 – 14	NC	1-7/16	13/32	0.323	0.242
7/16 – 20	NF	1-7/16	13/32	0.323	0.242
1/2 – 13	NC	1-21/32	7/16	0.367	0.275
1/2 – 20	NF	1-21/32	7/16	0.367	0.275
5/8 – 11	NC	1-13/16	9/16	0.480	0.360
5/8 – 18	NF	1-13/16	9/16	0.480	0.360
3/4 – 10	NC	2	11/16	0.590	0.442
3/4 – 16	NF	2	11/16	0.590	0.442

METRIC TAPS

SIZE	OVERALL LENGTH	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SQUARE	INCH BLANK
M1.6 x 0.35	1-5/8	5/16	3/16	.141	.110	#0
M2 x 0.40	1-3/4	7/16	3/16	.141	.110	#2
M2.5 x 0.45	1-13/16	1/2	3/16	.141	.110	#3
M3 x 0.50	1-15/16	5/8	3/16	.141	.110	#5
M3.5 x 0.60	2	11/16	3/16	.141	.110	#6
M4 x 0.70	2-1/8	3/4	1/4	.168	.131	#8
M4.5 x 0.75	2-3/8	7/8	1/4	.194	.152	#10
M5 x 0.80	2-3/8	7/8	1/4	.194	.152	#10
M6 x 1	2-1/2	1	5/16	.255	.191	1/4
M6.3 x 1	2-1/2	1	5/16	.255	.191	1/4
M7 x 1	2-23/32	1-1/8	3/8	.318	.238	5/16
M8 x 1.25	2-23/32	1-1/8	3/8	.318	.238	5/16
M10 x 1.50	2-15/16	1-1/4	7/16	.381	.286	3/8
M12 x 1.75	3-3/8	1-21/32	7/16	.367	.275	1/2
M14 x 2	3-19/32	1-21/32	1/2	.429	.322	9/16
M16 x 2	3-13/16	1-13/16	9/16	.480	.360	5/8
M18 x 2.50	4-1/32	1-13/16	5/8	.542	.406	11/16
M20 x 2.50	4-15/32	2	11/16	.652	.489	13/16
M24 x 3	4-29/32	2-7/32	3/4	.760	.570	15/16
M30 x 3.50	5-7/16	2-9/16	1	1.021	.766	1-3/16
M36 x 4	6-1/16	3	1-1/8	1.233	.925	1-7/16

GENERAL PURPOSE TAPS TECHNICAL INFORMATION

TAP RECOMMENDATIONS FOR CLASSES 2B & 3B UNIFIED INCH SCREW THREADS

SIZE	THREADS PER INCH		RECOMMENDED TAP LIMITS		INTERNAL THREAD PITCH DIAMETER LIMITS		
	NC UC	NF UNF	CLASS 2B	CLASS 3B	MIN. ALL CLASSES (BASIC)	MAX CLASS 2B	MAX CLASS 3B
0	–	80	H2	H1	.0519	.0542	.0536
1	64	–	H2	H1	.0629	.0655	.0648
1	–	72	H2	H1	.0640	.0665	.0659
2	56	–	H2	H1	.0744	.0772	.0765
2	–	64	H2	H1	.0759	.0786	.0779
3	48	–	H2	H1	.0855	.0885	.0877
3	–	56	H2	H1	.0874	.0902	.0895
4	40	–	H2	H2	.0958	.0991	.0982
4	–	48	H2	H1	.0985	.1016	.1008
5	40	–	H2	H2	.1088	.1121	.1113
5	–	44	H2	H1	.1102	.1134	.1126
6	32	–	H3	H2	.1177	.1214	.1204
6	–	40	H2	H1	.1218	.1252	.1243
8	32	–	H3	H2	.1437	.1475	.1465
8	–	36	H2	H1	.1460	.1496	.1487
10	24	–	H3	H3	.1629	.1672	.1661
10	–	32	H3	H2	.1697	.1736	.1726
12	24	–	H3	H3	.1889	.1933	.1922
12	–	28	H3	H3	.1928	.1970	.1959
1/4	20	–	H5	H3	.2175	.2223	.2211
1/4	–	28	H4	H3	.2268	.2311	.2300
5/16	18	–	H5	H3	.2764	.2817	.2803
5/16	–	24	H4	H3	.2854	.2902	.2890
3/8	16	–	H5	H3	.3344	.3401	.3387
3/8	–	24	H4	H3	.3479	.3528	.3516
7/16	14	–	H5	H3	.3911	.3972	.3957
7/16	–	20	H5	H3	.4050	.4104	.4091
1/2	13	–	H5	H3	.4500	.4565	.4548
1/2	–	20	H5	H3	.4675	.4731	.4717
9/16	12	–	H5	H3	.5084	.5152	.5135
9/16	–	18	H5	H3	.5264	.5323	.5308
5/8	11	–	H5	H3	.5660	.5732	.5714
5/8	–	18	H5	H3	.5889	.5949	.5934
3/4	10	–	H5	H5	.6850	.6927	.6907
3/4	–	16	H5	H3	.7094	.7159	.7143
7/8	9	–	H6	H4	.8028	.8110	.8089
7/8	–	14	H6	H4	.8286	.8356	.8339

The above recommended taps normally produce the Class of Thread indicated in average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gage fit in the work, a choice of some other limit tap will be necessary.

GENERAL PURPOSE TAPS TECHNICAL INFORMATION

TAP RECOMMENDATIONS FOR CLASSES 2B & 3B UNIFIED INCH SCREW THREADS

SIZE	THREADS PER INCH		RECOMMENDED TAP LIMITS		INTERNAL THREAD PITCH DIAMETER LIMITS		
	NC UC	NF UNF	CLASS 2B	CLASS 3B	MIN. ALL CLASSES (BASIC)	MAX CLASS 2B	MAX CLASS 3B
1	8	–	H6	H4	.9188	.9276	.9254
1	–	12	H6	H4	.9459	.9535	.9516
1	NS		H6	H4	.9536	.9609	.9590
1 1/8	7	–	H8	H4	1.0332	1.0416	.10393
1 1/8	–	12	H6	H4	1.0709	1.0787	.10768
1 1/4	7	–	H8	H4	1.1572	1.1668	1.1644
1 1/4	–	12	H6	H4	1.1959	1.2309	1.2019
1 3/8	6	–	H8	H4	1.2667	1.2771	1.2745
1 3/8	–	12	H6	H4	1.3209	1.3291	1.3270
1 1/2	6	–	H8	H4	1.3917	1.4022	1.3996
1 1/2	–	12	H6	H4	1.4459	1.4542	1.4522

TAP RECOMMENDATIONS FOR CLASS 6H METRIC SCREW THREADS

THREAD SIZE		RECOMMENDED TAP	INTERNAL THREAD - PRODUCT LIMITS - CLASS 6H			
			PITCH DIAMETER (MM)		PITCH DIAMETER (MM)	
NOMINAL DIA. (MM)	PITCH (MM)	LIMIT NUMBER	MIN.	MAX.	MIN.	MAX.
1.6	.35	D3	1.373	1.458	.05406	.05740
2	.4	D3	1.740	1.830	.06850	.07205
2.5	.45	D3	2.208	2.303	.08693	.09067
3	.5	D3	2.675	2.775	.10531	.10925
3.5	.6	D4	3.110	3.222	.12244	.12685
4	.7	D4	3.545	3.663	.13957	.14421
4.5	.75	D4	4.013	4.131	.15789	.16264
5	.8	D4	4.480	4.605	.17638	.18130
6	1	D5	5.350	5.500	.21063	.21654
7	1	D5	6.350	6.500	.25000	.25591
8	1.25	D5	7.188	7.348	.28299	.28929
10	1.5	D6	9.026	9.206	.35935	.36244
12	1.75	D6	10.863	11.063	.42758	.43555
14	2	D7	12.701	12.913	.50004	.50839
16	2	D7	14.701	14.913	.57878	.58713
20	2.5	D7	18.376	18.600	.72346	.73228
24	3	D8	22.051	22.316	.86815	.87858
30	3.5	D9	27.727	28.007	1.09161	1.10264
36	4	D9	33.402	33.702	1.31504	1.32685

THREAD FORMING TAPS TECHNICAL INFORMATION

PRE TAP HOLE SIZE

TAP SIZE	TPI	75% THREAD	65% THREAD	NEAREST DRILL SIZE
0	80	0.054	0.055	#54 or 1.4 mm
1	64	0.066	0.067	#51 or 1.7 mm
1	72	0.067	0.068	#51 or 1.75 mm
2	56	0.078	0.079	#47 or 2.0 mm
2	64	0.079	0.080	2.0 mm
3	48	0.090	0.091	2.3 mm
3	56	0.091	0.092	2.3 mm
4	40	0.100	0.101	#39
4	48	0.103	0.104	#37
5	40	0.113	0.114	#33 or 2.9 mm
5	44	0.114	0.115	#33 or 2.9 mm
6	32	0.124	0.125	3.1 mm
6	40	0.126	0.127	1/8" or 3.2 mm
8	32	0.149	0.150	#25 or 3.8 mm
8	36	0.151	0.152	#24
10	24	0.170	0.172	11/64"
10	32	0.175	0.176	#16 or .176"
12	24	0.196	0.198	#9 or 5.0 mm
12	28	0.199	0.201	#7 or 5.1 mm
1/4	20	0.225	0.227	5.75 mm
1/4	28	0.233	0.235	"A"
5/16	18	0.285	0.287	7.25 mm
5/16	24	0.292	0.294	.293"
3/8	16	0.344	0.347	"S" or 11/32"
3/8	24	0.355	0.357	9.0 mm
7/16	14	0.402	0.405	"Y"
7/16	20	0.414	0.416	"Z" or 10.5 mm
1/2	13	0.462	0.466	.463"

PRE TAP HOLE SIZE - METRIC

TAP SIZE	PITCH	75% THREAD	65% THREAD	NEAREST DRILL SIZE
M1.6	0.35	0.057	0.058	1.45 mm
M1.7	0.35	0.061	0.062	1.55 mm
M2	0.4	0.072	0.073	1.85 mm
M2.5	0.45	0.091	0.092	2.30 mm
M3	0.5	0.110	0.111	#35
M3.5	0.6	0.128	0.129	#30
M4	0.7	0.145	0.146	3.70 mm
M5	0.8	0.183	0.184	#14
M6	1	0.218	0.220	5.50 mm
M8	1.25	0.291	0.294	7.40 mm
M10	1.5	0.365	0.368	9.30 mm
M12	1.75	0.439	0.442	7/16"

WHERE TO USE THREAD FORMING TAPS

Materials particularly well suited for thread forming include aluminum, brass, copper, lead, stainless steel, carbon steel, cast steel, leaded steel and zinc. In general, any material which produces a stringy chip is a good candidate for cold forming threads. If the chips are powdery, the material may be too brittle. Forming taps generate threads without producing chips. The threads produced are much stronger than those created by cut taps because of the displacements of the grain of the metal in the workpiece. Cutting taps produce chips which may interfere with the tapping process.

MAJOR ADVANTAGES TO THREAD FORMING

- Chipless Tapping – no chip removal problems in blind holes.
- Stronger Threads – the grain flow of formed threads follows the contour of the thread in steel and stainless steel, resulting in greater thread strength.
- Better Thread Gaging – forming taps create their own lead therefore the possibility of producing oversized threads is greatly reduced.
- Stronger Taps – the absence for the need for flutes results in a stronger more solid tap.
- Longer Tap Life – forming taps last 3 to 20 times longer because they have no cutting edge to dull.
- More Efficient Production – longer tap life, less tap breakage and faster tapping speeds (up to 2X faster than cutting taps).
- Ideal for Non-Lead Screw Tappers – the ability to form their own lead makes forming taps well suited for NC machines or other machines without lead screws.

THREAD FORMING TAPS
TECHNICAL INFORMATION

SPEED CHART FOR THREAD FORMING TAPS

MATERIAL / TYPE	HARDNESS Bhn	HARDNESS Rc	FORMING SPEED (fpm)
ALUMINUM ALLOYS			
UNALLOYED - 1000 SERIES	–	–	80
CAST - 360, A380	–	–	60
WROUGHT - 2000-7000 SERIES	–	–	80
BRASS			
HIGH-LEADED, FREE CUTTING - C34000, C36000	–	–	60
NAVAL, RED - C46400-C46700, C23000	–	–	60
NICKEL ALLOYS			
NICKEL BASE ALLOY, WROUGHT & CAST - NICKEL 200, MONEL ALLOY 400	< 253	< 25	15
STEEL			
LOW CARBON - 1010, 1018, 1029, 1513, 1522	< 190	< 10	55
MEDIUM CARBON - 1030, 1040, 1045, 1050	< 208	< 15	35
HIGH CARBON - 1050, 1070, 1080, 1090, 1561, 1572	< 253	< 25	15
STAINLESS STEEL			
AUSTENITIC - SAE (300 SERIES)	< 253	< 25	20
MARTENSITIC & FERRITIC - 400 SERIES, 416, 420F, 446	253 - 301	25 - 32	15
TITANIUM ALLOYS			
ALPHA & ALPHA-BETA ALLOYS ANNEALED - Ti-6Al-4V	253 - 301	25 - 32	10
TOOL STEEL			
HOT WORK, COLD WORK & MOLD - A2, D2, H10, H14, P2, P13	190 - 253	10 - 25	20

CALCULATING TAP DRILL SIZES - THREAD FORMING TAPS

DRILL SIZE = MAJOR DIAMETER - [(0.0068 X desired % of thread) ÷ Threads Per Inch]

DRILL SIZE (mm) = MAJOR DIAMETER - [(0.0068 X desired % of thread x Pitch (mm)]

GUIDELINES FOR USING THREAD FORMING TAPS

PRE-TAP HOLE SIZE - Thread Forming taps require a larger pre-tap hole size than a cutting tap. Tapping with too small of a pre-tap hole size results in excessive tap wear, torque and possible tap breakage.

LUBRICATION - Thread Forming Taps require good lubrication. Cutting oils are generally preferred because of their lubricity compared to water soluble coolants.

GENERAL PURPOSE
SOLID CARBIDE SPOT DRILLS

90° POINT

UNCOATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138686	32.64
3/16	3/16	3/4	2	138697	38.84
1/4	1/4	3/4	2-1/2	138708	47.17
3/8	3/8	1	3	138719	77.19
1/2	1/2	1	3	138730	125.33
5/8	5/8	1-1/4	3	138741	223.11
3/4	3/4	1-3/4	4	138752	299.58

120° POINT

UNCOATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138763	32.64
3/16	3/16	3/4	2	138774	38.84
1/4	1/4	3/4	2-1/2	138785	47.17
3/8	3/8	1	3	138796	77.19
1/2	1/2	1	3	138807	125.33
5/8	5/8	1-1/4	3	138818	223.11
3/4	3/4	1-3/4	4	138829	299.58

142° POINT

UNCOATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138840	32.64
3/16	3/16	3/4	2	138851	38.84
1/4	1/4	3/4	2-1/2	138862	47.17
3/8	3/8	1	3	138873	77.19
1/2	1/2	1	3	138884	125.33
5/8	5/8	1-1/4	3	138895	223.11
3/4	3/4	1-3/4	4	138906	299.58

TOLERANCES	SHANK
ALL SIZES	-.0001, -.0004 ISO H6

For technical information, please see pages 208 - 209.

GENERAL PURPOSE
SOLID CARBIDE SPOT DRILLS

90° POINT

ALTIN COATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138753	40.79
3/16	3/16	3/4	2	138754	48.56
1/4	1/4	3/4	2-1/2	138755	59.24
3/8	3/8	1	3	138756	93.74
1/2	1/2	1	3	138757	163.18
5/8	5/8	1-1/4	3	138758	285.25
3/4	3/4	1-3/4	4	138759	374.48

120° POINT

ALTIN COATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138830	40.79
3/16	3/16	3/4	2	138831	48.56
1/4	1/4	3/4	2-1/2	138832	59.24
3/8	3/8	1	3	138833	93.74
1/2	1/2	1	3	138834	163.18
5/8	5/8	1-1/4	3	138835	285.25
3/4	3/4	1-3/4	4	138836	374.48

142° POINT

ALTIN COATED

DIA	SHANK	FL LENGTH	OAL	ITEM#	LIST PRICE
1/8	1/8	5/8	2	138907	40.79
3/16	3/16	3/4	2	138908	48.56
1/4	1/4	3/4	2-1/2	138909	59.24
3/8	3/8	1	3	138910	93.74
1/2	1/2	1	3	138911	163.18
5/8	5/8	1-1/4	3	138912	285.25
3/4	3/4	1-3/4	4	138913	374.48

TOLERANCES	SHANK
ALL SIZES	-.0001, -.0004 ISO H6

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

GENERAL PURPOSE SOLID CARBIDE DRILLS

STUB LENGTH - 135º SPLIT POINT - 15º HELIX

UNCOATED

ALTIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
1/32	3/8	1-1/2	141469	19.92	217358	24.91
3/64	3/8	1-1/2	141480	19.92	217369	24.91
1/16	13/32	1-1/2	141491	18.82	217380	23.50
5/64	7/16	1-1/2	141502	19.92	217391	24.91
3/32	1/2	1-1/2	141513	21.95	217402	27.43
7/64	5/8	2	141524	24.91	217413	31.14
1/8	3/4	2	141535	26.59	217424	33.22
9/64	3/4	2	141546	29.46	217435	36.79
5/32	7/8	2	141557	33.00	217446	41.21
11/64	7/8	2	141568	38.96	217457	48.72
3/16	7/8	2	141579	40.06	217468	50.09
13/64	1-1/8	2-1/2	141590	46.29	217479	57.86
7/32	1-1/8	2-1/2	141601	51.37	217490	64.22
15/64	1-1/4	2-1/2	141612	58.13	217501	72.66
1/4	1-1/4	2-1/2	141623	61.09	217512	76.37
17/64	1-1/4	2-1/2	141634	68.86	217523	86.04

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
9/32	1-1/4	2-1/2	141645	71.73	217534	89.67
19/64	1-1/4	2-1/2	141656	80.57	217545	100.75
5/16	1-1/4	2-1/2	141667	84.85	217556	106.01
21/64	1-3/8	3	141678	92.54	217567	115.68
11/32	1-3/8	3	141689	101.19	217578	126.46
23/64	1-3/8	3	141700	113.12	217589	141.39
3/8	1-3/8	3	141711	119.97	217600	149.96
25/64	1-3/8	3	141722	140.51	217611	175.62
13/32	1-3/8	3	141733	153.89	217622	192.36
27/64	1-3/8	3	141744	167.40	217633	209.23
7/16	1-3/8	3	141755	175.09	217644	218.86
29/64	1-3/8	3	141766	203.14	217655	253.93
15/32	1-3/8	3	141777	211.66	217666	264.58
31/64	1-3/8	3	141788	217.63	217677	272.04
1/2	1-3/8	3	141799	218.11	217688	272.62

NOTE: SIZES 7/64" AND UNDER ARE NOT SPLIT.

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
A	1-1/4	2-1/2	141810	58.66	217699	73.32
B	1-1/4	2-1/2	141821	61.09	217710	76.37
C	1-1/4	2-1/2	141832	61.53	217721	76.94
D	1-1/4	2-1/2	141843	62.32	217732	77.87
E	1-1/4	2-1/2	141854	61.09	217743	76.37
F	1-1/4	2-1/2	141865	67.98	217754	84.94
G	1-1/4	2-1/2	141876	72.04	217765	90.06
H	1-1/4	2-1/2	141887	73.59	217776	92.01
I	1-1/4	2-1/2	141898	74.82	217787	93.55
J	1-1/4	2-1/2	141909	76.81	217798	96.03
K	1-1/4	2-1/2	141920	77.52	217809	96.86
L	1-1/4	2-1/2	141931	81.94	217820	102.39
M	1-1/4	2-1/2	141942	83.57	217831	104.51

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
N	1-1/4	2-1/2	141953	88.83	217842	111.00
O	1-3/8	3	141964	93.64	217853	117.05
P	1-3/8	3	141975	97.22	217864	121.51
Q	1-3/8	3	141986	100.75	217875	125.93
R	1-3/8	3	141997	105.17	217886	131.45
S	1-3/8	3	142008	112.02	217897	140.06
T	1-3/8	3	142019	116.03	217908	145.05
U	1-3/8	3	142030	121.78	217919	152.21
V	1-3/8	3	142041	134.85	217930	168.55
W	1-3/8	3	142052	145.23	217941	181.54
X	1-3/8	3	142063	158.53	217952	198.15
Y	1-3/8	3	142074	163.83	217963	204.77
Z	1-3/8	3	142085	177.56	217974	221.91

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE SOLID CARBIDE DRILLS

STUB LENGTH - 135º SPLIT POINT - 15º HELIX

UNCOATED

ALTIN COATED

WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#1	1-1/4	2-1/2	142096	53.14	217985	66.43
#2	1-1/4	2-1/2	142107	53.14	217996	66.43
#3	1-1/8	2-1/2	142118	53.14	218007	66.43
#4	1-1/8	2-1/2	142129	52.56	218018	65.73
#5	1-1/8	2-1/2	142140	46.95	218029	58.66
#6	1-1/8	2-1/2	142151	46.95	218040	58.66
#7	1-1/8	2-1/2	142162	45.58	218051	56.98
#8	1-1/8	2-1/2	142173	45.41	218062	56.76
#9	1-1/8	2-1/2	142184	45.41	218073	56.76
#10	1-1/8	2-1/2	142195	45.41	218084	56.76
#11	1-1/8	2-1/2	142206	44.26	218095	55.35
#12	1-1/8	2-1/2	142217	44.26	218106	55.35
#13	7/8	2	142228	42.71	218117	53.40
#14	7/8	2	142239	41.65	218128	52.08
#15	7/8	2	142250	40.99	218139	51.19
#16	7/8	2	142261	40.99	218150	51.19
#17	7/8	2	142272	38.96	218161	48.72
#18	7/8	2	142283	36.62	218172	45.80
#19	7/8	2	142294	35.87	218183	44.83
#20	7/8	2	142305	34.32	218194	42.93
#21	7/8	2	142316	34.32	218205	42.93
#22	7/8	2	142327	33.00	218216	41.21
#23	7/8	2	142338	33.00	218227	41.21
#24	7/8	2	142349	32.77	218238	40.99
#25	7/8	2	142360	31.01	218249	38.74
#26	7/8	2	142371	31.01	218260	38.74
#27	7/8	2	142382	31.01	218271	38.74
#28	3/4	2	142393	29.46	218282	36.79
#29	3/4	2	142404	29.46	218293	36.79
#30	3/4	2	142415	27.87	218304	34.85

WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#31	3/4	2	142426	25.93	218315	32.38
#32	3/4	2	142437	25.93	218326	32.38
#33	3/4	2	142448	25.66	218337	32.11
#34	3/4	2	142459	25.44	218348	31.80
#35	3/4	2	142470	25.44	218359	31.80
#36	5/8	2	142481	25.44	218370	31.80
#37	5/8	2	142492	24.12	218381	30.17
#38	5/8	2	142503	23.68	218392	29.59
#39	5/8	2	142514	23.68	218403	29.59
#40	5/8	2	142525	22.79	218414	28.53
#41	5/8	2	142536	22.79	218425	28.53
#42	1/2	1-1/2	142547	22.17	218436	27.69
#43	1/2	1-1/2	142558	22.17	218447	27.69
#44	1/2	1-1/2	142569	21.02	218458	26.28
#45	1/2	1-1/2	142580	20.36	218469	25.44
#46	1/2	1-1/2	142591	20.36	218480	25.44
#47	1/2	1-1/2	142602	20.36	218491	25.44
#48	7/16	1-1/2	142613	20.36	218502	25.44
#49	7/16	1-1/2	142624	19.48	218513	24.34
#50	7/16	1-1/2	142635	19.48	218524	24.34
#51	7/16	1-1/2	142646	18.82	218535	23.50
#52	7/16	1-1/2	142657	18.82	218546	23.50
#53	13/32	1-1/2	142668	19.92	218557	24.91
#54	13/32	1-1/2	142679	19.92	218568	24.91
#55	13/32	1-1/2	142690	19.92	218579	24.91
#56	3/8	1-1/2	142701	19.92	218590	24.91
#57	3/8	1-1/2	142712	19.92	218601	24.91
#58	3/8	1-1/2	142723	19.92	218612	24.91
#59	3/8	1-1/2	142734	19.92	218623	24.91
#60	3/8	1-1/2	142745	19.92	218634	24.91

NOTE: SIZES 31 - 60 ARE NOT SPLIT.

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE SOLID CARBIDE DRILLS

JOBBER LENGTH - 118º SPLIT POINT - 25º HELIX

UNCOATED

ALTIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
1/32	5/16	1-1/4	138917	18.73	227324	23.41
3/64	3/4	1-1/2	138928	18.73	227335	23.41
1/16	3/4	1-1/2	138939	17.71	227346	22.13
5/64	7/8	1-3/4	138950	18.73	227357	23.41
3/32	1	2	138961	20.63	227368	25.80
7/64	1-1/4	2-1/4	138972	23.45	227379	29.33
1/8	1-1/4	2-1/4	138983	25.00	227390	31.27
9/64	1-3/8	2-1/2	138994	27.69	227401	34.63
5/32	1-3/8	2-1/2	139005	31.05	227412	38.83
11/64	1-5/8	2-3/4	139016	36.66	227423	45.85
3/16	1-5/8	2-3/4	139027	37.72	227434	47.13
13/64	1-3/4	3	139038	43.55	227445	54.46
7/32	1-3/4	3	139049	48.32	227456	60.42
15/64	2	3-1/4	139060	54.73	227467	68.38
1/4	2	3-1/4	139071	57.51	227478	71.86
17/64	2-1/8	3-1/2	139082	64.75	227489	80.96

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
9/32	2-1/8	3-1/2	139093	67.54	227500	84.45
19/64	2-3/8	3-3/4	139104	75.88	227511	94.83
5/16	2-3/8	3-3/4	139115	79.82	227522	99.74
21/64	2-1/2	4	139126	87.10	227533	108.88
11/32	2-1/2	4	139137	95.23	227544	119.04
23/64	2-3/4	4-1/4	139148	106.49	227555	133.13
3/8	2-3/4	4-1/4	139159	112.94	227566	141.17
25/64	2-7/8	4-1/2	139170	132.25	227577	165.28
13/32	2-7/8	4-1/2	139181	144.83	227588	181.05
27/64	2-7/8	4-1/2	139192	157.51	227599	196.87
7/16	2-7/8	4-1/2	139203	164.80	227610	206.05
29/64	3	4-3/4	139214	191.21	227621	239.00
15/32	3	4-3/4	139225	199.21	227632	248.99
31/64	3	4-3/4	139236	204.82	227643	256.05
1/2	3	4-3/4	139247	205.26	227654	256.58

NOTE: SIZES 7/64" AND UNDER ARE NOT SPLIT.

METRIC SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
0.7	12	31	216775	23.28	228611	29.11
0.8	12	31	216786	23.28	228622	29.11
0.9	16	38	216797	23.28	228633	29.11
1.0	16	38	216808	23.28	228644	29.11
1.1	19	38	216819	23.28	228655	29.11
1.2	19	38	216830	23.28	228666	29.11
1.3	19	38	216841	23.28	228677	29.11
1.4	19	38	216852	23.28	228688	29.11
1.5	19	38	216863	23.45	228699	29.33
1.6	19	38	216874	23.45	228710	29.33
1.7	19	38	216885	23.45	228721	29.33
1.8	22	38	216896	23.45	228732	29.33
1.9	22	38	216907	23.45	228743	29.33
2.0	22	44	216918	24.91	228754	31.14
2.1	22	44	216929	24.91	228765	31.14
2.2	25	50	216940	24.91	228776	31.14
2.3	25	50	216951	24.91	228787	31.14
2.4	25	50	216962	24.91	228798	31.14
2.5	25	50	216973	28.62	228809	35.78
2.6	32	57	216984	28.62	228820	35.78
2.7	32	57	216995	28.62	228831	35.78
2.8	32	57	217006	28.62	228842	35.78
2.9	32	57	217017	28.62	228853	35.78

METRIC SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
3.0	32	57	217028	32.07	228864	40.06
3.1	32	57	217039	32.07	228875	40.06
3.2	32	57	217050	32.07	228886	40.06
3.3	32	57	217061	32.07	228897	40.06
3.4	35	63	217072	34.81	228908	43.55
3.5	35	63	217083	34.81	228919	43.55
4.0	35	63	217094	42.85	228930	53.53
4.5	41	70	217105	45.89	228941	57.38
5.0	44	75	217116	50.75	228952	63.47
5.5	44	75	217127	60.12	228963	75.13
6.0	50	82	217138	63.56	228974	79.42
6.5	50	82	217149	101.24	228985	126.55
7.0	54	89	217160	110.87	228996	138.61
7.5	60	95	217171	114.49	229007	143.11
8.0	60	95	217182	121.11	229018	151.37
8.5	63	100	217193	149.52	229029	186.88
9.0	70	100	217204	169.75	229040	212.19
9.5	70	108	217215	193.69	229051	242.14
10.0	73	114	217226	222.44	229062	278.05
10.5	73	114	217237	248.77	229073	310.96
11.0	73	114	217248	295.98	229084	370.01
11.5	76	120	217259	304.86	229095	381.10
12.0	76	120	217270	338.34	229106	422.97

NOTE: ALL DIMENSIONS IN TABLE ARE METRIC

NOTE: SIZES 3.1 AND UNDER ARE NOT SPLIT

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE SOLID CARBIDE DRILLS

JOBBER LENGTH - 118º SPLIT POINT - 25º HELIX

UNCOATED

ALTIN COATED

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
A	2	3-1/4	139258	55.21	227665	68.99
B	2	3-1/4	139269	57.51	227676	71.86
C	2	3-1/4	139280	57.95	227687	72.44
D	2	3-1/4	139291	58.66	227698	73.32
E	2	3-1/4	139302	57.51	227709	71.86
F	2	3-1/4	139313	68.27	227720	79.95
G	2-1/8	3-1/2	139324	73.84	227731	84.76
H	2-1/8	3-1/2	139335	75.79	227742	86.62
I	2-1/8	3-1/2	139346	77.25	227753	88.03
J	2-1/8	3-1/2	139357	82.12	227764	90.42
K	2-1/8	3-1/2	139368	82.31	227775	91.17
L	2-1/8	3-1/2	139379	82.67	227786	96.38
M	2-3/8	3-3/4	139390	83.15	227797	98.32

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
N	2-3/8	3-3/4	139401	91.25	227808	104.51
O	2-3/8	3-3/4	139412	96.51	227819	110.16
P	2-3/8	3-3/4	139423	99.74	227830	114.36
Q	2-1/2	4	139434	105.92	227841	118.51
R	2-1/2	4	139445	109.17	227852	123.72
S	2-1/2	4	139456	116.53	227863	131.80
T	2-3/4	4-1/4	139467	120.61	227874	136.49
U	2-3/4	4-1/4	139478	126.44	227885	143.24
V	2-3/4	4-1/4	139489	137.02	227896	158.66
W	2-7/8	4-1/2	139500	143.92	227907	170.89
X	2-7/8	4-1/2	139511	157.24	227918	186.49
Y	2-7/8	4-1/2	139522	162.36	227929	192.76
Z	2-7/8	4-1/2	139533	201.49	227940	208.88

WIRE SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#1	1-3/4	3	139544	50.04	227951	62.54
#2	1-3/4	3	139555	50.04	227962	62.54
#3	1-3/4	3	139566	50.04	227973	62.54
#4	1-3/4	3	139577	49.51	227984	61.88
#5	1-3/4	3	139588	44.17	227995	55.26
#6	1-3/4	3	139599	44.17	228006	55.26
#7	1-3/4	3	139610	42.93	228017	53.67
#8	1-3/4	3	139621	42.71	228028	53.40
#9	1-3/4	3	139632	42.71	228039	53.40
#10	1-5/8	2-3/4	139643	42.71	228050	53.40
#11	1-5/8	2-3/4	139654	41.70	228061	52.08
#12	1-5/8	2-3/4	139665	41.70	228072	52.08
#13	1-5/8	2-3/4	139676	40.19	228083	50.27
#14	1-5/8	2-3/4	139687	39.18	228094	48.98
#15	1-5/8	2-3/4	139698	38.56	228105	48.19
#16	1-5/8	2-3/4	139709	38.56	228116	48.19
#17	1-5/8	2-3/4	139720	36.66	228127	45.85
#18	1-5/8	2-3/4	139731	34.50	228138	43.11
#19	1-5/8	2-3/4	139742	33.75	228149	42.18
#20	1-3/8	2-1/2	139753	32.29	228160	40.37
#21	1-3/8	2-1/2	139764	32.29	228171	40.37
#22	1-3/8	2-1/2	139775	31.05	228182	38.83
#23	1-3/8	2-1/2	139786	31.05	228193	38.83
#24	1-3/8	2-1/2	139797	30.83	228204	38.56
#25	1-3/8	2-1/2	139808	29.15	228215	36.48
#26	1-3/8	2-1/2	139819	29.15	228226	36.48
#27	1-3/8	2-1/2	139830	29.15	228237	36.48
#28	1-3/8	2-1/2	139841	27.69	228248	34.63
#29	1-3/8	2-1/2	139852	27.69	228259	34.63
#30	1-1/4	2-1/4	139863	26.24	228270	32.82

WIRE SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#31	1-1/4	2-1/4	139874	24.38	228281	30.48
#32	1-1/4	2-1/4	139885	24.38	228292	30.48
#33	1-1/4	2-1/4	139896	24.16	228303	30.21
#34	1-1/4	2-1/4	139907	23.98	228314	29.95
#35	1-1/4	2-1/4	139918	23.98	228325	29.95
#36	1-1/4	2-1/4	139929	23.98	228336	29.95
#37	1-1/4	2-1/4	139940	22.70	228347	28.40
#38	1-1/4	2-1/4	139951	22.31	228358	27.87
#39	1-1/4	2-1/4	139962	22.31	228369	27.87
#40	1	2	139973	21.47	228380	26.81
#41	1	2	139984	21.47	228391	26.81
#42	1	2	139995	20.85	228402	26.06
#43	1	2	140006	20.85	228413	26.06
#44	1	2	140017	19.79	228424	24.74
#45	7/8	1-3/4	140028	19.21	228435	23.98
#46	7/8	1-3/4	140039	19.21	228446	23.98
#47	7/8	1-3/4	140050	19.21	228457	23.98
#48	7/8	1-3/4	140061	19.21	228468	23.98
#49	7/8	1-3/4	140072	18.33	228479	22.92
#50	7/8	1-3/4	140083	18.33	228490	22.92
#51	3/4	1-1/2	140094	17.71	228501	22.13
#52	3/4	1-1/2	140105	17.71	228512	22.13
#53	3/4	1-1/2	140116	18.73	228523	23.41
#54	3/4	1-1/2	140127	18.73	228534	23.41
#55	3/4	1-1/2	140138	18.73	228545	23.41
#56	3/4	1-1/2	140149	18.73	228556	23.41
#57	3/4	1-1/2	140160	18.73	228567	23.41
#58	3/4	1-1/2	140171	18.73	228578	23.41
#59	3/4	1-1/2	140182	18.73	228589	23.41
#60	3/4	1-1/2	140193	18.73	228600	23.41

NOTE: SIZES 31-60 ARE NOT SPLIT.

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE SOLID CARBIDE DRILLS

STRAIGHT FLUTE - 140º SPLIT POINT

UNCOATED

ALTIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
1/8	3/4	2	140270	29.15	229183	36.44
9/64	3/4	2	140281	33.35	229194	41.65
5/32	7/8	2	140292	37.32	229205	46.69
11/64	7/8	2	140303	41.43	229216	51.77
3/16	7/8	2	140314	38.25	229227	47.79
13/64	1-1/8	2-1/2	140325	49.74	229238	62.24
7/32	1-1/8	2-1/2	140336	55.88	229249	69.88
15/64	1-1/4	2-1/2	140347	58.97	229260	73.72
1/4	1-1/4	2-1/2	140358	55.79	229271	69.74
17/64	1-1/4	2-1/2	140369	77.56	229282	96.91
9/32	1-1/4	2-1/2	140380	80.61	229293	100.80
19/64	1-1/4	2-1/2	140391	85.34	229304	106.67

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
5/16	1-1/4	2-1/2	140402	88.38	229315	110.47
21/64	1-3/8	3	140413	95.01	229326	118.73
11/32	1-3/8	3	140424	105.39	229337	131.72
23/64	1-3/8	3	140435	115.28	229348	144.13
3/8	1-3/8	3	140446	114.31	229359	142.89
25/64	1-3/8	3	140457	141.39	229370	176.72
13/32	1-3/8	3	140468	135.29	229381	169.13
27/64	1-3/8	3	140479	171.56	229392	214.40
7/16	1-3/8	3	140490	167.32	229403	209.15
15/32	1-3/8	3	140501	186.18	229414	232.73
1/2	1-3/8	3	140512	201.72	229425	252.17

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
A	1-1/4	2-1/2	140523	58.97	229436	73.72
B	1-1/4	2-1/2	140534	58.97	229447	73.72
C	1-1/4	2-1/2	140545	58.97	229458	73.72
D	1-1/4	2-1/2	140556	58.97	229469	73.72
E	1-1/4	2-1/2	140567	55.79	229480	69.74
F	1-1/4	2-1/2	140578	77.56	229491	96.91
G	1-1/4	2-1/2	140589	77.56	229502	96.91
H	1-1/4	2-1/2	140600	77.56	229513	96.91
I	1-1/4	2-1/2	140611	80.61	229524	100.80
J	1-1/4	2-1/2	140622	80.61	229535	100.80
K	1-1/4	2-1/2	140633	80.61	229546	100.80
L	1-1/4	2-1/2	140644	85.34	229557	106.67
M	1-1/4	2-1/2	140655	85.34	229568	106.67

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
N	1-1/4	2-1/2	140666	88.38	229579	110.47
O	1-3/8	3	140677	88.38	229590	110.47
P	1-3/8	3	140688	95.01	229601	118.77
Q	1-3/8	3	140699	105.39	229612	131.72
R	1-3/8	3	140710	105.39	229623	131.72
S	1-3/8	3	140721	115.28	229634	144.13
T	1-3/8	3	140732	115.28	229645	144.13
U	1-3/8	3	140743	127.87	229656	159.81
V	1-3/8	3	140754	127.87	229667	159.81
W	1-3/8	3	140765	141.39	229678	176.72
X	1-3/8	3	140776	156.45	229689	195.59
Y	1-3/8	3	140787	164.00	229700	204.99
Z	1-3/8	3	140798	171.56	229711	214.40

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE SOLID CARBIDE DRILLS

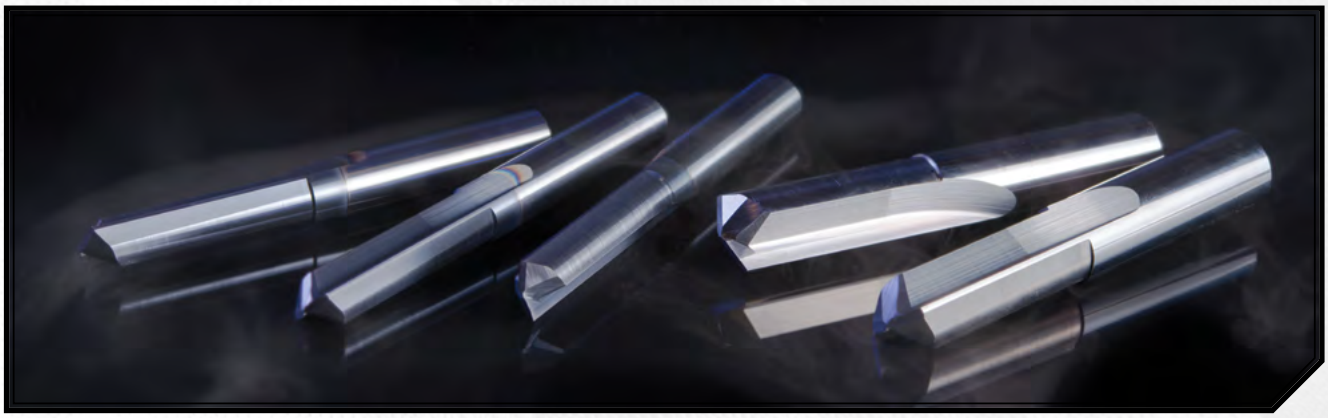
STRAIGHT FLUTE - 140º SPLIT POINT

UNCOATED

ALTIN COATED

WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#1	1-1/4	2-1/2	140809	57.38	229722	71.73
#2	1-1/4	2-1/2	140820	56.36	229733	70.45
#3	1-1/8	2-1/2	140831	54.11	229744	67.62
#4	1-1/8	2-1/2	140842	51.10	229755	63.87
#5	1-1/8	2-1/2	140853	51.68	229766	64.58
#6	1-1/8	2-1/2	140864	50.93	229777	63.65
#7	1-1/8	2-1/2	140875	49.03	229788	61.31
#8	1-1/8	2-1/2	140886	48.32	229799	60.38
#9	1-1/8	2-1/2	140897	46.86	229810	58.57
#10	1-1/8	2-1/2	140908	46.16	229821	57.73
#11	1-1/8	2-1/2	140919	45.36	229832	56.67
#12	1-1/8	2-1/2	140930	44.52	229843	55.65
#13	7/8	2	140941	43.77	229854	54.68
#14	7/8	2	140952	43.46	229865	54.37
#15	7/8	2	140963	43.07	229876	53.80

WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#16	7/8	2	140974	42.89	229887	53.62
#17	7/8	2	140985	41.87	229898	52.34
#18	7/8	2	140996	40.68	229909	50.84
#19	7/8	2	141007	40.42	229920	50.53
#20	7/8	2	141018	39.05	229931	48.81
#21	7/8	2	141029	38.78	229942	48.50
#22	7/8	2	141040	38.03	229953	47.57
#23	7/8	2	141051	36.44	229964	45.54
#24	7/8	2	141062	35.42	229975	44.30
#25	7/8	2	141073	34.36	229986	42.98
#26	7/8	2	141084	33.97	229997	42.45
#27	7/8	2	141095	33.30	230008	41.65
#28	3/4	2	141106	32.20	230019	40.19
#29	3/4	2	141117	31.49	230030	39.36
#30	3/4	2	141128	31.01	230041	38.78



Straight flute drills excel in high rockwell and hard-to-machine materials

For coating information see pages 6-9. For technical information, please see pages 208 - 209.

DIAMETER TOLERANCE	+.0000, -.0005

GENERAL PURPOSE
M42 COBALT DRILLS

STUB LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "J"

NAS 907 - M42 COBALT

NAS 907 - M42 COBALT
ALTIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
1/16	5/8	1-5/8	12	103365	2.86	233990	5.19
5/64	11/16	1-11/16	12	103376	2.86	234001	5.19
3/32	3/4	1-3/4	12	103387	2.86	234012	5.19
7/64	13/16	1-13/16	12	103398	3.24	234023	5.87
1/8	7/8	1-7/8	12	103409	3.74	234034	6.82
9/64	15/16	1-15/16	12	103420	3.74	234045	6.82
5/32	1	2-1/16	12	103431	4.12	234056	7.46
11/64	1-1/16	2-1/8	12	103442	4.67	234067	8.40
3/16	1-1/8	2-3/16	12	103453	5.47	234078	9.91
13/64	1-3/16	2-1/4	12	103464	6.27	234089	11.28
7/32	1-1/4	2-3/8	12	103475	6.90	234100	12.48
15/64	1-5/16	2-7/16	12	103486	7.40	234111	13.42
1/4	1-3/8	2-1/2	12	103497	7.70	234122	13.94
17/64	1-7/16	2-5/8	6	103508	8.79	234133	15.87
9/32	1-1/2	2-11/16	6	103519	9.55	234144	17.28

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
19/64	1-9/16	2-3/4	6	103530	11.06	234155	19.98
5/16	1-5/8	2-13/16	6	103541	11.86	234166	21.44
21/64	1-11/16	2-15/16	6	103552	13.17	234177	23.80
11/32	1-11/16	3	6	103563	14.22	234188	25.73
23/64	1-3/4	3-1/16	6	103574	16.37	234199	29.59
3/8	1-13/16	3-1/8	6	103585	16.37	234210	29.59
25/64	1-7/8	3-1/4	6	103596	18.72	234221	33.87
13/32	1-15/16	3-5/16	6	103607	19.35	234232	34.95
27/64	2	3-3/8	6	103618	21.46	234243	38.72
7/16	1-1/16	3-7/16	6	103629	22.04	234254	39.84
29/64	2-1/8	3-9/16	6	103640	26.46	234265	47.77
15/32	2-1/8	3-5/8	6	103651	26.46	234276	47.77
31/64	2-3/16	3-11/16	6	103662	26.46	234287	47.77
1/2	2-1/4	3-3/4	6	103673	26.46	234298	47.77

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
A	1-5/16	2-7/16	12	104344	8.83	234969	15.95
B	1-3/8	2-1/2	12	104355	9.38	234980	16.94
C	1-3/8	2-1/2	12	104366	9.38	234991	16.94
D	1-3/8	2-1/2	12	104377	9.38	235002	16.94
E	1-3/8	2-1/2	12	104388	8.54	235013	15.48
F	1-7/16	2-5/8	6	104399	9.93	235024	17.92
G	1-7/16	2-5/8	6	104410	9.93	235035	17.92
H	1-1/2	2-11/16	6	104421	10.52	235046	19.04
I	1-1/2	2-11/16	6	104432	10.52	235057	19.04
J	1-1/2	2-11/16	6	104443	10.52	235068	19.04
K	1-1/2	2-11/16	6	104454	10.52	235079	19.04
L	1-9/16	2-3/4	6	104465	12.49	235090	22.55
M	1-9/16	2-3/4	6	104476	12.49	235101	22.55

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
N	1-5/8	2-13/16	6	104487	13.42	235112	24.23
O	1-11/16	2-15/16	6	104498	14.85	235123	26.84
P	1-11/16	2-15/16	6	104509	14.85	235134	26.84
Q	1-11/16	3	6	104520	16.07	235145	29.03
R	1-11/16	3	6	104531	16.07	235156	29.03
S	1-3/4	3-1/16	6	104542	19.98	235167	36.15
T	1-3/4	3-1/16	6	104553	19.98	235178	36.15
U	1-13/16	3-1/8	6	104564	19.98	235189	36.15
V	1-7/8	3-1/4	6	104575	22.21	235200	40.09
W	1-7/8	3-1/4	6	104586	22.21	235211	40.09
X	1-15/16	3-5/16	6	104597	22.21	235222	40.09
Y	1-15/16	3-5/16	6	104608	22.21	235233	40.09
Z	2	3-3/8	6	104619	25.45	235244	46.01

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

All cobalt drills have identification ring on shank.
For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE
M42 COBALT DRILLS

STUB LENGTH - HEAVY DUTY - 135° SPLIT POINT - TYPE "J"

NAS 907 - M42 COBALT

NAS 907 - M42 COBALT
ALTIN COATED

WIRE SIZES								WIRE SIZES							
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE	SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#1	1-5/16	2-7/16	12	103684	8.50	234309	15.35	#31	7/8	1-7/8	12	104014	3.53	234639	6.39
#2	1-5/16	2-7/16	12	103695	8.50	234320	15.35	#32	7/8	1-7/8	12	104025	3.53	234650	6.39
#3	1-1/4	2-3/8	12	103706	8.50	234331	15.35	#33	7/8	1-7/8	12	104036	3.41	234661	6.17
#4	1-1/4	2-3/8	12	103717	7.57	234342	13.72	#34	7/8	1-7/8	12	104047	3.41	234672	6.17
#5	1-1/4	2-3/8	12	103728	7.57	234353	13.72	#35	7/8	1-7/8	12	104058	3.41	234683	6.17
#6	1-1/4	2-3/8	12	103739	7.57	234364	13.72	#36	13/16	1-13/16	12	104069	3.41	234694	6.17
#7	1-3/16	2-1/4	12	103750	5.97	234375	10.76	#37	13/16	1-13/16	12	104080	3.41	234705	6.17
#8	1-3/16	2-1/4	12	103761	5.97	234386	10.76	#38	13/16	1-13/16	12	104091	3.11	234716	5.62
#9	1-3/16	2-1/4	12	103772	5.97	234397	10.76	#39	13/16	1-13/16	12	104102	3.11	234727	5.62
#10	1-3/16	2-1/4	12	103783	5.97	234408	10.76	#40	13/16	1-13/16	12	104113	3.11	234738	5.62
#11	1-3/16	2-1/4	12	103794	5.81	234419	10.46	#41	13/16	1-13/16	12	104124	2.99	234749	5.62
#12	1-3/16	2-1/4	12	103805	5.81	234430	10.46	#42	3/4	1-3/4	12	104135	2.95	234760	5.62
#13	1-1/8	2-3/16	12	103816	5.68	234441	10.29	#43	3/4	1-3/4	12	104146	2.95	234771	5.62
#14	1-1/8	2-3/16	12	103827	5.68	234452	10.29	#44	3/4	1-3/4	12	104157	2.95	234782	5.62
#15	1-1/8	2-3/16	12	103838	5.68	234463	10.29	#45	3/4	1-3/4	12	104168	2.95	234793	5.62
#16	1-1/8	2-3/16	12	103849	5.68	234474	10.25	#46	3/4	1-3/4	12	104179	2.95	234804	5.62
#17	1-1/8	2-3/16	12	103860	5.47	234485	9.91	#47	11/16	1-11/16	12	104190	2.95	234815	5.62
#18	1-1/16	2-1/8	12	103871	4.67	234496	8.40	#48	11/16	1-11/16	12	104201	2.95	234826	5.62
#19	1-1/16	2-1/8	12	103882	4.42	234507	7.98	#49	11/16	1-11/16	12	104212	2.95	234837	5.62
#20	1-1/16	2-1/8	12	103893	4.42	234518	7.98	#50	11/16	1-11/16	12	104223	2.95	234848	5.62
#21	1-1/16	2-1/8	12	103904	4.42	234529	7.98	#51	11/16	1-11/16	12	104234	2.95	234859	5.62
#22	1-1/16	2-1/8	12	103915	4.42	234540	7.98	#52	11/16	1-11/16	12	104245	2.95	234870	5.62
#23	1	2-1/16	12	103926	4.42	234551	7.98	#53	5/8	1-5/8	12	104256	3.32	234881	6.00
#24	1	2-1/16	12	103937	4.42	234562	7.98	#54	5/8	1-5/8	12	104267	3.32	234892	6.00
#25	1	2-1/16	12	103948	4.12	234573	7.46	#55	5/8	1-5/8	12	104278	3.32	234903	6.00
#26	1	2-1/16	12	103959	4.12	234584	7.46	#56	1/2	1-3/8	12	104289	3.32	234914	6.00
#27	1	2-1/16	12	103970	4.12	234595	7.46	#57	1/2	1-3/8	12	104300	3.32	234925	6.00
#28	15/16	1-15/16	12	103981	3.74	234606	6.82	#58	1/2	1-3/8	12	104311	3.53	234936	6.39
#29	15/16	1-15/16	12	103992	3.74	234617	6.82	#59	1/2	1-3/8	12	104322	3.53	234947	6.39
#30	15/16	1-15/16	12	104003	3.53	234628	6.39	#60	1/2	1-3/8	12	104333	3.53	234958	6.39

- AlTiN coating for use in high temperature drilling applications
- Coating allows for increased machining speeds from 50% up to 200%
- Used in drilling Stainless Steels, Nickel-based and Titanium alloys
- Not recommended for Aluminum

All cobalt drills have identification ring on shank.
For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE
M42 COBALT DRILLS

JOBBER LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "J"

NAS 907 - M42 COBALT

NAS 907 - M42 COBALT
ALTIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
1/16	7/8	1-7/8	12	111923	3.32	235266	5.96
5/64	1	2	12	111934	3.32	235277	5.96
3/32	1-1/4	2-1/4	12	111945	3.32	235288	5.96
7/64	1-1/2	2-5/8	12	111956	3.49	235299	6.30
1/8	1-5/8	2-3/4	12	111967	4.29	235310	7.72
9/64	1-3/4	2-7/8	12	111978	4.29	235321	7.72
5/32	2	3-1/8	12	111989	4.80	235332	8.66
11/64	2-1/8	3-1/4	12	112000	5.05	235343	9.13
3/16	2-5/16	3-1/2	12	112011	5.68	235354	10.25
13/64	2-7/16	3-5/8	12	112022	6.82	235365	12.31
7/32	2-1/2	3-3/4	12	112033	7.45	235376	13.46
15/64	2-5/8	3-7/8	12	112044	7.91	235387	14.28
1/4	2-3/4	4	12	112055	8.46	235398	15.31
17/64	2-7/8	4-1/8	6	112066	9.59	235409	17.32
9/32	2-15/16	4-1/4	6	112077	10.05	235420	18.18

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
19/64	3-1/16	4-3/8	6	112088	12.24	235431	22.13
5/16	3-3/16	4-1/2	6	112099	13.04	235442	23.54
21/64	3-5/16	4-5/8	6	112110	14.43	235453	26.07
11/32	3-7/16	4-3/4	6	112121	15.86	235464	28.64
23/64	3-1/2	4-7/8	6	112132	18.17	235475	32.80
3/8	3-5/8	5	6	112143	18.17	235486	32.80
25/64	3-3/4	5-1/8	6	112154	20.66	235497	37.31
13/32	3-7/8	5-1/4	6	112165	21.54	235508	38.93
27/64	3-15/16	5-3/8	6	112176	23.81	235519	43.05
7/16	4-1/16	5-1/2	6	112187	24.36	235530	44.04
29/64	4-3/16	5-5/8	6	112198	29.24	235541	52.83
15/32	4-5/16	5-3/4	6	112209	29.79	235552	53.81
31/64	4-3/8	5-7/8	6	112220	29.95	235563	54.11
1/2	4-1/2	6	6	112231	29.95	235574	54.11

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
A	2-5/8	3-7/8	12	113122	8.96	236245	16.17
B	2-3/4	4	12	113133	10.35	236256	18.65
C	2-3/4	4	12	113144	10.35	236267	18.65
D	2-3/4	4	12	113155	11.65	236278	21.01
E	2-3/4	4	12	113166	8.46	236289	15.31
F	2-7/8	4-1/8	6	113177	10.35	236300	18.65
G	2-7/8	4-1/8	6	113188	10.35	236311	18.65
H	2-7/8	4-1/8	6	113199	11.65	236322	21.01
I	2-7/8	4-1/8	6	113210	11.65	236333	21.01
J	2-7/8	4-1/8	6	113221	11.65	236344	21.01
K	2-15/16	4-1/4	6	113232	11.65	236355	21.01
L	2-15/16	4-1/4	6	113243	13.21	236366	23.88
M	3-1/16	4-3/8	6	113254	14.01	236377	25.34

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
N	3-1/16	4-3/8	6	113265	14.01	236388	25.34
O	3-3/16	4-1/2	6	113276	15.48	236399	28.00
P	3-5/16	4-5/8	6	113287	16.45	236410	29.76
Q	3-7/16	4-3/4	6	113298	17.08	236421	30.83
R	3-7/16	4-3/4	6	113309	17.08	236432	30.83
S	3-1/2	4-7/8	6	113320	20.91	236443	37.82
T	3-1/2	4-7/8	6	113331	20.91	236454	37.82
U	3-5/8	5	6	113342	20.91	236465	37.82
V	3-5/8	5	6	113353	23.05	236476	41.68
W	3-3/4	5-1/8	6	113364	23.05	236487	41.68
X	3-3/4	5-1/8	6	113375	23.05	236498	41.68
Y	3-7/8	5-1/4	6	113386	24.44	236509	44.17
Z	3-7/8	5-1/4	6	113397	26.59	236520	48.03

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

All cobalt drills have identification ring on shank.
For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE
M42 COBALT DRILLS

MADE IN THE USA

JOBBER LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "J"

NAS 907 - M42 COBALT

NAS 907 - M42 COBALT
ALTIN COATED

WIRE SIZES							WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE	SIZE	FLUTE LENGTH	OAL	PKG. QTY.	UNCOATED	LIST PRICE	ALTIN	LIST PRICE
#1	2-5/8	3-7/8	12	112242	9.05	235585	16.38	#31	1-5/8	2-3/4	12	112572	3.83	235915	6.95
#2	2-5/8	3-7/8	12	112253	9.05	235596	16.38	#32	1-5/8	2-3/4	12	112583	3.79	235926	6.86
#3	2-1/2	3-3/4	12	112264	8.46	235607	15.31	#33	1-1/2	2-5/8	12	112594	3.66	235937	6.60
#4	2-1/2	3-3/4	12	112275	8.46	235618	15.31	#34	1-1/2	2-5/8	12	112605	3.66	235948	6.60
#5	2-1/2	3-3/4	12	112286	8.46	235629	15.31	#35	1-1/2	2-5/8	12	112616	3.66	235959	6.60
#6	2-1/2	3-3/4	12	112297	8.46	235640	15.31	#36	1-7/16	2-1/2	12	112627	3.62	235970	6.52
#7	2-7/16	3-5/8	12	112308	6.61	235651	11.92	#37	1-7/16	2-1/2	12	112638	3.62	235981	6.52
#8	2-7/16	3-5/8	12	112319	6.61	235662	11.92	#38	1-7/16	2-1/2	12	112649	3.37	235992	6.23
#9	2-7/16	3-5/8	12	112330	6.61	235673	11.92	#39	1-3/8	2-3/8	12	112660	3.37	236003	6.23
#10	2-7/16	3-5/8	12	112341	6.61	235684	11.92	#40	1-3/8	2-3/8	12	112671	3.37	236014	6.23
#11	2-5/16	3-1/2	12	112352	6.61	235695	11.92	#41	1-3/8	2-3/8	12	112682	3.32	236025	6.23
#12	2-5/16	3-1/2	12	112363	6.61	235706	11.92	#42	1-1/4	2-1/4	12	112693	3.28	236036	6.23
#13	2-5/16	3-1/2	12	112374	6.48	235717	11.71	#43	1-1/4	2-1/4	12	112704	3.28	236047	6.23
#14	2-3/16	3-3/8	12	112385	6.48	235728	11.71	#44	1-1/8	2-1/8	12	112715	3.28	236058	6.23
#15	2-3/16	3-3/8	12	112396	6.48	235739	11.71	#45	1-1/8	2-1/8	12	112726	3.28	236069	6.23
#16	2-3/16	3-3/8	12	112407	5.89	235750	10.68	#46	1-1/8	2-1/8	12	112737	3.28	236080	6.23
#17	2-3/16	3-3/8	12	112418	5.76	235761	10.42	#47	1	2	12	112748	3.28	236091	6.23
#18	2-1/8	3-1/4	12	112429	5.26	235772	9.52	#48	1	2	12	112759	3.28	236102	6.23
#19	2-1/8	3-1/4	12	112440	5.13	235783	9.26	#49	1	2	12	112770	3.28	236113	6.23
#20	2-1/8	3-1/4	12	112451	5.13	235794	9.26	#50	1	2	12	112781	3.28	236124	6.23
#21	2-1/8	3-1/4	12	112462	5.09	235805	9.18	#51	1	2	12	112792	3.28	236135	6.23
#22	2	3-1/8	12	112473	5.09	235816	9.18	#52	7/8	1-7/8	12	112803	3.28	236146	6.23
#23	2	3-1/8	12	112484	5.09	235827	9.18	#53	7/8	1-7/8	12	112814	3.66	236157	6.65
#24	2	3-1/8	12	112495	5.09	235838	9.18	#54	7/8	1-7/8	12	112825	3.66	236168	6.65
#25	1-7/8	3	12	112506	4.67	235849	8.40	#55	7/8	1-7/8	12	112836	3.66	236179	6.65
#26	1-7/8	3	12	112517	4.59	235860	8.32	#56	3/4	1-3/4	12	112847	4.12	236190	7.50
#27	1-7/8	3	12	112528	4.59	235871	8.32	#57	3/4	1-3/4	12	112858	4.12	236201	7.50
#28	1-3/4	2-7/8	12	112539	4.29	235882	7.80	#58	11/16	1-5/8	12	112869	4.12	236212	7.50
#29	1-3/4	2-7/8	12	112550	4.17	235893	7.55	#59	11/16	1-5/8	12	112880	4.12	236223	7.50
#30	1-5/8	2-3/4	12	112561	3.95	235904	7.08	#60	11/16	1-5/8	12	112891	4.12	236234	7.50

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

- AlTiN coating for use in high temperature drilling applications
- Coating allows for increased machining speeds from 50% up to 200%
- Used in drilling Stainless Steels, Nickel-based and Titanium alloys
- Not recommended for Aluminum

All cobalt drills have identification ring on shank.
For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

STUB LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "C"

OXIDE FINISH

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
1/16	5/8	1-5/8	12	102100	2.23
5/64	11/16	1-11/16	12	102111	2.27
3/32	3/4	1-3/4	12	102122	2.27
7/64	13/16	1-13/16	12	102133	2.27
1/8	7/8	1-7/8	12	102144	2.27
9/64	15/16	1-15/16	12	102155	2.27
5/32	1	2-1/16	12	102166	2.47
11/64	1-1/16	2-1/8	12	102177	2.47
3/16	1-1/8	2-3/16	12	102188	2.88
13/64	1-3/16	2-1/4	12	102199	2.96
7/32	1-1/4	2-3/8	12	102210	3.37
15/64	1-5/16	2-7/16	12	102221	3.89
1/4	1-3/8	2-1/2	12	102232	4.30
17/64	1-7/16	2-5/8	6	102243	4.42
9/32	1-1/2	2-11/16	6	102254	4.66

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
19/64	1-9/16	2-3/4	6	102265	5.07
5/16	1-5/8	2-13/16	6	102276	5.39
21/64	1-11/16	2-15/16	6	102287	6.04
11/32	1-11/16	3	6	102298	6.45
23/64	1-3/4	3-1/16	6	102309	6.85
3/8	1-13/16	3-1/8	6	102320	7.46
25/64	1-7/8	3-1/4	6	102331	7.91
13/32	1-15/16	3-5/16	6	102342	8.68
27/64	2	3-3/8	6	102353	9.16
7/16	1-1/16	3-7/16	6	102364	10.01
29/64	2-1/8	3-9/16	6	102375	10.62
15/32	2-1/8	3-5/8	6	102386	11.68
31/64	2-3/16	3-11/16	6	102397	12.12
1/2	2-1/4	3-3/4	6	102408	12.77

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
A	1-5/16	2-7/16	12	103079	4.66
B	1-3/8	2-1/2	12	103090	4.91
C	1-3/8	2-1/2	12	103101	4.91
D	1-3/8	2-1/2	12	103112	4.95
E	1-3/8	2-1/2	12	103123	4.95
F	1-7/16	2-5/8	6	103134	6.37
G	1-7/16	2-5/8	6	103145	6.81
H	1-1/2	2-11/16	6	103156	7.01
I	1-1/2	2-11/16	6	103167	7.05
J	1-1/2	2-11/16	6	103178	7.22
K	1-1/2	2-11/16	6	103189	7.34
L	1-9/16	2-3/4	6	103200	7.50
M	1-9/16	2-3/4	6	103211	7.86

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
N	1-5/8	2-13/16	6	103222	8.19
O	1-11/16	2-15/16	6	103233	9.20
P	1-11/16	2-15/16	6	103244	9.45
Q	1-11/16	3	6	103255	9.85
R	1-11/16	3	6	103266	10.14
S	1-3/4	3-1/16	6	103277	10.54
T	1-3/4	3-1/16	6	103288	10.78
U	1-13/16	3-1/8	6	103299	11.64
V	1-7/8	3-1/4	6	103310	12.36
W	1-7/8	3-1/4	6	103321	12.81
X	1-15/16	3-5/16	6	103332	13.58
Y	1-15/16	3-5/16	6	103343	13.86
Z	2	3-3/8	6	103354	14.35

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

For technical information, please see pages 210 - 211.

STUB LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "C"

OXIDE FINISH

WIRE SIZES					
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
#1	1-5/16	2-7/16	12	102419	3.89
#2	1-5/16	2-7/16	12	102430	3.89
#3	1-1/4	2-3/8	12	102441	4.01
#4	1-1/4	2-3/8	12	102452	4.01
#5	1-1/4	2-3/8	12	102463	4.01
#6	1-1/4	2-3/8	12	102474	4.01
#7	1-3/16	2-1/4	12	102485	3.45
#8	1-3/16	2-1/4	12	102496	3.45
#9	1-3/16	2-1/4	12	102507	3.45
#10	1-3/16	2-1/4	12	102518	3.45
#11	1-3/16	2-1/4	12	102529	3.45
#12	1-3/16	2-1/4	12	102540	3.45
#13	1-1/8	2-3/16	12	102551	3.45
#14	1-1/8	2-3/16	12	102562	3.45
#15	1-1/8	2-3/16	12	102573	3.45
#16	1-1/8	2-3/16	12	102584	3.45
#17	1-1/8	2-3/16	12	102595	3.45
#18	1-1/16	2-1/8	12	102606	3.28
#19	1-1/16	2-1/8	12	102617	3.28
#20	1-1/16	2-1/8	12	102628	3.28
#21	1-1/16	2-1/8	12	102639	3.28
#22	1-1/16	2-1/8	12	102650	3.20
#23	1	2-1/16	12	102661	3.20
#24	1	2-1/16	12	102672	3.20
#25	1	2-1/16	12	102683	3.20
#26	1	2-1/16	12	102694	3.20
#27	1	2-1/16	12	102705	3.20
#28	15/16	1-15/16	12	102716	3.20
#29	15/16	1-15/16	12	102727	3.20
#30	15/16	1-15/16	12	102738	2.51

WIRE SIZES					
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
#31	7/8	1-7/8	12	102749	2.51
#32	7/8	1-7/8	12	102760	2.51
#33	7/8	1-7/8	12	102771	2.51
#34	7/8	1-7/8	12	102782	2.51
#35	7/8	1-7/8	12	102793	2.51
#36	13/16	1-13/16	12	102804	2.51
#37	13/16	1-13/16	12	102815	2.51
#38	13/16	1-13/16	12	102826	2.51
#39	13/16	1-13/16	12	102837	2.51
#40	13/16	1-13/16	12	102848	2.51
#41	13/16	1-13/16	12	102859	2.51
#42	3/4	1-3/4	12	102870	2.51
#43	3/4	1-3/4	12	102881	2.51
#44	3/4	1-3/4	12	102892	2.51
#45	3/4	1-3/4	12	102903	2.51
#46	3/4	1-3/4	12	102914	2.51
#47	11/16	1-11/16	12	102925	2.51
#48	11/16	1-11/16	12	102936	2.51
#49	11/16	1-11/16	12	102947	2.51
#50	11/16	1-11/16	12	102958	2.51
#51	11/16	1-11/16	12	102969	2.51
#52	11/16	1-11/16	12	102980	2.51
#53	5/8	1-5/8	12	102991	2.51
#54	5/8	1-5/8	12	103002	2.51
#55	5/8	1-5/8	12	103013	2.51
#56	1/2	1-3/8	12	103024	2.51
#57	1/2	1-3/8	12	103035	2.51
#58	1/2	1-3/8	12	103046	2.51
#59	1/2	1-3/8	12	103057	2.51
#60	1/2	1-3/8	12	103068	2.51

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

JOBBER LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "B"

HIGH SPEED STEEL OXIDE FINISH

HIGH SPEED STEEL BLACK & GOLD

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE
1/16	7/8	1-7/8	12	107798	1.91	109063	2.19
5/64	1	2	12	107809	1.91	109074	2.19
3/32	1-1/4	2-1/4	12	107820	1.91	109085	2.19
7/64	1-1/2	2-5/8	12	107831	1.91	109096	2.27
1/8	1-5/8	2-3/4	12	107842	1.91	109107	2.51
9/64	1-3/4	2-7/8	12	107853	2.07	109118	2.64
5/32	2	3-1/8	12	107864	2.51	109129	3.16
11/64	2-1/8	3-1/4	12	107875	2.68	109140	3.32
3/16	2-5/16	3-1/2	12	107886	3.04	109151	3.69
13/64	2-7/16	3-5/8	12	107897	3.28	109162	4.01
7/32	2-1/2	3-3/4	12	107908	3.61	109173	4.38
15/64	2-5/8	3-7/8	12	107919	3.93	109184	4.82
1/4	2-3/4	4	12	107930	4.18	109195	5.07
17/64	2-7/8	4-1/8	6	107941	5.76	109206	6.81
9/32	2-15/16	4-1/4	6	107952	6.24	109217	7.34

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE
19/64	3-1/16	4-3/8	6	107963	6.89	109228	8.07
5/16	3-3/16	4-1/2	6	107974	7.09	109239	8.35
21/64	3-5/16	4-5/8	6	107985	8.03	109250	9.20
11/32	3-7/16	4-3/4	6	107996	8.51	109261	9.85
23/64	3-1/2	4-7/8	6	108007	8.96	109272	10.66
3/8	3-5/8	5	6	108018	9.77	109283	11.15
25/64	3-3/4	5-1/8	6	108029	10.62	109294	12.12
13/32	3-7/8	5-1/4	6	108040	11.51	109305	13.34
27/64	3-15/16	5-3/8	6	108051	12.41	109316	14.23
7/16	4-1/16	5-1/2	6	108062	13.46	109327	15.32
29/64	4-3/16	5-5/8	6	108073	14.35	109338	16.30
15/32	4-5/16	5-3/4	6	108084	15.61	109349	17.72
31/64	4-3/8	5-7/8	6	108095	16.50	109360	18.69
1/2	4-1/2	6	6	108106	17.35	109371	19.54

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE
A	2-5/8	3-7/8	12	108777	4.50	110042	7.11
B	2-3/4	4	12	108788	4.50	110053	7.11
C	2-3/4	4	12	108799	4.50	110064	7.11
D	2-3/4	4	12	108810	4.50	110075	6.88
E	2-3/4	4	12	108821	4.50	110086	5.73
F	2-7/8	4-1/8	6	108832	5.72	110097	7.68
G	2-7/8	4-1/8	6	108843	5.72	110108	8.31
H	2-7/8	4-1/8	6	108854	5.72	110119	8.48
I	2-7/8	4-1/8	6	108865	5.72	110130	8.48
J	2-7/8	4-1/8	6	108876	6.93	110141	9.00
K	2-15/16	4-1/4	6	108887	6.93	110152	10.03
L	2-15/16	4-1/4	6	108898	6.93	110163	9.68
M	3-1/16	4-3/8	6	108909	8.51	110174	10.66

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE
N	3-1/16	4-3/8	6	108920	8.51	110185	10.66
O	3-3/16	4-1/2	6	108931	8.51	110196	10.66
P	3-5/16	4-5/8	6	108942	9.61	110207	11.92
Q	3-7/16	4-3/4	6	108953	9.61	110218	12.26
R	3-7/16	4-3/4	6	108964	9.61	110229	12.78
S	3-1/2	4-7/8	6	108975	10.95	110240	13.81
T	3-1/2	4-7/8	6	108986	10.95	110251	15.53
U	3-5/8	5	6	108997	11.64	110262	15.53
V	3-5/8	5	6	109008	11.64	110273	15.82
W	3-3/4	5-1/8	6	109019	13.22	110284	19.37
X	3-3/4	5-1/8	6	109030	13.22	110295	22.86
Y	3-7/8	5-1/4	6	109041	14.39	110306	23.15
Z	3-7/8	5-1/4	6	109052	14.39	110317	23.67

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

MADE IN THE USA

JOBBER LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "B"

HIGH SPEED STEEL
OXIDE FINISH

HIGH SPEED STEEL
BLACK & GOLD

WIRE SIZES								WIRE SIZES							
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE	SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE	BLACK & GOLD	LIST PRICE
#1	2-5/8	3-7/8	12	108117	3.89	109382	6.59	#31	1-5/8	2-3/4	12	108447	2.72	109712	3.28
#2	2-5/8	3-7/8	12	108128	3.89	109393	6.59	#32	1-5/8	2-3/4	12	108458	2.72	109723	3.28
#3	2-1/2	3-3/4	12	108139	3.61	109404	6.13	#33	1-1/2	2-5/8	12	108469	2.72	109734	3.28
#4	2-1/2	3-3/4	12	108150	3.61	109415	6.13	#34	1-1/2	2-5/8	12	108480	2.72	109745	3.28
#5	2-1/2	3-3/4	12	108161	3.61	109426	6.13	#35	1-1/2	2-5/8	12	108491	2.72	109756	3.28
#6	2-1/2	3-3/4	12	108172	3.61	109437	6.13	#36	1-7/16	2-1/2	12	108502	2.72	109767	3.16
#7	2-7/16	3-5/8	12	108183	3.41	109448	5.39	#37	1-7/16	2-1/2	12	108513	2.72	109778	3.16
#8	2-7/16	3-5/8	12	108194	3.45	109459	5.39	#38	1-7/16	2-1/2	12	108524	2.72	109789	3.16
#9	2-7/16	3-5/8	12	108205	3.45	109470	5.39	#39	1-3/8	2-3/8	12	108535	2.72	109800	3.16
#10	2-7/16	3-5/8	12	108216	3.12	109481	5.27	#40	1-3/8	2-3/8	12	108546	2.72	109811	3.16
#11	2-5/16	3-1/2	12	108227	3.12	109492	4.87	#41	1-3/8	2-3/8	12	108557	2.59	109822	3.16
#12	2-5/16	3-1/2	12	108238	3.12	109503	4.87	#42	1-1/4	2-1/4	12	108568	2.59	109833	3.16
#13	2-5/16	3-1/2	12	108249	3.45	109514	4.70	#43	1-1/4	2-1/4	12	108579	2.59	109844	3.16
#14	2-3/16	3-3/8	12	108260	3.45	109525	4.70	#44	1-1/8	2-1/8	12	108590	2.59	109855	3.16
#15	2-3/16	3-3/8	12	108271	3.45	109536	4.70	#45	1-1/8	2-1/8	12	108601	2.59	109866	3.16
#16	2-3/16	3-3/8	12	108282	3.45	109547	4.70	#46	1-1/8	2-1/8	12	108612	2.59	109877	3.16
#17	2-3/16	3-3/8	12	108293	3.45	109558	4.70	#47	1	2	12	108623	2.59	109888	3.16
#18	2-1/8	3-1/4	12	108304	3.45	109569	4.13	#48	1	2	12	108634	2.59	109899	3.16
#19	2-1/8	3-1/4	12	108315	3.28	109580	4.13	#49	1	2	12	108645	2.59	109910	3.16
#20	2-1/8	3-1/4	12	108326	3.28	109591	4.13	#50	1	2	12	108656	2.59	109921	3.16
#21	2-1/8	3-1/4	12	108337	3.08	109602	4.09	#51	1	2	12	108667	2.59	109932	3.16
#22	2	3-1/8	12	108348	3.08	109613	4.09	#52	7/8	1-7/8	12	108678	2.59	109943	2.96
#23	2	3-1/8	12	108359	3.08	109624	3.97	#53	7/8	1-7/8	12	108689	2.59	109954	2.96
#24	2	3-1/8	12	108370	3.08	109635	3.97	#54	7/8	1-7/8	12	108700	2.59	109965	2.96
#25	1-7/8	3	12	108381	3.08	109646	3.97	#55	7/8	1-7/8	12	108711	2.59	109976	2.96
#26	1-7/8	3	12	108392	3.08	109657	3.97	#56	3/4	1-3/4	12	108722	2.59	109987	2.96
#27	1-7/8	3	12	108403	3.08	109668	3.85	#57	3/4	1-3/4	12	108733	2.59	109998	2.96
#28	1-3/4	2-7/8	12	108414	3.08	109679	3.85	#58	11/16	1-5/8	12	108744	2.59	110009	2.96
#29	1-3/4	2-7/8	12	108425	2.47	109690	3.77	#59	11/16	1-5/8	12	108755	2.59	110020	2.96
#30	1-5/8	2-3/4	12	108436	2.47	109701	3.28	#60	11/16	1-5/8	12	108766	2.59	110031	2.96

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

JOBBER LENGTH - 118º POINT

OXIDE FINISH

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
1/16	7/8	1-7/8	12	104663	1.91
5/64	1	2	12	104674	1.91
3/32	1-1/4	2-1/4	12	104685	1.91
7/64	1-1/2	2-5/8	12	104696	1.91
1/8	1-5/8	2-3/4	12	104707	1.91
9/64	1-3/4	2-7/8	12	104718	2.03
5/32	2	3-1/8	12	104729	2.11
11/64	2-1/8	3-1/4	12	104740	2.27
3/16	2-5/16	3-1/2	12	104751	2.47
13/64	2-7/16	3-5/8	12	104762	2.80
7/32	2-1/2	3-3/4	12	104773	3.08
15/64	2-5/8	3-7/8	12	104784	3.45
1/4	2-3/4	4	12	104795	3.53
17/64	2-7/8	4-1/8	6	104806	5.07
9/32	2-15/16	4-1/4	6	104817	5.39
19/64	3-1/16	4-3/8	6	104828	5.92
5/16	3-3/16	4-1/2	6	104839	6.16
21/64	3-5/16	4-5/8	6	104850	6.89
11/32	3-7/16	4-3/4	6	104861	7.38
23/64	3-1/2	4-7/8	6	104872	8.11
3/8	3-5/8	5	6	104883	8.51

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
25/64	3-3/4	5-1/8	6	104894	9.20
13/32	3-7/8	5-1/4	6	104905	10.05
27/64	3-15/16	5-3/8	6	104916	10.70
7/16	4-1/16	5-1/2	6	104927	11.68
29/64	4-3/16	5-5/8	6	104938	12.45
15/32	4-5/16	5-3/4	6	104949	13.54
31/64	4-3/8	5-7/8	6	104960	14.31
1/2	4-1/2	6	6	104971	14.92
33/64	4-13/16	6-5/8	1	104982	35.64
17/32	4-13/16	6-5/8	1	104993	37.34
35/64	4-13/16	6-5/8	1	105004	40.42
9/16	4-13/16	6-5/8	1	105015	42.32
37/64	4-13/16	6-5/8	1	105026	42.45
19/32	5-3/16	7-1/8	1	105037	43.62
39/64	5-3/16	7-1/8	1	105048	47.92
5/8	5-3/16	7-1/8	1	105059	46.78
41/64	5-3/16	7-1/8	1	105070	51.16
21/32	5-3/16	7-1/8	1	105081	49.42
43/64	5-5/8	7-5/8	1	105092	58.09
11/16	5-5/8	7-5/8	1	105103	56.84

METRIC SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
1.00	17	41	12	215037	2.49
1.05	17	41	12	215048	2.75
1.10	19	44	12	215059	2.62
1.15	19	44	12	215070	2.66
1.20	22	48	12	215081	2.62
1.25	22	48	12	215092	2.66
1.30	22	48	12	215103	2.62
1.35	22	48	12	215114	2.75
1.40	22	48	12	215125	2.62
1.50	22	48	12	215147	2.62
1.60	22	48	12	215169	2.62
1.70	25	51	12	215191	2.66
1.80	25	51	12	215213	2.66
1.90	25	51	12	215235	2.66
2.00	25	51	12	215257	2.66
2.50	35	60	12	215367	2.79
3.00	41	70	12	215422	2.92
3.50	45	73	12	215477	3.05
4.00	54	83	12	215532	3.18

METRIC SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
4.50	56	86	12	215587	3.57
5.00	62	92	12	215642	4.04
5.50	64	95	12	215697	4.56
6.00	70	102	12	215752	4.94
6.50	73	105	6	215807	6.32
7.00	73	105	6	215862	6.57
7.50	78	111	6	215917	7.82
8.00	81	114	6	215972	8.59
8.50	87	121	6	216027	9.84
9.00	89	124	6	216082	11.09
9.50	92	127	6	216137	11.60
10.00	95	130	6	216192	14.18
10.50	98	133	6	216214	14.18
11.00	103	140	6	216225	14.57
11.50	106	143	6	216247	16.37
12.00	111	149	6	216258	18.05
12.50	114	152	6	216269	18.44
13.00	114	152	6	216280	30.55

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

JOBBER LENGTH - 118º POINT

OXIDE FINISH

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
A	2-5/8	3-7/8	12	105994	3.45
B	2-3/4	4	12	106005	3.53
C	2-3/4	4	12	106016	3.53
D	2-3/4	4	12	106027	3.65
E	2-3/4	4	12	106038	3.69
F	2-7/8	4-1/8	6	106049	5.11
G	2-7/8	4-1/8	6	106060	4.91
H	2-7/8	4-1/8	6	106071	4.99
I	2-7/8	4-1/8	6	106082	5.11
J	2-7/8	4-1/8	6	106093	5.27
K	2-15/16	4-1/4	6	106104	5.39
L	2-15/16	4-1/4	6	106115	5.64
M	3-1/16	4-3/8	6	106126	5.96

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
N	3-1/16	4-3/8	6	106137	6.16
O	3-3/16	4-1/2	6	106148	6.69
P	3-5/16	4-5/8	6	106159	7.18
Q	3-7/16	4-3/4	6	106170	7.46
R	3-7/16	4-3/4	6	106181	7.74
S	3-1/2	4-7/8	6	106192	8.11
T	3-1/2	4-7/8	6	106203	8.51
U	3-5/8	5	6	106214	9.20
V	3-5/8	5	6	106225	9.53
W	3-3/4	5-1/8	6	106236	10.14
X	3-3/4	5-1/8	6	106247	10.74
Y	3-7/8	5-1/4	6	106258	11.27
Z	3-7/8	5-1/4	6	106269	11.51

WIRE SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
#1	2-5/8	3-7/8	12	105114	3.77
#2	2-5/8	3-7/8	12	105125	3.77
#3	2-1/2	3-3/4	12	105136	3.45
#4	2-1/2	3-3/4	12	105147	3.45
#5	2-1/2	3-3/4	12	105158	3.41
#6	2-1/2	3-3/4	12	105169	3.41
#7	2-7/16	3-5/8	12	105180	3.28
#8	2-7/16	3-5/8	12	105191	3.28
#9	2-7/16	3-5/8	12	105202	3.24
#10	2-7/16	3-5/8	12	105213	2.96
#11	2-5/16	3-1/2	12	105224	2.96
#12	2-5/16	3-1/2	12	105235	2.96
#13	2-5/16	3-1/2	12	105246	2.96
#14	2-3/16	3-3/8	12	105257	2.80
#15	2-3/16	3-3/8	12	105268	2.80
#16	2-3/16	3-3/8	12	105279	2.80
#17	2-3/16	3-3/8	12	105290	2.68
#18	2-1/8	3-1/4	12	105301	2.68
#19	2-1/8	3-1/4	12	105312	2.68
#20	2-1/8	3-1/4	12	105323	2.39
#21	2-1/8	3-1/4	12	105334	2.39
#22	2	3-1/8	12	105345	2.31
#23	2	3-1/8	12	105356	2.31
#24	2	3-1/8	12	105367	2.31
#25	1-7/8	3	12	105378	1.99
#26	1-7/8	3	12	105389	1.99
#27	1-7/8	3	12	105400	1.99
#28	1-3/4	2-7/8	12	105411	1.82
#29	1-3/4	2-7/8	12	105422	1.82
#30	1-5/8	2-3/4	12	105433	1.78

WIRE SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BLACK OXIDE	LIST PRICE
#31	1-5/8	2-3/4	12	105444	1.74
#32	1-5/8	2-3/4	12	105455	1.74
#33	1-1/2	2-5/8	12	105466	1.74
#34	1-1/2	2-5/8	12	105477	1.74
#35	1-1/2	2-5/8	12	105488	1.74
#36	1-7/16	2-1/2	12	105499	1.74
#37	1-7/16	2-1/2	12	105510	1.74
#38	1-7/16	2-1/2	12	105521	1.74
#39	1-3/8	2-3/8	12	105532	1.74
#40	1-3/8	2-3/8	12	105543	1.74
#41	1-3/8	2-3/8	12	105554	1.74
#42	1-1/4	2-1/4	12	105565	1.74
#43	1-1/4	2-1/4	12	105576	1.74
#44	1-1/8	2-1/8	12	105587	1.74
#45	1-1/8	2-1/8	12	105598	1.82
#46	1-1/8	2-1/8	12	105609	1.82
#47	1	2	12	105620	1.82
#48	1	2	12	105631	1.82
#49	1	2	12	105642	1.82
#50	1	2	12	105653	1.82
#51	1	2	12	105664	1.82
#52	7/8	1-7/8	12	105675	1.82
#53	7/8	1-7/8	12	105686	1.82
#54	7/8	1-7/8	12	105697	1.95
#55	7/8	1-7/8	12	105708	1.95
#56	3/4	1-3/4	12	105719	1.95
#57	3/4	1-3/4	12	105730	2.15
#58	11/16	1-5/8	12	105741	2.15
#59	11/16	1-5/8	12	105752	2.15
#60	11/16	1-5/8	12	105763	2.15

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

JOBBER LENGTH - 118º POINT

BRIGHT FINISH

TIN COATED

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE
1/16	7/8	1-7/8	12	106313	1.91	110647	5.39
5/64	1	2	12	106324	1.91	110658	5.39
3/32	1-1/4	2-1/4	12	106335	1.91	110669	5.39
7/64	1-1/2	2-5/8	12	106346	1.91	110680	5.48
1/8	1-5/8	2-3/4	12	106357	1.91	110691	5.48
9/64	1-3/4	2-7/8	12	106368	2.03	110702	5.74
5/32	2	3-1/8	12	106379	2.11	110713	6.39
11/64	2-1/8	3-1/4	12	106390	2.27	110724	6.48
3/16	2-5/16	3-1/2	12	106401	2.47	110735	6.83
13/64	2-7/16	3-5/8	12	106412	2.80	110746	9.72
7/32	2-1/2	3-3/4	12	106423	3.08	110757	9.99
15/64	2-5/8	3-7/8	12	106434	3.45	110768	10.42
1/4	2-3/4	4	12	106445	3.53	110779	10.69
17/64	2-7/8	4-1/8	6	106456	5.07	110790	15.20
9/32	2-15/16	4-1/4	6	106467	5.39	110801	16.86

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE
19/64	3-1/16	4-3/8	6	106478	5.92	110812	17.21
5/16	3-3/16	4-1/2	6	106489	6.16	110823	18.18
21/64	3-5/16	4-5/8	6	106500	6.89	110834	20.72
11/32	3-7/16	4-3/4	6	106511	7.38	110845	21.81
23/64	3-1/2	4-7/8	6	106522	8.11	110856	24.62
3/8	3-5/8	5	6	106533	8.51	110867	24.88
25/64	3-3/4	5-1/8	6	106544	9.20	110878	30.79
13/32	3-7/8	5-1/4	6	106555	10.05	110889	31.49
27/64	3-15/16	5-3/8	6	106566	10.70	110900	32.59
7/16	4-1/16	5-1/2	6	106577	11.68	110911	33.29
29/64	4-3/16	5-5/8	6	106588	12.45	110922	36.57
15/32	4-5/16	5-3/4	6	106599	13.54	110933	37.62
31/64	4-3/8	5-7/8	6	106610	14.31	110944	37.93
1/2	4-1/2	6	6	106621	14.92	110955	38.72

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE
A	2-5/8	3-7/8	12	107512	3.45	110966	10.86
B	2-3/4	4	12	107523	3.53	110977	11.13
C	2-3/4	4	12	107534	3.53	110988	11.13
D	2-3/4	4	12	107545	3.65	110999	11.13
E	2-3/4	4	12	107556	3.69	111010	10.69
F	2-7/8	4-1/8	6	107567	5.11	111021	18.35
G	2-7/8	4-1/8	6	107578	4.91	111032	18.35
H	2-7/8	4-1/8	6	107589	4.99	111043	18.35
I	2-7/8	4-1/8	6	107600	5.11	111054	18.35
J	2-7/8	4-1/8	6	107611	5.27	111065	18.48
K	2-15/16	4-1/4	6	107622	5.39	111076	19.89
L	2-15/16	4-1/4	6	107633	5.64	111087	19.89
M	3-1/16	4-3/8	6	107644	5.96	111098	20.24

LETTER SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE
N	3-1/16	4-3/8	6	107655	6.16	111109	20.59
O	3-3/16	4-1/2	6	107666	6.69	111120	20.59
P	3-5/16	4-5/8	6	107677	7.18	111131	21.46
Q	3-7/16	4-3/4	6	107688	7.46	111142	21.46
R	3-7/16	4-3/4	6	107699	7.74	111153	22.03
S	3-1/2	4-7/8	6	107710	8.11	111164	27.77
T	3-1/2	4-7/8	6	107721	8.51	111175	29.08
U	3-5/8	5	6	107732	9.20	111186	29.08
V	3-5/8	5	6	107743	9.53	111197	29.48
W	3-3/4	5-1/8	6	107754	10.14	111208	34.12
X	3-3/4	5-1/8	6	107765	10.74	111219	36.75
Y	3-7/8	5-1/4	6	107776	11.27	111230	39.16
Z	3-7/8	5-1/4	6	107787	11.51	111241	39.59

For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

MADE IN THE USA

JOBBER LENGTH - 118º POINT

BRIGHT FINISH

TiN COATED

WIRE SIZES							WIRE SIZES						
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE	SIZE	FLUTE LENGTH	OAL	PKG. QTY.	BRIGHT	LIST PRICE	TIN	LIST PRICE
#1	2-5/8	3-7/8	12	106632	3.77	111252	10.86	#31	1-5/8	2-3/4	12	106962	1.74	111582	5.48
#2	2-5/8	3-7/8	12	106643	3.77	111263	10.86	#32	1-5/8	2-3/4	12	106973	1.74	111593	5.48
#3	2-1/2	3-3/4	12	106654	3.45	111274	10.42	#33	1-1/2	2-5/8	12	106984	1.74	111604	5.48
#4	2-1/2	3-3/4	12	106665	3.45	111285	10.42	#34	1-1/2	2-5/8	12	106995	1.74	111615	5.48
#5	2-1/2	3-3/4	12	106676	3.41	111296	10.42	#35	1-1/2	2-5/8	12	107006	1.74	111626	5.48
#6	2-1/2	3-3/4	12	106687	3.41	111307	10.42	#36	1-7/16	2-1/2	12	107017	1.74	111637	5.39
#7	2-7/16	3-5/8	12	106698	3.28	111318	9.90	#37	1-7/16	2-1/2	12	107028	1.74	111648	5.39
#8	2-7/16	3-5/8	12	106709	3.28	111329	9.90	#38	1-7/16	2-1/2	12	107039	1.74	111659	5.39
#9	2-7/16	3-5/8	12	106720	3.24	111340	9.90	#39	1-3/8	2-3/8	12	107050	1.74	111670	5.39
#10	2-7/16	3-5/8	12	106731	2.96	111351	9.90	#40	1-3/8	2-3/8	12	107061	1.74	111681	5.39
#11	2-5/16	3-1/2	12	106742	2.96	111362	9.90	#41	1-3/8	2-3/8	12	107072	1.74	111692	5.39
#12	2-5/16	3-1/2	12	106753	2.96	111373	8.10	#42	1-1/4	2-1/4	12	107083	1.74	111703	5.39
#13	2-5/16	3-1/2	12	106764	2.96	111384	7.97	#43	1-1/4	2-1/4	12	107094	1.74	111714	5.39
#14	2-3/16	3-3/8	12	106775	2.80	111395	7.97	#44	1-1/8	2-1/8	12	107105	1.74	111725	5.39
#15	2-3/16	3-3/8	12	106786	2.80	111406	7.97	#45	1-1/8	2-1/8	12	107116	1.82	111736	5.39
#16	2-3/16	3-3/8	12	106797	2.80	111417	7.97	#46	1-1/8	2-1/8	12	107127	1.82	111747	5.39
#17	2-3/16	3-3/8	12	106808	2.68	111428	7.97	#47	1	2	12	107138	1.82	111758	5.39
#18	2-1/8	3-1/4	12	106819	2.68	111439	7.10	#48	1	2	12	107149	1.82	111769	5.39
#19	2-1/8	3-1/4	12	106830	2.68	111450	7.10	#49	1	2	12	107160	1.82	111780	5.39
#20	2-1/8	3-1/4	12	106841	2.39	111461	7.10	#50	1	2	12	107171	1.82	111791	5.39
#21	2-1/8	3-1/4	12	106852	2.39	111472	7.01	#51	1	2	12	107182	1.82	111802	5.39
#22	2	3-1/8	12	106863	2.27	111483	7.01	#52	7/8	1-7/8	12	107193	1.82	111813	5.39
#23	2	3-1/8	12	106874	2.27	111494	6.92	#53	7/8	1-7/8	12	107204	1.82	111824	5.39
#24	2	3-1/8	12	106885	2.27	111505	6.92	#54	7/8	1-7/8	12	107215	1.95	111835	5.39
#25	1-7/8	3	12	106896	1.99	111516	6.79	#55	7/8	1-7/8	12	107226	1.95	111846	5.39
#26	1-7/8	3	12	106907	1.99	111527	6.79	#56	3/4	1-3/4	12	107237	1.95	111857	5.39
#27	1-7/8	3	12	106918	1.99	111538	6.79	#57	3/4	1-3/4	12	107248	2.15	111868	5.39
#28	1-3/4	2-7/8	12	106929	1.82	111549	6.57	#58	11/16	1-5/8	12	107259	2.15	111879	5.39
#29	1-3/4	2-7/8	12	106940	1.82	111560	6.57	#59	11/16	1-5/8	12	107270	2.15	111890	5.39
#30	1-5/8	2-3/4	12	106951	1.78	111571	5.48	#60	11/16	1-5/8	12	107281	2.15	111901	5.39

For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS & M42 DRILLS

AIRCRAFT EXTENSION DRILLS - 6" OVERALL LENGTH - 135º SPLIT POINT

HIGH SPEED STEEL - NAS 907 - TYPE "B"
OXIDE FINISH

M42 COBALT - NAS 907 - TYPE "J"

FRACTIONAL SIZES

SIZE	OVERALL LENGTH	FLUTE LENGTH	PACKAGE QUANTITY	HSS	LIST PRICE	COBALT	LIST PRICE
3/32	6	1-1/4	12	116433	8.39	116741	13.89
7/64	6	1-1/2	12	116444	8.37	116752	15.74
1/8	6	1-5/8	12	116455	8.23	116763	12.91
9/64	6	1-3/4	12	116466	9.81	116774	17.65
5/32	6	2	12	116477	10.86	116785	17.65
11/64	6	2-1/8	12	116488	11.97	116796	19.44
3/16	6	2-5/16	12	116499	11.85	116807	16.35
13/64	6	2-7/16	12	116510	14.44	116818	24.07
7/32	6	2-1/2	12	116521	14.44	116829	24.69
15/64	6	2-5/8	12	116532	16.05	116840	26.23
1/4	6	2-3/4	12	116543	14.27	116851	25.61
17/64	6	2-7/8	6	116554	36.41	–	–
9/32	6	2-15/16	6	116565	37.65	–	–
19/64	6	3-1/16	6	116576	44.44	–	–
5/16	6	3-3/16	6	116587	48.14	–	–
21/64	6	3-5/16	6	116598	51.84	–	–
11/32	6	3-7/16	6	116609	51.84	–	–
23/64	6	3-1/2	6	116620	57.71	–	–
3/8	6	3-5/8	6	116631	58.63	–	–

WIRE SIZES

SIZE	OVERALL LENGTH	FLUTE LENGTH	PACKAGE QUANTITY	HSS	LIST PRICE	COBALT	LIST PRICE
#1	6	2-5/8	12	116642	16.66	116862	27.46
#2	6	2-5/8	12	116653	16.66	116873	27.46
#10	6	2-7/16	12	116664	12.96	116884	18.72
#11	6	2-5/16	12	116675	12.96	116895	18.00
#20	6	2-1/8	12	116686	10.80	116906	17.03
#21	6	2-1/8	12	116697	11.36	116917	17.03
#29	6	1-3/4	12	116708	12.03	116928	18.82
#30	6	1-5/8	12	116719	9.26	116939	12.96
#40	6	1-5/8	12	116730	7.59	116950	11.78

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS & M42 DRILLS

AIRCRAFT EXTENSION DRILLS - 12" OVERALL LENGTH - 135º SPLIT POINT

HIGH SPEED STEEL - NAS 907 - TYPE "B"
OXIDE FINISH

M42 COBALT - NAS 907 - TYPE "J"

FRACTIONAL SIZES

SIZE	OVERALL LENGTH	FLUTE LENGTH	PACKAGE QUANTITY	HSS	LIST PRICE	COBALT	LIST PRICE
1/8	12	1-5/8	12	116961	23.82	118314	39.50
9/64	12	1-3/4	12	116972	24.04	118325	43.51
5/32	12	2	12	116983	24.04	118336	40.12
11/64	12	2-1/8	12	116994	27.09	118347	43.20
3/16	12	2-5/16	12	117005	26.82	118358	41.97
13/64	12	2-7/16	12	117016	30.77	118369	54.93
7/32	12	2-1/2	12	117027	30.45	118380	49.99
15/64	12	2-5/8	12	117038	34.31	118391	53.08
1/4	12	2-3/4	12	117049	37.34	118402	48.55
17/64	12	2-7/8	6	117060	43.20	–	–
9/32	12	2-15/16	6	117071	42.89	–	–
19/64	12	3-1/16	6	117082	48.00	–	–
5/16	12	3-3/16	6	117093	52.55	–	–
21/64	12	3-5/16	6	117104	57.09	–	–
11/32	12	3-7/16	6	117115	56.45	–	–
23/64	12	3-1/2	6	117126	63.95	–	–
3/8	12	3-5/8	6	117137	64.54	–	–
25/64	12	3-3/4	6	117148	72.00	–	–
13/32	12	3-7/8	6	117159	69.41	–	–
27/64	12	3-15/16	6	117170	76.54	–	–
7/16	12	4-1/16	6	117181	76.68	–	–
29/64	12	4-3/16	6	117192	86.50	–	–
15/32	12	4-5/16	6	117203	89.64	–	–
31/64	12	4-3/8	6	117214	92.95	–	–
1/2	12	4-1/2	6	117225	91.95	–	–

WIRE SIZES

SIZE	OVERALL LENGTH	FLUTE LENGTH	PACKAGE QUANTITY	HSS	LIST PRICE	COBALT	LIST PRICE
#1	12	2-5/8	12	117236	37.36	118413	59.25
#10	12	2-7/16	12	117247	30.04	118424	45.67
#11	12	2-5/16	12	117258	30.32	118435	44.13
#20	12	2-1/8	12	117269	27.27	118446	40.73
#21	12	2-1/8	12	117280	26.77	118457	40.73
#29	12	1-3/4	12	117291	28.36	118468	42.28
#30	12	1-5/8	12	117302	26.77	118479	38.59
#40	12	1-3/8	12	117313	26.77	118490	42.28

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

SILVER & DEMING - 1/2" ROUND SHANK - 118º POINT

HIGH SPEED STEEL

SIZE	OAL	ITEM#	LIST PRICE
33/64	6	120591	37.18
17/32	6	120602	37.18
35/64	6	120613	39.24
9/16	6	120624	39.24
37/64	6	120635	42.13
19/32	6	120646	42.13
39/64	6	120657	44.28
5/8	6	120668	44.28
41/64	6	120679	46.39
21/32	6	120690	46.39
43/64	6	120701	49.32
11/16	6	120712	49.32
45/64	6	120723	49.53
23/32	6	120734	49.53
47/64	6	120745	54.03

SIZE	OAL	ITEM#	LIST PRICE
3/4	6	120756	54.19
49/64	6	120767	57.46
25/32	6	120778	57.46
51/64	6	120789	60.39
13/16	6	120800	60.39
53/64	6	120811	62.74
27/32	6	120822	62.74
55/64	6	120833	64.81
7/8	6	120844	64.81
57/64	6	120855	67.45
29/32	6	120866	67.45
59/64	6	120877	73.44
15/16	6	120888	73.44
61/64	6	120899	76.99
31/32	6	120910	76.99

SIZE	OAL	ITEM#	LIST PRICE
63/64	6	120921	85.83
1	6	120932	85.83
1-1/32	6	120943	115.16
1-1/16	6	120954	115.16
1-3/32	6	120965	122.80
1-1/8	6	120976	131.19
1-5/32	6	120987	131.19
1-3/16	6	120998	145.23
1-7/32	6	121009	160.72
1-1/4	6	121020	160.72
1-5/16	6	121031	170.01
1-3/8	6	121042	195.83
1-7/16	6	121053	215.33
1-1/2	6	121064	236.60

SILVER & DEMING - 1/2" SHANK - 3 FLATS - 118º POINT

HIGH SPEED STEEL

SIZE	OAL	ITEM#	LIST PRICE
33/64	6	121075	40.52
17/32	6	121086	40.52
35/64	6	121097	43.08
9/16	6	121108	43.08
37/64	6	121119	46.30
19/32	6	121130	46.30
39/64	6	121141	48.45
5/8	6	121152	48.45
41/64	6	121163	51.67
21/32	6	121174	51.67
43/64	6	121185	53.74

SIZE	OAL	ITEM#	LIST PRICE
11/16	6	121196	53.74
45/64	6	121207	54.44
23/32	6	121218	54.44
47/64	6	121229	59.31
3/4	6	121240	59.31
49/64	6	121251	63.28
25/32	6	121262	63.28
51/64	6	121273	69.35
13/16	6	121284	69.35
53/64	6	121295	72.24
27/32	6	121306	72.24

SIZE	OAL	ITEM#	LIST PRICE
55/64	6	121317	77.08
7/8	6	121328	77.08
57/64	6	121339	79.97
29/32	6	121350	79.97
59/64	6	121361	81.87
15/16	6	121372	81.87
61/64	6	121383	85.71
31/32	6	121394	85.71
63/64	6	121405	93.93
1	6	121416	93.93

All S & D drills have 3" flute length.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS & M42 DRILLS

SILVER & DEMING - 1/2" SHANK - 3 FLATS - 118º SPLIT POINT

HIGH SPEED STEEL - BLACK & GOLD

SIZE	OAL	ITEM#	LIST PRICE
33/64	6	121779	47.46
17/32	6	121790	47.46
35/64	6	121801	50.27
9/16	6	121812	50.27
37/64	6	121823	53.37
19/32	6	121834	53.37
39/64	6	121845	55.47
5/8	6	121856	55.47
41/64	6	121867	58.86
21/32	6	121878	58.86
43/64	6	121889	61.38

SIZE	OAL	ITEM#	LIST PRICE
11/16	6	121900	61.38
45/64	6	121911	63.94
23/32	6	121922	63.94
47/64	6	121933	66.71
3/4	6	121944	66.71
49/64	6	121955	70.43
25/32	6	121966	70.43
51/64	6	121977	74.93
13/16	6	121988	74.93
53/64	6	121999	78.19
27/32	6	122010	78.19

SIZE	OAL	ITEM#	LIST PRICE
55/64	6	122021	80.30
7/8	6	122032	80.30
57/64	6	122043	83.81
29/32	6	122054	83.81
59/64	6	122065	90.09
15/16	6	122076	90.09
61/64	6	122087	97.03
31/32	6	122098	97.03
63/64	6	122109	101.90
1	6	122120	101.90

SILVER & DEMING - 1/2" ROUND SHANK - 135º SPLIT POINT

M42 COBALT

SIZE	OAL	ITEM#	LIST PRICE
33/64	6	121427	73.94
17/32	6	121438	73.94
35/64	6	121449	88.97
9/16	6	121460	88.97
37/64	6	121471	91.99
19/32	6	121482	91.99
39/64	6	121493	94.34
5/8	6	121504	94.34
41/64	6	121515	98.97
21/32	6	121526	98.97
43/64	6	121537	100.99

SIZE	OAL	ITEM#	LIST PRICE
11/16	6	121548	100.99
45/64	6	121559	106.53
23/32	6	121570	106.53
47/64	6	121581	111.15
3/4	6	121592	111.15
49/64	6	121603	116.23
25/32	6	121614	116.23
51/64	6	121625	119.33
13/16	6	121636	119.33
53/64	6	121647	128.96
27/32	6	121658	128.96

SIZE	OAL	ITEM#	LIST PRICE
55/64	6	121669	128.96
7/8	6	121680	128.96
57/64	6	121691	133.87
29/32	6	121702	133.87
59/64	6	121713	139.65
15/16	6	121724	139.65
61/64	6	121735	147.38
31/32	6	121746	147.38
63/64	6	121757	167.24
1	6	121768	167.24

All S & D drills have 3" flute length.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

TAPER LENGTH - 118º POINT

OXIDE FINISH

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	OXIDE	LIST PRICE
3/64	1-1/8	2-1/4	12	113683	13.23
1/16	1-3/4	3	12	113694	13.23
5/64	2	3-3/4	12	113705	13.23
3/32	2-1/4	4-1/4	12	113716	12.32
7/64	2-1/2	4-5/8	12	113727	12.87
1/8	2-3/4	5-1/8	12	113738	13.24
9/64	3	5-3/8	12	113749	17.68
5/32	3	5-3/8	12	113760	17.87
11/64	3-3/8	5-3/4	12	113771	18.75
3/16	3-3/8	5-3/4	12	113782	17.45
13/64	3-5/8	6	12	113793	21.30
7/32	3-5/8	6	12	113804	22.96
15/64	3-3/4	6-1/8	12	113815	22.96
1/4	3-3/4	6-1/8	12	113826	19.81
17/64	3-7/8	6-1/4	6	113837	24.03
9/32	3-7/8	6-1/4	6	113848	24.03
19/64	4	6-3/8	6	113859	26.16
5/16	4	6-3/8	6	113870	26.16
21/64	4-1/8	6-1/2	6	113881	26.16
11/32	4-1/8	6-1/2	6	113892	26.16
23/64	4-1/4	6-3/4	6	113903	30.83
3/8	4-1/4	6-3/4	6	113914	30.83
25/64	4-3/8	6-3/4	6	113925	35.09
13/32	4-3/8	7	6	113936	35.09
27/64	4-5/8	7-1/4	6	113947	37.22
7/16	4-5/8	7-1/4	6	113958	37.22
29/64	4-3/4	7-1/2	6	113969	42.36
15/32	4-3/4	7-1/2	6	113980	42.36
31/64	4-3/4	7-3/4	6	113991	44.81
1/2	4-3/4	7-3/4	6	114002	44.81
33/64	4-3/4	8	1	114013	59.53
17/32	4-3/4	8	1	114024	59.53
35/64	4-7/8	8-1/4	1	114035	62.54
9/16	4-7/8	8-1/4	1	114046	62.54

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PKG. QTY.	OXIDE	LIST PRICE
37/64	4-7/8	8-3/4	1	114057	73.19
19/32	4-7/8	8-3/4	1	114068	73.19
39/64	4-7/8	8-3/4	1	114079	75.83
5/8	4-7/8	8-3/4	1	114090	75.83
41/64	5-1/8	9	1	114101	86.34
21/32	5-1/8	9	1	114112	86.34
43/64	5-3/8	9-1/4	1	114123	102.12
11/16	5-3/8	9-1/4	1	114134	102.12
45/64	5-5/8	9-1/2	1	114145	106.80
23/32	5-5/8	9-1/2	1	114156	106.80
47/64	5-7/8	9-3/4	1	114167	114.86
3/4	5-7/8	9-3/4	1	114178	114.86
49/64	6	9-7/8	1	114189	124.44
25/32	6	9-7/8	1	114200	124.44
51/64	6-1/8	10	1	114211	134.35
13/16	6-1/8	10	1	114222	134.35
53/64	6-1/8	10	1	114233	141.47
27/32	6-1/8	10	1	114244	141.47
55/64	6-1/8	10	1	114255	148.47
7/8	6-1/8	10	1	114266	148.47
57/64	6-1/8	10	1	114277	154.76
29/32	6-1/8	10	1	114288	154.76
59/64	6-1/8	10-3/4	1	114299	168.23
15/16	6-1/8	10-3/4	1	114310	168.23
61/64	6-3/8	11	1	114321	185.69
31/32	6-3/8	11	1	114332	185.69
63/64	6-3/8	11	1	114343	193.56
1	6-3/8	11	1	114354	193.56
1-1/16	6-5/8	11-1/4	1	114376	239.85
1-1/8	7-1/8	11-3/4	1	114398	266.98
1-3/16	7-3/8	12	1	114420	312.90
1-1/4	7-7/8	12-1/2	1	114442	335.12
1-5/16	8-5/8	14-1/4	1	114464	399.89
1-3/8	8-7/8	14-1/2	1	114486	428.87

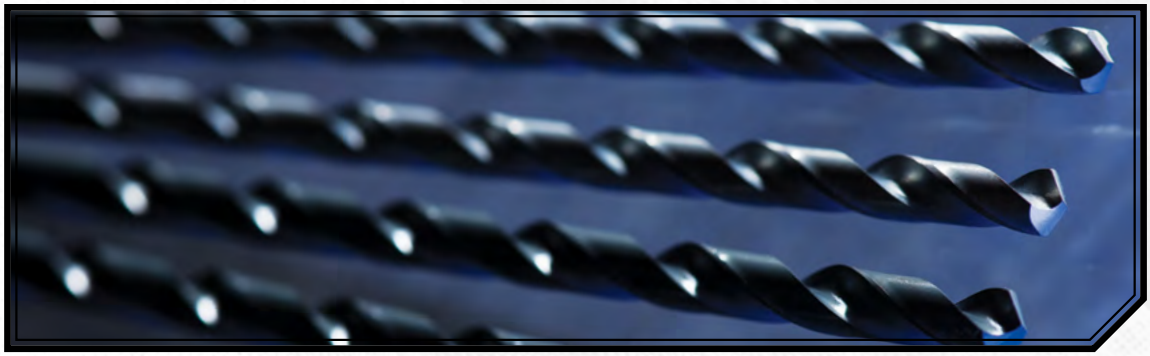
For technical information, please see pages 210 - 211.

TAPER LENGTH - 118º POINT

OXIDE FINISH

WIRE SIZES					
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	OXIDE	LIST PRICE
#1	3-3/4	6-1/8	12	114574	24.07
#2	3-3/4	6-1/8	12	114585	24.07
#3	3-5/8	6	12	114596	23.29
#4	3-5/8	6	12	114607	23.29
#5	3-5/8	6	12	114618	23.29
#6	3-5/8	6	12	114629	23.29
#7	3-5/8	6	12	114640	23.29
#8	3-5/8	6	12	114651	23.29
#9	3-5/8	6	12	114662	23.29
#10	3-5/8	6	12	114673	23.29
#11	3-5/8	6	12	114684	23.29
#12	3-5/8	6	12	114695	23.29
#13	3-3/8	5-3/4	12	114706	21.16
#14	3-3/8	5-3/4	12	114717	21.16
#15	3-3/8	5-3/4	12	114728	21.16
#16	3-3/8	5-3/4	12	114739	21.16
#17	3-3/8	5-3/4	12	114750	21.16
#18	3-3/8	5-3/4	12	114761	21.16
#19	3-3/8	5-3/4	12	114772	21.16
#20	3-3/8	5-3/4	12	114783	21.16

WIRE SIZES					
SIZE	FLUTE LENGTH	OAL	PKG. QTY.	OXIDE	LIST PRICE
#21	3-3/8	5-3/4	12	114794	21.16
#22	3-3/8	5-3/4	12	114805	21.16
#23	3	5-3/8	12	114816	21.16
#24	3	5-3/8	12	114827	21.16
#25	3	5-3/8	12	114838	21.16
#26	3	5-3/8	12	114849	21.16
#27	3	5-3/8	12	114860	21.16
#28	3	5-3/8	12	114871	21.16
#29	3	5-3/8	12	114882	21.16
#30	3	5-3/8	12	114893	21.16
#31	2-3/4	5-1/8	12	114904	20.74
#32	2-3/4	5-1/8	12	114915	20.74
#33	2-3/4	5-1/8	12	114926	20.74
#34	2-3/4	5-1/8	12	114937	20.74
#35	2-3/4	5-1/8	12	114948	20.74
#36	2-1/2	4-5/8	12	114959	15.51
#37	2-1/2	4-5/8	12	114970	15.51
#38	2-1/2	4-5/8	12	114981	15.51
#39	2-1/2	4-5/8	12	114992	13.61
#40	2-1/2	4-5/8	12	115003	13.61



Highest quality American-Made drills outlast the competition

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

TAPER SHANK - 118º POINT

OXIDE FINISH

FRACTIONAL SIZES

SIZE	MORSE TAPER	FLUTE LENGTH	OAL	OXIDE	LIST PRICE
3/16	1	2-1/2	5-3/4	115201	46.80
13/64	1	2-3/4	6	115212	46.80
7/32	1	2-3/4	6	115223	46.80
15/64	1	2-7/8	6-1/8	115234	46.80
1/4	1	2-7/8	6-1/8	115245	46.80
17/64	1	3	6-1/4	115256	46.80
9/32	1	3	6-1/4	115267	46.80
19/64	1	3-1/8	6-3/8	115278	49.58
5/16	1	3-1/8	6-3/8	115289	52.13
21/64	1	3-1/4	6-1/2	115300	52.13
11/32	1	3-1/4	6-1/2	115311	52.13
23/64	1	3-1/2	6-3/4	115322	53.19
3/8	1	3-1/2	6-3/4	115333	53.19
25/64	1	3-5/8	7	115344	63.19
13/32	1	3-5/8	7	115355	63.19
27/64	1	3-7/8	7-1/4	115366	68.05
7/16	1	3-7/8	7-1/4	115377	68.05
29/64	1	4-1/8	7-1/2	115388	68.05
15/32	1	4-1/8	7-1/2	115399	68.05
31/64	2	4-3/8	8-1/4	115410	74.44
1/2	2	4-3/8	8-1/4	115421	69.67
33/64	2	4-5/8	8-1/2	115432	80.32
17/32	2	4-5/8	8-1/2	115443	82.96
35/64	2	4-7/8	8-3/4	115454	87.40
9/16	2	4-7/8	8-3/4	115465	85.09
37/64	2	4-7/8	8-3/4	115476	93.05
19/32	2	4-7/8	8-3/4	115487	91.48
39/64	2	4-7/8	8-3/4	115498	96.80
5/8	2	4-7/8	8-3/4	115509	92.54
41/64	2	5-1/8	9	115520	106.38
21/32	2	5-1/8	9	115531	104.25
43/64	2	5-3/8	9-1/4	115542	114.86
11/16	2	5-3/8	9-1/4	115553	108.47
45/64	2	5-5/8	9-1/2	115564	119.11
23/32	2	5-5/8	9-1/2	115575	115.09
47/64	2	5-7/8	9-3/4	115586	127.63
3/4	2	5-7/8	9-3/4	115597	126.57
49/64	2	6	9-7/8	115608	152.54
25/32	2	6	9-7/8	115619	151.66
51/64	3	6-1/8	10-3/4	115630	166.98

FRACTIONAL SIZES

SIZE	MORSE TAPER	FLUTE LENGTH	OAL	OXIDE	LIST PRICE
13/16	3	6-1/8	10-3/4	115641	156.89
53/64	3	6-1/8	10-3/4	115652	173.79
27/32	3	6-1/8	10-3/4	115663	169.11
55/64	3	6-1/8	10-3/4	115674	190.82
7/8	3	6-1/8	10-3/4	115685	174.25
57/64	3	6-1/8	10-3/4	115696	184.02
29/32	3	6-1/8	10-3/4	115707	184.02
59/64	3	6-1/8	10-3/4	115718	186.57
15/16	3	6-1/8	10-3/4	115729	174.85
61/64	3	6-3/8	11	115740	191.66
31/32	3	6-3/8	11	115751	190.36
63/64	3	6-3/8	11	115762	203.37
1	3	6-3/8	11	115773	193.56
1-1/64	3	6-1/2	11-1/8	115784	225.04
1-1/32	3	6-1/2	11-1/8	115795	223.37
1-3/64	3	6-5/8	11-1/4	115806	234.02
1-1/16	3	6-5/8	11-1/4	115817	223.37
1-5/64	4	6-7/8	12-1/2	115828	265.87
1-3/32	4	6-7/8	12-1/2	115839	265.87
1-7/64	4	7-1/8	12-3/4	115850	276.51
1-1/8	4	7-1/8	12-3/4	115861	276.51
1-9/64	4	7-1/4	12-7/8	115872	297.81
1-5/32	4	7-1/4	12-7/8	115883	287.16
1-11/64	4	7-3/8	13	115894	297.81
1-3/16	4	7-3/8	13	115905	297.81
1-13/64	4	7-1/2	13-1/8	115916	319.06
1-7/32	4	7-1/2	13-1/8	115927	319.06
1-1/4	4	7-7/8	13-1/2	115949	333.97
1-5/16	4	8-5/8	14-1/4	115982	410.54
1-3/8	4	8-7/8	14-1/2	116004	438.17
1-7/16	4	9-1/8	14-3/4	116026	480.72
1-1/2	4	9-3/8	15	116048	504.14
1-9/16	5	9-5/8	16-5/8	116070	614.74
1-5/8	5	10	17	116092	663.67
1-11/16	5	10-1/8	17-1/8	116114	731.77
1-3/4	5	10-1/8	17-1/8	116136	778.57
1-13/16	5	10-1/8	17-1/8	116158	835.98
1-7/8	5	10-3/8	17-3/8	116180	872.13
1-15/16	5	10-3/8	17-3/8	116202	940.23
2	5	10-3/8	17-3/8	116224	974.26

Taper shank drills sold individually.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

EXTRA LENGTH - 118º POINT - 12" O.A.L.

BRIGHT FINISH

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	BRIGHT	LIST PRICE
1/8	9	12	117863	52.27
9/64	9	12	117874	75.76
5/32	9	12	117885	68.89
11/64	9	12	117896	58.75
3/16	9	12	117907	58.75
13/64	9	12	117918	71.20
7/32	9	12	117929	63.75
15/64	9	12	117940	63.75
1/4	9	12	117951	65.91
17/64	9	12	117962	68.22
9/32	9	12	117973	68.22
19/64	9	12	117984	70.72
5/16	9	12	117995	70.72
21/64	9	12	118006	75.76
11/32	9	12	118017	75.76
23/64	9	12	118028	75.76

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	BRIGHT	LIST PRICE
3/8	9	12	118039	69.80
25/64	9	12	118050	105.64
13/32	9	12	118061	105.64
27/64	9	12	118072	105.64
7/16	9	12	118083	90.22
29/64	9	12	118094	110.25
15/32	9	12	118105	99.20
31/64	9	12	118116	101.51
1/2	9	12	118127	101.51
17/32	9	12	118149	128.61
9/16	9	12	118171	128.61
19/32	9	12	118193	160.75
5/8	9	12	118215	156.18
11/16	9	12	118259	165.36
3/4	9	12	118303	186.26

SCREW EXTRACTORS

SIZE	FOR SCREW & BOLT SIZES	PIPE SIZE	PKG. QTY.	ITEM#	LIST PRICE
1	3/16 - 1/4		1	115014	8.70
2	1/4 - 5/16		1	115025	9.27
3	5/16 - 7/16		1	115036	11.24
4	7/16 - 9/16	1/8	1	115047	11.91
5	9/16 - 3/4	1/4	1	115058	14.89
6	3/4-1	3/8	1	115069	32.72
7	1 - 1-3/8	1/2	1	115080	52.65
SET	SIZES 1-5		1	115146	55.97

All tools sold individually.

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILLS

MECHANICS LENGTH - HEAVY DUTY - 135º SPLIT POINT - TYPE "B"

BLACK & GOLD

FRACTIONAL SIZES

SIZE	FLUTE LENGTH	OAL	PACKAGE QUANTITY	ITEM#	LIST PRICE
1/16	7/8	1-7/8	12	110328	2.59
5/64	1	2	12	110339	2.80
3/32	1-1/4	2-1/4	12	110350	2.80
7/64	1-5/16	2-3/8	12	110361	2.88
1/8	1-7/16	2-1/2	12	110372	3.00
9/64	1-9/16	2-5/8	12	110383	3.08
5/32	1-11/16	2-3/4	12	110394	3.69
11/64	1-13/16	2-7/8	12	110405	3.77
3/16	1-7/8	3	12	110416	4.30
13/64	1-15/16	3-1/8	12	110427	4.66
7/32	2	3-1/4	12	110438	5.19
15/64	2-1/16	3-3/8	12	110449	5.55
1/4	2	3-1/2	12	110460	5.88
17/64	2-1/8	3-5/8	6	110471	7.38
9/32	2-1/4	3-3/4	6	110482	7.38

FRACTIONAL SIZES

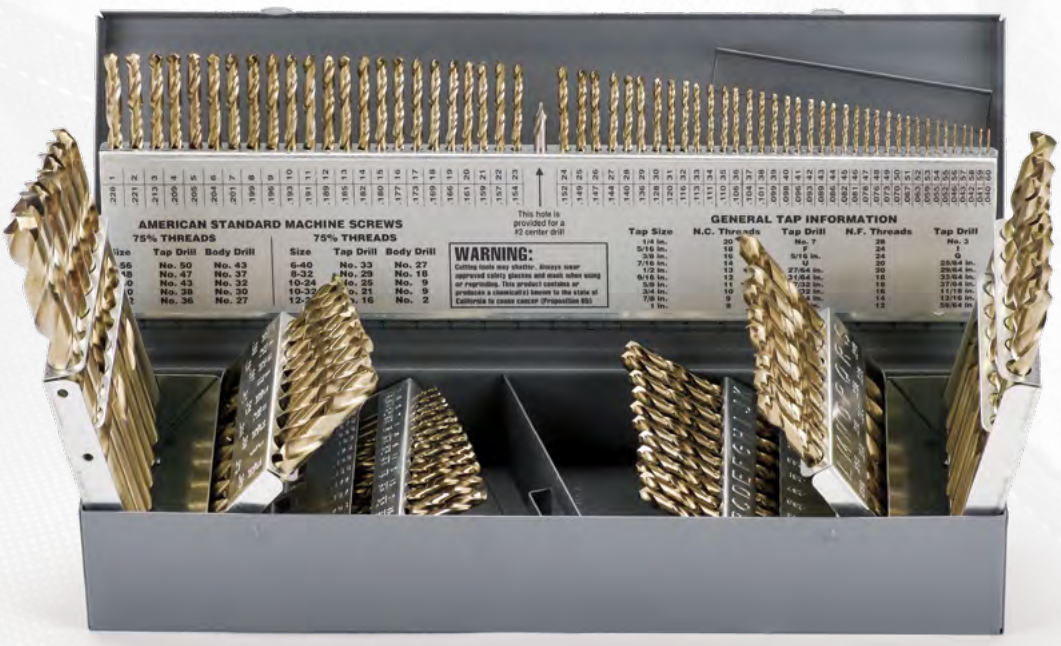
SIZE	FLUTE LENGTH	OAL	PACKAGE QUANTITY	ITEM#	LIST PRICE
19/64	2-3/8	3-7/8	6	110493	8.76
5/16	2-1/2	4	6	110504	9.36
21/64	2-9/16	4-1/16	6	110515	9.97
11/32	2-5/8	4-1/8	6	110526	10.86
23/64	2-11/16	4-3/16	6	110537	11.55
3/8	2-11/16	4-1/4	6	110548	12.24
25/64	2-3/4	4-5/16	6	110559	13.01
13/32	2-13/16	4-3/8	6	110570	14.03
27/64	2-7/8	4-7/16	6	110581	15.81
7/16	2-15/16	4-1/2	6	110592	16.70
29/64	3	4-5/8	6	110603	18.20
15/32	3-1/8	4-3/4	6	110614	19.50
31/64	3-1/4	4-7/8	6	110625	19.91
1/2	3-3/8	5	6	110636	20.43

SIZES 3/16" TO 1/2" - HAVE 3 FLATS;
SIZES 27/64" AND HIGHER - HAVE 3/8" REDUCED FLATTED SHANKS

For technical information, please see pages 210 - 211.

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

GENERAL PURPOSE
M42 COBALT DRILL SETS



ITEM# 120426

115 PC JOBBER DRILL SET - M42 COBALT

JOBBER DRILL SETS

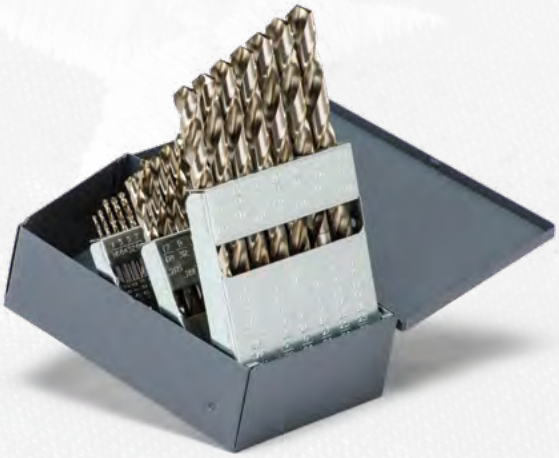
DESCRIPTION	ITEM#	LIST PRICE
13PC • 1/16" - 1/4" by 64ths • Heavy Duty • 135° SP/PT	120360	63.26
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT	120371	213.45
21PC • 1/16" - 3/8" by 64ths • Heavy Duty • 135° SP/PT	120382	232.48
26PC • A - Z • Heavy Duty • 135° SP/PT	120393	354.01
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT	120404	346.49
60PC • #1 - #60 • Heavy Duty • 135° SP/PT	120415	302.44
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • H.D. • 135° SP/PT	120426	1275.53

SCREW MACHINE DRILL SET

DESCRIPTION	ITEM#	LIST PRICE
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • H.D. • 135° SP/PT	259472	1057.42

For technical information, please see pages 210 - 211.

GENERAL PURPOSE HSS DRILL SETS



ITEM# 120250
29 PC JOBBER DRILL SET - BRIGHT FINISH
HIGH SPEED STEEL

ITEM# 120281
29 PC HEAVY DUTY DRILL SET - BLACK & GOLD
HIGH SPEED STEEL

JOBBER DRILL SETS

DESCRIPTION	ITEM#	LIST PRICE
13PC • 1/16" - 1/4" by 64ths • 118° Point • Oxided	120107	46.93
13PC • 1/16" - 1/4" by 64ths • 118° Point • Bright	120118	46.93
15PC • 1/16" - 1/2" by 32nds • 118° Point • Oxided	120140	131.03
15PC • 1/16" - 1/2" by 32nds • 118° Point • Bright	120162	131.03
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT • Oxided	120173	144.52
21PC • 1/16" - 3/8" by 64ths • 118° Point • Oxided	120184	110.74
21PC • 1/16" - 3/8" by 64ths • 118° Point • Bright	120195	110.74
25PC • 1.0mm - 13.0mm by 0.5mm • 118° Point • Oxided	120203	252.90
26PC • A-Z • 118° Point • Oxided	120217	185.34
26PC • A-Z • 118° Point • Bright	120228	185.34
29PC • 1/16" - 1/2" by 64ths • 118° Point • Oxided	120239	180.06
29PC • 1/16" - 1/2" by 64ths • 118° Point • Bright	120250	180.06
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT • Oxided	120272	224.10
29PC • 1/16" - 1/2" by 64ths • 118° Point • TIN Coated	120294	445.29
60PC • #1 - #60 • 118° Point • Oxided	120305	162.87
60PC • #1 - #60 • 118° Point • Bright	120316	162.87
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • 118° Point • Oxided	120327	517.53
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • 118° Point • Bright	120338	517.53

BLACK & GOLD SETS

DESCRIPTION	ITEM#	LIST PRICE
13PC • 1/16" - 1/4" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold	120129	58.53
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT • Black & Gold	120151	169.53
21PC • 1/16" - 3/8" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold	120206	166.05
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold	120261	271.25
29PC • 1/16" - 1/2" by 64ths • H.D. • 135° SP/PT • Black & Gold • Plastic Case	120569	271.25
115PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold	120349	748.16

NOTE: SIZES BELOW 1/16" ARE NOT SPLIT POINT.

For coating information see pages 6-9. For technical information, please see pages 210 - 211.

GENERAL PURPOSE
HSS & M42 DRILL SETS

ITEM# 120448
8 PC SILVER & DEMING DRILL SET
HIGH SPEED STEEL

SILVER & DEMING SETS - 1/2" SHANK

DESCRIPTION	ITEM#	LIST PRICE
8PC • HSS • 9/16" - 1" by 16ths • 118° Point • Plastic Case	120448	437.60
8PC • HSS • 9/16" - 1" by 16ths • Black & Gold • 118° Split Point • Plastic Case	120481	555.73
8PC • 9/16" - 1" by 16ths • M42 Cobalt • 118° Split Point • Plastic Case	120470	902.79
33PC • HSS • 1/2" - 1" by 64ths • 118° Point • Metal Stand	120459	1968.68

ITEM# 120580
29 PC MECHANICS LENGTH DRILL SET
HIGH SPEED STEEL - BLACK & GOLD

HIGH SPEED STEEL - MECHANICS LENGTH SETS

DESCRIPTION	ITEM#	LIST PRICE
15PC • 1/16" - 1/2" by 32ths • Black & Gold • Heavy Duty • 135° SP/PT • Metal Case	120558	159.56
29PC • 1/16" - 1/2" by 64ths • Black & Gold • Heavy Duty • 135° SP/PT • Metal Case	120547	294.45
29PC • 1/16" - 1/2" by 64ths • Black & Gold • Heavy Duty • 135° SP/PT • Plastic Case	120580	294.45

MECHANICS LENGTH: SIZES 3/16" TO 1/2" - HAVE 3 FLATS;
SIZES 27/64" AND HIGHER - HAVE 3/8" REDUCED FLATTED SHANKS

HIGH SPEED STEEL - TAP & DRILL SETS

DESCRIPTION	ITEM#	LIST PRICE
18PC • (6-32, #36), (8-32, #29), (10-24, #25), (10-32, #21), (1/4-20, #7) (5/16-18,"F"), (3/8-16, 5/16"), (7/16-14,"U"), (1/2-13, 27/64) • Metal Case	120437	241.42

For technical information, please see pages 210 - 211.

GENERAL PURPOSE CARBIDE COUNTERSINKS

SINGLE FLUTE COUNTERSINKS
60° • 82° • 90° • 100°

SIZE	SHANK	OAL	PKG QTY	60°-ITEM#	82°-ITEM#	90°-ITEM#	100°-ITEM#	LIST PRICE
* 1/8	1/8	1-1/2	1	118842	118930	119018	216313	27.51
* 3/16	3/16	2	1	118853	118941	119029	216324	29.39
* 1/4	1/4	2	1	118864	118952	119040	216335	33.39
3/8	1/4	2-5/8	1	118875	118963	119051	216346	60.46
1/2	1/4	2-5/8	1	118886	118974	119062	216357	74.89
5/8	3/8	2-3/4	1	118897	118985	119073	216368	109.41
3/4	3/8	2-3/4	1	118908	118996	119084	216379	154.65
1	1/2	3	1	118919	119007	119095	216390	229.25

* One Piece

THREE FLUTE COUNTERSINKS
60° • 82° • 90° • 100°

SIZE	SHANK	OAL	PKG QTY	60°-ITEM#	82°-ITEM#	90°-ITEM#	100°-ITEM#	LIST PRICE
* 1/8	1/8	1-1/2	1	119106	119194	119282	216401	27.51
* 3/16	3/16	2	1	119117	119205	119293	216412	29.39
* 1/4	1/4	2	1	119128	119216	119304	216423	33.39
3/8	1/4	2-5/8	1	119139	119227	119315	216434	60.46
1/2	1/4	2-5/8	1	119150	119238	119326	216445	74.89
5/8	3/8	2-3/4	1	119161	119249	119337	216456	109.41
3/4	3/8	2-3/4	1	119172	119260	119348	216467	154.65
1	1/2	3	1	119183	119271	119359	216478	229.25

* One Piece

SIX FLUTE CHATTERLESS COUNTERSINKS
60° • 82° • 90° • 100°

SIZE	SHANK	OAL	PKG QTY	60°-ITEM#	82°-ITEM#	90°-ITEM#	100°-ITEM#	LIST PRICE
* 1/8	1/8	1-1/2	1	119480	119568	119656	216489	27.51
* 3/16	3/16	2	1	119491	119579	119667	216500	29.39
* 1/4	1/4	2	1	119502	119590	119678	216511	33.39
3/8	1/4	2-5/8	1	119513	119601	119689	216522	60.46
1/2	1/4	2-5/8	1	119524	119612	119700	216533	74.89
5/8	3/8	2-3/4	1	119535	119623	119711	216544	109.41
3/4	3/8	2-3/4	1	119546	119634	119722	216555	154.65
1	1/2	3	1	119557	119645	119733	216566	229.25

* One Piece

GENERAL PURPOSE HSS COUNTERSINKS

SINGLE FLUTE COUNTERSINKS
60° • 82° • 90°

SIZE	SHANK	OAL	PKG QTY	60°-ITEM#	82°-ITEM#	90°-ITEM#	LIST PRICE
1/4	3/16	1-7/16	1	113408	113463	113518	30.20
3/8	1/4	1-21/32	1	113419	113474	113529	34.37
1/2	1/4	1-13/32	1	113430	113485	113540	43.96
3/4	1/2	1-27/32	1	113441	113496	113551	60.70
1	1/2	2-13/16	1	113452	113507	113562	94.30

FOUR FLUTE COUNTERSINKS
60° • 82°

SIZE	SHANK	OAL	PKG. QTY	60°-ITEM#	82°-ITEM#	LIST PRICE
1/2	1/2	3-7/8	1	113573	113628	96.39
5/8	1/2	4	1	113584	113639	108.52
3/4	1/2	4-1/8	1	113595	113650	138.49
7/8	1/2	4-1/4	1	113606	113661	162.78
1	1/2	4-3/8	1	113617	113672	168.23

HSS Countersinks for countersinking, deburring and chamfering

GENERAL PURPOSE SOLID CARBIDE & M42 COMBINED DRILL & COUNTERSINKS

UNCOATED
SOLID CARBIDE - 60º

SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
00	.025	1/8	1-1/2	1	216302	35.36
0	1/32	1/8	1-1/2	1	216291	33.79
1	3/64	1/8	1-1/2	1	118776	30.76
2	5/64	3/16	2	1	118787	45.77
3	7/64	1/4	2	1	118798	51.63
4	1/8	5/16	2-1/8	1	118809	66.64
5	3/16	7/16	2-3/4	1	118820	105.64
6	7/32	1/2	3	1	118831	131.49

ALTIN COATED
SOLID CARBIDE - 60º

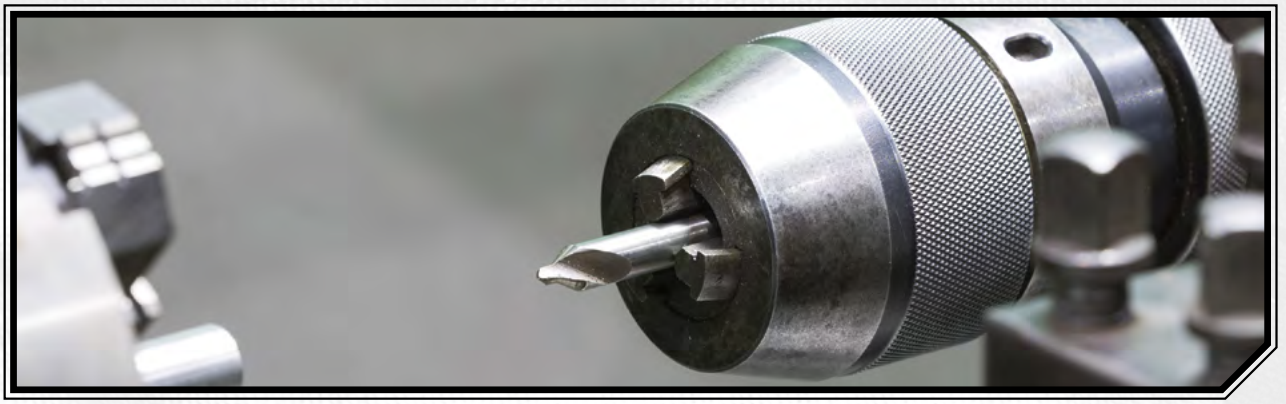
SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
00	.025	1/8	1-1/2	1	118833	44.16
0	1/32	1/8	1-1/2	1	118834	42.25
1	3/64	1/8	1-1/2	1	118835	38.44
2	5/64	3/16	2	1	118836	57.22
3	7/64	1/4	2	1	118837	64.51
4	1/8	5/16	2-1/8	1	118838	83.29
5	3/16	7/16	2-3/4	1	118839	132.06
6	7/32	1/2	3	1	118840	164.38

UNCOATED
M42 COBALT - 60º

SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
1	3/64	1/8	1-1/4	6	118732	31.83
2	5/64	3/16	1-7/8	6	118743	34.40
3	7/64	1/4	2	6	118754	35.56
4	1/8	5/16	2-1/8	6	118765	36.99

ALTIN COATED
M42 COBALT - 60º

SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
1	3/64	1/8	1-1/4	6	118767	40.15
2	5/64	3/16	1-7/8	6	118768	43.73
3	7/64	1/4	2	6	118769	47.21
4	1/8	5/16	2-1/8	6	118770	49.97



HSS Stocked in sizes from #00000 to #8

For coating information please see pages 6-9.

GENERAL PURPOSE HSS COMBINED DRILL & COUNTERSINKS

UNCOATED
HIGH SPEED STEEL - 60º

SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
00000	.010	1/8	1-1/4	6	118567	19.39
0000	.015	1/8	1-1/4	6	118556	17.79
000	.020	1/8	1-1/4	6	118545	16.83
00	.025	1/8	1-1/4	6	118534	16.83
0	1/32	1/8	1-1/4	6	118666	17.94
1	3/64	1/8	1-1/4	6	118578	10.72
2	5/64	3/16	1-7/8	6	118589	11.22
3	7/64	1/4	2	6	118600	11.71
4	1/8	5/16	2-1/8	6	118611	12.05
5	3/16	7/16	2-3/4	1	118622	19.09
6	7/32	1/2	3	1	118633	28.68
7	1/4	5/8	3-1/4	1	118644	50.02
8	5/16	3/4	3-1/2	1	118655	69.58

ALTIN COATED
HIGH SPEED STEEL - 60º

SIZE	DRILL DIA.	BODY DIA.	OVERALL LENGTH	PKG. QTY	ITEM#	LIST PRICE
00000	.010	1/8	1-1/4	6	119466	25.74
0000	.015	1/8	1-1/4	6	119467	24.09
000	.020	1/8	1-1/4	6	119468	23.58
00	.025	1/8	1-1/4	6	119469	22.50
0	1/32	1/8	1-1/4	6	119458	22.50
1	3/64	1/8	1-1/4	6	119370	17.02
2	5/64	3/16	1-7/8	6	119381	17.48
3	7/64	1/4	2	6	119392	23.81
4	1/8	5/16	2-1/8	6	119403	24.55
5	3/16	7/16	2-3/4	1	119414	34.18
6	7/32	1/2	3	1	119425	54.56
7	1/4	5/8	3-1/4	1	119436	78.42
8	5/16	3/4	3-1/2	1	119447	126.18

HIGH SPEED STEEL - LONG LENGTH - 60º

SIZE	DRILL DIA.	BODY DIA.	PKG. QTY	ITEM#	LIST PRICE
1 x 3	3/64	1/8	1	119832	26.90
1 x 4	3/64	1/8	1	119843	28.08
1 x 5	3/64	1/8	1	119854	39.00
1 x 6	3/64	1/8	1	119865	51.10
2 x 3	5/64	3/16	1	119876	27.21
2 x 4	5/64	3/16	1	119887	30.78
2 x 5	5/64	3/16	1	119898	39.41
2 x 6	5/64	3/16	1	119909	51.25
3 x 3	7/64	1/4	1	119920	28.43
3 x 4	7/64	1/4	1	119931	32.41
3 x 5	7/64	1/4	1	119942	42.62
3 x 6	7/64	1/4	1	119953	51.71
4 x 4	1/8	5/16	1	119975	35.94

SIZE	DRILL DIA.	BODY DIA.	PKG. QTY	ITEM#	LIST PRICE
4 x 5	1/8	5/16	1	119986	45.89
4 x 6	1/8	5/16	1	119997	53.04
4-1/2 x 4	9/64	3/8	1	119964	40.38
4-1/2 x 5	9/64	3/8	1	120008	58.76
4-1/2 x 6	9/64	3/8	1	120052	65.66
5 x 4	3/16	7/16	1	120019	47.17
5 x 5	3/16	7/16	1	120030	54.62
5 x 6	3/16	7/16	1	120041	61.31
6 x 5	7/32	1/2	1	120063	58.70
6 x 6	7/32	1/2	1	120074	70.96
7 x 6	1/4	5/6	1	120085	132.16
8 x 6	5/16	3/4	1	120096	159.80

For coating information please see pages 6-9.

GENERAL PURPOSE DRILLS - CARBIDE TECHNICAL INFORMATION

THESE VALUES ARE FOR UNCOATED TOOLS. FOR AlTiN COATED TOOLS INCREASE SFM +40%

CARBIDE DRILLING – SFM & I.P.T. (INCH PER TOOTH)

MATERIAL / TYPE	Rc HARDNESS	25° HELIX	15° HELIX STR FLT
COBALT BASE ALLOYS			
STELLITE, HS-21,	UNDER 32	100 - 150	100 - 150
HAYNES 25/188, X-40, L-605	OVER 32	80 - 110	80 - 110
NICKEL BASE ALLOYS			
INCONEL-625/718, WASPALLOY,	UNDER 32	125 - 150	125 - 175
RENE, HASTELLOY	OVER 32	100 - 125	100 - 125
IRON BASE ALLOYS			
INCOLOY 800-802, MULTIMET N-155,	UNDER 32	150 - 200	175 - 200
TIMKIN 16-25-6, CARPENTER 22-b3	OVER 32	150 - 175	150 - 200
MONEL			
MONEL-65% NICKEL	–	100 - 150	100 - 150
TITANIUM ALLOYS			
COMMERCIALLY PURE, 6Al-4V,	–	150 - 200	150 - 200
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	–	–
STAINLESS STEEL (PRECIPITATION)			
12/8, 15/5, 17/4, AM-350/355	UNDER 32	125 - 175	150 - 200
	OVER 32	80 - 125	100 - 150
STAINLESS STEEL (AUSTENITIC)			
200 SERIES, 302, 303, 304, 316	UNDER 32	100 - 175	150 - 200
	OVER 32	100 - 125	125 - 150
STAINLESS STEEL (AUSTENITIC)			
304L, 316L	UNDER 32	80 - 100	90 - 125
	OVER 32	60 - 90	80 - 100
STAINLESS STEEL (MARTENSITIC)			
403, 410, 416, 440	UNDER 32	100 - 150	125 - 175
	OVER 32	80 - 125	100 - 140
HIGH STRENGTH TOOL STEELS			
4140, 4340, 6150, 5210, A2,	UNDER 32	100 - 175	125 - 175
D2, P20, H11, H13, S2, 01	OVER 32	80 - 130	80 - 130
MEDIUM ALLOY STEELS			
200, 250, 300	UNDER 32	125 - 175	125 - 175
	OVER 32	100 - 150	100 - 150
CARBON STEELS			
1000's, 1100's, 1300's	UNDER 32	125 - 175	150 - 200
	OVER 32	100 - 125	100 - 175
DUCTILE			
DUCTILE CAST IRONS	–	125 - 200	150 - 250
CAST IRONS			
GRAY CAST IRONS	–	100 - 200	150 - 250
ALUMINUM			
2014, 2024, 6061-(T1-T6)	–	150 - 300	–
7075, DIE CAST, EXTRUDED	–	–	–
MAGNESIUM			
	–	200 - 500	–
COPPER, COPPER ALLOYS			
	–	150 - 300	–
BRASS BRONZE			
BRASS, ALUM/BRONZE	–	150 - 300	–
BRASS BRONZE			
LOW SILICON BRONZE	–	125 - 200	–
COMPOSITES			
G-10 FIBERGLASS, GRAPHITE,	–	150 - 300	150 - 300
GRAPHITE/EPOXY, PLASTICS	–	–	–

GENERAL PURPOSE DRILLS - CARBIDE TECHNICAL INFORMATION

THESE VALUES ARE FOR UNCOATED TOOLS. FOR AlTiN COATED TOOLS INCREASE SFM +40%

CARBIDE DRILLING – SFM & I.P.T. (INCH PER TOOTH)

MATERIAL / TYPE	SUGGESTED CHIP LOAD PER TOOTH				
	1/16"- 1/8"	1/8"- 1/4"	1/4"- 3/8"	3/8"- 1/2"	1/2"- 5/8"
COBALT BASE ALLOYS					
STELLITE, HS-21,	.0004"-.0010"	.0008"-.0020"	.0015"-.0025"	.0020"-.0040"	.0025"-.0050"
HAYNES 25/188, X-40, L-605	.0004"-.0010"	.0005"-.0010"	.0010"-.0015"	.0010"-.0020"	.0015"-.0030"
NICKEL BASE ALLOYS					
INCONEL-625/718, WASPALLOY,	.0005"-.0015"	.0010"-.0015"	.0015"-.0025"	.0020"-.0040"	.0025"-.0050"
RENE, HASTELLOY	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
IRON BASE ALLOYS					
INCOLOY 800-802, MULTIMET N-155,	.0010"-.0015"	.0010"-.0020"	.0015"-.0035"	.0020"-.0020"	.0030"-.0060"
TIMKIN 16-25-6, CARPENTER 22-b3	.0008"-.0015"	.0010"-.0020"	.0015"-.0025"	.0020"-.0040"	.0025"-.0050"
MONEL					
MONEL-65% NICKEL	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
TITANIUM ALLOYS					
COMMERCIALLY PURE, 6Al-4V,	.0008"-.0015"	.0010"-.0020"	.0015"-.0030"	.0020"-.0040"	.0025"-.0050"
ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si	–	–	–	–	–
STAINLESS STEEL (PRECIPITATION)					
12/8, 15/5, 17/4, AM-350/355	.0005"-.0015"	.0010"-.0020"	.0015"-.0035"	.0020"-.0040"	.0025"-.0050"
	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
STAINLESS STEEL (AUSTENITIC)					
200 SERIES, 302, 303, 304, 316	.0005"-.0015"	.0010"-.0020"	.0015"-.0035"	.0020"-.0040"	.0025"-.0050"
	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
STAINLESS STEEL (AUSTENITIC)					
304L, 316L	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
	.0003"-.0008"	.0005"-.0010"	.0010"-.0015"	.0010"-.0020"	.0015"-.0030"
STAINLESS STEEL (MARTENSITIC)					
403, 410, 416, 440	.0005"-.0015"	.0010"-.0020"	.0015"-.0035"	.0020"-.0040"	.0025"-.0050"
	.0004"-.0010"	.0008"-.0015"	.0010"-.0015"	.0015"-.0030"	.0020"-.0040"
HIGH STRENGTH TOOL STEELS					
4140, 4340, 6150, 5210, A2,	.0005"-.0015"	.0010"-.0020"	.0015"-.0025"	.0015"-.0030"	.0020"-.0040"
D2, P20, H11, H13, S2, 01	.0004"-.0010"	.0010"-.0020"	.0010"-.0020"	.0015"-.0030"	.0020"-.0040"
MEDIUM ALLOY STEELS					
200, 250, 300	.0010"-.0015"	.0015"-.0025"	.0020"-.0030"	.0020"-.0040"	.0025"-.0050"
	.0005"-.0010"	.0010"-.0020"	.0010"-.0025"	.0015"-.0030"	.0020"-.0040"
CARBON STEELS					
1000's, 1100's, 1300's	.0010"-.0015"	.0015"-.0025"	.0020"-.0030"	.0020"-.0040"	.0025"-.0050"
	.0005"-.0010"	.0010"-.0020"	.0010"-.0025"	.0015"-.0035"	.0020"-.0040"
DUCTILE					
DUCTILE CAST IRONS	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
CAST IRONS					
GRAY CAST IRONS	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
ALUMINUM					
2014, 2024, 6061-(T1-T6)	.0010"-.0020"	.0015"-.0040"	.0020"-.0020"	.0030"-.0060"	.0035"-.0070"
7075, DIE CAST, EXTRUDED	–	–	–	–	–
MAGNESIUM					
	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
COPPER, COPPER ALLOYS					
	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
BRASS BRONZE					
BRASS, ALUM/BRONZE	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
BRASS BRONZE					
LOW SILICON BRONZE	.0008"-.0015"	.0010"-.0020"	.0015"-.0030"	.0020"-.0040"	.0025"-.0050"
COMPOSITES					
G-10 FIBERGLASS, GRAPHITE,	.0010"-.0020"	.0010"-.0030"	.0015"-.0035"	.0025"-.0040"	.0030"-.0050"
GRAPHITE/EPOXY, PLASTICS	–	–	–	–	–

GENERAL PURPOSE DRILLS - HSS & M42 COBALT TECHNICAL INFORMATION

ELEMENT & DIMENSIONAL DRILL TOLERANCES

DIAMETER AT POINT

SIZE (INCLUSIVE)	TOLERANCE
OVER #81 TO 1/8	+.0000 TO -.0005
OVER 1/8 TO 1/4	+.0000 TO -.0007
OVER 1/4 TO 1/2	+.0000 TO -.0010
OVER 1/2 TO 1	+.0000 TO -.0012
OVER 1 TO 2	+.0000 TO -.0015
OVER 2 TO 3-1/2	+.0000 TO -.0020

SHANK DIAMETER

SIZE (INCLUSIVE)	TOLERANCE
OVER #81 TO 1/8	-.0000 TO -.0025
OVER 1/8 TO 1/4	-.0005 TO -.0030
OVER 1/4 TO 1/2	-.0005 TO -.0045
OVER 1/2 TO 2	-.0005 TO -.0030

BACK TAPER

SIZE (INCLUSIVE)	TOLERANCE PER INCH
OVER #81 TO 1/8	.0000 TO .0008
OVER 1/8 TO 1/4	.0002 TO .0008
OVER 1/4 TO 1/2	.0002 TO .0009
OVER 1/2 TO 1	.0003 TO .0011
OVER 1 TO 3-1/2	.0004 TO .0015

FLUTE LENGTH

SIZE (INCLUSIVE)	TOLERANCE
OVER #81 TO 1/8	+1/8 TO -1/16
OVER 1/8 TO 1/2	+1/8 TO -1/8
OVER 1/2 TO 1	+1/4 TO -1/8
OVER 1 TO 2	+1/4 TO -1/4
OVER 2 TO 3-1/2	+3/8 TO -3/8

OVERALL LENGTH

SIZE (INCLUSIVE)	TOLERANCE
OVER #81 TO 1/8	+1/8 TO -1/16
OVER 1/8 TO 1/2	+1/8 TO -1/8
OVER 1/2 TO 1	+1/4 TO -1/8
OVER 1 TO 2	+1/4 TO -1/4
OVER 2 TO 3-1/2	+3/8 TO -3/8

INCLUDED POINT ANGLE

SIZE (INCLUSIVE)	INCLUDED ANGLE	TOLERANCE
1/16 TO 1/2	118°	±5°
OVER 1/2 TO 1-1/2	118°	±3°
OVER 1-1/2 TO 3-1/2	118°	±2°

LIP HEIGHT

SIZE (INCLUSIVE)	TIV (TOTAL INDICATOR VARIATION)
1/16 TO 1/8	.0020
OVER 1/8 TO 1/4	.0030
OVER 1/4 TO 1/2	.0040
OVER 1/2 TO 1	.0050
OVER 1 TO 3-1/2	.0060

NOTE: 95% of drills in any one lot to fall within tolerances above.

SUGGESTED METHOD OF MEASUREMENT:

1. Rotate the drill in a vee block against a back end stop.
2. Measure the cutting lip height variation on a comparator, or with an indicator set at allocation approximately 75% of the distance from the center to the periphery of the drill.

CENTRALITY OF WEB

SIZE (INCLUSIVE)	TIV (TOTAL INDICATOR VARIATION)
1/16 TO 1/8	.0030
OVER 1/8 TO 1/4	.0040
OVER 1/4 TO 1/2	.0050
OVER 1/2 TO 1	.0070
OVER 1 TO 3-1/2	.0100

NOTE: 95% of drills in any one lot to fall within tolerances above.

SUGGESTED METHOD OF MEASUREMENT:

1. Rotate the drill in a close fitting bushing.
2. Record the difference in indicator readings of the web at the point as the drill is indexed 180°.

FLUTE SPACING

SIZE (INCLUSIVE)	TOLERANCE (TIV)	ACTUAL DEVIATION
1/16 TO 1/8	.0030	.0015
OVER 1/8 TO 1/4	.0060	.0030
OVER 1/4 TO 1/2	.0100	.0050
OVER 1/2 TO 1	.0140	.0070
OVER 1 TO 3-1/2	.0260	.0130

NOTE: 95% of drills in any one lot to fall within tolerances above.

SUGGESTED METHOD OF MEASUREMENT:

1. Place the drill in a vee block against a back end stop, and rotate it against a radial finger stop.
2. Take an indicator reading at the leading edge of the margin on the opposite flute.
3. Repeat for the other flute and note the difference between the two readings.
4. The deviation in flute spacing is equal to one-half the difference between the two readings.

GENERAL PURPOSE DRILLS - HSS & M42 COBALT TECHNICAL INFORMATION

ALTIN COATED INCREASE SFM BY 40%

SFM & I.P.T. (INCH PER TOOTH)

MATERIAL / TYPE	SFM			FEED in INCHES PER REVOLUTION (IPR) +/-25%									
	GENERAL PURPOSE	HSS HEAVY DUTY	COBALT	1/32"	3/32"	1/8"	5/32"	3/16"	1/4"	5/16"	3/8"	1/2"	9/16"
STEEL													
12L14, 12L15	115	115	115	.0008-.0009	.0026-.0033	.0040-.0053	.0046-.0060	.0051-.0067	.0059-.0078	.0075-.0098	.009-.0117	.0096-.0124	.0107-.0137
1005-1025, 1214, 1215, A36	98	98	98	0.0008	0.0026	0.004	0.0046	0.0051	0.0059	0.0075	0.009	0.0096	0.0107
1000'S, 1100'S	82	89	89	0.0007	.0020-.0022	.0029-.0033	.0033-.0038	.0037-.0043	.0043-.0050	.0054-.0063	.0065-.0075	.0070-.0081	.0080-.0091
4140, 4340, 52100, 8620, H11-H41, A2, D2, 01, P20, 420	30-66	33-79	33-79	.0006-.0007	.0015-.0020	.0021-.0029	.0024-.0033	.0027-.0037	.0031-.0043	.0039-.0054	.0047-.0065	.0051-.0070	.0059-.0080
STAINLESS STEEL													
200, 303, 416, 440	49	72	72	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068
300 SERIES	26	36	36	0.0007	0.0022	0.0033	0.0038	0.0043	0.005	0.0063	0.0075	0.0081	0.0091
318-329, 400-446, DUPLEX	30	49	49	0.0006	0.0013	0.0017	0.002	0.0022	0.0025	0.0031	0.0039	0.0043	0.0049
CAST IRON													
GREY, G10, Gg40, J431C, A48 CLASS 20	79-98	92-115	92-115	.0006-.0008	.0013-.0026	.0021-.0040	.0024-.0046	.0027-.0051	.0031-.0059	.0039-.0075	.0047-.009	.0051-.0096	.0059-.0107
A220, A436, A439, A602, BLACK	66	72	72	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068
BLACK Gts/Gtw, J434C	46	56	56	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068
TITANIUM													
COMMERCIALLY PURE	75	92	92	0.0007	.0017-.0020	.0024-.0029	.0028-.0033	.0031-.0037	.0037-.0043	.0045-.0054	.0055-.0065	.0059-.0070	.0068-.0080
6Al4V, 6A14V-2SnMonel, Monel K	20-39	36-66	36-66	0.0006	.0011-.0015	.0015-.0021	.0016-.0024	.0018-.0027	.0021-.0031	.0026-.0039	.0031-.0047	.0035-.0051	.0041-.0059
NICKEL													
COMMERCIALLY PURE, 17644, 200, 5553	33	49	49	0.0007	0.0022	0.0033	0.0038	0.0043	0.005	0.0063	0.0075	0.0081	0.0091
Monel 400, Hastelloy C, Inconel 625, Waspalloy	20	23	23	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068
Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	10	20	20	.0004-.0006	.0009-.0011	.0011-.0015	.0013-.0016	.0014-.0018	.0017-.0021	.0021-.0026	.0024-.0031	.0027-.0035	.0032-.0041
COPPER													
COMMERCIALLY PURE	108	125	125	.0007-.0008	.0022-.0026	.0033-.0040	.0038-.0046	.0043-.0051	.0050-.0059	.0063-.0075	.0075-.0090	.0081-.0096	.0091-.0107
BRASS, BRONZE 314-340, 350-370	115	131	131	.0007-.0008	.0020-.0030	.0029-.0047	.0033-.0053	.0037-.0059	.0043-.0068	.0054-.0087	.0065-.0104	.0070-.0110	.008-.0122
BRASS ALLOYED Cu+Al+Fe, LONG CHIPPING	89	89	89	0.0008	0.0026	0.004	0.0046	0.0051	0.0059	0.0075	0.009	0.0096	0.0107
High Strength Bronze	52	69	69	0.0007	.0020-.0022	.0029-.0033	.0033-.0038	.0037-.0043	.0043-.0050	.0054-.0063	.0065-.0075	.0070-.0081	.0080-.0091
ALUMINUM, MAGNESIUM													
Commercially Pure	108	108	108	0.0009	0.0033	0.0053	0.006	0.0067	0.0078	0.0098	0.0117	0.0124	0.0137
6061, T6	89-98	98	98	.0007-.0009	.0022-.0033	.0033-.0053	.0038-.0060	.0043-.0067	.0050-.0078	.0063-.0098	.0075-.0117	.0081-.0124	.0091-.0137
SYNTHETIC MATERIALS													
Thermoplastics	98	–	–	0.0009	0.0033	0.0053	0.006	0.0067	0.0078	0.0098	0.0117	0.0124	0.0137
Thermosetting Plastics	92	–	–	0.0008	0.0026	0.004	0.0046	0.0051	0.0059	0.0075	0.009	0.0096	0.0107
Reinforced Plastic Material	46	–	–	0.0007	0.002	0.0029	0.0033	0.0037	0.0043	0.0054	0.0065	0.007	0.008

GENERAL PURPOSE CARBIDE BURS

SA - CYLINDRICAL

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SA-61	1/16	3/32	1/4	1-1/2	260585	11.61	260750	11.61
* SA-41	1/16	1/8	1/4	1-1/2	122131	10.99	122461	10.99
* SA-41L2	1/16	1/8	1/4	2	260596	16.47	260761	16.47
* SA-41L3	1/16	1/8	1/4	3	260607	18.23	260772	18.23
* SA-63	3/32	3/32	3/8	1-1/2	260618	11.61	260783	11.61
* SA-42	3/32	1/8	7/16	1-1/2	122153	10.99	122483	10.99
* SA-42L2	3/32	1/8	7/16	2	260629	16.47	260794	16.47
* SA-42L3	3/32	1/8	7/16	3	260640	18.23	260805	18.23
* SA-43	1/8	1/8	9/16	1-1/2	122175	10.99	122505	10.99
* SA-43L2	1/8	1/8	9/16	2	260651	16.47	260816	16.47
* SA-43L3	1/8	1/8	9/16	3	260662	18.23	260827	18.23
* SA-11	1/8	1/4	1/2	2	122263	21.83	122593	21.83
* SA-12	1/8	1/4	5/8	2	260673	21.94	260838	21.94
SA-52	5/32	1/8	1/2	2	122197	24.19	122527	24.19
* SA-13	5/32	1/4	5/8	2	128973	30.25	129171	30.25
SA-53	3/16	1/8	1/2	2	122219	24.19	122549	24.19
* SA-81	3/16	3/16	1/2	2	260684	26.56	260849	26.56
* SA-14	3/16	1/4	5/8	2	122285	26.12	122615	26.12
SA-51	1/4	1/8	1/2	2	122241	16.31	122571	16.31
* SA-1	1/4	1/4	5/8	2	122307	18.50	122637	18.50
SA-1L6	1/4	1/4	1/2	6-1/2	127763	37.49	127829	37.49
* SA-1L	1/4	1/4	1	2	260695	28.56	260860	28.56
SA-2	5/16	1/4	3/4	2-1/2	122329	34.16	122659	34.16
SA-3	3/8	1/4	3/4	2-1/2	122351	22.90	122681	22.90
SA-3L6	3/8	1/4	3/4	6-3/4	127785	52.81	127851	52.81
SA-3L	3/8	1/4	1	2-3/4	260706	35.25	260871	35.25
SA-3X	3/8	1/4	1-1/2	3-1/4	260717	50.14	260882	50.14
SA-4	7/16	1/4	1	2-3/4	122373	53.08	122703	53.08
SA-5	1/2	1/4	1	2-3/4	122395	36.53	122725	36.53
SA-5L6	1/2	1/4	1	7	127807	82.53	127873	82.53
SA-6	5/8	1/4	1	2-3/4	122417	52.67	122747	52.67
SA-15	3/4	1/4	1/2	2-1/4	260728	80.22	260893	80.22
SA-16	3/4	1/4	3/4	2-1/2	260739	80.22	260904	80.22
SA-7	3/4	1/4	1	2-3/4	122439	82.13	122769	82.13
SA-9	1	1/4	1	2-3/4	128995	129.70	129193	129.70

* One Piece

SA - CYLINDRICAL - FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
* SA-1NF	1/4	1/4	5/8	2	128423	26.77
SA-3NF	3/8	1/4	3/4	2-1/2	128445	37.41
SA-5NF	1/2	1/4	1	2-3/4	128467	62.50
SA-6NF	5/8	1/4	1	2-3/4	128489	92.88
SA-7NF	3/4	1/4	1	2-3/4	128511	122.03

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SB - CYLINDRICAL END CUT

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SB-41	1/16	1/8	1/4	1-1/2	122791	14.82	129259	14.82
* SB-41L2	1/16	1/8	1/4	2	261135	18.11	261278	18.11
* SB-41L3	1/16	1/8	1/4	3	261146	20.06	261289	20.06
* SB-42	3/32	1/8	7/16	1-1/2	122813	11.72	129237	11.72
* SB-42L2	3/32	1/8	7/16	2	261157	18.11	261300	18.11
* SB-42L3	3/32	1/8	7/16	3	261168	20.06	261311	20.06
† SB-ECO	1/8	1/8	-	1-1/2	261179	8.51	-	-
* SB-43	1/8	1/8	9/16	1-1/2	122835	10.72	129215	10.72
* SB-43L2	1/8	1/8	9/16	2	261190	18.11	261333	18.11
* SB-43L3	1/8	1/8	9/16	3	261201	20.06	261344	20.06
* SB-11	1/8	1/4	1/2	2	122901	28.26	123077	28.26
* SB-12	1/8	1/4	5/8	2	261212	24.07	261355	24.07
* SB-13	5/32	1/4	5/8	2	129017	34.12	129281	34.12
* SB-14	3/16	1/4	5/8	2	122923	28.26	123099	28.26
SB-51	1/4	1/8	3/16	1-11/16	122857	16.35	123033	16.35
SB-51	1/4	1/8	1/2	2	122879	17.81	123055	17.81
* SB-1	1/4	1/4	5/8	2	122945	21.94	123121	21.94
* SB-1L	1/4	1/4	1	2	261223	31.42	261366	31.42
SB-2	5/16	1/4	3/4	2-1/2	122967	37.57	123143	37.57
SB-3	3/8	1/4	3/4	2-1/2	122989	26.19	123165	26.19
SB-3L	3/8	1/4	1	2-3/4	261234	38.71	261377	38.71
SB-3X	3/8	1/4	1-1/2	3-1/4	261245	51.17	261388	51.17
SB-4	7/16	1/4	1	2-3/4	129039	60.32	123187	60.32
SB-5	1/2	1/4	1	2-3/4	123011	40.21	123209	40.21
SB-6	5/8	1/4	1	2-3/4	129369	58.93	123231	58.93
SB-15	3/4	1/4	1/2	2-1/4	261256	87.89	261399	87.89
SB-16	3/4	1/4	3/4	2-1/2	261267	87.89	261410	87.89
SB-7	3/4	1/4	1	2-3/4	129061	90.50	123253	90.50
SB-9	1	1/4	1	2-3/4	129083	141.54	129303	141.54

* One Piece

SB - CYLINDRICAL END CUT - FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
SB-3NF	3/8	1/4	3/4	2-1/2	261421	42.30
SB-5NF	1/2	1/4	1	2-3/4	261432	64.89
SB-6NF	5/8	1/4	1	2-3/4	261443	89.66
SB-7NF	3/4	1/4	1	2-3/4	261454	131.27

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SC - CYLINDRICAL BALL NOSE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SC-61	3/32	3/32	3/8	1-1/2	260915	11.61	261025	11.61
* SC-41	3/32	1/8	7/16	1-1/2	123275	10.99	123583	10.99
* SC-42	1/8	1/8	9/16	1-1/2	123297	10.99	123605	10.99
* SC-42L2	1/8	1/8	9/16	2	260926	16.47	261036	16.47
* SC-42L3	1/8	1/8	9/16	3	260937	18.23	261047	18.23
* SC-11	1/8	1/4	1/2	2	123385	30.37	123693	30.37
* SC-12	1/8	1/4	5/8	2	260948	23.28	261058	23.28
SC-52	5/32	1/8	1/2	2	123319	24.19	123627	24.19
* SC-13	5/32	1/4	5/8	2	129105	34.73	129325	34.73
SC-53	3/16	1/8	1/2	2	123341	24.19	123649	24.19
* SC-81	3/16	3/16	1/2	2	260959	26.56	261069	26.56
* SC-14	3/16	1/4	5/8	2	123407	30.37	123715	30.37
SC-51	1/4	1/8	1/2	2	123363	16.35	123671	16.35
* SC-1	1/4	1/4	5/8	2	123429	21.98	123737	21.98
* SC-1L	1/4	1/4	1	2	260970	28.56	261080	28.56
SC-1L6	1/4	1/4	1/2	6-1/2	127895	43.66	127961	43.66
SC-2	5/16	1/4	3/4	2-1/2	123451	36.92	123759	36.92
SC-3	3/8	1/4	3/4	2-1/2	123473	26.58	123781	26.58
SC-3L	3/8	1/4	1	2-3/4	260981	38.59	261091	38.59
SC-3L6	3/8	1/4	3/4	6-3/4	127917	58.82	127983	58.82
SC-3X	3/8	1/4	1-1/2	3-1/4	260992	45.34	261102	45.34
SC-4	7/16	1/4	1	2-3/4	123495	58.32	123803	58.32
SC-5	1/2	1/4	1	2-3/4	123517	41.21	123825	41.21
SC-5L6	1/2	1/4	1	7	127939	92.56	128005	92.56
SC-6	5/8	1/4	1	2-3/4	123539	61.39	123847	61.39
SC-15	3/4	1/4	1/2	2-1/4	261003	86.12	261113	86.12
SC-16	3/4	1/4	3/4	2-1/2	261014	86.12	261124	86.12
SC-7	3/4	1/4	1	2-3/4	123561	88.48	123869	88.48
SC-9	1	1/4	1	2-3/4	129435	133.79	129457	133.79

* One Piece

SC - CYLINDRICAL BALL NOSE FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
* SC-1NF	1/4	1/4	5/8	2	128533	26.35
SC-3NF	3/8	1/4	3/4	2-1/2	128555	35.12
SC-5NF	1/2	1/4	1	2-3/4	128577	49.78
SC-7NF	3/4	1/4	1	2-3/4	128599	120.67

* One Piece

For technical information, please see page 223.

SD - BALL SHAPE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SD-40	1/16	1/8	1/16	1-1/2	126267	11.61	260255	11.61
* SD-61	3/32	3/32	3/32	1-1/2	260189	11.61	260266	11.61
* SD-41	3/32	1/8	3/32	1-1/2	126289	10.99	126531	10.99
* SD-42	1/8	1/8	1/8	1-1/2	129127	10.99	126553	10.99
* SD-42L2	1/8	1/8	1/8	2	260200	16.47	260277	16.47
SD-42L3	1/8	1/8	1/8	3	260211	18.23	260288	18.23
SD-11	1/8	1/4	1/8	2	126333	27.88	126619	27.88
* SD-52	5/32	1/8	5/32	1-21/32	260222	22.42	260299	22.42
* SD-53	3/16	1/8	3/16	1-11/16	260233	24.19	126575	24.19
SD-81	3/16	3/16	5/32	2	260244	26.56	260310	26.56
* SD-14	3/16	1/4	3/16	2	126355	27.88	126641	27.88
SD-51	1/4	1/8	1/4	1-3/4	126311	16.31	126597	16.31
SD-1	1/4	1/4	1/4	2	126377	21.37	126663	21.37
SD-1L6	1/4	1/4	1/4	6-1/4	128027	40.25	128093	40.25
SD-2	5/16	1/4	5/16	2-1/16	126399	30.02	126685	30.02
SD-3	3/8	1/4	3/8	2-1/8	126421	22.90	126707	22.90
SD-3L6	3/8	1/4	3/8	6-3/8	128049	48.41	128115	48.41
SD-4	7/16	1/4	7/16	2-3/16	126443	38.76	126729	38.76
SD-5	1/2	1/4	1/2	2-1/2	126465	31.06	126751	31.06
SD-5L6	1/2	1/4	1/2	6-1/2	128071	65.22	128137	65.22
SD-6	5/8	1/4	5/8	2-3/8	126487	48.36	126773	48.36
SD-7	3/4	1/4	3/4	2-1/2	126509	66.72	126795	66.72
SD-9	1	1/4	1	2-3/4	129149	141.54	129347	141.54

* One Piece

SD - BALL SHAPE FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
* SD-1NF	1/4	1/4	1/4	2	128885	25.96
SD-3NF	3/8	1/4	3/8	2-1/8	128907	32.82
SD-5NF	1/2	1/4	1/2	2-13/64	128929	53.84
SD-6NF	5/8	1/4	5/8	2-5/16	128951	81.08

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SE - EGG SHAPE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SE-61	3/32	3/32	1/8	1-1/2	260321	11.61	260409	11.61
* SE-41	1/8	1/8	7/32	1-1/2	125519	10.99	125695	10.99
* SE-41L2	1/8	1/8	7/32	2	260332	16.47	260420	16.47
* SE-41L3	1/8	1/8	7/32	3	260343	18.23	260431	18.23
SE-53	3/16	1/8	9/32	1-25/32	125541	24.19	125717	24.19
* SE-81	3/16	3/16	9/32	2	260354	26.56	260442	26.56
* SE-11	3/16	1/4	5/16	2	260365	23.88	260453	23.88
SE-51	1/4	1/8	3/8	1-7/8	125563	16.31	125739	16.31
* SE-1	1/4	1/4	3/8	2	125585	26.12	125761	26.12
SE-1L6	1/4	1/4	3/8	6-3/8	260376	35.25	260464	35.25
SE-3	3/8	1/4	5/8	2-3/8	125607	27.50	125783	27.50
SE-3L6	3/8	1/4	5/8	6-5/8	260387	39.50	260475	39.50
SE-5	1/2	1/4	7/8	2-5/8	125629	38.45	125805	38.45
SE-5L6	1/2	1/4	7/8	6-7/8	260398	59.26	260486	59.26
SE-6	5/8	1/4	1	2-3/4	125651	60.73	125827	60.73
SE-7	3/4	1/4	1	2-3/4	125673	84.95	125849	84.95

* One Piece

SE - EGG SHAPE FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
SE-3NF	3/8	1/4	5/8	2-3/8	128731	36.46
SE-5NF	1/2	1/4	7/8	2-5/8	128753	63.46
SE-6NF	5/8	1/4	1	2-3/4	128775	89.89
SE-7NF	3/4	1/4	1	2-3/4	128797	128.64

For technical information, please see page 223.

SF - ROUND NOSE TREE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SF-61	3/32	3/32	1/4	1-1/2	260497	11.61	260541	11.61
* SF-41	1/8	1/8	1/4	1-1/2	123891	10.99	124177	10.99
* SF-42	1/8	1/8	1/2	1-1/2	123913	10.99	124199	10.99
* SF-42L2	1/8	1/8	1/2	2	260508	16.47	260552	16.47
* SF-42L3	1/8	1/8	1/2	3	260519	18.23	260563	18.23
SF-53	3/16	1/8	1/2	2	123935	24.19	124221	24.19
* SF-81	3/16	3/16	1/2	2	260530	26.56	260574	26.56
SF-51	1/4	1/8	1/2	2	123957	16.31	124243	16.31
* SF-1	1/4	1/4	3/4	2	123979	23.82	124265	23.82
SF-1L6	1/4	1/4	1/2	6-1/2	128159	45.53	128225	45.53
SF-3	3/8	1/4	3/4	2-1/2	124001	26.58	124287	26.58
SF-3L6	3/8	1/4	3/4	6-3/4	128181	57.67	128247	57.67
SF-4	7/16	1/4	1	2-3/4	124023	55.57	124309	55.57
SF-13	1/2	1/4	3/4	2-1/2	124045	59.17	124331	59.17
SF-5	1/2	1/4	1	2-3/4	124067	39.90	124353	39.90
SF-5L6	1/2	1/4	1	7	128203	85.05	128269	85.05
SF-6	5/8	1/4	1	2-3/4	124089	61.08	124375	61.08
SF-7	3/4	1/4	1	2-3/4	124111	85.35	124397	85.35
SF-14	3/4	1/4	1-1/4	3	124133	155.42	124419	155.42
SF-15	3/4	1/4	1-1/2	3-1/4	124155	182.50	124441	182.50

* One Piece

SF - ROUND NOSE TREE FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
* SF-1NF	1/4	1/4	3/4	2	128621	26.85
SF-3NF	3/8	1/4	3/4	2-1/2	128643	35.50
SF-5NF	1/2	1/4	1	2-3/4	128665	62.80
SF-6NF	5/8	1/4	1	2-3/4	128687	95.83
SF-14NF	3/4	1/4	1-1/4	3	128709	116.57

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SG - POINTED TREE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SG-61	3/32	3/32	1/4	1-1/2	261465	11.61	261553	11.61
* SG-41	1/8	1/8	1/4	1-1/2	124463	10.95	124749	10.95
* SG-42	1/8	1/8	5/16	1-1/2	124485	10.95	124771	10.95
* SG-43	1/8	1/8	3/8	1-1/2	124507	10.95	124793	10.95
* SG-44	1/8	1/8	1/2	1-1/2	124529	15.24	124815	15.24
* SG-44L2	1/8	1/8	1/2	2	261476	16.47	261564	16.47
* SG-44L3	1/8	1/8	1/2	3	261487	18.23	261575	18.23
SG-53	3/16	1/8	1/2	2	124551	24.19	124837	24.19
* SG-81	3/16	3/16	1/2	2	261498	26.56	261586	26.56
SG-51	1/4	1/8	1/2	2	124573	16.31	124859	16.31
* SG-1	1/4	1/4	5/8	2	124595	24.28	124881	24.28
SG-1L6	1/4	1/4	1/2	6-1/2	261509	33.30	261597	33.30
SG-2	5/16	1/4	3/4	2-1/2	124617	38.49	124903	38.49
SG-3	3/8	1/4	3/4	2-1/2	124639	27.38	124925	27.38
SG-3L6	3/8	1/4	3/4	6-3/4	261520	41.94	261608	41.94
SG-13	1/2	1/4	3/4	2-1/2	124661	58.06	124947	58.06
SG-5	1/2	1/4	1	2-3/4	124683	40.21	124969	40.21
SG-5L6	1/2	1/4	1	7	261531	54.70	261619	54.70
SG-6	5/8	1/4	1	2-3/4	124705	62.36	124991	62.36
SG-7	3/4	1/4	1	2-3/4	124727	83.46	125013	83.46
SG-15	3/4	1/4	1-1/2	3-1/4	261542	100.28	261630	100.28

* One Piece

SH - FLAME SHAPE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
SH-41	1/8	1/8	1/4	1-1/2	126817	10.99	126949	10.99
SH41L2	1/8	1/8	1/4	2	261641	16.47	261685	16.47
* SH41L3	1/8	1/8	1/4	3	261652	18.23	261696	18.23
* SH-53	3/16	1/8	3/8	1-7/8	126839	24.19	126971	24.19
* SH-1	1/4	1/4	5/8	2	129501	25.81	129523	25.81
SH-2	5/16	1/4	3/4	2-1/2	126861	29.76	126993	29.76
* SH-2L6	5/16	1/4	3/4	6-3/4	261663	39.50	261707	39.50
SH-5	1/2	1/4	1-1/4	3	126883	57.67	127015	57.67
SH-5L6	1/2	1/4	1-1/4	7-1/4	261674	63.81	261718	63.81
SH-6	5/8	1/4	1-7/16	3-3/16	126905	135.95	127037	135.95
SH-7	3/4	1/4	1-5/8	3-3/8	126927	172.72	127059	172.72

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SJ - 60º INCLUDED ANGLE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SJ-42	1/8	1/8	3/32	1-1/2	127587	10.99	127675	10.99
* SJ-1	1/4	1/4	3/16	2	127609	21.37	127697	21.37
SJ-3	3/8	1/4	5/16	2-3/16	127631	26.19	127719	26.19
SJ-5	1/2	1/4	7/16	2-19/64	127653	35.92	127741	35.92
SJ-6	5/8	1/4	9/16	2-5/16	261729	43.33	261762	43.33
SJ-7	3/4	1/4	11/16	2-7/16	261740	56.83	261773	56.83
SJ-9	1	1/4	15/16	2-11/16	261751	114.32	261784	114.32

* One Piece

SK - 90º INCLUDED ANGLE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SK-42	1/8	1/8	1/16	1-1/2	127411	10.99	127499	10.99
* SK-1	1/4	1/4	1/8	2	127433	21.37	127521	21.37
SK-3	3/8	1/4	3/16	2-1/16	127455	22.10	127543	22.10
SK-5	1/2	1/4	1/4	2-1/8	127477	34.62	127565	34.62
SK-6	5/8	1/4	5/16	2-3/16	261795	43.33	261817	43.33
SK-7	3/4	1/4	3/8	2-1/4	129391	70.51	129413	70.51
SK-9	1	1/4	1/2	2-1/4	261806	107.39	261828	107.39

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SL - INCLUDED ANGLE WITH RADIUS END

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SL-41	1/8	1/8	3/8	1-1/2	125871	10.95	126069	10.95
* SL-42	1/8	1/8	1/2	1-1/2	125893	10.95	126091	10.95
* SL-42L2	1/8	1/8	1/2	2	261839	16.47	261872	16.47
* SL-42L3	1/8	1/8	1/2	3	261850	18.23	261883	18.23
SL-53	3/16	1/8	1/2	2	125915	24.19	126113	24.19
* SL-81	3/16	3/16	7/16	2	261861	26.56	261894	26.56
* SL-1	1/4	1/4	5/8	2	125937	22.25	126135	22.25
SL-1L6	1/4	1/4	5/8	6-5/8	128291	46.64	128357	46.64
SL-2	5/16	1/4	7/8	2-3/4	125959	42.55	126157	42.55
SL-3	3/8	1/4	1-1/16	2-15/16	125981	30.79	126179	30.79
SL-3L6	3/8	1/4	1-1/16	7-1/16	128313	73.49	128379	73.49
SL-4	1/2	1/4	1-1/8	3	126003	62.38	126201	62.38
SL-4L6	1/2	1/4	1-1/4	7-1/4	128335	90.03	128401	90.03
SL-6	5/8	1/4	1-5/16	3-3/16	126025	100.06	126223	100.06
SL-7	3/4	1/4	1-1/2	3-3/8	126047	136.92	126245	136.92

* One Piece

SL - INCLUDED ANGLE WITH RADIUS END - FOR ALUMINUM

TOOL #	SIZE	SHANK	LOC	OAL	ALUMA CUT	LIST PRICE
SL-3NF	3/8	1/4	1-1/16	2-15/16	259483	54.98
SL-4NF	1/2	1/4	1-1/4	3	128819	62.96
SL-5NF	5/8	1/4	1-3/16	3-5/16	259494	114.54
SL-6NF	5/8	1/4	1-5/16	3-3/16	128841	126.79
SL-7NF	3/4	1/4	1-1/2	3-3/8	128863	157.49

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BURS

SM - POINTED CONE

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SM-61	3/32	3/32	1/4	1-1/2	260002	11.61	260035	11.61
* SM-41	1/8	1/8	11/32	1-1/2	125035	10.99	125277	10.99
* SM-42	1/8	1/8	7/16	1-1/2	125057	10.99	125299	10.99
* SM-42L2	1/8	1/8	7/16	2	260013	16.47	260046	16.47
* SM-42L3	1/8	1/8	7/16	3	260024	18.23	260057	18.23
* SM-43	1/8	1/8	5/8	1-1/2	125079	10.99	125321	10.99
SM-53	3/16	1/8	1/2	2	125101	24.19	125343	24.19
SM-51	1/4	1/8	1/2	2-1/8	125123	16.31	125365	16.31
* SM-1	1/4	1/4	1/2	2	125145	20.91	125387	20.91
* SM-2	1/4	1/4	3/4	2	125167	32.40	125409	32.40
* SM-3	1/4	1/4	1	2	125189	23.36	125431	23.36
SM-4	3/8	1/4	5/8	2-1/2	125211	31.13	125453	31.13
SM-5	1/2	1/4	7/8	2-3/4	125233	43.58	125475	43.58
SM-6	5/8	1/4	1	2-7/8	125255	98.43	125497	98.43

* One Piece

SN - INVERTED TAPER

TOOL #	SIZE	SHANK	LOC	OAL	SINGLE CUT	LIST PRICE	DOUBLE CUT	LIST PRICE
* SN-61	3/32	3/32	1/8	1-1/2	260068	11.61	260123	11.61
* SN-41	3/32	1/8	1/8	1-1/2	127081	11.00	260134	11.00
* SN-42	1/8	1/8	3/16	1-1/2	127103	10.99	127213	10.99
SN-53	3/16	1/8	1/4	1-3/4	127125	24.19	127235	24.19
* SN-81	3/16	3/16	1/4	2	260079	26.56	260145	26.56
SN-51	1/4	1/8	1/4	1-3/4	127147	16.31	127257	16.31
* SN-1	1/4	1/4	5/16	2	127169	21.25	127279	21.25
SN-2	3/8	1/4	3/8	2-1/8	260090	29.90	260156	29.90
SN-4	1/2	1/4	1/2	2-1/4	127191	62.04	127301	62.04
SN-6	5/8	1/4	3/4	2-1/2	260101	54.88	260167	54.88
SN-7	3/4	1/4	5/8	2-3/8	260112	66.25	260178	66.25

* One Piece

For technical information, please see page 223.

GENERAL PURPOSE CARBIDE BUR SETS

CARBIDE BUR SETS

ITEM# 127323

ITEM# 129545

SET SIZES	# OF PCS. IN SET	DIA.	SHANK DIAMETER	CASE TYPE	TYPE	ITEM#	LIST PRICE
SA-42, SA-43, SC-41, SC-42, SD-42, SE-41,SF-42, SG-42, SM-43	9 PCS.	1/8	1/8	WOOD	DOUBLE CUT	127323	161.91
SA-1, SC-1, SD-3, SH-1, SF-3, SA-3, SC-3, SC-5, SF-5, SA-5	10 PCS.	–	1/4	METAL	DOUBLE CUT	129545	304.87

For technical information, please see page 223.

SELECTION BY CUT

SINGLE CUT:

Provides the best surface finish and largest contact patch on the work piece.

Demands greater operator skill since the single flute direction pulls the bur into the work piece.

USE IN - Non-hardened steel <45 HRc, Hardened Steel >45HRc, stainless steel, non-ferrous light metals, hardened cast iron >45HRc, High temp resistant metals

DOUBLE CUT:

Most popular geometry as the dual flute direction reduces the contact patch on the work piece and therefore provides easier operator control while still maintaining a good surface finish.

USE IN - Ferrous metals, Non-ferrous metals

ALUMINUM CUT:

These burs employ a coarser flute which results in improved cutting performance for aluminum and aluminum alloys.

USE IN - Non-ferrous metals, aluminum alloys, plastics

CARBIDE BURS - SPEEDS

CUTTING DIA.	SUGGESTED RPM	MAXIMUM RPM
1/16	55,000 – 85,000	90,000
1/8	35,000 – 65,000	80,000
3/16	30,000 – 55,000	70,000
1/4	25,000 – 50,000	70,000
5/16	20,000 – 40,000	67,000
3/8	18,000 – 40,000	63,000
7/16	16,000 – 38,000	58,000
1/2	14,000 – 36,000	50,000
5/8	12,000 – 25,000	40,000
3/4	10,000 – 20,000	33,000
1	7,500 – 20,000	25,000

When using double cut: Reduce speeds by 25% approximately
For stainless steel material: Increase speeds by 50% approximately.

GENERAL PURPOSE SOLID CARBIDE REAMERS

STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0400	#60	.0400	1-1/2	1/4	4	157353	49.69
.0410	#59	.0410	1-1/2	3/8	4	157364	49.69
.0420	#58	.0420	1-1/2	3/8	4	157375	49.69
.0430	#57	.0430	1-1/2	3/8	4	157386	49.69
.0440		.0440	1-1/2	3/8	4	157397	52.50
.0450		.0450	1-1/2	3/8	4	157408	52.50
.0460		.0460	1-1/2	3/8	4	157419	52.50
.0465	#56	.0465	1-1/2	3/8	4	157430	49.69
.0469	3/64	.0469	1-1/2	3/8	4	157441	47.21
.0470		.0470	1-1/2	3/8	4	157452	52.50
.0480		.0480	1-1/2	3/8	4	157463	52.50
.0490		.0490	1-1/2	3/8	4	157474	52.50
.0500		.0500	1-1/2	3/8	4	157485	52.50
.0510		.0510	1-1/2	3/8	4	157496	52.50
.0520	#55	.0520	1-1/2	3/8	4	157507	49.69
.0530		.0530	1-1/2	3/8	4	157518	52.50
.0540		.0540	1-1/2	3/8	4	157529	52.50
.0550	#54	.0550	1-1/2	3/8	4	157540	49.69
.0560		.0560	1-1/2	3/8	4	157551	52.50
.0570		.0570	1-1/2	3/8	4	157562	52.50
.0580		.0580	1-1/2	3/8	4	157573	52.50
.0590		.0590	1-1/2	3/8	4	157584	52.50
.0591	1.5mm	.0591	1-1/2	3/8	4	157595	52.50
.0595	#53	.0595	1-1/2	3/8	4	157606	49.69
.0600		.0600	1-1/2	3/8	4	157617	52.50
.0605		.0605	1-1/2	3/8	4	157628	69.81
.0610		.0610	1-1/2	3/8	4	157639	52.50
.0615		.0615	1-1/2	3/8	4	157650	58.07
.0620		.0620	1-1/2	3/8	4	157661	52.50
.0625	1/16	.0625	1-1/2	3/8	4	157672	47.21
.0630		.0630	1-1/2	3/8	4	157683	52.50
.0635	#52	.0635	1-1/2	3/8	4	157694	49.69
.0640		.0640	1-1/2	3/8	4	157705	52.50
.0645		.0645	1-1/2	3/8	4	157716	69.81
.0650		.0650	1-1/2	3/8	4	157727	52.50
.0660		.0660	1-3/4	1/2	4	157738	52.50
.0670	#51	.0670	1-3/4	1/2	4	157749	49.69
.0680		.0680	1-3/4	1/2	4	157760	52.50
.0690		.0690	1-3/4	1/2	4	157771	52.50
.0700	#50	.0700	1-3/4	1/2	4	157782	49.69

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0710		.0710	1-3/4	1/2	4	157793	52.50
.0720		.0720	1-3/4	1/2	4	157804	52.50
.0730	#49	.0730	1-3/4	1/2	4	157815	49.69
.0740		.0740	1-3/4	1/2	4	157826	52.50
.0750		.0750	1-3/4	1/2	4	157837	52.50
.0760	#48	.0760	1-3/4	1/2	4	157848	49.69
.0770		.0770	1-3/4	1/2	4	157859	52.50
.0780		.0780	1-3/4	1/2	4	157870	52.50
.0781	5/64	.0781	1-3/4	1/2	4	157881	47.21
.0785	#47	.0785	1-3/4	1/2	4	157892	49.69
.0787	2.0mm	.0787	1-3/4	1/2	4	157903	52.50
.0790		.0790	1-3/4	1/2	4	157914	52.50
.0800		.0800	1-3/4	1/2	4	157925	52.50
.0810	#46	.0810	2	1/2	4	157936	49.69
.0820	#45	.0820	2	1/2	4	157947	49.69
.0830		.0830	2	1/2	4	157958	52.50
.0840		.0840	2	1/2	4	157969	52.50
.0850		.0850	2	1/2	4	157980	52.50
.0860	#44	.0860	2	1/2	4	157991	49.69
.0870		.0870	2	1/2	4	158002	52.50
.0880		.0880	2	1/2	4	158013	52.50
.0890	#43	.0890	2	1/2	4	158024	49.69
.0900		.0900	2	1/2	4	158035	52.50
.0910		.0910	2	1/2	4	158046	52.50
.0915		.0915	2	1/2	4	158057	69.25
.0920		.0920	2	1/2	4	158068	52.50
.0925		.0925	2	1/2	4	158079	58.07
.0930		.0930	2	1/2	4	158090	52.50
.0935	#42	.0935	2	1/2	4	158101	49.69
.0938	3/32	.0938	2	1/2	4	158112	47.21
.0940		.0940	2	1/2	4	158123	52.50
.0945		.0945	2	1/2	4	158134	58.07
.0950		.0950	2	1/2	4	158145	52.50
.0960	#41	.0960	2	5/8	4	158156	49.69
.0970		.0970	2	5/8	4	158167	52.50
.0980	#40	.0980	2	5/8	4	158178	49.69
.0984	2.5mm	.0984	2	5/8	4	158189	52.50
.0990		.0990	2-1/4	5/8	4	158200	52.50
.0995	#39	.0995	2-1/4	5/8	4	158211	49.69
.1000		.1000	2-1/4	5/8	4	158222	52.50

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GENERAL PURPOSE SOLID CARBIDE REAMERS

STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1010		.1010	2-1/4	5/8	4	158233	52.50
.1015	#38	.1015	2-1/4	5/8	4	158244	49.69
.1020		.1020	2-1/4	5/8	4	158255	52.50
.1030		.1030	2-1/4	5/8	4	158266	52.50
.1040	#37	.1040	2-1/4	5/8	4	158277	49.69
.1050		.1050	2-1/4	5/8	4	158288	52.50
.1060		.1060	2-1/4	5/8	4	158299	52.50
.1065	#36	.1065	2-1/4	5/8	4	158310	49.69
.1070		.1070	2-1/4	5/8	4	158321	52.50
.1080		.1080	2-1/4	5/8	4	158332	52.50
.1090		.1090	2-1/4	5/8	4	158343	54.70
.1094	7/64	.1094	2-1/4	5/8	4	158354	47.21
.1100	#35	.1100	2-1/4	5/8	4	158365	49.69
.1110	#34	.1110	2-1/4	5/8	4	158376	49.69
.1120		.1120	2-1/4	5/8	4	158387	52.50
.1130	#33	.1130	2-1/4	5/8	4	158398	49.69
.1140		.1140	2-1/4	5/8	4	158409	52.50
.1150		.1150	2-1/4	5/8	4	158420	52.50
.1160	#32	.1160	2-1/4	5/8	4	158431	52.27
.1170		.1170	2-1/4	5/8	4	158442	55.59
.1180		.1180	2-1/4	5/8	4	158453	55.59
.1181	3.0mm	.1181	2-1/4	5/8	4	158464	51.10
.1190		.1190	2-1/4	5/8	4	158475	55.59
.1200	#31	.1200	2-1/4	5/8	4	158486	52.27
.1210		.1210	2-1/4	5/8	4	158497	55.59
.1220		.1220	2-1/4	5/8	4	158508	55.59
.1230		.1230	2-1/4	5/8	4	158519	55.59
.1235		.1235	2-1/4	5/8	4	158530	74.03
.1240		.1240	2-1/4	5/8	4	158541	55.59
.1245		.1245	2-1/4	5/8	4	158552	61.44
.1250	1/8	.1250	2-1/4	5/8	4	158563	50.25
.1255		.1255	2-1/4	5/8	4	158574	61.44
.1260		.1260	2-1/4	5/8	4	158585	55.59
.1265		.1265	2-1/4	5/8	4	158596	74.03
.1270		.1270	2-1/4	5/8	4	158607	55.59
.1275		.1275	2-1/4	5/8	4	158618	74.03
.1280		.1280	2-1/4	5/8	4	158629	55.59
.1285	#30	.1285	2-1/4	5/8	4	158640	55.59
.1290		.1290	2-1/4	5/8	4	158651	55.59
.1300		.1300	2-1/2	5/8	4	158662	55.59

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1310		.1310	2-1/2	3/4	4	158673	63.64
.1320		.1320	2-1/2	3/4	4	158684	63.64
.1330		.1330	2-1/2	3/4	4	158695	63.64
.1340		.1340	2-1/2	3/4	4	158706	63.64
.1350		.1350	2-1/2	3/4	4	158717	63.64
.1360	#29	.1360	2-1/2	3/4	4	158728	59.52
.1370		.1370	2-1/2	3/4	4	158739	63.64
.1378	3.5mm	.1378	2-1/2	3/4	4	158750	63.64
.1380		.1380	2-1/2	3/4	4	158761	63.64
.1390		.1390	2-1/2	3/4	4	158772	63.64
.1400		.1400	2-1/2	3/4	4	158783	63.64
.1405	#28	.1405	2-1/2	3/4	4	158794	59.52
.1406	9/64	.1406	2-1/2	3/4	4	158805	57.27
.1410		.1410	2-1/2	3/4	4	158816	63.64
.1420		.1420	2-1/2	3/4	4	158827	63.64
.1430		.1430	2-1/2	3/4	4	158838	63.64
.1440	#27	.1440	2-1/2	3/4	4	158849	59.52
.1450		.1450	2-1/2	3/4	4	158860	63.64
.1460		.1460	2-1/2	3/4	4	158871	66.45
.1470	#26	.1470	2-1/2	3/4	4	158882	62.00
.1480		.1480	2-1/2	3/4	4	158893	66.45
.1490		.1490	2-1/2	3/4	4	158904	66.45
.1495	#25	.1495	2-1/2	3/4	4	158915	62.00
.1500		.1500	2-1/2	3/4	4	158926	66.45
.1510		.1510	2-1/2	3/4	4	158937	66.45
.1520	#24	.1520	2-1/2	3/4	4	158948	62.00
.1530		.1530	2-1/2	3/4	4	158959	66.45
.1540	#23	.1540	2-1/2	3/4	4	158970	62.00
.1545		.1545	2-1/2	3/4	4	158981	76.83
.1550		.1550	2-1/2	3/4	4	158992	66.45
.1555		.1555	2-1/2	3/4	4	159003	76.83
.1560		.1560	2-1/2	3/4	4	159014	66.45
.1562	5/32	.1562	2-1/2	3/4	4	159025	60.08
.1565		.1565	2-1/2	3/4	4	159036	76.83
.1570	#22	.1570	2-1/2	3/4	4	159047	62.00
.1575	4.0mm	.1575	2-1/2	3/4	4	159058	66.45
.1580		.1580	2-1/2	3/4	4	159069	66.45
.1590	#21	.1590	2-1/2	3/4	4	159080	62.00
.1600		.1600	2-1/2	3/4	4	159091	66.45
.1610	#20	.1610	2-1/2	7/8	4	159102	69.81

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GENERAL PURPOSE SOLID CARBIDE REAMERS

STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1620		.1620	2-3/4	7/8	4	159113	74.82
.1630		.1630	2-3/4	7/8	4	159124	74.82
.1640		.1640	2-3/4	7/8	4	159135	74.82
.1650		.1650	2-3/4	7/8	4	159146	69.81
.1660	#19	.1660	2-3/4	7/8	4	159157	69.81
.1670		.1670	2-3/4	7/8	4	159168	74.82
.1680		.1680	2-3/4	7/8	4	159179	74.82
.1690		.1690	2-3/4	7/8	4	159190	74.82
.1695	#18	.1695	2-3/4	7/8	4	159201	69.81
.1700		.1700	2-3/4	7/8	4	159212	74.82
.1710		.1710	2-3/4	7/8	4	159223	74.82
.1719	11/64	.1719	2-3/4	7/8	4	159234	67.29
.1720		.1720	2-3/4	7/8	4	159245	74.82
.1730	#17	.1730	2-3/4	7/8	4	159256	69.81
.1740		.1740	2-3/4	7/8	4	159267	74.82
.1750		.1750	2-3/4	7/8	4	159278	74.82
.1760		.1760	2-3/4	7/8	4	159289	74.82
.1770	#16	.1770	2-3/4	7/8	4	159300	69.81
.1772	4.5mm	.1772	2-3/4	7/8	4	159311	77.91
.1780		.1780	2-3/4	7/8	4	159322	74.82
.1790		.1790	2-3/4	7/8	4	159333	74.82
.1800	#15	.1800	2-3/4	7/8	4	159344	69.81
.1810		.1810	2-3/4	7/8	4	159355	74.82
.1820	#14	.1820	2-3/4	7/8	4	159366	69.81
.1830		.1830	2-3/4	7/8	4	159377	74.82
.1840		.1840	2-3/4	7/8	4	159388	74.82
.1850	#13	.1850	2-3/4	7/8	4	159399	69.81
.1855		.1855	2-3/4	7/8	4	159410	89.93
.1860		.1860	2-3/4	7/8	4	159421	74.82
.1865		.1865	2-3/4	7/8	4	159432	80.44
.1870		.1870	2-3/4	7/8	4	159443	74.82
.1875	3/16	.1875	2-3/4	7/8	4	159454	67.29
.1880		.1880	2-3/4	7/8	4	159465	74.82
.1885		.1885	2-3/4	7/8	4	159476	80.44
.1890	#12	.1890	2-3/4	7/8	4	159487	69.81
.1900		.1900	2-3/4	7/8	4	159498	74.82
.1910	#11	.1910	2-3/4	7/8	4	159509	84.88
.1920		.1920	2-3/4	7/8	4	159520	90.78
.1930		.1930	2-3/4	7/8	4	159531	90.78
.1935	#10	.1935	2-3/4	7/8	4	159542	84.88

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1940		.1940	2-3/4	7/8	4	159553	90.78
.1950		.1950	2-3/4	7/8	4	159564	90.78
.1960	#9	.1960	3	1	4	159575	84.88
.1969	5.0mm	.1969	3	1	4	159586	90.78
.1970		.1970	3	1	4	159597	90.78
.1980		.1980	3	1	4	159608	90.78
.1990	#8	.1990	3	1	4	159619	84.88
.2000		.2000	3	1	4	159630	90.78
.2010	#7	.2010	3	1	4	159641	84.88
.2020		.2020	3	1	4	159652	90.78
.2030		.2030	3	1	4	159663	90.78
.2031	13/64	.2031	3	1	4	159674	81.51
.2040	#6	.2040	3	1	4	159685	84.88
.2050		.2050	3	1	4	159696	90.78
.2055	#5	.2055	3	1	4	159707	84.88
.2060		.2060	3	1	4	159718	90.78
.2070		.2070	3	1	4	159729	90.78
.2080		.2080	3	1	4	159740	90.78
.2090	#4	.2090	3	1	4	159751	84.88
.2100		.2100	3	1	4	159762	90.78
.2110		.2110	3	1	4	159773	90.78
.2120		.2120	3	1	4	159784	90.78
.2130	#3	.2130	3	1	4	159795	84.88
.2140		.2140	3	1	4	159806	90.78
.2150		.2150	3	1	4	159817	90.78
.2160		.2160	3	1	4	159828	90.78
.2165	5.5mm	.2165	3	1	4	159839	95.78
.2170		.2170	3	1	4	159850	90.78
.2180		.2180	3	1	4	159861	90.78
.2188	7/32	.2188	3	1	4	159872	81.51
.2190		.2190	3	1	4	159883	90.78
.2200		.2200	3	1	4	159894	90.78
.2210	#2	.2210	3	1	4	159905	84.88
.2220		.2220	3	1	4	159916	90.78
.2230		.2230	3	1	4	159927	90.78
.2240		.2240	3	1	4	159938	90.78
.2250		.2250	3	1	4	159949	90.78
.2260		.2260	3	1	4	159960	99.71
.2270		.2270	3	1	4	159971	99.71
.2280	#1	.2280	3	1	4	159982	93.02

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GENERAL PURPOSE SOLID CARBIDE REAMERS

STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2290		.2290	3	1	4	159993	93.02
.2300		.2300	3	1	4	160004	99.71
.2310		.2310	3	1	4	160015	99.71
.2320		.2320	3	1	4	160026	99.71
.2330		.2330	3	1	4	160037	99.71
.2340	A	.2340	3	1	4	160048	99.71
.2344	15/64	.2344	3	1	4	160059	89.65
.2350		.2350	3	1	4	160070	99.71
.2360		.2360	3	1	4	160081	99.71
.2362	6.0mm	.2362	3	1	4	160092	94.94
.2370		.2370	3	1	4	160103	99.71
.2380	B	.2380	3	1	4	160114	99.71
.2390		.2390	3	1	4	160125	99.71
.2400		.2400	3	1	4	160136	99.71
.2410		.2410	3	1	4	160147	99.71
.2420	C	.2420	3	1	4	160158	99.71
.2430		.2430	3	1	4	160169	99.71
.2440		.2440	3	1	4	160180	99.71
.2450		.2450	3	1	4	160191	99.71
.2460	D	.2460	3	1	4	160202	99.71
.2470		.2470	3	1	4	160213	99.71
.2480		.2480	3	1	4	160224	99.71
.2485		.2485	3	1	4	160235	111.41
.2490		.2490	3	1	4	160246	99.71
.2495		.2495	3	1	4	160257	105.84
.2500	1/4	.2500	3	1	4	160268	89.65
.2505		.2505	3	1	4	160279	105.84
.2510		.2510	3	1	4	160290	99.71
.2515		.2515	3	1	4	160301	124.00
.2520		.2520	3	1	4	160312	99.71
.2530		.2530	3	1	4	160323	99.71
.2540		.2540	3	1	4	160334	99.71
.2550		.2550	3	1	6	160345	99.71
.2559	6.5mm	.2559	3-1/4	1-1/8	6	160356	105.56
.2560		.2560	3-1/4	1-1/8	6	160367	120.63
.2570	F	.2570	3-1/4	1-1/8	6	160378	120.63
.2580		.2580	3-1/4	1-1/8	6	160389	120.63
.2590		.2590	3-1/4	1-1/8	6	160400	120.63
.2600		.2600	3-1/4	1-1/8	6	160411	120.63
.2610	G	.2610	3-1/4	1-1/8	6	160422	120.63

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2620		.2620	3-1/4	1-1/8	6	160433	120.63
.2630		.2630	3-1/4	1-1/8	6	160444	120.63
.2640		.2640	3-1/4	1-1/8	6	160455	120.63
.2650		.2650	3-1/4	1-1/8	6	160466	120.63
.2656	17/64	.2656	3-1/4	1-1/8	6	160477	108.65
.2660	H	.2660	3-1/4	1-1/8	6	160488	120.63
.2670		.2670	3-1/4	1-1/8	6	160499	120.63
.2680		.2680	3-1/4	1-1/8	6	160510	120.63
.2690		.2690	3-1/4	1-1/8	6	160521	120.63
.2700		.2700	3-1/4	1-1/8	6	160532	120.63
.2710		.2710	3-1/4	1-1/8	6	160543	120.63
.2720	I	.2720	3-1/4	1-1/8	6	160554	120.63
.2730		.2730	3-1/4	1-1/8	6	160565	120.63
.2740		.2740	3-1/4	1-1/8	6	160576	120.63
.2750		.2750	3-1/4	1-1/8	6	160587	120.63
.2756	7.0mm	.2756	3-1/4	1-1/8	6	160598	131.77
.2760		.2760	3-1/4	1-1/8	6	160609	120.63
.2770	J	.2770	3-1/4	1-1/8	6	160620	120.63
.2780		.2780	3-1/4	1-1/8	6	160631	120.63
.2790		.2790	3-1/4	1-1/8	6	160642	120.63
.2800		.2800	3-1/4	1-1/8	6	160653	120.63
.2810	K	.2810	3-1/4	1-1/8	6	160664	120.63
.2812	9/32	.2812	3-1/4	1-1/8	6	160675	108.65
.2820		.2820	3-1/4	1-1/8	6	160686	120.63
.2830		.2830	3-1/4	1-1/8	6	160697	120.63
.2840		.2840	3-1/4	1-1/8	6	160708	120.63
.2850		.2850	3-1/4	1-1/8	6	160719	120.63
.2860		.2860	3-1/4	1-1/8	6	160730	120.63
.2870		.2870	3-1/4	1-1/8	6	160741	120.63
.2880		.2880	3-1/4	1-1/8	6	160752	120.63
.2890		.2890	3-1/4	1-1/8	6	160763	120.63
.2900	L	.2900	3-1/4	1-1/8	6	160774	120.63
.2910		.2910	3-1/4	1-1/8	6	160785	120.63
.2920		.2920	3-1/4	1-1/8	6	160796	120.63
.2930		.2930	3-1/4	1-1/8	6	160807	120.63
.2940		.2940	3-1/4	1-1/8	6	160818	120.63
.2950	M	.2950	3-1/4	1-1/8	6	160829	120.63
.2953		.2953	3-1/4	1-1/8	6	160840	131.77
.2960		.2960	3-1/4	1-1/8	6	160851	120.63
.2969	19/64	.2969	3-1/4	1-1/8	6	160862	120.63

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DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2970		.2970	3-1/4	1-1/8	6	160873	120.63
.2980		.2980	3-1/4	1-1/8	6	160884	120.63
.2990		.2990	3-1/4	1-1/8	6	160895	120.63
.3000		.3000	3-1/4	1-1/8	6	160906	120.63
.3010		.3010	3-1/4	1-1/8	6	160917	120.63
.3020	N	.3020	3-1/4	1-1/8	6	160928	120.63
.3030		.3030	3-1/4	1-1/8	6	160939	120.63
.3040		.3040	3-1/4	1-1/8	6	160950	120.63
.3050		.3050	3-1/4	1-1/8	6	160961	120.63
.3060		.3060	3-1/4	1-1/8	6	160972	120.63
.3070		.3070	3-1/4	1-1/8	6	160983	120.63
.3080		.3080	3-1/4	1-1/8	6	160994	120.63
.3090		.3090	3-1/4	1-1/8	6	161005	120.63
.3100		.3100	3-1/4	1-1/8	6	161016	120.63
.3110		.3110	3-1/4	1-1/8	6	161027	120.63
.3115		.3115	3-1/4	1-1/8	6	161038	138.51
.3120		.3120	3-1/4	1-1/8	6	161049	120.63
.3125	5/16	.3125	3-1/4	1-1/8	6	161060	120.63
.3130		.3130	3-1/4	1-1/8	6	161071	120.63
.3135		.3135	3-1/4	1-1/8	6	161082	138.51
.3140		.3140	3-1/4	1-1/8	6	161093	120.63
.3150	8.0mm	.3150	3-1/4	1-1/8	6	161104	120.63
.3160	O	.3160	3-1/4	1-1/8	6	161115	134.90
.3170		.3170	3-1/4	1-1/8	6	161126	134.90
.3180		.3180	3-1/4	1-1/8	6	161137	134.90
.3190		.3190	3-1/4	1-1/8	6	161148	134.90
.3200		.3200	3-1/4	1-1/8	6	161159	134.90
.3210		.3210	3-1/2	1-1/4	6	161170	134.90
.3220		.3220	3-1/2	1-1/4	6	161181	134.90
.3230	P	.3230	3-1/2	1-1/4	6	161192	134.90
.3240		.3240	3-1/2	1-1/4	6	161203	134.90
.3250		.3250	3-1/2	1-1/4	6	161214	134.90
.3260		.3260	3-1/2	1-1/4	6	161225	134.90
.3270		.3270	3-1/2	1-1/4	6	161236	134.90
.3280		.3280	3-1/2	1-1/4	6	161247	134.90
.3281	21/64	.3281	3-1/2	1-1/4	6	161258	136.26
.3290		.3290	3-1/2	1-1/4	6	161269	134.90
.3300		.3300	3-1/2	1-1/4	6	161280	134.90
.3310		.3310	3-1/2	1-1/4	6	161291	134.90
.3320	Q	.3320	3-1/2	1-1/4	6	161302	134.90

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3330		.3330	3-1/2	1-1/4	6	161313	134.90
.3340		.3340	3-1/2	1-1/4	6	161324	134.90
.3346	8.5mm	.3346	3-1/2	1-1/4	6	161335	134.90
.3350		.3350	3-1/2	1-1/4	6	161346	134.90
.3360		.3360	3-1/2	1-1/4	6	161357	134.90
.3370		.3370	3-1/2	1-1/4	6	161368	134.90
.3380		.3380	3-1/2	1-1/4	6	161379	134.90
.3390	R	.3390	3-1/2	1-1/4	6	161390	135.79
.3400		.3400	3-1/2	1-1/4	6	161401	134.90
.3410		.3410	3-1/2	1-1/4	6	161412	134.90
.3420		.3420	3-1/2	1-1/4	6	161423	134.90
.3430		.3430	3-1/2	1-1/4	6	161434	134.90
.3438	11/32	.3438	3-1/2	1-1/4	6	161445	136.26
.3440		.3440	3-1/2	1-1/4	6	161456	134.90
.3450		.3450	3-1/2	1-1/4	6	161467	134.90
.3460		.3460	3-1/2	1-1/4	6	161478	134.90
.3470		.3470	3-1/2	1-1/4	6	161489	134.90
.3480	S	.3480	3-1/2	1-1/4	6	161500	134.90
.3490		.3490	3-1/2	1-1/4	6	161511	134.90
.3500		.3500	3-1/2	1-1/4	6	161522	134.90
.3510		.3510	3-1/2	1-1/4	6	161533	147.16
.3520		.3520	3-1/2	1-1/4	6	161544	147.16
.3530		.3530	3-1/2	1-1/4	6	161555	147.16
.3540		.3540	3-1/2	1-1/4	6	161566	147.16
.3543	9.0mm	.3543	3-1/2	1-1/4	6	161577	153.57
.3550		.3550	3-1/2	1-1/4	6	161588	147.16
.3560		.3560	3-1/2	1-1/4	6	161599	147.16
.3570		.3570	3-1/2	1-1/4	6	161610	147.16
.3580	T	.3580	3-1/2	1-1/4	6	161621	147.16
.3590		.3590	3-1/2	1-1/4	6	161632	149.69
.3594	23/64	.3594	3-1/2	1-1/4	6	161643	145.20
.3600		.3600	3-1/2	1-1/4	6	161654	147.16
.3610		.3610	3-1/2	1-1/4	6	161665	147.16
.3620		.3620	3-1/2	1-1/4	6	161676	147.16
.3630		.3630	3-1/2	1-1/4	6	161687	147.16
.3640		.3640	3-1/2	1-1/4	6	161698	147.16
.3650		.3650	3-1/2	1-1/4	6	161709	147.16
.3660		.3660	3-1/2	1-1/4	6	161720	147.16
.3670		.3670	3-1/2	1-1/4	6	161731	147.16
.3680	U	.3680	3-1/2	1-1/4	6	161742	147.16

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DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3690		.3690	3-1/2	1-1/4	6	161753	147.16
.3700		.3700	3-1/2	1-1/4	6	161764	147.16
.3710		.3710	3-1/2	1-1/4	6	161775	147.16
.3720		.3720	3-1/2	1-1/4	6	161786	147.16
.3730		.3730	3-1/2	1-1/4	6	161797	147.16
.3740	9.5mm	.3740	3-1/2	1-1/4	6	161808	147.16
.3745		.3745	3-1/2	1-1/4	6	161819	178.70
.3750	3/8	.3750	3-1/2	1-1/4	6	161830	145.20
.3755		.3755	3-1/2	1-1/4	6	161841	178.70
.3760		.3760	3-1/2	1-1/4	6	161852	184.83
.3765		.3765	3-1/2	1-1/4	6	161863	193.91
.3770	V	.3770	3-1/2	1-1/4	6	161874	184.83
.3780		.3780	3-1/2	1-1/4	6	161885	184.83
.3790		.3790	3-1/2	1-1/4	6	161896	184.83
.3800		.3800	3-1/2	1-1/4	6	161907	184.83
.3810		.3810	3-1/2	1-1/4	6	161918	184.83
.3820		.3820	3-1/2	1-1/4	6	161929	184.83
.3830		.3830	3-1/2	1-1/4	6	161940	184.83
.3840		.3840	3-1/2	1-1/4	6	161951	184.83
.3850		.3850	3-1/2	1-1/4	6	161962	184.83
.3860	W	.3860	3-1/2	1-1/4	6	161973	184.83
.3870		.3870	3-1/2	1-1/4	6	161984	229.28
.3880		.3880	3-1/2	1-1/4	6	161995	229.28
.3890		.3890	3-1/2	1-1/4	6	162006	229.28
.3900		.3900	3-1/2	1-1/4	6	162017	229.28
.3906	25/64	.3906	3-1/2	1-1/4	6	162028	229.28
.3910		.3910	3-1/2	1-1/4	6	162039	229.28
.3920		.3920	3-1/2	1-1/4	6	162050	229.28
.3930		.3930	3-1/2	1-1/4	6	162061	229.28
.3937	10.0mm	.3937	3-1/2	1-1/4	6	162072	173.69
.3940		.3940	3-1/2	1-1/4	6	162083	229.28
.3950		.3950	3-1/2	1-1/4	6	162094	229.28
.3960		.3960	3-1/2	1-1/4	6	162105	229.28
.3970	X	.3970	3-1/2	1-1/4	6	162116	229.28
.3980		.3980	3-1/2	1-1/4	6	162127	229.28
.3990		.3990	3-1/2	1-1/4	6	162138	229.28
.4000		.4000	3-1/2	1-1/4	6	162149	229.28
.4010		.4010	3-1/2	1-1/4	6	162160	229.28
.4020		.4020	3-1/2	1-1/4	6	162171	229.28
.4030		.4030	3-1/2	1-1/4	6	162182	229.28

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4040	Y	.4040	3-1/2	1-1/4	6	162193	229.28
.4050		.4050	3-1/2	1-1/4	6	162204	229.28
.4060		.4060	3-1/2	1-1/4	6	162215	229.28
.4062	13/32	.4062	3-1/2	1-1/4	6	162226	166.44
.4070		.4070	3-1/2	1-1/4	6	162237	229.28
.4080		.4080	3-1/2	1-1/4	6	162248	229.28
.4090		.4090	3-1/2	1-1/4	6	162259	229.28
.4100		.4100	3-1/2	1-1/4	6	162270	229.28
.4110		.4110	3-1/2	1-1/4	6	162281	229.28
.4120		.4120	3-1/2	1-1/4	6	162292	229.28
.4130	Z	.4130	3-1/2	1-1/4	6	162303	229.28
.4134	10.5mm	.4134	3-1/2	1-1/4	6	162314	208.83
.4140		.4140	3-1/2	1-1/4	6	162325	229.28
.4150		.4150	3-1/2	1-1/4	6	162336	229.28
.4160		.4160	4	1-3/8	6	162347	229.28
.4170		.4170	4	1-3/8	6	162358	229.28
.4180		.4180	4	1-3/8	6	162369	229.28
.4190		.4190	4	1-3/8	6	162380	229.28
.4200		.4200	4	1-3/8	6	162391	229.28
.4210		.4210	4	1-3/8	6	162402	229.28
.4219	27/64	.4219	4	1-3/8	6	162413	188.71
.4220		.4220	4	1-3/8	6	162424	229.28
.4230		.4230	4	1-3/8	6	162435	229.28
.4240		.4240	4	1-3/8	6	162446	229.28
.4250		.4250	4	1-3/8	6	162457	229.28
.4260		.4260	4	1-3/8	6	162468	229.28
.4270		.4270	4	1-3/8	6	162479	229.28
.4280		.4280	4	1-3/8	6	162490	229.28
.4290		.4290	4	1-3/8	6	162501	229.28
.4300		.4300	4	1-3/8	6	162512	229.28
.4310		.4310	4	1-3/8	6	162523	229.28
.4320		.4320	4	1-3/8	6	162534	229.28
.4330		.4330	4	1-3/8	6	162545	229.28
.4331	11.0mm	.4331	4	1-3/8	6	162556	208.83
.4340		.4340	4	1-3/8	6	162567	229.28
.4350		.4350	4	1-3/8	6	162578	229.28
.4360		.4360	4	1-3/8	6	162589	229.28
.4365		.4365	4	1-3/8	6	162600	229.28
.4370		.4370	4	1-3/8	6	162611	229.28
.4375	7/16	.4375	4	1-3/8	6	162622	188.71

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DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4380		.4380	4	1-3/8	6	162633	229.28
.4385		.4385	4	1-3/8	6	162644	273.97
.4390		.4390	4	1-3/8	6	162655	229.28
.4400		.4400	4	1-3/8	6	162666	229.28
.4410		.4410	4	1-3/8	6	162677	260.17
.4420		.4420	4	1-3/8	6	162688	260.17
.4430		.4430	4	1-3/8	6	162699	260.17
.4440		.4440	4	1-3/8	6	162710	260.17
.4450		.4450	4	1-3/8	6	162721	260.17
.4460		.4460	4	1-3/8	6	162732	260.17
.4470		.4470	4	1-3/8	6	162743	260.17
.4480		.4480	4	1-3/8	6	162754	260.17
.4490		.4490	4	1-3/8	6	162765	260.17
.4500		.4500	4	1-3/8	6	162776	260.17
.4510		.4510	4	1-3/8	6	162787	260.17
.4520		.4520	4	1-3/8	6	162798	260.17
.4528	11.5mm	.4528	4	1-3/8	6	162809	260.17
.4530		.4530	4	1-3/8	6	162820	238.45
.4531	29/64	.4531	4	1-3/8	6	162831	208.04
.4540		.4540	4	1-3/8	6	162842	260.17
.4550		.4550	4	1-3/8	6	162853	260.17
.4560		.4560	4	1-3/8	6	162864	260.17
.4570		.4570	4	1-3/8	6	162875	260.17
.4580		.4580	4	1-3/8	6	162886	260.17
.4590		.4590	4	1-3/8	6	162897	260.17
.4600		.4600	4	1-3/8	6	162908	260.17
.4610		.4610	4	1-3/8	6	162919	260.17
.4620		.4620	4	1-3/8	6	162930	260.17
.4630		.4630	4	1-3/8	6	162941	260.17
.4640		.4640	4	1-3/8	6	162952	260.17
.4650		.4650	4	1-3/8	6	162963	260.17
.4660		.4660	4	1-3/8	6	162974	260.17
.4670		.4670	4	1-3/8	6	162985	260.17
.4680		.4680	4	1-3/8	6	162996	260.17
.4688	15/32	.4688	4	1-3/8	6	163007	208.04
.4690		.4690	4	1-3/8	6	163018	274.16
.4700		.4700	4	1-3/8	6	163029	274.16

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4710		.4710	4	1-3/8	6	163040	274.16
.4720		.4720	4	1-3/8	6	163051	274.16
.4724	12mm	.4724	4	1-3/8	6	163062	264.14
.4730		.4730	4	1-3/8	6	163073	274.16
.4740		.4740	4	1-3/8	6	163084	274.16
.4750		.4750	4	1-3/8	6	163095	274.16
.4760		.4760	4	1-1/2	6	163106	274.16
.4770		.4770	4	1-1/2	6	163117	274.16
.4780		.4780	4	1-1/2	6	163128	274.16
.4790		.4790	4	1-1/2	6	163139	274.16
.4800		.4800	4	1-1/2	6	163150	274.16
.4810		.4810	4	1-1/2	6	163161	274.16
.4820		.4820	4	1-1/2	6	163172	274.16
.4830		.4830	4	1-1/2	6	163183	274.16
.4840		.4840	4	1-1/2	6	163194	274.16
.4844	31/64	.4844	4	1-1/2	6	163205	235.69
.4850		.4850	4	1-1/2	6	163216	274.16
.4860		.4860	4	1-1/2	6	163227	274.16
.4870		.4870	4	1-1/2	6	163238	330.59
.4880		.4880	4	1-1/2	6	163249	330.59
.4890		.4890	4	1-1/2	6	163260	330.59
.4900		.4900	4	1-1/2	6	163271	330.59
.4910		.4910	4	1-1/2	6	163282	330.59
.4920		.4920	4	1-1/2	6	163293	330.59
.4921	12.5mm	.4921	4	1-1/2	6	163304	330.59
.4930		.4930	4	1-1/2	6	163315	330.59
.4940		.4940	4	1-1/2	6	163326	330.59
.4950		.4950	4	1-1/2	6	163337	330.59
.4960		.4960	4	1-1/2	6	163348	330.59
.4970		.4970	4	1-1/2	6	163359	330.59
.4980		.4980	4	1-1/2	6	163370	330.59
.4990		.4990	4	1-1/2	6	163381	330.59
.4995		.4995	4	1-1/2	6	163392	330.59
.5000	1/2	.5000	4	1-1/2	6	163403	235.69
.5005		.5005	4	1-1/2	6	163414	330.59
.5010		.5010	4	1-1/2	6	163425	330.59
.5020		.5020	4	1-1/2	6	163436	330.59

For technical information, please see page 262.

DIAMETER TOLERANCE	+.0003, -.0000

GENERAL PURPOSE SOLID CARBIDE REAMERS

SPECIAL SIZES

QUANTITY PRICING

SIZE RANGE	SHANK	FL LGTH	OAL	1 pc	2 pcs	3-5 pcs	6-11 pcs	12-17 pcs	18-23 pcs	24-35 pcs	36-49 pcs	50-74 pcs
.0401 - .0450	0.037	3/8	1-1/2	317.94	210.35	183.43	117.40	92.93	83.16	78.27	73.35	68.48
.0451 - .0500	0.042	3/8	1-1/2	317.94	210.35	183.43	117.40	92.93	83.16	78.27	73.35	68.48
.0501 - .0570	0.046	3/8	1-1/2	320.37	212.76	185.87	119.84	95.39	85.59	80.71	75.82	70.95
.0571 - .0650	0.053	3/8	1-1/2	317.94	210.35	183.43	117.40	92.93	83.16	78.27	73.35	68.48
.0651 - .0800	0.060	1/2	1-3/4	320.37	212.76	185.87	119.84	95.39	85.59	80.71	75.82	70.95
.0801 - .0950	0.075	1/2	2	322.84	215.22	188.32	122.30	97.83	88.05	83.16	78.27	73.35
.0951 - .1150	0.090	5/8	2-1/4	327.73	220.10	193.20	127.17	102.71	92.93	88.05	83.16	78.27
.1151 - .1300	0.110	5/8	2-1/4	330.18	222.53	195.65	129.62	105.16	95.39	90.48	85.59	80.71
.1301 - .1450	0.125	3/4	2-1/2	337.49	229.89	203.00	136.95	112.53	102.71	97.83	92.93	88.05
.1451 - .1600	0.140	3/4	2-1/2	344.85	237.22	210.35	144.30	119.84	110.05	105.16	100.28	95.39
.1601 - .1750	0.155	7/8	2-3/4	352.17	244.57	217.64	151.62	127.17	117.40	112.53	107.61	102.71
.1751 - .1950	0.170	7/8	2-3/4	361.97	254.33	227.46	161.41	136.95	127.17	122.30	117.40	112.53
.1951 - .2100	0.188	1	3	381.52	273.91	247.03	180.98	156.54	146.74	141.85	136.95	132.06
.2101 - .2250	0.205	1	3	388.86	281.25	254.33	188.32	163.87	154.07	149.19	144.30	139.38
.2251 - .2400	0.220	1	3	401.09	293.50	266.59	200.53	176.10	166.30	161.41	156.54	151.62
.2401 - .2550	0.235	1	3	410.86	303.25	276.35	210.35	185.87	176.10	171.18	166.30	161.41
.2551 - .2750	0.250	1	3-1/4	435.35	327.73	300.80	234.79	210.35	200.53	195.65	190.77	185.87
.2751 - .2950	0.270	1-1/8	3-1/4	437.76	330.18	303.25	237.22	212.76	203.00	198.09	193.20	188.32
.2951 - .3150	0.290	1-1/8	3-1/4	462.21	354.60	327.73	261.68	237.22	227.46	222.53	217.64	212.76
.3151 - .3350	0.313	1-1/4	3-1/2	496.47	388.86	361.97	295.93	271.48	261.68	256.79	251.91	247.03
.3351 - .3550	0.330	1-1/4	3-1/2	501.35	398.64	366.87	300.80	276.35	266.59	261.68	256.79	251.91
.3551 - .3800	0.350	1-1/4	3-1/2	511.14	408.42	376.63	310.62	286.15	276.35	271.48	266.59	261.68
.3801 - .4100	0.375	1-1/4	4	547.82	440.23	413.32	347.30	322.84	313.03	308.17	303.25	298.36
.4101 - .4400	0.405	1-3/8	4	567.39	459.81	432.89	366.87	342.39	332.61	327.73	322.84	317.94
.4401 - .4700	0.438	1-3/8	4	596.73	489.14	462.21	396.20	371.74	361.97	357.07	352.17	347.30
.4701 - .5050	0.465	1-1/2	4	645.66	538.06	511.14	445.10	420.65	410.86	406.00	401.09	396.20
.5051 - .5400	0.500	1-1/2	4-1/2	709.24	601.64	574.74	508.71	484.24	474.45	469.57	464.68	459.81
.5401 - .5800	0.535	1-1/2	4-1/2	807.06	699.44	672.57	606.53	582.07	572.30	567.39	562.50	557.60
.5801 - .6260	0.575	1-3/4	4-1/2	885.34	777.73	750.82	684.80	660.33	650.56	645.66	640.76	635.87
.6261 - .6600	0.615	1-3/4	4-1/2	1002.73	895.11	868.22	802.19	777.73	767.92	763.05	758.17	753.27
.6601 - .7050	0.655	2	5	1149.48	1041.88	1014.95	948.92	924.48	914.68	909.79	904.92	900.01
.7051 - .7550	0.700	2	5	1247.28	1139.70	1112.77	1046.75	1022.30	1012.48	1007.62	1002.73	997.84
.7551 - .7950	0.750	2	5	1345.11	1237.52	1210.59	1144.56	1120.12	1110.35	1105.43	1100.55	1095.66
.7951 - .8450	0.750	2-1/4	5	1442.96	1335.34	1308.44	1242.40	1217.97	1208.15	1203.26	1198.39	1193.50
.8451 - .9000	0.750	2-1/4	5	1638.61	1531.02	1504.09	1438.06	1413.62	1403.81	1398.92	1394.04	1389.15
.9001 - .9600	0.875	2-1/4	5	1883.17	1775.56	1748.67	1682.63	1658.16	1648.38	1643.49	1638.61	1633.71
.9601 - 1.025	0.875	2-1/4	5	2078.82	1971.23	1944.32	1878.29	1853.82	1844.05	1839.15	1834.25	1829.36

FOR .0001" TOLERANCE, ALL SIZES ADD 20% TO ABOVE PRICING
FOR .0002" TOLERANCE FROM .5001" - 1.025", ADD 10% TO ABOVE PRICING

For technical information, please see page 262.

DIAMETER TOLERANCE	+.0003, -.0000

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0135	#80	.0135	3/4	3/8	2	182708	43.20
.0140		.0135	3/4	3/8	2	172346	53.79
.0145	#79	.0145	3/4	3/8	2	182719	43.20
.0150		.0156	3/4	3/8	2	172357	53.79
.0155		.0156	3/4	3/8	2	172368	53.79
.0156	1/64	.0156	3/4	3/8	2	182730	43.20
.0160	#78	.0160	7/8	3/8	2	182741	43.20
.0165		.0180	7/8	3/8	2	172379	53.79
.0170		.0180	7/8	3/8	2	172390	53.79
.0175		.0180	7/8	3/8	2	172401	53.79
.0180	#77	.0180	7/8	3/8	2	182752	43.20
.0185		.0200	7/8	3/8	2	172412	53.79
.0190		.0200	7/8	3/8	2	172423	53.79
.0195		.0200	7/8	3/8	2	172434	53.79
.0200	#76	.0200	7/8	3/8	2	182763	43.20
.0205		.0210	1	1/2	3	172445	48.98
.0210	#75	.0210	1	1/2	3	182774	43.20
.0215		.0225	1	1/2	3	172456	48.98
.0220		.0225	1	1/2	3	172467	48.98
.0225	#74	.0225	1	1/2	3	182785	43.20
.0230		.0240	1-1/8	1/2	3	172478	48.98
.0235		.0240	1-1/8	1/2	3	172489	48.98
.0240	#73	.0240	1-1/8	1/2	3	182796	43.20
.0245		.0250	1-1/8	1/2	3	172500	48.98
.0250	#72	.0250	1-1/8	1/2	3	182807	43.20
.0255		.0260	1-1/4	1/2	3	172511	48.98
.0260	#71	.0260	1-1/4	1/2	3	182818	43.20
.0265		.0280	1-1/4	1/2	3	172522	48.98
.0270		.0280	1-1/4	1/2	3	172533	48.98
.0275		.0280	1-1/4	1/2	3	172544	48.98
.0280	#70	.0280	1-1/4	1/2	3	182829	43.20
.0285		.0292	1-3/8	1/2	3	172555	48.98
.0290		.0292	1-3/8	1/2	3	172566	48.98
.0292	#69	.0292	1-3/8	1/2	3	182840	43.20
.0295		.0310	1-3/8	1/2	3	172577	44.50
.0300		.0310	1-3/8	1/2	3	172588	44.50
.0305		.0310	1-3/8	1/2	3	172599	44.50
.0310	#68	.0310	1-3/8	1/2	3	182851	43.20
.0312	1/32	.0312	1-3/8	1/2	3	182862	34.06
.0315		.0320	1-3/8	1/2	3	172610	44.50
.0320	#67	.0320	1-3/8	1/2	3	182873	36.18
.0325		.0330	1-3/8	1/2	3	172621	44.50
.0330	#66	.0330	1-3/8	1/2	3	182884	36.18
.0335		.0350	1-1/2	1/2	3	172632	44.50

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0340		.0350	1-1/2	1/2	3	172643	44.50
.0345		.0350	1-1/2	1/2	3	172654	44.50
.0350	#65	.0350	1-1/2	1/2	3	182895	36.18
.0355		.0360	1-1/2	1/2	3	172665	44.50
.0360	#64	.0360	1-1/2	1/2	3	182906	36.18
.0365		.0370	1-1/2	1/2	3	172676	44.50
.0370	#63	.0370	1-1/2	1/2	3	182917	36.18
.0375		.0380	1-1/2	1/2	3	172687	44.50
.0380	#62	.0380	1-1/2	1/2	3	182928	36.18
.0385		.0390	1-1/2	1/2	3	172698	44.50
.0390	#61	.0390	1-1/2	1/2	3	182939	36.18
.0394	1.0mm	.0394	2-1/2	1/2	4	182950	36.18
.0395		.0390	2-1/2	1/2	4	172709	42.34
.0400	#60	.0390	2-1/2	1/2	4	182961	36.18
.0405		.0390	2-1/2	1/2	4	172720	42.34
.0410	#59	.0390	2-1/2	1/2	4	182972	36.18
.0415		.0390	2-1/2	1/2	4	172731	42.34
.0420	#58	.0390	2-1/2	1/2	4	182983	36.18
.0425		.0390	2-1/2	1/2	4	172742	42.34
.0430	#57	.0390	2-1/2	1/2	4	182994	36.18
.0435		.0455	2-1/2	1/2	4	172753	42.34
.0440		.0455	2-1/2	1/2	4	172764	42.34
.0445		.0455	2-1/2	1/2	4	172775	42.34
.0450		.0455	2-1/2	1/2	4	172786	42.34
.0455		.0455	2-1/2	1/2	4	172797	42.34
.0460		.0455	2-1/2	1/2	4	172808	42.34
.0465	#56	.0455	2-1/2	1/2	4	183005	36.18
.0469	3/64	.0455	2-1/2	1/2	4	183016	36.18
.0470		.0510	2-1/2	1/2	4	172819	42.34
.0475		.0510	2-1/2	1/2	4	172830	42.34
.0480		.0510	2-1/2	1/2	4	172841	42.34
.0485		.0510	2-1/2	1/2	4	172852	42.34
.0490		.0510	2-1/2	1/2	4	172863	42.34
.0495		.0510	2-1/2	1/2	4	172874	42.34
.0500		.0510	2-1/2	1/2	4	172885	42.34
.0505		.0510	2-1/2	1/2	4	172896	42.34
.0510		.0510	2-1/2	1/2	4	172907	42.34
.0515		.0510	2-1/2	1/2	4	172918	42.34
.0520	#55	.0510	2-1/2	1/2	4	183027	36.18
.0525		.0510	2-1/2	1/2	4	172929	42.34
.0530		.0510	2-1/2	1/2	4	172940	42.34
.0535		.0510	2-1/2	1/2	4	172951	42.34
.0540		.0510	2-1/2	1/2	4	172962	42.34
.0545		.0510	2-1/2	1/2	4	172973	42.34

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

MADE IN THE USA

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0550	#54	.0510	2-1/2	1/2	4	183038	36.18
.0555		.0510	2-1/2	1/2	4	172984	42.34
.0560		.0510	2-1/2	1/2	4	172995	42.34
.0565		.0510	2-1/2	1/2	4	173006	42.34
.0570		.0510	2-1/2	1/2	4	173017	42.34
.0575		.0510	2-1/2	1/2	4	173028	42.34
.0580		.0510	2-1/2	1/2	4	173039	42.34
.0585		.0510	2-1/2	1/2	4	173050	42.34
.0590		.0510	2-1/2	1/2	4	173061	42.34
.0591	1.5mm	.0510	2-1/2	1/2	4	183049	36.18
.0595	#53	.0585	2-1/2	1/2	4	183060	36.18
.0600		.0585	2-1/2	1/2	4	173072	42.34
.0605		.0585	2-1/2	1/2	4	173083	42.34
.0610		.0585	2-1/2	1/2	4	173094	42.34
.0615		.0585	2-1/2	1/2	4	173105	42.34
.0620		.0585	2-1/2	1/2	4	173116	42.34
.0625	1/16	.0585	2-1/2	1/2	4	183071	32.52
.0630		.0585	2-1/2	1/2	4	173127	37.95
.0635	#52	.0585	2-1/2	1/2	4	183082	32.52
.0640		.0660	3	3/4	4	173138	37.95
.0645		.0660	3	3/4	4	173149	37.95
.0650		.0660	3	3/4	4	173160	37.95
.0655		.0660	3	3/4	4	173171	37.95
.0660		.0660	3	3/4	4	173182	37.95
.0665		.0660	3	3/4	4	173193	37.95
.0670	#51	.0660	3	3/4	4	183093	29.11
.0675		.0660	3	3/4	4	173204	37.95
.0680		.0660	3	3/4	4	173215	37.95
.0685		.0660	3	3/4	4	173226	37.95
.0690		.0660	3	3/4	4	173237	37.95
.0695		.0660	3	3/4	4	173248	37.95
.0700	#50	.0660	3	3/4	4	183104	29.11
.0705		.0660	3	3/4	4	173259	37.95
.0710		.0660	3	3/4	4	173270	37.95
.0715		.0660	3	3/4	4	173281	37.95
.0720		.0660	3	3/4	4	173292	37.95
.0725		.0660	3	3/4	4	173303	37.95
.0730	#49	.0660	3	3/4	4	183115	29.11
.0735		.0720	3	3/4	4	173314	37.95
.0740		.0720	3	3/4	4	173325	37.95
.0745		.0720	3	3/4	4	173336	37.95
.0750		.0720	3	3/4	4	173347	37.95
.0755		.0720	3	3/4	4	173358	37.95
.0760	#48	.0720	3	3/4	4	183126	29.11

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0765		.0720	3	3/4	4	173369	37.95
.0770		.0720	3	3/4	4	173380	37.95
.0775		.0720	3	3/4	4	173391	37.95
.0780		.0720	3	3/4	4	173402	37.95
.0781	5/64	.0720	3	3/4	4	183137	29.11
.0785	#47	.0720	3	3/4	4	183148	29.11
.0787	2.0mm	.0720	3	3/4	4	183159	29.11
.0790		.0771	3	3/4	4	173413	37.95
.0795		.0771	3	3/4	4	173424	37.95
.0800		.0771	3	3/4	4	173435	37.95
.0805		.0771	3	3/4	4	173446	37.95
.0810	#46	.0771	3	3/4	4	183170	29.11
.0815		.0771	3	3/4	4	173457	37.95
.0820	#45	.0771	3	3/4	4	183181	29.11
.0825		.0810	3	3/4	4	173468	37.95
.0830		.0810	3	3/4	4	173479	37.95
.0835		.0810	3	3/4	4	173490	37.95
.0840		.0810	3	3/4	4	173501	37.95
.0845		.0810	3	3/4	4	173512	37.95
.0850		.0810	3	3/4	4	173523	37.95
.0855		.0810	3	3/4	4	173534	37.95
.0860	#44	.0810	3	3/4	4	183192	29.11
.0865		.0810	3	3/4	4	173545	37.95
.0870		.0810	3	3/4	4	173556	37.95
.0875		.0810	3	3/4	4	173567	37.95
.0880		.0810	3	3/4	4	173578	37.95
.0885		.0810	3	3/4	4	173589	37.95
.0890	#43	.0810	3	3/4	4	183203	29.11
.0895		.0880	3	3/4	4	173600	37.95
.0900		.0880	3	3/4	4	173611	37.95
.0905		.0880	3	3/4	4	173622	37.95
.0910		.0880	3	3/4	4	173633	37.95
.0915		.0880	3	3/4	4	173644	37.95
.0920		.0880	3	3/4	4	173655	37.95
.0925		.0880	3	3/4	4	173666	37.95
.0930		.0880	3	3/4	4	173677	37.95
.0935	#42	.0880	3	3/4	4	183214	29.11
.0938	3/32	.0880	3	3/4	4	183225	26.17
.0940		.0928	3-1/2	7/8	4	173688	37.95
.0945		.0928	3-1/2	7/8	4	173699	37.95
.0950		.0928	3-1/2	7/8	4	173710	37.95
.0955		.0928	3-1/2	7/8	4	173721	37.95
.0960	#41	.0928	3-1/2	7/8	4	183236	29.39
.0965		.0928	3-1/2	7/8	4	173732	37.95

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.0970		.0928	3-1/2	7/8	4	173743	37.95
.0975		.0928	3-1/2	7/8	4	173754	37.95
.0980	#40	.0928	3-1/2	7/8	4	183247	29.39
.0984	2.5mm	.0928	3-1/2	7/8	4	183258	29.39
.0985		.0928	3-1/2	7/8	4	173765	37.95
.0990		.0928	3-1/2	7/8	4	173776	37.95
.0995	#39	.0928	3-1/2	7/8	4	183269	29.39
.1000		.0950	3-1/2	7/8	4	173787	37.95
.1005		.0950	3-1/2	7/8	4	173798	37.95
.1010		.0950	3-1/2	7/8	4	173809	37.95
.1015	#38	.0950	3-1/2	7/8	4	183280	29.39
.1020		.0950	3-1/2	7/8	4	173820	37.95
.1025		.0950	3-1/2	7/8	4	173831	37.95
.1030		.0950	3-1/2	7/8	4	173842	37.95
.1035		.0950	3-1/2	7/8	4	173853	37.95
.1040	#37	.0950	3-1/2	7/8	4	183291	29.39
.1045		.1030	3-1/2	7/8	4	173864	37.95
.1050		.1030	3-1/2	7/8	4	173875	37.95
.1055		.1030	3-1/2	7/8	4	173886	37.95
.1060		.1030	3-1/2	7/8	4	173897	37.95
.1065	#36	.1030	3-1/2	7/8	4	183302	29.39
.1070		.1030	3-1/2	7/8	4	173908	37.95
.1075		.1030	3-1/2	7/8	4	173919	37.95
.1080		.1030	3-1/2	7/8	4	173930	37.95
.1085		.1030	3-1/2	7/8	4	173941	37.95
.1090		.1030	3-1/2	7/8	4	173952	37.95
.1094	7/64	.1030	3-1/2	7/8	4	183313	30.31
.1095		.1030	3-1/2	7/8	4	173963	32.81
.1100	#35	.1030	3-1/2	7/8	4	183324	30.31
.1105		.1055	3-1/2	7/8	4	173974	32.81
.1110	#34	.1055	3-1/2	7/8	4	183335	30.31
.1115		.1055	3-1/2	7/8	4	173985	32.81
.1120		.1055	3-1/2	7/8	4	173996	32.81
.1125		.1055	3-1/2	7/8	4	174007	32.81
.1130	#33	.1055	3-1/2	7/8	4	183346	30.31
.1135		.1120	3-1/2	7/8	4	174018	32.81
.1140		.1120	3-1/2	7/8	4	174029	32.81
.1145		.1120	3-1/2	7/8	4	174040	32.81
.1150		.1120	3-1/2	7/8	4	174051	32.81
.1155		.1120	3-1/2	7/8	4	174062	32.81
.1160	#32	.1120	3-1/2	7/8	4	183357	30.31
.1165		.1120	3-1/2	7/8	4	174073	32.81
.1170		.1120	3-1/2	7/8	4	174084	32.81
.1175		.1120	3-1/2	7/8	4	174095	32.81

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1180		.1120	3-1/2	7/8	4	174106	32.81
.1181	3.0mm	.1120	3-1/2	7/8	4	183368	30.31
.1185		.1120	3-1/2	7/8	4	174117	32.81
.1190		.1120	3-1/2	7/8	4	174128	32.81
.1195		.1120	3-1/2	7/8	4	174139	32.81
.1200	#31	.1120	3-1/2	7/8	4	183379	30.31
.1205		.1190	3-1/2	7/8	4	174150	32.81
.1210		.1190	3-1/2	7/8	4	174161	32.81
.1215		.1190	3-1/2	7/8	4	174172	32.81
.1220		.1190	3-1/2	7/8	4	174183	32.81
.1225		.1190	3-1/2	7/8	4	174194	32.81
.1230		.1190	3-1/2	7/8	4	174205	32.81
.1235		.1190	3-1/2	7/8	4	174216	32.81
.1240	O/U	.1190	3-1/2	7/8	4	183390	30.31
.1245		.1190	3-1/2	7/8	4	174227	32.81
.1247		.1190	3-1/2	7/8	4	174238	32.81
.1250	1/8	.1190	3-1/2	7/8	4	183401	27.32
.1255		.1190	3-1/2	7/8	4	174249	44.50
.1260	O/U	.1190	3-1/2	7/8	4	183412	30.31
.1265		.1190	3-1/2	7/8	4	174260	44.50
.1270		.1190	3-1/2	7/8	4	174271	44.50
.1275		.1190	3-1/2	7/8	4	174282	44.50
.1280		.1190	3-1/2	7/8	4	174293	44.50
.1285	#30	.1190	3-1/2	7/8	4	183423	30.31
.1290		.1275	4	1	4	174304	44.50
.1295		.1275	4	1	4	174315	44.50
.1300		.1275	4	1	4	174326	44.50
.1305		.1275	4	1	4	174337	44.50
.1310		.1275	4	1	4	174348	44.50
.1315		.1275	4	1	4	174359	44.50
.1320		.1275	4	1	4	174370	44.50
.1325		.1275	4	1	4	174381	44.50
.1330		.1275	4	1	4	174392	44.50
.1335		.1275	4	1	4	174403	44.50
.1340		.1275	4	1	4	174414	44.50
.1345		.1275	4	1	4	174425	44.50
.1350		.1275	4	1	4	174436	44.50
.1355		.1275	4	1	4	174447	44.50
.1360	#29	.1275	4	1	4	183434	36.18
.1365		.1350	4	1	4	174458	44.50
.1370		.1350	4	1	4	174469	44.50
.1375		.1350	4	1	4	174480	44.50
.1378	3.5mm	.1350	4	1	4	183445	36.18
.1380		.1350	4	1	4	174491	44.50

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1385		.1350	4	1	4	174502	44.50
.1390		.1350	4	1	4	174513	44.50
.1395		.1350	4	1	4	174524	44.50
.1400		.1350	4	1	4	174535	44.50
.1405	#28	.1350	4	1	4	183456	36.18
.1406	9/64	.1350	4	1	4	183467	36.18
.1410		.1350	4	1	4	174546	42.34
.1415		.1350	4	1	4	174557	42.34
.1420		.1350	4	1	4	174568	42.34
.1425		.1350	4	1	4	174579	42.34
.1430		.1350	4	1	4	174590	42.34
.1435		.1350	4	1	4	174601	42.34
.1440	#27	.1350	4	1	4	183478	36.18
.1445		.1430	4	1	4	174612	42.34
.1450		.1430	4	1	4	174623	42.34
.1455		.1430	4	1	4	174634	42.34
.1460		.1430	4	1	4	174645	42.34
.1465		.1430	4	1	4	174656	42.34
.1470	#26	.1430	4	1	4	183489	36.18
.1475		.1430	4	1	4	174667	42.34
.1480		.1430	4	1	4	174678	42.34
.1485		.1430	4	1	4	174689	42.34
.1490		.1430	4	1	4	174700	42.34
.1495	#25	.1430	4	1	4	183500	36.18
.1500		.1460	4	1	4	174711	42.34
.1505		.1460	4	1	4	174722	42.34
.1510		.1460	4	1	4	174733	42.34
.1515		.1460	4	1	4	174744	42.34
.1520	#24	.1460	4	1	4	183511	36.18
.1525		.1460	4	1	4	174755	42.34
.1530		.1460	4	1	4	174766	42.34
.1535		.1460	4	1	4	174777	42.34
.1540	#23	.1460	4	1	4	183522	36.18
.1545		.1510	4	1	4	174788	42.34
.1550		.1510	4	1	4	174799	42.34
.1555		.1510	4	1	4	174810	42.34
.1560		.1510	4	1	4	174821	42.34
.1562	5/32	.1510	4	1	4	183533	36.18
.1565		.1510	4	1	6	174832	44.50
.1570	#22	.1510	4	1	6	183544	36.18
.1575	4.0mm	.1510	4	1	6	183555	36.18
.1580		.1530	4-1/2	1-1/8	6	174843	44.50
.1585		.1530	4-1/2	1-1/8	6	174854	44.50
.1590	#21	.1530	4-1/2	1-1/8	6	183566	38.63

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1595		.1530	4-1/2	1-1/8	6	174865	44.50
.1600		.1530	4-1/2	1-1/8	6	174876	44.50
.1605		.1530	4-1/2	1-1/8	6	174887	44.50
.1610	#20	.1530	4-1/2	1-1/8	6	183577	38.63
.1615		.1595	4-1/2	1-1/8	6	174898	44.50
.1620		.1595	4-1/2	1-1/8	6	174909	44.50
.1625		.1595	4-1/2	1-1/8	6	174920	44.50
.1630		.1595	4-1/2	1-1/8	6	174931	44.50
.1635		.1595	4-1/2	1-1/8	6	174942	44.50
.1640		.1595	4-1/2	1-1/8	6	174953	44.50
.1645		.1595	4-1/2	1-1/8	6	174964	44.50
.1650		.1595	4-1/2	1-1/8	6	174975	44.50
.1655		.1595	4-1/2	1-1/8	6	174986	44.50
.1660	#19	.1595	4-1/2	1-1/8	6	183588	38.63
.1665		.1595	4-1/2	1-1/8	6	174997	44.50
.1670		.1595	4-1/2	1-1/8	6	175008	44.50
.1675		.1595	4-1/2	1-1/8	6	175019	44.50
.1680		.1595	4-1/2	1-1/8	6	175030	44.50
.1685		.1595	4-1/2	1-1/8	6	175041	44.50
.1690		.1595	4-1/2	1-1/8	6	175052	44.50
.1695	#18	.1595	4-1/2	1-1/8	6	183599	38.63
.1700		.1645	4-1/2	1-1/8	6	175063	44.50
.1705		.1645	4-1/2	1-1/8	6	175074	44.50
.1710		.1645	4-1/2	1-1/8	6	175085	44.50
.1715		.1645	4-1/2	1-1/8	6	175096	44.50
.1719	11/64	.1645	4-1/2	1-1/8	6	183610	38.63
.1720		.1645	4-1/2	1-1/8	6	175107	41.81
.1725		.1645	4-1/2	1-1/8	6	175118	41.81
.1730	#17	.1645	4-1/2	1-1/8	6	183621	38.63
.1735		.1704	4-1/2	1-1/8	6	175129	41.81
.1740		.1704	4-1/2	1-1/8	6	175140	41.81
.1745		.1704	4-1/2	1-1/8	6	175151	41.81
.1750		.1704	4-1/2	1-1/8	6	175162	41.81
.1755		.1704	4-1/2	1-1/8	6	175173	41.81
.1760		.1704	4-1/2	1-1/8	6	175184	41.81
.1765		.1704	4-1/2	1-1/8	6	175195	41.81
.1770	#16	.1704	4-1/2	1-1/8	6	183632	38.63
.1772	4.5mm	.1704	4-1/2	1-1/8	6	183643	38.63
.1775		.1755	4-1/2	1-1/8	6	175206	41.81
.1780		.1755	4-1/2	1-1/8	6	175217	41.81
.1785		.1755	4-1/2	1-1/8	6	175228	41.81
.1790		.1755	4-1/2	1-1/8	6	175239	41.81
.1795		.1755	4-1/2	1-1/8	6	175250	41.81
.1800	#15	.1755	4-1/2	1-1/8	6	183654	38.63

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.1805		.1755	4-1/2	1-1/8	6	175261	41.81
.1810		.1755	4-1/2	1-1/8	6	175272	41.81
.1815		.1755	4-1/2	1-1/8	6	175283	41.81
.1820	#14	.1755	4-1/2	1-1/8	6	183665	38.63
.1825		.1805	4-1/2	1-1/8	6	175294	41.81
.1830		.1805	4-1/2	1-1/8	6	175305	41.81
.1835		.1805	4-1/2	1-1/8	6	175316	41.81
.1840		.1805	4-1/2	1-1/8	6	175327	41.81
.1845		.1805	4-1/2	1-1/8	6	175338	41.81
.1850	#13	.1805	4-1/2	1-1/8	6	183676	38.63
.1855		.1805	4-1/2	1-1/8	6	175349	41.81
.1860		.1805	4-1/2	1-1/8	6	175360	41.81
.1865	O/U	.1805	4-1/2	1-1/8	6	183687	38.63
.1870		.1805	4-1/2	1-1/8	6	175371	41.81
.1875	3/16	.1805	4-1/2	1-1/8	6	183698	34.73
.1880		.1805	4-1/2	1-1/8	6	175382	52.77
.1885	O/U	.1805	4-1/2	1-1/8	6	183709	38.63
.1890	#12	.1805	4-1/2	1-1/8	6	183720	38.63
.1895		.1860	5	1-1/4	6	175393	52.77
.1900		.1860	5	1-1/4	6	175404	52.77
.1905		.1860	5	1-1/4	6	175415	52.77
.1910	#11	.1860	5	1-1/4	6	183731	43.25
.1915		.1860	5	1-1/4	6	175426	52.77
.1920		.1860	5	1-1/4	6	175437	52.77
.1925		.1860	5	1-1/4	6	175448	52.77
.1930		.1860	5	1-1/4	6	175459	52.77
.1935	#10	.1860	5	1-1/4	6	183742	43.25
.1940		.1895	5	1-1/4	6	175470	52.77
.1945		.1895	5	1-1/4	6	175481	52.77
.1950		.1895	5	1-1/4	6	175492	52.77
.1955		.1895	5	1-1/4	6	175503	52.77
.1960	#9	.1895	5	1-1/4	6	183753	43.25
.1965		.1895	5	1-1/4	6	175514	52.77
.1969	5.0mm	.1895	5	1-1/4	6	183764	43.25
.1970		.1895	5	1-1/4	6	175525	52.77
.1975		.1895	5	1-1/4	6	175536	52.77
.1980		.1895	5	1-1/4	6	175547	52.77
.1985		.1895	5	1-1/4	6	175558	52.77
.1990	#8	.1895	5	1-1/4	6	183775	43.25
.1995		.1945	5	1-1/4	6	175569	52.77
.2000		.1945	5	1-1/4	6	175580	52.77
.2005		.1945	5	1-1/4	6	175591	52.77
.2010	#7	.1895	5	1-1/4	6	183786	43.25
.2015		.1945	5	1-1/4	6	175602	52.77

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2020		.1945	5	1-1/4	6	175613	52.77
.2025		.1945	5	1-1/4	6	175624	52.77
.2030		.1945	5	1-1/4	6	175635	52.77
.2031	13/64	.1945	5	1-1/4	6	183797	43.25
.2035		.1945	5	1-1/4	6	175646	51.43
.2040	#6	.1945	5	1-1/4	6	183808	43.25
.2045		.2016	5	1-1/4	6	175657	51.43
.2050		.2016	5	1-1/4	6	175668	51.43
.2055	#5	.2016	5	1-1/4	6	183819	43.25
.2060		.2016	5	1-1/4	6	175679	51.43
.2065		.2016	5	1-1/4	6	175690	51.43
.2070		.2016	5	1-1/4	6	175701	51.43
.2075		.2016	5	1-1/4	6	175712	51.43
.2080		.2016	5	1-1/4	6	175723	51.43
.2085		.2016	5	1-1/4	6	175734	51.43
.2090	#4	.2016	5	1-1/4	6	183830	43.25
.2095		.2075	5	1-1/4	6	175745	51.43
.2100		.2075	5	1-1/4	6	175756	51.43
.2105		.2075	5	1-1/4	6	175767	51.43
.2110		.2075	5	1-1/4	6	175778	51.43
.2115		.2075	5	1-1/4	6	175789	51.43
.2120		.2075	5	1-1/4	6	175800	51.43
.2125		.2075	5	1-1/4	6	175811	51.43
.2130	#3	.2075	5	1-1/4	6	183841	43.25
.2135		.2075	5	1-1/4	6	175822	51.43
.2140		.2075	5	1-1/4	6	175833	51.43
.2145		.2075	5	1-1/4	6	175844	51.43
.2150		.2075	5	1-1/4	6	175855	51.43
.2155		.2075	5	1-1/4	6	175866	51.43
.2160		.2075	5	1-1/4	6	175877	51.43
.2165	5.5mm	.2075	5	1-1/4	6	183852	43.25
.2170		.2075	5	1-1/4	6	175888	51.43
.2175		.2075	5	1-1/4	6	175899	51.43
.2180		.2075	5	1-1/4	6	175910	51.43
.2185		.2075	5	1-1/4	6	175921	51.43
.2188	7/32	.2075	5	1-1/4	6	183863	43.25
.2190		.2173	6	1-1/2	6	175932	52.29
.2195		.2173	6	1-1/2	6	175943	52.29
.2200		.2173	6	1-1/2	6	175954	52.29
.2205		.2173	6	1-1/2	6	175965	52.29
.2210	#2	.2173	6	1-1/2	6	183874	44.45
.2215		.2173	6	1-1/2	6	175976	52.29
.2220		.2173	6	1-1/2	6	175987	52.29
.2225		.2173	6	1-1/2	6	175998	52.29

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2230		.2173	6	1-1/2	6	176009	52.29
.2235		.2173	6	1-1/2	6	176020	52.29
.2240		.2173	6	1-1/2	6	176031	52.29
.2245		.2173	6	1-1/2	6	176042	52.29
.2250		.2173	6	1-1/2	6	176053	52.29
.2255		.2173	6	1-1/2	6	176064	52.29
.2260		.2173	6	1-1/2	6	176075	52.29
.2265		.2173	6	1-1/2	6	176086	52.29
.2270		.2173	6	1-1/2	6	176097	52.29
.2275		.2173	6	1-1/2	6	176108	52.29
.2280	#1	.2173	6	1-1/2	6	183885	44.45
.2285		.2265	6	1-1/2	6	176119	52.29
.2290		.2265	6	1-1/2	6	176130	52.29
.2295		.2265	6	1-1/2	6	176141	52.29
.2300		.2265	6	1-1/2	6	176152	52.29
.2305		.2265	6	1-1/2	6	176163	52.29
.2310		.2265	6	1-1/2	6	176174	52.29
.2315		.2265	6	1-1/2	6	176185	52.29
.2320		.2265	6	1-1/2	6	176196	52.29
.2325		.2265	6	1-1/2	6	176207	52.29
.2330		.2265	6	1-1/2	6	176218	52.29
.2335		.2265	6	1-1/2	6	176229	52.29
.2340	A	.2265	6	1-1/2	6	183896	44.45
.2344	15/64	.2265	6	1-1/2	6	183907	44.45
.2345		.2265	6	1-1/2	6	176240	47.14
.2350		.2265	6	1-1/2	6	176251	47.14
.2355		.2265	6	1-1/2	6	176262	47.14
.2360		.2265	6	1-1/2	6	176273	47.14
.2362	6.0mm	.2265	6	1-1/2	6	183918	46.86
.2365		.2329	6	1-1/2	6	176284	47.14
.2370		.2329	6	1-1/2	6	176295	47.14
.2375		.2329	6	1-1/2	6	176306	47.14
.2380	B	.2329	6	1-1/2	6	183929	46.86
.2385		.2329	6	1-1/2	6	176317	47.14
.2390		.2329	6	1-1/2	6	176328	47.14
.2395		.2329	6	1-1/2	6	176339	47.14
.2400		.2329	6	1-1/2	6	176350	47.14
.2405		.2329	6	1-1/2	6	176361	47.14
.2410		.2329	6	1-1/2	6	176372	47.14
.2415		.2329	6	1-1/2	6	176383	47.14
.2420	C	.2329	6	1-1/2	6	183940	46.86
.2425		.2329	6	1-1/2	6	176394	47.14
.2430		.2329	6	1-1/2	6	176405	47.14
.2435		.2329	6	1-1/2	6	176416	47.14

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2440		.2329	6	1-1/2	6	176427	47.14
.2445		.2329	6	1-1/2	6	176438	47.14
.2450		.2329	6	1-1/2	6	176449	47.14
.2455		.2329	6	1-1/2	6	176460	47.14
.2460	D	.2329	6	1-1/2	6	183951	46.86
.2465		.2405	6	1-1/2	6	176471	47.14
.2470		.2405	6	1-1/2	6	176482	47.14
.2475		.2405	6	1-1/2	6	176493	47.14
.2480		.2405	6	1-1/2	6	176504	47.14
.2485		.2405	6	1-1/2	6	176515	47.14
.2490	O/U	.2405	6	1-1/2	6	183962	43.85
.2495		.2405	6	1-1/2	6	176526	47.14
.2500	1/4	.2405	6	1-1/2	6	183973	41.70
.2505		.2405	6	1-1/2	6	176537	60.14
.2510	O/U	.2405	6	1-1/2	6	183984	43.85
.2515		.2405	6	1-1/2	6	176548	60.14
.2520		.2405	6	1-1/2	6	176559	60.14
.2525		.2405	6	1-1/2	6	176570	60.14
.2530		.2405	6	1-1/2	6	176581	60.14
.2535		.2405	6	1-1/2	6	176592	60.14
.2540		.2405	6	1-1/2	6	176603	60.14
.2545		.2405	6	1-1/2	6	176614	60.14
.2550		.2405	6	1-1/2	6	176625	60.14
.2555		.2405	6	1-1/2	6	176636	60.14
.2559	6.5mm	.2405	6	1-1/2	6	183995	46.86
.2560		.2485	6	1-1/2	6	176647	60.14
.2565		.2485	6	1-1/2	6	176658	60.14
.2570	F	.2485	6	1-1/2	6	184006	46.86
.2575		.2485	6	1-1/2	6	176669	60.14
.2580		.2485	6	1-1/2	6	176680	60.14
.2585		.2485	6	1-1/2	6	176691	60.14
.2590		.2485	6	1-1/2	6	176702	60.14
.2595		.2485	6	1-1/2	6	176713	60.14
.2600		.2485	6	1-1/2	6	176724	60.14
.2605		.2485	6	1-1/2	6	176735	60.14
.2610	G	.2485	6	1-1/2	6	184017	46.86
.2615		.2485	6	1-1/2	6	176746	60.14
.2620		.2485	6	1-1/2	6	176757	60.14
.2625		.2485	6	1-1/2	6	176768	60.14
.2630		.2485	6	1-1/2	6	176779	60.14
.2635		.2485	6	1-1/2	6	176790	60.14
.2640		.2485	6	1-1/2	6	176801	60.14
.2645		.2485	6	1-1/2	6	176812	60.14
.2650		.2485	6	1-1/2	6	176823	60.14

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2655		.2485	6	1-1/2	6	176834	60.14
.2656	17/64	.2485	6	1-1/2	6	184028	52.20
.2660	H	.2485	6	1-1/2	6	184039	52.20
.2665		.2485	6	1-1/2	6	176845	60.14
.2670		.2485	6	1-1/2	6	176856	60.14
.2675		.2485	6	1-1/2	6	176867	60.14
.2680		.2485	6	1-1/2	6	176878	60.14
.2685		.2485	6	1-1/2	6	176889	60.14
.2690		.2485	6	1-1/2	6	176900	60.14
.2695		.2485	6	1-1/2	6	176911	60.14
.2700		.2485	6	1-1/2	6	176922	60.14
.2705		.2485	6	1-1/2	6	176933	60.14
.2710		.2485	6	1-1/2	6	176944	60.14
.2715		.2485	6	1-1/2	6	176955	60.14
.2720	I	.2485	6	1-1/2	6	184050	52.20
.2725		.2485	6	1-1/2	6	176966	60.14
.2730		.2485	6	1-1/2	6	176977	60.14
.2735		.2485	6	1-1/2	6	176988	60.14
.2740		.2485	6	1-1/2	6	176999	60.14
.2745		.2485	6	1-1/2	6	177010	60.14
.2750		.2485	6	1-1/2	6	177021	60.14
.2755		.2485	6	1-1/2	6	177032	60.14
.2756	7.0mm	.2485	6	1-1/2	6	184061	52.20
.2760		.2485	6	1-1/2	6	177043	60.14
.2765		.2485	6	1-1/2	6	177054	60.14
.2770	J	.2485	6	1-1/2	6	184072	52.20
.2775		.2485	6	1-1/2	6	177065	60.14
.2780		.2485	6	1-1/2	6	177076	60.14
.2785		.2485	6	1-1/2	6	177087	60.14
.2790		.2485	6	1-1/2	6	177098	60.14
.2795		.2485	6	1-1/2	6	177109	60.14
.2800		.2485	6	1-1/2	6	177120	60.14
.2805		.2485	6	1-1/2	6	177131	60.14
.2810	K	.2485	6	1-1/2	6	184083	52.20
.2812	9/32	.2485	6	1-1/2	6	184094	49.55
.2815		.2792	6	1-1/2	6	177142	60.14
.2820		.2792	6	1-1/2	6	177153	60.14
.2825		.2792	6	1-1/2	6	177164	60.14
.2830		.2792	6	1-1/2	6	177175	60.14
.2835		.2792	6	1-1/2	6	177186	60.14
.2840		.2792	6	1-1/2	6	177197	60.14
.2845		.2792	6	1-1/2	6	177208	60.14
.2850		.2792	6	1-1/2	6	177219	60.14
.2855		.2792	6	1-1/2	6	177230	60.14

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.2860		.2792	6	1-1/2	6	177241	60.14
.2865		.2792	6	1-1/2	6	177252	60.14
.2870		.2792	6	1-1/2	6	177263	60.14
.2875		.2792	6	1-1/2	6	177274	60.14
.2880		.2792	6	1-1/2	6	177285	60.14
.2885		.2792	6	1-1/2	6	177296	60.14
.2890		.2792	6	1-1/2	6	177307	60.14
.2895		.2792	6	1-1/2	6	177318	60.14
.2900	L	.2792	6	1-1/2	6	184105	52.20
.2905		.2792	6	1-1/2	6	177329	60.14
.2910		.2792	6	1-1/2	6	177340	60.14
.2915		.2792	6	1-1/2	6	177351	60.14
.2920		.2792	6	1-1/2	6	177362	60.14
.2925		.2792	6	1-1/2	6	177373	60.14
.2930		.2792	6	1-1/2	6	177384	60.14
.2935		.2792	6	1-1/2	6	177395	60.14
.2940		.2792	6	1-1/2	6	177406	60.14
.2945		.2792	6	1-1/2	6	177417	60.14
.2950	M	.2792	6	1-1/2	6	184116	52.20
.2953	7.5mm	.2792	6	1-1/2	6	184127	52.20
.2955		.2792	6	1-1/2	6	177428	60.14
.2960		.2792	6	1-1/2	6	177439	60.14
.2965		.2792	6	1-1/2	6	177450	60.14
.2969	19/64	.2792	6	1-1/2	6	184138	52.20
.2970		.2792	6	1-1/2	6	177461	53.83
.2975		.2792	6	1-1/2	6	177472	53.83
.2980		.2792	6	1-1/2	6	177483	53.83
.2985		.2792	6	1-1/2	6	177494	53.83
.2990		.2792	6	1-1/2	6	177505	53.83
.2995		.2792	6	1-1/2	6	177516	53.83
.3000		.2792	6	1-1/2	6	177527	53.83
.3005		.2792	6	1-1/2	6	177538	53.83
.3010		.2792	6	1-1/2	6	177549	53.83
.3015		.2792	6	1-1/2	6	177560	53.83
.3020	N	.2792	6	1-1/2	6	184149	52.20
.3025		.2792	6	1-1/2	6	177571	53.83
.3030		.2792	6	1-1/2	6	177582	53.83
.3035		.2792	6	1-1/2	6	177593	53.83
.3040		.2792	6	1-1/2	6	177604	53.83
.3045		.2792	6	1-1/2	6	177615	53.83
.3050		.2792	6	1-1/2	6	177626	53.83
.3055		.2792	6	1-1/2	6	177637	53.83
.3060		.2792	6	1-1/2	6	177648	53.83
.3065		.2792	6	1-1/2	6	177659	53.83

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3070		.2792	6	1-1/2	6	177670	53.83
.3075		.2792	6	1-1/2	6	177681	53.83
.3080		.2792	6	1-1/2	6	177692	53.83
.3085		.2792	6	1-1/2	6	177703	53.83
.3090		.2792	6	1-1/2	6	177714	53.83
.3095		.2792	6	1-1/2	6	177725	53.83
.3100		.2792	6	1-1/2	6	177736	53.83
.3105		.2792	6	1-1/2	6	177747	53.83
.3110		.2792	6	1-1/2	6	177758	53.83
.3115	O/U	.2792	6	1-1/2	6	184160	49.55
.3120		.2792	6	1-1/2	6	177769	53.83
.3125	5/16	.2792	6	1-1/2	6	184171	47.05
.3130		.2792	6	1-1/2	6	177780	63.40
.3135	O/U	.2792	6	1-1/2	6	184182	49.55
.3140		.2792	6	1-1/2	6	177791	63.40
.3145		.2792	6	1-1/2	6	177802	63.40
.3150	8.0mm	.2792	6	1-1/2	6	184193	52.20
.3155		.2792	6	1-1/2	6	177813	63.40
.3160	O	.2792	6	1-1/2	6	184204	52.20
.3165		.2792	6	1-1/2	6	177824	63.40
.3170		.2792	6	1-1/2	6	177835	63.40
.3175		.2792	6	1-1/2	6	177846	63.40
.3180		.2792	6	1-1/2	6	177857	63.40
.3185		.2792	6	1-1/2	6	177868	63.40
.3190		.2792	6	1-1/2	6	177879	63.40
.3195		.2792	6	1-1/2	6	177890	63.40
.3200		.2792	6	1-1/2	6	177901	63.40
.3205		.2792	6	1-1/2	6	177912	63.40
.3210		.2792	6	1-1/2	6	177923	63.40
.3215		.2792	6	1-1/2	6	177934	63.40
.3220		.2792	6	1-1/2	6	177945	63.40
.3225		.2792	6	1-1/2	6	177956	63.40
.3230	P	.2792	6	1-1/2	6	184215	55.81
.3235		.2792	6	1-1/2	6	177967	63.40
.3240		.2792	6	1-1/2	6	177978	63.40
.3245		.2792	6	1-1/2	6	177989	63.40
.3250		.2792	6	1-1/2	6	178000	63.40
.3255		.2792	6	1-1/2	6	178011	63.40
.3260		.2792	6	1-1/2	6	178022	63.40
.3265		.2792	6	1-1/2	6	178033	63.40
.3270		.2792	6	1-1/2	6	178044	63.40
.3275		.2792	6	1-1/2	6	178055	63.40
.3280		.2792	6	1-1/2	6	178066	63.40
.3281	21/64	.2792	6	1-1/2	6	184226	55.81

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3285		.2792	6	1-1/2	6	178077	63.40
.3290		.2792	6	1-1/2	6	178088	63.40
.3295		.2792	6	1-1/2	6	178099	63.40
.3300		.2792	6	1-1/2	6	178110	63.40
.3305		.2792	6	1-1/2	6	178121	63.40
.3310		.2792	6	1-1/2	6	178132	63.40
.3315		.2792	6	1-1/2	6	178143	63.40
.3320	Q	.2792	6	1-1/2	6	184237	55.81
.3325		.2792	6	1-1/2	6	178154	63.40
.3330		.2792	6	1-1/2	6	178165	63.40
.3335		.2792	6	1-1/2	6	178176	63.40
.3340		.2792	6	1-1/2	6	178187	63.40
.3345		.2792	6	1-1/2	6	178198	63.40
.3346	8.5mm	.2792	6	1-1/2	6	184248	55.81
.3350		.2792	6	1-1/2	6	178209	63.40
.3355		.2792	6	1-1/2	6	178220	63.40
.3360		.2792	6	1-1/2	6	178231	63.40
.3365		.2792	6	1-1/2	6	178242	63.40
.3370		.2792	6	1-1/2	6	178253	63.40
.3375		.2792	6	1-1/2	6	178264	63.40
.3380		.2792	6	1-1/2	6	178275	63.40
.3385		.2792	6	1-1/2	6	178286	63.40
.3390	R	.2792	6	1-1/2	6	184259	55.81
.3395		.2792	6	1-1/2	6	178297	63.40
.3400		.2792	6	1-1/2	6	178308	63.40
.3405		.2792	6	1-1/2	6	178319	63.40
.3410		.2792	6	1-1/2	6	178330	63.40
.3415		.2792	6	1-1/2	6	178341	63.40
.3420		.2792	6	1-1/2	6	178352	63.40
.3425		.2792	6	1-1/2	6	178363	63.40
.3430		.2792	6	1-1/2	6	178374	63.40
.3435		.2792	6	1-1/2	6	178385	63.40
.3438	11/32	.2792	6	1-1/2	6	184270	55.81
.3440		.3105	7	1-3/4	6	178396	64.33
.3445		.3105	7	1-3/4	6	178407	64.33
.3450		.3105	7	1-3/4	6	178418	64.33
.3455		.3105	7	1-3/4	6	178429	64.33
.3460		.3105	7	1-3/4	6	178440	64.33
.3465		.3105	7	1-3/4	6	178451	64.33
.3470		.3105	7	1-3/4	6	178462	64.33
.3475		.3105	7	1-3/4	6	178473	64.33
.3480	S	.3105	6	1-3/4	6	184281	56.38
.3485		.3105	7	1-3/4	6	178484	64.33
.3490		.3105	7	1-3/4	6	178495	64.33

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3495		.3105	7	1-3/4	6	178506	64.33
.3500		.3105	7	1-3/4	6	178517	64.33
.3505		.3105	7	1-3/4	6	178528	64.33
.3510		.3105	7	1-3/4	6	178539	64.33
.3515		.3105	7	1-3/4	6	178550	64.33
.3520		.3105	7	1-3/4	6	178561	64.33
.3525		.3105	7	1-3/4	6	178572	64.33
.3530		.3105	7	1-3/4	6	178583	64.33
.3535		.3105	7	1-3/4	6	178594	64.33
.3540		.3105	7	1-3/4	6	178605	64.33
.3543	9.0mm	.3105	7	1-3/4	6	184292	56.38
.3545		.3105	7	1-3/4	6	178616	64.33
.3550		.3105	7	1-3/4	6	178627	64.33
.3555		.3105	7	1-3/4	6	178638	64.33
.3560		.3105	7	1-3/4	6	178649	64.33
.3565		.3105	7	1-3/4	6	178660	64.33
.3570		.3105	7	1-3/4	6	178671	64.33
.3575		.3105	7	1-3/4	6	178682	64.33
.3580	T	.3105	7	1-3/4	6	184303	56.38
.3585		.3105	7	1-3/4	6	178693	64.33
.3590		.3105	7	1-3/4	6	178704	64.33
.3594	23/64	.3105	7	1-3/4	6	184314	56.38
.3595		.3105	7	1-3/4	6	178715	57.64
.3600		.3105	7	1-3/4	6	178726	57.64
.3605		.3105	7	1-3/4	6	178737	57.64
.3610		.3105	7	1-3/4	6	178748	57.64
.3615		.3105	7	1-3/4	6	178759	57.64
.3620		.3105	7	1-3/4	6	178770	57.64
.3625		.3105	7	1-3/4	6	178781	57.64
.3630		.3105	7	1-3/4	6	178792	57.64
.3635		.3105	7	1-3/4	6	178803	57.64
.3640		.3105	7	1-3/4	6	178814	57.64
.3645		.3105	7	1-3/4	6	178825	57.64
.3650		.3105	7	1-3/4	6	178836	57.64
.3655		.3105	7	1-3/4	6	178847	57.64
.3660		.3105	7	1-3/4	6	178858	57.64
.3665		.3105	7	1-3/4	6	178869	57.64
.3670		.3105	7	1-3/4	6	178880	57.64
.3675		.3105	7	1-3/4	6	178891	57.64
.3680	U	.3105	7	1-3/4	6	184325	56.38
.3685		.3105	7	1-3/4	6	178902	57.64
.3690		.3105	7	1-3/4	6	178913	57.64
.3695		.3105	7	1-3/4	6	178924	57.64
.3700		.3105	7	1-3/4	6	178935	57.64

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3705		.3105	7	1-3/4	6	178946	57.64
.3710		.3105	7	1-3/4	6	178957	57.64
.3715		.3105	7	1-3/4	6	178968	57.64
.3720		.3105	7	1-3/4	6	178979	57.64
.3725		.3105	7	1-3/4	6	178990	57.64
.3730		.3105	7	1-3/4	6	179001	57.64
.3735		.3105	7	1-3/4	6	179012	57.64
.3740	O/U	.3105	7	1-3/4	6	184336	53.54
.3745		.3105	7	1-3/4	6	179023	57.64
.3750	3/8	.3105	7	1-3/4	6	184347	50.66
.3755		.3105	7	1-3/4	6	179034	69.37
.3760	O/U	.3105	7	1-3/4	6	184358	53.54
.3765		.3105	7	1-3/4	6	179045	69.37
.3770	V	.3105	7	1-3/4	6	184369	61.29
.3775		.3105	7	1-3/4	6	179056	69.37
.3780		.3105	7	1-3/4	6	179067	69.37
.3785		.3105	7	1-3/4	6	179078	69.37
.3790		.3105	7	1-3/4	6	179089	69.37
.3795		.3105	7	1-3/4	6	179100	69.37
.3800		.3105	7	1-3/4	6	179111	69.37
.3805		.3105	7	1-3/4	6	179122	69.37
.3810		.3105	7	1-3/4	6	179133	69.37
.3815		.3105	7	1-3/4	6	179144	69.37
.3820		.3105	7	1-3/4	6	179155	69.37
.3825		.3105	7	1-3/4	6	179166	69.37
.3830		.3105	7	1-3/4	6	179177	69.37
.3835		.3105	7	1-3/4	6	179188	69.37
.3840		.3105	7	1-3/4	6	179199	69.37
.3845		.3105	7	1-3/4	6	179210	69.37
.3850		.3105	7	1-3/4	6	179221	69.37
.3855		.3105	7	1-3/4	6	179232	69.37
.3860	W	.3105	7	1-3/4	6	184380	61.29
.3865		.3105	7	1-3/4	6	179243	69.37
.3870		.3105	7	1-3/4	6	179254	69.37
.3875		.3105	7	1-3/4	6	179265	69.37
.3880		.3105	7	1-3/4	6	179276	69.37
.3885		.3105	7	1-3/4	6	179287	69.37
.3890		.3105	7	1-3/4	6	179298	69.37
.3895		.3105	7	1-3/4	6	179309	69.37
.3900		.3105	7	1-3/4	6	179320	69.37
.3905		.3105	7	1-3/4	6	179331	69.37
.3906	25/64	.3105	7	1-3/4	6	184391	61.29
.3910		.3105	7	1-3/4	6	179342	71.15
.3915		.3105	7	1-3/4	6	179353	71.15

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.3920		.3105	7	1-3/4	6	179364	71.15
.3925		.3105	7	1-3/4	6	179375	71.15
.3930		.3105	7	1-3/4	6	179386	71.15
.3935		.3105	7	1-3/4	6	179397	71.15
.3937	10.0mm	.3105	7	1-3/4	6	184402	61.29
.3940		.3105	7	1-3/4	6	179408	71.15
.3945		.3105	7	1-3/4	6	179419	71.15
.3950		.3105	7	1-3/4	6	179430	71.15
.3955		.3105	7	1-3/4	6	179441	71.15
.3960		.3105	7	1-3/4	6	179452	71.15
.3965		.3105	7	1-3/4	6	179463	71.15
.3970	X	.3105	7	1-3/4	6	184413	61.29
.3975		.3105	7	1-3/4	6	179474	71.15
.3980		.3105	7	1-3/4	6	179485	71.15
.3985		.3105	7	1-3/4	6	179496	71.15
.3990		.3105	7	1-3/4	6	179507	71.15
.3995		.3105	7	1-3/4	6	179518	71.15
.4000		.3105	7	1-3/4	6	179529	71.15
.4005		.3105	7	1-3/4	6	179540	71.15
.4010		.3105	7	1-3/4	6	179551	71.15
.4015		.3105	7	1-3/4	6	179562	71.15
.4020		.3105	7	1-3/4	6	179573	71.15
.4025		.3105	7	1-3/4	6	179584	71.15
.4030		.3105	7	1-3/4	6	179595	71.15
.4035		.3105	7	1-3/4	6	179606	71.15
.4040	Y	.3105	7	1-3/4	6	184424	63.60
.4045		.3105	7	1-3/4	6	179617	71.15
.4050		.3105	7	1-3/4	6	179628	71.15
.4055		.3105	7	1-3/4	6	179639	71.15
.4060		.3105	7	1-3/4	6	179650	71.15
.4062	13/32	.3105	7	1-3/4	6	184435	63.60
.4065		.3730	7	1-3/4	6	179661	71.15
.4070		.3730	7	1-3/4	6	179672	71.15
.4075		.3730	7	1-3/4	6	179683	71.15
.4080		.3730	7	1-3/4	6	179694	71.15
.4085		.3730	7	1-3/4	6	179705	71.15
.4090		.3730	7	1-3/4	6	179716	71.15
.4095		.3730	7	1-3/4	6	179727	71.15
.4100		.3730	7	1-3/4	6	179738	71.15
.4105		.3730	7	1-3/4	6	179749	71.15
.4110		.3730	7	1-3/4	6	179760	71.15
.4115		.3730	7	1-3/4	6	179771	71.15
.4120		.3730	7	1-3/4	6	179782	71.15
.4125		.3730	7	1-3/4	6	179793	71.15

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4130	Z	.3730	7	1-3/4	6	184446	63.60
.4134	10.5mm	.3730	7	1-3/4	6	184457	64.22
.4135		.3730	7	1-3/4	6	179804	71.15
.4140		.3730	7	1-3/4	6	179815	71.15
.4145		.3730	7	1-3/4	6	179826	71.15
.4150		.3730	7	1-3/4	6	179837	71.15
.4155		.3730	7	1-3/4	6	179848	71.15
.4160		.3730	7	1-3/4	6	179859	71.15
.4165		.3730	7	1-3/4	6	179870	71.15
.4170		.3730	7	1-3/4	6	179881	71.15
.4175		.3730	7	1-3/4	6	179892	71.15
.4180		.3730	7	1-3/4	6	179903	71.15
.4185		.3730	7	1-3/4	6	179914	71.15
.4190		.3730	7	1-3/4	6	179925	71.15
.4195		.3730	7	1-3/4	6	179936	71.15
.4200		.3730	7	1-3/4	6	179947	71.15
.4205		.3730	7	1-3/4	6	179958	71.15
.4210		.3730	7	1-3/4	6	179969	71.15
.4215		.3730	7	1-3/4	6	179980	71.15
.4219	27/64	.3730	7	1-3/4	6	184468	63.60
.4220		.3730	7	1-3/4	6	179991	66.72
.4225		.3730	7	1-3/4	6	180002	66.72
.4230		.3730	7	1-3/4	6	180013	66.72
.4235		.3730	7	1-3/4	6	180024	66.72
.4240		.3730	7	1-3/4	6	180035	66.72
.4245		.3730	7	1-3/4	6	180046	66.72
.4250		.3730	7	1-3/4	6	180057	66.72
.4255		.3730	7	1-3/4	6	180068	66.72
.4260		.3730	7	1-3/4	6	180079	66.72
.4265		.3730	7	1-3/4	6	180090	66.72
.4270		.3730	7	1-3/4	6	180101	66.72
.4275		.3730	7	1-3/4	6	180112	66.72
.4280		.3730	7	1-3/4	6	180123	66.72
.4285		.3730	7	1-3/4	6	180134	66.72
.4290		.3730	7	1-3/4	6	180145	66.72
.4295		.3730	7	1-3/4	6	180156	66.72
.4300		.3730	7	1-3/4	6	180167	66.72
.4305		.3730	7	1-3/4	6	180178	66.72
.4310		.3730	7	1-3/4	6	180189	66.72
.4315		.3730	7	1-3/4	6	180200	66.72
.4320		.3730	7	1-3/4	6	180211	66.72
.4325		.3730	7	1-3/4	6	180222	66.72
.4330		.3730	7	1-3/4	6	180233	66.72
.4331	11.0mm	.3730	7	1-3/4	6	184479	63.60

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4335		.3730	7	1-3/4	6	180244	66.72
.4340		.3730	7	1-3/4	6	180255	66.72
.4345		.3730	7	1-3/4	6	180266	66.72
.4350		.3730	7	1-3/4	6	180277	66.72
.4355		.3730	7	1-3/4	6	180288	66.72
.4360		.3730	7	1-3/4	6	180299	66.72
.4365	O/U	.3730	7	1-3/4	6	184490	60.42
.4370		.3730	7	1-3/4	6	180310	66.72
.4375	7/16	.3730	7	1-3/4	6	184501	60.42
.4380		.3730	7	1-3/4	6	180321	75.67
.4385	O/U	.3730	7	1-3/4	6	184512	60.42
.4390		.3730	7	1-3/4	6	180332	75.67
.4395		.3730	7	1-3/4	6	180343	75.67
.4400		.3730	7	1-3/4	6	180354	75.67
.4405		.3730	7	1-3/4	6	180365	75.67
.4410		.3730	7	1-3/4	6	180376	75.67
.4415		.3730	7	1-3/4	6	180387	75.67
.4420		.3730	7	1-3/4	6	180398	75.67
.4425		.3730	7	1-3/4	6	180409	75.67
.4430		.3730	7	1-3/4	6	180420	75.67
.4435		.3730	7	1-3/4	6	180431	75.67
.4440		.3730	7	1-3/4	6	180442	75.67
.4445		.3730	7	1-3/4	6	180453	75.67
.4450		.3730	7	1-3/4	6	180464	75.67
.4455		.3730	7	1-3/4	6	180475	75.67
.4460		.3730	7	1-3/4	6	180486	75.67
.4465		.3730	7	1-3/4	6	180497	75.67
.4470		.3730	7	1-3/4	6	180508	75.67
.4475		.3730	7	1-3/4	6	180519	75.67
.4480		.3730	7	1-3/4	6	180530	75.67
.4485		.3730	7	1-3/4	6	180541	75.67
.4490		.3730	7	1-3/4	6	180552	75.67
.4495		.3730	7	1-3/4	6	180563	75.67
.4500		.3730	7	1-3/4	6	180574	75.67
.4505		.3730	7	1-3/4	6	180585	75.67
.4510		.3730	7	1-3/4	6	180596	75.67
.4515		.3730	7	1-3/4	6	180607	75.67
.4520		.3730	7	1-3/4	6	180618	75.67
.4525		.3730	7	1-3/4	6	180629	75.67
.4528	11.5mm	.3730	7	1-3/4	6	184523	69.28
.4530		.3730	7	1-3/4	6	180640	75.67
.4531	29/64	.3730	7	1-3/4	6	184534	69.28
.4535		.3730	7	1-3/4	6	180651	75.67
.4540		.3730	7	1-3/4	6	180662	75.67
.4545		.3730	7	1-3/4	6	180673	75.67
.4550		.3730	7	1-3/4	6	180684	75.67
.4555		.3730	7	1-3/4	6	180695	75.67
.4560		.3730	7	1-3/4	6	180706	75.67
.4565		.3730	7	1-3/4	6	180717	75.67
.4570		.3730	7	1-3/4	6	180728	75.67
.4575		.3730	7	1-3/4	6	180739	75.67
.4580		.3730	7	1-3/4	6	180750	75.67
.4585		.3730	7	1-3/4	6	180761	75.67
.4590		.3730	7	1-3/4	6	180772	75.67
.4595		.3730	7	1-3/4	6	180783	75.67
.4600		.3730	7	1-3/4	6	180794	75.67
.4605		.3730	7	1-3/4	6	180805	75.67
.4610		.3730	7	1-3/4	6	180816	75.67
.4615		.3730	7	1-3/4	6	180827	75.67
.4620		.3730	7	1-3/4	6	180838	75.67
.4625		.3730	7	1-3/4	6	180849	75.67
.4630		.3730	7	1-3/4	6	180860	75.67
.4635		.3730	7	1-3/4	6	180871	75.67
.4640		.3730	7	1-3/4	6	180882	75.67
.4645		.3730	7	1-3/4	6	180893	75.67
.4650		.3730	7	1-3/4	6	180904	75.67
.4655		.3730	7	1-3/4	6	180915	75.67
.4660		.3730	7	1-3/4	6	180926	75.67
.4665		.3730	7	1-3/4	6	180937	75.67
.4670		.3730	7	1-3/4	6	180948	75.67
.4675		.3730	7	1-3/4	6	180959	75.67
.4680		.3730	7	1-3/4	6	180970	75.67
.4685		.3730	7	1-3/4	6	180981	75.67
.4688	15/32	.3730	7	1-3/4	6	184545	69.28
.4690		.4355	8	2	6	180992	75.67
.4695		.4355	8	2	6	181003	75.67
.4700		.4355	8	2	6	181014	75.67
.4705		.4355	8	2	6	181025	75.67
.4710		.4355	8	2	6	181036	75.67
.4715		.4355	8	2	6	181047	75.67
.4720		.4355	8	2	6	181058	75.67
.4724	12.0mm	.4355	8	2	6	184556	69.28
.4725		.4355	8	2	6	181069	75.67
.4730		.4355	8	2	6	181080	75.67
.4735		.4355	8	2	6	181091	75.67
.4740		.4355	8	2	6	181102	75.67
.4745		.4355	8	2	6	181113	75.67
.4750		.4355	8	2	6	181124	75.67

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4755		.4355	8	2	6	181135	75.67
.4760		.4355	8	2	6	181146	75.67
.4765		.4355	8	2	6	181157	75.67
.4770		.4355	8	2	6	181168	75.67
.4775		.4355	8	2	6	181179	75.67
.4780		.4355	8	2	6	181190	75.67
.4785		.4355	8	2	6	181201	75.67
.4790		.4355	8	2	6	181212	75.67
.4795		.4355	8	2	6	181223	75.67
.4800		.4355	8	2	6	181234	75.67
.4805		.4355	8	2	6	181245	75.67
.4810		.4355	8	2	6	181256	75.67
.4815		.4355	8	2	6	181267	75.67
.4820		.4355	8	2	6	181278	75.67
.4825		.4355	8	2	6	181289	75.67
.4830		.4355	8	2	6	181300	75.67
.4835		.4355	8	2	6	181311	75.67
.4840		.4355	8	2	6	181322	75.67
.4844	31/64	.4355	8	2	6	184567	69.28
.4845		.4355	8	2	6	181333	71.15
.4850		.4355	8	2	6	181344	71.15
.4855		.4355	8	2	6	181355	71.15
.4860		.4355	8	2	6	181366	71.15
.4865		.4355	8	2	6	181377	71.15
.4870		.4355	8	2	6	181388	71.15
.4875		.4355	8	2	6	181399	71.15
.4880		.4355	8	2	6	181410	71.15
.4885		.4355	8	2	6	181421	71.15
.4890		.4355	8	2	6	181432	71.15
.4895		.4355	8	2	6	181443	71.15
.4900		.4355	8	2	6	181454	71.15
.4905		.4355	8	2	6	181465	71.15
.4910		.4355	8	2	6	181476	71.15
.4915		.4355	8	2	6	181487	71.15
.4920		.4355	8	2	6	181498	71.15
.4921	12.5mm	.4355	8	2	6	184578	69.28
.4925		.4355	8	2	6	181509	71.15
.4930		.4355	8	2	6	181520	71.15
.4935		.4355	8	2	6	181531	71.15
.4940		.4355	8	2	6	181542	71.15
.4945		.4355	8	2	6	181553	71.15
.4950		.4355	8	2	6	181564	71.15
.4955		.4355	8	2	6	181575	71.15
.4960		.4355	8	2	6	181586	71.15

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.4965		.4355	8	2	6	181597	71.15
.4970		.4355	8	2	6	181608	71.15
.4975		.4355	8	2	6	181619	71.15
.4980		.4355	8	2	6	181630	71.15
.4985		.4355	8	2	6	181641	71.15
.4990	O/U	.4355	8	2	6	184589	65.76
.4995		.4355	8	2	6	181652	71.15
.5000	1/2	.4355	8	2	6	184600	65.76
.5005		.4355	8	2	6	181663	95.74
.5010	O/U	.4355	8	2	6	184611	65.76
.5015		.4355	8	2	6	181674	95.74
.5020		.4355	8	2	6	181685	95.74
.5025		.4355	8	2	6	181696	95.74
.5030		.4355	8	2	6	181707	95.74
.5035		.4355	8	2	6	181718	95.74
.5040		.4355	8	2	6	181729	95.74
.5045		.4355	8	2	6	181740	95.74
.5050		.4355	8	2	6	181751	95.74
.5060		.4355	8	2	6	181762	95.74
.5070		.4355	8	2	6	181773	95.74
.5080		.4355	8	2	6	181784	95.74
.5090		.4355	8	2	6	181795	95.74
.5100		.4355	8	2	6	181806	95.74
.5118	13.0mm	.4355	8	2	6	184622	85.83
.5156	33/64	.4355	8	2	6	184633	85.83
.5312	17/32	.4355	8	2	6	184644	81.74
.5315	13.5mm	.4355	8	2	6	184655	85.83
.5469	35/64	.4355	8	2	8	184666	85.83
.5512	14.0mm	.4355	8	2	8	184677	85.83
.5600		.4355	8	2	8	181817	93.77
.5605		.4355	8	2	8	181828	93.77
.5610		.4355	8	2	8	181839	93.77
.5615	O/U	.4355	8	2	8	184688	85.83
.5620		.4355	8	2	8	181850	93.77
.5625	9/16	.4355	8	2	8	184699	81.74
.5630		.4355	8	2	8	181861	107.66
.5635	O/U	.4355	8	2	8	184710	85.83
.5640		.4355	8	2	8	181872	107.66
.5645		.4355	8	2	8	181883	107.66
.5650		.4355	8	2	8	181894	107.66
.5655		.4355	8	2	8	181905	107.66
.5709	14.5mm	.4355	8	2	8	184721	85.83
.5781	37/64	.4355	8	2	8	184732	85.83
.5906	15.0mm	.4355	8	2	8	184743	85.83

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.5938	19/32	.4355	8	2	8	184754	81.74
.6094	39/64	.5615	9	2-1/4	8	184765	100.16
.6102	15.5mm	.5615	9	2-1/4	8	184776	100.16
.6220		.5615	9	2-1/4	8	181916	108.15
.6225		.5615	9	2-1/4	8	181927	108.15
.6230		.5615	9	2-1/4	8	181938	108.15
.6235		.5615	9	2-1/4	8	181949	108.15
.6240	O/U	.5615	9	2-1/4	8	184787	100.16
.6245		.5615	9	2-1/4	8	181960	108.15
.6250	5/8	.5615	9	2-1/4	8	184798	95.74
.6255		.5615	9	2-1/4	8	181971	120.80
.6260	O/U	.5615	9	2-1/4	8	184809	103.09
.6265		.5615	9	2-1/4	8	181982	120.80
.6270		.5615	9	2-1/4	8	181993	120.80
.6275		.5615	9	2-1/4	8	182004	120.80
.6280		.5615	9	2-1/4	8	182015	120.80
.6299	16.0mm	.5615	9	2-1/4	8	184820	103.09
.6300		.5615	9	2-1/4	8	182697	120.80
.6406	41/64	.5615	9	2-1/4	8	184831	102.99
.6496	16.5mm	.5615	9	2-1/4	8	184842	108.04
.6562	21/32	.5615	9	2-1/4	8	184853	110.98
.6693	17.0mm	.5615	9	2-1/4	8	184864	116.47
.6719	43/64	.5615	9	2-1/4	8	184875	116.47
.6845		.5615	9	2-1/4	8	182026	120.80
.6850		.5615	9	2-1/4	8	182037	120.80
.6855		.5615	9	2-1/4	8	182048	120.80
.6860		.5615	9	2-1/4	8	182059	120.80
.6865	O/U	.5615	9	2-1/4	8	184886	116.42
.6870		.5615	9	2-1/4	8	182070	120.80
.6875	11/16	.5615	9	2-1/4	8	184897	110.83
.6880		.5615	9	2-1/4	8	182081	133.17
.6885	O/U	.5615	9	2-1/4	8	184908	125.17
.6890	17.5mm	.5615	9	2-1/4	8	184919	125.17
.6895		.5615	9	2-1/4	8	182092	133.17
.6900		.5615	9	2-1/4	8	182103	133.17
.6905		.5615	9	2-1/4	8	182114	133.17
.7031	45/64	.5615	9	2-1/4	8	184930	124.96
.7087	18.0mm	.5615	9	2-1/4	8	184941	124.96
.7188	23/32	.5615	9	2-1/4	8	184952	123.78
.7283	18.5mm	.6240	9-1/2	2-1/2	8	184963	129.72
.7344	47/64	.6240	9-1/2	2-1/2	8	184974	143.96
.7470		.6240	9-1/2	2-1/2	8	182125	141.49
.7475		.6240	9-1/2	2-1/2	8	182136	141.49
.7480	19.0mm	.6240	9-1/2	2-1/2	8	184985	143.86

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.7485		.6240	9-1/2	2-1/2	8	182147	141.49
.7490	O/U	.6240	9-1/2	2-1/2	8	184996	143.86
.7495		.6240	9-1/2	2-1/2	8	182158	141.49
.7500	3/4	.6240	9-1/2	2-1/2	8	185007	124.12
.7505		.6240	9-1/2	2-1/2	8	182169	153.57
.7510	O/U	.6240	9-1/2	2-1/2	8	185018	138.31
.7515		.6240	9-1/2	2-1/2	8	182180	153.57
.7520		.6240	9-1/2	2-1/2	8	182191	153.57
.7525		.6240	9-1/2	2-1/2	8	182202	153.57
.7530		.6240	9-1/2	2-1/2	8	182213	153.57
.7540		.6240	9-1/2	2-1/2	8	182224	153.57
.7550		.6240	9-1/2	2-1/2	8	182235	153.57
.7656	49/64	.6240	9-1/2	2-1/2	8	185029	138.11
.7677	19.5mm	.6240	9-1/2	2-1/2	8	185040	138.11
.7812	25/32	.6240	9-1/2	2-1/2	8	185051	133.80
.7874	20.0mm	.6240	9-1/2	2-1/2	8	185062	147.94
.7969	51/64	.6240	9-1/2	2-1/2	8	185073	147.94
.8071	20.5mm	.6240	9-1/2	2-1/2	8	185084	147.84
.8095		.6240	9-1/2	2-1/2	8	182246	153.57
.8100		.6240	9-1/2	2-1/2	8	182257	153.57
.8105		.6240	9-1/2	2-1/2	8	182268	153.57
.8110		.6240	9-1/2	2-1/2	8	182279	153.57
.8115	O/U	.6240	9-1/2	2-1/2	8	185095	147.84
.8120		.6240	9-1/2	2-1/2	8	182290	153.57
.8125	13/16	.6240	9-1/2	2-1/2	8	185106	133.60
.8130		.6240	9-1/2	2-1/2	8	182301	169.11
.8135	O/U	.6240	9-1/2	2-1/2	8	185117	147.84
.8140		.6240	9-1/2	2-1/2	8	182312	169.11
.8145		.6240	9-1/2	2-1/2	8	182323	169.11
.8150		.6240	9-1/2	2-1/2	8	182334	169.11
.8155		.6240	9-1/2	2-1/2	8	182345	169.11
.8268	21.0mm	.6240	9-1/2	2-1/2	8	185128	147.69
.8281	53/64	.6240	9-1/2	2-1/2	8	185139	147.69
.8438	27/32	.6240	9-1/2	2-1/2	8	185150	158.31
.8465	21.5mm	.7490	10	2-5/8	8	185161	172.35
.8594	55/64	.7490	10	2-5/8	8	185172	172.35
.8661	22.0mm	.7490	10	2-5/8	8	185183	172.25
.8720		.6240	10	2-5/8	8	182356	173.47
.8725		.6240	10	2-5/8	8	182367	173.47
.8730		.6240	10	2-5/8	8	182378	173.47
.8735		.6240	10	2-5/8	8	182389	173.47
.8740	O/U	.7490	10	2-5/8	8	185194	172.25
.8745		.7490	10	2-5/8	8	182400	173.47
.8750	7/8	.7490	10	2-5/8	8	185205	161.74

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE
STOCKED INTERMEDIATE & STANDARD SIZES

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.8755		.7490	10	2-5/8	8	182411	189.02
.8760	O/U	.7490	10	2-5/8	8	185216	176.09
.8765		.7490	10	2-5/8	8	182422	189.02
.8770		.7490	10	2-5/8	8	182433	189.02
.8775		.7490	10	2-5/8	8	182444	189.02
.8780		.7490	10	2-5/8	8	182455	189.02
.8858	22.5mm	.7490	10	2-5/8	8	185227	175.83
.8906	57/64	.7490	10	2-5/8	8	185238	175.83
.9055	23.0mm	.7490	10	2-5/8	8	185249	175.83
.9062	29/32	.7490	10	2-5/8	8	185260	174.34
.9219	59/64	.7490	10	2-5/8	8	185271	188.38
.9252	23.5mm	.7490	10	2-5/8	8	185282	188.38
.9340		.7490	10	2-5/8	8	182466	189.02
.9345		.7490	10	2-5/8	8	182477	189.02
.9350		.7490	10	2-5/8	8	182488	189.02
.9355		.7490	10	2-5/8	8	182499	189.02
.9360		.7490	10	2-5/8	8	182510	189.02
.9365	O/U	.7490	10	2-5/8	8	185293	188.13
.9370		.7490	10	2-5/8	8	182521	189.02
.9375	15/16	.7490	10	2-5/8	8-10	185304	173.98
.9380		.7490	10	2-5/8	8	182532	207.49
.9385	O/U	.7490	10	2-5/8	8-10	185315	188.13
.9390		.7490	10	2-5/8	8	182543	207.49
.9395		.7490	10	2-5/8	8	182554	207.49
.9400		.7490	10	2-5/8	8	182565	207.49
.9405		.7490	10	2-5/8	8	182576	207.49
.9449	24.0mm	.7490	10	2-5/8	8-10	185326	188.13
.9531	61/64	.7490	10	2-5/8	8-10	185337	188.13
.9646	24.5mm	.7490	10	2-5/8	8-10	185348	187.98
.9688	31/32	.7490	10	2-5/8	8-10	185359	204.83
.9843	25.0mm	.8740	10-1/2	2-3/4	8-10	185370	199.44
.9844	63/64	.8740	10-1/2	2-3/4	8-10	185381	199.44
.9970		.8740	10-1/2	2-3/4	8	182587	211.49
.9975		.8740	10-1/2	2-3/4	8	182598	211.49
.9980		.8740	10-1/2	2-3/4	8	182609	211.49

DEC. EQUIV.	SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
.9985		.8740	10-1/2	2-3/4	8	182620	211.49
.9990	O/U	.8740	10-1/2	2-3/4	8-10	185392	199.44
.9995		.8740	10-1/2	2-3/4	8	182631	211.49
1.0000	1	.8740	10-1/2	2-3/4	8-10	185403	196.63
1.0001	O/U	.8740	10-1/2	2-3/4	8-10	185414	210.82
1.0005		.8740	10-1/2	2-3/4	8	182642	293.75
1.0015		.8740	10-1/2	2-3/4	8	182653	293.75
1.0020		.8740	10-1/2	2-3/4	8	182664	293.75
1.0025		.8740	10-1/2	2-3/4	8	182675	293.75
1.0030		.8740	10-1/2	2-3/4	8	182686	293.75
1.0312	1-1/32	.8740	10-1/2	2-3/4	8-10	185425	275.04
1.0625	1-1/16	.8740	10-1/2	2-3/4	8-10	185436	217.92
1.0938	1-3/32	.8740	11	2-7/8	8-10	185447	288.32
1.1250	1-1/8	.8740	11	2-7/8	8-10	185458	231.05
1.1562	1-5/32	.9990	11	2-7/8	8-12	185469	328.27
1.1875	1-3/16	.9990	11	2-7/8	8-12	185480	270.65
1.2188	1-7/32	.9990	11-1/2	3	8-12	185491	343.87
1.2500	1-1/4	.9990	11-1/2	3	8-12	185502	286.27
1.2812	1-9/32	.9990	11-1/2	3	8-12	185513	392.22
1.3125	1-5/16	.9990	11-1/2	3	8-12	185524	334.57
1.3438	1-11/32	.9990	12	3-1/4	8-12	185535	405.89
1.3750	1-3/8	.9990	12	3-1/4	8-12	185546	350.72
1.4062	1-13/32	1.2490	12	3-1/4	8-12	185557	432.18
1.4375	1-7/16	1.2490	12	3-1/4	8-12	185568	375.23
1.4688	1-15/32	1.2490	12-1/2	3-1/2	8-12	185579	461.13
1.5000	1-1/2	1.2490	12-1/2	3-1/2	8-12	185590	403.41
1.5625	1-9/16	1.2490	13	3-1/2	10-12	192124	579.60
1.6250	1-5/8	1.2490	13	3-1/2	10-12	192135	579.60
1.6875	1-11/16	1.2490	13-1/2	4	10-12	192146	665.64
1.7500	1-3/4	1.2490	13-1/2	4	10-12	192157	721.41
1.8125	1-13/16	1.4990	14	4	10-12	192168	834.47
1.8750	1-7/8	1.4990	14	4	10-12	192179	766.66
1.9375	1-15/16	1.4990	14	4	10-12	192190	899.06
2.0000	2	1.4990	14	4	10-12	192201	978.45

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE
M42 COBALT REAMERS

CHUCKING - STRAIGHT FLUTE

SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
#80	.0135	3/4	3/8	2	185920	47.82
#79	.0145	3/4	3/8	2	185931	47.82
1/64	.0156	3/4	3/8	2	185942	47.82
#78	.0160	7/8	3/8	2	185953	47.82
#77	.0180	7/8	3/8	2	185964	47.82
#76	.0200	7/8	3/8	2	185975	47.82
#75	.0210	1	1/2	3	185986	47.82
#74	.0225	1	1/2	3	185997	47.82
#73	.0240	1-1/8	1/2	3	186008	47.82
#72	.0250	1-1/8	1/2	3	186019	47.82
#71	.0260	1-1/4	1/2	3	186030	47.82
#70	.0280	1-1/4	1/2	3	186041	47.82
#69	.0292	1-3/8	1/2	3	186052	47.82
#68	.0310	1-3/8	1/2	3	186063	47.82
1/32	.0312	1-3/8	1/2	3	186074	39.35
#67	.0320	1-3/8	1/2	3	186085	39.35
#66	.0330	1-3/8	1/2	3	186096	39.35
#65	.0350	1-1/2	1/2	3	186107	39.35
#64	.0360	1-1/2	1/2	3	186118	39.35
#63	.0370	1-1/2	1/2	3	186129	39.35
#62	.0380	1-1/2	1/2	3	186140	39.35
#61	.0390	1-1/2	1/2	3	186151	39.35
1.0mm	.0394	2-1/2	1/2	4	186162	38.73
#60	.0390	2-1/2	1/2	4	186173	38.73
#59	.0390	2-1/2	1/2	4	186184	38.73
#58	.0390	2-1/2	1/2	4	186195	38.73
#57	.0390	2-1/2	1/2	4	186206	38.73
#56	.0455	2-1/2	1/2	4	186217	38.73
3/64	.0455	2-1/2	1/2	4	186228	38.73
#55	.0510	2-1/2	1/2	4	186239	38.73
#54	.0510	2-1/2	1/2	4	186250	38.73
1.5mm	.0510	2-1/2	1/2	4	186261	38.73
#53	.0585	2-1/2	1/2	4	186272	38.73
1/16	.0585	2-1/2	1/2	4	186283	38.73
#52	.0585	2-1/2	1/2	4	186294	38.73
#51	.0660	3	3/4	4	186305	31.17
#50	.0660	3	3/4	4	186316	31.17
#49	.0660	3	3/4	4	186327	31.17
#48	.0720	3	3/4	4	186338	31.17
5/64	.0720	3	3/4	4	186349	31.17
#47	.0720	3	3/4	4	186360	31.17
2.0mm	.0720	3	3/4	4	186371	31.17
#46	.0771	3	3/4	4	186382	31.17
#45	.0771	3	3/4	4	186393	31.17
#44	.0810	3	3/4	4	186404	31.17
#43	.0810	3	3/4	4	186415	31.17
#42	.0880	3	3/4	4	186426	31.17
3/32	.0880	3	3/4	4	186437	31.17

SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
#41	.0928	3-1/2	7/8	4	186448	31.41
#40	.0928	3-1/2	7/8	4	186459	31.41
2.5mm	.0928	3-1/2	7/8	4	186470	31.41
#39	.0928	3-1/2	7/8	4	186481	31.41
#38	.0950	3-1/2	7/8	4	186492	31.41
#37	.0950	3-1/2	7/8	4	186503	31.41
#36	.1030	3-1/2	7/8	4	186514	31.41
7/64	.1030	3-1/2	7/8	4	186525	32.38
#35	.1030	3-1/2	7/8	4	186536	32.38
#34	.1055	3-1/2	7/8	4	186547	32.38
#33	.1055	3-1/2	7/8	4	186558	32.38
#32	.1120	3-1/2	7/8	4	186569	32.38
3.0mm	.1120	3-1/2	7/8	4	186580	32.38
#31	.1120	3-1/2	7/8	4	186591	32.38
.124 O/U	.1190	3-1/2	7/8	4	186602	32.38
1/8	.1190	3-1/2	7/8	4	186613	29.16
.126 O/U	.1190	3-1/2	7/8	4	186624	32.38
#30	.1190	3-1/2	7/8	4	186635	32.38
#29	.1275	4	1	4	186646	38.73
3.5mm	.1350	4	1	4	186657	38.73
#28	.1350	4	1	4	186668	38.73
9/64	.1350	4	1	4	186679	38.73
#27	.1350	4	1	4	186690	38.73
#26	.1430	4	1	4	186701	38.73
#25	.1430	4	1	4	186712	38.73
#24	.1460	4	1	4	186723	38.73
#23	.1460	4	1	4	186734	38.73
5/32	.1510	4	1	4	186745	38.73
#22	.1510	4	1	6	186756	38.73
4.0mm	.1510	4	1	6	186767	38.73
#21	.1530	4-1/2	1-1/8	6	186778	41.33
#20	.1530	4-1/2	1-1/8	6	186789	41.33
#19	.1595	4-1/2	1-1/8	6	186800	41.33
#18	.1595	4-1/2	1-1/8	6	186811	41.33
11/64	.1645	4-1/2	1-1/8	6	186822	41.33
#17	.1645	4-1/2	1-1/8	6	186833	41.33
#16	.1704	4-1/2	1-1/8	6	186844	41.33
4.5mm	.1704	4-1/2	1-1/8	6	186855	41.33
#15	.1755	4-1/2	1-1/8	6	186866	41.33
#14	.1755	4-1/2	1-1/8	6	186877	41.33
#13	.1805	4-1/2	1-1/8	6	186888	41.33
.1865 O/U	.1805	4-1/2	1-1/8	6	186899	41.33
3/16	.1805	4-1/2	1-1/8	6	186910	39.93
.1885 O/U	.1805	4-1/2	1-1/8	6	186921	41.33
#12	.1805	4-1/2	1-1/8	6	186932	41.33
#11	.1860	5	1-1/4	6	186943	49.94
#10	.1860	5	1-1/4	6	186954	49.94
#9	.1895	5	1-1/4	6	186965	49.94

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE
M42 COBALT REAMERS

CHUCKING - STRAIGHT FLUTE

SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
5.0mm	.1895	5	1-1/4	6	186976	49.94
#8	.1895	5	1-1/4	6	186987	49.94
#7	.1895	5	1-1/4	6	186998	49.94
13/64	.1945	5	1-1/4	6	187009	49.94
#6	.1945	5	1-1/4	6	187020	49.94
#5	.2016	5	1-1/4	6	187031	49.94
#4	.2016	5	1-1/4	6	187042	49.94
#3	.2075	5	1-1/4	6	187053	49.94
5.5mm	.2075	5	1-1/4	6	187064	49.94
7/32	.2075	5	1-1/4	6	187075	49.94
#2	.2173	6	1-1/2	6	187086	51.38
#1	.2173	6	1-1/2	6	187097	51.38
A	.2265	6	1-1/2	6	187108	51.38
15/64	.2265	6	1-1/2	6	187119	51.38
6.0mm	.2265	6	1-1/2	6	187130	51.62
B	.2329	6	1-1/2	6	187141	51.62
C	.2329	6	1-1/2	6	187152	51.62
D	.2329	6	1-1/2	6	187163	46.91
.249 O/U	.2405	6	1-1/2	6	187174	46.42
1/4	.2405	6	1-1/2	6	187185	43.87
.251 O/U	.2405	6	1-1/2	6	187196	46.47
6.5mm	.2405	6	1-1/2	6	187207	51.62
F	.2485	6	1-1/2	6	187218	51.62
G	.2485	6	1-1/2	6	187229	51.62
17/64	.2485	6	1-1/2	6	187240	70.00
H	.2485	6	1-1/2	6	187251	70.00
I	.2485	6	1-1/2	6	187262	70.00
7.0mm	.2485	6	1-1/2	6	187273	70.00
J	.2485	6	1-1/2	6	187284	70.00
K	.2485	6	1-1/2	6	187295	70.00
9/32	.2485	6	1-1/2	6	187306	66.49
L	.2792	6	1-1/2	6	187317	70.00
M	.2792	6	1-1/2	6	187328	70.00
7.5mm	.2792	6	1-1/2	6	187339	70.00
19/64	.2792	6	1-1/2	6	187350	70.00
N	.2792	6	1-1/2	6	187361	70.00
.3115 O/U	.2792	6	1-1/2	6	187372	66.49
5/16	.2792	6	1-1/2	6	187383	62.97
.3135 O/U	.2792	6	1-1/2	6	187394	66.49
8.0mm	.2792	6	1-1/2	6	187405	70.00
O	.2792	6	1-1/2	6	187416	70.00
P	.2792	6	1-1/2	6	187427	75.43
21/64	.2792	6	1-1/2	6	187438	75.43
Q	.2792	6	1-1/2	6	187449	75.43
8.5mm	.2792	6	1-1/2	6	187460	75.43
R	.2792	6	1-1/2	6	187471	75.43
11/32	.2792	6	1-1/2	6	187482	75.43

SIZE	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	#OF FLUTES	ITEM#	LIST PRICE
S	.3105	6	1-3/4	6	187493	76.68
9.0mm	.3105	7	1-3/4	6	187504	76.68
T	.3105	7	1-3/4	6	187515	76.68
23/64	.3105	7	1-3/4	6	187526	76.68
U	.3105	7	1-3/4	6	187537	76.68
9.5mm	.3105	7	1-3/4	6	187548	72.79
3/8	.3105	7	1-3/4	6	187559	68.99
.376 O/U	.3105	7	1-3/4	6	187570	72.79
V	.3105	7	1-3/4	6	187581	93.47
W	.3105	7	1-3/4	6	187592	93.47
25/64	.3105	7	1-3/4	6	187603	93.47
10.0mm	.3105	7	1-3/4	6	187614	93.47
X	.3105	7	1-3/4	6	187625	93.47
Y	.3105	7	1-3/4	6	187636	93.47
13/32	.3105	7	1-3/4	6	187647	93.47
Z	.3730	7	1-3/4	6	187658	93.47
10.5mm	.3730	7	1-3/4	6	187669	93.47
27/64	.3730	7	1-3/4	6	187680	93.47
11.0mm	.3730	7	1-3/4	6	187691	93.47
.4365 O/U	.3730	7	1-3/4	6	187702	93.47
7/16	.3730	7	1-3/4	6	187713	93.47
.4385 O/U	.3730	7	1-3/4	6	187724	93.47
11.5mm	.3730	7	1-3/4	6	187735	107.14
29/64	.3730	7	1-3/4	6	187746	107.14
15/32	.3730	7	1-3/4	6	187757	107.14
12.0mm	.4355	8	2	6	187768	107.14
31/64	.4355	8	2	6	187779	107.14
12.5mm	.4355	8	2	6	187790	107.14
.499 O/U	.4355	8	2	6	187801	107.14
1/2	.4355	8	2	6	187812	107.14
.501 O/U	.4355	8	2	6	187823	107.14
17/32	.4355	8	2	6	187834	120.17
9/16	.4355	8	2	8	187845	120.17
19/32	.4355	8	2	8	187856	120.17
5/8	.5615	9	2-1/4	8	187867	140.24
21/32	.5615	9	2-1/4	8	187878	162.38
11/16	.5615	9	2-1/4	8	187889	161.78
23/32	.5615	9	2-1/4	8	187900	181.03
3/4	.6240	9	2-1/2	8	187911	180.98
25.32	.6240	9	2-1/2	8	187922	195.57
13/16	.6240	9	2-1/2	8	187933	194.58
27/32	.6240	9-1/2	2-1/2	8	187944	231.31
7/8	.7490	10	2-5/8	8	187955	235.86
29/32	.7490	10	2-5/8	8	187966	254.71
15/16	.7490	10	2-5/8	8-10	187977	253.77
31/32	.7490	10	2-5/8	8-10	187988	285.09
1	.8740	10-1/2	2-3/4	8-10	187999	287.02

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE HSS REAMERS

CHUCKING - STRAIGHT FLUTE - SPECIAL SIZES

QUANTITY PRICING

SIZE RANGE	1	2	3-5	6-7	8-11	12-17	18-23	24-35	36-47	48-59	60-71	72-95	96+
.0135 - .0195	235.48	153.89	114.67	75.68	68.36	58.10	52.57	48.90	47.63	43.64	42.31	41.76	40.78
.0196 - .0290	214.10	139.90	104.33	68.79	62.12	54.45	47.78	44.53	41.28	39.63	39.45	39.39	39.25
.0291 - .0390	194.62	126.96	94.79	62.48	56.45	49.55	43.48	40.46	37.49	36.04	35.02	34.53	33.71
.0391 - .0624	175.91	117.12	94.79	60.26	54.33	47.09	41.43	38.49	35.50	33.32	32.80	32.68	32.46
.0626 - .1093	185.22	118.56	91.43	56.97	49.94	41.41	37.49	34.51	31.61	29.83	29.11	28.58	27.60
.1095 - .1249	182.77	116.00	85.95	49.79	43.72	40.00	32.80	29.83	29.40	28.92	28.44	27.91	27.69
.1251 - .1405	194.62	126.96	85.72	62.48	58.85	49.55	43.48	40.46	37.49	36.04	35.12	34.53	33.37
.1407 - .1561	191.67	124.96	94.90	60.59	54.33	47.46	41.43	38.49	36.33	35.50	34.70	33.88	33.03
.1563 - .1718	194.62	121.46	94.35	62.48	56.59	49.55	43.48	40.46	37.49	36.90	36.33	36.04	35.34
.1720 - .1874	186.66	116.51	94.29	58.20	52.30	46.74	41.13	38.01	37.61	37.03	36.50	35.58	35.12
.1876 - .2030	199.86	133.15	104.49	69.94	63.98	56.87	50.87	47.97	44.70	42.31	41.41	41.13	40.79
.2032 - .2187	199.86	133.15	103.37	68.86	62.93	55.71	49.63	46.76	43.72	41.13	40.61	40.12	39.93
.2189 - .2343	200.66	134.20	104.21	69.74	63.75	56.59	50.53	47.53	44.59	42.80	42.16	41.76	41.43
.2345 - .2499	200.66	134.20	99.20	64.71	58.68	51.76	45.85	42.85	39.68	39.45	38.92	38.51	38.35
.2501 - .2968	208.41	141.69	111.62	77.14	71.23	63.62	57.64	54.67	51.51	48.83	48.35	47.93	47.46
.2970 - .3124	202.62	135.96	105.87	71.27	65.29	58.10	51.99	48.93	48.73	48.31	48.07	47.75	47.46
.3126 - .3437	212.86	145.10	114.86	74.40	72.13	66.55	60.75	57.64	54.40	52.03	51.51	51.16	50.74
.3439 - .3593	212.55	145.89	115.72	81.19	75.17	70.56	60.75	58.47	55.50	52.84	52.30	51.88	51.51
.3595 - .3749	206.45	139.58	109.51	74.78	68.86	61.58	55.63	52.39	52.11	52.03	51.68	51.42	51.24
.3751 - .3905	216.10	149.49	119.60	84.75	78.78	72.21	66.06	63.06	60.15	56.97	56.66	56.18	55.71
.3907 - .4218	218.82	152.07	121.91	87.40	81.43	73.57	67.62	64.69	61.62	58.94	58.37	58.10	57.94
.4220 - .4374	214.68	148.09	117.77	83.40	77.46	69.74	63.62	60.65	60.15	59.94	59.68	58.45	57.81
.4376 - .4843	224.63	157.85	127.76	93.27	87.29	79.11	70.21	68.79	67.28	65.19	64.71	63.98	63.41
.4845 - .4999	219.34	152.61	122.48	87.84	82.02	73.89	64.88	64.69	64.16	63.91	63.41	63.19	62.99
.5001 - .5311	318.29	197.69	157.60	117.23	107.32	97.16	90.54	87.03	83.68	82.13	81.09	80.43	79.64
.5313 - .5624	316.50	195.85	155.67	115.38	105.46	95.27	88.73	85.26	81.81	80.16	79.15	78.42	78.05
.5626 - .5937	328.96	208.29	168.04	127.76	120.11	107.76	104.24	97.87	94.29	92.76	91.68	91.00	90.07
.5939 - .6249	329.42	208.62	168.42	128.15	118.24	108.18	101.50	98.31	94.68	93.17	92.04	91.43	91.03
.6251 - .6874	341.17	220.50	180.27	140.01	129.97	124.74	113.16	109.83	106.52	104.79	103.79	103.23	102.90
.6876 - .7187	352.21	231.65	191.37	150.62	140.80	130.96	124.33	121.07	117.74	116.00	114.90	114.10	113.44
.7189 - .7499	356.66	236.00	195.99	155.58	145.72	135.59	128.80	128.63	128.49	128.37	127.90	127.65	127.21
.7501 - .8124	370.71	250.14	210.08	169.72	159.72	149.70	142.98	139.60	136.26	134.60	133.62	132.85	131.95
.8126 - .8437	384.93	264.20	224.19	183.87	173.82	163.91	157.09	153.73	150.44	148.69	147.60	147.02	146.18
.8439 - .8749	388.50	267.86	227.57	187.29	177.29	167.29	160.49	157.70	156.23	152.07	150.99	150.36	147.51
.8751 - .9374	403.10	282.43	242.22	201.95	191.98	182.07	175.19	171.84	168.59	168.07	167.78	167.53	167.22
.9376 - .9687	419.84	297.40	258.99	218.82	208.79	198.75	191.98	188.62	185.32	183.77	182.52	182.13	181.12
.9689 - .9999	423.32	302.70	262.52	222.18	212.27	202.20	195.56	192.26	188.74	187.15	186.07	185.32	184.56
1.0001 - 1.0624	454.30	339.35	327.34	315.33	303.19	291.17	279.10	267.04	255.05	253.48	247.68	245.65	243.57
1.0626 - 1.1249	479.75	365.41	352.21	338.96	325.72	312.50	299.33	286.12	272.93	259.74	258.51	257.22	255.77
1.1251 - 1.1874	512.33	399.64	385.93	372.83	359.67	346.55	333.82	320.33	309.60	294.03	280.89	267.82	254.65
1.1876 - 1.2499	540.82	426.51	412.19	398.00	383.80	369.62	355.37	341.17	326.97	312.79	298.58	284.34	270.17
1.2501 - 1.3749	615.17	495.46	480.00	464.88	449.78	432.39	419.55	404.52	389.32	374.21	370.32	366.47	363.30
1.3751 - 1.4999	680.50	564.65	547.78	530.97	514.09	497.21	480.46	463.54	446.75	429.84	425.26	419.02	411.87

For technical information, please see page 263.

THRU 1/2" DIAMETER	ABOVE 1/2" TO 5/8"	ABOVE 5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE
M42 COBALT REAMERS

CHUCKING - STRAIGHT FLUTE - SPECIAL SIZES

QUANTITY PRICING

SIZE RANGE	1	2	3-5	6-7	8-11	12-17	18-23	24-35	36-47	48-59	60-71	72-95	96+
.0135 - .0195	340.17	179.83	133.29	86.99	75.39	63.72	56.04	52.14	48.28	46.36	45.23	43.64	43.48
.0196 - .0290	309.29	163.39	121.18	79.09	68.54	57.94	50.87	47.39	43.92	43.72	43.66	43.64	43.48
.0291 - .0390	281.19	148.65	110.20	71.83	62.25	55.70	46.27	43.12	39.93	38.35	37.41	36.72	35.87
.0391 - .0624	256.00	146.39	108.00	69.57	59.97	50.39	44.05	40.85	37.64	36.05	35.85	35.55	35.23
.0626 - .1093	257.76	143.11	104.73	66.31	56.80	47.10	40.78	37.56	34.34	32.80	32.61	32.46	32.19
.1095 - .1249	251.87	137.15	98.86	60.45	50.86	41.31	34.91	33.02	31.14	30.60	30.16	29.76	29.42
.1251 - .1405	263.26	148.58	109.75	71.83	62.25	52.69	46.27	43.12	39.93	38.35	37.41	36.72	35.87
.1407 - .1561	261.08	146.39	108.00	69.57	59.97	50.39	44.05	40.85	37.64	36.05	35.58	35.45	35.19
.1563 - .1718	263.50	148.69	110.31	72.01	62.45	52.84	46.49	43.26	40.04	38.43	38.15	37.88	37.56
.1720 - .1874	261.57	146.96	108.50	70.21	62.24	51.03	44.60	41.43	38.22	38.15	37.92	37.64	37.63
.1876 - .2030	272.29	157.60	119.12	80.82	71.26	61.58	55.29	52.06	48.84	47.23	46.27	45.67	45.42
.2032 - .2343	271.13	156.50	118.14	79.73	70.21	60.65	54.18	52.52	50.82	50.28	49.97	49.55	48.78
.2345 - .2499	266.48	152.07	113.71	75.39	65.75	56.16	49.79	49.50	49.17	48.78	48.32	47.46	46.85
.2501 - .2968	290.24	175.59	137.07	98.86	89.21	79.66	73.11	69.99	66.84	65.24	64.76	63.82	63.62
.2970 - .3124	282.93	168.16	129.79	91.43	81.77	72.23	65.91	65.50	65.09	64.79	64.24	64.15	63.70
.3126 - .3437	293.84	179.05	140.66	102.34	92.76	83.12	76.78	73.56	70.30	70.03	69.64	68.98	68.60
.3439 - .3593	294.35	179.70	141.30	102.95	93.39	83.84	77.36	74.25	71.11	70.60	70.19	70.03	69.57
.3595 - .3749	287.64	172.91	134.55	96.11	86.54	76.94	70.56	70.38	70.19	69.94	35.12	69.79	69.51
.3751 - .3905	314.17	199.52	161.17	122.80	113.16	103.62	96.94	93.88	90.83	89.21	88.23	87.64	86.82
.3907 - .4218	318.19	203.61	165.14	126.79	117.26	107.62	101.23	98.05	94.88	93.39	92.20	91.63	90.83
.4220 - .4374	311.95	197.26	158.90	120.52	110.99	101.36	94.92	91.77	88.55	87.03	86.02	85.41	84.62
.4376 - .4843	327.10	212.47	174.07	135.73	126.15	116.53	110.27	107.06	103.84	102.20	101.23	100.62	99.78
.4845 - .4999	318.85	204.11	165.78	127.40	117.74	108.22	101.87	100.14	98.39	98.12	97.77	97.57	97.41
.5001 - .5311	336.44	220.10	182.13	140.65	136.74	133.09	129.47	125.84	122.20	118.57	114.90	111.28	107.70
.5313 - .5624	338.96	223.81	187.14	145.14	140.88	136.74	132.66	128.57	124.48	120.40	116.31	112.22	108.12
.5626 - .5937	345.38	229.58	191.83	149.60	144.94	140.37	135.82	142.81	126.76	122.20	117.66	113.10	108.52
.5939 - .6249	356.30	241.09	204.45	162.10	157.74	153.73	149.70	145.67	141.65	137.53	133.52	129.47	125.44
.6251 - .6874	367.64	251.97	217.22	174.65	170.70	167.00	163.31	159.59	155.85	152.19	149.91	144.69	141.06
.6876 - .7187	378.81	262.99	225.93	183.15	179.96	176.98	173.82	170.92	168.04	165.10	162.10	161.17	160.88
.7189 - .7499	392.18	277.62	243.10	199.96	195.30	190.67	186.12	181.57	176.98	172.39	167.78	163.22	158.59
.7501 - .8124	412.88	297.39	261.34	219.66	205.92	201.52	197.08	192.68	188.30	183.87	179.42	175.02	170.63
.8126 - .8437	433.66	319.42	281.61	242.73	231.22	227.25	223.47	219.66	215.81	211.93	208.08	204.29	200.47
.8439 - .8749	456.21	340.61	303.49	262.57	247.27	242.05	236.96	231.87	226.74	221.64	216.48	211.44	206.31
.8751 - .9374	474.41	358.37	321.66	278.80	263.26	258.03	252.90	247.72	242.56	237.42	232.20	229.94	227.56
.9376 - .9687	498.72	380.26	344.00	302.24	295.94	290.33	284.34	278.48	272.49	266.52	260.63	257.64	254.87
.9689 - .9999	516.08	400.60	365.07	324.24	316.14	308.16	300.23	292.37	284.50	276.66	268.77	260.84	252.95
1.0001 - 1.0624	555.31	439.69	402.17	360.44	351.58	690.17	333.77	324.94	316.09	307.20	298.32	289.38	280.59
1.0626 - 1.1249	594.91	479.74	442.96	402.19	390.51	379.24	367.89	356.59	345.23	334.00	322.67	311.36	300.08
1.1251 - 1.1874	633.27	516.08	482.62	437.83	427.67	417.71	407.82	397.85	387.93	377.94	367.95	358.06	348.05
1.1876 - 1.2499	673.40	559.98	523.83	480.17	467.26	455.16	442.97	430.92	418.87	406.75	394.66	382.51	370.50
1.2501 - 1.3749	713.85	596.21	557.37	517.75	509.90	426.98	494.19	486.36	478.50	470.65	462.81	462.30	461.24
1.3751 - 1.4999	753.46	637.60	601.46	559.55	554.02	548.85	543.62	540.31	537.00	535.86	534.93	533.65	532.58

For technical information, please see page 263.

THRU 1/2" DIAMETER	ABOVE 1/2" TO 5/8"	ABOVE 5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE
HSS & M42 COBALT REAMERS

CHUCKING - RIGHT HAND SPIRAL - RIGHT HAND CUT

SIZE	DEC. EQUIV.	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	HSS	LIST PRICE	M42 COBALT	LIST PRICE
1.0mm	.0394	1/2	4	2-1/2	.0394	188252	41.61	190188	45.51
#60	.0400	1/2	4	2-1/2	.0390	188263	41.61	190199	45.51
#59	.0410	1/2	4	2-1/2	.0390	188274	41.61	190210	45.51
#58	.0420	1/2	4	2-1/2	.0390	188285	41.61	190221	45.51
#57	.0430	1/2	4	2-1/2	.0390	188296	41.61	190232	45.51
#56	.0465	1/2	4	2-1/2	.0455	188307	41.61	190243	45.51
3/64	.0469	1/2	4	2-1/2	.0455	188318	41.61	190254	45.51
#55	.0520	1/2	4	2-1/2	.0510	188329	41.61	190265	45.51
#54	.0550	1/2	4	2-1/2	.0510	188340	41.61	190276	45.51
1.5mm	.0591	1/2	4	2-1/2	.0510	188351	41.61	190287	45.51
#53	.0595	1/2	4	2-1/2	.0585	188362	41.61	190298	45.51
1/16	.0625	1/2	4	2-1/2	.0585	188373	41.61	190309	45.51
#52	.0635	1/2	4	2-1/2	.0585	188384	41.61	190320	45.51
#51	.0670	3/4	4	3	.0660	188395	33.48	190331	36.66
#50	.0700	3/4	4	3	.0660	188406	33.48	190342	36.66
#49	.0730	3/4	4	3	.0660	188417	33.48	190353	36.66
#48	.0760	3/4	4	3	.0720	188428	33.48	190364	36.66
5/64	.0781	3/4	4	3	.0720	188439	33.48	190375	36.66
#47	.0785	3/4	4	3	.0720	188450	33.48	190386	36.66
2.0mm	.0787	3/4	4	3	.0720	188461	33.48	190397	36.66
#46	.0810	3/4	4	3	.0771	188472	33.48	190408	36.66
#45	.0820	3/4	4	3	.0771	188483	33.48	190419	36.66
#44	.0860	3/4	4	3	.0810	188494	33.48	190430	36.66
#43	.0890	3/4	4	3	.0810	188505	33.48	190441	36.66
#42	.0935	3/4	4	3	.0880	188516	33.48	190452	36.66
3/32	.0938	3/4	4	3	.0880	188527	33.19	190463	36.66
#41	.0960	7/8	4	3-1/2	.0928	188538	33.72	190474	37.00
#40	.0980	7/8	4	3-1/2	.0928	188549	33.72	190485	37.00
2.5mm	.0984	7/8	4	3-1/2	.0928	188560	33.72	190496	37.00
#39	.0995	7/8	4	3-1/2	.0928	188571	33.72	190507	37.00
#38	.1015	7/8	4	3-1/2	.0950	188582	33.72	190518	37.00
#37	.1040	7/8	4	3-1/2	.0950	188593	33.72	190529	37.00
#36	.1065	7/8	4	3-1/2	.1030	188604	33.72	190540	37.00
7/64	.1094	7/8	4	3-1/2	.1030	188615	34.73	190551	38.15
#35	.1100	7/8	4	3-1/2	.1030	188626	34.73	190562	38.15
#34	.1110	7/8	4	3-1/2	.1055	188637	34.73	190573	38.15
#33	.1130	7/8	4	3-1/2	.1055	188648	34.73	190584	38.15
#32	.1160	7/8	4	3-1/2	.1120	188659	34.73	190595	38.15
3.0mm	.1181	7/8	4	3-1/2	.1120	188670	34.73	190606	38.15
#31	.1200	7/8	4	3-1/2	.1120	188681	34.73	190617	38.15
o/u	.1240	7/8	4	3-1/2	.1190	188692	34.73	190628	38.15
1/8	.1250	7/8	4	3-1/2	.1190	188703	31.32	190639	34.30
o/u	.1260	7/8	4	3-1/2	.1190	188714	34.73	190650	38.15
#30	.1285	7/8	4	3-1/2	.1190	188725	34.73	190661	38.15
#29	.1360	1	4	4	.1275	188736	41.61	190672	45.56
3.5mm	.1378	1	4	4	.1350	188747	41.61	190683	45.56

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE
HSS & M42 COBALT REAMERS

CHUCKING - RIGHT HAND SPIRAL - RIGHT HAND CUT

SIZE	DEC. EQUIV.	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	HSS	LIST PRICE	M42 COBALT	LIST PRICE
#28	.1405	1	4	4	.1350	188758	41.61	190694	45.56
9/64	.1406	1	4	4	.1350	188769	41.61	190705	45.56
#27	.1440	1	4	4	.1350	188780	41.61	190716	45.56
#26	.1470	1	4	4	.1430	188791	41.61	190727	45.56
#25	.1495	1	4	4	.1430	188802	41.61	190738	45.56
#24	.1520	1	4	4	.1460	188813	43.30	190749	45.56
#23	.1540	1	4	4	.1460	188824	43.30	190760	45.56
5/32	.1562	1	4	4	.1510	188835	43.30	190771	45.56
#22	.1570	1	6	4	.1510	188846	43.30	190782	45.56
4.0mm	.1575	1	6	4	.1510	188857	43.30	190793	45.56
#21	.1590	1-1/8	6	4-1/2	.1530	188868	44.40	190804	48.64
#20	.1610	1-1/8	6	4-1/2	.1530	188879	44.40	190815	48.64
#19	.1660	1-1/8	6	4-1/2	.1595	188890	44.40	190826	48.64
#18	.1695	1-1/8	6	4-1/2	.1595	188901	44.40	190837	48.64
11/64	.1719	1-1/8	6	4-1/2	.1645	188912	44.40	190848	48.64
#17	.1730	1-1/8	6	4-1/2	.1645	188923	44.40	190859	48.64
#16	.1770	1-1/8	6	4-1/2	.1704	188934	44.40	190870	48.64
4.5mm	.1772	1-1/8	6	4-1/2	.1704	188945	44.40	190881	48.64
#15	.1800	1-1/8	6	4-1/2	.1755	188956	44.40	190892	48.64
#14	.1820	1-1/8	6	4-1/2	.1755	188967	44.40	190903	48.64
#13	.1850	1-1/8	6	4-1/2	.1805	188978	44.40	190914	48.64
o/u	.1865	1-1/8	6	4-1/2	.1805	188989	44.40	190925	48.64
3/16	.1875	1-1/8	6	4-1/2	.1805	189000	42.19	190936	46.18
o/u	.1885	1-1/8	6	4-1/2	.1805	189011	44.40	190947	48.64
#12	.1890	1-1/8	6	4-1/2	.1805	189022	44.40	190958	48.64
#11	.1910	1-1/4	6	5	.1860	189033	49.74	190969	54.51
#10	.1935	1-1/4	6	5	.1860	189044	49.74	190980	54.51
#9	.1960	1-1/4	6	5	.1895	189055	49.74	190991	54.51
5.0mm	.1969	1-1/4	6	5	.1895	189066	49.74	191002	54.51
#8	.1990	1-1/4	6	5	.1895	189077	49.74	191013	54.51
#7	.2010	1-1/4	6	5	.1895	189088	49.74	191024	54.51
13/64	.2031	1-1/4	6	5	.1945	189099	49.74	191035	54.51
#6	.2040	1-1/4	6	5	.1945	189110	49.74	191046	54.51
#5	.2055	1-1/4	6	5	.2016	189121	49.74	191057	54.51
#4	.2090	1-1/4	6	5	.2016	189132	49.74	191068	54.51
#3	.2130	1-1/4	6	5	.2075	189143	49.74	191079	54.51
5.5mm	.2165	1-1/4	6	5	.2075	189154	49.74	191090	54.51
7/32	.2188	1-1/4	6	5	.2075	189165	49.74	191101	54.51
#2	.2210	1-1/2	6	6	.2173	189176	51.14	191112	56.05
#1	.2280	1-1/2	6	6	.2173	189187	51.14	191123	56.05
A	.2340	1-1/2	6	6	.2265	189198	51.14	191134	56.05
15/64	.2344	1-1/2	6	6	.2265	189209	51.14	191145	56.05
6.0mm	.2362	1-1/2	6	6	.2265	189220	51.48	191156	58.98
B	.2380	1-1/2	6	6	.2329	189231	51.48	191167	58.98
C	.2420	1-1/2	6	6	.2329	189242	51.48	191178	58.98
D	.2460	1-1/2	6	6	.2329	189253	51.48	191189	53.64

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE
HSS & M42 COBALT REAMERS

CHUCKING - RIGHT HAND SPIRAL - RIGHT HAND CUT

SIZE	DEC. EQUIV.	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	HSS	LIST PRICE	M42 COBALT	LIST PRICE
o/u	.2490	1-1/2	6	6	.2405	189264	54.94	191200	63.17
1/4	.2500	1-1/2	6	6	.2405	189275	45.88	191211	50.13
o/u	.2510	1-1/2	6	6	.2405	189286	54.94	191222	63.17
6.5mm	.2559	1-1/2	6	6	.2405	189297	51.48	191233	58.98
F	.2570	1-1/2	6	6	.2485	189308	51.48	191244	58.98
G	.2610	1-1/2	6	6	.2485	189319	51.48	191255	58.98
17/64	.2656	1-1/2	6	6	.2485	189330	57.44	191266	72.84
H	.2660	1-1/2	6	6	.2485	189341	57.44	191277	72.84
I	.2720	1-1/2	6	6	.2485	189352	57.44	191288	72.84
7.0mm	.2756	1-1/2	6	6	.2485	189363	57.44	191299	72.84
J	.2770	1-1/2	6	6	.2485	189374	57.44	191310	72.84
K	.2810	1-1/2	6	6	.2485	189385	57.44	191321	72.84
9/32	.2812	1-1/2	6	6	.2485	189396	54.51	191332	69.23
L	.2900	1-1/2	6	6	.2792	189407	57.44	191343	72.84
M	.2950	1-1/2	6	6	.2792	189418	57.44	191354	72.84
7.5mm	.2953	1-1/2	6	6	.2792	189429	57.44	191365	72.84
19/64	.2969	1-1/2	6	6	.2792	189440	57.44	191376	72.84
N	.3020	1-1/2	6	6	.2792	189451	57.44	191387	72.84
o/u	.3115	1-1/2	6	6	.2792	189462	54.51	191398	69.23
5/16	.3125	1-1/2	6	6	.2792	189473	51.67	191409	65.57
o/u	.3135	1-1/2	6	6	.2792	189484	54.51	191420	69.23
8.0mm	.3150	1-1/2	6	6	.2792	189495	57.44	191431	72.84
O	.3160	1-1/2	6	6	.2792	189506	57.44	191442	72.84
P	.3230	1-1/2	6	6	.2792	189517	61.43	191453	78.46
21/64	.3281	1-1/2	6	6	.2792	189528	61.43	191464	78.46
Q	.3320	1-1/2	6	6	.2792	189539	61.43	191475	78.46
8.5mm	.3346	1-1/2	6	6	.2792	189550	61.43	191486	78.46
R	.3390	1-1/2	6	6	.2792	189561	61.43	191497	78.46
11/32	.3438	1-1/2	6	6	.2792	189572	61.43	191508	78.46
S	.3480	1-3/4	6	6	.3105	189583	61.96	191519	79.52
9.0mm	.3543	1-3/4	6	7	.3105	189594	61.96	191530	79.52
T	.3580	1-3/4	6	7	.3105	189605	61.96	191541	79.52
23/64	.3594	1-3/4	6	7	.3105	189616	61.96	191552	79.52
U	.3680	1-3/4	6	7	.3105	189627	61.96	191563	79.52
9.5mm	.3740	1-3/4	6	7	.3105	189638	58.88	191574	75.48
3/8	.3750	1-3/4	6	7	.3105	189649	55.81	191585	71.59
o/u	.3760	1-3/4	6	7	.3105	189660	58.88	191596	75.48
V	.3770	1-3/4	6	7	.3105	189671	67.45	191607	100.16
W	.3860	1-3/4	6	7	.3105	189682	67.45	191618	100.16
25/64	.3906	1-3/4	6	7	.3105	189693	67.45	191629	100.16
10.0mm	.3937	1-3/4	6	7	.3105	189704	67.45	191640	100.16
X	.3970	1-3/4	6	7	.3105	189715	67.45	191651	100.16
Y	.4040	1-3/4	6	7	.3105	189726	69.95	191662	100.16
13/32	.4062	1-3/4	6	7	.3105	189737	69.95	191673	100.16
Z	.4130	1-3/4	6	7	.3730	189748	69.95	191684	100.16
10.5mm	.4134	1-3/4	6	7	.3730	189759	69.95	191695	100.16

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE
HSS & M42 COBALT REAMERS

CHUCKING - RIGHT HAND SPIRAL - RIGHT HAND CUT

SIZE	DEC. EQUIV.	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	HSS	LIST PRICE	M42 COBALT	LIST PRICE
27/64	.4219	1-3/4	6	7	.3730	189770	69.95	191706	100.16
11.0mm	.4331	1-3/4	6	7	.3730	189781	69.95	191717	100.16
o/u	.4365	1-3/4	6	7	.3730	189792	69.95	191728	100.16
7/16	.4375	1-3/4	6	7	.3730	189803	66.44	191739	95.11
o/u	.4385	1-3/4	6	7	.3730	189814	69.95	191750	100.16
11.5mm	.4528	1-3/4	6	7	.3730	189825	76.25	191761	114.79
29/64	.4531	1-3/4	6	7	.3730	189836	76.25	191772	114.79
15/32	.4688	1-3/4	6	7	.3730	189847	76.25	191783	114.79
12.0mm	.4724	2	6	8	.4355	189858	76.25	191794	114.79
31/64	.4844	2	6	8	.4355	189869	76.25	191805	114.79
12.5mm	.4921	2	6	8	.4355	189880	76.25	191816	114.79
o/u	.4990	2	6	8	.4355	189891	76.25	191827	114.79
1/2	.5000	2	6	8	.4355	189902	72.31	191838	109.01
o/u	.5010	2	6	8	.4355	189913	76.25	–	–
17/32	.5312	2	6	8	.4355	189924	89.91	–	–
9/16	.5625	2	8	8	.4355	189935	89.91	–	–
19/32	.5938	2	8	8	.4355	189946	89.91	–	–
5/8	.6250	2-1/4	8	9	.5615	189957	104.92	–	–
21/32	.6562	2-1/4	8	9	.5615	189968	113.62	–	–
11/16	.6875	2-1/4	8	9	.5615	189979	122.13	–	–
23/32	.7188	2-1/4	8	9	.5615	189990	143.07	–	–
3/4	.7500	2-1/2	8	9-1/2	.6240	190001	136.04	–	–
25/32	.7812	2-1/2	8	9-1/2	.6240	190012	147.43	–	–
13/16	.8125	2-1/2	8	9-1/2	.6240	190023	147.23	–	–
27/32	.8438	2-1/2	8	9-1/2	.6240	190034	182.98	–	–
7/8	.8750	2-5/8	8	10	.7490	190045	173.82	–	–
29/32	.9062	2-5/8	8	10	.7490	190056	201.60	–	–
15/16	.9375	2-5/8	8	10	.7490	190067	191.77	–	–
31/32	.9688	2-5/8	8	10	.7490	190078	215.10	–	–
1	1.0000	2-3/4	8	10-1/2	.8740	190089	216.76	–	–
1-1/16	1.0625	2-3/4	8	10-1/2	.8740	190100	240.15	–	–
1-1/8	1.1250	2-7/8	8	11	.8740	190111	254.77	–	–
1-3/16	1.1875	2-7/8	8	11	.9990	190122	298.33	–	–
1-1/4	1.2500	3	8	11-1/2	.9990	190133	315.66	–	–
1-5/16	1.3125	3	10	11-1/2	.9990	190144	368.84	–	–
1-3/8	1.3750	3-1/4	10	12	.9990	190155	386.88	–	–
1-7/16	1.4375	3-1/4	10	12	1.2490	190166	413.89	–	–
1-1/2	1.5000	3-1/2	10	12-1/2	1.2490	190177	444.92	–	–
1-9/16	1.5625	3-1/2	12	13	1.2490	192036	634.49	–	–
1-5/8	1.6250	3-1/2	12	13	1.2490	192047	637.72	–	–
1-11/16	1.6875	4	12	13-1/2	1.2490	192058	726.28	–	–
1-3/4	1.7500	4	12	13-1/2	1.2490	192069	732.26	–	–
1-13/16	1.8125	4	12	14	1.4990	192080	843.36	–	–
1-7/8	1.8750	4	12	14	1.4990	192091	843.36	–	–
1-15/16	1.9375	4	12	14	1.4990	192102	987.32	–	–
2	2.0000	4	12	14	1.4990	192113	987.32	–	–

For technical information, please see page 263.

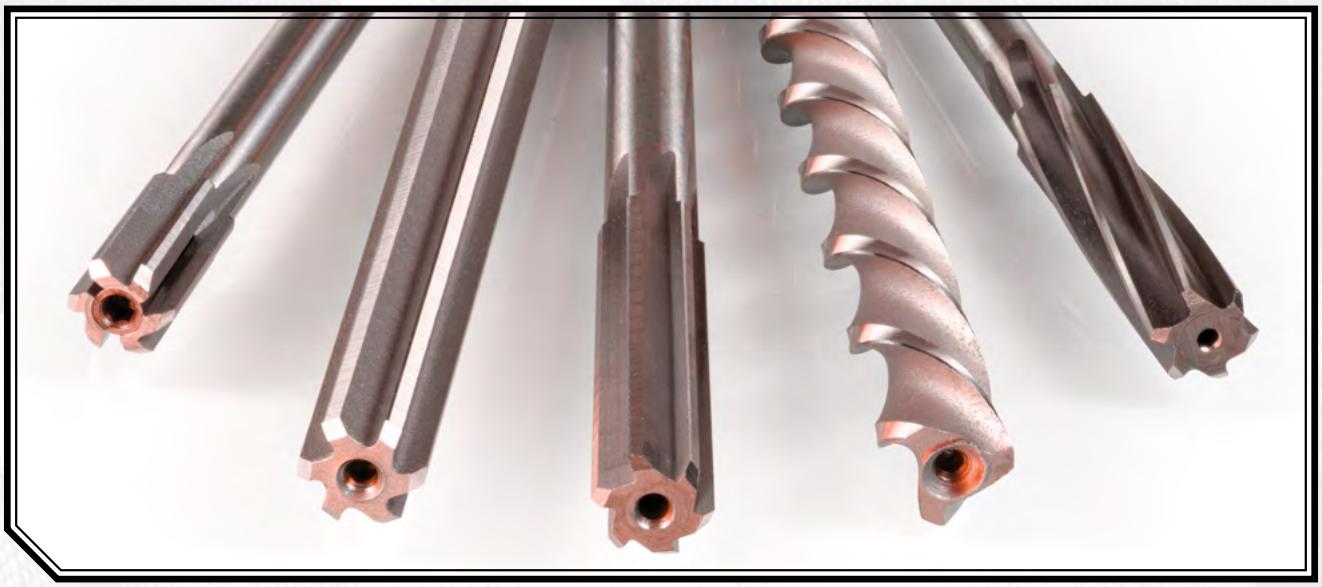
THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE
HSS & M42 COBALT REAMERS

DOWEL PIN - STRAIGHT FLUTE

DOWEL PIN - RIGHT HAND SPIRAL - RIGHT HAND CUT

					STRAIGHT FLUTE				RIGHT HAND SPIRAL			
SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	HSS	LIST PRICE	M42	LIST PRICE	HSS	LIST PRICE	M42	LIST PRICE
.1230	7/8	4	3-1/2	.1190	185601	30.31	188098	32.69	192212	34.73	192366	36.23
.1247	7/8	4	3-1/2	.1190	185612	30.31	188109	31.37	192223	34.73	192377	36.23
.1855	1-1/8	6	4-1/2	.1805	185623	38.68	188120	39.40	192234	44.40	192388	48.31
.1870	1-1/8	6	4-1/2	.1805	185634	38.68	188131	39.40	192245	44.40	192399	48.25
.2480	1-1/2	6	6	.2405	185645	42.19	188142	44.21	192256	46.38	192410	50.56
.2495	1-1/2	6	6	.2405	185656	42.19	188153	44.21	192267	46.38	192421	50.56
.3105	1-1/2	6	6	.2792	185667	49.55	188164	63.31	192278	54.55	192432	66.97
.3120	1-1/2	6	6	.2792	185678	49.55	188175	63.31	192289	54.55	192443	65.67
.3730	1-3/4	6	7	.3105	185689	53.50	188186	69.37	192300	58.88	192454	71.92
.3745	1-3/4	6	7	.3105	185700	53.50	188197	69.37	192311	58.88	192465	71.92
.4355	1-3/4	6	7	.3730	185711	60.38	188208	89.00	192322	69.95	192476	98.79
.4370	1-3/4	6	7	.3730	185722	60.38	188219	89.00	192333	69.95	192487	98.79
.4980	2	6	8	.4355	185733	65.76	188230	102.09	192344	76.20	192498	109.35
.4995	2	6	8	.4355	185744	65.76	188241	102.09	192355	76.20	192509	112.90



Huge assortment of HSS and M42 Cobalt Reamers for precision machining

For technical information, please see page 263.

THRU 1/2" DIAMETER	1/2" TO 5/8"	5/8" TO 1-1/2"	1-1/2 " TO 2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004	+.0002, +.0006

GENERAL PURPOSE HSS REAMERS

EXPANSION - STRAIGHT FLUTE

END VIEW

HIGH SPEED STEEL

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	ITEM#	LIST PRICE
3/8	3/4	6	7	5/16	194456	183.82
13/32	3/4	6	7	5/16	194467	205.23
7/16	7/8	6	7	3/8	194478	195.80
15/32	7/8	6	8	27/64	194489	212.91
1/2	1	6	8	7/16	194500	206.96
17/32	1	6	8	7/16	194511	230.39
9/16	1-1/8	6	8	7/16	194522	224.62
19/32	1-1/8	6	8	7/16	194533	227.99
5/8	1-1/4	6	9	9/16	194544	234.67
21/32	1-1/4	6	9	9/16	194555	250.60
11/16	1-1/4	6	9	9/16	194566	264.74
23/32	1-1/4	6	9	9/16	194577	282.06
3/4	1-3/8	6	9-1/2	5/8	194588	277.80
25/32	1-3/8	8	9-1/2	5/8	194599	293.97
13/16	1-3/8	8	9-1/2	5/8	194610	320.36
27/32	1-3/8	8	9-1/2	5/8	194621	321.52
7/8	1-1/2	8	10	3/4	194632	327.33

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	ITEM#	LIST PRICE
29/32	1-1/2	8	10	3/4	194643	361.86
15/16	1-1/2	8	10	3/4	194654	378.68
31/32	1-1/2	8	10	3/4	194665	395.79
1	1-5/8	8	10-1/2	7/8	194676	397.63
1-1/32	1-5/8	8	10-1/2	7/8	194687	580.69
1-1/16	1-5/8	8	10-1/2	7/8	194698	461.28
1-3/32	1-5/8	8	10-1/2	7/8	194709	460.29
1-1/8	1-3/4	8	11	7/8	194720	480.80
1-5/32	1-3/4	8	11	7/8	194731	511.51
1-3/16	1-3/4	8	11	1	194742	506.04
1-7/32	1-3/4	8	11	1	194753	550.69
1-1/4	1-7/8	8	11-1/2	1	194764	544.94
1-5/16	1-7/8	8	11-1/2	1	194775	562.91
1-3/8	2	8	12	1	194786	583.53
1-7/16	2	8	12	1-1/4	194797	636.11
1-1/2	2-1/8	8	12-1/2	1-1/4	194808	631.47

EXPANSION - TAPER SHANK - STRAIGHT FLUTE

END VIEW

HIGH SPEED STEEL

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	MORSE TAPER #	ITEM#	LIST PRICE
3/8	3/4	6	7	1	194819	218.62
13/32	3/4	6	7	1	194830	241.84
7/16	7/8	6	7	1	194841	231.38
15/32	7/8	6	8	1	194852	236.94
1/2	1	6	8	1	194863	230.58
17/32	1	6	8	1	194874	239.72
9/16	1-1/8	6	8	1	194885	243.44
19/32	1-1/8	6	8	1	194896	264.95
5/8	1-1/4	6	9	2	194907	261.11
21/32	1-1/4	6	9	2	194918	289.17
11/16	1-1/4	6	9	2	194929	290.82
23/32	1-1/4	6	9	2	194940	310.19
3/4	1-3/8	6	9-1/2	2	194951	304.51
25/32	1-3/8	8	9-1/2	2	194962	318.49
13/16	1-3/8	8	9-1/2	2	194973	323.12
27/32	1-3/8	8	9-1/2	2	194984	358.87
7/8	1-1/2	8	10	2	194995	355.28

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	MORSE TAPER #	ITEM#	LIST PRICE
29/32	1-1/2	8	10	2	195006	392.39
15/16	1-1/2	8	10	3	195017	402.04
31/32	1-1/2	8	10	3	195028	418.98
1	1-5/8	8	10-1/2	3	195039	422.07
1-1/32	1-5/8	8	10-1/2	3	195050	438.18
1-1/16	1-5/8	8	10-1/2	3	195061	459.08
1-3/32	1-5/8	8	10-1/2	3	195072	503.43
1-1/8	1-3/4	8	11	3	195083	496.07
1-5/32	1-3/4	8	11	3	195094	542.13
1-3/16	1-3/4	8	11	3	195105	563.60
1-7/32	1-3/4	8	11	3	195116	585.39
1-1/4	1-7/8	8	11-1/2	4	195127	582.93
1-5/16	1-7/8	8	11-1/2	4	195138	635.69
1-3/8	2	8	12	4	195149	630.48
1-7/16	2	8	12	4	195160	667.05
1-1/2	2-1/8	8	12-1/2	4	195171	689.71

For technical information, please see page 263.

THRU 1/2" DIAMETER	ABOVE 1/2" TO 5/8"	ABOVE 5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE HSS REAMERS

HAND - STRAIGHT FLUTE

HIGH SPEED STEEL

SIZE	DECIMAL EQUIV.	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	ITEM#	LIST PRICE
1/16	.0625	1	4	2	.0625	196997	85.78
5/64	.0781	1	4	2	.0781	197008	85.78
3/32	.0938	1-1/4	4	2-1/2	.0938	197019	85.78
7/64	.1094	1-1/4	4	2-1/2	.1094	197030	85.78
1/8	.1250	1-1/2	4	3	.1250	197041	80.87
9/64	.1406	1-5/8	4	3-1/4	.1406	197052	80.87
5/32	.1562	1-5/8	4	3-1/4	.1562	197063	87.41
11/64	.1719	1-3/4	6	3-1/2	.1719	197074	87.41
3/16	.1875	1-3/4	6	3-1/2	.1875	197085	85.78
13/64	.2031	1-7/8	6	3-3/4	.2031	197096	85.78
7/32	.2188	1-7/8	6	3-3/4	.2188	197107	94.53
15/64	.2344	2	6	4	.2344	197118	94.53
1/4	.2500	2	6	4	.2500	197129	93.96
17/64	.2656	2-1/8	6	4-1/4	.2656	197140	94.53
9/32	.2812	2-1/8	6	4-1/4	.2812	197151	101.70
19/64	.2969	2-1/4	6	4-1/2	.2969	197162	101.70
5/16	.3125	2-1/4	6	4-1/2	.3125	197173	99.44
11/32	.3438	2-3/8	6	4-3/4	.3438	197184	115.41
3/8	.3750	2-1/2	6	5	.3750	197195	112.67
13/32	.4062	2-5/8	6	5-1/4	.4062	197206	130.76
7/16	.4375	2-3/4	6	5-1/2	.4375	197217	128.11
15/32	.4688	2-7/8	6	5-3/4	.4688	197228	141.73
1/2	.5000	3	6	6	.5000	197239	136.24
17/32	.5312	3-1/8	8	6-1/4	.5312	197250	147.21
9/16	.5625	3-1/4	8	6-1/2	.5625	197261	157.46
19/32	.5938	3-3/8	8	6-3/4	.5938	197272	175.02
5/8	.6250	3-1/2	8	7	.6250	197283	169.68
21/32	.6562	3-11/16	8	7-3/8	.6562	197294	193.73
11/16	.6875	3-7/8	8	7-3/4	.6875	197305	189.03
23/32	.7188	4-1/16	8	8-1/8	.7188	197316	206.88
3/4	.7500	4-3/16	8	8-3/8	.7500	197327	198.78
25/32	.7812	4-3/8	8	8-3/4	.7812	197338	218.12
13/16	.8125	4-9/16	8	9-1/8	.8125	197349	198.78
27/32	.8438	4-11/16	8	9-3/8	.8438	197360	238.81
7/8	.8750	4-7/8	8	9-3/4	.8750	197371	240.88
29/32	.9062	5	8	10	.9062	197382	266.18
15/16	.9375	5-1/8	8	10-1/4	.9375	197393	241.07
31/32	.9688	5-5/16	8	10-5/8	.9688	197404	293.08
1	1.0000	5-7/16	8	10-7/8	1.0000	197415	291.78
1-1/8	1.1250	5-13/16	8	11-5/8	1.1250	197426	381.31
1-1/4	1.2500	6-1/8	8	12-1/4	1.2500	197437	468.24
1-3/8	1.3750	6-5/16	10	12-5/8	1.3750	197448	553.44
1-1/2	1.5000	6-1/2	10	13	1.5000	197459	653.22

For technical information, please see page 263.

THRU 1/2" DIAMETER	ABOVE 1/2" TO 5/8"	ABOVE 5/8" TO 1-1/2"
+.0002, -.0000	+.0003, -.0000	+.0001, +.0004

GENERAL PURPOSE HSS REAMERS

TAPER PIPE - LEFT HAND SPIRAL - RIGHT HAND CUT

HIGH SPEED STEEL

SIZE	DIAMETER SMALL END	DIAMETER LARGE END	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIAMETER	SIZE OF SQUARE	ITEM#	LIST PRICE
1/16	.2320	0.2750	3/4	6	2-1/8	.3125	.235	197470	112.19
1/8	.3160	0.3620	3/4	6	2-1/8	.4375	.328	197481	104.59
1/4	.4060	0.4720	1-1/16	6	2-7/16	.5625	.421	197492	119.74
3/8	.5400	0.6060	1-1/16	6	2-9/16	.7000	.531	197503	135.57
1/2	.6650	0.7510	1-3/8	6	3-1/8	.6875	.515	197514	171.27
3/4	.8760	0.9620	1-3/8	8	3-1/4	.9063	.679	197525	237.46
1	1.1030	1.2120	1-3/4	8	3-3/4	1.1250	.843	197536	349.41
1-1/4	1.4440	1.5530	1-3/4	10	4	1.3125	.984	197547	588.51
1-1/2	1.6840	1.7930	1-3/4	12	4-1/4	1.5000	1.125	197558	744.14
2	2.1590	2.2680	1-3/4	12	4-1/2	1.8750	1.406	197569	993.97

TAPER PIN

HIGH SPEED STEEL

STRAIGHT FLUTE

LEFT HAND SPIRAL
RIGHT HAND CUT

LEFT HAND HELICAL
RIGHT HAND CUT

SIZE	DIAMETER SMALL END	DIAMETER LARGE END	# OF FLUTES	STRAIGHT	LIST PRICE	LH-SPIRAL	LIST PRICE	LH-HELICAL	LIST PRICE
7/0	.0497	0.0666	4	196117	89.72	196579	93.09	196348	83.23
6/0	.0611	0.0806	4	196128	89.72	196590	93.09	196359	78.37
5/0	.0719	0.0966	4	196139	81.78	196601	89.72	196370	81.30
4/0	.0869	0.1142	4	196150	81.78	196612	89.72	196381	81.30
3/0	.1029	0.1302	4	196161	81.78	196623	89.72	196392	73.41
2/0	.1137	0.1462	4	196172	73.12	196634	78.37	196403	74.28
0	.1287	0.1638	4	196183	70.33	196645	74.90	196414	76.06
1	.1447	0.1798	6	196194	68.12	196656	76.06	196425	77.21
2	.1605	0.2008	6	196205	68.12	196667	76.06	196436	87.41
3	.1813	0.2294	6	196216	68.12	196678	76.06	196447	90.35
4	.2071	0.2604	6	196227	76.06	196689	82.94	196458	101.70
5	.2409	0.2994	6	196238	81.78	196700	88.47	196469	111.27
6	.2773	0.3540	6	196249	98.72	196711	109.01	196480	130.61
7	.3297	0.4220	6	196260	127.15	196722	137.83	196491	161.21
8	.3971	0.5050	6	196271	164.78	196733	180.30	196502	189.16
9	.4805	0.6066	6	196282	197.58	196744	215.09	196513	207.83
10	.5799	0.7216	6	196293	216.92	196755	238.43	196524	263.87
11	.7060	0.8780	8	196304	231.16	196766	254.35	196535	292.40
12	.8420	1.0500	8	196315	357.69	196777	393.43	196546	432.98
13	1.0090	1.2590	10	196326	693.77	196788	763.14	196557	1185.93
14	1.2500	1.5420	10	196337	1111.64	196799	1233.69	196568	1354.64

For technical information, please see page 263.

GENERAL PURPOSE HSS REAMERS

CAPSCREW COUNTERBORES

STANDARD TOLERANCE

SIZE	PILOT SIZE	PILOT LENGTH	FLUTE SIZE	BODY LENGTH	OVERALL LENGTH	ITEM#	LIST PRICE
4	.1120	1/8	0.1830	9/16	3-7/8	195655	53.68
5	.1250	5/32	0.2050	5/8	4-1/8	195666	53.57
6	.1380	3/16	0.2270	3/4	4-5/8	195677	54.51
8	.1640	7/32	0.2700	3/4	5	195688	58.40
10	.1900	1/4	0.3120	7/8	5-1/4	195699	59.65
1/4	.2500	9/32	0.3800	1	5-5/8	195710	62.73
5/16	.3125	5/16	0.4740	1	6-1/8	195721	78.37
3/8	.3750	3/8	0.5690	1-1/4	6-1/2	195732	85.58
7/16	.4370	7/16	0.6610	1-1/4	7	195743	102.95
1/2	.5000	1/2	0.7550	1-1/2	7-1/2	195754	121.10
5/8	.6250	5/8	0.9430	1-1/2	7-5/8	195765	197.71
3/4	.7500	3/4	1.1310	1-5/8	7-3/4	195776	228.63
7/8	.8750	7/8	1.3200	1-7/8	8	195787	276.82
1	1.0000	1	1.5080	2	8-1/2	195798	367.16

1/64 OVERSIZE TOLERANCE

SIZE	PILOT SIZE	PILOT LENGTH	FLUTE SIZE	BODY LENGTH	OVERALL LENGTH	ITEM#	LIST PRICE
4	.1270	1/8	0.1990	9/16	3-7/8	195809	51.48
5	.1400	5/32	0.2210	5/8	4-1/8	195820	53.52
6	.1530	3/16	0.2430	3/4	4-5/8	195831	54.51
8	.1790	7/32	0.2860	3/4	5	195842	58.40
10	.2050	1/4	0.3280	7/8	5-1/4	195853	59.65
1/4	.2650	9/32	0.3960	1	5-5/8	195864	62.73
5/16	.3280	5/16	0.4890	1	6-1/8	195875	78.37
3/8	.3900	3/8	0.5850	1-1/4	6-1/2	195886	85.58
7/16	.4520	7/16	0.6760	1-1/4	7	195897	102.95
1/2	.5150	1/2	0.7710	1-1/2	7-1/2	195908	120.95
5/8	.6400	5/8	0.9590	1-1/2	7-5/8	195919	207.48
3/4	.7650	3/4	1.1470	1-5/8	7-3/4	195930	228.38
7/8	.8910	7/8	1.3360	1-7/8	8	195941	290.34
1	1.0150	1	1.5240	2	8-1/2	195952	367.16

1/32 OVERSIZE TOLERANCE

SIZE	PILOT SIZE	PILOT LENGTH	FLUTE SIZE	BODY LENGTH	OVERALL LENGTH	ITEM#	LIST PRICE
4	.1430	1/8	0.2150	9/16	3-7/8	195963	51.48
5	.1560	5/32	0.2370	5/8	4-1/8	195974	51.48
6	.1690	3/16	0.2590	3/4	4-5/8	195985	54.51
8	.1950	7/32	0.3020	3/4	5	195996	58.40
10	.2180	1/4	0.3440	7/8	5-1/4	196007	59.65
1/4	.2810	9/32	0.4120	1	5-5/8	196018	62.73
5/16	.3430	5/16	0.5040	1	6-1/8	196029	78.37
3/8	.4060	3/8	0.6010	1-1/4	6-1/2	196040	85.58
7/16	.4680	7/16	0.6910	1-1/4	7	196051	102.95
1/2	.5310	1/2	0.7870	1-1/2	7-1/2	196062	120.95
5/8	.6560	5/8	0.9750	1-1/2	7-5/8	196073	197.61
3/4	.7810	3/4	1.1630	1-5/8	7-3/4	196084	228.24
7/8	.9060	7/8	1.3520	1-7/8	8	196095	276.29
1	1.0310	1	1.5400	2	8-1/2	196106	349.26

For technical information, please see page 263.

GENERAL PURPOSE HSS REAMERS

CONSTRUCTION FLATTED SHANK

HIGH SPEED STEEL
LEFT HAND SPIRAL
RIGHT HAND CUT

BLACK & GOLD
3 FLATS

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	SHANK DIA.	ITEM#	LIST PRICE
3/8	2-1/2	5	4-5/8	3/8	196876	91.64
7/16	3-1/4	5	5-3/8	7/16	196887	98.90
1/2	3-3/4	5	5-7/8	1/2	196898	109.46
9/16	3-3/4	5	5-7/8	1/2	196909	113.92
5/8	4-1/4	5	6-3/8	1/2	196920	126.71
11/16	4-1/4	5	6-3/8	1/2	196931	152.01
3/4	4-1/2	5	6-7/8	1/2	196942	159.95
13/16	4-1/2	5	6-7/8	1/2	196953	159.95
7/8	4-1/2	5	6-7/8	1/2	196964	181.43
15/16	4-1/2	5	6-7/8	1/2	196975	181.43
1	4-1/2	5	6-7/8	1/2	196986	207.17
1-1/16	4-1/2	5	6-7/8	1/2	197580	243.71

SAFETY MAGNETIC HEX SHANK

HIGH SPEED STEEL
LEFT HAND SPIRAL
RIGHT HAND CUT

BLACK & GOLD
Magnetic Hex Shank has been designed to protect against danger and loss
See OSHA 29CFR Part 1926.759 (falling object protection)

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	HEX SHANK DIA.	ITEM#	LIST PRICE
9/16	4	5	5-1/2	1-1/16	198196	193.17
11/16	4-1/2	5	6-3/8	1-1/16	198207	233.60
13/16	5	5	7	1-1/4	198218	279.33
15/16	5	5	7	1-7/16	198229	315.62
1-1/16	5	5	7	1-5/8	198240	418.05
1-3/16	5	5	7	1-13/16	232956	538.52
1-5/16	5	5	7-7/8	2	232967	643.29

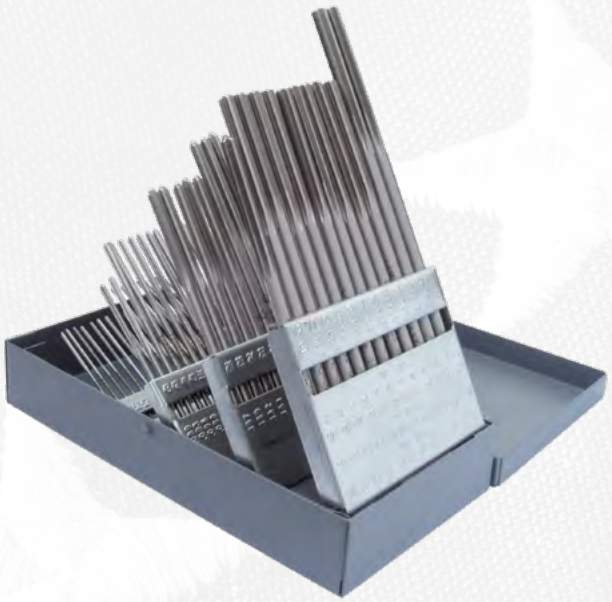
BRIDGE TAPER SHANK

HIGH SPEED STEEL
LEFT HAND SPIRAL
RIGHT HAND CUT

SIZE	FLUTE LENGTH	# OF FLUTES	OVERALL LENGTH	MORSE TAPER #	SMALL DIA.	ITEM#	LIST PRICE
7/16	5-1/8	5	9	2	.3050	198042	137.51
1/2	5-1/8	5	9	2	.3125	198053	150.99
9/16	5-1/8	5	9	2	.3430	196810	145.43
5/8	6-1/8	5	10	2	.3750	198064	159.55
11/16	7-1/8	5	11-3/4	3	.3906	196821	167.96
3/4	7-3/8	5	12	3	.5000	196832	230.57
13/16	7-3/8	5	12	3	.5000	196843	229.02
7/8	7-3/8	5	12	3	.5625	198075	250.89
15/16	7-3/8	5	12	3	.6250	196854	267.06
1	7-3/8	5	12	3	.6875	198086	290.09
1-1/16	7-3/8	5	12	3	.7500	196865	299.97
1-1/8	7-3/8	5	12	3	.8125	198097	367.35
1-3/16	7-3/8	5	12	3	.8750	198108	472.23
1-1/4	7-3/8	5	13	4	.9375	198119	538.16
1-5/16	7-3/8	5	13	4	1.000	198130	636.86

For technical information, please see page 263.

GENERAL PURPOSE HSS REAMER SETS



ITEM# 185799
60 PC #1-#60
HIGH SPEED STEEL

DESCRIPTION	FLUTE STYLE	ITEM#	LIST PRICE
10PC • #4 - 1/2" • Standard • Ctr Bore Set • HSS	RH Spiral	185887	762.95
10PC • #4 - 1/2" • 1/64" OS • Ctr Bore Set • HSS	RH Spiral	185898	762.95
10PC • #4 - 1/2" • 1/32" OS • Ctr Bore Set • HSS	RH Spiral	185909	762.95
14PC • Dowel Pin • .1230 - .4995 • HSS	Straight	185755	900.21
14PC • O/U • .1240 - .5010 • HSS	Straight	185843	776.18
20PC • #61 - #80 • HSS	Straight	185865	909.83
26PC • A-Z • HSS	Straight	185821	1384.80
29PC • 1/16" - 1/2" by 64ths • HSS	Straight	185777	1496.51
60PC • #1 - #60 • HSS	Straight	185799	2220.15

For technical information, please see page 263.

GENERAL PURPOSE
M42 COBALT REAMER SETS

ITEM# 185832
29 PC 1/16"-1/2" BY 64ths
M42 COBALT

DESCRIPTION	FLUTE STYLE	ITEM#	LIST PRICE
14PC • Dowel Pin • .1230 - .4995 • M42 Cobalt	Straight	185766	1018.12
14PC • O/U • .1240 - .5010 • M42 Cobalt	Straight	185854	972.90
26PC • A-Z • M42 Cobalt	Straight	185832	1927.65
29PC • 1/16" - 1/2" by 64ths • M42 Cobalt	Straight	185788	1960.42
60PC • #1 - #60 • M42 Cobalt	Straight	185810	2410.47

For technical information, please see page 263.

CARBIDE REAMER TECHNICAL INFORMATION

CARBIDE REAMERS - SFM & I.P.T. (INCH PER TOOTH)

MATERIAL	SFM	FEED (IPR)
ALUMINUM / ALUMINUM ALLOYS	100 - 250	.005 - .015
ALUMINUM - HIGH SILICON	80 - 200	.003 - .012
BRASS	100 - 250	.005 - .015
BRONZE	90 - 175	.003 - .012
COPPER / COPPER ALLOYS	90 - 220	.005 - .015
CAST IRON - SOFT	80 - 200	.006 - .015
CAST IRON - MEDIUM	60 - 150	.006 - .012
CAST IRON - HARD	40 - 90	.004 - .010
MAGNESIUM	100 - 250	.005 - .015
MONEL	40 - 120	.004 - .012
STEEL - CAST & FORGED	40 - 100	.003 - .010
STEEL - HEAT TREATED (35-40 Rc)	40 - 70	.004 - .008
STEEL - HEAT TREATED (40-45 Rc)	30 - 50	.002 - .006
STEEL - HEAT TREATED (45+ Rc)	15 - 40	.001 - .004

MATERIAL	SFM	FEED (IPR)
STEEL - MEDIUM CARBON	50 - 100	.005 - .010
MOLD STEEL	40 - 120	.004 - .006
TOOL STEEL	30 - 90	.004 - .006
STAINLESS STEEL - 300 SERIES	20 - 80	.004 - .008
STAINLESS STEEL - 400 SERIES	30 - 120	.005 - .010
INCONEL	20 - 60	.001 - .005
RENE	20 - 60	.002 - .006
TITANIUM	30 - 90	.002 - .008
WASPOLOY	20 - 60	.002 - .006
EPOXY FIBER	100 - 250	.005 - .015
PLASTIC	100 - 300	.005 - .015
RESIN - FIBER GLASS	100 - 300	.005 - .015
MASONITE	60 - 150	.005 - .015
PHENOLIC	60 - 100	.005 - .015

All Tools in this book are 100% American-Made

HSS & M42 COBALT TECHNICAL INFORMATION

RECOMMENDED SPEEDS

MATERIAL	SFM
STEEL - ALL TYPES	
60+ Rc	8 - 12
50 - 60 Rc	15 - 30
40 - 50 Rc	20 - 40
30 - 40 Rc	35 - 65
Less than 30 Rc	60 - 90
CAST IRON & MALLEABLE IRON	50 - 85
NON-FERROUS	
ALUMINUM, BRASS, BRONZE, COPPER	90 - 175
FIBER, PLASTIC, HARD RUBBER, etc.	90 - 175

Work piece hardness and machinability must be considered when setting machine speed. The feed rate plays an important part in the life expectancy of a tool and the hole finish which one is looking to attain. Improper feed rate can cause excessive tool wear as well as an inadequate hole finish.

To eliminate chatter, slow cutting speed and increase feed appropriately. Stock removal on roughing operations should not exceed 2 to 4 percent of tool diameter in most cases. Stock removal recommendations on finishing operations are .002 to .004.

For best results with brass, cast iron and some plastics, use a Left-Hand Spiral-Fluted reamer with negative shear action. This type of reamer helps prevent chips from working back into the flutes and scoring the hole. In all reaming operations, use constant-flow coolants. Soluable oil is effective for most metals; however, sulphur-based oils are recommended for stainless and certain alloy steels. Lard oil and kerosene improve the finish on aluminum.

RECOMMENDED FEEDS

MATERIAL	FEED (IPR)
STEEL - ALL TYPES	
50+ Rc	.002 - .004
30 - 50 Rc	.004 - .008
CAST IRON & MALLEABLE IRON	.005 - .012
NON-FERROUS	
ALUMINUM, BRASS, BRONZE, COPPER	.005 - .012
FIBER, PLASTIC, HARD RUBBER, etc.	.005 - .012

RECOMMENDED STOCK REMOVAL

REAMER DIAMETER	REMOVAL (Inches)
Up to 1/16" incl.	.003 - .005
Over 1/16" to 1/8" incl.	.004 - .008
Over 1/8" to 1/4" incl.	.006 - .012
Over 1/4" to 3/8" incl.	.008 - .014
Over 3/8" to 1/2" incl.	.010 - .015
Over 1/2" to 3/4" incl.	.012 - .018

RECOMMENDED LUBRICANTS

MATERIAL	LUBRICANT
Steel harder than 50 Rc	Light Oil
Steel softer than 50 Rc	Light Oil for good finishes or Soluable Oil and Water
Cast Iron & Malleable Iron	Soluable Oil and Water
Non-Ferrous Materials	Soluable Oil and Water

GENERAL MACHINING FORMULAS

Surface Feet Per Minute	$SFM = RPM \times D \times .262$
Revolutions Per Minute	$RPM = \frac{SFM \times 3.82}{D}$
Inches Per Minute	$IPM = RPM \times IPT \times Z$
Inches Per Tooth	$IPT = \frac{IPR}{Z}$
Inches Per Revolution	$IPR = \frac{IPM}{RPM}$
Metal Removal Rate (cu . in./min.)	$MRR = RDOC \times ADOC \times IPM$
Inches Per Tooth *(Chip Thinning Adjustment)*	$IPT_{adj} = \frac{CT \times D}{2 \times \sqrt{(D \times RDOC) - RDOC}}$
Feed Rate Adjustment - Inside Arc	$F_i = \frac{IPM \times (r_i + R)}{r_i}$
Feed Rate Adjustment - Outside Arc	$F_0 = \frac{IPM \times (r_0 + R)}{r_0}$
Chip Thickness	$CT = \frac{2 \times IPT \times \sqrt{(D \times RDOC) - RDOC}}{D}$
Ball Nose Velocity Adjustment	$V_{adj} = \frac{SFM \times 3.82}{D_{eff}}$
Ball Nose "Effective Diameter"	$D_{eff} = 2 \times \sqrt{ADOC \times (D - ADOC)}$

D	Tool Cutting Diameter	r_i	Part Radius (inside arc)	RDOC	Radial Depth of Cut
Z	Number of Flutes	r_o	Part Radius (outside arc)	ADOC	Axial Depth of Cut

DECIMAL EQUIVALENTS & TAP DRILL SIZES

DRILL SIZE	DECIMAL INCHES	DRILL SIZE	DECIMAL INCHES	TAP SIZE	DRILL SIZE	DECIMAL INCHES	TAP SIZE	DRILL SIZE	DECIMAL INCHES	TAP SIZE	DRILL SIZE	DECIMAL INCHES	TAP SIZE
97	.0059	58	.0420		27	.1440		H	.2660		17/32	.5312	5/8-11
.15mm	.0059	57	.0430		3.7mm	.1457		6.8mm	.2677		13.5mm	.5315	
96	.0063	1.1mm	.0433		26	.1470	3/16-24NS	6.9mm	.2717		35/64	.5469	
.16mm	.0063	1.15mm	.0453		3.75mm	.1476	m4.5x0.75	I	.2720	5/16-24NF	14mm	.5512	m16x2
95	.0067	56	.0465		25	.1495	#10-24	7mm	.2756	m8x1	9/16	.5625	3/8-18NPT
.17mm	.0067	3/64	.0469	#0-80	3.8mm	.1496		J	.2770		14.5mm	.5709	m16x1.5
94	.0071	1.2mm	.0472		24	.1520		7.1mm	.2795		37/64	.5781	5/8-18NF
.18mm	.0071	1.25mm	.0492	m1.6x0.35	3.9mm	.1535		K	.2810		15mm	.5906	
93	.0075	1.3mm	.0512		23	.1540		9/32	.2812	5/16-32NS	19/32	.5938	3/8-18 NPS PIPE
.19mm	.0075	55	.0520		5/32	.1562		7.2mm	.2835		39/64	.6094	
92	.0079	1.35mm	.0531		22	.1570	3/16-32NS	7.25mm	.2854		15.5mm	.6102	m18x2.5
.2mm	.0079	54	.0550		4mm	.1575		7.3mm	.2874		5/8	.6250	11/16-16NS
91	.0083	1.4mm	.0551		21	.1590	#10-32	L	.2900		16mm	.6299	m18x2.0
.21mm	.0083	1.45mm	.0571	m1.8x0.35	20	.1610		7.4mm	.2913		41/64	.6406	
90	.0087	1.5mm	.0591		4.1mm	.1614		M	.2950		16.5mm	.6496	
.22mm	.0087	53	.0595	#1-64,72	4.2mm	.1654	m5x0.8	7.5mm	.2953		21/32	.6562	3/4-10NC
89	.0091	1.55mm	.0610		19	.1660		19/64	.2969		17mm	.6693	
.23mm	.0091	1/16	.0625		4.25mm	.1673		7.6mm	.2992		43/64	.6719	
.24mm	.0094	1.6mm	.0630	m2x0.4	4.3mm	.1693		N	.3020		11/16	.6875	3/4-16NF
88	.0095	52	.0635		18	.1695		7.7mm	.3031		17.5mm	.6890	m20x2.5
.25mm	.0098	1.65mm	.0650		11/64	.1719		7.75mm	.3051	m9x1.25	45/64	.7031	1/2-14NPT PIPE
87	.0100	1.7mm	.0669		17	.1730		7.8mm	.3071		18mm	.7087	m20x2.0
.26mm	.0102	51	.0670	#2-56	4.4mm	.1732		7.9mm	.3110		23/32	.7188	
86	.0105	1.75mm	.0689	m2.2x0.45	16	.1770	#12-24	5/16	.3125	3/8-16NC	18.5mm	.7283	m20x1.5
.27mm	.0106	50	.0700	#2-64	4.5mm	.1772		8mm	.3150		47/64	.7344	1/2-14NPS PIPE
85	.0110	1.8mm	.0709		15	.1800		O	.3160		19mm	.7480	
.28mm	.0110	1.85mm	.0728		4.6mm	.1811		8.1mm	.3189		3/4	.7500	
.29mm	.0114	49	.0730		14	.1820	#12-28	8.2mm	.3228		49/64	.7656	7/8-9NC
84	.0115	1.9mm	.0748	m2.3x.04	13	.1850		P	.3230		19.5mm	.7677	m22x2.5
.3mm	.0118	48	.0760		4.7mm	.1850		8.25mm	.3248		25/32	.7812	
83	.0120	1.95mm	.0768		4.75mm	.1870		8.3mm	.3268		20mm	.7874	m22x2.0
82	.0125	5/64	.0781		3/16	.1875		21/64	.3281		51/64	.7969	
.32mm	.0126	47	.0785	#3-48	4.8mm	.1890		8.4mm	.3307		20.5mm	.8071	m22x1.5
81	.0130	2mm	.0787		12	.1890	7/32-32NS	Q	.3320	1/8-27NPT PIPE 3/8-24NF	13/16	.8125	7/8-14NF
.34mm	.0134	2.05mm	.0807	m2.5x0.45	11	.1910		8.5mm	.3346	m10x1.5	21mm	.8268	m24x3
80	.0135	46	.0810		4.9mm	.1929		8.6mm	.3386		53/64	.8281	
.35mm	.0138	45	.0820	#3-56	10	.1935		R	.3390		27/32	.8438	
.36mm	.0142	2.1mm	.0827		9	.1960		8.7mm	.3425		21.5mm	.8465	
79	.0145	2.15mm	.0846	m2.6x0.45	5mm	.1969	m6x1	11/32	.3438		55/64	.8594	
.38mm	.0150	44	.0860	#4-36	8	.1990		8.75mm	.3445	m10x1.25	22mm	.8661	m24x2
1/64	.0156	2.2mm	.0866		5.1mm	.2008		8.8mm	.3465		7/8	.8750	1-8NC
.4mm	.0157	2.25mm	.0886		7	.2010	1/4-20	S	.3480	1/8-27NPS PIPE	22.25mm	.8760	
78	.0160	43	.0890	#4-40	13/64	.2031		8.9mm	.3504		22.5mm	.8858	m24x1.50
.42mm	.0165	2.3mm	.0906		6	.2040		9mm	.3543	m10x1.00	57/64	.8906	
.44mm	.0173	2.35mm	.0925		5.2mm	.2047		T	.3580		23mm	.9055	
.45mm	.0177	42	.0935	#4-48	5	.2055		9.1mm	.3583		29/32	.9062	3/4-14NPT PIPE
77	.0180	3/32	.0938		5.25mm	.2067	m6x0.75	23/64	.3594		59/64	.9219	
.46mm	.0181	2.4mm	.0945		5.3mm	.2087		9.2mm	.3622		23.5mm	.9252	
.48mm	.0189	41	.0960		4	.2090	1/4-24	9.25mm	.3642		15/16	.9375	3/4-14 NPS 1-14 NF
.5mm	.0197	2.45mm	.0965		5.4mm	.2126		9.3mm	.3661		24mm	.9449	m27x3
76	.0200	40	.0980		3	.2130	1/4-28	U	.3680	7/16-14NC	61/64	.9531	
75	.0210	2.5mm	.0984	m3x0.5	5.5mm	.2165		9.4mm	.3701		24.5mm	.9646	
.55mm	.0217	39	.0995		7/32	.2188		9.5mm	.3740	m11x1.50	31/32	.9688	
74	.0225	38	.1015	#5-40	5.6mm	.2205		3/8	.3750		25mm	.9843	m27x2
.6mm	.0236	2.6mm	.1024		2	.2210		V	.3770		63/64	.9844	1-1/8-7NC
73	.0240	37	.1040	#5-44	5.7mm	.2244		9.6mm	.3780		1	1.0000	
72	.0250	2.7mm	.1063		5.75mm	.2264		9.7mm	.3819		25.5mm	1.0039	
.65mm	.0256	36	.1065	#6-32	1	.2280		9.75mm	.3839		1-1/64	1.0156	
71	.0260	2.75mm	.1083		5.8mm	.2283		9.8mm	.3858		26mm	1.0236	
.7mm	.0276	7/64	.1094		5.9mm	.2323		W	.3860		1-1/32	1.0312	
70	.0280	35	.1100		A	.2340		9.9mm	.3898		26.5mm	1.0433	m30x3.5
69	.0292	2.8mm	.1102		15/64	.2344		25/64	.3906	7/16-20	1-3/64	1.0469	1-1/8-12NF
.75mm	.0295	34	.1110		6mm	.2362	m7x1	10mm	.3937	m12x1.75	1-1/16	1.0625	
68	.0310	33	.1130	#6-40	B	.2380		X	.3970		27mm	1.0630	
1/32	.0312	2.9mm	.1142	m3.5x0.6	6.1mm	.2402		Y	.4040		1-5/64	1.0781	
.8mm	.0315	32	.1160		C	.2420	1/16-27 NPT PIPE	13/32	.4062		27.5mm	1.0827	
67	.0320	3mm	.1181		6.2mm	.2441		Z	.4130		1-3/32	1.0938	
66	.0330	31	.1200		D	.2460		10.5mm	.4134	m12x1.25	28mm	1.1024	m30x2.0
.85mm	.0335	3.1mm	.1220		6.25mm	.2461		27/64	.4219	1/2-13	1-7/64	1.1094	1-1/4-7NC
65	.0350	1/8	.1250	5/32-32NS	6.3mm	.2480		11mm	.4331		28.5mm	1.1220	
.9mm	.0354	3.2mm	.1260		E	.2500	1/16-27 NPS PIPE	7/16	.4375	1/4-18 NPT PIPE	1-1/8	1.1250	
64	.0360	3.25mm	.1280		1/4	.2500		11.5mm	.4528		1-9/64	1.1406	
63	.0370	30	.1285	5/32-36NS	6.4mm	.2520		29/64	.4531	1/4-18 NPS PIPE 1/2-20	29mm	1.1417	
.95mm	.0374	3.3mm	.1299	m4x0.70	6.5mm	.2559		15/32	.4688		1-5/32	1.1562	1-11-1/2NPT PIPE
62	.0380	3.4mm	.1339		F	.2570	5/16-18NC	12mm	.4724	m14x2	29.5mm	1.1614	
61	.0390	29	.1360	#8-32	6.6mm	.2598		31/64	.4844	9/16-12	1-11/64	1.1719	1-1/4-12NF
1mm	.0394	3.5mm	.1378		G	.2610		12.5mm	.4921	m14x1.5			
60	.0400	28	.1405		6.7mm	.2638		1/2	.5000				
59	.0410	9/64	.1406		17/64	.2656		13mm	.5118	m14x1.25			
1.05mm	.0413	3.6mm	.1417		6.75mm	.2657	m8x1.25	33/64	.5156	9/16-18			

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