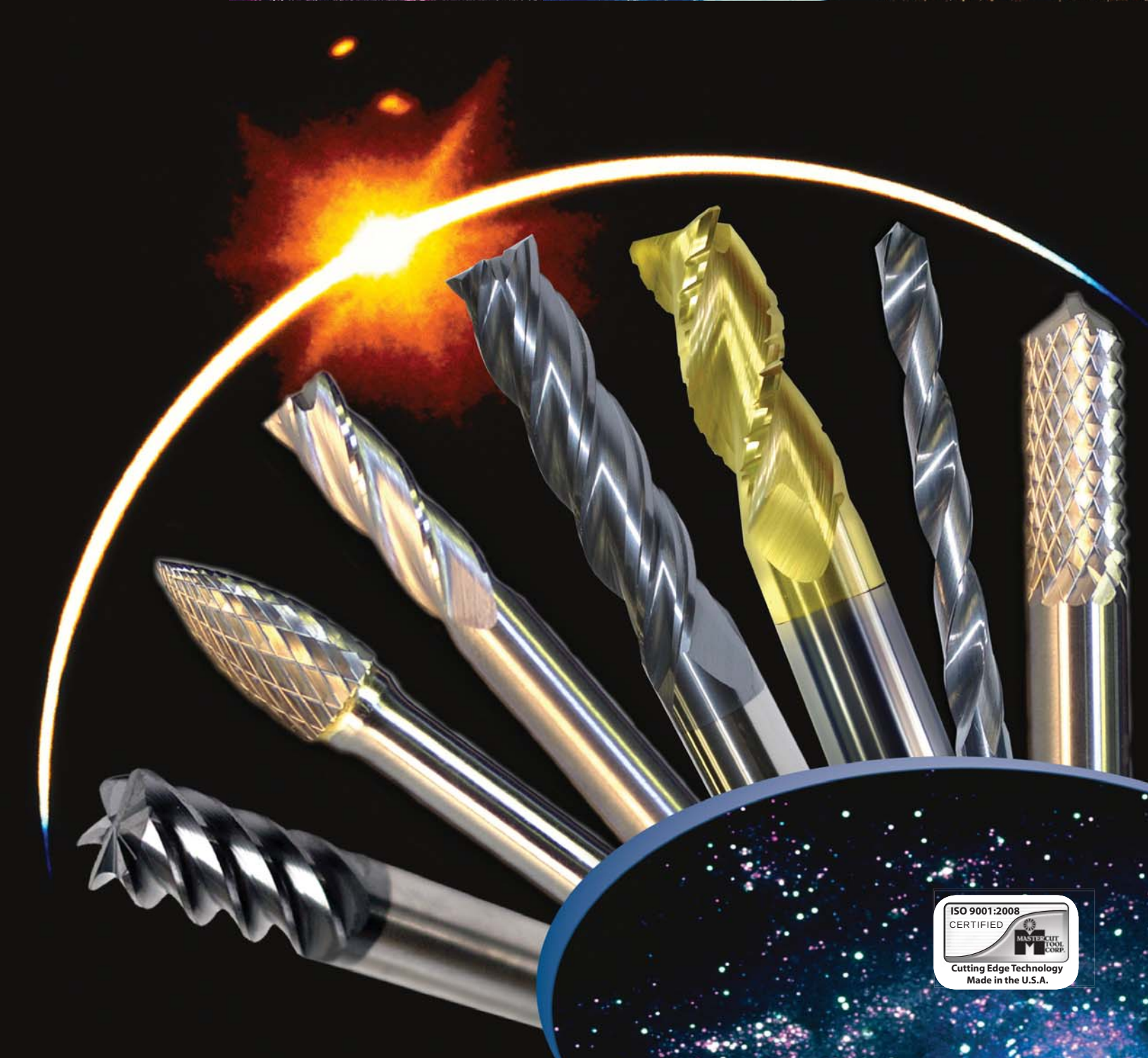
MASTERCUT TOOL CORP.

www.mastercuttool.com

Rotary Cutting Tools

2009 Fractional



ISO 9001:2008 CERTIFIED

Cutting Edge Technology
Made in the U.S.A.

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Important Calculations

$$\text{Weight Of Fractional Carbide Rod (lbs)} = 3.142 \times \left[\frac{\text{Shank Diameter}}{2}\right]^2 \times \text{Overall Length} \times 0.509$$

$$\text{SFM} = 0.262 \times D1 \times \text{R.P.M.}$$

SFM (Surface Feet/Minute)

$$\text{R.P.M.} = \left[\frac{318.3 \times \text{SFM}}{D1}\right]$$

D1 (Diameter of Cutter)

$$\text{Inches Per Revolution} = \text{Chip Load} \times \text{Number of Flutes}$$

$$\text{Inches Per Revolution} = \frac{\text{Inch Per Minute}}{\text{R.P.M.}}$$

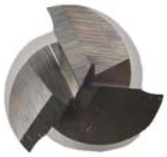
$$\text{Inches Per Minute} = \text{R.P.M.} \times \text{Inches Per Revolution}$$

$$\text{Chip Load} = \frac{\text{Inches Per Revolution}}{\text{Number of Flutes}}$$

$$\text{Chip Load} = \frac{\text{Inches Per Minute}}{\text{R.P.M} \times \text{Number of Flutes}}$$

$$\text{Weight Of Metric Carbide Rod (lbs)} = 3.142 \times \left[\frac{\text{Shank Diameter}}{2}\right]^2 \times \frac{\text{Overall Length}}{25.4} \times 0.509$$

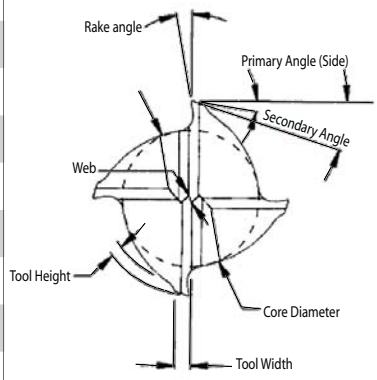
2 Flute

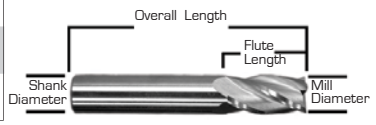


3 Flute

4 Flute

Materials	2FL	3FL	4FL	6FL	Straight
Aluminum	✓	✓			
Brass, Bronze	✓	✓	✓		
Fiberglass	✓	✓			
Iron	✓		✓	✓	
Plastics	✓	✓			
Steel nickle, Chrome		✓	✓	✓	✓
Steel: Carbon	✓	✓	✓		
Steel: 39-48Rc		✓	✓	✓	
Steel: 46-68Rc	✓		✓	✓	✓
Steel Stainless		✓	✓	✓	
Steel Weldments	✓	✓	✓		✓
Titanium		✓	✓	✓	
Zinc		✓	✓		





Basic List of Endmill Use

FACE MILLING: For small face areas of relatively shallow depth of cut. The surface finish produced can be "scratchy".

KEYWAY PRODUCTION: Normally two separate endmills are required to produce a quality keyway.

WOODRUFF KEYWAYS: Normally produced with a single cutter in a straight plunge operation.

SPECIALITY CUTTING: Includes milling of tapered surfaces such as "T" shaped slots & dovetail production.

FINISHING PROFILING: To finish the inside/outside shape on a part with a parallel side wall.

CAVITY DIE WORK: Generally involves plunging and finishing cutting of pockets in die steel. Cavity work requires the production of three dimensional shapes. A ball type endmill is used for the finishing cutter with this application.

Types of Milling Procedures

CLIMB MILLING CUTTER
Direction for a milling operation. The cutter tending to "Climb" into the workspace, relieving feed force requirements. First choice for CNC machining. Increases cutter tool life. Sometimes called down-milling.

CONVENTIONAL MILLING
Cutter Direction for a milling operation. The cutter tendency to push the workpiece away from the part, increasing the required feeding force. First choice for manual machining. Sometimes called up-milling.

END MILLING
Metal removal process that is achieved by feeding a workpiece into a revolving cutter. The cutter removes material as it chips.

PERIPHERAL MILLING
To machine the edge surface of a part. Peripheral milling is accomplished by presenting the workpiece to the circumference or the periphery of the milling cutter.

PLUNGE CUT
Axial feeding into a part. CNC machine movement in the Z-axis direction. Direct plunging into the face of a part. Plunge feeding in an axial direction requires a center cutting endmill.

RAMP CUT
Axial feeding into a part. CNC machine movement in the Z-axis direction and an additional axis (X or Y). Angle plunged into the face of a part, feeding in other than the axial direction. Requires a center cutting endmill. Ramp cutting will assist the endmill to enter a part face.

Endmill Speeds and Feeds

		Feed Per Tooth (IPT) Endmill Diameter equals			
Material Group	Speed SFM	up to 1/4"	1/4" to 1/2"	1/2" to 3/4"	3/4" to 1"
Aluminum/Related Alloys	600-1200	.001-.002	.002-.004	.004-.006	.006-.008
Brass/Bronze	300-550	.001-.002	.002-.003	.003-.004	.004-.005
Copper/Related Alloys	500-900	.001-.002	.002-.003	.003-.005	.005-.006
Cast Iron (soft ±195bhn)	200-500	.001-.002	.002-.003	.003-.005	.005-.008
Cast Iron (medium ±225bhn)	125-350	.001-.002	.002-.003	.003-.004	.004-.007
Cast Iron (hard ±275bhn)	80-300	.0005-.001	.001-.002	.002-.003	.003-.005
Magnesium	800-1400	.001-.003	.003-.005	.005-.007	.007-.009
Monel/Nickel Alloys	65-175	.0005-.001	.001-.002	.002-.003	.003-.004
Plastics	600-1200	.001-.003	.003-.006	.006-.010	.010-.015
Steel-Heat Treated (35-40Rc)	150-350	.0003-.0005	.0005-.001	.001-.003	.003-.005
Steel-Heat Treated (40- 45Rc)	125-275	.0002-.0005	.0005-.001	.001-.002	.002-.004
Steel-Heat Treated (45+Rc)	50-200	.0002-.0005	.0005-.001	.001-.002	.002-.003
Steel-Medium Carbon	175-350	.0005-.001	.001-.002	.002-.004	.004-.006
Steel; Mold & Die	50-250	.0005-.001	.001-.002	.002-.004	.004-.007
Steel; Tool	150-250	.0005-.001	.001-.002	.002-.004	.004-.006
Stainless-Soft	250-400	.0005-.001	.001-.002	.002-.004	.004-.006
Stainless-Hard	75-250	.0005-.001	.001-.002	.002-.003	.003-.005
Titanium Alloys	90-225	.0003-.0008	.0008-.002	.002-.003	.003-.005

Terms and Conditions of Sale

To Order
Faxed or e-mailed orders are required. Please specify quantity and EDP numbers.

Minimum Orders
$50 for standard items, $200 for special orders. Orders below $50 are subject to a $7.50 handling fee.

Standard Payment Terms
Overseas customers: Prepaid.
US customers: Net 30 Days, pending credit approval, past due after 30 days from billing date.

Freight
Minimum freight charge, $7.00. Orders totaling $1500 or more are shipped freight prepaid barring any special labeling or etching requirements. Freight is F.O.B. shipping point. A 1.5% special marking fee is available as an option to receive prepaid freight for privately marked orders exceeding $1500. Prepaid freight only applies to ground shipments within the US.

Special Tooling for your Requirements
When you need a non-standard tool for a specific job, give us a call. Requirements for special tooling or modifications of existing standard items will be given prompt, expert attention.

Resharpening
Mastercut Tool Corp. employs skilled craftsmen and advanced equipment to provide excellent resharpening services. We can sharpen dull cutters regardless of the manufacturer. This is an excellent and efficient way to get new tool performance at a fraction of the cost. Please inquire about our resharpening price list.

Return Policy
We do not accept returns on items which we do not maintain in stock. Returns are subject to a 15% re-stocking fee.
No returns will be accepted beyond 6 months from date of shipment.

PRODUCTS IN THIS CATALOG ARE SUBJECT TO CHANGE WITHOUT NOTICE!

www.mastercuttool.com
sales@mastercuttool.com

Materials Index of Friction

Material	Coefficient of Friction	
	Clean	Lubricated
Steel	0.8	0.16
Copper-lead alloy	0.22	-
Phosphor-bronze	0.35	-
Aluminum-bronze	0.45	-
Brass	0.35	0.19
Cast iron	0.4	0.21
Bronze	-	0.16
Sintered bronze	-	0.13
Hard carbon	0.14	0.11-0.14
Graphite	0.1	0.1
Tungsten carbide	0.4-0.6	0.1-0.2
Plexiglas	0.4-0.5	0.4-0.5
Polystyrene	0.3-0.35	0.3-0.35
Polythene	0.2	0.2
Teflon	0.04	0.04
Aluminum-aluminum	1.35	0.3
Cadmium-cadmium	0.5	0.05
Chromium-chromium	0.41	0.34
Copper-copper	1	0.08
Iron-iron	1	0.15-0.20
Magnesium-magnesium	0.6	0.08
Nickel-nickel	0.7	0.28
Platinum-platinum	1.2	0.25
Silver-silver	1.4	0.55
Zinc-zinc	0.6	0.04
Glass-glass	0.9-1.0	0.1-0.6
Glass-metal	0.5-0.7	0.2-0.3
Diamond-diamond	0.1	0.05-0.1
Diamond-metal	0.1-0.15	0.1
Sapphire-sapphire	0.2	0.2
Hard carbon on carbon	0.16	0.12-0.14
Graphite-graphite (in vacuum)	0.5-0.8	-
Graphite-graphite	0.1	0.1
Tungsten carbide-tungsten carbide	0.2-0.25	0.12
Plexiglas-plexiglas	0.8	0.8
Polystyrene-polystyrene	0.5	0.5
Wood on wood (clean)	0.25-0.5	-
Wood on wood (wet)	0.2	-
Wood on metals (clean)	0.2-0.6	-
Wood on metals (wet)	0.2	-
Brake material on cast iron	0.4	-
Brake material on cast iron (wet)	0.2	-

Looking for more technical data and how-to's?
Visit the Mastercut Tool Website at:
http://www.mastercuttool.com
E-mail: sales@mastercuttool.com

Mastercut High-Performance Coatings

With today's coating technologies, you can make your tools last longer and run harder than ever before. At Mastercut Tool Corp. we offer a full range of coatings including Titanium Nitride, Titanium Aluminum Nitride, and many more. Look below for more information. TiN and TiCN coatings are not listed in this catalog but are available on all tools by request.

PowerA Coating

PowerA is Mastercut Tool Corp's new proprietary coating that surpasses the proven performance of TiAlN for superior extreme machining results. With a thermal stability above 1,600°F (900°C) this coating excels in high speed dry machining applications. Harder than our original TiAlN by 1000 HV, with an increase in thermal stability of 200°F (100°C), PowerA will ensure that heat buildup, friction, and edge breakdown are all greatly reduced, resulting in better cutting performance and longer tool life. As with it's predecessor, PowerA will be an excellent coating for applications involving tough-to-cut tool steels, stainless, cast iron and non-ferrous material, and it can also be used very effectively for interrupted cuts. PowerA can be run at more aggressive speeds and feeds than other coatings, and can be run without coolant in specific applications. **PowerA continues to be the coating of choice for tough-to-cut materials.**

Hardness: 3800 HV
Coating Thickness: 2-4 Microns
Thermal Stability: 1,650°F or 900°C

PowerA

Consider **PowerA** coatings to run more aggressive speeds and feeds!

PowerT Titanium Nitride (TiN) Coating

PowerT Titanium Nitride (TiN) Coating is bright gold in color, has an ambient temperature hardness in the 2800 Vickers (low 80Rc) range, a coefficient of friction under 0.5, and a thermal stability up to about 1000°F. TiN meets FDA requirements for surgical tools and food applications. Cutting speeds, feeds, wear resistance and tool life generally improve.

PowerT

PowerZ Zirconium Based (ZrN) Coating

PowerZ Zirconium Nitride (ZrN) Coating has proven itself over the years in many industries. ZrN's characteristics have made it suitable for applications where TiN has not performed well. It has excellent erosion resistance, good lubricity and ductility combined with an attractive appearance to make it stand out from the all the rest. This coating has worked well in all non-ferrous applications. Recommended Applications: Aluminum, Brass, Cast Iron, Graphite, Ni Alloys, Ti Alloys, 300/PH Series Stainless Zinc, Glass-filled Plastics (Not recommended for carbon steels). Coating Characteristics: Thickness (2-5 microns), Hardness (2800 Vickers), Thermal 1,049°F (550°C),
Lubricity (0.5 coefficient of friction).

PowerZ

Also available:

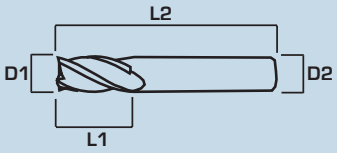
Titanium Carbon Nitride **(TiCN)** Coating

Titanium Carbon Nitride (TiCN) Coating has an ambient temperature hardness in the 4000 Vickers (low 90Rc) range. It's use is particularly advantageous when cutting cast iron, silicon aluminum, certain non-ferrous and other abrasive materials. Tool life can be extended using the right combination of speeds, feeds and coolant.

Why use a Coating?

- Carbide tool's life increased 2 to 5 times . Deposition temperatures as low as 480°-840°F (250°-450°C) protect carbide's binder from deterioration, by comparison with the CVD process applied at more than 1,850°F (1,000°C).
- Isolates the tool from the part, avoids edge buildup and tool cratering.
- Reduced friction against workpiece and chips, reduced spindle torque, less vibration, better finish.
- Speed and Feed increased from 10 to 50 percent.
- Reduces or eliminates coolant (with specific coatings).
- Repeatable, stable performance of the coatings between batches.

Material to Machine	PowerT	TiCN	PowerA	PowerZ
Aluminum, Low Silicon < 10%		✺	✺	✺
Aluminum, High Silicon > 10%		✺	✺	✺
Copper, Copper Alloys	✺	✺	✺	✺
Ductile, Malleable Cast Iron	✺	✺	✺	✺
Carbon Steel, 1000 Series	✺	✺	✺	✺
Alloy Steel, 4 to 9000 Series	✺	✺	✺	✺
Tool Steel	✺	✺	✺	✺
SS Steel, 300 Series	✺	✺	✺	✺
SS Steel, 400 Series	✺	✺	✺	✺
SS PH Series	✺	✺	✺	✺
Titanium, Titanium Alloys	✺	✺	✺	✺
Nickel, Nickel Alloys, Cobalt	✺	✺	✺	✺
Wood, Paper	✺	✺	✺	✺
Composites, Plastics	✺	✺	✺	✺



Square End Standard Length Endmills

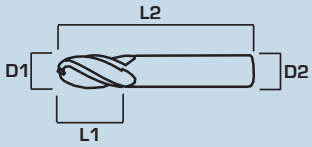
D1	L1	D2	L2	4 FL SQ	2 FL SQ	3 FL SQ	4 FL SQ PowerA	2 FL SQ PowerA	3 FL SQ PowerA
1/32	3/32	1/8	1-1/2	50010	50011	50013	51730	51731	51733
3/64	1/8	1/8	1-1/2	50220	50221	50223	51740	51741	51743
1/16	1/4	1/8	1-1/2	50000	50001	50003	51750	51751	51753
5/64	1/4	1/8	1-1/2	50110	50111	50113	51760	51761	51763
3/32	3/8	1/8	1-1/2	50100	50101	50103	51770	51771	51773
7/64	3/8	1/8	1-1/2	50210	50211	50213	51780	51781	51783
1/8	1/2	1/8	1-1/2	50200	50201	50203	51790	51791	51793
9/64	9/16	3/16	2	50320	50321	50323	51800	51801	51803
5/32	9/16	3/16	2	50240	50241	50243	51810	51811	51813
11/64	9/16	3/16	2	50310	50311	50313	51820	51821	51823
3/16	5/8	3/16	2	50300	50301	50303	51830	51831	51833
13/64	5/8	1/4	2-1/2	50510	50511	50513	51840	51841	51843
7/32	5/8	1/4	2-1/2	50400	50401	50403	51850	51851	51853
15/64	3/4	1/4	2-1/2	50520	50521	50523	51860	51861	51863
1/4	3/4	1/4	2-1/2	50500	50501	50503	51870	51871	51873
17/64	7/8	5/16	2-1/2	50530	50531	50533	51880	51881	51883
9/32	7/8	5/16	2-1/2	50610	50611	50613	51890	51891	51893
19/64	7/8	5/16	2-1/2	50620	50621	50623	51900	51901	51903
5/16	7/8	5/16	2-1/2	50600	50601	50603	51910	51911	51913
21/64	7/8	3/8	2-1/2	50630	50631	50633	51920	51921	51923
11/32	7/8	3/8	2-1/2	50640	50641	50643	51930	51931	51933
23/64	7/8	3/8	2-1/2	50650	50651	50653	51940	51941	51943
3/8	7/8	3/8	2-1/2	50700	50701	50703	51950	51951	51953
25/64	7/8	7/16	2-1/2	50660	50661	50663	51960	51961	51963
13/32	7/8	7/16	2-1/2	50667	50668	50669	51970	51971	51973
27/64	7/8	7/16	2-1/2	50690	50691	50693	51980	51981	51983
7/16	1	7/16	2-1/2	50800	50801	50803	51990	51991	51993
29/64	1	1/2	3	50710	50711	50713	52000	52001	52003
15/32	1	1/2	3	50720	50721	50723	52010	52011	52013
31/64	1	1/2	3	50730	50731	50733	52020	52021	52023
1/2	1	1/2	3	50900	50901	50903	52030	52031	52033
9/16	1-1/4	9/16	3-1/2	50910	50911	50913	52040	52041	52043
5/8	1-1/4	5/8	3-1/2	51000	51001	51003	52050	52051	52053
11/16	1-1/2	3/4	4	51110	51111	51113	52060	52061	52063
3/4	1-1/2	3/4	4	51100	51101	51103	52070	52071	52073
7/8	1-1/2	7/8	4	51200	51201	51203	52080	52081	52083
1	1-1/2	1	4	51300	51301	51303	52090	52091	52093
1-1/4	2	1-1/4	4-1/2	50740	50741	50743	52100	52101	52103

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

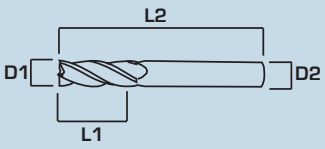
Ball End Standard Length Endmills

D1	L1	D2	L2	4 FL	2 FL	3 FL	4 FL PowerA	2 FL PowerA	3 FL PowerA
1/32	3/32	1/8	1-1/2	50014	50015	50016	51734	51735	51736
3/64	1/8	1/8	1-1/2	50224	50225	50226	51744	51745	51746
1/16	1/4	1/8	1-1/2	50004	50005	50006	51754	51755	51756
5/64	1/4	1/8	1-1/2	50114	50115	50116	51764	51765	51766
3/32	3/8	1/8	1-1/2	50104	50105	50106	51774	51775	51776
7/64	3/8	1/8	1-1/2	50214	50215	50216	51784	51785	51786
1/8	1/2	1/8	1-1/2	50204	50205	50206	51794	51795	51796
9/64	9/16	3/16	2	50324	50325	50326	51804	51805	51806
5/32	9/16	3/16	2	50244	50245	50246	51814	51815	51816
11/64	9/16	3/16	2	50314	50315	50316	51824	51825	51826
3/16	5/8	3/16	2	50304	50305	50306	51834	51835	51836
13/64	5/8	1/4	2-1/2	50514	50515	50516	51844	51845	51846
7/32	5/8	1/4	2-1/2	50404	50405	50406	51854	51855	51856
15/64	3/4	1/4	2-1/2	50524	50525	50526	51864	51865	51866
1/4	3/4	1/4	2-1/2	50504	50505	50506	51874	51875	51876
17/64	7/8	5/16	2-1/2	50614	50535	50536	51884	51885	51886
9/32	7/8	5/16	2-1/2	50634	50615	50616	51894	51895	51896
19/64	7/8	5/16	2-1/2	50624	50625	50626	51904	51905	51906
5/16	7/8	5/16	2-1/2	50604	50605	50606	51914	51915	51916
21/64	7/8	3/8	2-1/2	50534	50635	50636	51924	51925	51926
11/32	7/8	3/8	2-1/2	50644	50645	50646	51934	51935	51936
23/64	7/8	3/8	2-1/2	50654	50655	50656	51944	51945	51946
3/8	7/8	3/8	2-1/2	50704	50705	50706	51954	51955	51956
25/64	7/8	7/16	2-1/2	50664	50665	50666	51964	51965	51966
13/32	7/8	7/16	2-1/2	50677	50678	50679	51974	51975	51976
27/64	7/8	7/16	2-1/2	50694	50695	50696	51984	51985	51986
7/16	1	7/16	2-1/2	50804	50805	50806	51994	51995	51996
29/64	1	1/2	3	50714	50715	50716	52004	52005	52006
15/32	1	1/2	3	50724	50725	50726	52014	52015	52016
31/64	1	1/2	3	50734	50735	50736	52024	52025	52026
1/2	1	1/2	3	50904	50905	50906	52034	52035	52036
9/16	1-1/4	9/16	3-1/2	50914	50915	50916	52044	52045	52046
5/8	1-1/4	5/8	3-1/2	51004	51005	51006	52054	52055	52056
11/16	1-1/2	3/4	4	51114	51115	51116	52064	52065	52066
3/4	1-1/2	3/4	4	51104	51105	51106	52074	52075	52076
7/8	1-1/2	7/8	4	51204	51205	51206	52084	52085	52086
1	1-1/2	1	4	51304	51305	51306	52094	52095	52096
1-1/4	2	1-1/4	4-1/2	50744	50745	50746	52104	52105	52106



D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**



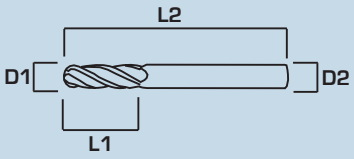
Long Length Endmills Square End

D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	5/8	1/8	2	53000	53001	53030	53031
1/8	3/4	1/8	2	54000	54001	54090	54091
1/8	1	1/8	3	53040	53041	53070	53071
3/16	3/4	3/16	2-1/2	54100	54101	54190	54191
3/16	1-1/8	3/16	3	53080	53081	53110	53111
3/16	1	3/16	4	53120	53121	53150	53151
1/4	1-1/8	1/4	3	54200	54201	54290	54291
1/4	1	1/4	4	53160	53161	53190	53191
1/4	1-1/2	1/4	4	53200	53201	53230	53231
1/4	1-1/2	1/4	6	53240	53241	53270	53271
5/16	1-1/8	5/16	3	54300	54301	54390	54391
5/16	1	5/16	4	53280	53281	53310	53311
5/16	1-5/8	5/16	4	53320	53321	53350	53351
5/16	1-1/2	5/16	6	53450	53451	53480	53481
3/8	1-1/8	3/8	3	54400	54401	54490	54491
3/8	1-3/4	3/8	4	54500	54501	54590	54591
3/8	2	3/8	4	53360	53361	53390	53391
3/8	1-1/2	3/8	6	53400	53401	53430	53431
3/8	3	3/8	6	53440	53441	53476	53477
7/16	1	7/16	4	53486	53487	53510	53511
7/16	2	7/16	4	53520	53521	53550	53551
7/16	1-1/2	7/16	6	53560	53561	53590	53591
7/16	3	7/16	6	53600	53601	53630	53631
1/2	1	1/2	4	53640	53641	53670	53671
1/2	2	1/2	4	54600	54601	54690	54691
1/2	1-1/2	1/2	6	53680	53681	53720	53721
1/2	3	1/2	6	54700	54701	54790	54791
5/8	2-1/4	5/8	5	54800	54801	54890	54891
5/8	3	5/8	6	54900	54901	54990	54991
3/4	2-1/4	3/4	5	55000	55001	55090	55091
3/4	3	3/4	6	55100	55101	55190	55191
1	2	1	6	55200	55201	55240	55241
1	3	1	6	55400	55401	55430	55431
1	4	1	6	55300	55301	55340	55341

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

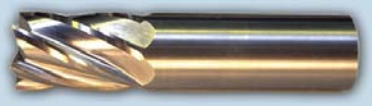
Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

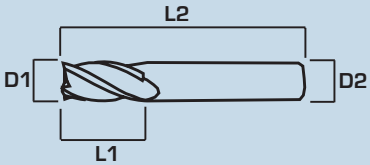
Long Length Endmills Ball End



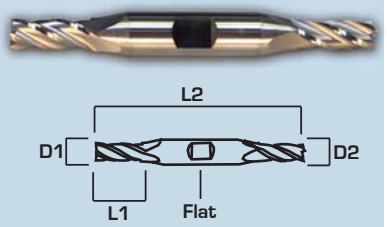
D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	5/8	1/8	2	53004	53005	53034	53035
1/8	3/4	1/8	2	54004	54005	54094	54095
1/8	1	1/8	3	53044	53045	53074	53075
3/16	3/4	3/16	2-1/2	54104	54105	54194	54195
3/16	1-1/8	3/16	3	53084	53085	53114	53115
3/16	1	3/16	4	53124	53125	53154	53155
1/4	1-1/8	1/4	3	54204	54205	54294	54295
1/4	1	1/4	4	53164	53165	53194	53195
1/4	1-1/2	1/4	4	53204	53205	53234	53235
1/4	1-1/2	1/4	6	53244	53245	53274	53275
5/16	1-1/8	5/16	3	54304	54305	54394	54395
5/16	1	5/16	4	53284	53285	53314	53315
5/16	1-5/8	5/16	4	53324	53325	53354	53355
5/16	1-1/2	5/16	6	53364	53365	53394	53395
3/8	1-1/8	3/8	3	54404	54405	54494	54495
3/8	1-3/4	3/8	4	54504	54505	54594	54595
3/8	2	3/8	4	55504	55505	55534	55535
3/8	1-1/2	3/8	6	53404	53405	53434	53435
3/8	3	3/8	6	53444	53445	53474	53475
7/16	1	7/16	4	53484	53485	53514	53515
7/16	2	7/16	4	53524	53525	53554	53555
7/16	1-1/2	7/16	6	53564	53565	53594	53595
7/16	3	7/16	6	53604	53605	53634	53635
1/2	1	1/2	4	53644	53645	53674	53675
1/2	2	1/2	4	54604	54605	54694	54695
1/2	1-1/2	1/2	6	53684	53685	53714	53715
1/2	3	1/2	6	54704	54705	54794	54795
5/8	2-1/4	5/8	5	54804	54805	54894	54895
5/8	3	5/8	6	54904	54905	54994	54995
3/4	2-1/4	3/4	5	55004	55005	55094	55095
3/4	3	3/4	6	55104	55105	55194	55195
1	2	1	6	55204	55205	55234	55235
1	3	1	6	55404	55405	55434	55435
1	4	1	6	55304	55305	55334	55335

6 Flute Endmills Square End





D1	L1	D2	L2	Uncoated	PowerA
3/16	5/8	3/16	2	50302	50392
1/4	3/4	1/4	2-1/2	50502	50592
5/16	7/8	5/16	2-1/2	50602	50692
3/8	1	3/8	2-1/2	50702	50792
7/16	1	7/16	2-1/2	50802	50892
1/2	1	1/2	3	50902	50992
5/8	1-1/4	5/8	3-1/2	51002	51092
3/4	1-1/2	3/4	4	51102	51192
7/8	1-1/2	7/8	4	51202	51292



3/8 Common Shank Double End Endmills Square End

D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	3/8	3/8	3	52207	52208	52297	52298
3/16	1/2	3/8	3	52307	52308	52397	52398
7/32	9/16	3/8	3	52407	52408	52497	52498
1/4	5/8	3/8	3	52507	52508	52597	52598
5/16	3/4	3/8	3-1/2	52607	52608	52697	52698
3/8	3/4	3/8	3-1/2	52707	52708	52797	52798

3/8 Common Shank Double End Endmills Ball End

D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	3/8	3/8	3	52202	52203	52292	52293
3/16	1/2	3/8	3	52302	52303	52392	52393
7/32	9/16	3/8	3	52402	52403	52492	52493
1/4	5/8	3/8	3	52502	52503	52592	52593
5/16	3/4	3/8	3-1/2	52602	52603	52692	52693
3/8	3/4	3/8	3-1/2	52702	52703	52792	52793

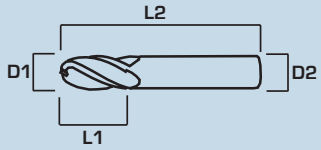
Stub Length Endmills Square End

D1	L1	D2	L2	4FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	1/16	1/8	1-1/2	56300	56301	56333	56334
3/64	3/32	1/8	1-1/2	56350	56351	56383	56384
1/16	1/8	1/8	1-1/2	56400	56401	56433	56434
3/32	3/16	1/8	1-1/2	56500	56501	56533	56534
1/8	1/4	1/8	1-1/2	57000	57001	57092	57093
5/32	5/16	3/16	2	56600	56601	56633	56634
3/16	3/8	3/16	2	57100	57101	57192	57193
7/32	7/16	1/4	2	57200	57201	57292	57293
1/4	1/2	1/4	2	57300	57301	57392	57393
5/16	1/2	5/16	2	57400	57401	57492	57493
3/8	5/8	3/8	2	57500	57501	57592	57593
7/16	5/8	7/16	3	57550	57551	57633	57634
1/2	5/8	1/2	2-1/2	57600	57601	57692	57693
5/8	3/4	5/8	3	57700	57701	57792	57793
3/4	1	3/4	3	57800	57801	57833	57834
1	1	1	3	57850	57851	57883	57884

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

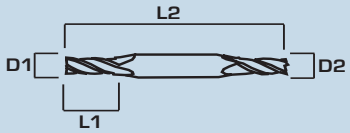
Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

Stub Length Endmills Ball End



D1	L1	D2	L2	4FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	1/16	1/8	1-1/2	56304	56305	56337	56338
3/64	3/32	1/8	1-1/2	56354	56355	56387	56388
1/16	1/8	1/8	1-1/2	56404	56405	56437	56438
3/32	3/16	1/8	1-1/2	56504	56505	56537	56538
1/8	1/4	1/8	1-1/2	57004	57005	57096	57097
5/32	5/16	3/16	2	56604	56605	56637	56638
3/16	3/8	3/16	2	57104	57105	57196	57197
7/32	7/16	1/4	2	57204	57205	57296	57297
1/4	1/2	1/4	2	57304	57305	57396	57397
5/16	1/2	5/16	2	57404	57405	57496	57497
3/8	5/8	3/8	2	57504	57505	57596	57597
7/16	5/8	7/16	3	57554	57555	57637	57638
1/2	5/8	1/2	2-1/2	57604	57605	57696	57697
5/8	3/4	5/8	3	57704	57705	57796	57797
3/4	1	3/4	3	57804	57805	57837	57838
1	1	1	3	57854	57855	57887	57888

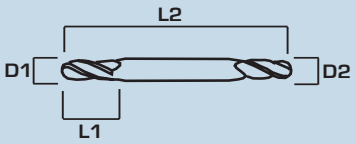
Standard Length Double End Endmills Square End



D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	3/32	1/8	2	58000	58001	58030	58032
3/64	1/8	1/8	2	58050	58051	58080	58081
1/16	3/16	1/8	2	58100	58101	58130	58131
3/32	1/4	1/8	2	58150	58151	58180	58181
1/8	3/8	1/8	2	58200	58201	58230	58231
5/32	7/16	3/16	2-1/2	58250	58251	58280	58281
3/16	1/2	3/16	2-1/2	58300	58301	58330	58331
7/32	9/16	1/4	2-1/2	58350	58351	58380	58381
1/4	5/8	1/4	2-1/2	58400	58401	58430	58431
5/16	3/4	5/16	3-1/2	58450	58451	58480	58481
3/8	3/4	3/8	3-1/2	58500	58501	58530	58531
7/16	7/8	7/16	4	58550	58551	58580	58581
1/2	1	1/2	4	58600	58601	58630	58631
9/16	1-1/4	9/16	6	58650	58651	58680	58681
5/8	1-1/4	5/8	6	58700	58701	58730	58731
3/4	1-1/2	3/4	6	58750	58751	58780	58781
7/8	1-1/2	7/8	6	58800	58801	58830	58831
1	1-1/2	1	6	58850	58851	58880	58881

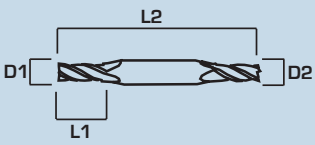
D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**



Standard Length Double End Endmills Ball End

D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	3/32	1/8	2	58004	58005	58034	58035
3/64	1/8	1/8	2	58054	58055	58084	58085
1/16	3/16	1/8	2	58104	58105	58134	58135
3/32	1/4	1/8	2	58154	58155	58184	58185
1/8	3/8	1/8	2	58204	58205	58234	58235
5/32	7/16	3/16	2-1/2	58254	58255	58284	58285
3/16	1/2	3/16	2-1/2	58304	58305	58334	58335
7/32	9/16	1/4	2-1/2	58354	58355	58384	58385
1/4	5/8	1/4	2-1/2	58404	58405	58434	58435
5/16	3/4	5/16	3-1/2	58454	58455	58484	58485
3/8	3/4	3/8	3-1/2	58504	58505	58534	58535
7/16	7/8	7/16	4	58554	58555	58584	58585
1/2	1	1/2	4	58604	58605	58634	58635
9/16	1-1/4	9/16	6	58654	58655	58684	58685
5/8	1-1/4	5/8	6	58704	58705	58734	58735
3/4	1-1/2	3/4	6	58754	58755	58784	58785
7/8	1-1/2	7/8	6	58804	58805	58834	58835
1	1-1/2	1	6	58854	58855	58884	58885



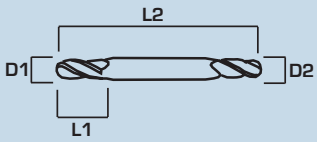
Stub Length Double End Endmills Square End

D1	L1	D2	L2	4FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	1/16	1/8	1-1/2	57016	57015	57058	57059
3/64	3/32	1/8	1-1/2	57127	57128	57158	57159
1/16	1/8	1/8	1-1/2	57227	57228	57258	57259
3/32	3/16	1/8	1-1/2	57027	57026	57358	57359
1/8	1/4	1/8	1-1/2	57007	57008	57098	57099
5/32	5/16	3/16	2	57137	57136	57458	57459
3/16	3/8	3/16	2	57107	57108	57198	57199
7/32	1/2	1/4	2-1/2	57207	57208	57298	57299
1/4	1/2	1/4	2-1/2	57307	57308	57398	57399
5/16	1/2	5/16	2-1/2	57407	57408	57498	57499
3/8	1/2	3/8	2-1/2	57507	57508	57598	57599
7/16	1/2	7/16	2-1/2	57535	57536	57568	57569
1/2	5/8	1/2	3	57607	57608	57698	57699
5/8	3/4	5/8	4	57707	57708	57740	57741
3/4	1	3/4	4	57807	57808	57840	57841

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

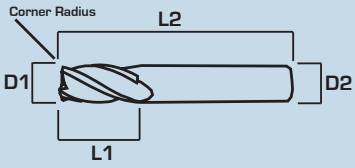
Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

Stub Length Double End Endmills Ball End



D1	L1	D2	L2	4FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/32	1/16	1/8	1-1/2	57019	57020	57062	57063
3/64	3/32	1/8	1-1/2	57119	57120	57162	57163
1/16	1/8	1/8	1-1/2	57219	57220	57262	57263
3/32	3/16	1/8	1-1/2	57022	57021	57362	57363
1/8	1/4	1/8	1-1/2	57002	57003	57094	57095
5/32	5/16	3/16	2	57419	57420	57462	57463
3/16	3/8	3/16	2	57102	57103	57210	57211
7/32	5/8	1/4	2-1/2	57202	57203	57294	57295
1/4	1/2	1/4	2-1/2	57302	57303	57394	57395
5/16	1/2	5/16	2-1/2	57402	57403	57494	57495
3/8	1/2	3/8	2-1/2	57502	57503	57594	57595
7/16	1/2	7/16	2-1/2	57530	57531	57563	57564
1/2	5/8	1/2	3	57602	57603	57694	57695
5/8	3/4	5/8	4	57702	57703	57735	57736
3/4	1	3/4	4	57802	57803	57835	57836

4 Flute Corner Radius Endmills



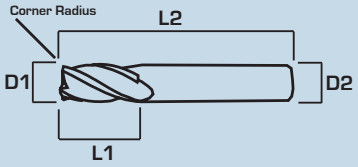
D1	L1	D2	L2	.015 Radius	.020 Radius	.030 Radius	.045 Radius	.060 Radius
1/8	1/2	1/8	1-1/2	63000	63010	63020	63030	63040
3/16	5/8	3/16	2	63100	63110	63120	63130	63140
1/4	3/4	1/4	2-1/2	63200	63210	63220	63230	63240
5/16	13/16	5/16	2-1/2	63300	63310	63320	63330	63340
3/8	1	3/8	2-1/2	63400	63410	63420	63430	63440
1/2	1	1/3	3	63500	63510	63520	63530	63540
5/8	1-1/4	5/8	3-1/2	63600	63610	63620	63630	63640
3/4	1-1/2	3/4	4	63700	63710	63720	63730	63740

2 Flute Corner Radius Endmills

D1	L1	D2	L2	.015 Radius	.020 Radius	.030 Radius	.045 Radius	.060 Radius
1/8	1/2	1/8	1-1/2	63001	63011	63021	63031	63041
3/16	5/8	3/16	2	63101	63111	63121	63131	63141
1/4	3/4	1/4	2-1/2	63201	63211	63221	63231	63241
5/16	13/16	5/16	2-1/2	63301	63311	63321	63331	63341
3/8	1	3/8	2-1/2	63401	63411	63421	63431	63441
1/2	1	1/3	3	63501	63511	63521	63531	63541
5/8	1-1/4	5/8	3-1/2	63601	63611	63621	63631	63641
3/4	1-1/2	3/4	4	63701	63711	63721	63731	63741

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

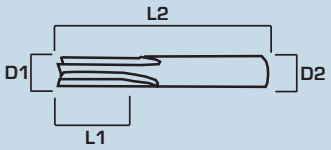


4 Flute Corner Radius Endmills

D1	L1	D2	L2	.015 Radius	.020 Radius	.030 Radius	.045 Radius	.060 Radius
				PowerA	PowerA	PowerA	PowerA	PowerA
1/8	1/2	1/8	1-1/2	65000	65010	65020	65030	65040
3/16	5/8	3/16	2	65100	65110	65120	65130	65140
1/4	3/4	1/4	2-1/2	65200	65210	65220	65230	65240
5/16	13/16	5/16	2-1/2	65300	65310	65320	65330	65340
3/8	1	3/8	2-1/2	65400	65410	65420	65430	65440
1/2	1	1/2	3	65500	65510	65520	65530	65540
5/8	1-1/4	5/8	3-1/2	65600	65610	65620	65630	65640
3/4	1-1/2	3/4	4	65700	65710	65720	65730	65740

2 Flute Corner Radius Endmills

D1	L1	D2	L2	.015 Radius	.020 Radius	.030 Radius	.045 Radius	.060 Radius
				PowerA	PowerA	PowerA	PowerA	PowerA
1/8	1/2	1/8	1-1/2	65001	65011	65021	65031	65041
3/16	5/8	3/16	2	65101	65111	65121	65131	65141
1/4	3/4	1/4	2-1/2	65201	65211	65221	65231	65241
5/16	13/16	5/16	2-1/2	65301	65311	65321	65331	65341
3/8	1	3/8	2-1/2	65401	65411	65421	65431	65441
1/2	1	1/2	3	65501	65511	65521	65531	65541
5/8	1-1/4	5/8	3-1/2	65601	65611	65621	65631	65641
3/4	1-1/2	3/4	4	65701	65711	65721	65731	65741



Straight Flute Endmills Square End

D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	1/2	1/8	1-1/2	59000	59001	59090	59091
3/16	5/8	3/16	2	59100	59101	59190	59191
7/32	5/8	1/4	2-1/2	59200	59201	59290	59291
1/4	3/4	1/4	2-1/2	59300	59301	59390	59391
5/16	13/16	5/16	2-1/2	59400	59401	59490	59491
3/8	1	3/8	2-1/2	59500	59501	59590	59591
1/2	1	1/2	3	59600	59601	59690	59691
5/8	1-1/4	5/8	3-1/2	59700	59701	59790	59791

Straight Flute Endmills Ball End

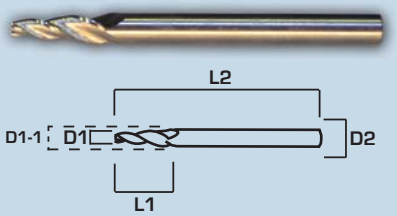
D1	L1	D2	L2	4 FL Uncoated	2 FL Uncoated	4 FL PowerA	2 FL PowerA
1/8	1/2	1/8	1-1/2	59004	59005	59094	59095
3/16	5/8	3/16	2	59104	59105	59194	59195
7/32	5/8	1/4	2-1/2	59204	59205	59294	59295
1/4	3/4	1/4	2-1/2	59304	59305	59394	59395
5/16	13/16	5/16	2-1/2	59404	59405	59494	59495
3/8	1	3/8	2-1/2	59504	59505	59594	59595
1/2	1	1/2	3	59604	59605	59694	59695
5/8	1-1/4	5/8	3-1/2	59704	59705	59794	59795

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

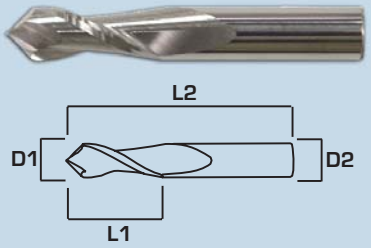
Taper Endmills

D1-1	Centerline Angle	D1	L1	D2	L2	3FL SQUARE	3FL BALL
1/4	5	1/8	3/4	1/4	3	61003	61006
1/4	7	1/8	1/2	1/4	3	61103	61106
1/4	10	3/32	1/2	1/4	3	61203	61206
3/8	5	1/8	1-1/2	3/8	3-1/2	61303	61306
3/8	7	1/8	3/4	3/8	3-1/2	61403	61406
3/8	10	1/8	3/4	3/8	3-1/2	61503	61506
1/2	5	1/4	1-1/4	1/2	4	61603	61606
1/2	7	3/16	1-1/4	1/2	4	61703	61706
1/2	10	1/8	1	1/2	4	61803	61806



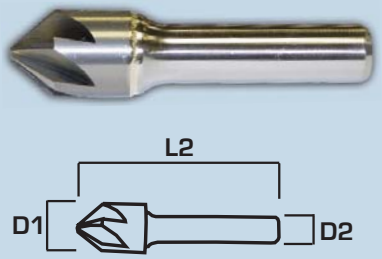
2 Flute Drill Mills

D1	L1	D2	L2	2 FL Uncoated	2 FL PowerA
1/8	1/2	1/8	1-1/2	50201-90	51791-90
3/16	5/8	3/16	2	50301-90	51831-90
1/4	3/4	1/4	2-1/2	50501-90	51871-90
5/16	7/8	5/16	2-1/2	50601-90	51911-90
3/8	7/8	3/8	2-1/2	50701-90	51951-90
7/16	1	7/16	2-1/2	50801-90	51991-90
1/2	1	1/2	3	50901-90	52031-90
5/8	1-1/4	5/8	3-1/2	51001-90	52051-90
3/4	1-1/2	3/4	4	51101-90	52071-90



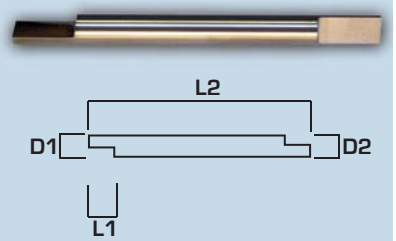
Carbide Countersinks Brazed to Steel Shank

D1	D2	L2	Flutes	60°	82°	90°
1/8	1/8	1-1/2	1	24001	24002	24003
1/8	1/8	1-1/2	3	24004	24005	24006
1/8	1/8	1-1/2	6	24007	24008	24009
3/16	3/16	2	1	24011	24012	24013
3/16	3/16	2	3	24014	24015	24016
3/16	3/16	2	6	24017	24018	24019
1/4	1/4	2	1	24021	24022	24023
1/4	1/4	2	3	24024	24025	24026
1/4	1/4	2	6	24027	24028	24029
3/8	1/4	2-5/8	1	24031	24032	24033
3/8	1/4	2-5/8	3	24034	24035	24036
3/8	1/4	2-5/8	6	24037	24038	24039
1/2	1/4	2-7/8	1	24041	24042	24043
1/2	1/4	2-7/8	3	24044	24045	24046
1/2	1/4	2-7/8	6	24047	24048	24049
5/8	3/8	3	1	24051	24052	24053
5/8	3/8	3	3	24054	24055	24056
5/8	3/8	3	6	24057	24058	24059
3/4	1/2	3	1	24061	24062	24063
3/4	1/2	3	3	24064	24065	24066
3/4	1/2	3	6	24067	24068	24069
1	1/2	2-3/4	1	24071	24072	24073
1	1/2	2-3/4	3	24074	24075	24076
1	1/2	2-3/4	6	24077	24078	24079



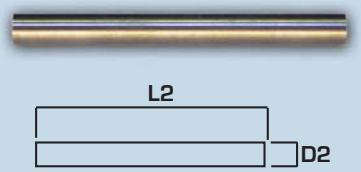
D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**



Engraving Blanks

D1	L2	D2	L1	Single End	Double End
1/8	1-1/2	1/8	3/8	78000	78001
1/8	2	1/8	3/8	78100	78101
3/16	2	3/16	1/2	78200	78201
1/4	2	1/4	1/2	78300	78301
1/4	2-1/2	1/4	1/2	78400	78401
1/4	3	1/4	1/2	78500	78501
5/16	2-1/2	5/16	1/2	78600	78601
3/8	2-1/2	3/8	1/2	78700	78701
7/16	3	7/16	1/2	78800	78801
1/2	3	1/2	1/2	78900	78901



Carbide Centerless Ground Rod

D2	L2	STD	D2	L2	STD	D2	L2	STD
.0925	1-1/2	ROD.0925x1-1/2G	1/4	2	ROD1/4x2G	3/8	4	ROD3/8x4G
3/32	1-1/2	ROD3/32x1-1/2G	1/4	2-1/2	ROD1/4x2-1/2G	1/2	3	ROD1/2x3G
3/32	2	ROD3/32x2G	1/4	3	ROD1/4x3G	1/2	4	ROD1/2x4G
1/8	1-1/2	ROD1/8x1-1/2G	1/4	12	ROD1/4x12G	1/2	6	ROD1/2x6G
1/8	2	ROD1/8x2G	5/16	2-1/2	ROD5/16x2-1/2G	5/8	3-1/2	ROD5/8x3-1/2G
1/8	3	ROD1/8x3G	5/16	3	ROD5/16x3G	5/8	6	ROD5/8x6G
1/8	12	ROD1/8x12G	3/8	2-1/2	ROD3/8x2-1/2G	3/4	4	ROD3/4x4G
3/16	2	ROD3/16x2G	3/8	3	ROD3/8x3G	3/4	6	ROD3/4x6G

Mini Mills

Ball

Square

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Mini Mills Square/Ball End

DESCRIPTION	2 Flute SQUARE	4 Flute SQUARE	2 Flute BALL	4 Flute BALL
	Part ID	Part ID	Part ID	Part ID
.005x.015x1/8x1-1/2	20-0050	-	23-0050	-
.010x.03x1/8x1-1/2	20-0100	21-0100	23-0100	24-0100
.015x.045x1/8x1-1/2	20-0150	21-0150	23-0150	24-0150
.020x.06x1/8x1-1/2	20-0200	21-0200	23-0200	24-0200
.025x.075x1/8x1-1/2	20-0250	21-0250	23-0250	24-0250
.030x.09x1/8x1-1/2	20-0300	21-0300	23-0300	24-0300
.035x.105x1/8x1-1/2	20-0350	21-0350	23-0350	24-0350
.040x.12x1/8x1-1/2	20-0400	21-0400	23-0400	24-0400
.045x.135x1/8x1-1/2	20-0450	21-0450	23-0450	24-0450
.050x.15x1/8x1-1/2	20-0500	21-0500	23-0500	24-0500
.055x.165x1/8x1-1/2	20-0550	21-0550	23-0550	24-0550
.060x.18x1/8x1-1/2	20-0600	21-0600	23-0600	24-0600
.065x.195x1/8x1-1/2	20-0650	21-0650	23-0650	24-0650
.070x.21x1/8x1-1/2	20-0700	21-0700	23-0700	24-0700
.075x.225x1/8x1-1/2	20-0750	21-0750	23-0750	24-0750
.080x.24x1/8x1-1/2	20-0800	21-0800	23-0800	24-0800
.085x.255x1/8x1-1/2	20-0850	21-0850	23-0850	24-0850
.090x.27x1/8x1-1/2	20-0900	21-0900	23-0900	24-0900
.095x.285x1/8x1-1/2	20-0950	21-0950	23-0950	24-0950
.100x.3x1/8x1-1/2	20-1000	21-1000	23-1000	24-1000
.105x.315x1/8x1-1/2	20-1050	21-1050	23-1050	24-1050
.110x.33x1/8x1-1/2	20-1100	21-1100	23-1100	24-1100
.115x.345x1/8x1-1/2	20-1150	21-1150	23-1150	24-1150
.120x.36x1/8x1-1/2	20-1200	21-1200	23-1200	24-1200

AX Mill Speed and Feed Recommendations

MATERIAL TO BE CUT

(1) Aluminum Alloys 6061-T6,7075-T6 (2) Aluminum Alloys 440, 356, 380, C61300

350 Aluminum Series, Roughing & Finishing E/M

				RPM	IPM	RPM	IPM	RPM	IPM
TYPE OF CUT		**Range**	**SFM Range**	**0.2500**	**0.3750**	**0.5000**	**0.6250**	**0.7500**	**1.000**
Shallow Slotting	< 1/2 x	1	1200 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200
	Dia.	2	600 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
Deep Slotting	3/4-1 x	1	1200 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
	Dia.	2	600 Plus	0.0027	0.0043	0.0060	0.0074	0.0089	0.0120
Medium Radial	30% x	1	1200 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200
1.0 X DIA DEPTH	Dia. Radial	2	600 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
Heavy Radial	50% x	1	1200 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
1.0 X DIA DEPTH	Dia. Radial	2	600 Plus	0.0027	0.0043	0.0060	0.0074	0.0089	0.0120
Medium Radial	30% x	1	1200 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200
2.0 X DIA DEPTH	Dia. Radial	2	600 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
Heavy Radial	50% x	1	1200 Plus	0.0036	0.0057	0.0060	0.0098	0.0119	0.0160
2.0 X DIA DEPTH	Dia. Radial	2	600 Plus	0.0027	0.0043	0.0060	0.0074	0.0089	0.0120
Finishing MEDIUM	< 25%	1	1200 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200
Radial	OF Dia.	2	600 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
Finishing Light	< 10%	1	1200 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200
Radial	OF Dia.	2	600 Plus	0.0036	0.0057	0.0080	0.0098	0.0119	0.0160
Finishing	< .010	1	1200 Plus	0.0054	0.0086	0.0120	0.0147	0.0178	0.0240
	Radial Depth	2	600 Plus	0.0045	0.0071	0.0100	0.0123	0.0149	0.0200

Recommended starting speeds and feeds for AX Mills.

Starting point for this chart is based on a 50 Taper Machine Spindle and the lower starting point on the SFM Range.

NOTE!

Reduce SFM & IPM by 10% for 45 Taper and 20% for a 40 Taper Machine Spindle!

MATERIAL TO BE CUT

Aluminum Alloys 6061-T6, 7075-T6, 440, 356, 380, C61300

350 Aluminum Series, Roughing & Finishing E/M

				RPM	IPM	RPM	IPM	RPM	IPM
TYPE OF CUT		**Rc Range**	**SFM Range**	**0.2500**	**0.2500**	**0.3750**	**0.3750**	**0.5000**	**0.5000**
Shallow Slotting	< 1/2 x	< 32	1200 Plus	18336	247.5	12224	261.3	9168	275.0
	Dia.	> 32	600 Plus	9168	99.0	6112	104.5	4584	110.0
Deep Slotting	3/4-1 x	< 32	1200 Plus	18336	198.0	12224	209.0	9168	220.0
	Dia.	> 32	600 Plus	9168	74.3	6112	78.4	4584	82.5
Medium Radial	30% x	< 32	1200 Plus	18336	247.5	12224	261.3	9168	275.0
1.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	9168	99.0	6112	104.5	4584	110.0
Heavy Radial	50% x	< 32	1200 Plus	18336	198.0	12224	209.0	9168	220.0
1.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	9168	74.3	6112	78.4	4584	82.5
Medium Radial	30% x	< 32	1200 Plus	18336	247.5	12224	261.5	9168	275.0
2.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	9168	99.0	6112	104.5	4584	110.0
Heavy Radial	50% x	< 32	1200 Plus	18336	198.0	12224	209.0	9184	220.0
2.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	9168	74.3	6112	78.4	4584	82.5
Finishing MEDIUM	< 25%	< 32	1200 Plus	18336	330.0	12224	261.3	9168	275.0
Radial	OF Dia.	> 32	600 Plus	9168	132.0	6112	104.5	4584	110.0
Finishing Light	< 10%	< 32	1200 Plus	18336	330.0	12224	261.3	9168	275.0
Radial	OF Dia.	> 32	600 Plus	9168	132.0	6112	104.5	4584	110.0
Finishing	< .010	< 32	1200 Plus	18336	396.1	12224	313.5	9168	330.0
	Radial Depth	> 32	600 Plus	9168	165.0	6112	130.6	4584	137.5
TYPE OF CUT		**Rc Range**	**SFM Range**	**0.6260**	**0.6260**	**0.7500**	**0.7500**	**1.0000**	**1.0000**
Shallow Slotting	< 1/2 x	< 32	1200 Plus	7323	269.1	6112	272.3	4584	275.0
	Dia.	> 32	600 Plus	3661	107.6	3056	108.9	2292	110.0
Deep Slotting	3/4-1 x	< 32	1200 Plus	7323	215.3	6112	217.8	4584	220.1
	Dia.	> 32	600 Plus	3661	80.7	3056	81.7	2292	82.5
Medium Radial	30% x	< 32	1200 Plus	7323	269.1	6112	272.3	4584	275.0
1.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	3661	107.6	3056	108.9	2292	110.0
Heavy Radial	50% x	< 32	1200 Plus	7323	215.3	6112	217.8	4584	220.0
1.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	3661	80.7	3056	81.7	2292	82.5
Medium Radial	30% x	< 32	1200 Plus	7223	269.1	6112	272.3	4584	275.0
2.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	3661	107.6	3056	108.9	2292	110.0
Heavy Radial	50% x	< 32	1200 Plus	7323	215.3	6112	217.8	4584	220.0
2.0 X DIA DEPTH	Dia. Radial	> 32	600 Plus	3661	80.7	3056	81.7	2292	82.5
Finishing MEDIUM	< 25%	< 32	1200 Plus	7323	269.1	6112	272.3	4584	275.0
Radial	OF Dia.	> 32	600 Plus	3661	107.6	3056	108.9	2292	110.0
Finishing Light	< 10%	< 32	1200 Plus	7323	269.1	6112	272.3	4584	275.0
Radial	OF Dia.	> 32	600 Plus	3661	107.6	3056	108.9	2292	110.0
Finishing	< .010	< 32	1200 Plus	7323	322.9	6112	326.7	4584	330.0
	Radial Depth	> 32	600 Plus	3661	134.6	3056	136.1	2292	137.5

AX MILL has unique geometry, highest possible feed rates!
AX MILL has highest possible finish in the milling of aluminum!

AX Mill - 2 Flute Uncoated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX2-55000	.015	AX2-55000R.015	AX2-55001
5/32x9/16x5/32x2	AX2-55050	.015	AX2-55050R.015	AX2-55051
3/16x3/4x3/16x2	AX2-55100	.015	AX2-55100R.015	AX2-55101
1/4x3/4x1/4x2-1/2	AX2-55150	.020	AX2-55150R.020	AX2-55151
1/4x1x1/4x2-1/2	AX2-55200	.020	AX2-55200R.020	AX2-55201
5/16x3/4x5/16x2-1/2	AX2-55250	.020	AX2-55250R.020	AX2-55251
5/16x1x5/16x3	AX2-55300	.020	AX2-55300R.020	AX2-55301
3/8x7/8x3/8x2-1/2	AX2-55350	.020	AX2-55350R.020	AX2-55351
3/8x1x3/8x2-1/2	AX2-55400	.020	AX2-55400R.020	AX2-55401
7/16x1x7/16x2-1/2	AX2-55425	.030	AX2-55425R.030	AX2-55426
1/2x1x1/2x3	AX2-55450	.030	AX2-55450R.030	AX2-55451
1/2x1-1/4x1/2x3	AX2-55500	.030	AX2-55500R.030	AX2-55501
9/16x1-1/4x9/16x3	AX2-55550	.030	AX2-55550R.030	AX2-55551
5/8x1-1/4x5/8x3-1/2	AX2-55600	.040	AX2-55600R.040	AX2-55601
5/8x1-5/8x5/8x3-1/2	AX2-55650	.040	AX2-55650R.040	AX2-55651
3/4x1-1/2x3/4x4	AX2-55700	.040	AX2-55700R.040	AX2-55701
3/4x1-3/4x3/4x4	AX2-55750	.040	AX2-55750R.040	AX2-55751
1x1-1/2x1x4	AX2-55800	.040	AX2-55800R.040	AX2-55801

Starting rake and high helix make the AX Mill a very powerful aluminum cutter.

AX Mill - 2 Flute Power Z Coated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX2-55030	.015	AX2-55030R.015	AX2-55031
5/32x9/16x5/32x2	AX2-55080	.015	AX2-55080R.015	AX2-55081
3/16x3/4x3/16x2	AX2-55130	.015	AX2-55130R.015	AX2-55131
1/4x3/4x1/4x2-1/2	AX2-55180	.020	AX2-55180R.020	AX2-55181
1/4x1x1/4x2-1/2	AX2-55230	.020	AX2-55230R.020	AX2-55231
5/16x3/4x5/16x2-1/2	AX2-55280	.020	AX2-55280R.020	AX2-55281
5/16x1x5/16x3	AX2-55330	.020	AX2-55330R.020	AX2-55331
3/8x7/8x3/8x2-1/2	AX2-55380	.020	AX2-55380R.020	AX2-55381
3/8x1x3/8x2-1/2	AX2-55430	.020	AX2-55430R.020	AX2-55431
7/16x1x7/16x2-1/2	AX2-55455	.030	AX2-55455R.030	AX2-55456
1/2x1x1/2x3	AX2-55480	.030	AX2-55480R.030	AX2-55481
1/2x1-1/4x1/2x3	AX2-55530	.030	AX2-55530R.030	AX2-55531
9/16x1-1/4x9/16x3	AX2-55580	.030	AX2-55580R.030	AX2-55581
5/8x1-1/4x5/8x3-1/2	AX2-55630	.040	AX2-55630R.040	AX2-55631
5/8x1-5/8x5/8x3-1/2	AX2-55680	.040	AX2-55680R.040	AX2-55681
3/4x1-1/2x3/4x4	AX2-55730	.040	AX2-55730R.040	AX2-55731
3/4x1-3/4x3/4x4	AX2-55780	.040	AX2-55780R.040	AX2-55781
1x1-1/2x1x4	AX2-55830	.040	AX2-55830R.040	AX2-55831

PowerZ coating is designed specifically for the effective evacuation of Aluminum.

The two flute design allows large chip load and high finish.

AX Mill Chipbreaker

Chipbreaker will increase the cutting feeds by 30%.

AX Mill - Chipbreaker 2 Flute Uncoated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX2-55002	.015	AX2-55002R.015	AX2-55003
5/32x9/16x5/32x2	AX2-55052	.015	AX2-55052R.015	AX2-55053
3/16x3/4x3/16x2	AX2-55102	.015	AX2-55102R.015	AX2-55103
1/4x3/4x1/4x2-1/2	AX2-55152	.020	AX2-55152R.020	AX2-55153
1/4x1x1/4x2-1/2	AX2-55202	.020	AX2-55202R.020	AX2-55203
5/16x3/4x5/16x2-1/2	AX2-55252	.020	AX2-55252R.020	AX2-55253
5/16x1x5/16x3	AX2-55302	.020	AX2-55302R.020	AX2-55303
3/8x7/8x3/8x2-1/2	AX2-55352	.020	AX2-55352R.020	AX2-55353
3/8x1x3/8x2-1/2	AX2-55402	.020	AX2-55402R.020	AX2-55403
7/16x1x7/16x2-1/2	AX2-55427	.030	AX2-55427R.030	AX2-55428
1/2x1x1/2x3	AX2-55452	.030	AX2-55452R.030	AX2-55453
1/2x1-1/4x1/2x3	AX2-55502	.030	AX2-55502R.030	AX2-55503
9/16x1-1/4x9/16x3	AX2-55552	.030	AX2-55552R.030	AX2-55553
5/8x1-1/4x5/8x3-1/2	AX2-55602	.040	AX2-55602R.040	AX2-55603
5/8x1-5/8x5/8x3-1/2	AX2-55652	.040	AX2-55652R.040	AX2-55653
3/4x1-1/2x3/4x4	AX2-55702	.040	AX2-55702R.040	AX2-55703
3/4x1-3/4x3/4x4	AX2-55752	.040	AX2-55752R.040	AX2-55753
1x1-1/2x1x4	AX2-55802	.040	AX2-55802R.040	AX2-55803

AX Mill Power Z

Our unique PowerZ coating combination increases the tool life by 40%.

AX Mill - Chipbreaker 2 Flute Power Z Coated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX2-55032	.015	AX2-55032R.015	AX2-55033
5/32x9/16x5/32x2	AX2-55082	.015	AX2-55082R.015	AX2-55083
3/16x3/4x3/16x2	AX2-55132	.015	AX2-55132R.015	AX2-55133
1/4x3/4x1/4x2-1/2	AX2-55182	.020	AX2-55182R.020	AX2-55183
1/4x1x1/4x2-1/2	AX2-55232	.020	AX2-55232R.020	AX2-55233
5/16x3/4x5/16x2-1/2	AX2-55282	.020	AX2-55282R.020	AX2-55283
5/16x1x5/16x3	AX2-55332	.020	AX2-55332R.020	AX2-55333
3/8x7/8x3/8x2-1/2	AX2-55382	.020	AX2-55382R.020	AX2-55383
3/8x1x3/8x2-1/2	AX2-55432	.020	AX2-55432R.020	AX2-55433
7/16x1x7/16x2-1/2	AX2-55457	.030	AX2-55457R.030	AX2-55458
1/2x1x1/2x3	AX2-55482	.030	AX2-55482R.030	AX2-55483
1/2x1-1/4x1/2x3	AX2-55532	.030	AX2-55532R.030	AX2-55533
9/16x1-1/4x9/16x3	AX2-55582	.030	AX2-55582R.030	AX2-55583
5/8x1-1/4x5/8x3-1/2	AX2-55632	.040	AX2-55632R.040	AX2-55633
5/8x1-5/8x5/8x3-1/2	AX2-55682	.040	AX2-55682R.040	AX2-55683
3/4x1-1/2x3/4x4	AX2-55732	.040	AX2-55732R.040	AX2-55733
3/4x1-3/4x3/4x4	AX2-55782	.040	AX2-55782R.040	AX2-55783
1x1-1/2x1x4	AX2-55832	.040	AX2-55832R.040	AX2-55833

AX Mill - 3 Flute Uncoated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX3-55000	.015	AX3-55000R.015	AX3-55001
5/32x9/16x5/32x2	AX3-55050	.015	AX3-55050R.015	AX3-55051
3/16x3/4x3/16x2	AX3-55100	.015	AX3-55100R.015	AX3-55101
1/4x3/4x1/4x2-1/2	AX3-55150	.020	AX3-55150R.020	AX3-55151
1/4x1x1/4x2-1/2	AX3-55200	.020	AX3-55200R.020	AX3-55201
5/16x3/4x5/16x2-1/2	AX3-55250	.020	AX3-55250R.020	AX3-55251
5/16x1x5/16x3	AX3-55300	.020	AX3-55300R.020	AX3-55301
3/8x7/8x3/8x2-1/2	AX3-55350	.020	AX3-55350R.020	AX3-55351
3/8x1x3/8x2-1/2	AX3-55400	.020	AX3-55400R.020	AX3-55401
7/16x1x7/16x2-1/2	AX3-55425	.030	AX3-55425R.030	AX3-55426
1/2x1x1/2x3	AX3-55450	.030	AX3-55450R.030	AX3-55451
1/2x1-1/4x1/2x3	AX3-55500	.030	AX3-55500R.030	AX3-55501
9/16x1-1/4x9/16x3	AX3-55550	.030	AX3-55550R.030	AX3-55551
5/8x1-1/4x5/8x3-1/2	AX3-55600	.040	AX3-55600R.040	AX3-55601
5/8x1-5/8x5/8x3-1/2	AX3-55650	.040	AX3-55650R.040	AX3-55651
3/4x1-1/2x3/4x4	AX3-55700	.040	AX3-55700R.040	AX3-55701
3/4x1-3/4x3/4x4	AX3-55750	.040	AX3-55750R.040	AX3-55751
1x1-1/2x1x4	AX3-55800	.040	AX3-55800R.040	AX3-55801

The three flute design increases the tool life, lowers the chip load and has a very high finish.

AX Mill - 3 Flute Power Z Coated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX3-55030	.015	AX3-55030R.015	AX3-55031
5/32x9/16x5/32x2	AX3-55080	.015	AX3-55080R.015	AX3-55081
3/16x3/4x3/16x2	AX3-55130	.015	AX3-55130R.015	AX3-55131
1/4x3/4x1/4x2-1/2	AX3-55180	.020	AX3-55180R.020	AX3-55181
1/4x1x1/4x2-1/2	AX3-55230	.020	AX3-55230R.020	AX3-55231
5/16x3/4x5/16x2-1/2	AX3-55280	.020	AX3-55280R.020	AX3-55281
5/16x1x5/16x3	AX3-55330	.020	AX3-55330R.020	AX3-55331
3/8x7/8x3/8x2-1/2	AX3-55380	.020	AX3-55380R.020	AX3-55381
3/8x1x3/8x2-1/2	AX3-55430	.020	AX3-55430R.020	AX3-55431
7/16x1x7/16x2-1/2	AX3-55455	.030	AX3-55455R.030	AX3-55456
1/2x1x1/2x3	AX3-55480	.030	AX3-55480R.030	AX3-55481
1/2x1-1/4x1/2x3	AX3-55530	.030	AX3-55530R.030	AX3-55531
9/16x1-1/4x9/16x3	AX3-55580	.030	AX3-55580R.030	AX3-55581
5/8x1-1/4x5/8x3-1/2	AX3-55630	.040	AX3-55630R.040	AX3-55631
5/8x1-5/8x5/8x3-1/2	AX3-55680	.040	AX3-55680R.040	AX3-55681
3/4x1-1/2x3/4x4	AX3-55730	.040	AX3-55730R.040	AX3-55731
3/4x1-3/4x3/4x4	AX3-55780	.040	AX3-55780R.040	AX3-55781
1x1-1/2x1x4	AX3-55830	.040	AX3-55830R.040	AX3-55831

Ax Mill
Chipbreaker

AX Mill - Chipbreaker 3 Flute Uncoated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX3-55002	.015	AX3-55002R.015	AX3-55003
5/32x9/16x5/32x2	AX3-55052	.015	AX3-55052R.015	AX3-55053
3/16x3/4x3/16x2	AX3-55102	.015	AX3-55102R.015	AX3-55103
1/4x3/4x1/4x2-1/2	AX3-55152	.020	AX3-55152R.020	AX3-55153
1/4x1x1/4x2-1/2	AX3-55202	.020	AX3-55202R.020	AX3-55203
5/16x3/4x5/16x2-1/2	AX3-55252	.020	AX3-55252R.020	AX3-55253
5/16x1x5/16x3	AX3-55302	.020	AX3-55302R.020	AX3-55303
3/8x7/8x3/8x2-1/2	AX3-55352	.020	AX3-55352R.020	AX3-55353
3/8x1x3/8x2-1/2	AX3-55402	.020	AX3-55402R.020	AX3-55403
7/16x1x7/16x2-1/2	AX3-55427	.030	AX3-55427R.030	AX3-55428
1/2x1x1/2x3	AX3-55452	.030	AX3-55452R.030	AX3-55453
1/2x1-1/4x1/2x3	AX3-55502	.030	AX3-55502R.030	AX3-55503
9/16x1-1/4x9/16x3	AX3-55552	.030	AX3-55552R.030	AX3-55553
5/8x1-1/4x5/8x3-1/2	AX3-55602	.040	AX3-55602R.040	AX3-55603
5/8x1-5/8x5/8x3-1/2	AX3-55652	.040	AX3-55652R.040	AX3-55653
3/4x1-1/2x3/4x4	AX3-55702	.040	AX3-55702R.040	AX3-55703
3/4x1-3/4x3/4x4	AX3-55752	.040	AX3-55752R.040	AX3-55753
1x1-1/2x1x4	AX3-55802	.040	AX3-55802R.040	AX3-55803

Ax Mill
Power Z

AX Mill - Chipbreaker 3 Flute Power Z Coated

DIA x LOC x SH x OAL	Square	Corner Radius		Ball
	Part #	CR	Part #	Part #
1/8x1/2x1/8x1-1/2	AX3-55032	.015	AX2-55032R.015	AX3-55033
5/32x9/16x5/32x2	AX3-55082	.015	AX2-55082R.015	AX3-55083
3/16x3/4x3/16x2	AX3-55132	.015	AX2-55132R.015	AX3-55133
1/4x3/4x1/4x2-1/2	AX3-55182	.020	AX2-55182R.020	AX3-55183
1/4x1x1/4x2-1/2	AX3-55232	.020	AX2-55232R.020	AX3-55233
5/16x3/4x5/16x2-1/2	AX3-55282	.020	AX2-55282R.020	AX3-55283
5/16x1x5/16x3	AX3-55332	.020	AX2-55332R.020	AX3-55333
3/8x7/8x3/8x2-1/2	AX3-55382	.020	AX2-55382R.020	AX3-55383
3/8x1x3/8x2-1/2	AX3-55432	.020	AX2-55432R.020	AX3-55433
7/16x1x7/16x2-1/2	AX3-55457	.030	AX3-55457R.030	AX3-55458
1/2x1x1/2x3	AX3-55482	.030	AX2-55482R.030	AX3-55483
1/2x1-1/4x1/2x3	AX3-55532	.030	AX2-55532R.030	AX3-55533
9/16x1-1/4x9/16x3	AX3-55582	.030	AX2-55582R.030	AX3-55583
5/8x1-1/4x5/8x3-1/2	AX3-55632	.040	AX2-55632R.040	AX3-55633
5/8x1-5/8x5/8x3-1/2	AX3-55682	.040	AX2-55682R.040	AX3-55683
3/4x1-1/2x3/4x4	AX3-55732	.040	AX2-55732R.040	AX3-55733
3/4x1-3/4x3/4x4	AX3-55782	.040	AX2-55782R.040	AX3-55783
1x1-1/2x1x4	AX3-55832	.040	AX2-55832R.040	AX3-55833

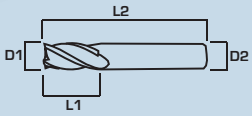
V4 - Variable Helix Endmills

The V4 Endmill reduces harmonic vibrations creating a smoother running endmill.

Speed and Feed Recomendations

Material	Surface Feet Per Min.	Chip Load Per Tooth (CLPT) 1/8	1/4	1/2	1
Aluminium Alloys	1,200	0.0010	0.0020	0.0040	0.0080
Carbon Steel	300 - 600	0.0010	0.0015	0.0030	0.0060
Cast Iron	350 - 550	0.0010	0.0015	0.0030	0.0060
Copper Alloys	500 - 900	0.0010	0.0020	0.0030	0.0060
Steel (Annealed)	350 - 500	0.0010	0.0020	0.0030	0.0050
Steel (18-24 HRC)	150 - 500	0.0004	0.0008	0.0015	0.0045
Steel (25-37 HRC)	125 - 200	0.0003	0.0005	0.0010	0.0030
Stainless Steel (Free Machining)	250 - 400	0.0005	0.0010	0.0020	0.0030
Stainless Steel (Other)	150 - 300	0.0005	0.0010	0.0020	0.0030
Inconel, Monel	60 - 100	0.0005	0.0010	0.0015	0.0030
Titanium	175 - 300	0.0005	0.0008	0.0015	0.0030

Recommended starting speeds and feeds for variable-helix endmills



V4 - PowerA 4 Flute Standard Length

D1	L1	D2	L2	SQUARE	CR	CORNER RADIUS	BALL
1/8	3/8	1/8	1-1/2	V4-50200WF*	.01-.015	V4-50200R.015WF*	V4-50204WF*
1/8	3/8	1/8	1-1/2	V4-50200NF	.01-.015	V4-50200R.015NF	V4-50204NF
3/16	7/16	3/16	2	V4-50300WF*	.01-.015	V4-50300R.015WF*	V4-50304WF*
3/16	7/16	3/16	2	V4-50300NF	.01-.015	V4-50300R.015NF	V4-50304NF
1/4	5/8	1/4	2-1/2	V4-50500WF	.015-.02	V4-50500R.020WF	V4-50504WF
1/4	5/8	1/4	2-1/2	V4-50500NF	.015-.02	V4-50500R.020NF	V4-50504NF
5/16	13/16	5/16	2-1/2	V4-50600WF	.015-.02	V4-50600R.020WF	V4-50604WF
5/16	13/16	5/16	2-1/2	V4-50600NF	.015-.02	V4-50600R.020NF	V4-50604NF
3/8	7/8	3/8	2-1/2	V4-50700WF	.015-.02	V4-50700R.020WF	V4-50704WF
3/8	7/8	3/8	2-1/2	V4-50700NF	.015-.02	V4-50700R.020NF	V4-50704NF
7/16	1	7/16	2-3/4	V4-50800WF	.015-.02	V4-50800R.020WF	V4-50804WF
7/16	1	7/16	2-3/4	V4-50800NF	.015-.02	V4-50800R.020NF	V4-50804NF
1/2	1	1/2	3	V4-50900WF	.025-.03	V4-50900R.030WF	V4-50904WF
1/2	1	1/2	3	V4-50900NF	.025-.03	V4-50900R.030NF	V4-50904NF
1/2	1-1/4	1/2	3	V4-50900LWF	.025-.03	V4-50900LR.030WF	V4-50904LWF
1/2	1-1/4	1/2	3	V4-50900LNF	.025-.03	V4-50900LR.030NF	V4-50904LNF
9/16	1-1/8	9/16	3-1/2	V4-50910WF	.025-.03	V4-50910R.030WF	V4-50914WF
9/16	1-1/8	9/16	3-1/2	V4-50910NF	.025-.03	V4-50910R.030NF	V4-50914NF
5/8	1-1/4	5/8	3-1/2	V4-51000WF	.035-.04	V4-51000R.040WF	V4-51004WF
5/8	1-1/4	5/8	3-1/2	V4-51000NF	.035-.04	V4-51000R.040NF	V4-51004NF
3/4	1-1/2	3/4	4	V4-51100WF	.035-.04	V4-51100R.040WF	V4-51104WF
3/4	1-1/2	3/4	4	V4-51100NF	.035-.04	V4-51100R.040NF	V4-51104NF
1	1-1/2	1	4	V4-51300WF	.035-.04	V4-51300R.040WF	V4-51304WF
1	1-1/2	1	4	V4-51300NF	.035-.04	V4-51300R.040NF	V4-51304NF

Alternative corner radius available for all V4s. Call for Quote.

* Mastercut Tool Corp. does not recommend adding a weldon flat on tools with a shank diameter under 1/4" or 6 mm.

NF - Smooth Shank
WF - Weldon Flat

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

V4 - PowerA 4 Flute Stub Length

D1	L1	D2	L2	SQUARE	CR	CORNER RADIUS	BALL
1/8	1/4	1/8	1-1/2	V4-57000WF	.01-.015	V4-57000R.015WF	V4-57004WF
1/8	1/4	1/8	1-1/2	V4-57000NF	.01-.015	V4-57000R.015NF	V4-57004NF
5/32	5/16	3/16	2	V4-56600WF	.01-.015	V4-56600R.015WF	V4-56604WF
5/32	5/16	3/16	2	V4-56600NF	.01-.015	V4-56600R.015NF	V4-56604NF
3/16	3/8	3/16	2	V4-57100WF	.01-.015	V4-57100R.015WF	V4-57104WF
3/16	3/8	3/16	2	V4-57100NF	.01-.015	V4-57100R.015NF	V4-57104NF
7/32	7/16	1/4	2	V4-57200WF	.01-.015	V4-57200R.015WF	V4-57204WF
7/32	7/16	1/4	2	V4-57200NF	.01-.015	V4-57200R.015NF	V4-57204NF
1/4	1/2	1/4	2	V4-57300WF	.015-.02	V4-57300R.020WF	V4-57304WF
1/4	1/2	1/4	2	V4-57300NF	.015-.02	V4-57300R.020NF	V4-57304NF
5/16	1/2	5/16	2	V4-57400WF	.015-.02	V4-57400R.020WF	V4-57404WF
5/16	1/2	5/16	2	V4-57400NF	.015-.02	V4-57400R.020NF	V4-57404NF
3/8	5/8	3/8	2	V4-57500WF	.015-.02	V4-57500R.020WF	V4-57504WF
3/8	5/8	3/8	2	V4-57500NF	.015-.02	V4-57500R.020NF	V4-57504NF
7/16	5/8	7/16	2-1/2	V4-57550WF	.015-.02	V4-57550R.020WF	V4-57554WF
7/16	5/8	7/16	2-1/2	V4-57550NF	.015-.02	V4-57550R.020NF	V4-57554NF
1/2	5/8	1/2	2-1/2	V4-57600WF	.025-.03	V4-57600R.030WF	V4-57604WF
1/2	5/8	1/2	2-1/2	V4-57600NF	.025-.03	V4-57600R.030NF	V4-57604NF
5/8	3/4	5/8	3	V4-57700WF	.035-.04	V4-57700R.040WF	V4-57704WF
5/8	3/4	5/8	3	V4-57700NF	.035-.04	V4-57700R.040NF	V4-57704NF
3/4	1	3/4	3	V4-57800WF	.035-.04	V4-57800R.040WF	V4-57804WF
3/4	1	3/4	3	V4-57800NF	.035-.04	V4-57800R.040NF	V4-57804NF

V4 - PowerA 4 Flute Long Length

D1	L1	D2	L2	SQUARE	CR	CORNER RADIUS	BALL
1/4	1-1/8	1/4	3	V4-54200WF	.015-.02	V4-54200R.020WF	V4-54204WF
1/4	1-1/8	1/4	3	V4-54200NF	.015-.02	V4-54200R.020NF	V4-54204NF
3/8	1-1/8	3/8	3	V4-54400WF	.015-.02	V4-54400R.020WF	V4-54404WF
3/8	1-1/8	3/8	3	V4-54400NF	.015-.02	V4-54400R.020NF	V4-54404NF
1/2	2	1/2	4	V4-54600WF	.025-.03	V4-54600R.030WF	V4-54604WF
1/2	2	1/2	4	V4-54600NF	.025-.03	V4-54600R.030NF	V4-54604NF
5/8	2-1/4	5/8	5	V4-54800WF	.03-.035	V4-54800R.035WF	V4-54804WF
5/8	2-1/4	5/8	5	V4-54800NF	.03-.035	V4-54800R.035NF	V4-54804NF
3/4	2-1/4	3/4	5	V4-55000WF	.03-.035	V4-55000R.035WF	V4-55004WF
3/4	2-1/4	3/4	5	V4-55000NF	.03-.035	V4-55000R.035NF	V4-55004NF

* Mastercut Tool Corp. does not recommend adding a weldon flat on tools with a shank diameter under 1/4" or 6mm.

NF - Smooth Shank
WF - Weldon Flat

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

Speed and Feed Recomendations

Material	Surface Feet per Minute	Chip Load Per Tooth (CLPT)				
		1/8	1/4	1/2	1/3	1
Cast Iron (Ductile)	250-400	.0005	.0015	.002	.004	.006
Cast Iron (Gray)	350-500	.0005	.002	.004	.006	.008
Cast Iron (Malleable)	200-350	.0005	.002	.004	.006	.008
Nickel Base Alloys	200-300	.0005	.001	.002	.003	.004
Stainless Steel (Free Machining)	300-400	.0005	.001	.002	.004	.006
Stainless Steel (Work Hardening)	150-300	.0005	.0005	.001	.003	.005
Steel(Low Alloy)	350-600	.0005	.001	.002	.004	.006
Steel(Medium Alloy)	200-400	.0005	.001	.002	.004	.006
Steel(High Alloy Mold-Die)	175-250	.0005	.001	.002	.004	.006
Steel(High Strength)	75-150	.0005	.0005	.001	.003	.004
Titanium (Soft)	150-300	.0005	.001	.002	.004	.006
Titanium (Hard)	50-150	.0005	.0005	.001	.00	.004

F45 6 Flute Square End

D1	L1	D2	L2	Uncoated	PowerA
3/16	5/8	3/16	2	F45-50302	F45-50392
1/4	3/4	1/4	2-1/2	F45-50502	F45-50592
5/16	7/8	5/16	2-1/2	F45-50602	F45-50692
3/8	1	3/8	2-1/2	F45-50702	F45-50792
7/16	1	7/16	2-1/2	F45-50802	F45-50892
1/2	1	1/2	3	F45-50902	F45-50992
9/16	1	9/16	3	F45-50912	F45-50982
5/8	1-1/4	5/8	3-1/2	F45-51002	F45-51092
3/4	1-1/2	3/4	4	F45-51102	F45-51192
7/8	1-1/2	7/8	4	F45-51202	F45-51292
1	1-1/2	1	4	F45-51302	F45-51392

F45 6 Flute Corner Radius

D1	L1	D2	L2	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	F45-50502R.010	F45-50592R.010
5/16	7/8	5/16	2-1/2	F45-50602R.012	F45-50692R.012
3/8	1	3/8	2-1/2	F45-50702R.012	F45-50792R.012
7/16	1	7/16	2-1/2	F45-50802R.015	F45-50892R.015
1/2	1	1/2	3	F45-50902R.015	F45-50992R.015
9/16	1	9/16	3	F45-50912R.020	F45-50982R.020
5/8	1-1/4	5/8	3-1/2	F45-51002R.020	F45-51092R.020
3/4	1-1/2	3/4	4	F45-51102R.030	F45-51192R.030
7/8	1-1/2	7/8	4	F45-51202R.030	F45-51292R.030
1	1-1/2	1	4	F45-51302R.030	F45-51392R.030

F45

Endmills

6 Flute 45 Degree Eccentric Relief High Performance Finishers

This special endmill is one of Mastercut Tool's newest additions. It is designed to achieve an impeccable finish in hard metals like stainless steel, alloys, and titanium. The 45° spiral achieves faster feed rates.

Enhanced Surface Finish

Faster Finishing Rates

Improved Tool Life

Radially Relieved For Better Accuracy

Proprietary Coating

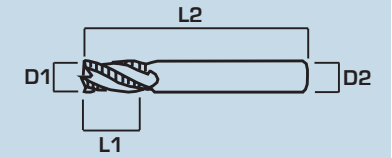
High Tolerance Concentrity

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

Roughers

Roughers, or "hoggers", are useful for rapid removal of large amounts of material. The chip groove design allows for more cutting fluid to the cutting edge and dissipates heat better. There is a wide range of variations in rougher profile forms for different material groups. The coarser the pitch of the roughing edge, the more material removed and the less smooth the finish. In addition, most roughers have eccentric relief so regrinding can be done only using the cutting face. This saves you if you have access to regrinding equipment.



For maximum stock removal of titanium, inconel, waspalloy, and other advanced materials.

Fine Pitch Roughers (.048 Pitch)

D1	L1	D2	L2	No. of Flutes	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	3	62001	62091
5/16	3/4	5/16	2-1/2	3	62101	62191
3/8	7/8	3/8	2-1/2	3	62201	62291
1/2	1	1/2	3	4	62301	62391
5/8	1-1/4	5/8	3-1/2	4	62401	62491
3/4	1-1/2	3/4	4	4	62501	62591
1	1-1/2	1	4	6	62601	62691

For maximum stock removal of mild, stainless, and hardened steels and alloys.

Medium Pitch Roughers (.062 Pitch)

D1	L1	D2	L2	No. of Flutes	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	3	62000	62090
5/16	3/4	5/16	2-1/2	3	62100	62190
3/8	7/8	3/8	2-1/2	3	62200	62290
1/2	1	1/2	3	4	62300	62390
5/8	1-1/4	5/8	3-1/2	4	62400	62490
3/4	1-1/2	3/4	4	4	62500	62590
1	1-1/2	1	4	5	62600	62690

For maximum stock removal of aluminum, brass, bronze, and other lightweight alloys.

Coarse Pitch Roughers (.105 Pitch)

D1	L1	D2	L2	No. of Flutes	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	3	62002	62092
5/16	3/4	5/16	2-1/2	3	62102	62192
3/8	7/8	3/8	2-1/2	3	62202	62292
1/2	1	1/2	3	3	62302	62392
5/8	1-1/4	5/8	3-1/2	3	62402	62492
3/4	1-1/2	3/4	4	3	62502	62592
1	1-1/2	1	4	3	62602	62692

TiN and **TiCN** also available!

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

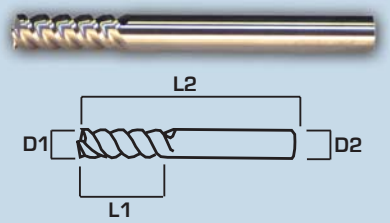
Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

TwisterMill

Designed for high speed milling of inconel, titanium, stainless, and steel alloys.

60° 3 Flute High Helix TwisterMill

D1	L1	D2	L2	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	68003	68093
5/16	13/16	5/16	2-1/2	68103	68193
3/8	1	3/8	2-1/2	68203	68293
1/2	1	1/2	3	68303	68393
5/8	1-1/4	5/8	3-1/2	68403	68493
3/4	1-1/2	3/4	4	68503	68593



AlumaZip

Designed for high speed milling of aluminum.

55° 2 Flute High Helix AlumaZips

D1	L1	D2	L2	Uncoated	PowerA
1/8	1/2	1/8	1-1/2	55030	55050
5/32	9/16	5/32	2	55031	55051
3/16	3/4	3/16	2	55032	55052
1/4	3/4	1/4	2-1/2	55033	55053
5/16	3/4	5/16	2-1/2	55034	55054
3/8	7/8	3/8	2-1/2	55035	55055
1/2	1	1/2	3	55036	55056
9/16	1-1/4	9/16	3	55037	55057
5/8	1-1/4	5/8	3-1/2	55038	55058
3/4	1-1/2	3/4	4	55039	55059
1	1-1-2	1	4	55040	55060

HyperMill

Designed for high speed milling of aluminum.

45° 2 Flute High Helix HyperMill

D1	L1	D2	L2	Uncoated	PowerA)
1/4	1	1/4	2-1/2	68001	68091
5/16	1	5/16	3	68101	68191
3/8	1	3/8	2-1/2	68201	68291
1/2	1-1/4	1/2	3	68301	68391
5/8	1-5/8	5/8	3-1/2	68401	68491
3/4	1-3/4	3/4	4	68501	68591

See the Mastercut Tool website for more in-depth information about High Performance Endmills.

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

FLOWPORT MILLS

3 Flute Ball FlowPort Mill

D1	L1	D2	L2	Part Number
1/4	1/4	1/4	6	64000
3/8	3/8	3/8	6	64001
3/8	3/8	3/8	7	64002
1/2	1/2	1/2	6	64003
1/2	1/2	1/2	7	64004

3 Flute Ball FlowPort Rougher Mill

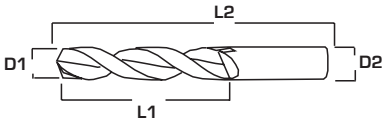
D1	L1	D2	L2	Part Number
1/4	1/4	1/4	6	64010
3/8	3/8	3/8	6	64011
3/8	3/8	3/8	7	64012
1/2	1/2	1/2	6	64013
1/2	1/2	1/2	7	64014

Other sizes and styles available,
call customer service for more information!

Die Grinder

Part Number
DIEGRINDER

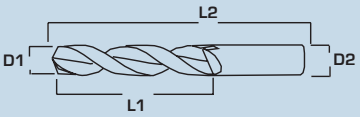
Standard Drill Recommendations



Material Group	Speed SFM	Feed Rate (I.P.R.) 1/16"	1/8"	1/4"	1/2"	3/4"
Aluminum/ Aluminum Alloys	300-600	.0008	.003	.007	.012	.015
Aluminum Alloyed Si > 10%	150-400	.0008	.002	.006	.010	.012
Soft Cast Irons	200-300	.001	.003	.005	.010	.012
Medium Cast Irons	125-225	.001	.003	.005	.008	.010
Malleable Cast Irons	65-200	.0005	.002	.004	.007	.010
Brass	200-300	.0007	.002	.003	.004	.006
Bronze	150-250	.0007	.002	.003	.004	.006
Coppers/ Copper Alloys	150-300	.001	.003	.006	.010	.012
Magnesium	300-600	.001	.003	.007	.012	.015
Nickel Alloys	75-200	.001	.003	.005	.009	.012
Free Machining Stainless Steels	100-150	.001	.003	.005	.008	.012
Work Hardening Stainless Steels	50-100	.0005	.002	.004	.006	.010
Low Carbon Steels	150-300	.001	.002	.004	.007	.012
Medium Carbon Steels	100-200	.001	.002	.003	.006	.010
High Tensile (35-40 Rc) Steels	75-150	.001	.002	.003	.004	.005
High Tensile (40-45 Rc) Steels	50-100	.0007	.001	.002	.003	.004
High Tensile (45 Rc+) Steels	25-75	.0005	.0007	.001	.002	.003
Tool Steels	40-100	.001	.0015	.003	.005	.008
Soft Titanium	80-125	.001	.002	.004	.006	.010
Titanium Alloys Hard Titanium	40-100	.0007	.001	.002	.005	.008

Replace or Resharpen drills at first sign of dulling or rounding.

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002



Solid Carbide Drills

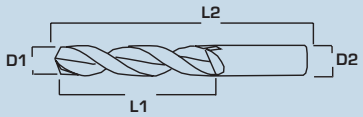
2 Flute - 118° Four Facet Point
3 Flute - 130° High Performance Point

Wire#	D1	L1	D2	L2	2 Flute	3 Flute
#70	.0280	5/16	.0280	1-1/4	40-0280	~
#69	.0292	5/16	.0292	1-1/4	40-0292	~
#68	.0310	5/16	.0310	1-1/4	40-0310	~
~	1/32	5/16	1/32	1-1/4	40-0312	~
#67	.0320	5/16	.0320	1-1/4	40-0320	~
#66	.0330	5/16	.0330	1-1/4	40-0330	~
#65	.0350	5/8	.0350	1-1/2	40-0350	~
#64	.0360	5/8	.0360	1-1/2	40-0360	~
#63	.0370	5/8	.0370	1-1/2	40-0370	~
#62	.0380	5/8	.0380	1-1/2	40-0380	~
#61	.0390	5/8	.0390	1-1/2	40-0390	~
~	.0394	5/8	.0394	1-1/2	40-0394	~
#60	.0400	3/4	.0400	1-1/2	40-0400	~
#59	.0410	3/4	.0410	1-1/2	40-0410	~
#58	.0420	3/4	.0420	1-1/2	40-0420	~
#57	.0430	3/4	.0430	1-1/2	40-0430	~
#56	.0465	3/4	.0465	1-1/2	40-0465	~
~	3/64	3/4	3/64	1-1/2	40-0469	~
#55	.0520	3/4	.0520	1-1/2	40-0520	~
#54	.0550	3/4	.0550	1-1/2	40-0550	~
~	.0591	3/4	.0591	1-1/2	40-0591	~
#53	.0595	3/4	.0595	1-1/2	40-0595	~
~	1/16	3/4	1/16	1-1/2	40-0625	~
#52	.0635	3/4	.0635	1-1/2	40-0635	~
#51	.0670	3/4	.0670	1-1/2	40-0670	~
#50	.0700	7/8	.0700	1-3/4	40-0700	~
#49	.0730	7/8	.0730	1-3/4	40-0730	~
#48	.0760	7/8	.0760	1-3/4	40-0760	~
~	5/64	7/8	5/64	1-3/4	40-0781	~
#47	.0785	7/8	.0785	1-3/4	40-0785	~
~	.0787	7/8	.0787	1-3/4	40-0787	~
#46	.0810	7/8	.0810	1-3/4	40-0810	~
#45	.0820	7/8	.0820	1-3/4	40-0820	~
#44	.0860	1	.0860	2	40-0860	~
#43	.0890	1	.0890	2	40-0890	~
#42	.0935	1	.0935	2	40-0935	~
~	3/32	1	3/32	2	40-0938	~
#41	.0960	1	.0960	2	40-0960	~
#40	.0980	1	.0980	2	40-0980	~
~	.0984	1	.0984	2	40-0984	~
#39	.0995	1-1/4	.0995	2-1/4	40-0995	~
#38	.1015	1-1/4	.1015	2-1/4	40-1015	~

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002

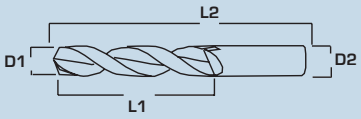
Solid Carbide Drills



2 Flute - 118° Four Facet Point
3 Flute - 130° High Performance Point

Wire#	D1	L1	D2	L2	2 Flute	3 Flute
#37	.1040	1-1/4	.1040	2-1/4	40-1040	~
#36	.1065	1-1/4	.1065	2-1/4	40-1065	~
~	7/64	1-1/4	7/64	2-1/4	40-1094	~
#35	.1100	1-1/4	.1100	2-1/4	40-1100	~
#34	.1110	1-1/4	.1110	2-1/4	40-1110	~
#33	.1130	1-1/4	.1130	2-1/4	40-1130	~
#32	.1160	1-1/4	.1160	2-1/4	40-1160	~
~	.1181	1-1/4	.1181	2-1/4	40-1181	~
#31	.1200	1-1/4	.1200	2-1/4	40-1200	~
~	1/8	1-1/4	1/8	2-1/4	40-1250	41-1250
#30	.1285	1-3/8	.1285	2-1/2	40-1285	41-1285
#29	.1360	1-3/8	.1360	2-1/2	40-1360	41-1360
~	.1378	1-3/8	.1378	2-1/2	40-1378	41-1378
#28	.1405	1-3/8	.1405	2-1/2	40-1405	41-1405
~	9/64	1-3/8	9/64	2-1/2	40-1406	41-1406
#27	.1440	1-3/8	.1440	2-1/2	40-1440	41-1440
#26	.1470	1-3/8	.1470	2-1/2	40-1470	41-1470
#25	.1495	1-3/8	.1495	2-1/2	40-1495	41-1495
#24	.1520	1-3/8	.1520	2-1/2	40-1520	41-1520
#23	.1540	1-3/8	.1540	2-1/2	40-1540	41-1540
~	5/32	1-3/8	5/32	2-1/2	40-1562	41-1562
#22	.1570	1-3/8	.1570	2-1/2	40-1570	41-1570
~	.1575	1-3/8	.1575	2-1/2	40-1575	41-1575
#21	.1590	1-3/8	.1590	2-1/2	40-1590	41-1590
#20	.1610	1-3/8	.1610	2-1/2	40-1610	41-1610
#19	.1660	1-5/8	.1660	2-3/4	40-1660	41-1660
#18	.1695	1-5/8	.1695	2-3/4	40-1695	41-1695
~	11/64	1-5/8	11/64	2-3/4	40-1719	41-1719
#17	.1730	1-5/8	.1730	2-3/4	40-1730	41-1730
#16	.1770	1-5/8	.1770	2-3/4	40-1770	41-1770
~	.1772	1-5/8	.1772	2-3/4	40-1772	41-1772
#15	.1800	1-5/8	.1800	2-3/4	40-1800	41-1800
#14	.1820	1-5/8	.1820	2-3/4	40-1820	41-1820
#13	.1850	1-5/8	.1850	2-3/4	40-1850	41-1850
~	3/16	1-5/8	3/16	2-3/4	40-1875	41-1875
#12	.1890	1-5/8	.1890	2-3/4	40-1890	41-1890
#11	.1910	1-5/8	.1910	2-3/4	40-1910	41-1910
#10	.1935	1-5/8	.1935	2-3/4	40-1935	41-1935
#9	.1960	1-3/4	.1960	3	40-1960	41-1960
~	.1968	1-3/4	.1968	3	40-1968	41-1968
#8	.1990	1-3/4	.1990	3	40-1990	41-1990
#7	.2010	1-3/4	.2010	3	40-2010	41-2010
~	13/64	1-3/4	13/64	3	40-2031	41-2031

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002



Solid Carbide Drills

2 Flute - 118° Four Facet Point
3 Flute - 130° High Performance Point

Wire#	D1	L1	D2	L2	2 Flute	3 Flute
#6	.2040	1-3/4	.2040	3	40-2040	41-2040
#5	.2055	1-3/4	.2055	3	40-2055	41-2055
#4	.2090	1-3/4	.2090	3	40-2090	41-2090
#3	.2130	1-3/4	.2130	3	40-2130	41-2130
~	.2165	1-3/4	.2165	3	40-2165	41-2165
~	7/32	1-3/4	7/32	3	40-2188	41-2188
#2	.2210	1-3/4	.2210	3	40-2210	41-2210
#1	.2280	1-3/4	.2280	3	40-2280	41-2280
#A	.2340	2	.2340	3-1/4	40-2340	41-2340
~	15/64	2	15/64	3-1/4	40-2344	41-2344
~	.2362	2	.2362	3-1/4	40-2362	41-2362
#B	.2380	2	.2380	3-1/4	40-2380	41-2380
#C	.2420	2	.2420	3-1/4	40-2420	41-2420
#D	.2460	2	.2460	3-1/4	40-2460	41-2460
#E	1/4	2	1/4	3-1/4	40-2500	41-2500
~	.2559	2	.2559	3-1/4	40-2559	41-2559
#F	.2570	2	.2570	3-1/4	40-2570	41-2570
#G	.2610	2-1/8	.2610	3-1/2	40-2610	41-2610
~	17/64	2-1/8	17/64	3-1/2	40-2656	41-2656
#H	.2660	2-1/8	.2660	3-1/2	40-2660	41-2660
#I	.2720	2-1/8	.2720	3-1/2	40-2720	41-2720
~	.2756	2-1/8	.2756	3-1/2	40-2756	41-2756
#J	.2770	2-1/8	.2770	3-1/2	40-2770	41-2770
#K	.2810	2-1/8	.2810	3-1/2	40-2810	41-2810
~	9/32	2-1/8	9/32	3-1/2	40-2812	41-2812
#L	.2900	2-1/8	.2900	3-1/2	40-2900	41-2900
#M	.2950	2-3/8	.2950	4	40-2950	41-2950
~	.2953	2-3/8	.2953	4	40-2953	41-2953
~	19/64	2-3/8	19/64	4	40-2969	41-2969
#N	.3020	2-3/8	.3020	4	40-3020	41-3020
~	5/16	2-3/8	5/16	4	40-3125	41-3125
~	.3150	2-3/8	.3150	4	40-3150	41-3150
#O	.3160	2-3/8	.3160	4	40-3160	41-3160
#P	.3230	2-3/8	.3230	4	40-3230	41-3230
~	21/64	2-3/8	21/64	4	40-3281	41-3281
#Q	.3320	2-3/8	.3320	4	40-3320	41-3320
~	.3346	2-3/8	.3346	4	40-3346	41-3346
#R	.3390	2-3/8	.3390	4	40-3390	41-3390
~	11/32	2-3/8	11/32	4	40-3438	41-3438

Coolant Hole Drills are available!

Contact our engineering department.

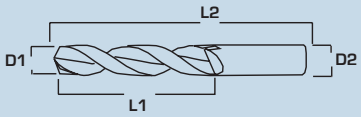
D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002

Solid Carbide Drills

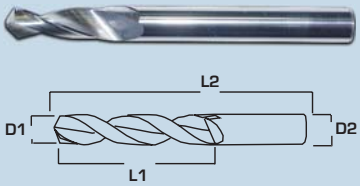
2 Flute - 118° Four Facet Point
3 Flute - 130° High Performance Point

Wire#	D1	L1	D2	L2	2 Flute	3 Flute
#S	.3480	2-3/8	.3480	4	40-3480	41-3480
~	.3543	2-3/4	.3543	4-1/4	40-3543	41-3543
#T	.3580	2-3/4	.3580	4-1/4	40-3580	41-3580
~	23/64	2-3/4	23/64	4-1/4	40-3594	41-3594
#U	.3680	2-3/4	.3680	4-1/4	40-3680	41-3680
~	.3740	2-3/4	.3740	4-1/4	40-3740	41-3740
~	3/8	2-3/4	3/8	4-1/4	40-3750	41-3750
#V	.3770	2-3/4	.3770	4-1/4	40-3770	41-3770
#W	.3860	2-7/8	.3860	4-1/2	40-3860	41-3860
~	25/64	2-7/8	25/64	4-1/2	40-3906	41-3906
~	.3937	2-7/8	.3937	4-1/2	40-3937	41-3937
#X	.3970	2-7/8	.3970	4-1/2	40-3970	41-3970
#Y	.4040	2-7/8	.4040	4-1/2	40-4040	41-4040
~	13/32	2-7/8	13/32	4-1/2	40-4062	41-4062
#Z	.4130	2-7/8	.4130	4-1/2	40-4130	41-4130
~	.4134	2-7/8	.4134	4-1/2	40-4134	41-4134
~	27/64	2-7/8	27/64	4-1/2	40-4219	41-4219
~	.4331	2-7/8	.4331	4-1/2	40-4332	41-4332
~	7/16	2-7/8	7/16	4-1/2	40-4375	41-4375
~	.4527	3	.4527	4-3/4	40-4527	41-4527
~	29/64	3	29/64	4-3/4	40-4531	41-4531
~	15/32	3	15/32	4-3/4	40-4688	41-4688
~	.4724	3	.4724	4-3/4	40-4724	41-4724
~	31/64	3	31/64	4-3/4	40-4844	41-4844
~	.4921	3	.4921	4-3/4	40-4921	41-4921
~	1/2	3	1/2	4-3/4	40-5000	41-5000
~	17/32	4	17/32	6	40-5312	41-5312
~	9/16	4	9/16	6	40-5625	41-5625
~	19/32	4	19/32	6	40-5938	41-5938
~	5/8	4	5/8	6	40-6250	41-6250
~	21/32	4	21/32	6	40-6562	41-6562
~	11/16	4	11/16	6	40-6875	41-6875
~	23/32	4	23/32	6	40-7188	41-7188
~	3/4	4	3/4	6	40-7500	41-7500
~	7/8	4	7/8	6	40-8750	41-8750
~	1	4	1	6	40-1	41-1



D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002



Stub Length Drills

2 Flute 27° Helix 118° Four Facet Point

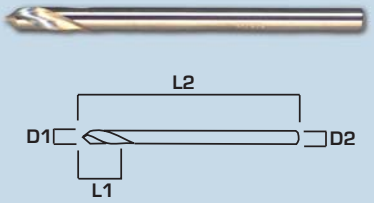
D1	L1	D2	L2	Part #	TiN Part #
0.1065	5/8	0.1065	2	43-1065	43-1065TN
0.1130	5/8	0.1130	2	43-1130	43-1130TN
1/8	5/8	1/8	2	43-1250	43-1250TN
0.1360	5/8	0.1360	2	43-1360	43-1360TN
9/64	5/8	9/64	2	43-1406	43-1406TN
0.1495	3/4	0.1495	2-1/2	43-1495	43-1495TN
5/32	3/4	5/32	2-1/2	43-1562	43-1562TN
0.1570	3/4	0.1570	2-1/2	43-1570	43-1570TN
11/64	3/4	11/64	2-1/2	43-1719	43-1719TN
3/16	3/4	3/16	2-1/2	43-1875	43-1875TN
13/64	3/4	13/64	2-1/2	43-2031	43-2031TN
0.2130	1	0.2130	2-1/2	43-2130	43-2130TN
7/32	1	7/32	2-1/2	43-2188	43-2188TN
15/64	1	15/64	2-1/2	43-2344	43-2344TN
1/4	1	1/4	2-1/2	43-2500	43-2500TN
0.2570	1	0.2570	2-1/2	43-2570	43-2570TN
17/64	1	17/64	2-1/2	43-2656	43-2656TN
0.2720	1	0.2720	2-1/2	43-2720	43-2720TN
0.2786	1-1/4	0.2756	2-1/2	43-2756	43-2756TN
9/32	1	9/32	2-1/2	43-2812	43-2812TN
19/64	1-1/4	19/64	2-3/4	43-2969	43-2969TN
5/16	1-1/4	5/16	2-3/4	43-3125	43-3125TN
21/64	1-1/4	21/64	2-3/4	43-3281	43-3281TN
11/32	1-1/4	11/32	3	43-3438	43-3438TN
23/64	1-1/4	23/64	3	43-3594	43-3594TN
3/8	1-1/4	3/8	3	43-3750	43-3750TN
25/64	1-1/4	25/64	3	43-3906	43-3906TN
13/32	1-1/4	13/32	3	43-4062	43-4062TN
27/64	1-1/4	27/64	3	43-4219	43-4219TN
7/16	1-1/4	7/16	3	43-4375	43-4375TN
29/64	1-1/4	29/64	3	43-4531	43-4531TN
15/32	1-1/4	15/32	3	43-4688	43-4688TN
31/64	1-1/4	31/64	3	43-4844	43-4844TN
1/2	1-1/4	1/2	3	43-5000	43-5000TN
9/16	1-1/4	9/16	3-1/2	43-5625	43-5625TN
5/8	1-1/2	5/8	3-1/2	43-6250	43-6250TN
3/4	1-1/2	3/4	4	43-7500	43-7500TN

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Cutting Edge Tolerance/Shank Tolerance
+.000 -.0002

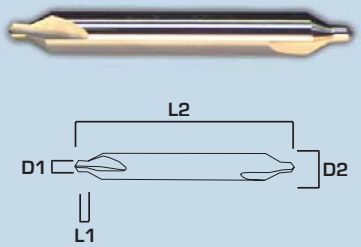
NC Spotting Drills

D1	L1	D2	L2	Point Angle	EDP#
1/8	3/8	1/8	2	90°	90500
3/16	3/4	3/16	3	90°	90510
1/4	3/4	1/4	3	90°	90520
3/8	1	3/8	3	90°	90530
1/2	1	1/2	4	90°	90540
1/8	3/8	1/8	2	120°	90610
3/16	3/4	3/16	3	120°	90620
1/4	3/4	1/4	3	120°	90630
3/8	1	3/8	3	120°	90640
1/2	1	1/2	4	120°	90650



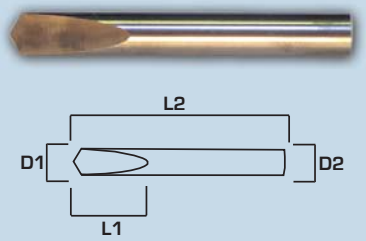
Solid Carbide CenterDrills

D1	L1	D2	L2	Size#	EDP# 60 Degree	EDP# 82 Degree	EDP# 90 Degree
3/64	3/64	1/8	1-1/2	1	90001	90011	90021
5/64	5/64	3/16	2	2	90002	90012	90022
7/64	7/64	1/4	2	3	90003	90013	90023
1/8	1/8	5/16	2-1/8	4	90004	90014	90024
3/16	3/16	7/16	2-3/4	5	90005	90015	90025
7/32	7/32	1/2	3	6	90006	90016	90026
1/4	1/4	5/8	3-1/8	7	90007	90017	90027
5/16	5/16	3/4	3-3/8	8	90008	90018	90028



Spade Drills

D1	L1	D2	L2	STD
1/8	7/16	1/8	1-1/2	40000
3/16	9/16	3/16	2	40100
1/4	11/16	1/4	2	40200
5/16	7/8	5/16	2-1/2	40300
3/8	1	3/8	2-1/2	40400
1/2	1-1/8	1/2	2-1/2	40500
Sets - Includes 40000, 40100, 40200, 40300, 40400, and 40500				40600



D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Bur Part Number Codes

L6 - 6 Inch Shank (150 mm)
L4 - 4 Inch Shank (100 mm)
L3 - 3 Inch Shank (75 mm)

R - 3/8 Diameter Shank (8 mm)

X - Solid Carbide (Bur and Shank)

ECO - Endcut Only

SC - Singlecut
DC - Doublecut
DM - Diamondcut
CB - Chipbreaker
FM - Fastmill Cut/Alumacut
FC - Fine Cut
CC - Coarse Cut

Example

SL-5L6RDC

- SL SHAPE
- CUTTER SIZE
- 6 INCH SHANK
- 3/8 SHANK DIAMETER
- DOUBLECUT

Bur Shapes and Sizes

We carry burs in all shapes and sizes.
We can also customize any bur to your needs.

Bur Cut Types

Single Cut (SC)

Chipbreaker Cut (CB)

Double Cut (DC)

Diamond Cut (DM)

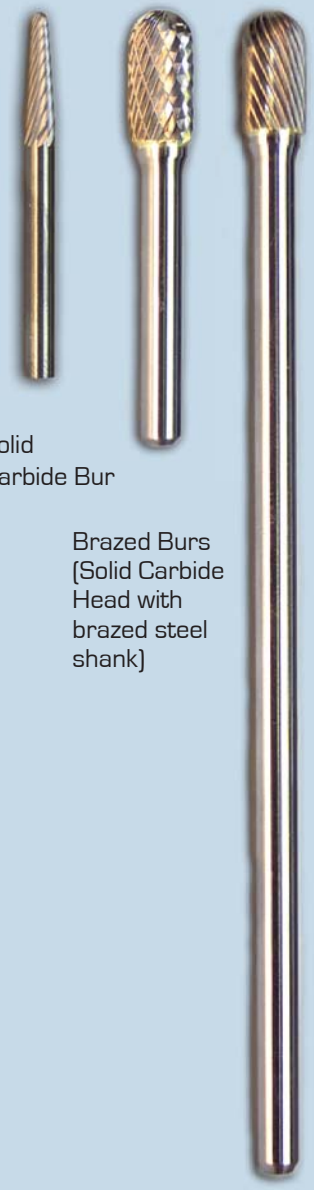
Fastmill Cut-Alumacut (FM)

Bur Use Data

General Bur Speed Recommendations

The following chart is a general and approximate recommendation. Variations to achieve desired results may be necessary. Long shank burs should be used at reduced speeds.

Bur Diameter	RPM
1/8 or 3mm Solid Carbide	45,000-50,000
3/16 or 5mm Solid Carbide	35,000-40,000
3/16 or 5mm Carbide Head Brazed to 1/8 or 3mm Steel Shank	30,000-35,000
1/4 or 6mm Solid Carbide	30,000-35,000
1/4 or 6mm Carbide Head Brazed to 1/8 or 3mm Steel Shank	25,000-30,000
5/16 or 8mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	25,000-30,000
3/8 or 10mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	25,000-30,000
7/16 or 11mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	20,000-25,000
1/2 or12mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	20,000-25,000
5/8 or 16mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	15,000-20,000
¾ or18mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	15,000-20,000
1" or 25mm Carbide Head Brazed to 1/4 or 6mm Steel Shank	12,000-18,000



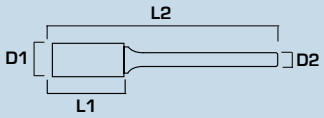
Solid Carbide Bur

Brazed Burs (Solid Carbide Head with brazed steel shank)

Long Series - Brazed Burs (Solid Carbide Head with brazed steel shank) Denoted with "L6" in part number

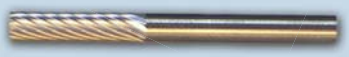
General Bur Cut Type Applications

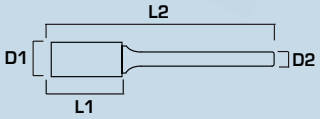
Materials	Doublecut	Singlecut	Alumacut	Diamondcut	Chipbreaker
Aluminum			✓	✓	
Brass, Bronze, Copper	✓	✓			✓
Fiberglass				✓	
Cast Iron	✓	✓		✓	
Plastics			✓	✓	
Steel: 40-55rc	✓	✓		✓	✓
Steel: 55-60rc	✓	✓		✓	✓
Steel: Carbon	✓	✓			✓
Steel Nickel, Chrome	✓	✓		✓	✓
Stainless Steel	✓	✓			✓
Steel Weldments	✓	✓			✓
Titanium	✓	✓			✓
Zinc			✓		



SA Burs - Cylindrical No Endcut

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/16	1/4	1/8	1-1/2	SA-41SC*	SA-41DC*	SA-41FM*
3/32	7/16	1/8	1-1/2	SA-42SC*	SA-42DC*	SA-42FM*
1/8	9/16	1/8	1-1/2	SA-43SC*	SA-43DC*	SA-43FM*
1/4	1/2	1/8	2	SA-51SC	SA-51DC	SA-51FM
1/8	5/8	1/4	2	SA-12SC*	SA-12DC*	SA-12FM*
3/16	5/8	1/4	2	SA-14SC*	SA-14DC*	SA-14FM*
1/4	5/8	1/4	2	SA-1SC*	SA-1DC*	SA-1FM*
1/4	5/8	1/4	6-3/4	SA-1L6SC	SA-1L6DC	SA-1L6FM
5/16	3/4	1/4	2-1/2	SA-2SC	SA-2DC	SA-2FM
3/8	3/4	1/4	2-1/2	SA-3SC	SA-3DC	SA-3FM
3/8	3/4	1/4	6-3/4	SA-3L6SC	SA-3L6DC	SA-3L6FM
7/16	1	1/4	2-3/4	SA-4SC	SA-4DC	SA-4FM
1/2	1	1/4	2-3/4	SA-5SC	SA-5DC	SA-5FM
1/2	1	1/4	7	SA-5L6SC	SA-5L6DC	SA-5L6FM
5/8	1	1/4	2-3/4	SA-6SC	SA-6DC	SA-6FM
3/4	3/4	1/4	2-1/2	SA-16SC	SA-16DC	SA-16FM
3/4	1	1/4	2-3/4	SA-7SC	SA-7DC	SA-7FM
1	1	1/4	2-3/4	SA-9SC	SA-9DC	SA-9FM





SB Burs - Cylindrical With Endcut

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/16	1/4	1/8	1-1/2	SB-41SC*	SB-41DC*	SB-41FM*
3/32	7/16	1/8	1-1/2	SB-42SC*	SB-42DC*	SB-42FM*
1/8	9/16	1/8	1-1/2	SB-43SC*	SB-43DC*	SB-43FM*
1/4	3/16	1/8	2-15/16	SB-51SC	SB-51DC	SB-51FM
1/8	5/8	1/4	2	SB-12SC*	SB-12DC*	SB-12FM*
3/16	5/8	1/4	2	SB-14SC*	SB-14DC*	SB-14FM*
1/4	5/8	1/4	2	SB-1SC*	SB-1DC*	SB-1FM*
1/4	5/8	1/4	6-3/4	SB-1L6SC	SB-1L6DC	SB-1L6FM
5/16	3/4	1/4	2-1/2	SB-2SC	SB-2DC	SB-2FM
3/8	3/4	1/4	2-1/2	SB-3SC	SB-3DC	SB-3FM
3/8	3/4	1/4	6-3/4	SB-3L6SC	SB-3L6DC	SB-3L6FM
7/16	1	1/4	2-3/4	SB-4SC	SB-4DC	SB-4FM
1/2	1	1/4	2-3/4	SB-5SC	SB-5DC	SB-5FM
1/2	1	1/4	7	SB-5L6SC	SB-5L6DC	SB-5L6FM
5/8	1	1/4	2-3/4	SB-6SC	SB-6DC	SB-6FM
3/4	3/4	1/4	2-1/2	SB-16SC	SB-16DC	SB-16FM
3/4	1	1/4	2-3/4	SB-7SC	SB-7DC	SB-7FM
1	1	1/4	2-3/4	SB-9SC	SB-9DC	SB-9FM

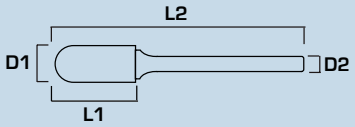
* Denotes Solid Carbide

Burs also available in Chipbreaker and Diamondcut

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

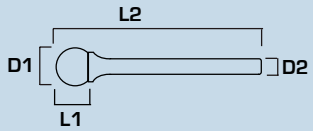
SC Burs - Radius Cylinder

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
3/32	7/16	1/8	1-1/2	SC-41SC*	SC-41DC*	SC-41FM*
1/8	9/16	1/8	1-1/2	SC-42SC*	SC-42DC*	SC-42FM*
1/4	1/2	1/8	2	SC-51SC	SC-51DC	SC-51FM
1/8	5/8	1/4	2	SC-12SC*	SC-12DC*	SC-12FM*
3/16	5/8	1/4	2	SC-14SC*	SC-14DC*	SC-14FM*
1/4	5/8	1/4	2	SC-1SC*	SC-1DC*	SC-1FM*
1/4	5/8	1/4	6-3/4	SC-1L6SC	SC-1L6DC	SC-1L6FM
5/16	3/4	1/4	2-1/2	SC-2SC	SC-2DC	SC-2FM
3/8	3/4	1/4	2-1/2	SC-3SC	SC-3DC	SC-3FM
3/8	3/4	1/4	6-3/4	SC-3L6SC	SC-3L6DC	SC-3L6FM
7/16	1	1/4	2-3/4	SC-4SC	SC-4DC	SC-4FM
1/2	1	1/4	2-3/4	SC-5SC	SC-5DC	SC-5FM
1/2	1	1/4	7	SC-5L6SC	SC-5L6DC	SC-5L6FM
5/8	1	1/4	2-3/4	SC-6SC	SC-6DC	SC-6FM
5/8	1	1/4	7	SC-6L6SC	SC-6L6DC	SC-6L6FM
3/4	1	1/4	2-3/4	SC-7SC	SC-7DC	SC-7FM



SD Burs - Ball Shape

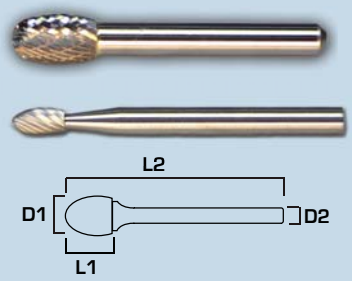
D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
3/32	3/32	1/8	1-1/2	SD-41SC*	SD-41DC*	SD-41FM*
1/8	1/8	1/8	1-1/2	SD-42SC*	SD-42DC*	SD-42FM*
1/4	7/32	1/8	2	SD-51SC	SD-51DC	SD-51FM
1/8	3/32	1/4	2	SD-12SC*	SD-12DC*	SD-12FM*
3/16	1/8	1/4	2	SD-14SC*	SD-14DC*	SD-14FM*
1/4	7/32	1/4	2	SD-1SC*	SD-1DC*	SD-1FM*
1/4	7/32	1/4	6-3/4	SD-1L6SC	SD-1L6DC	SD-1L6FM
5/16	1/4	1/4	2-1/16	SD-2SC	SD-2DC	SD-2FM
3/8	5/16	1/4	2-1/8	SD-3SC	SD-3DC	SD-3FM
3/8	5/16	1/4	6-3/8	SD-3L6SC	SD-3L6DC	SD-3L6FM
7/16	3/8	1/4	2-3/16	SD-4SC	SD-4DC	SD-4FM
1/2	7/16	1/4	2-1/4	SD-5SC	SD-5DC	SD-5FM
1/2	7/16	1/4	6-1/2	SD-5L6SC	SD-5L6DC	SD-5L6FM
5/8	9/16	1/4	2-3/8	SD-6SC	SD-6DC	SD-6FM
3/4	11/16	1/4	2-1/2	SD-7SC	SD-7DC	SD-7FM
1	15/16	1/4	2-3/4	SD-9SC	SD-9DC	SD-9FM



* Denotes Solid Carbide

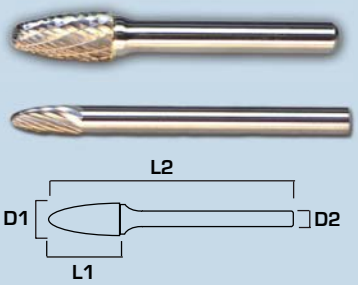
D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length

Burs also available in Chipbreaker and Diamondcut



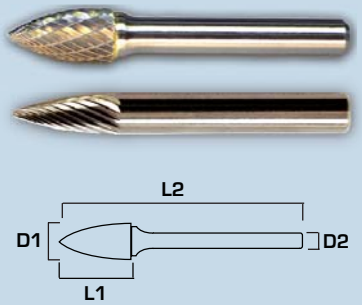
SE Burs - Oval Shape

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	7/32	1/8	1-1/2	SE-41SC*	SE-41DC*	SE-41FM*
1/4	3/8	1/8	1-3/4	SE-51SC	SE-51DC	SE-51FM
1/4	3/8	1/4	2	SE-1SC*	SE-1DC*	SE-1FM*
1/4	3/8	1/4	6-3/4	SE-1L6SC	SE-1L6DC	SE-1L6FM
3/8	5/8	1/4	2-3/8	SE-3SC	SE-3DC	SE-3FM
3/8	5/8	1/4	6-5/8	SE-3L6SC	SE-3L6DC	SE-3L6FM
1/2	7/8	1/4	2-5/8	SE-5SC	SE-5DC	SE-5FM
1/2	7/8	1/4	6-7/8	SE-5L6SC	SE-5L6DC	SE-5L6FM
5/8	1	1/4	2-3/4	SE-6SC	SE-6DC	SE-6FM
3/4	1	1/4	2-3/4	SE-7SC	SE-7DC	SE-7FM



SF Burs - Tree Shape

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	1/4	1/8	1-1/2	SF-41SC*	SF-41DC*	SF-41FM*
1/8	1/2	1/8	1-1/2	SF-42SC*	SF-42DC*	SF-42FM*
1/4	1/2	1/8	2	SF-51SC	SF-51DC	SF-51FM
1/8	1/2	1/4	2	SF-12SC*	SF-12DC*	SF-12FM*
1/4	5/8	1/4	2	SF-1SC*	SF-1DC*	SF-1FM*
1/4	5/8	1/4	6-3/4	SF-1L6SC	SF-1L6DC	SF-1L6FM
3/8	3/4	1/4	2-1/2	SF-3SC	SF-3DC	SF-3FM
3/8	3/4	1/4	6-3/4	SF-3L6SC	SF-3L6DC	SF-3L6FM
7/16	1	1/4	2-3/4	SF-4SC	SF-4DC	SF-4FM
1/2	3/4	1/4	2-1/2	SF-13SC	SF-13DC	SF-13FM
1/2	1	1/4	2-3/4	SF-5SC	SF-5DC	SF-5FM
1/2	1	1/4	7	SF-5L6SC	SF-5L6DC	SF-5L6FM
5/8	1	1/4	2-3/4	SF-6SC	SF-6DC	SF-6FM
3/4	1	1/4	2-3/4	SF-7SC	SF-7DC	SF-7FM
3/4	1-1/4	1/4	3	SF-14SC	SF-14DC	SF-14FM
3/4	1-1/2	1/4	3-1/4	SF-15SC	SF-15DC	SF-15FM

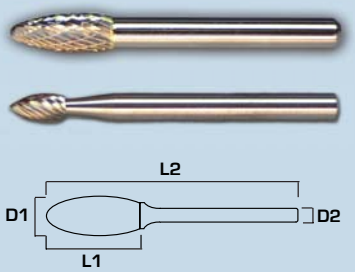


SG Burs - Pointed Tree

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	1/4	1/8	1-1/2	SG-41SC*	SG-41DC*	SG-41FM*
1/8	3/8	1/8	1-1/2	SG-43SC*	SG-43DC*	SG-43FM*
1/8	1/2	1/8	1-1/2	SG-44SC*	SG-44DC*	SG-44FM*
1/4	1/2	1/8	2	SG-51SC	SG-51DC	SG-51FM
1/4	5/8	1/4	2	SG-1SC*	SG-1DC*	SG-1FM*
1/4	5/8	1/4	6-3/4	SG-1L6SC	SG-1L6DC	SG-1L6FM
5/16	3/4	1/4	2-1/2	SG-2SC	SG-2DC	SG-2FM
3/8	3/4	1/4	2-1/2	SG-3SC	SG-3DC	SG-3FM
3/8	3/4	1/4	6-3/4	SG-3L6SC	SG-3L6DC	SG-3L6FM
1/2	3/4	1/4	2-1/2	SG-13SC	SG-13DC	SG-13FM
1/2	1	1/4	2-3/4	SG-5SC	SG-5DC	SG-5FM
1/2	1	1/4	6-3/4	SG-5L6SC	SG-5L6DC	SG-5L6FM
5/8	1	1/4	2-3/4	SG-6SC	SG-6DC	SG-6FM
3/4	1	1/4	2-3/4	SG-7SC	SG-7DC	SG-7FM
3/4	1-1/2	1/4	3-1/4	SG-15SC	SG-15DC	SG-15FM

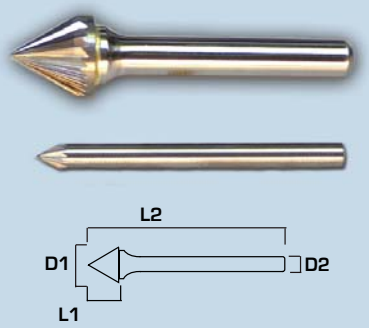
SH Burs - Flame Shape

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	1/4	1/8	1-1/2	SH-41SC*	SH-41DC*	SH-41FM*
1/4	1/2	1/4	2	SH-1SC*	SH-1DC*	SH-1FM*
1/4	1/2	1/4	6-3/4	SH-1L6SC	SH-1L6DC	SH-1L6FM
5/16	3/4	1/4	2-1/2	SH-2SC	SH-2DC	SH-2FM
5/16	3/4	1/4	6	SH-2L6SC	SH-2L6DC	SH-2L6FM
1/2	1-1/4	1/4	3	SH-5SC	SH-5DC	SH-5FM
1/2	1-1/4	1/4	7-1/4	SH-5L6SC	SH-5L6DC	SH-5L6FM
5/8	1-7/16	1/4	3-3/16	SH-6SC	SH-6DC	SH-6FM
3/4	1-5/8	1/4	3-3/8	SH-7SC	SH-7DC	SH-7FM



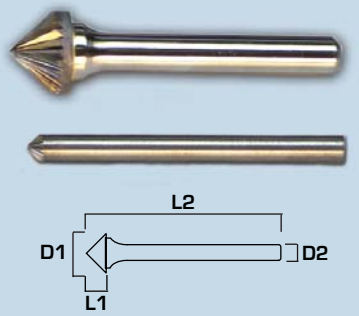
SJ Burs - 60° Included Cone

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	3/32	1/8	1-1/2	SJ-42SC*	SJ-42DC*	SJ-42FM*
1/8	3/32	1/8	1-1/2	SJ-42DESC*^	SJ-42DEDC*^	SJ-42DEFM*^
3/16	3/16	3/16	2	SJ-81SC	SJ-81DC	SJ-81FM
1/4	3/16	1/4	2	SJ-1SC*	SJ-1DC*	SJ-1FM*
1/4	3/16	1/4	2	SJ-1DESC*^	SJ-1DEDC*^	SJ-1DEFM*^
5/16	5/16	1/4	2-1/16	SJ-2SC	SJ-2DC	SJ-2FM
3/8	5/16	1/4	2-1/16	SJ-3SC	SJ-3DC	SJ-3FM
1/2	7/16	1/4	2-3/16	SJ-5SC	SJ-5DC	SJ-5FM
5/8	9/16	1/4	2-5/16	SJ-6SC	SJ-6DC	SJ-6FM
3/4	11/16	1/4	2-7/16	SJ-7SC	SJ-7DC	SJ-7FM
1	15/16	1/4	2-9/16	SJ-9SC	SJ-9DC	SJ-9FM



SK Burs - 90° Included Cone

D1	L1	D2	L2	Singlecut	Doublecut	Alumacut
1/8	1/16	1/8	1-1/2	SK-42SC*	SK-42DC*	SK-42FM*
1/8	1/16	1/8	1-1/2	SK-42DESC*^	SK-42DEDC*^	SK-42DEFM*^
1/4	1/8	1/4	2	SK-1SC*	SK-1DC*	SK-1FM*
1/4	1/8	1/4	2	SK-1SCDE*^	SK-1DEDC*^	SK-1DEFM*^
5/16	3/16	1/4	1-15/16	SK-2SC	SK-2DC	SK-2FM
3/8	3/16	1/4	1-15/16	SK-3SC	SK-3DC	SK-3FM
7/16	1/4	1/4	2	SK-4SC	SK-4DC	SK-4FM
1/2	1/4	1/4	2	SK-5SC	SK-5DC	SK-5FM
5/8	5/16	1/4	2-1/16	SK-6SC	SK-6DC	SK-6FM
3/4	3/8	1/4	2-1/8	SK-7SC	SK-7DC	SK-7FM
1	1/2	1/4	2-1/4	SK-9SC	SK-9DC	SK-9FM

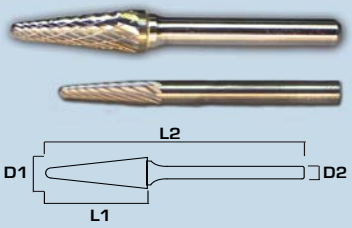


* Denotes Solid Carbide

*^ Double End

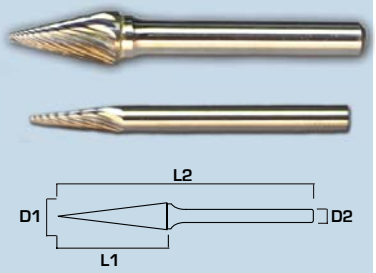
Burs also available in Chipbreaker and Diamondcut

D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length



SL Burs - 14° Included Cone

D1	L1	D2	L2	DEG	Singlecut	Doublecut	Alumacut
1/8	3/8	1/8	1-1/2	8°	SL-41SC*	SL-41DC*	SL-41FM*
1/8	1/2	1/8	1-1/2	8°	SL-42SC*	SL-42DC*	SL-42FM*
1/4	5/8	1/4	2	14°	SL-1SC*	SL-1DC*	SL-1FM*
1/4	5/8	1/4	6-3/4	14°	SL-1L6SC	SL-1L6DC	SL-1L6FM
5/16	7/8	1/4	2-5/8	14°	SL-2SC	SL-2DC	SL-2FM
3/8	1-1/16	1/4	2-13/16	14°	SL-3SC	SL-3DC	SL-3FM
3/8	1-1/16	1/4	7-1/16	14°	SL-3L6SC	SL-3L6DC	SL-3L6FM
1/2	1-1/8	1/4	2-7/8	14°	SL-4SC	SL-4DC	SL-4FM
1/2	1-1/8	1/4	7-1/8	14°	SL-4L6SC	SL-4L6DC	SL-4L6FM
5/8	1-3/16	1/4	2-15/16	14°	SL-5SC	SL-5DC	SL-5FM
5/8	1-5/16	1/4	3-1/16	14°	SL-6SC	SL-6DC	SL-6FM
3/4	1-1/2	1/4	3-1/4	14°	SL-7SC	SL-7DC	SL-7FM



SM Burs - Pointed Cone Shape

D1	L1	D2	L2	DEG	Singlecut	Doublecut	Alumacut
1/8	11/32	1/8	1-1/2	12°	SM-41SC*	SM-41DC*	SM-41FM*
1/8	7/16	1/8	1-1/2	14°	SM-42SC*	SM-42DC*	SM-42FM*
1/8	5/8	1/8	1-1/2	7°	SM-43SC*	SM-43DC*	SM-43FM*
1/4	1/2	1/8	2-1/8	22°	SM-51SC	SM-51DC	SM-51FM
1/4	1/2	1/4	2	22°	SM-1SC*	SM-1DC*	SM-1FM*
1/4	1/2	1/4	6-3/4	14°	SM-1L6SC	SM-1L6DC	SM-1L6FM
1/4	3/4	1/4	2	14°	SM-2SC	SM-2DC	SM-2FM
1/4	3/4	1/4	6-3/4	14°	SM-2L6SC	SM-2L6DC	SM-2L6FM
1/4	1	1/4	2	14°	SM-3SC*	SM-3DC*	SM-3FM*
3/8	5/8	1/4	2-1/2	14°	SM-4SC	SM-4DC	SM-4FM
3/8	5/8	1/4	6-5/8	14°	SM-4L6SC	SM-4L6DC	SM-4L6FM
1/2	7/8	1/4	2-5/8	14°	SM-5SC	SM-5DC	SM-5FM
1/2	7/8	1/4	6-7/8	14°	SM-5L6SC	SM-5L6DC	SM-5L6FM
5/8	1	1/4	2-3/4	14°	SM-6SC	SM-6DC	SM-6FM

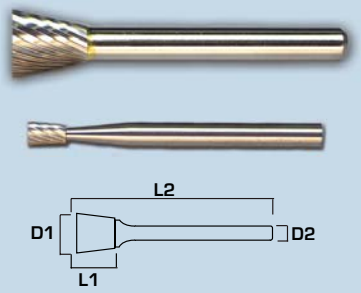
* Denotes Solid Carbide

D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Burs also available in Chipbreaker and Diamondcut

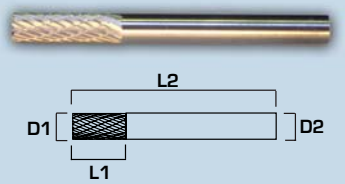
SN Burs - Inverted Cone Shape

D1	L1	D2	L2	DEG	Singlecut	Doublecut	Alumacut
3/32	1/8	1/8	1-1/2	10°	SN-41SC*	SN-41DC*	SN-41FM*
1/8	3/16	1/8	1-1/2	10°	SN-42SC*	SN-42DC*	SN-42FM*
1/4	1/4	1/8	1-3/4	10°	SN-51SC	SN-51DC	SN-51FM
1/4	5/16	1/4	2	10°	SN-1SC*	SN-1DC*	SN-1FM*
1/4	5/16	1/4	6-3/4	10°	SN-1L6SC	SN-1L6DC	SN-1L6FM
3/8	3/8	1/4	2-1/8	13°	SN-2SC	SN-2DC	SN-2FM
1/2	1/2	1/4	2-1/4	16°	SN-3SC	SN-3DC	SN-3FM
1/2	1/2	1/4	2-1/4	28°	SN-4SC	SN-4DC	SN-4FM
1/2	1/2	1/4	6-1/2	28°	SN-4L6SC	SN-4L6DC	SN-4L6FM
5/8	5/8	1/4	2-3/8	19°	SN-5SC	SN-5DC	SN-5FM
5/8	3/4	1/4	2-1/2	18°	SN-6SC	SN-6DC	SN-6FM
3/4	5/8	1/4	2-3/8	30°	SN-7SC	SN-7DC	SN-7FM



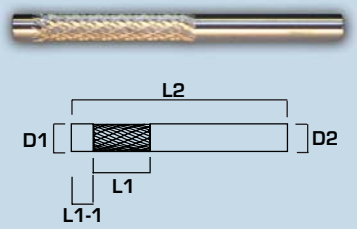
Die mills

D1	L1	D2	L2	STD	Coarse
1/8	1/2	1/8	1-1/2	28000	28020
5/32	1/2	3/16	2	28100	28120
3/16	5/8	3/16	2	28200	28220
1/4	3/4	1/4	2	28300	28320
5/16	13/16	5/16	2-1/2	28400	28420
3/8	1	3/8	2-1/2	28500	28520
7/16	1	7/16	3	28600	28620
1/2	1	1/2	3	28700	28720



Piloted Die mills

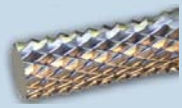
D1	L1	L1-1	D2	L2	Doublecut	Singlecut
1/8	1	1/8	1/8	3	22000	22001
3/16	2	3/16	3/16	3	22100	22101
1/4	1-1/4	1/4	1/4	3	22200	22201
3/8	2	3/8	3/8	4	22300	22301
1/2	2	1/2	1/2	4	22400	22401



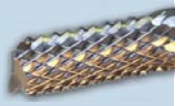
* Denotes Solid Carbide

Burs also available in Chipbreaker and Diamondcut

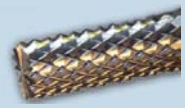
D1 - Cutting Diameter
L 1 - Cutting Length
D2 - Shank Diameter
L 2 - Overall Length



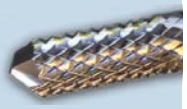
Plain End



Mill End



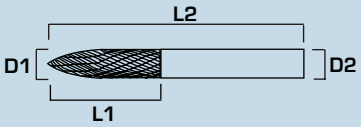
Bur End



Drill End

Fiberglass Routers

D1	L1	D2	L2	Plain (A)	Burend (B)	Millend (C)	Drillend (D)
1/16	3/16	1/8	1-1/2	FGR1A	FGR1B	FGR1C	FGR1D
3/32	3/8	1/8	1-1/2	FGR1-1A	FGR1-1B	FGR1-1C	FGR1-1D
1/8	1/2	1/8	1-1/2	FGR2A	FGR2B	FGR2C	FGR2D
3/16	5/8	3/16	2	FGR3A	FGR3B	FGR3C	FGR3D
3/16	5/8	1/4	2	FGR4A	FGR4B	FGR4C	FGR4D
1/4	3/4	1/4	2	FGR5A	FGR5B	FGR5C	FGR5D
1/4	3/4	1/4	2-1/2	FGR6A	FGR6B	FGR6C	FGR6D
1/4	1	1/4	2-1/2	FGR6-0A	FGR6-0B	FGR6-0C	FGR6-0D
1/4	3/4	1/4	3	FGR6-1A	FGR6-1B	FGR6-1C	FGR6-1D
1/4	1	1/4	3	FGR6-2A	FGR6-2B	FGR6-2C	FGR6-2D
5/16	1	5/16	2-1/2	FGR7A	FGR7B	FGR7C	FGR7D
3/8	1	3/8	2-1/2	FGR8A	FGR8B	FGR8C	FGR8D
1/2	1	1/2	3	FGR9A	FGR9B	FGR9C	FGR9D



Tire Burs

D1	L1	D2	L2	Round Shank	Tri-Shank
3/16	1	3/16	2	STB-011	STB-011T
3/16	2	3/16	3	STB-012	STB-012T
7/32	2	1/4	3	STB-013	STB-013T
1/4	2	1/4	3	STB-014	STB-014T
5/16	1-1/2	5/16	3	STB-015	STB-015T
5/16	2	5/16	4	STB-016	STB-016T
3/8	3	3/8	4-1/2	STB-017	STB-017T
1/2	3	3/8	5	STB-018	STB-018T

Home Improvement Burs

D1	L1	D2	L2	Item	Application
1/8	1	1/8	2	TC1D	Tile
1/4	1	1/4	2	TC4D	Tile
1/4	1-1/4	1/4	2-1/16	DW-2	Drywall
3/32	9/16	1/8	1-1/2	GC1D	Grout
5/32	3/8	5/32	2	MC4	Sheet Metal

DW-2 Drywall, DuraRock

TC4D Wall Tile, FiberRock, Cement, Board

TC1D Wall Tile Cutter

GC1D Upside down

MC4 Sheet Metal Cutter

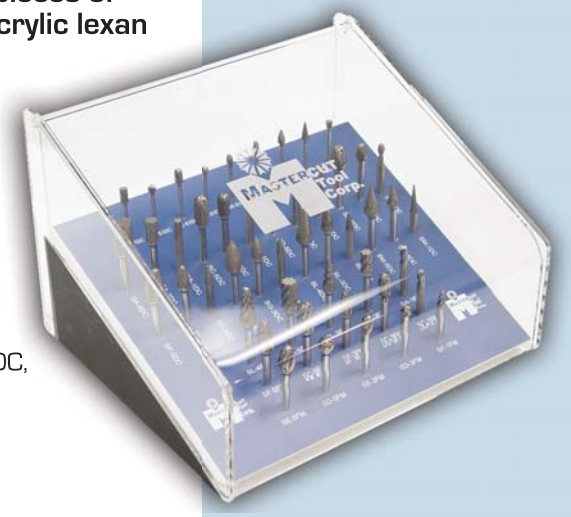
D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Bur Sets

BURS INCLUDED	Singlecut	Doublecut	Alumacut
SA43, SA42, SC42, SC41, SD42, SE41, SF41, SG41, SH41, SJ41, SL42, SN42	SETM100WSC	SETM100WDC	~
SA51, SB51, SC51, SD51, SE51, SF51, SG51, SM51, SN51	SETM110WSC	SETM110WDC	~
SA1, SC1, SD1, SE1, SF1, SG1, SH1, SJ1, SK1, SL1, SM1, SN1	SETM120WSC	SETM120WDC	~
SA1, SA3, SC1, SC3, SD1, SD3, SF1, SF3	SETM130WSC	SETM130WDC	SETM130WFM
SB1, SB3, SC1, SC3, SD1, SD3, SF1, SF3	SETM135WSC	SETM135WDC	SETM135WFM
SA3, SA5, SC3, SC5, SD3, SD5, SF3, SF5	SETM140WSC	SETM140WDC	SETM140WFM
SB3, SB5, SC3, SC5, SD3, SD5, SF3, SF5	SETM145WSC	SETM145WDC	SETM145WFM
SA5, SC3, SC5, SD5, SF3, SF5, SG3, SL4	SETM150WSC	SETM150WDC	SETM150WFM
SB5, SC3, SC5, SD5, SF3, SF5, SG3, SL4	SETM155WSC	SETM155WDC	SETM155WFM
SC3L6, SD3L6, SF3L6, SF5L6	SETM640SC	SETM640DC	SETM640FM

The Mastercut 48-Piece Countertop Display

The Mastercut 48-Piece Countertop Display showcases 48 pieces of our popular burs. The burs are showcased in a high quality acrylic lexan display with locking back panel.



The set includes:

Doublecut Burs (1/8 Shank)
SA-51DC, SB-51DC, SC-51DC, SD-51DC, SE-51DC, SF-51DC, SG-51DC, SM-51DC, SN-51DC

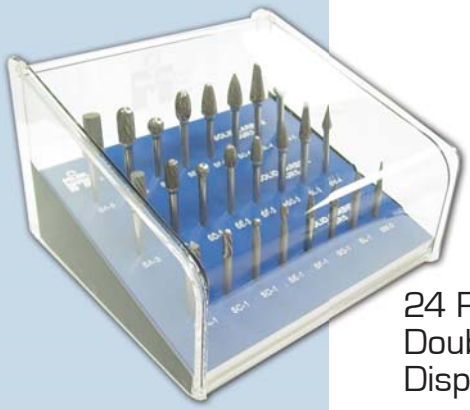
Doublecut Burs (1/4 Shank)
SA-1DC, SA-3DC, SA-5DC, SC-1DC, SC-3DC, SC-5DC, SD-1DC, SD-3DC, SD-5DC, SE-1DC, SE-3DC, SE-5DC, SF-1DC, SF-3DC, SF-5DC, SG-1DC, SG-3DC, SG-5DC, SL-4DC, SL-3DC, SL-1DC, SM-5DC, SM-4DC, SM-3DC

AlumaCut Burs (1/4 Shank)
SA-1FM, SA-3FM, SA-5FM, SC-1FM, SC-3FM, SC-5FM, SD-5FM, SD-3FM, SE-5FM, SE-3FM, SF-5FM, SF-3FM, SF-1FM, SL-4FM, SL-3FM

Description	Part Number
48 Piece Bur Display - includes 48 burs	DISPLAY2-48
48 Piece Bur Display Without 1/8th Shank Burs- includes 39 burs	DISPLAY2-39
Bur Set Without Plastic Display - includes 48 burs	DIS48-ND

Additional Bur Sets

Description	No. Of Pieces	Part Number
Plastic Pouch 6 Inch Shank Set Includes: SD-3L6DC, SF-5L6DC, SF-3L6DC, and SC-3L6DC	4	SET8170
Tire Bur Set Includes: 270, 271, and 271/38 in Clamshell Case	3	SET-TB1
Tire Bur Set Includes: 270, 270P, 271, and 271P in Clamshell Case	4	SET-TB2
24 Piece Display Includes: SA-5DC, SA-3DC, SA-1DC, SC-5DC, SC-3DC, SC-1DC, SD-5DC, SD-3DC, SD-1DC, SE-5DC, SE-3DC, SE-1DC, SF-5DC, SF-3DC, SF-1DC, SG-5DC, SG-3DC, SG-1DC, SL-4DC, SL-3DC, SL-1DC, SM-5DC, SM-4DC, SM-3DC	24	DISPLAY2
15 Piece Alumacut Display Includes: SA-1FM, SA-3FM, SA-5FM, SC-1FM, SC-3FM, SC-5FM, SD-3FM, SD-5FM, SE-3FM, SE-5FM, SF-1M, SF-3FM, SF-5FM, SL-3FM, SL-4FM Similar to 24 Piece display but with 15 holes.	15	SETBDIS250-FM
18 Piece 6 inch Shank Bur Dislpay Includes: SC-5L6DC, SC-3L6DC, SC-1L6DC, SE-5L6DC, SE-3L6DC, SE-1L6DC, SF-5L6DC, SF-3L6DC, SF-1L6DC, SC-5L6FM, SC-3L6FM, SC-1L6FM, SE-5L6FM, SE-3L6FM, SE-1L6FM, SF-5L6FM, SF-3L6FM, SF-1L6FM,	18	DISPLAY6-18



24 Piece Doublecut Bur Display

6 Inch Shank Bur Display

6 Inch Shank Plastic Pouch

Tirebur Set with Clamshell Case

Quality Control

At Mastercut Tool we take great pride in our high standards of quality control and in the accomplishments of your customers using our tools. Therefore, our bottom line is: **Our customers' success with our products is the measure of our success.** From advanced grinders and machinery, to great quality control personnel, our priority has always been providing you with the highest quality tools for your customers.

ISO 9001:2008 CERTIFIED
MASTERCUT TOOL CORP.
Cutting Edge Technology

Mastercut Tool Corp. successfully achieved registration under **ISO 9001:2000** on June 13, 2003 and continues to strive for the highest quality products, services, and more.

We at Mastercut have kept our quality system up to date and are now proud to be **ISO 9001:2008** certified.

Mastercut Automated Production System (M.A.P.S.)

Mastercut Automated Production System or MAPS is a production control technique which utilizes Simulators, Measuring Equipment, and Grinding Equipment in a process that ensures that our tools are consistent from differing manufacturing dates. Our process starts with a simulated grinding of a tool on a "Cyber Grinding Computer". Simulated grinding is faster and does not consume any physical resources. Upon a good simulation, a real carbide test tool is ground. The test tool is then inspected using advanced automated inspection equipment and compared to previously saved geometry. If it meets our standards, it is then and only then that the tool will go into production and the program to grind the tool is saved on a separate production server to be used on all future tool manufacturing runs.

Inspection

All of our tools receive a full inspection before being placed on our stock shelves. When the tool has finished the manufacturing cycle, it is given a detailed inspection of tool geometry. Every dimension is taken down, this includes general dimensions, such as radius and cutting edge length, and some not so common dimensions like secondary land width and rake angles. As tool complexity increases, so does the number of dimensions recorded. When the tool has passed the quality inspection, it then must go through another inspection while in cleaning and packaging. After cleaning and packaging, the tools are placed on our stock shelves awaiting your order.

Diagramming

Diagramming is an essential part of manufacturing customized tools to your specifications. Routinely, samples from both our customers special items, and our standard items are translated into AutoCAD format tool manufacturing prints. These prints are useful in maintaining accurate details of a tool for future measurements. Our tools are compared to these prints after each manufacturing cycle to ensure that the newly manufactured tools match the tools you purchased in the past.

Don't Forget to Check Out All That Mastercut Has to Offer

Mastercut Tool Corp. offers a full line of solid carbide cutting tools, both standards and special requests. Whether you are cutting wood, exotic metals, acrylic, or any other material, Mastercut has an ideal solution for all of your cutting tool needs.

We can also sharpen your dull cutters, regardless of manufacturer. Call or E-mail us for more information.

www.mastercuttool.com

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