



Rotary Cutting Tools

2009 Fractional

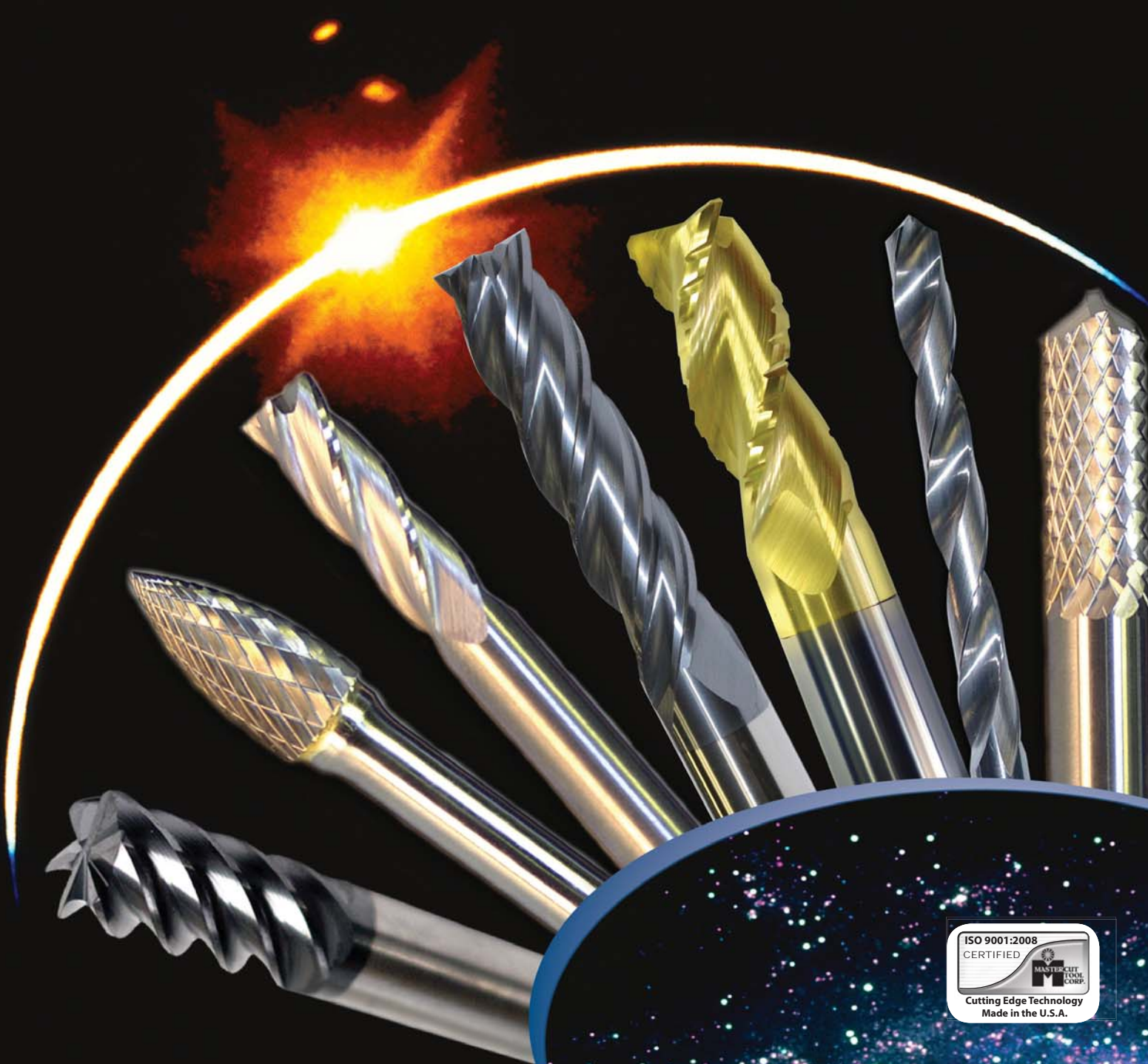


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Important Calculations

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

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

SFM (Surface Feet/Minute)

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

D1 (Diameter of Cutter)

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

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

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

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

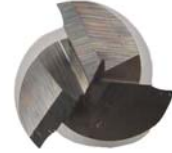
$$\text{Chip Load} = \frac{\text{Inches Per Minute}}{\text{R.P.M} \times \text{Number of Flutes}}$$

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

| 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 | | ✱ | ✱ | | |



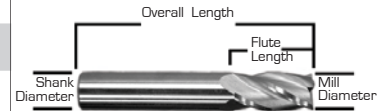
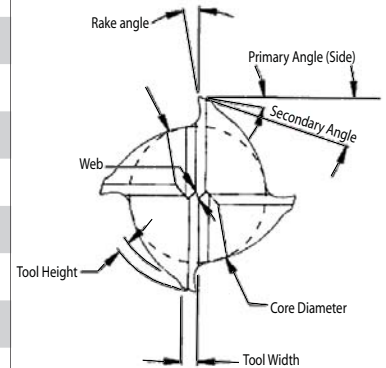
2 Flute



3 Flute



4 Flute



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.

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.

Resharpener

Mastercut Tool Corp. employs skilled craftsmen and advanced equipment to provide excellent resharpener 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 resharpener 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

Endmill Speeds and Feeds

| Material Group | Speed SFM | Feed Per Tooth (IPT) | | | |
|------------------------------|-----------|----------------------|--------------|--------------|------------|
| | | 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 |

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 its 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-fer-

rous 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

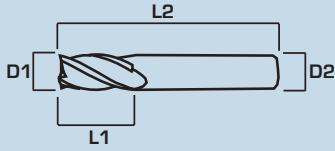
aluminum, certain non-ferrous and other abrasive materials. Tool life can be extended using the right combination of speeds, feeds and coolant.



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 |

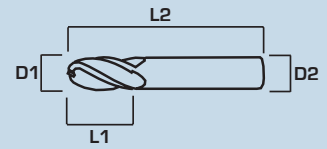
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

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

ENDMILLS

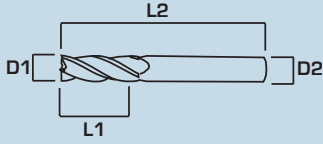
Ball End Standard Length Endmills

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

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



Long Length Endmills Square End

| D1 | L1 | D2 | L2 | 4 FL | | 2 FL | |
|------|-------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 |

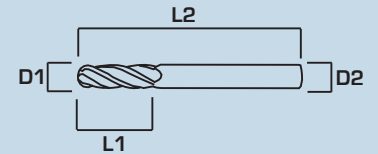
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

Cutting Edge Tolerance **+0.000 - .002**
 Shank Tolerance **h6**

ENDMILLS

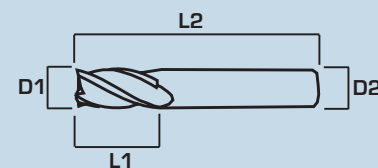
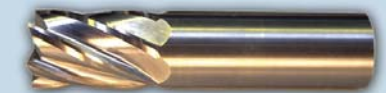
Long Length Endmills Ball End

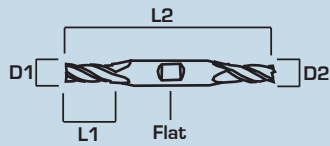
| D1 | L1 | D2 | L2 | 4 FL | | 2 FL | |
|------|-------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | PowerA |
| 1/8 | 5/8 | 1/8 | 2 | 53004 | 53005 | 53034 | 53035 |
| 1/8 | 3/4 | 1/8 | 2 | 54004 | 54005 | 54094 | 54095 |
| 1/8 | 1 | 1/8 | 3 | 53044 | 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

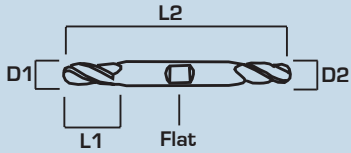
| D1 | L1 | D2 | L2 | Uncoated | | PowerA | |
|------|-------|------|-------|----------|--|--------|--|
| | | | | | | | |
| 3/16 | 5/8 | 3/16 | 2 | 50302 | | 50392 | |
| 1/4 | 3/4 | 1/4 | 2-1/2 | 50502 | | 50592 | |
| 5/16 | 7/8 | 5/16 | 2-1/2 | 50602 | | 50692 | |
| 3/8 | 1 | 3/8 | 2-1/2 | 50702 | | 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 | |





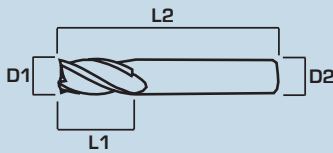
3/8 Common Shank Double End Endmills Square End

| 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 |

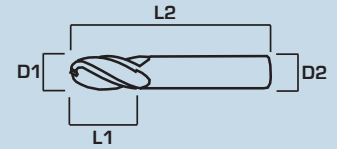
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

Cutting Edge Tolerance **+0.000 - .002**
 Shank Tolerance **h6**

ENDMILLS

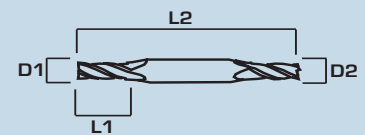
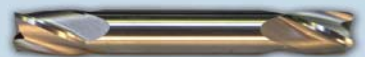
Stub Length Endmills Ball End

| D1 | L1 | D2 | L2 | 4 FL | | 2 FL | |
|------|------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 |



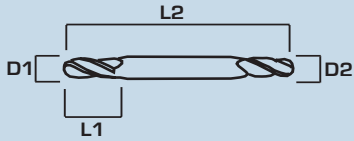
Standard Length Double End Endmills Square End

| D1 | L1 | D2 | L2 | 4 FL | | 2 FL | |
|------|-------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 |



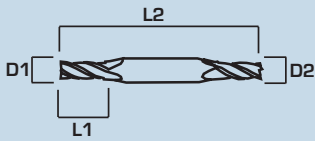
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

Cutting Edge Tolerance **+0.000 - .002**
 Shank Tolerance **h6**



Standard Length Double End Endmills Ball End

| D1 | L1 | D2 | L2 | 4 FL | 2 FL | 4 FL | 2 FL |
|------|-------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 | 2 FL | 4 FL | 2 FL |
|------|------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 |

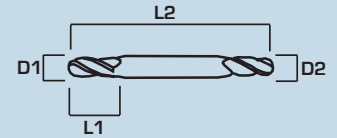
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

Cutting Edge Tolerance **+0.000 - .002**
 Shank Tolerance **h6**

ENDMILLS

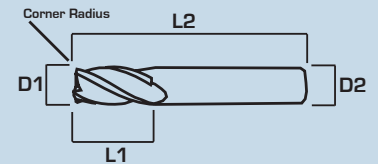
Stub Length Double End Endmills Ball End

| D1 | L1 | D2 | L2 | 4 FL | | 2 FL | |
|------|------|------|-------|----------|----------|--------|--------|
| | | | | Uncoated | Uncoated | PowerA | 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 | Corner Radius | | | | |
|------|-------|------|-------|---------------|-------------|-------------|-------------|-------------|
| | | | | .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 |



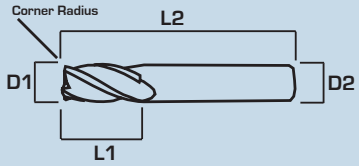
2 Flute Corner Radius Endmills

| D1 | L1 | D2 | L2 | Corner Radius | | | | |
|------|-------|------|-------|---------------|-------------|-------------|-------------|-------------|
| | | | | .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
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

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



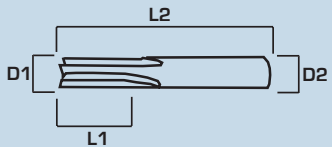
4 Flute Corner Radius Endmills

| 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 |
|------|-------|------|-------|---------------|---------------|-------------|-------------|
| | | | | 59000 | 59001 | 59090 | 59091 |
| 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

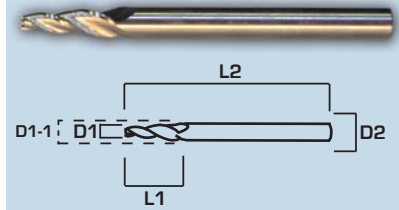
| D1 | L1 | D2 | L2 | 4 FL Uncoated | 2 FL Uncoated | 4 FL PowerA | 2 FL PowerA |
|------|-------|------|-------|---------------|---------------|-------------|-------------|
| | | | | 59004 | 59005 | 59094 | 59095 |
| 1/8 | 1/2 | 1/8 | 1-1/2 | 59004 | 59005 | 59094 | 59095 |
| 3/16 | 5/8 | 3/16 | 2 | 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 **+0.000 - .002**
Shank Tolerance **h6**

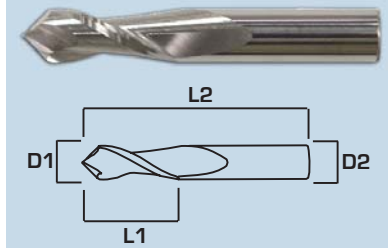
Taper Endmills

| 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 |



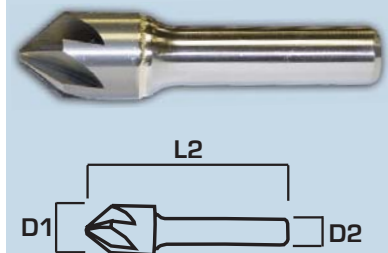
2 Flute Drill Mills

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

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

Engraving Blanks

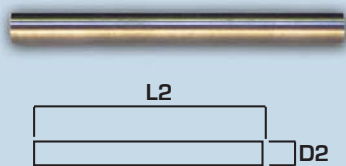
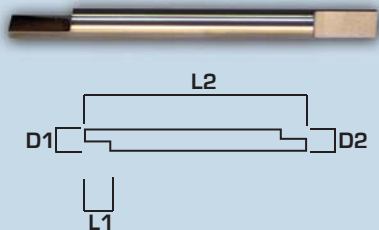
| D1 | L2 | D2 | L1 | Single End | Double End |
|------|-------|------|-----|------------|------------|
| 1/8 | 1-1/2 | 1/8 | 3/8 | 78000 | 78001 |
| 1/8 | 2 | 1/8 | 3/8 | 78100 | 78101 |
| 3/16 | 2 | 3/16 | 1/2 | 78200 | 78201 |
| 1/4 | 2 | 1/4 | 1/2 | 78300 | 78301 |
| 1/4 | 2-1/2 | 1/4 | 1/2 | 78400 | 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 |

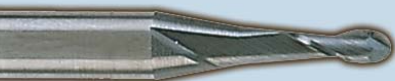
Mini Mills Square/Ball End

| 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 |



Mini Mills

Ball



Square



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

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 Dia. | 1 | 1200 Plus | 0.0045 | 0.0071 | 0.0100 | 0.0123 | 0.0149 | 0.0200 |
| | | 2 | 600 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| Deep Slotting | 3/4-1 x Dia. | 1 | 1200 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| | | 2 | 600 Plus | 0.0027 | 0.0043 | 0.0060 | 0.0074 | 0.0089 | 0.0120 |
| Medium Radial 1.0 X DIA DEPTH | 30% x Dia. Radial | 1 | 1200 Plus | 0.0045 | 0.0071 | 0.0100 | 0.0123 | 0.0149 | 0.0200 |
| | | 2 | 600 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| Heavy Radial 1.0 X DIA DEPTH | 50% x Dia. Radial | 1 | 1200 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| | | 2 | 600 Plus | 0.0027 | 0.0043 | 0.0060 | 0.0074 | 0.0089 | 0.0120 |
| Medium Radial 2.0 X DIA DEPTH | 30% x Dia. Radial | 1 | 1200 Plus | 0.0045 | 0.0071 | 0.0100 | 0.0123 | 0.0149 | 0.0200 |
| | | 2 | 600 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| Heavy Radial 2.0 X DIA DEPTH | 50% x Dia. Radial | 1 | 1200 Plus | 0.0036 | 0.0057 | 0.0060 | 0.0098 | 0.0119 | 0.0160 |
| | | 2 | 600 Plus | 0.0027 | 0.0043 | 0.0060 | 0.0074 | 0.0089 | 0.0120 |
| Finishing MEDIUM Radial | < 25% OF Dia. | 1 | 1200 Plus | 0.0045 | 0.0071 | 0.0100 | 0.0123 | 0.0149 | 0.0200 |
| | | 2 | 600 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| Finishing Light Radial | < 10% OF Dia. | 1 | 1200 Plus | 0.0045 | 0.0071 | 0.0100 | 0.0123 | 0.0149 | 0.0200 |
| | | 2 | 600 Plus | 0.0036 | 0.0057 | 0.0080 | 0.0098 | 0.0119 | 0.0160 |
| Finishing Radial Depth | < .010 | 1 | 1200 Plus | 0.0054 | 0.0086 | 0.0120 | 0.0147 | 0.0178 | 0.0240 |
| | | 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 Dia. | < 32 | 1200 Plus | 18336 | 247.5 | 12224 | 261.3 | 9168 | 275.0 |
| | | > 32 | 600 Plus | 9168 | 99.0 | 6112 | 104.5 | 4584 | 110.0 |
| Deep Slotting | 3/4-1 x Dia. | < 32 | 1200 Plus | 18336 | 198.0 | 12224 | 209.0 | 9168 | 220.0 |
| | | > 32 | 600 Plus | 9168 | 74.3 | 6112 | 78.4 | 4584 | 82.5 |
| Medium Radial 1.0 X DIA DEPTH | 30% x Dia. Radial | < 32 | 1200 Plus | 18336 | 247.5 | 12224 | 261.3 | 9168 | 275.0 |
| | | > 32 | 600 Plus | 9168 | 99.0 | 6112 | 104.5 | 4584 | 110.0 |
| Heavy Radial 1.0 X DIA DEPTH | 50% x Dia. Radial | < 32 | 1200 Plus | 18336 | 198.0 | 12224 | 209.0 | 9168 | 220.0 |
| | | > 32 | 600 Plus | 9168 | 74.3 | 6112 | 78.4 | 4584 | 82.5 |
| Medium Radial 2.0 X DIA DEPTH | 30% x Dia. Radial | < 32 | 1200 Plus | 18336 | 247.5 | 12224 | 261.5 | 9168 | 275.0 |
| | | > 32 | 600 Plus | 9168 | 99.0 | 6112 | 104.5 | 4584 | 110.0 |
| Heavy Radial 2.0 X DIA DEPTH | 50% x Dia. Radial | < 32 | 1200 Plus | 18336 | 198.0 | 12224 | 209.0 | 9184 | 220.0 |
| | | > 32 | 600 Plus | 9168 | 74.3 | 6112 | 78.4 | 4584 | 82.5 |
| Finishing MEDIUM Radial | < 25% OF Dia. | < 32 | 1200 Plus | 18336 | 330.0 | 12224 | 261.3 | 9168 | 275.0 |
| | | > 32 | 600 Plus | 9168 | 132.0 | 6112 | 104.5 | 4584 | 110.0 |
| Finishing Light Radial | < 10% OF Dia. | < 32 | 1200 Plus | 18336 | 330.0 | 12224 | 261.3 | 9168 | 275.0 |
| | | > 32 | 600 Plus | 9168 | 132.0 | 6112 | 104.5 | 4584 | 110.0 |
| Finishing Radial Depth | < .010 | < 32 | 1200 Plus | 18336 | 396.1 | 12224 | 313.5 | 9168 | 330.0 |
| | | > 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 Dia. | < 32 | 1200 Plus | 7323 | 269.1 | 6112 | 272.3 | 4584 | 275.0 |
| | | > 32 | 600 Plus | 3661 | 107.6 | 3056 | 108.9 | 2292 | 110.0 |
| Deep Slotting | 3/4-1 x Dia. | < 32 | 1200 Plus | 7323 | 215.3 | 6112 | 217.8 | 4584 | 220.1 |
| | | > 32 | 600 Plus | 3661 | 80.7 | 3056 | 81.7 | 2292 | 82.5 |
| Medium Radial 1.0 X DIA DEPTH | 30% x Dia. Radial | < 32 | 1200 Plus | 7323 | 269.1 | 6112 | 272.3 | 4584 | 275.0 |
| | | > 32 | 600 Plus | 3661 | 107.6 | 3056 | 108.9 | 2292 | 110.0 |
| Heavy Radial 1.0 X DIA DEPTH | 50% x Dia. Radial | < 32 | 1200 Plus | 7323 | 215.3 | 6112 | 217.8 | 4584 | 220.0 |
| | | > 32 | 600 Plus | 3661 | 80.7 | 3056 | 81.7 | 2292 | 82.5 |
| Medium Radial 2.0 X DIA DEPTH | 30% x Dia. Radial | < 32 | 1200 Plus | 7223 | 269.1 | 6112 | 272.3 | 4584 | 275.0 |
| | | > 32 | 600 Plus | 3661 | 107.6 | 3056 | 108.9 | 2292 | 110.0 |
| Heavy Radial 2.0 X DIA DEPTH | 50% x Dia. Radial | < 32 | 1200 Plus | 7323 | 215.3 | 6112 | 217.8 | 4584 | 220.0 |
| | | > 32 | 600 Plus | 3661 | 80.7 | 3056 | 81.7 | 2292 | 82.5 |
| Finishing MEDIUM Radial | < 25% OF Dia. | < 32 | 1200 Plus | 7323 | 269.1 | 6112 | 272.3 | 4584 | 275.0 |
| | | > 32 | 600 Plus | 3661 | 107.6 | 3056 | 108.9 | 2292 | 110.0 |
| Finishing Light Radial | < 10% OF Dia. | < 32 | 1200 Plus | 7323 | 269.1 | 6112 | 272.3 | 4584 | 275.0 |
| | | > 32 | 600 Plus | 3661 | 107.6 | 3056 | 108.9 | 2292 | 110.0 |
| Finishing Radial Depth | < .010 | < 32 | 1200 Plus | 7323 | 322.9 | 6112 | 326.7 | 4584 | 330.0 |
| | | > 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 # | 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 # | 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.



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 # | 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 | |



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 # | 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 # | 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 # | 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 Recommendations

| 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

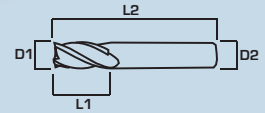
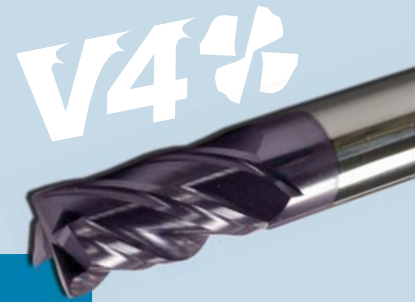
V4 - PowerA 4 Flute Standard Length

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

V4



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



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**

HIGH PERFORMANCE
ENDMILLS

Speed and Feed Recommendations



| 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

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
Concentricity**

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

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 |

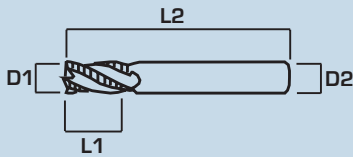
F45 6 Flute Corner Radius

| 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 |

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, waspally, 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

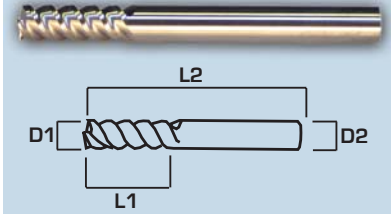
Cutting Edge Tolerance **+.000 - .002**
Shank Tolerance **h6**

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 |

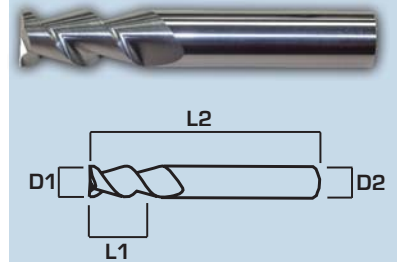


AlumaZip

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 |

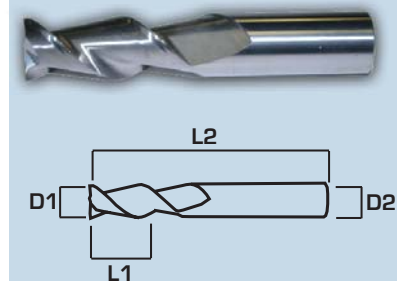


HyperMill

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

Cutting Edge Tolerance **+0.000 - .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 |

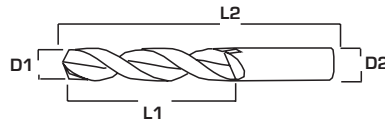
Other sizes and styles **available**,
call customer service for more information!

Die Grinder

Part Number
DIEGRINDER



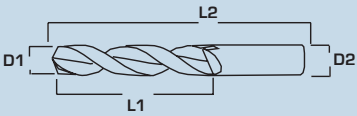
Standard Drill Recommendations



| 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 Resharp
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 | ~ |

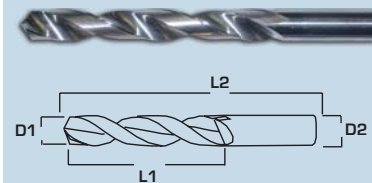
D1 - Cutting Diameter
 L1 - Cutting Length
 D2 - Shank Diameter
 L2 - Overall Length

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

Solid Carbide Drills

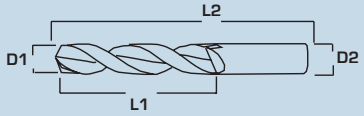
2 Flute - 118° Four Facet Point

3 Flute - 130° High Performance Point



| Wire# | D1 | L1 | D2 | L2 | 2 Flute | 3 Flute |
|-------|-------|-------|-------|-------|---------|---------|
| #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

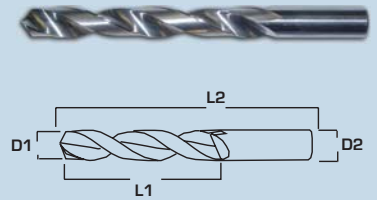
DRILLS

Solid Carbide Drills

2 Flute - 118° Four Facet Point

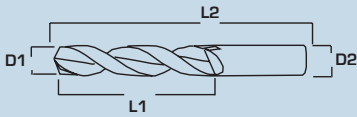
3 Flute - 130° High Performance Point

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

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



Stub Length Drills

2 Flute 27° Helix 118° Four Facet Point

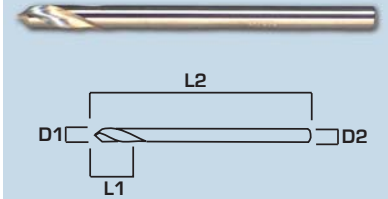
| D1 | L1 | D2 | L2 | Part # | TiN Part # |
|--------|-------|--------|-------|---------|------------|
| 0.1065 | 5/8 | 0.1065 | 2 | 43-1065 | 43-1065TN |
| 0.1130 | 5/8 | 0.1130 | 2 | 43-1130 | 43-1130TN |
| 1/8 | 5/8 | 1/8 | 2 | 43-1250 | 43-1250TN |
| 0.1360 | 5/8 | 0.1360 | 2 | 43-1360 | 43-1360TN |
| 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

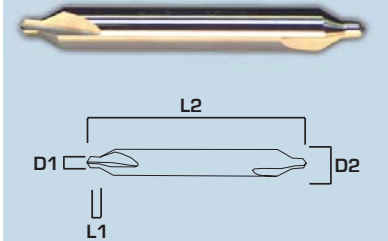
NC Spotting Drills

| 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 |



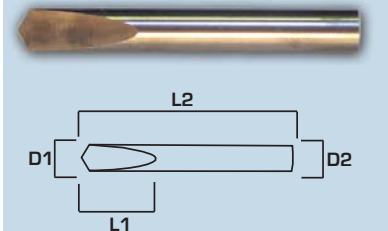
Solid Carbide Center Drills

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

Bur Shapes and Sizes

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

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



Bur Cut Types

Example

SL-5L6RDC

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



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 or 12mm 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 |
| 3/4 or 18mm 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 |

General Bur Cut Type Applications

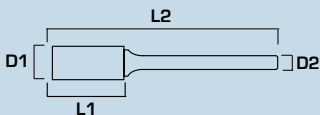
| Materials | Doublecut | Singlecut | Alumacut | Diamondcut | Chipbreaker |
|-----------------------|-----------|-----------|----------|------------|-------------|
| Aluminum | | | ☼ | ☼ | |
| Brass, Bronze, Copper | ☼ | ☼ | | | ☼ |
| Fiberglass | | | | ☼ | |
| Cast Iron | ☼ | ☼ | | ☼ | |
| Plastics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



Solid Carbide Bur

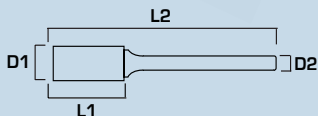
Brazed Burs
(Solid Carbide Head with brazed steel shank)

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



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

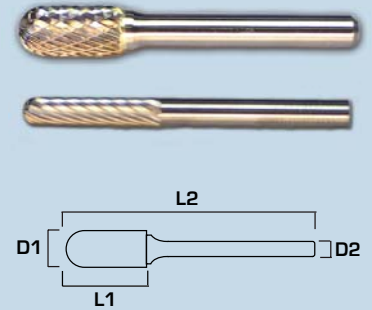
**Burs also available in
Chipbreaker and Diamondcut**

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

BURS

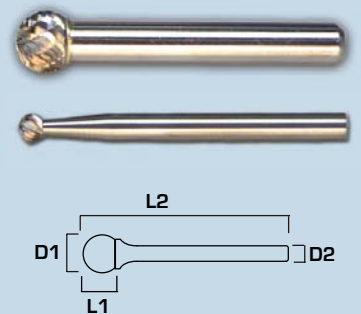
SC Burs - Radius Cylinder

| 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

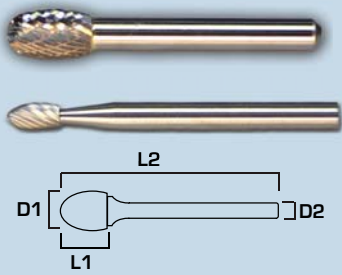
| D1 | L1 | D2 | L2 | Singlecut | Doublecut | Alumacut |
|------|-------|-----|--------|-----------|-----------|----------|
| 3/32 | 3/32 | 1/8 | 1-1/2 | SD-41SC* | SD-41DC* | SD-41FM* |
| 1/8 | 1/8 | 1/8 | 1-1/2 | SD-42SC* | SD-42DC* | SD-42FM* |
| 1/4 | 7/32 | 1/8 | 2 | SD-51SC | SD-51DC | SD-51FM |
| 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

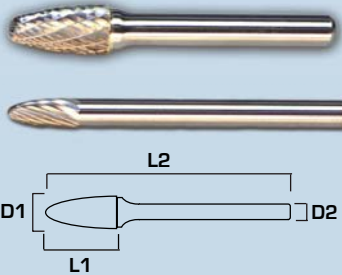
D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length

Burs also available in
Chipbreaker and Diamondcut



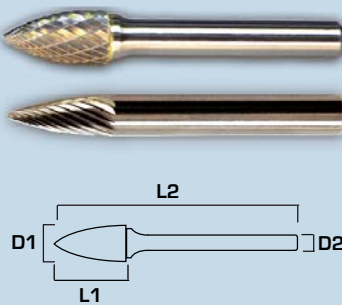
SE Burs - Oval Shape

| 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 |

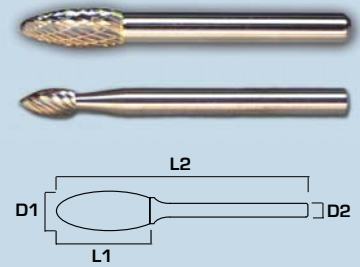


SG Burs - Pointed Tree

| 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 |

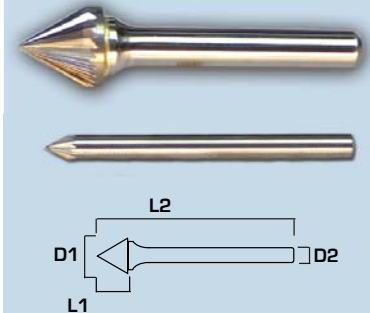
SH Burs - Flame Shape

| 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 |



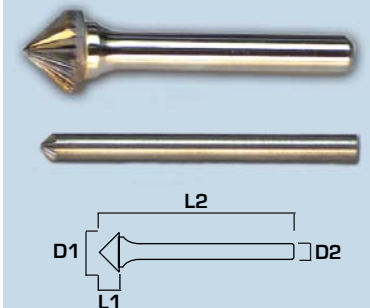
SJ Burs - 60° Included Cone

| 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 |

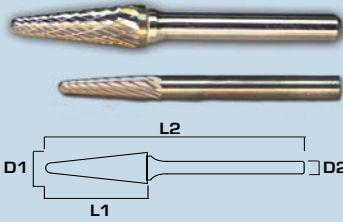


* Denotes Solid Carbide

*^ Double End

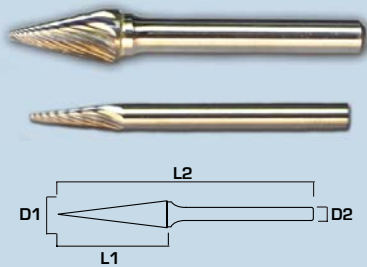
**Burs also available in
Chipbreaker and Diamondcut**

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

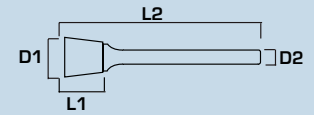
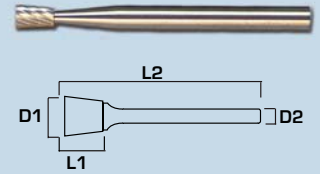
* Denotes Solid Carbide

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

**Burs also available in
Chipbreaker and Diamondcut**

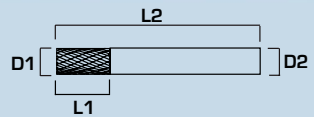
SN Burs - Inverted Cone Shape

| 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 |



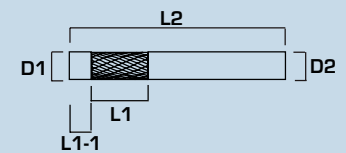
Die mills

| 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

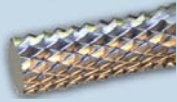
| D1 | L1 | L1-1 | D2 | L2 | Doublecut | Singlecut |
|------|-------|------|------|----|-----------|-----------|
| 1/8 | 1 | 1/8 | 1/8 | 3 | 22000 | 22001 |
| 3/16 | 2 | 3/16 | 3/16 | 3 | 22100 | 22101 |
| 1/4 | 1-1/4 | 1/4 | 1/4 | 3 | 22200 | 22201 |
| 3/8 | 2 | 3/8 | 3/8 | 4 | 22300 | 22301 |
| 1/2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



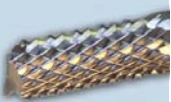
* Denotes Solid Carbide

Burs also available in
Chipbreaker and Diamondcut

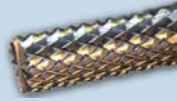
D1 - Cutting Diameter
L1 - Cutting Length
D2 - Shank Diameter
L2 - Overall Length



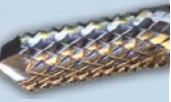
Plain End



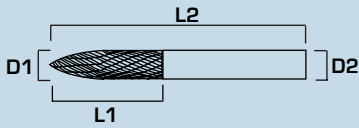
Mill End



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)

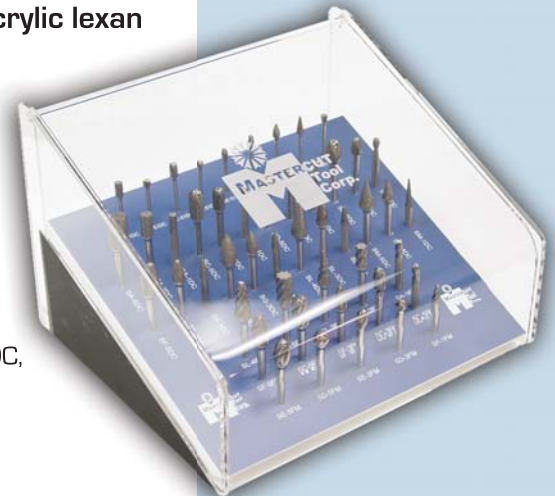
SA-51DC, SB-51DC, SC-51DC, SD-51DC, SE-51DC, SF-51DC, SG-51DC, SM-51DC, SN-51DC

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 <i>Includes:</i> SD-3L6DC, SF-5L6DC, SF-3L6DC, and SC-3L6DC | 4 | SET8170 |
| Tire Bur Set <i>Includes:</i> 270, 271, and 271/38 in Clamshell Case | 3 | SET-TB1 |
| Tire Bur Set <i>Includes:</i> 270, 270P, 271, and 271P in Clamshell Case | 4 | SET-TB2 |
| 24 Piece Display <i>Includes:</i> 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 <i>Includes:</i> 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 Display <i>Includes:</i> 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.



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



www.mastercuttool.com

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