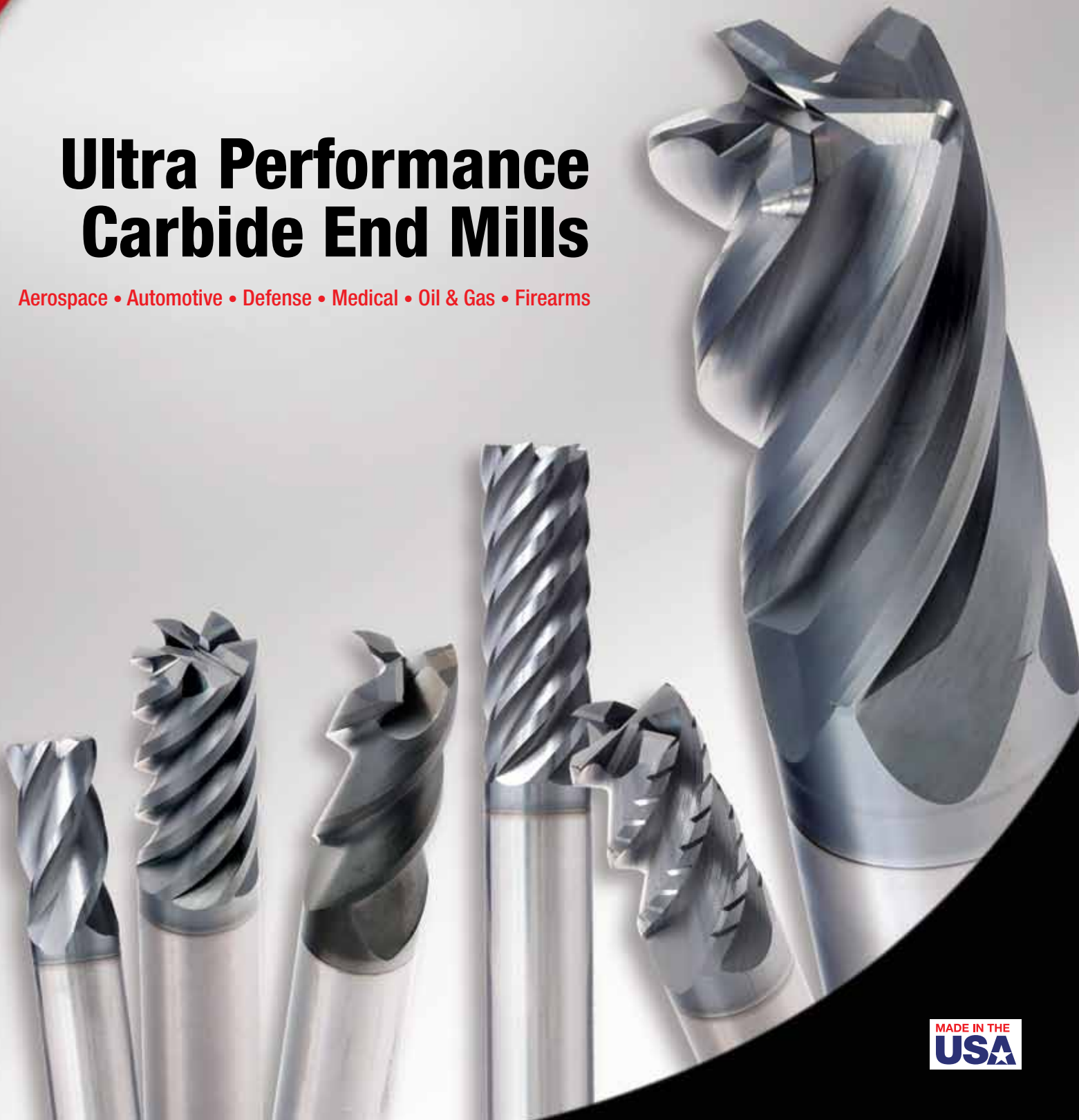




Ultra Performance Carbide End Mills

Aerospace • Automotive • Defense • Medical • Oil & Gas • Firearms



MADE IN THE
USA

About SUPERMILL

A photograph of several carbide end mills, showing their various flutes and cutting edges, set against a red background.

Ultra Performance Carbide End Mills

Designed for maximum productivity
when machining difficult workpiece materials

Our company started out as a regrind shop for end mills and drills in 1990. Then, we were known as Primary Cutter Grinding. Being in Connecticut, our customers were predominantly involved in the Aerospace, Defense and Firearm Manufacturing Industries. We modified and reconditioned a lot of tools for the larger New England shops serving these demanding fields. Over the years, as a general practice, we counseled our customers and modified their tools, to help maximize productivity. Eventually, a number of our customers asked us to design and fully manufacture tools for them. We did. And with great results! That success led us to introduce our own line of high performance carbide end mills under the label Supermill in 2003.

The company has grown since, expanding our customer base across the nation. Our line has evolved as well and now includes a unique offering of **Ultra Performance** end mills. With geometries designed to address particular applications and deliver maximum productivity and state-of-the-art PVD tool coatings selected to best serve those applications, the Supermill brand indeed provides end mills that can outperform the competition. End mills that make a difference. End mills that deliver the performance they need to... *when it truly matters.*

Today, joining our already wide range of tool styles, we're focusing our energies on several new series of tools we've designed for machining Titanium Alloys, Steel Alloys and Stainless Steels. Over time we'll be adding new tool styles to our product line, targeted at the materials our customers tell us they need solutions. So please take your time to look throughout our catalog, especially the index page. Check out a few of the tool series recommended for applications you might have special interest in. Take a look at the sizes available (from stock!) You'll not only see the breadth of our line, but also the depth!

And if you haven't already tried our tools.... I challenge you to do so. The best proof we're as good as we say, is on the spindle. Go to www.supermill.com and see why we say...

When performance matters... you can count on Supermill!

A handwritten signature in black ink that reads "Thomas Hale".

Tom Hale
President

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ULTRA PERFORMANCE



Series XPV: 4 Flute end mill for roughing or finishing **TITANIUM ALLOYS**



Series XPVB: 4 Flute ball nose end mill for roughing or finishing **TITANIUM ALLOYS**



Series SM7F: 7 flute end mill for High Speed Machining programs (HSM) & finishing applications in **TITANIUM ALLOYS**



Series XPVS: 4 flute end mill for roughing or finishing **STEEL & STAINLESS ALLOYS**



Series XPVSB: 4 flute ball nose end mill for roughing or finishing **STEEL & STAINLESS ALLOYS**



Series TC5F — The Tomcat: 5 flute end mill for High Speed Machining programs (HSM) & finishing applications in **STEEL & STAINLESS ALLOYS**

30 **Cutting Parameters for Ultra Performance End Mills**

HIGH PERFORMANCE



Series XP (Inch Sizes): 4 flute end mill for slotting & heavy profiling **FERROUS MATERIALS <45 HRC**

Series XP-NB (Inch Sizes): 4 flute end mill for slotting & heavy profiling **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



Series MXP (Metric Sizes): 4 flute end mill for slotting & heavy profiling **FERROUS MATERIALS <45 HRC**

Series MXP-NB (Metric Sizes): 4 flute end mill for slotting & heavy profiling **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**

HIGH PERFORMANCE (CONT'D)



Series XPB: 4 flute ball nose end mill for slotting & heavy profiling **FERROUS MATERIALS <45 HRC**

Series XPB-NB: 4 flute ball nose end mill for slotting & heavy profiling **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



Series XPR: 4 flute end mill with chipbreakers for slotting & heavy profiling **FERROUS MATERIALS <45 HRC**

Series XPR-NB: 4 flute end mill with chipbreakers for slotting & heavy profiling **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



Series SM3F: 3 flute end mill for slotting & heavy profiling **NON-FERROUS** and **FERROUS MATERIALS <45 HRC**



Series SR3F: 3 flute roughing end mill with chipbreakers for slotting & heavy profiling **NON-FERROUS** and **FERROUS MATERIALS <45 HRC**



Series SM4F: 4 flute end mill for medium profiling and finishing **FERROUS MATERIALS <45 HRC**



Series SR4F: 4 flute roughing end mill with chipbreakers for medium profiling **FERROUS MATERIALS <45 HRC**



Series SM5F (Inch Sizes): 5 flute end mill for medium profiling and finishing **FERROUS MATERIALS <45 HRC**

Series SM5F-NB (Inch Sizes): 5 flute end mill for medium profiling and finishing **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**

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HIGH PERFORMANCE (CONT'D)



55 **Series MSM5F (Metric Sizes):** 5 flute end mill for medium profiling and finishing **FERROUS MATERIALS <45 HRC**

Series MSM5F-NB (Metric Sizes): 5 flute end mill for medium profiling and finishing **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



56 **Series SM6F:** 6 flute end mill for light profiling and finishing **FERROUS MATERIALS <45 HRC**

Series SM6F-NB: 6 flute end mill for light profiling and finishing **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



60 **AL3F:** 3 flute, diamond-like carbon coated end mill for roughing or finishing **ALUMINUM ALLOYS**

62 **Cutting Parameters for High Performance End Mills**

ALL PURPOSE



74 **Series SAP:** 4 flute end mill for universal machining applications in **FERROUS MATERIALS <45 HRC**

Series SAP-NB: 4 flute end mill for universal machining applications in **NICKEL BASED ALLOYS & HARDENED MATERIALS >45 HRC**



82 **Series SAPB:** 4 flute ball nose end mill for universal ball nose machining applications in **FERROUS MATERIALS <45 HRC**

Series SAPB-NB: 4 flute ball nose end mill for universal ball nose machining applications in **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**



84 **Series SAPBR:** 4 flute ball nose end mill with chipbreakers for slotting & heavy profiling **FERROUS MATERIALS <45 HRC**

Series SAPBR-NB: 4 flute ball nose end mill with chipbreakers for slotting & heavy profiling **NICKEL BASED ALLOYS & HARDENED MATERIALS > 45 HRC**

86 **Cutting Parameters for All Purpose End Mills**

73 **Customer Comments**

85 **Performance Reviews**

88 **Index by EDP Number**

89 **Speed Calculations (SFM to RPM)**

90 **Test Tool Performance Form**

Supermill's Standard Tolerances

| Dimension | Tolerance |
|------------------|---------------------------|
| Cutting Diameter | +0.000 / -0.002 |
| Shank Diameter | H6 Tolerance |
| Length Of Cut | -0.000 / +0.025 |
| Overall Length | -0.000 / +0.050 |
| Corner Radius | -0.001 / +0.001 |
| TIR | Exceeds industry standard |

Material Group ISO Codes

| | ISO Code | Material |
|-----------------------|----------|-------------------------|
| Ferrous Materials | P | Steels |
| | H | Hardened Steels |
| | M | Stainless Steels |
| | S | High Temperature Alloys |
| | K | Cast Iron |
| Non-Ferrous Materials | S | Titanium Alloys |
| | N | Aluminum, Copper, Brass |

Series Selector

Reference the chart below to select the best series for your application

| Material Group | ISO Code | Material Examples | Finish Cuts | Medium D.O.C. | Heavy D.O.C. | Slotting | Facing | Circular Interpolation | High Feed / High Speed Machining (HSM) |
|-------------------------------|----------|---|------------------------------|--------------------|--------------|------------|------------------------------|------------------------|--|
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | SM5F SM4F | SM4F | XPVS | XPVS | SAP | XPVS XP | TC5F |
| Steel Alloys | P | 4140 thru 8820 Steel Alloys <45 HRC, Cobalt Chrome | SM5F | | | | | | |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | SM6F | XP | XP-NB | XP-NB | SM5F SAP | XP | |
| | H | AR-450, Steels >45 HRC | SM6F-NB | SM5F-NB XP-NB | | | SAP-NB | XP-NB | |
| Stainless Steel | M | 303,304, 316 | SM3F | SM3F | XPVS XP | XPVS XP | SAP | XPVS | |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | SM5F | XPVS | | | SM5F | XP | |
| High Temp Titanium Alloys | S | 6Al4V, 5553, 99 | SM7F SM5F | XPV | XPV | XPV | XPV | XPV | SM7F |
| High Temp Nickel Based Alloys | S | Inconel 100, 625, 718, 925, Hastelloy-B, Rene 77, Jethete M252, Haynes 75, Waspalloy, Monel 400 | SM6F-NB SM5F-NB SAP-NB | SM5F-NB XP-NB | XP-NB | XP-NB | SM5F-NB SM6F-NB SAP-NB | XP-NB | SM6F-NB |
| High Temp Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | SM5F-NB SM6F-NB | SM5F-NB SM6F-NB | | | | | |
| High Temp Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF-12 | | | | | | | |
| Cast Iron | K | Gray Cast, Malleable & Ductile Iron | SM6F | XP | XPVS | XPVS | SM5F SAP | XPVS XP | TC5F |
| Non-Ferrous Materials | N | Aluminium, Copper, Brass, Bronze | AL3F | AL3F | AL3F | AL3F | AL3F | AL3F | AL3F |
| | | Plastics, Fibreglass | SM3F | SM3F | SM3F | SM3F | SM3F | SM3F | SM3F |

NOTE: For best results when facing, use tools with a corner radius or a chamfer

Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S



- 4 Flute
- Variable Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.000 | XPV125S | 40001 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.010 | XPV125S-010 | 40002 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.000 | XPV125 | 40003 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.010 | XPV125-010 | 40004 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.000 | XPV187S | 40005 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.010 | XPV187S-010 | 40006 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.015 | XPV187S-015 | 40007 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.025 | XPV187S-025 | 40008 |
| 3/16 | 3/16 | 9/16 | 2 | 0.000 | XPV187 | 40009 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | XPV187-010 | 40010 |
| 3/16 | 3/16 | 9/16 | 2 | 0.015 | XPV187-015 | 40011 |
| 3/16 | 3/16 | 9/16 | 2 | 0.025 | XPV187-025 | 40012 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | XPV250S | 40013 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | XPV250S-015 | 40014 |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | XPV250S-030 | 40015 |
| 1/4 | 1/4 | 1/2 | 2 | 0.060 | XPV250S-060 | 40016 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | XPV250 | 40017 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | XPV250-015 | 40018 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | XPV250-030 | 40019 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.060 | XPV250-060 | 40020 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | XPV250L | 40021 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | XPV250L-015 | 40022 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.030 | XPV250L-030 | 40023 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.060 | XPV250L-060 | 40024 |

See page 30 for Cutting Parameters

Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | XPV312S | 40025 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | XPV312S-015 | 40026 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | XPV312S-030 | 40027 |
| 5/16 | 5/16 | 1/2 | 2 | 0.060 | XPV312S-060 | 40028 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | XPV312 | 40029 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | XPV312-015 | 40030 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | XPV312-030 | 40031 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.060 | XPV312-060 | 40032 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | XPV312L | 40033 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | XPV312L-015 | 40034 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.030 | XPV312L-030 | 40035 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.060 | XPV312L-060 | 40036 |
| 3/8 | 3/8 | 1/2 | 2 | 0.000 | XPV375S | 40037 |
| 3/8 | 3/8 | 1/2 | 2 | 0.015 | XPV375S-015 | 40038 |
| 3/8 | 3/8 | 1/2 | 2 | 0.030 | XPV375S-030 | 40039 |
| 3/8 | 3/8 | 1/2 | 2 | 0.060 | XPV375S-060 | 40040 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.000 | XPV375 | 40041 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.015 | XPV375-015 | 40042 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.030 | XPV375-030 | 40043 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.060 | XPV375-060 | 40044 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.000 | XPV375L | 40045 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.015 | XPV375L-015 | 40046 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.030 | XPV375L-030 | 40047 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.060 | XPV375L-060 | 40048 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.000 | XPV375XL | 40049 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.015 | XPV375XL-015 | 40050 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.030 | XPV375XL-030 | 40051 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.060 | XPV375XL-060 | 40052 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | XPV500S | 40053 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.015 | XPV500S-015 | 40054 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | XPV500S-030 | 40055 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.045 | XPV500S-045 | 40056 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | XPV500S-060 | 40057 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.090 | XPV500S-090 | 40058 |



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Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.125 | XPV500S-125 | 40059 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | XPV500 | 40060 |
| 1/2 | 1/2 | 1 | 3 | 0.015 | XPV500-015 | 40061 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | XPV500-030 | 40062 |
| 1/2 | 1/2 | 1 | 3 | 0.045 | XPV500-045 | 40063 |
| 1/2 | 1/2 | 1 | 3 | 0.060 | XPV500-060 | 40064 |
| 1/2 | 1/2 | 1 | 3 | 0.090 | XPV500-090 | 40065 |
| 1/2 | 1/2 | 1 | 3 | 0.125 | XPV500-125 | 40066 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | XPV500M | 40067 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.015 | XPV500M-015 | 40068 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | XPV500M-030 | 40069 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.045 | XPV500M-045 | 40070 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | XPV500M-060 | 40071 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.090 | XPV500M-090 | 40072 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.125 | XPV500M-125 | 40073 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | XPV500L | 40074 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.015 | XPV500L-015 | 40075 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | XPV500L-030 | 40076 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.045 | XPV500L-045 | 40077 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.060 | XPV500L-060 | 40078 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.090 | XPV500L-090 | 40079 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.125 | XPV500L-125 | 40080 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | XPV500XL | 40081 |
| 1/2 | 1/2 | 2 | 4 | 0.015 | XPV500XL-015 | 40082 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | XPV500XL-030 | 40083 |
| 1/2 | 1/2 | 2 | 4 | 0.045 | XPV500XL-045 | 40084 |
| 1/2 | 1/2 | 2 | 4 | 0.060 | XPV500XL-060 | 40085 |
| 1/2 | 1/2 | 2 | 4 | 0.090 | XPV500XL-090 | 40086 |
| 1/2 | 1/2 | 2 | 4 | 0.125 | XPV500XL-125 | 40087 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | XPV500XXL | 40088 |
| 1/2 | 1/2 | 3 | 6 | 0.015 | XPV500XXL-015 | 40089 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | XPV500XXL-030 | 40090 |
| 1/2 | 1/2 | 3 | 6 | 0.045 | XPV500XXL-045 | 40091 |
| 1/2 | 1/2 | 3 | 6 | 0.060 | XPV500XXL-060 | 40092 |
| 1/2 | 1/2 | 3 | 6 | 0.090 | XPV500XXL-090 | 40093 |

Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 1/2 | 1/2 | 3 | 6 | 0.125 | XPV500XXL-125 | 40094 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | XPV625S | 40095 |
| 5/8 | 5/8 | 3/4 | 3 | 0.015 | XPV625S-015 | 40096 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | XPV625S-030 | 40097 |
| 5/8 | 5/8 | 3/4 | 3 | 0.045 | XPV625S-045 | 40098 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | XPV625S-060 | 40099 |
| 5/8 | 5/8 | 3/4 | 3 | 0.090 | XPV625S-090 | 40100 |
| 5/8 | 5/8 | 3/4 | 3 | 0.125 | XPV625S-125 | 40101 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.000 | XPV625 | 40102 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.015 | XPV625-015 | 40103 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | XPV625-030 | 40104 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.045 | XPV625-045 | 40105 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.060 | XPV625-060 | 40106 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.090 | XPV625-090 | 40107 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.125 | XPV625-125 | 40108 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | XPV625L | 40109 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.015 | XPV625L-015 | 40110 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | XPV625L-030 | 40111 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.045 | XPV625L-045 | 40112 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.060 | XPV625L-060 | 40113 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.090 | XPV625L-090 | 40114 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.125 | XPV625L-125 | 40115 |
| 3/4 | 3/4 | 1 | 3 | 0.000 | XPV750S | 40116 |
| 3/4 | 3/4 | 1 | 3 | 0.015 | XPV750S-015 | 40117 |
| 3/4 | 3/4 | 1 | 3 | 0.030 | XPV750S-030 | 40118 |
| 3/4 | 3/4 | 1 | 3 | 0.045 | XPV750S-045 | 40119 |
| 3/4 | 3/4 | 1 | 3 | 0.060 | XPV750S-060 | 40120 |
| 3/4 | 3/4 | 1 | 3 | 0.090 | XPV750S-090 | 40121 |
| 3/4 | 3/4 | 1 | 3 | 0.125 | XPV750S-125 | 40122 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | XPV750 | 40123 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.015 | XPV750-015 | 40124 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | XPV750-030 | 40125 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.045 | XPV750-045 | 40126 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.060 | XPV750-060 | 40127 |



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Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.090 | XPV750-090 | 40128 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.125 | XPV750-125 | 40129 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | XPV750L | 40130 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.015 | XPV750L-015 | 40131 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | XPV750L-030 | 40132 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.045 | XPV750L-045 | 40133 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | XPV750L-060 | 40134 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.090 | XPV750L-090 | 40135 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.125 | XPV750L-125 | 40136 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | XPV750XL | 40137 |
| 3/4 | 3/4 | 3 | 6 | 0.015 | XPV750XL-015 | 40138 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | XPV750XL-030 | 40139 |
| 3/4 | 3/4 | 3 | 6 | 0.045 | XPV750XL-045 | 40140 |
| 3/4 | 3/4 | 3 | 6 | 0.060 | XPV750XL-060 | 40141 |
| 3/4 | 3/4 | 3 | 6 | 0.090 | XPV750XL-090 | 40142 |
| 3/4 | 3/4 | 3 | 6 | 0.125 | XPV750XL-125 | 40143 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | XPV1.0 | 40144 |
| 1 | 1 | 1 1/2 | 4 | 0.015 | XPV1.0-015 | 40145 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | XPV1.0-030 | 40146 |
| 1 | 1 | 1 1/2 | 4 | 0.045 | XPV1.0-045 | 40147 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | XPV1.0-060 | 40148 |
| 1 | 1 | 1 1/2 | 4 | 0.090 | XPV1.0-090 | 40149 |
| 1 | 1 | 1 1/2 | 4 | 0.125 | XPV1.0-125 | 40150 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | XPV1.0L | 40151 |
| 1 | 1 | 2 1/4 | 5 | 0.015 | XPV1.0L-015 | 40152 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | XPV1.0L-030 | 40153 |
| 1 | 1 | 2 1/4 | 5 | 0.045 | XPV1.0L-045 | 40154 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | XPV1.0L-060 | 40155 |
| 1 | 1 | 2 1/4 | 5 | 0.090 | XPV1.0L-090 | 40156 |
| 1 | 1 | 2 1/4 | 5 | 0.125 | XPV1.0L-125 | 40157 |
| 1 | 1 | 3 | 6 | 0.000 | XPV1.0XL | 40158 |
| 1 | 1 | 3 | 6 | 0.015 | XPV1.0XL-015 | 40159 |
| 1 | 1 | 3 | 6 | 0.030 | XPV1.0XL-030 | 40160 |
| 1 | 1 | 3 | 6 | 0.045 | XPV1.0XL-045 | 40161 |

Series *XPV*

Ultra Performance Carbide End Mill for Roughing or Finishing Titanium Alloys

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|
| | | | | | XPV Tool # | XPV EDP # |
| 1 | 1 | 3 | 6 | 0.060 | XPV1.0XL-060 | 40162 |
| 1 | 1 | 3 | 6 | 0.090 | XPV1.0XL-090 | 40163 |
| 1 | 1 | 3 | 6 | 0.125 | XPV1.0XL-125 | 40164 |



Series *XPVB*

**Ultra Performance Carbide End Mill for Ball Nose
Roughing or Finishing Titanium Alloys**

ISO CODE
S



- 4 Flute
- Ball Nose
- Variable Helix
- Variable Pitch
- Full Eccentric Relief
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | XPVB Tool # | XPVB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | Ball Nose | XPVB125S | 41001 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | Ball Nose | XPVB125 | 41002 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | Ball Nose | XPVB187S | 41003 |
| 3/16 | 3/16 | 9/16 | 2 | Ball Nose | XPVB187 | 41004 |
| 1/4 | 1/4 | 1/2 | 2 | Ball Nose | XPVB250S | 41005 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | Ball Nose | XPVB250 | 41006 |
| 1/4 | 1/4 | 1 1/8 | 3 | Ball Nose | XPVB250L | 41007 |
| 5/16 | 5/16 | 1/2 | 2 | Ball Nose | XPVB312S | 41008 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | Ball Nose | XPVB312 | 41009 |
| 5/16 | 5/16 | 1 1/8 | 3 | Ball Nose | XPVB312L | 41010 |
| 3/8 | 3/8 | 1/2 | 2 | Ball Nose | XPVB375S | 41011 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | Ball Nose | XPVB375 | 41012 |
| 3/8 | 3/8 | 1 1/8 | 3 | Ball Nose | XPVB375L | 41013 |
| 3/8 | 3/8 | 1 1/2 | 4 | Ball Nose | XPVB375XL | 41014 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | Ball Nose | XPVB500S | 41015 |
| 1/2 | 1/2 | 1 | 3 | Ball Nose | XPVB500 | 41016 |
| 1/2 | 1/2 | 1 1/4 | 3 | Ball Nose | XPVB500M | 41017 |
| 1/2 | 1/2 | 1 1/2 | 4 | Ball Nose | XPVB500L | 41018 |
| 1/2 | 1/2 | 2 | 4 | Ball Nose | XPVB500XL | 41019 |
| 1/2 | 1/2 | 3 | 6 | Ball Nose | XPVB500XXL | 41020 |
| 5/8 | 5/8 | 3/4 | 3 | Ball Nose | XPVB625S | 41021 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | Ball Nose | XPVB625 | 41022 |
| 5/8 | 5/8 | 2 1/4 | 5 | Ball Nose | XPVB625L | 41023 |

See page 30 for Cutting Parameters

Series *XPVB*

Ultra Performance Carbide End Mill for Ball Nose
Roughing or Finishing Titanium Alloys

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | XPVB Tool # | XPVB EDP # |
| 3/4 | 3/4 | 1 | 3 | Ball Nose | XPVB750S | 41024 |
| 3/4 | 3/4 | 1 1/2 | 4 | Ball Nose | XPVB750 | 41025 |
| 3/4 | 3/4 | 2 1/4 | 5 | Ball Nose | XPVB750L | 41026 |
| 3/4 | 3/4 | 3 | 6 | Ball Nose | XPVB750XL | 41027 |
| 1 | 1 | 1 1/2 | 4 | Ball Nose | XPVB1.0 | 41028 |
| 1 | 1 | 2 1/4 | 5 | Ball Nose | XPVB1.0L | 41029 |
| 1 | 1 | 3 | 6 | Ball Nose | XPVB1.0XL | 41030 |



Series SM7F

Ultra Performance Carbide End Mill for High Speed Machining (HSM) Programs & Finishing Applications in Titanium Alloys

ISO CODE
S



- 7 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SM7F Tool # | SM7F EDP # |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.000 | SM7F187S | 17001 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.010 | SM7F187S-010 | 17002 |
| 3/16 | 3/16 | 9/16 | 2 | 0.000 | SM7F187 | 17003 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | SM7F187-010 | 17004 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.000 | SM7F187L | 17005 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.010 | SM7F187L-010 | 17006 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | SM7F250S | 17007 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | SM7F250S-015 | 17008 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | SM7F250 | 17009 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM7F250-015 | 17010 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | SM7F250L | 17011 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SM7F250L-015 | 17012 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | SM7F312S | 17013 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | SM7F312S-015 | 17014 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | SM7F312 | 17015 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SM7F312-015 | 17016 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | SM7F312L | 17017 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | SM7F312L-015 | 17018 |
| 3/8 | 3/8 | 9/16 | 2 | 0.000 | SM7F375S | 17019 |
| 3/8 | 3/8 | 9/16 | 2 | 0.015 | SM7F375S-015 | 17020 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.000 | SM7F375 | 17021 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SM7F375-015 | 17022 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.000 | SM7F375L | 17023 |

See page 30 for Cutting Parameters

Series SM7F

Ultra Performance Carbide End Mill for High Speed Machining (HSM) Programs & Finishing Applications in Titanium Alloys

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | SM7F Tool # | SM7F EDP # |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SM7F375L-015 | 17024 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.000 | SM7F437 | 17025 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SM7F437-015 | 17026 |
| 7/16 | 7/16 | 2 | 4 | 0.000 | SM7F437L | 17027 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SM7F437L-015 | 17028 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | SM7F500S | 17029 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.015 | SM7F500S-015 | 17030 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SM7F500S-030 | 17031 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | SM7F500 | 17032 |
| 1/2 | 1/2 | 1 | 3 | 0.015 | SM7F500-015 | 17033 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | SM7F500-030 | 17034 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | SM7F500M | 17035 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.015 | SM7F500M-015 | 17036 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SM7F500M-030 | 17037 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | SM7F500L | 17038 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.015 | SM7F500L-015 | 17039 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SM7F500L-030 | 17040 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | SM7F500XL | 17041 |
| 1/2 | 1/2 | 2 | 4 | 0.015 | SM7F500XL-015 | 17042 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SM7F500XL-030 | 17043 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | SM7F625S | 17044 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SM7F625S-030 | 17045 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | SM7F625S-060 | 17046 |
| 5/8 | 5/8 | 1 1/2 | 3 1/2 | 0.000 | SM7F625 | 17047 |
| 5/8 | 5/8 | 1 1/2 | 3 1/2 | 0.030 | SM7F625-030 | 17048 |
| 5/8 | 5/8 | 1 1/2 | 3 1/2 | 0.060 | SM7F625-060 | 17049 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | SM7F625L | 17050 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SM7F625L-030 | 17051 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.060 | SM7F625L-060 | 17052 |
| 3/4 | 3/4 | 7/8 | 3 | 0.000 | SM7F750S | 17053 |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | SM7F750S-030 | 17054 |
| 3/4 | 3/4 | 7/8 | 3 | 0.060 | SM7F750S-060 | 17055 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | SM7F750 | 17056 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | SM7F750-030 | 17057 |



Continued on next page

Series SM7F

Ultra Performance Carbide End Mill for High Speed Machining (HSM) Programs & Finishing Applications in Titanium Alloys

ISO CODE
S



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | SM7F Tool # | SM7F EDP # |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.060 | SM7F750-060 | 17058 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | SM7F750L | 17059 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SM7F750L-030 | 17060 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | SM7F750L-060 | 17061 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | SM7F750XL | 17062 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | SM7F750XL-030 | 17063 |
| 3/4 | 3/4 | 3 | 6 | 0.060 | SM7F750XL-060 | 17064 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | SM7F1.0 | 17065 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | SM7F1.0-030 | 17066 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | SM7F1.0-060 | 17067 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | SM7F1.0L | 17068 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | SM7F1.0L-030 | 17069 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | SM7F1.0L-060 | 17070 |
| 1 | 1 | 3 | 6 | 0.000 | SM7F1.0XL | 17071 |
| 1 | 1 | 3 | 6 | 0.030 | SM7F1.0XL-030 | 17072 |
| 1 | 1 | 3 | 6 | 0.060 | SM7F1.0XL-060 | 17073 |



NEW
XTREME XPV

SUPERMILL'S
Most Advanced Asymmetric
Design Yet!

New Xtreme XPV Series carbide end mills
for Titanium and other difficult materials.
Engineered with variable index, variable helix
and progressive rake angles.

This new design has been tested and
proven to dampen harmonics, eliminate
vibration and stop chatter.

They produce a quieter and smoother
cut at increased speeds and feeds.
With the Xtreme XPV series you can
easily double your production with:

- Heavier Cuts (Less Passes)
- Shorter Cycle Times
- Greater tool life



NEW
XTREME XPVS

SUPERMILL'S
Most Advanced Asymmetric
Design Yet!

New Xtreme XPVS Series carbide end mills
for Steel, Steel Alloys, Stainless Steels and
Hardened Steels. Engineered with variable
index, variable helix and progressive rake
angles.

This new design has been tested and
proven to dampen harmonics, eliminate
vibration and stop chatter.

They produce a quieter and smoother
cut at increased speeds and feeds.
With the Xtreme-XPVS series you can
easily double your production with:

- Heavier Cuts (Less Passes)
- Shorter Cycle Times
- Greater tool life



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Series *XPVS*

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



- 4 Flute
- Variable Helix
- Variable Pitch
- Primary & Secondary Relief
- Sharp or Radius Corners
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.000 | XPVS125S | 42001 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.010 | XPVS125S-010 | 42002 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.000 | XPVS125 | 42003 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.010 | XPVS125-010 | 42004 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.000 | XPVS187S | 42005 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.010 | XPVS187S-010 | 42006 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.015 | XPVS187S-015 | 42007 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.025 | XPVS187S-025 | 42008 |
| 3/16 | 3/16 | 9/16 | 2 | 0.000 | XPVS187 | 42009 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | XPVS187-010 | 42010 |
| 3/16 | 3/16 | 9/16 | 2 | 0.015 | XPVS187-015 | 42011 |
| 3/16 | 3/16 | 9/16 | 2 | 0.025 | XPVS187-025 | 42012 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | XPVS250S | 42013 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | XPVS250S-015 | 42014 |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | XPVS250S-030 | 42015 |
| 1/4 | 1/4 | 1/2 | 2 | 0.060 | XPVS250S-060 | 42016 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | XPVS250 | 42017 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | XPVS250-015 | 42018 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | XPVS250-030 | 42019 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.060 | XPVS250-060 | 42020 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | XPVS250L | 42021 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | XPVS250L-015 | 42022 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.030 | XPVS250L-030 | 42023 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.060 | XPVS250L-060 | 42024 |

See page 32 for Cutting Parameters

Series **XPVS**

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | XPVS312S | 42025 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | XPVS312S-015 | 42026 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | XPVS312S-030 | 42027 |
| 5/16 | 5/16 | 1/2 | 2 | 0.060 | XPVS312S-060 | 42028 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | XPVS312 | 42029 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | XPVS312-015 | 42030 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | XPVS312-030 | 42031 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.060 | XPVS312-060 | 42032 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | XPVS312L | 42033 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | XPVS312L-015 | 42034 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.030 | XPVS312L-030 | 42035 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.060 | XPVS312L-060 | 42036 |
| 3/8 | 3/8 | 1/2 | 2 | 0.000 | XPVS375S | 42037 |
| 3/8 | 3/8 | 1/2 | 2 | 0.015 | XPVS375S-015 | 42038 |
| 3/8 | 3/8 | 1/2 | 2 | 0.030 | XPVS375S-030 | 42039 |
| 3/8 | 3/8 | 1/2 | 2 | 0.060 | XPVS375S-060 | 42040 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.000 | XPVS375 | 42041 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.015 | XPVS375-015 | 42042 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.030 | XPVS375-030 | 42043 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.060 | XPVS375-060 | 42044 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.000 | XPVS375L | 42045 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.015 | XPVS375L-015 | 42046 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.030 | XPVS375L-030 | 42047 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.060 | XPVS375L-060 | 42048 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.000 | XPVS375XL | 42049 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.015 | XPVS375XL-015 | 42050 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.030 | XPVS375XL-030 | 42051 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.060 | XPVS375XL-060 | 42052 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | XPVS500S | 42053 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.015 | XPVS500S-015 | 42054 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | XPVS500S-030 | 42055 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.045 | XPVS500S-045 | 42056 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | XPVS500S-060 | 42057 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.090 | XPVS500S-090 | 42058 |

Continued on next page

Series *XPVS*

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.125 | XPVS500S-125 | 42059 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | XPVS500 | 42060 |
| 1/2 | 1/2 | 1 | 3 | 0.015 | XPVS500-015 | 42061 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | XPVS500-030 | 42062 |
| 1/2 | 1/2 | 1 | 3 | 0.045 | XPVS500-045 | 42063 |
| 1/2 | 1/2 | 1 | 3 | 0.060 | XPVS500-060 | 42064 |
| 1/2 | 1/2 | 1 | 3 | 0.090 | XPVS500-090 | 42065 |
| 1/2 | 1/2 | 1 | 3 | 0.125 | XPVS500-125 | 42066 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | XPVS500M | 42067 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.015 | XPVS500M-015 | 42068 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | XPVS500M-030 | 42069 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.045 | XPVS500M-045 | 42070 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | XPVS500M-060 | 42071 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.090 | XPVS500M-090 | 42072 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.125 | XPVS500M-125 | 42073 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | XPVS500L | 42074 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.015 | XPVS500L-015 | 42075 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | XPVS500L-030 | 42076 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.045 | XPVS500L-045 | 42077 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.060 | XPVS500L-060 | 42078 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.090 | XPVS500L-090 | 42079 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.125 | XPVS500L-125 | 42080 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | XPVS500XL | 42081 |
| 1/2 | 1/2 | 2 | 4 | 0.015 | XPVS500XL-015 | 42082 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | XPVS500XL-030 | 42083 |
| 1/2 | 1/2 | 2 | 4 | 0.045 | XPVS500XL-045 | 42084 |
| 1/2 | 1/2 | 2 | 4 | 0.060 | XPVS500XL-060 | 42085 |
| 1/2 | 1/2 | 2 | 4 | 0.090 | XPVS500XL-090 | 42086 |
| 1/2 | 1/2 | 2 | 4 | 0.125 | XPVS500XL-125 | 42087 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | XPVS500XXL | 42088 |
| 1/2 | 1/2 | 3 | 6 | 0.015 | XPVS500XXL-015 | 42089 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | XPVS500XXL-030 | 42090 |
| 1/2 | 1/2 | 3 | 6 | 0.045 | XPVS500XXL-045 | 42091 |
| 1/2 | 1/2 | 3 | 6 | 0.060 | XPVS500XXL-060 | 42092 |
| 1/2 | 1/2 | 3 | 6 | 0.090 | XPVS500XXL-090 | 42093 |

Series **XPVS**

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 1/2 | 1/2 | 3 | 6 | 0.125 | XPVS500XL-125 | 42094 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | XPVS625S | 42095 |
| 5/8 | 5/8 | 3/4 | 3 | 0.015 | XPVS625S-015 | 42096 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | XPVS625S-030 | 42097 |
| 5/8 | 5/8 | 3/4 | 3 | 0.045 | XPVS625S-045 | 42098 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | XPVS625S-060 | 42099 |
| 5/8 | 5/8 | 3/4 | 3 | 0.090 | XPVS625S-090 | 42100 |
| 5/8 | 5/8 | 3/4 | 3 | 0.125 | XPVS625S-125 | 42101 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.000 | XPVS625 | 42102 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.015 | XPVS625-015 | 42103 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | XPVS625-030 | 42104 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.045 | XPVS625-045 | 42105 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.060 | XPVS625-060 | 42106 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.090 | XPVS625-090 | 42107 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.125 | XPVS625-125 | 42108 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | XPVS625L | 42109 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.015 | XPVS625L-015 | 42110 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | XPVS625L-030 | 42111 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.045 | XPVS625L-045 | 42112 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.060 | XPVS625L-060 | 42113 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.090 | XPVS625L-090 | 42114 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.125 | XPVS625L-125 | 42115 |
| 3/4 | 3/4 | 1 | 3 | 0.000 | XPVS750S | 42116 |
| 3/4 | 3/4 | 1 | 3 | 0.015 | XPVS750S-015 | 42117 |
| 3/4 | 3/4 | 1 | 3 | 0.030 | XPVS750S-030 | 42118 |
| 3/4 | 3/4 | 1 | 3 | 0.045 | XPVS750S-045 | 42119 |
| 3/4 | 3/4 | 1 | 3 | 0.060 | XPVS750S-060 | 42120 |
| 3/4 | 3/4 | 1 | 3 | 0.090 | XPVS750S-090 | 42121 |
| 3/4 | 3/4 | 1 | 3 | 0.125 | XPVS750S-125 | 42122 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | XPVS750 | 42123 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.015 | XPVS750-015 | 42124 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | XPVS750-030 | 42125 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.045 | XPVS750-045 | 42126 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.060 | XPVS750-060 | 42127 |



Continued on next page

Series *XPVS*

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.090 | XPVS750-090 | 42128 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.125 | XPVS750-125 | 42129 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | XPVS750L | 42130 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.015 | XPVS750L-015 | 42131 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | XPVS750L-030 | 42132 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.045 | XPVS750L-045 | 42133 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | XPVS750L-060 | 42134 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.090 | XPVS750L-090 | 42135 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.125 | XPVS750L-125 | 42136 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | XPVS750XL | 42137 |
| 3/4 | 3/4 | 3 | 6 | 0.015 | XPVS750XL-015 | 42138 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | XPVS750XL-030 | 42139 |
| 3/4 | 3/4 | 3 | 6 | 0.045 | XPVS750XL-045 | 42140 |
| 3/4 | 3/4 | 3 | 6 | 0.060 | XPVS750XL-060 | 42141 |
| 3/4 | 3/4 | 3 | 6 | 0.090 | XPVS750XL-090 | 42142 |
| 3/4 | 3/4 | 3 | 6 | 0.125 | XPVS750XL-125 | 42143 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | XPVS1.0 | 42144 |
| 1 | 1 | 1 1/2 | 4 | 0.015 | XPVS1.0-015 | 42145 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | XPVS1.0-030 | 42146 |
| 1 | 1 | 1 1/2 | 4 | 0.045 | XPVS1.0-045 | 42147 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | XPVS1.0-060 | 42148 |
| 1 | 1 | 1 1/2 | 4 | 0.090 | XPVS1.0-090 | 42149 |
| 1 | 1 | 1 1/2 | 4 | 0.125 | XPVS1.0-125 | 42150 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | XPVS1.0L | 42151 |
| 1 | 1 | 2 1/4 | 5 | 0.015 | XPVS1.0L-015 | 42152 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | XPVS1.0L-030 | 42153 |
| 1 | 1 | 2 1/4 | 5 | 0.045 | XPVS1.0L-045 | 42154 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | XPVS1.0L-060 | 42155 |
| 1 | 1 | 2 1/4 | 5 | 0.090 | XPVS1.0L-090 | 42156 |
| 1 | 1 | 2 1/4 | 5 | 0.125 | XPVS1.0L-125 | 42157 |
| 1 | 1 | 3 | 6 | 0.000 | XPVS1.0XL | 42158 |
| 1 | 1 | 3 | 6 | 0.015 | XPVS1.0XL-015 | 42159 |
| 1 | 1 | 3 | 6 | 0.030 | XPVS1.0XL-030 | 42160 |
| 1 | 1 | 3 | 6 | 0.045 | XPVS1.0XL-045 | 42161 |

Series *XPVS*

Ultra Performance Carbide End Mill for Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | XPVS Tool # | XPVS EDP # |
| 1 | 1 | 3 | 6 | 0.060 | XPVS1.0XL-060 | 42162 |
| 1 | 1 | 3 | 6 | 0.090 | XPVS1.0XL-090 | 42163 |
| 1 | 1 | 3 | 6 | 0.125 | XPVS1.0XL-125 | 42164 |



Series *XPVSB*

**Ultra Performance Carbide End Mill for Ball Nose
Roughing or Finishing Steel and Stainless Alloys**

ISO CODE
P

ISO CODE
M

ISO CODE
K



- 4 Flute
- Ball Nose
- Variable Helix
- Variable Pitch
- Primary & Secondary Relief
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-------------|
| | | | | | XPVSB Tool # | XPVSB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | Ball Nose | XPVSB125S | 43001 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | Ball Nose | XPVSB125 | 43002 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | Ball Nose | XPVSB187S | 43003 |
| 3/16 | 3/16 | 9/16 | 2 | Ball Nose | XPVSB187 | 43004 |
| 1/4 | 1/4 | 1/2 | 2 | Ball Nose | XPVSB250S | 43005 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | Ball Nose | XPVSB250 | 43006 |
| 1/4 | 1/4 | 1 1/8 | 3 | Ball Nose | XPVSB250L | 43007 |
| 5/16 | 5/16 | 1/2 | 2 | Ball Nose | XPVSB312S | 43008 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | Ball Nose | XPVSB312 | 43009 |
| 5/16 | 5/16 | 1 1/8 | 3 | Ball Nose | XPVSB312L | 43010 |
| 3/8 | 3/8 | 1/2 | 2 | Ball Nose | XPVSB375S | 43011 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | Ball Nose | XPVSB375 | 43012 |
| 3/8 | 3/8 | 1 1/8 | 3 | Ball Nose | XPVSB375L | 43013 |
| 3/8 | 3/8 | 1 1/2 | 4 | Ball Nose | XPVSB375XL | 43014 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | Ball Nose | XPVSB500S | 43015 |
| 1/2 | 1/2 | 1 | 3 | Ball Nose | XPVSB500 | 43016 |
| 1/2 | 1/2 | 1 1/4 | 3 | Ball Nose | XPVSB500M | 43017 |
| 1/2 | 1/2 | 1 1/2 | 4 | Ball Nose | XPVSB500L | 43018 |
| 1/2 | 1/2 | 2 | 4 | Ball Nose | XPVSB500XL | 43019 |
| 1/2 | 1/2 | 3 | 6 | Ball Nose | XPVSB500XXL | 43020 |
| 5/8 | 5/8 | 3/4 | 3 | Ball Nose | XPVSB625S | 43021 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | Ball Nose | XPVSB625 | 43022 |
| 5/8 | 5/8 | 2 1/4 | 5 | Ball Nose | XPVSB625L | 43023 |

See page 32 for Cutting Parameters

Series *XPVSB*

Ultra Performance Carbide End Mill for Ball Nose Roughing or Finishing Steel and Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-------------|
| | | | | | XPVSB Tool # | XPVSB EDP # |
| 3/4 | 3/4 | 1 | 3 | Ball Nose | XPVSB750S | 43024 |
| 3/4 | 3/4 | 1 1/2 | 4 | Ball Nose | XPVSB750 | 43025 |
| 3/4 | 3/4 | 2 1/4 | 5 | Ball Nose | XPVSB750L | 43026 |
| 3/4 | 3/4 | 3 | 6 | Ball Nose | XPVSB750XL | 43027 |
| 1 | 1 | 1 1/2 | 4 | Ball Nose | XPVSB1.0 | 43028 |
| 1 | 1 | 2 1/4 | 5 | Ball Nose | XPVSB1.0L | 43029 |
| 1 | 1 | 3 | 6 | Ball Nose | XPVSB1.0XL | 43030 |



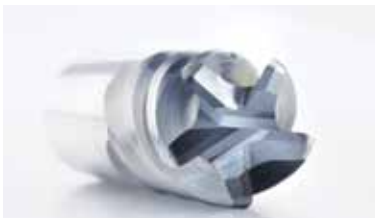
Series *TC5F* — *The Tomcat*

Ultra Performance Carbide End Mill for High Speed Machining Programs (HSM) & Finishing Applications in Steel & Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



- 5 Flute
- Variable Helix
- Variable Pitch
- Sharp or Radius Corners
- Full Eccentric Relief
- AICrN Coating

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AICrN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|
| | | | | | TC5F Tool # | TC5F EDP # |
| 1/4 | 1/4 | 3/8 | 2 | 0.000 | TC5F250VXS | 12001 |
| 1/4 | 1/4 | 3/8 | 2 | 0.015 | TC5F250VXS-015 | 12002 |
| 1/4 | 1/4 | 3/8 | 2 | 0.030 | TC5F250VXS-030 | 12003 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | TC5F250VS | 12004 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | TC5F250VS-015 | 12005 |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | TC5F250VS-030 | 12006 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | TC5F250V | 12007 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | TC5F250V-015 | 12008 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | TC5F250V-030 | 12009 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | TC5F312VS | 12010 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | TC5F312VS-015 | 12011 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | TC5F312VS-030 | 12012 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | TC5F312V | 12013 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | TC5F312V-015 | 12014 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | TC5F312V-030 | 12015 |
| 3/8 | 3/8 | 1/2 | 2 | 0.000 | TC5F375VXS | 12016 |
| 3/8 | 3/8 | 1/2 | 2 | 0.015 | TC5F375VXS-015 | 12017 |
| 3/8 | 3/8 | 1/2 | 2 | 0.030 | TC5F375VXS-030 | 12018 |
| 3/8 | 3/8 | 1/2 | 2 | 0.060 | TC5F375VXS-060 | 12019 |
| 3/8 | 3/8 | 5/8 | 2 | 0.000 | TC5F375VS | 12020 |
| 3/8 | 3/8 | 5/8 | 2 | 0.015 | TC5F375VS-015 | 12021 |
| 3/8 | 3/8 | 5/8 | 2 | 0.030 | TC5F375VS-030 | 12022 |
| 3/8 | 3/8 | 5/8 | 2 | 0.060 | TC5F375VS-060 | 12023 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.000 | TC5F375V | 12024 |

See page 31 for Cutting Parameters

Series **TC5F** — The Tomcat

Ultra Performance Carbide End Mill for High Speed Machining Programs (HSM) & Finishing Applications in Steel & Stainless Alloys



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|
| | | | | | TC5F Tool # | TC5F EDP # |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | TC5F375V-015 | 12025 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.030 | TC5F375V-030 | 12026 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.060 | TC5F375V-060 | 12027 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | TC5F500VS | 12028 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.015 | TC5F500VS-015 | 12029 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | TC5F500VS-030 | 12030 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | TC5F500VS-060 | 12031 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | TC5F500V | 12032 |
| 1/2 | 1/2 | 1 | 3 | 0.015 | TC5F500V-015 | 12033 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | TC5F500V-030 | 12034 |
| 1/2 | 1/2 | 1 | 3 | 0.060 | TC5F500V-060 | 12035 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | TC5F500VM | 12036 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.015 | TC5F500VM-015 | 12037 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | TC5F500VM-030 | 12038 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | TC5F500VM-060 | 12039 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | TC5F500VML | 12040 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.015 | TC5F500VML-015 | 12041 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | TC5F500VML-030 | 12042 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.060 | TC5F500VML-060 | 12043 |
| 1/2 | 1/2 | 1 3/4 | 4 | 0.000 | TC5F500VL | 12044 |
| 1/2 | 1/2 | 1 3/4 | 4 | 0.015 | TC5F500VL-015 | 12045 |
| 1/2 | 1/2 | 1 3/4 | 4 | 0.030 | TC5F500VL-030 | 12046 |
| 1/2 | 1/2 | 1 3/4 | 4 | 0.060 | TC5F500VL-060 | 12047 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | TC5F625VS | 12048 |
| 5/8 | 5/8 | 3/4 | 3 | 0.015 | TC5F625VS-015 | 12049 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | TC5F625VS-030 | 12050 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | TC5F625VS-060 | 12051 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.000 | TC5F625V | 12052 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.015 | TC5F625V-015 | 12053 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | TC5F625V-030 | 12054 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.060 | TC5F625V-060 | 12055 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.090 | TC5F625V-090 | 12056 |
| 5/8 | 5/8 | 1 3/4 | 4 | 0.000 | TC5F625VM | 12057 |
| 5/8 | 5/8 | 1 3/4 | 4 | 0.015 | TC5F625VM-015 | 12058 |



Continued on next page

Series *TC5F* — *The Tomcat*

Ultra Performance Carbide End Mill for High Speed Machining Programs (HSM) & Finishing Applications in Steel & Stainless Alloys

ISO CODE
P

ISO CODE
M

ISO CODE
K



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|
| | | | | | TC5F Tool # | TC5F EDP # |
| 5/8 | 5/8 | 1 3/4 | 4 | 0.030 | TC5F625VM-030 | 12059 |
| 5/8 | 5/8 | 1 3/4 | 4 | 0.060 | TC5F625VM-060 | 12060 |
| 3/4 | 3/4 | 7/8 | 3 | 0.000 | TC5F750VS | 12061 |
| 3/4 | 3/4 | 7/8 | 3 | 0.015 | TC5F750VS-015 | 12062 |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | TC5F750VS-030 | 12063 |
| 3/4 | 3/4 | 7/8 | 3 | 0.060 | TC5F750VS-060 | 12064 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | TC5F750V | 12065 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.015 | TC5F750V-015 | 12066 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | TC5F750V-030 | 12067 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.060 | TC5F750V-060 | 12068 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.090 | TC5F750V-090 | 12069 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.125 | TC5F750V-125 | 12070 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | TC5F750VL | 12071 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.015 | TC5F750VL-015 | 12072 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | TC5F750VL-030 | 12073 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | TC5F750VL-060 | 12074 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.090 | TC5F750VL-090 | 12075 |
| 1 | 1 | 1 1/4 | 4 | 0.000 | TC5F1.0VS | 12076 |
| 1 | 1 | 1 1/4 | 4 | 0.015 | TC5F1.0VS-015 | 12077 |
| 1 | 1 | 1 1/4 | 4 | 0.030 | TC5F1.0VS-030 | 12078 |
| 1 | 1 | 1 1/4 | 4 | 0.060 | TC5F1.0VS-060 | 12079 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | TC5F1.0V | 12080 |
| 1 | 1 | 1 1/2 | 4 | 0.015 | TC5F1.0V-015 | 12081 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | TC5F1.0V-030 | 12082 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | TC5F1.0V-060 | 12083 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | TC5F1.0VL | 12084 |
| 1 | 1 | 2 1/4 | 5 | 0.015 | TC5F1.0VL-015 | 12085 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | TC5F1.0VL-030 | 12086 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | TC5F1.0VL-060 | 12087 |

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Series *XPV & XPVB*

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | |
|-----------------------------|----------|-------------------|-----------------------|-------|--------------------------|-------|-------------------------|-------|-----------|-------|--------------------------|-------|---------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle -7° | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| High Temp - Titanium Alloys | S | 6Al4V, 5553, 99 | 300 | 20.00 | 300 | 18.00 | 300 | 14.00 | 300 | 10.00 | 300 | 18.00 | 300 | 14.00 |

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|-----------------------------|----------|-------------------|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| High Temp - Titanium Alloys | S | 6Al4V, 5553, 99 | 0.0004 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 |

Series *SM7F*

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | High Feed | |
|-----------------------------|----------|-------------------|-----------------------|-----|
| | | | .1D Radial x 3D Axial | |
| | | | SFM | IPM |
| High Temp - Titanium Alloys | S | 6Al4V, 5553, 99 | 400 | 60 |

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | |
|-----------------------------|----------|-------------------|------------------|--------|--------|--------|--------|--------|--------|
| | | | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| High Temp - Titanium Alloys | S | 6Al4V, 5553, 99 | 0.0010 | 0.0014 | 0.0020 | 0.0028 | 0.0035 | 0.0042 | 0.0056 |

ULTRA PERFORMANCE

Series TC5F — The Tomcat

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | High Feed | |
|--------------------|----------|---|-----------------------|-----|
| | | | .1D Radial x 3D Axial | |
| | | | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 800 | 150 |
| Steel Alloys | P | 4140 thru 8820 | 700 | 120 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 500 | 100 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 600 | 100 |
| Stainless Steel | M | 303,304, 316 | 500 | 50 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 600 | 60 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 800 | 150 |

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | |
|--------------------|----------|---|------------------|--------|--------|--------|--------|--------|
| | | | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0075 | 0.0090 |
| Steel Alloys | P | 4140 thru 8820 | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0075 | 0.0090 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0075 | 0.0090 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0075 | 0.0090 |
| Stainless Steel | M | 303,304, 316 | 0.0013 | 0.0020 | 0.0026 | 0.0033 | 0.0040 | 0.0052 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0013 | 0.0020 | 0.0026 | 0.0033 | 0.0040 | 0.0052 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0075 | 0.0090 |

ULTRA PERFORMANCE

Series *XPVS & XPVSB*

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | |
|--------------------|----------|---|-----------------------|-------|--------------------------|-------|-------------------------|-------|-----------|-------|--------------------------|-------|----------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle - 7° | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 800 | 80.00 | 800 | 65.00 | 800 | 60.00 | 800 | 55.00 | 800 | 65.00 | 800 | 60.00 |
| Steel Alloys | P | 4140 thru 8820 | 700 | 70.00 | 700 | 60.00 | 700 | 55.00 | 700 | 50.00 | 700 | 60.00 | 700 | 55.00 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 300 | 12.00 | 300 | 10.00 | 300 | 9.00 | 300 | 8.00 | 300 | 10.00 | 300 | 9.00 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 350 | 45.00 | 350 | 40.00 | 350 | 30.00 | 350 | 25.00 | 350 | 40.00 | 350 | 30.00 |
| Stainless Steel | M | 303,304, 316 | 450 | 40.00 | 450 | 35.00 | 450 | 30.00 | 450 | 25.00 | 450 | 35.00 | 450 | 30.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 350 | 40.00 | 350 | 35.00 | 350 | 30.00 | 350 | 25.00 | 350 | 35.00 | 350 | 30.00 |
| Cast Iron | K | Gray Cast, Malleable & Ductile Iron | 800 | 80.00 | 800 | 65.00 | 800 | 60.00 | 800 | 55.00 | 800 | 65.00 | 800 | 60.00 |

ULTRA PERFORMANCE

Series *XPVS & XPVSB*

Cutting Parameters

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|--------------------|----------|---|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0006 | 0.0010 | 0.0013 | 0.0020 | 0.0027 | 0.0034 | 0.0043 | 0.0052 |
| Steel Alloys | P | 4140 thru 8820 | 0.0007 | 0.0011 | 0.0015 | 0.0022 | 0.0030 | 0.0037 | 0.0047 | 0.0057 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 0.0003 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0010 | 0.0014 | 0.0019 | 0.0028 | 0.0037 | 0.0042 | 0.0052 | 0.0062 |
| Stainless Steel | M | 303,304, 316 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0008 | 0.0014 | 0.0019 | 0.0028 | 0.0037 | 0.0042 | 0.0052 | 0.0062 |
| Cast Iron | K | Gray Cast, Malleable and Ductile | 0.0006 | 0.0010 | 0.0013 | 0.0020 | 0.0027 | 0.0034 | 0.0043 | 0.0052 |

ULTRA PERFORMANCE

Series **XP & XP-NB** (inch sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials



- 4 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Chamfer, Sharp or Radius Corners
- AlCrN or AlTiN Coatings



Series **XP**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **XP-NB**

ISO CODE
H

ISO CODE
S

- For Ferrous Materials <45 HRC, use **Series XP** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series XP-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Chamfer or Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|------------------------|--------------|----------|--------------|-------------|
| | | | | | XP Tool # | XP EDP # | XP-NB Tool # | XP-NB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | .005 x 45° | XP125SC | 30001 | XP125SCA | 30501 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.000 | XP125S | 30002 | XP125SA | 30502 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.008 | XP125SR | 30003 | XP125SRA | 30503 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | .005 x 45° | XP125C | 30004 | XP125CA | 30504 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.000 | XP125 | 30005 | XP125A | 30505 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.008 | XP125R | 30006 | XP125RA | 30506 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | .010 x 45° | XP187SC | 30007 | XP187SCA | 30507 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.000 | XP187S | 30008 | XP187SA | 30508 |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.010 | XP187SR | 30009 | XP187SRA | 30509 |
| 3/16 | 3/16 | 9/16 | 2 | .010 x 45° | XP187C | 30010 | XP187CA | 30510 |
| 3/16 | 3/16 | 9/16 | 2 | 0.000 | XP187 | 30011 | XP187A | 30511 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | XP187R | 30012 | XP187RA | 30512 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | .010 x 45° | XP187LC | 30013 | XP187LCA | 30513 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.000 | XP187L | 30014 | XP187LA | 30514 |
| 7/32 | 1/4 | 1/2 | 2 | .015 x 45° | XP218SC | 30015 | XP218SCA | 30515 |
| 7/32 | 1/4 | 1/2 | 2 | 0.000 | XP218S | 30016 | XP218SA | 30516 |
| 7/32 | 1/4 | 1/2 | 2 | 0.015 | XP218SR | 30017 | XP218SRA | 30517 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | .015 x 45° | XP218C | 30018 | XP218CA | 30518 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.000 | XP218 | 30019 | XP218A | 30519 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.015 | XP218R | 30020 | XP218RA | 30520 |
| 1/4 | 1/4 | 1/2 | 2 | .015 x 45° | XP250SC | 30021 | XP250SCA | 30521 |

See page 62 for Cutting Parameters

Series **XP & XP-NB** (inch sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Chamfer or Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|------------------------|--------------|----------|--------------|-------------|
| | | | | | XP Tool # | XP EDP # | XP-NB Tool # | XP-NB EDP # |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | XP250S | 30022 | XP250SA | 30522 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | XP250SR | 30023 | XP250SRA | 30523 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | .015 x 45° | XP250C | 30024 | XP250CA | 30524 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | XP250 | 30025 | XP250A | 30525 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | XP250R | 30026 | XP250RA | 30526 |
| 1/4 | 1/4 | 1 1/8 | 3 | .015 x 45° | XP250LC | 30027 | XP250LCA | 30527 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | XP250L | 30028 | XP250LA | 30528 |
| 1/4 | 1/4 | 1 1/2 | 4 | .015 x 45° | XP250XLC | 30029 | XP250XLCA | 30529 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.000 | XP250XL | 30030 | XP250XLA | 30530 |
| 5/16 | 5/16 | 1/2 | 2 | .015 x 45° | XP312SC | 30031 | XP312SCA | 30531 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | XP312S | 30032 | XP312SA | 30532 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | XP312SR | 30033 | XP312SRA | 30533 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | .015 x 45° | XP312C | 30034 | XP312CA | 30534 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | XP312 | 30035 | XP312A | 30535 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | XP312R | 30036 | XP312RA | 30536 |
| 5/16 | 5/16 | 1 1/8 | 3 | .015 x 45° | XP312LC | 30037 | XP312LCA | 30537 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | XP312L | 30038 | XP312LA | 30538 |
| 3/8 | 3/8 | 1/2 | 2 | .020" x 45° | XP375SC | 30039 | XP375SCA | 30539 |
| 3/8 | 3/8 | 1/2 | 2 | 0.000 | XP375S | 30040 | XP375SA | 30540 |
| 3/8 | 3/8 | 1/2 | 2 | 0.015 | XP375SR | 30041 | XP375SRA | 30541 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | .020" x 45° | XP375C | 30042 | XP375CA | 30542 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.000 | XP375 | 30043 | XP375A | 30543 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.015 | XP375R | 30044 | XP375RA | 30544 |
| 3/8 | 3/8 | 1 1/8 | 3 | .020" x 45° | XP375LC | 30045 | XP375LCA | 30545 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.000 | XP375L | 30046 | XP375LA | 30546 |
| 3/8 | 3/8 | 1 3/4 | 4 | .020" x 45° | XP375XLC | 30047 | XP375XLCA | 30547 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.000 | XP375XL | 30048 | XP375XLA | 30548 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.015 | XP375XLR | 30049 | XP375XLRA | 30549 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | .020" x 45° | XP437SC | 30050 | XP437SCA | 30550 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.000 | XP437S | 30051 | XP437SA | 30551 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.015 | XP437SR | 30052 | XP437SRA | 30552 |
| 7/16 | 7/16 | 1 | 2 3/4 | .020" x 45° | XP437C | 30053 | XP437CA | 30553 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.000 | XP437 | 30054 | XP437A | 30554 |



Continued on next page

Series *XP & XP-NB* (inch sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Chamfer or Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|------------------------|--------------|----------|--------------|-------------|
| | | | | | XP Tool # | XP EDP # | XP-NB Tool # | XP-NB EDP # |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | XP437R | 30055 | XP437RA | 30555 |
| 7/16 | 7/16 | 2 | 4 | .020" x 45° | XP437LC | 30056 | XP437LCA | 30556 |
| 7/16 | 7/16 | 2 | 4 | 0.000 | XP437L | 30057 | XP437LA | 30557 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | .020" x 45° | XP500SC | 30058 | XP500SCA | 30558 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | XP500S | 30059 | XP500SA | 30559 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | XP500SR | 30060 | XP500SRA | 30560 |
| 1/2 | 1/2 | 1 | 3 | .020" x 45° | XP500C | 30061 | XP500CA | 30561 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | XP500 | 30062 | XP500A | 30562 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | XP500R | 30063 | XP500RA | 30563 |
| 1/2 | 1/2 | 1 1/4 | 3 | .020" x 45° | XP500MC | 30064 | XP500MCA | 30564 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | XP500M | 30065 | XP500MA | 30565 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | XP500MR | 30066 | XP500MRA | 30566 |
| 1/2 | 1/2 | 1 1/2 | 4 | .020" x 45° | XP500LC | 30067 | XP500LCA | 30567 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | XP500L | 30068 | XP500LA | 30568 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | XP500LR | 30069 | XP500LRA | 30569 |
| 1/2 | 1/2 | 2 | 4 | .020" x 45° | XP500XLC | 30070 | XP500XLCA | 30570 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | XP500XL | 30071 | XP500XLA | 30571 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | XP500XLR | 30072 | XP500XLRA | 30572 |
| 1/2 | 1/2 | 3 | 6 | .020" x 45° | XP500XXLC | 30073 | XP500XXLCA | 30573 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | XP500XXL | 30074 | XP500XXLA | 30574 |
| 5/8 | 5/8 | 3/4 | 3 | .020" x 45° | XP625SC | 30075 | XP625SCA | 30575 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | XP625S | 30076 | XP625SA | 30576 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | XP625SR | 30077 | XP625SRA | 30577 |
| 5/8 | 5/8 | 1 1/4 | 4 | .020" x 45° | XP625C | 30078 | XP625CA | 30578 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.000 | XP625 | 30079 | XP625A | 30579 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | XP625R | 30080 | XP625RA | 30580 |
| 5/8 | 5/8 | 2 1/4 | 5 | .020" x 45° | XP625LC | 30081 | XP625LCA | 30581 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | XP625L | 30082 | XP625LA | 30582 |
| 3/4 | 3/4 | 1 | 3 | .020" x 45° | XP750SC | 30083 | XP750SCA | 30583 |
| 3/4 | 3/4 | 1 | 3 | 0.000 | XP750S | 30084 | XP750SA | 30584 |
| 3/4 | 3/4 | 1 | 3 | 0.030 | XP750SR | 30085 | XP750SRA | 30585 |
| 3/4 | 3/4 | 1 1/2 | 4 | .020" x 45° | XP750C | 30086 | XP750CA | 30586 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | XP750 | 30087 | XP750A | 30587 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | XP750R | 30088 | XP750RA | 30588 |

Series *XP & XP-NB* (inch sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Chamfer or Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|------------------------|--------------|----------|--------------|-------------|
| | | | | | XP Tool # | XP EDP # | XP-NB Tool # | XP-NB EDP # |
| 3/4 | 3/4 | 2 1/4 | 5 | .020" x 45° | XP750LC | 30089 | XP750LCA | 30589 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | XP750L | 30090 | XP750LA | 30590 |
| 3/4 | 3/4 | 3 | 6 | .020" x 45° | XP750XLC | 30091 | XP750XLCA | 30591 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | XP750XL | 30092 | XP750XLA | 30592 |
| 1 | 1 | 1 1/2 | 4 | .020" x 45° | XP1.0C | 30093 | XP1.0CA | 30593 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | XP1.0 | 30094 | XP1.0A | 30594 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | XP1.0R | 30095 | XP1.0RA | 30595 |
| 1 | 1 | 2 1/4 | 5 | .020" x 45° | XP1.0LC | 30096 | XP1.0LCA | 30596 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | XP1.0L | 30097 | XP1.0LA | 30597 |
| 1 | 1 | 3 | 6 | .020" x 45° | XP1.0XLC | 30098 | XP1.0XLCA | 30598 |
| 1 | 1 | 3 | 6 | 0.000 | XP1.0XL | 30099 | XP1.0XLA | 30599 |



Series **MXP & MXP-NB** (metric sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials



- 4 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN or AlTiN Coatings



Series **MXP**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **MXP-NB**

ISO CODE
H

ISO CODE
S

- For Ferrous Materials <45 HRC, use **Series MXP** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series MXP-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | MXP Tool # | MXP EDP # | MXP-NB Tool # | MXP-NB EDP # |
| 3mm | 6mm | 8mm | 58mm | 0.000 | MXP3 | 30401 | MXP3A | 30901 |
| 3mm | 6mm | 8mm | 58mm | .25mm | MXP3R | 30402 | MXP3RA | 30902 |
| 4mm | 6mm | 11mm | 58mm | 0.000 | MXP4 | 30403 | MXP4A | 30903 |
| 4mm | 6mm | 11mm | 58mm | .25mm | MXP4R | 30404 | MXP4RA | 30904 |
| 5mm | 6mm | 13mm | 58mm | 0.000 | MXP5 | 30405 | MXP5A | 30905 |
| 5mm | 6mm | 13mm | 58mm | .25mm | MXP5R | 30406 | MXP5RA | 30906 |
| 6mm | 6mm | 13mm | 58mm | 0.000 | MXP6 | 30407 | MXP6A | 30907 |
| 6mm | 6mm | 13mm | 58mm | .38mm | MXP6R | 30408 | MXP6RA | 30908 |
| 7mm | 8mm | 19mm | 64mm | 0.000 | MXP7 | 30409 | MXP7A | 30909 |
| 7mm | 8mm | 19mm | 64mm | .38mm | MXP7R | 30410 | MXP7RA | 30910 |
| 8mm | 8mm | 19mm | 64mm | 0.000 | MXP8 | 30411 | MXP8A | 30911 |
| 8mm | 8mm | 19mm | 64mm | .38mm | MXP8R | 30412 | MXP8RA | 30912 |
| 9mm | 10mm | 22mm | 67mm | 0.000 | MXP9 | 30413 | MXP9A | 30913 |
| 9mm | 10mm | 22mm | 67mm | .38mm | MXP9R | 30414 | MXP9RA | 30914 |
| 10mm | 10mm | 22mm | 67mm | 0.000 | MXP10 | 30415 | MXP10A | 30915 |
| 10mm | 10mm | 22mm | 67mm | .38mm | MXP10R | 30416 | MXP10RA | 30916 |
| 11mm | 12mm | 26mm | 74mm | 0.000 | MXP11 | 30417 | MXP11A | 30917 |
| 11mm | 12mm | 26mm | 74mm | .64mm | MXP11R | 30418 | MXP11RA | 30918 |
| 12mm | 12mm | 26mm | 74mm | 0.000 | MXP12 | 30419 | MXP12A | 30919 |
| 12mm | 12mm | 26mm | 74mm | .64mm | MXP12R | 30420 | MXP12RA | 30920 |
| 13mm | 14mm | 26mm | 76mm | 0.000 | MXP13 | 30421 | MXP13A | 30921 |

See page 62 for Cutting Parameters

Series **MXP & MXP-NB** (metric sizes)

High Performance Carbide End Mill for Slotting & Heavy Profiling Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | MXP Tool # | MXP EDP # | MXP-NB Tool # | MXP-NB EDP # |
| 13mm | 14mm | 26mm | 76mm | .64mm | MXP13R | 30422 | MXP13RA | 30922 |
| 14mm | 14mm | 26mm | 76mm | 0.000 | MXP14 | 30423 | MXP14A | 30923 |
| 14mm | 14mm | 26mm | 76mm | .64mm | MXP14R | 30424 | MXP14RA | 30924 |
| 15mm | 16mm | 32mm | 93mm | 0.000 | MXP15 | 30425 | MXP15A | 30925 |
| 15mm | 16mm | 32mm | 93mm | .75mm | MXP15R | 30426 | MXP15RA | 30926 |
| 16mm | 16mm | 32mm | 93mm | 0.000 | MXP16 | 30427 | MXP16A | 30927 |
| 16mm | 16mm | 32mm | 93mm | .75mm | MXP16R | 30428 | MXP16RA | 30928 |
| 18mm | 18mm | 32mm | 93mm | 0.000 | MXP18 | 30429 | MXP18A | 30929 |
| 18mm | 18mm | 32mm | 93mm | .75mm | MXP18R | 30430 | MXP18RA | 30930 |
| 20mm | 20mm | 38mm | 100mm | 0.000 | MXP20 | 30431 | MXP20A | 30931 |
| 20mm | 20mm | 38mm | 100mm | .75mm | MXP20R | 30432 | MXP20RA | 30932 |
| 25mm | 25mm | 38mm | 101mm | 0.000 | MXP25 | 30433 | MXP25A | 30933 |
| 25mm | 25mm | 38mm | 101mm | .75mm | MXP25R | 30434 | MXP25RA | 30934 |



Series *XPB & XPB-NB*

High Performance Carbide End Mill for Ball Nose Slotting & Heavy Profiling Ferrous Materials

Series **XPB**

ISO CODE

P

ISO CODE

M

ISO CODE

S

ISO CODE

K

Series **XPB-NB**

ISO CODE

H

ISO CODE

S



- 4 Flute
- Ball Nose
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series XPB** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series XPB-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | XPB Tool # | XPB EDP # | XPB-NB Tool # | XPB-NB EDP # |
| 3/16 | 3/16 | 3/8 | 1 1/2 | Ball Nose | XPB187S | 31001 | XPB187SA | 31501 |
| 3/16 | 3/16 | 9/16 | 2 | Ball Nose | XPB187 | 31002 | XPB187A | 31502 |
| 1/4 | 1/4 | 1/2 | 2 | Ball Nose | XPB250S | 31003 | XPB250SA | 31503 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | Ball Nose | XPB250 | 31004 | XPB250A | 31504 |
| 5/16 | 5/16 | 1/2 | 2 | Ball Nose | XPB312S | 31005 | XPB312SA | 31505 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | Ball Nose | XPB312 | 31006 | XPB312A | 31506 |
| 3/8 | 3/8 | 1/2 | 2 | Ball Nose | XPB375S | 31007 | XPB375SA | 31507 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | Ball Nose | XPB375 | 31008 | XPB375A | 31508 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | Ball Nose | XPB437S | 31009 | XPB437SA | 31509 |
| 7/16 | 7/16 | 1 | 2 3/4 | Ball Nose | XPB437 | 31010 | XPB437A | 31510 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | Ball Nose | XPB500S | 31011 | XPB500SA | 31511 |
| 1/2 | 1/2 | 1 | 3 | Ball Nose | XPB500 | 31012 | XPB500A | 31512 |
| 1/2 | 1/2 | 1 1/4 | 3 | Ball Nose | XPB500L | 31013 | XPB500LA | 31513 |
| 1/2 | 1/2 | 1 1/2 | 4 | Ball Nose | XPB500ML | 31014 | XPB500MLA | 31514 |
| 5/8 | 5/8 | 3/4 | 3 | Ball Nose | XPB625S | 31015 | XPB625SA | 31515 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | Ball Nose | XPB625 | 31016 | XPB625A | 31516 |
| 3/4 | 3/4 | 1 | 3 | Ball Nose | XPB750S | 31017 | XPB750SA | 31517 |
| 3/4 | 3/4 | 1 1/2 | 4 | Ball Nose | XPB750 | 31018 | XPB750A | 31518 |
| 1 | 1 | 1 1/2 | 4 | Ball Nose | XPB1.0 | 31019 | XPB1.0A | 31519 |

See page 62 for Cutting Parameters

Series XPR & XPR-NB

High Performance Carbide End Mill with Chipbreakers for Slotting & Heavy Profiling Ferrous Materials



- 4 Flute
- 45° Helix
- Variable Pitch with Chipbreakers
- Full Eccentric Relief
- Corner Radius
- AlCrN or AlTiN Coating



Series XP

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series XP-NB

ISO CODE
H

ISO CODE
S

- For Ferrous Materials <45 HRC, use **Series XPR** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series XPR-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | XPR Tool # | XPR EDP # | XPR-NB Tool # | XPR-NB EDP # |
| 3/16 | 3/16 | 3/8 | 1 1/2 | 0.010 | XPR187SR | 32001 | XPR187SRA | 32501 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | XPR187R | 32002 | XPR187RA | 32502 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | XPR250SR | 32003 | XPR250SRA | 32503 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | XPR250R | 32004 | XPR250RA | 32504 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | XPR312SR | 32005 | XPR312SRA | 32505 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | XPR312R | 32006 | XPR312RA | 32506 |
| 3/8 | 3/8 | 1/2 | 2 | 0.015 | XPR375SR | 32007 | XPR375SRA | 32507 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.015 | XPR375R | 32008 | XPR375RA | 32508 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.015 | XPR437SR | 32009 | XPR437SRA | 32509 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | XPR437R | 32010 | XPR437RA | 32510 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | XPR500SR | 32011 | XPR500SRA | 32511 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | XPR500R | 32012 | XPR500RA | 32512 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | XPR500MR | 32013 | XPR500MRA | 32513 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | XPR500LR | 32014 | XPR500LRA | 32514 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | XPR500XLR | 32015 | XPR500XLRA | 32515 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | XPR625SR | 32016 | XPR625SRA | 32516 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | XPR625R | 32017 | XPR625RA | 32517 |
| 3/4 | 3/4 | 1 | 3 | 0.030 | XPR750SR | 32018 | XPR750SRA | 32518 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | XPR750R | 32019 | XPR750RA | 32519 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | XPR1.0R | 32020 | XPR1.0RA | 32520 |

See page 62 for Cutting Parameters



Series SM3F

High Performance Carbide End Mill for Slotting and Heavy Profiling Non-Ferrous & Ferrous Materials <45 HRC

ISO CODE
M

ISO CODE
N



- 3 Flute
- 50° Helix
- Variable Pitch
- Full Eccentric Relief
- Corner Radius
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SM3F Tool # | SM3F EDP # |
| 3/16 | 3/16 | 5/16 | 1 1/2 | 0.010 | SM3F187SR | 13001 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | SM3F187R | 13002 |
| 7/32 | 1/4 | 1/2 | 2 | 0.015 | SM3F218SR | 13003 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM3F218R | 13004 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | SM3F250SR | 13005 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM3F250R | 13006 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SM3F250LR | 13007 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.015 | SM3F250XLR | 13008 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | SM3F312SR | 13009 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SM3F312R | 13010 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | SM3F312LR | 13011 |
| 3/8 | 3/8 | 9/16 | 2 | 0.015 | SM3F375SR | 13012 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SM3F375R | 13013 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SM3F375LR | 13014 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SM3F437R | 13015 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SM3F437LR | 13016 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SM3F500SR | 13017 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SM3F500R | 13018 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SM3F500MR | 13019 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SM3F500LR | 13020 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | SM3F500XLR | 13021 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SM3F625SR | 13022 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SM3F625R | 13023 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SM3F625LR | 13024 |

See page 64 for Cutting Parameters

Series SM3F

High Performance Carbide End Mill for Slotting and Heavy Profiling Non-Ferrous & Ferrous Materials <45 HRC

ISO CODE
M

ISO CODE
N

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SM3F Tool # | SM3F EDP # |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | SM3F750SR | 13025 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SM3F750R | 13026 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SM3F750LR | 13027 |
| 1 | 1 | 2 | 4 | 0.030 | SM3F1.0R | 13028 |
| 1 | 1 | 3 | 6 | 0.030 | SM3F1.0XLR | 13029 |



Series SR3F

High Performance Carbide End Mill with Chipbreakers for Slotting & Heavy Profiling Non-Ferrous and Ferrous Materials <45 HRC

ISO CODE
M

ISO CODE
N

- 3 Flute
- 50° Helix
- Variable Pitch with Chipbreakers
- Full Eccentric Relief
- Corner Radius
- AlCrN Coating



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SR3F Tool # | SR3F EDP # |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SR3F250R | 13301 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SR3F250LR | 13302 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SR3F312R | 13303 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SR3F375R | 13304 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SR3F375LR | 13305 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SR3F437R | 13306 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SR3F437LR | 13307 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SR3F500R | 13308 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SR3F500MR | 13309 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SR3F500LR | 13310 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SR3F625R | 13311 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SR3F625LR | 13312 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SR3F750R | 13313 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SR3F750LR | 13314 |
| 1 | 1 | 2 | 4 | 0.030 | SR3F1.0R | 13315 |
| 1 | 1 | 3 | 6 | 0.030 | SR3F1.0LR | 13316 |

See page 64 for Cutting Parameters

Series SM4F

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials <45 HRC



- 4 Flute
- 50° Helix
- Equal Flute Spacing
- Full Eccentric Relief
- Corner Radius
- AlCrN Coating

ISO CODE
P

ISO CODE
M

ISO CODE
K



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SM4F Tool # | SM4F EDP # |
| 3/16 | 3/16 | 5/16 | 1 1/2 | 0.010 | SM4F187SR | 14001 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | SM4F187R | 14002 |
| 7/32 | 1/4 | 1/2 | 2 | 0.015 | SM4F218SR | 14003 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM4F218R | 14004 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | SM4F250SR | 14005 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM4F250R | 14006 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SM4F250LR | 14007 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.015 | SM4F250XLR | 14008 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | SM4F312SR | 14009 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SM4F312R | 14010 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | SM4F312LR | 14011 |
| 3/8 | 3/8 | 9/16 | 2 | 0.015 | SM4F375SR | 14012 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SM4F375R | 14013 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SM4F375LR | 14014 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SM4F437R | 14015 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SM4F437LR | 14016 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SM4F500SR | 14017 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SM4F500R | 14018 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SM4F500MR | 14019 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SM4F500LR | 14020 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | SM4F500XLR | 14021 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SM4F625SR | 14022 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SM4F625R | 14023 |



See page 66 for Cutting Parameters

Continued on next page

Series **SM4F**

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials <45 HRC

ISO CODE
P

ISO CODE
M

ISO CODE
K

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SM4F Tool # | SM4F EDP # |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SM4F625LR | 14024 |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | SM4F750SR | 14025 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SM4F750R | 14026 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SM4F750LR | 14027 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | SM4F750XLR | 14028 |
| 1 | 1 | 2 | 4 | 0.030 | SM4F1.0R | 14029 |
| 1 | 1 | 3 | 6 | 0.030 | SM4F1.0XLR | 14030 |



Series SR4F

High Performance Carbide End Mill with Chipbreakers for Medium Profiling Ferrous Materials <45 HRC



- 4 Flute
- 50° Helix
- Equal Flute Spacing with Chipbreakers
- Full Eccentric Relief
- Corner Radius
- AlCrN Coating



ISO CODE
P

ISO CODE
M

ISO CODE
K

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|
| | | | | | SR4F Tool # | SR4F EDP # |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SR4F250R | 14401 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SR4F250LR | 14402 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SR4F312R | 14403 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SR4F375R | 14404 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SR4F375LR | 14405 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SR4F437R | 14406 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SR4F437LR | 14407 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SR4F500R | 14408 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SR4F500MR | 14409 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SR4F500LR | 14410 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SR4F625R | 14411 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SR4F625LR | 14412 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SR4F750R | 14413 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SR4F750LR | 14414 |
| 1 | 1 | 2 | 4 | 0.030 | SR4F1.0R | 14415 |
| 1 | 1 | 3 | 6 | 0.030 | SR4F1.0LR | 14416 |



See page 66 for Cutting Parameters

Series **SM5F & SM5F-NB** (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials

Series **SM5F**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **SM5F-NB**

ISO CODE
H

ISO CODE
S

- 5 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series SM5F** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series SM5F-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.000 | SM5F125S | 15001 | SM5F125SA | 15501 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.010 | SM5F125S-010 | 15002 | SM5F125SA-010 | 15502 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.000 | SM5F125 | 15003 | SM5F125A | 15503 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.010 | SM5F125-010 | 15004 | SM5F125A-010 | 15504 |
| 5/32 | 3/16 | 5/16 | 2 | 0.000 | SM5F156S | 15005 | SM5F156SA | 15505 |
| 5/32 | 3/16 | 5/16 | 2 | 0.010 | SM5F156S-010 | 15006 | SM5F156SA-010 | 15506 |
| 5/32 | 3/16 | 9/16 | 2 | 0.000 | SM5F156 | 15007 | SM5F156A | 15507 |
| 5/32 | 3/16 | 9/16 | 2 | 0.010 | SM5F156-010 | 15008 | SM5F156A-010 | 15508 |
| 3/16 | 3/16 | 5/16 | 1 1/2 | 0.000 | SM5F187S | 15009 | SM5F187SA | 15509 |
| 3/16 | 3/16 | 5/16 | 1 1/2 | 0.010 | SM5F187S-010 | 15010 | SM5F187SA-010 | 15510 |
| 3/16 | 3/16 | 5/16 | 1 1/2 | 0.030 | SM5F187S-030 | 15011 | SM5F187SA-030 | 15511 |
| 3/16 | 3/16 | 9/16 | 2 | 0.000 | SM5F187 | 15012 | SM5F187A | 15512 |
| 3/16 | 3/16 | 9/16 | 2 | 0.010 | SM5F187-010 | 15013 | SM5F187A-010 | 15513 |
| 3/16 | 3/16 | 9/16 | 2 | 0.020 | SM5F187-020 | 15014 | SM5F187A-020 | 15514 |
| 3/16 | 3/16 | 9/16 | 2 | 0.030 | SM5F187-030 | 15015 | SM5F187A-030 | 15515 |
| 7/32 | 1/4 | 1/2 | 2 | 0.000 | SM5F218S | 15016 | SM5F218SA | 15516 |
| 7/32 | 1/4 | 1/2 | 2 | 0.015 | SM5F218S-015 | 15017 | SM5F218SA-015 | 15517 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.000 | SM5F218 | 15018 | SM5F218A | 15518 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM5F218-015 | 15019 | SM5F218A-015 | 15519 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | SM5F250S | 15020 | SM5F250SA | 15520 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | SM5F250S-015 | 15021 | SM5F250SA-015 | 15521 |

See page 68 for Cutting Parameters

Series **SM5F & SM5F-NB** (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | SM5F250S-030 | 15022 | SM5F250SA-030 | 15522 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | SM5F250 | 15023 | SM5F250A | 15523 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM5F250-015 | 15024 | SM5F250A-015 | 15524 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | SM5F250-030 | 15025 | SM5F250A-030 | 15525 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | SM5F250L | 15026 | SM5F250LA | 15526 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SM5F250L-015 | 15027 | SM5F250LA-015 | 15527 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.030 | SM5F250L-030 | 15028 | SM5F250LA-030 | 15528 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.000 | SM5F250XL | 15029 | SM5F250XLA | 15529 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.015 | SM5F250XL-015 | 15030 | SM5F250XLA-015 | 15530 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.030 | SM5F250XL-030 | 15031 | SM5F250XLA-030 | 15531 |
| 9/32 | 5/16 | 1/2 | 2 | 0.000 | SM5F281S | 15032 | SM5F281SA | 15532 |
| 9/32 | 5/16 | 1/2 | 2 | 0.015 | SM5F281S-015 | 15033 | SM5F281SA-015 | 15533 |
| 9/32 | 5/16 | 3/4 | 2 1/2 | 0.000 | SM5F281 | 15034 | SM5F281A | 15534 |
| 9/32 | 5/16 | 3/4 | 2 1/2 | 0.015 | SM5F281-015 | 15035 | SM5F281A-015 | 15535 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | SM5F312S | 15036 | SM5F312SA | 15536 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | SM5F312S-015 | 15037 | SM5F312SA-015 | 15537 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | SM5F312S-030 | 15038 | SM5F312SA-030 | 15538 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | SM5F312 | 15039 | SM5F312A | 15539 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SM5F312-015 | 15040 | SM5F312A-015 | 15540 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | SM5F312-030 | 15041 | SM5F312A-030 | 15541 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | SM5F312L | 15042 | SM5F312LA | 15542 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | SM5F312L-015 | 15043 | SM5F312LA-015 | 15543 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.030 | SM5F312L-030 | 15044 | SM5F312LA-030 | 15544 |
| 11/32 | 3/8 | 9/16 | 2 1/2 | 0.000 | SM5F343S | 15045 | SM5F343SA | 15545 |
| 11/32 | 3/8 | 9/16 | 2 1/2 | 0.015 | SM5F343S-015 | 15046 | SM5F343SA-015 | 15546 |
| 11/32 | 3/8 | 7/8 | 2 1/2 | 0.000 | SM5F343 | 15047 | SM5F343A | 15547 |
| 11/32 | 3/8 | 7/8 | 2 1/2 | 0.015 | SM5F343-015 | 15048 | SM5F343A-015 | 15548 |
| 3/8 | 3/8 | 9/16 | 2 | 0.000 | SM5F375S | 15049 | SM5F375SA | 15549 |
| 3/8 | 3/8 | 9/16 | 2 | 0.015 | SM5F375S-015 | 15050 | SM5F375SA-015 | 15550 |
| 3/8 | 3/8 | 9/16 | 2 | 0.030 | SM5F375S-030 | 15051 | SM5F375SA-030 | 15551 |
| 3/8 | 3/8 | 9/16 | 2 | 0.062 | SM5F375S-062 | 15052 | SM5F375SA-062 | 15552 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.000 | SM5F375 | 15053 | SM5F375A | 15553 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SM5F375-015 | 15054 | SM5F375A-015 | 15554 |



Continued on next page

Series SM5F & SM5F-NB (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|-----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.030 | SM5F375-030 | 15055 | SM5F375A-030 | 15555 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.062 | SM5F375-062 | 15056 | SM5F375A-062 | 15556 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.125 | SM5F375-125 | 15057 | SM5F375A-125 | 15557 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.000 | SM5F375L | 15058 | SM5F375LA | 15558 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SM5F375L-015 | 15059 | SM5F375LA-015 | 15559 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.030 | SM5F375L-030 | 15060 | SM5F375LA-030 | 15560 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.062 | SM5F375L-062 | 15061 | SM5F375LA-062 | 15561 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.000 | SM5F375XL | 15062 | SM5F375XLA | 15562 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.015 | SM5F375XL-015 | 15063 | SM5F375XLA-015 | 15563 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.030 | SM5F375XL-030 | 15064 | SM5F375XLA-030 | 15564 |
| 3/8 | 3/8 | 1 1/2 | 4 | 0.062 | SM5F375XL-062 | 15065 | SM5F375XLA-062 | 15565 |
| 3/8 | 3/8 | 2 | 4 | 0.000 | SM5F375XXL | 15066 | SM5F375XXLA | 15566 |
| 3/8 | 3/8 | 2 | 4 | 0.015 | SM5F375XXL-015 | 15067 | SM5F375XXLA-015 | 15567 |
| 3/8 | 3/8 | 2 | 4 | 0.030 | SM5F375XXL-030 | 15068 | SM5F375XXLA-030 | 15568 |
| 3/8 | 3/8 | 2 | 4 | 0.062 | SM5F375XXL-062 | 15069 | SM5F375XXLA-062 | 15569 |
| 7/16 | 7/16 | 9/16 | 2 1/2 | 0.000 | SM5F437S | 15070 | SM5F437SA | 15570 |
| 7/16 | 7/16 | 9/16 | 2 1/2 | 0.015 | SM5F437S-015 | 15071 | SM5F437SA-015 | 15571 |
| 7/16 | 7/16 | 9/16 | 2 1/2 | 0.030 | SM5F437S-030 | 15072 | SM5F437SA-030 | 15572 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.000 | SM5F437 | 15073 | SM5F437A | 15573 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SM5F437-015 | 15074 | SM5F437A-015 | 15574 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.030 | SM5F437-030 | 15075 | SM5F437A-030 | 15575 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.040 | SM5F437-040 | 15076 | SM5F437A-040 | 15576 |
| 7/16 | 7/16 | 2 | 4 | 0.000 | SM5F437L | 15077 | SM5F437LA | 15577 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SM5F437L-015 | 15078 | SM5F437LA-015 | 15578 |
| 7/16 | 7/16 | 2 | 4 | 0.030 | SM5F437L-030 | 15079 | SM5F437LA-030 | 15579 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | SM5F500S | 15080 | SM5F500SA | 15580 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.010 | SM5F500S-010 | 15081 | SM5F500SA-010 | 15581 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.015 | SM5F500S-015 | 15082 | SM5F500SA-015 | 15582 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SM5F500S-030 | 15083 | SM5F500SA-030 | 15583 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.045 | SM5F500S-045 | 15084 | SM5F500SA-045 | 15584 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.050 | SM5F500S-050 | 15085 | SM5F500SA-050 | 15585 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | SM5F500S-060 | 15205 | SM5F500SA-060 | 15705 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.062 | SM5F500S-062 | 15086 | SM5F500SA-062 | 15586 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.090 | SM5F500S-090 | 15087 | SM5F500SA-090 | 15587 |

Series **SM5F & SM5F-NB** (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.125 | SM5F500S-125 | 15088 | SM5F500SA-125 | 15588 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | SM5F500MS | 15089 | SM5F500MSA | 15589 |
| 1/2 | 1/2 | 1 | 3 | 0.015 | SM5F500MS-015 | 15090 | SM5F500MSA-015 | 15590 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | SM5F500MS-030 | 15091 | SM5F500MSA-030 | 15591 |
| 1/2 | 1/2 | 1 | 3 | 0.045 | SM5F500MS-045 | 15092 | SM5F500MSA-045 | 15592 |
| 1/2 | 1/2 | 1 | 3 | 0.050 | SM5F500MS-050 | 15093 | SM5F500MSA-050 | 15593 |
| 1/2 | 1/2 | 1 | 3 | 0.062 | SM5F500MS-062 | 15094 | SM5F500MSA-062 | 15594 |
| 1/2 | 1/2 | 1 | 3 | 0.090 | SM5F500MS-090 | 15206 | SM5F500MSA-090 | 15706 |
| 1/2 | 1/2 | 1 | 3 | 0.125 | SM5F500MS-125 | 15095 | SM5F500MSA-125 | 15595 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | SM5F500 | 15096 | SM5F500A | 15596 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.010 | SM5F500-010 | 15097 | SM5F500A-010 | 15597 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.015 | SM5F500-015 | 15098 | SM5F500A-015 | 15598 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SM5F500-030 | 15099 | SM5F500A-030 | 15599 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.045 | SM5F500-045 | 15100 | SM5F500A-045 | 15600 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.047 | SM5F500-047 | 15101 | SM5F500A-047 | 15601 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.050 | SM5F500-050 | 15102 | SM5F500A-050 | 15602 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | SM5F500-060 | 15103 | SM5F500A-060 | 15603 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.062 | SM5F500-062 | 15104 | SM5F500A-062 | 15604 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.090 | SM5F500-090 | 15105 | SM5F500A-090 | 15605 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.125 | SM5F500-125 | 15106 | SM5F500A-125 | 15606 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | SM5F500M | 15107 | SM5F500MA | 15607 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.015 | SM5F500M-015 | 15108 | SM5F500MA-015 | 15608 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SM5F500M-030 | 15109 | SM5F500MA-030 | 15609 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.045 | SM5F500M-045 | 15110 | SM5F500MA-045 | 15610 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.050 | SM5F500M-050 | 15111 | SM5F500MA-050 | 15611 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.062 | SM5F500M-062 | 15112 | SM5F500MA-062 | 15612 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.090 | SM5F500M-090 | 15113 | SM5F500MA-090 | 15613 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.125 | SM5F500M-125 | 15114 | SM5F500MA-125 | 15614 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | SM5F500L | 15115 | SM5F500LA | 15615 |
| 1/2 | 1/2 | 2 | 4 | 0.015 | SM5F500L-015 | 15116 | SM5F500LA-015 | 15616 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SM5F500L-030 | 15117 | SM5F500LA-030 | 15617 |
| 1/2 | 1/2 | 2 | 4 | 0.045 | SM5F500L-045 | 15118 | SM5F500LA-045 | 15618 |
| 1/2 | 1/2 | 2 | 4 | 0.050 | SM5F500L-050 | 15119 | SM5F500LA-050 | 15619 |



Continued on next page

Series SM5F & SM5F-NB (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 1/2 | 1/2 | 2 | 4 | 0.062 | SM5F500L-062 | 15120 | SM5F500LA-062 | 15620 |
| 1/2 | 1/2 | 2 | 4 | 0.090 | SM5F500L-090 | 15121 | SM5F500LA-090 | 15621 |
| 1/2 | 1/2 | 2 | 4 | 0.125 | SM5F500L-125 | 15122 | SM5F500LA-125 | 15622 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | SM5F500XL | 15123 | SM5F500XLA | 15623 |
| 1/2 | 1/2 | 3 | 6 | 0.015 | SM5F500XL-015 | 15124 | SM5F500XLA-015 | 15624 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | SM5F500XL-030 | 15125 | SM5F500XLA-030 | 15625 |
| 1/2 | 1/2 | 3 | 6 | 0.045 | SM5F500XL-045 | 15126 | SM5F500XLA-045 | 15626 |
| 1/2 | 1/2 | 3 | 6 | 0.050 | SM5F500XL-050 | 15127 | SM5F500XLA-050 | 15627 |
| 1/2 | 1/2 | 3 | 6 | 0.062 | SM5F500XL-062 | 15128 | SM5F500XLA-062 | 15628 |
| 1/2 | 1/2 | 3 | 6 | 0.090 | SM5F500XL-090 | 15129 | SM5F500XLA-090 | 15629 |
| 1/2 | 1/2 | 3 | 6 | 0.125 | SM5F500XL-125 | 15130 | SM5F500XLA-125 | 15630 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | SM5F625S | 15131 | SM5F625SA | 15631 |
| 5/8 | 5/8 | 3/4 | 3 | 0.015 | SM5F625S-015 | 15132 | SM5F625SA-015 | 15632 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SM5F625S-030 | 15133 | SM5F625SA-030 | 15633 |
| 5/8 | 5/8 | 3/4 | 3 | 0.045 | SM5F625S-045 | 15134 | SM5F625SA-045 | 15634 |
| 5/8 | 5/8 | 3/4 | 3 | 0.062 | SM5F625S-062 | 15135 | SM5F625SA-062 | 15635 |
| 5/8 | 5/8 | 3/4 | 3 | 0.090 | SM5F625S-090 | 15136 | SM5F625SA-090 | 15636 |
| 5/8 | 5/8 | 3/4 | 3 | 0.125 | SM5F625S-125 | 15137 | SM5F625SA-125 | 15637 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.000 | SM5F625 | 15138 | SM5F625A | 15638 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.015 | SM5F625-015 | 15139 | SM5F625A-015 | 15639 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SM5F625-030 | 15140 | SM5F625A-030 | 15640 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.040 | SM5F625-040 | 15141 | SM5F625A-040 | 15641 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.045 | SM5F625-045 | 15142 | SM5F625A-045 | 15642 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.062 | SM5F625-062 | 15143 | SM5F625A-062 | 15643 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.090 | SM5F625-090 | 15144 | SM5F625A-090 | 15644 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.125 | SM5F625-125 | 15145 | SM5F625A-125 | 15645 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | SM5F625L | 15146 | SM5F625LA | 15646 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.015 | SM5F625L-015 | 15147 | SM5F625LA-015 | 15647 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SM5F625L-030 | 15148 | SM5F625LA-030 | 15648 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.040 | SM5F625L-040 | 15149 | SM5F625LA-040 | 15649 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.045 | SM5F625L-045 | 15150 | SM5F625LA-045 | 15650 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.062 | SM5F625L-062 | 15151 | SM5F625LA-062 | 15651 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.090 | SM5F625L-090 | 15152 | SM5F625LA-090 | 15652 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.125 | SM5F625L-125 | 15153 | SM5F625LA-125 | 15653 |

Series **SM5F & SM5F-NB** (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 3/4 | 3/4 | 7/8 | 3 | 0.000 | SM5F750S | 15154 | SM5F750SA | 15654 |
| 3/4 | 3/4 | 7/8 | 3 | 0.015 | SM5F750S-015 | 15207 | SM5F750SA-015 | 15707 |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | SM5F750S-030 | 15155 | SM5F750SA-030 | 15655 |
| 3/4 | 3/4 | 7/8 | 3 | 0.045 | SM5F750S-045 | 15156 | SM5F750SA-045 | 15656 |
| 3/4 | 3/4 | 7/8 | 3 | 0.050 | SM5F750S-050 | 15157 | SM5F750SA-050 | 15657 |
| 3/4 | 3/4 | 7/8 | 3 | 0.062 | SM5F750S-062 | 15158 | SM5F750SA-062 | 15658 |
| 3/4 | 3/4 | 7/8 | 3 | 0.090 | SM5F750S-090 | 15159 | SM5F750SA-090 | 15659 |
| 3/4 | 3/4 | 7/8 | 3 | 0.125 | SM5F750S-125 | 15160 | SM5F750SA-125 | 15660 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.000 | SM5F750 | 15161 | SM5F750A | 15661 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.015 | SM5F750-015 | 15162 | SM5F750A-015 | 15662 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SM5F750-030 | 15163 | SM5F750A-030 | 15663 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.045 | SM5F750-045 | 15164 | SM5F750A-045 | 15664 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.050 | SM5F750-050 | 15165 | SM5F750A-050 | 15665 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.062 | SM5F750-062 | 15166 | SM5F750A-062 | 15666 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.090 | SM5F750-090 | 15167 | SM5F750A-090 | 15667 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.125 | SM5F750-125 | 15168 | SM5F750A-125 | 15668 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | SM5F750L | 15169 | SM5F750LA | 15669 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.015 | SM5F750L-015 | 15170 | SM5F750LA-015 | 15670 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SM5F750L-030 | 15171 | SM5F750LA-030 | 15671 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.045 | SM5F750L-045 | 15172 | SM5F750LA-045 | 15672 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.050 | SM5F750L-050 | 15173 | SM5F750LA-050 | 15673 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.062 | SM5F750L-062 | 15174 | SM5F750LA-062 | 15674 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.090 | SM5F750L-090 | 15175 | SM5F750LA-090 | 15675 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.125 | SM5F750L-125 | 15176 | SM5F750LA-125 | 15676 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | SM5F750XL | 15177 | SM5F750XLA | 15677 |
| 3/4 | 3/4 | 3 | 6 | 0.015 | SM5F750XL-015 | 15178 | SM5F750XLA-015 | 15678 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | SM5F750XL-030 | 15179 | SM5F750XLA-030 | 15679 |
| 3/4 | 3/4 | 3 | 6 | 0.045 | SM5F750XL-045 | 15180 | SM5F750XLA-045 | 15680 |
| 3/4 | 3/4 | 3 | 6 | 0.050 | SM5F750XL-050 | 15181 | SM5F750XLA-050 | 15681 |
| 3/4 | 3/4 | 3 | 6 | 0.062 | SM5F750XL-062 | 15182 | SM5F750XLA-062 | 15682 |
| 3/4 | 3/4 | 3 | 6 | 0.090 | SM5F750XL-090 | 15183 | SM5F750XLA-090 | 15683 |
| 3/4 | 3/4 | 3 | 6 | 0.125 | SM5F750XL-125 | 15184 | SM5F750XLA-125 | 15684 |
| 1 | 1 | 1 1/4 | 4 | 0.000 | SM5F1.0S | 15185 | SM5F1.0SA | 15685 |



Continued on next page

Series **SM5F & SM5F-NB** (inch sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 1 | 1 | 1 1/4 | 4 | 0.030 | SM5F1.0S-030 | 15186 | SM5F1.0SA-030 | 15686 |
| 1 | 1 | 1 1/4 | 4 | 0.062 | SM5F1.0S-062 | 15187 | SM5F1.0SA-062 | 15687 |
| 1 | 1 | 1 1/4 | 4 | 0.125 | SM5F1.0S-125 | 15188 | SM5F1.0SA-125 | 15688 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | SM5F1.0M | 15189 | SM5F1.0MA | 15689 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | SM5F1.0M-030 | 15190 | SM5F1.0MA-030 | 15690 |
| 1 | 1 | 1 1/2 | 4 | 0.062 | SM5F1.0M-062 | 15191 | SM5F1.0MA-062 | 15691 |
| 1 | 1 | 1 1/2 | 4 | 0.125 | SM5F1.0M-125 | 15192 | SM5F1.0MA-125 | 15692 |
| 1 | 1 | 2 | 4 | 0.000 | SM5F1.0 | 15193 | SM5F1.0A | 15693 |
| 1 | 1 | 2 | 4 | 0.030 | SM5F1.0-030 | 15194 | SM5F1.0A-030 | 15694 |
| 1 | 1 | 2 | 4 | 0.062 | SM5F1.0-062 | 15195 | SM5F1.0A-062 | 15695 |
| 1 | 1 | 2 | 4 | 0.090 | SM5F1.0-090 | 15196 | SM5F1.0A-090 | 15696 |
| 1 | 1 | 2 | 4 | 0.125 | SM5F1.0-125 | 15197 | SM5F1.0A-125 | 15697 |
| 1 | 1 | 2 | 4 | 0.250 | SM5F1.0-250 | 15198 | SM5F1.0A-250 | 15698 |
| 1 | 1 | 3 | 6 | 0.000 | SM5F1.0XL | 15199 | SM5F1.0XLA | 15699 |
| 1 | 1 | 3 | 6 | 0.030 | SM5F1.0XL-030 | 15200 | SM5F1.0XLA-030 | 15700 |
| 1 | 1 | 3 | 6 | 0.062 | SM5F1.0XL-062 | 15201 | SM5F1.0XLA-062 | 15701 |
| 1 | 1 | 3 | 6 | 0.090 | SM5F1.0XL-090 | 15202 | SM5F1.0XLA-090 | 15702 |
| 1 | 1 | 3 | 6 | 0.125 | SM5F1.0XL-125 | 15203 | SM5F1.0XLA-125 | 15703 |
| 1 | 1 | 3 | 6 | 0.250 | SM5F1.0XL-250 | 15204 | SM5F1.0XLA-250 | 15704 |

Series **MSM5F & MSM5F-NB** (metric sizes)

High Performance Carbide End Mill for Medium Profiling & Finishing Ferrous Materials



- 5 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN or AlTiN Coating

Series **MSM5F**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **MSM5F-NB**

ISO CODE
H

ISO CODE
S



- For Ferrous Materials <45 HRC, use **Series MSM5F** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series MSM5F-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|----------------|---------------|
| | | | | | SM5F Tool # | SM5F EDP # | SM5F-NB Tool # | SM5F-NB EDP # |
| 4mm | 6mm | 14mm | 58mm | 0.000 | MSM5F4 | 15401 | MSM5F4A | 15901 |
| 4mm | 6mm | 14mm | 58mm | .25mm | MSM5F4R | 15402 | MSM5F4RA | 15902 |
| 5mm | 6mm | 16mm | 58mm | 0.000 | MSM5F5 | 15403 | MSM5F5A | 15903 |
| 5mm | 6mm | 16mm | 58mm | .25mm | MSM5F5R | 15404 | MSM5F5RA | 15904 |
| 6mm | 6mm | 19mm | 58mm | 0.000 | MSM5F6 | 15405 | MSM5F6A | 15905 |
| 6mm | 6mm | 19mm | 58mm | .38mm | MSM5F6R | 15406 | MSM5F6RA | 15906 |
| 8mm | 8mm | 20mm | 64mm | 0.000 | MSM5F8 | 15407 | MSM5F8A | 15907 |
| 8mm | 8mm | 20mm | 64mm | .38mm | MSM5F8R | 15408 | MSM5F8RA | 15908 |
| 10mm | 10mm | 22mm | 67mm | 0.000 | MSM5F10 | 15409 | MSM5F10A | 15909 |
| 10mm | 10mm | 22mm | 67mm | .38mm | MSM5F10R | 15410 | MSM5F10RA | 15910 |
| 12mm | 12mm | 25mm | 74mm | 0.000 | MSM5F12 | 15411 | MSM5F12A | 15911 |
| 12mm | 12mm | 25mm | 74mm | .64mm | MSM5F12R | 15412 | MSM5F12RA | 15912 |
| 14mm | 14mm | 32mm | 76mm | 0.000 | MSM5F14 | 15413 | MSM5F14A | 15913 |
| 14mm | 14mm | 32mm | 76mm | .64mm | MSM5F14R | 15414 | MSM5F14RA | 15914 |
| 16mm | 16mm | 32mm | 93mm | 0.000 | MSM5F16 | 15415 | MSM5F16A | 15915 |
| 16mm | 16mm | 32mm | 93mm | .75mm | MSM5F16R | 15416 | MSM5F16RA | 15916 |
| 18mm | 18mm | 38mm | 100mm | 0.000 | MSM5F18 | 15417 | MSM5F18A | 15917 |
| 18mm | 18mm | 38mm | 100mm | .75mm | MSM5F18R | 15418 | MSM5F18RA | 15918 |
| 20mm | 20mm | 38mm | 100mm | 0.000 | MSM5F20 | 15419 | MSM5F20A | 15919 |
| 20mm | 20mm | 38mm | 100mm | .75mm | MSM5F20R | 15420 | MSM5F20RA | 15920 |
| 25mm | 25mm | 38mm | 101mm | 0.000 | MSM5F25 | 15421 | MSM5F25A | 15921 |
| 25mm | 25mm | 38mm | 101mm | .75mm | MSM5F25R | 15422 | MSM5F25RA | 15922 |

See page 68 for Cutting Parameters



Series SM6F & SM6F-NB

High Performance Carbide End Mill for Light Profiling & Finishing Ferrous Materials

Series SM6F

ISO CODE
P

ISO CODE
S

ISO CODE
K

Series SM6F-NB

ISO CODE
H

ISO CODE
S



- 6 Flute
- 45° Helix
- Equal Flute Spacing
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series SM6F** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series SM6F-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM6F Tool # | SM6F EDP # | SM6F-NB Tool # | SM6F-NB EDP # |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | SM6F250S | 16001 | SM6F250SA | 16501 |
| 1/4 | 1/4 | 1/2 | 2 | 0.015 | SM6F250S-015 | 16002 | SM6F250SA-015 | 16502 |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | SM6F250S-030 | 16003 | SM6F250SA-030 | 16503 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | SM6F250 | 16004 | SM6F250A | 16504 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SM6F250-015 | 16005 | SM6F250A-015 | 16505 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | SM6F250-030 | 16006 | SM6F250A-030 | 16506 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | SM6F250L | 16007 | SM6F250LA | 16507 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.015 | SM6F250L-015 | 16008 | SM6F250LA-015 | 16508 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.030 | SM6F250L-030 | 16009 | SM6F250LA-030 | 16509 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.000 | SM6F250XL | 16010 | SM6F250XLA | 16510 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.015 | SM6F250XL-015 | 16011 | SM6F250XLA-015 | 16511 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.030 | SM6F250XL-030 | 16012 | SM6F250XLA-030 | 16512 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | SM6F312S | 16013 | SM6F312SA | 16513 |
| 5/16 | 5/16 | 1/2 | 2 | 0.015 | SM6F312S-015 | 16014 | SM6F312SA-015 | 16514 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | SM6F312S-030 | 16015 | SM6F312SA-030 | 16515 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | SM6F312 | 16016 | SM6F312A | 16516 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.015 | SM6F312-015 | 16017 | SM6F312A-015 | 16517 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | SM6F312-030 | 16018 | SM6F312A-030 | 16518 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | SM6F312L | 16019 | SM6F312LA | 16519 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.015 | SM6F312L-015 | 16020 | SM6F312LA-015 | 16520 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.030 | SM6F312L-030 | 16021 | SM6F312LA-030 | 16521 |

See page 70 for Cutting Parameters

Series **SM6F & SM6F-NB**

High Performance Carbide End Mill for Light Profiling & Finishing Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|---------------|------------|----------------|---------------|
| | | | | | SM6F Tool # | SM6F EDP # | SM6F-NB Tool # | SM6F-NB EDP # |
| 3/8 | 3/8 | 9/16 | 2 | 0.000 | SM6F375S | 16022 | SM6F375SA | 16522 |
| 3/8 | 3/8 | 9/16 | 2 | 0.015 | SM6F375S-015 | 16023 | SM6F375SA-015 | 16523 |
| 3/8 | 3/8 | 9/16 | 2 | 0.030 | SM6F375S-030 | 16024 | SM6F375SA-030 | 16524 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.000 | SM6F375 | 16025 | SM6F375A | 16525 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.015 | SM6F375-015 | 16026 | SM6F375A-015 | 16526 |
| 3/8 | 3/8 | 1 | 2 1/2 | 0.030 | SM6F375-030 | 16027 | SM6F375A-030 | 16527 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.000 | SM6F375L | 16028 | SM6F375LA | 16528 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.015 | SM6F375L-015 | 16029 | SM6F375LA-015 | 16529 |
| 3/8 | 3/8 | 1 1/4 | 3 | 0.030 | SM6F375L-030 | 16030 | SM6F375LA-030 | 16530 |
| 3/8 | 3/8 | 2 | 4 | 0.000 | SM6F375XL | 16031 | SM6F375XLA | 16531 |
| 3/8 | 3/8 | 2 | 4 | 0.015 | SM6F375XL-015 | 16032 | SM6F375XLA-015 | 16532 |
| 3/8 | 3/8 | 2 | 4 | 0.030 | SM6F375XL-030 | 16033 | SM6F375XLA-030 | 16533 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.000 | SM6F437 | 16034 | SM6F437A | 16534 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.015 | SM6F437-015 | 16035 | SM6F437A-015 | 16535 |
| 7/16 | 7/16 | 1 | 2 3/4 | 0.030 | SM6F437-030 | 16036 | SM6F437A-030 | 16536 |
| 7/16 | 7/16 | 2 | 4 | 0.000 | SM6F437L | 16037 | SM6F437LA | 16537 |
| 7/16 | 7/16 | 2 | 4 | 0.015 | SM6F437L-015 | 16038 | SM6F437LA-015 | 16538 |
| 7/16 | 7/16 | 2 | 4 | 0.030 | SM6F437L-030 | 16039 | SM6F437LA-030 | 16539 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | SM6F500S | 16040 | SM6F500SA | 16540 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.020 | SM6F500S-020 | 16041 | SM6F500SA-020 | 16541 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SM6F500S-030 | 16042 | SM6F500SA-030 | 16542 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | SM6F500S-060 | 16043 | SM6F500SA-060 | 16543 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | SM6F500 | 16044 | SM6F500A | 16544 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.020 | SM6F500-020 | 16045 | SM6F500A-020 | 16545 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SM6F500-030 | 16046 | SM6F500A-030 | 16546 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | SM6F500-060 | 16047 | SM6F500A-060 | 16547 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | SM6F500ML | 16048 | SM6F500MLA | 16548 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.020 | SM6F500ML-020 | 16049 | SM6F500MLA-020 | 16549 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SM6F500ML-030 | 16050 | SM6F500MLA-030 | 16550 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.060 | SM6F500ML-060 | 16051 | SM6F500MLA-060 | 16551 |
| 1/2 | 1/2 | 2 | 4 | 0.000 | SM6F500L | 16052 | SM6F500LA | 16552 |
| 1/2 | 1/2 | 2 | 4 | 0.020 | SM6F500L-020 | 16053 | SM6F500LA-020 | 16553 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SM6F500L-030 | 16054 | SM6F500LA-030 | 16554 |



Continued on next page

Series *SM6F & SM6F-NB*

High Performance Carbide End Mill for Light Profiling & Finishing Ferrous Materials



| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|-----------------|---------------|
| | | | | | SM6F Tool # | SM6F EDP # | SM6F-NB Tool # | SM6F-NB EDP # |
| 1/2 | 1/2 | 2 | 4 | 0.060 | SM6F500L-060 | 16055 | SM6F500LA-060 | 16555 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | SM6F500XL | 16056 | SM6F500XLA | 16556 |
| 1/2 | 1/2 | 3 | 6 | 0.020 | SM6F500XL-020 | 16057 | SM6F500XLA-020 | 16557 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | SM6F500XL-030 | 16058 | SM6F500XLA-030 | 16558 |
| 1/2 | 1/2 | 3 | 6 | 0.060 | SM6F500XL-060 | 16059 | SM6F500XLA-060 | 16559 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | SM6F625S | 16060 | SM6F625SA | 16560 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SM6F625S-030 | 16061 | SM6F625SA-030 | 16561 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | SM6F625S-060 | 16062 | SM6F625SA-060 | 16562 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.000 | SM6F625 | 16063 | SM6F625A | 16563 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.030 | SM6F625-030 | 16064 | SM6F625A-030 | 16564 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | 0.060 | SM6F625-060 | 16065 | SM6F625A-060 | 16565 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | SM6F625L | 16066 | SM6F625LA | 16566 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SM6F625L-030 | 16067 | SM6F625LA-030 | 16567 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.060 | SM6F625L-060 | 16068 | SM6F625LA-060 | 16568 |
| 3/4 | 3/4 | 7/8 | 3 | 0.000 | SM6F750S | 16069 | SM6F750SA | 16569 |
| 3/4 | 3/4 | 7/8 | 3 | 0.030 | SM6F750S-030 | 16070 | SM6F750SA-030 | 16570 |
| 3/4 | 3/4 | 7/8 | 3 | 0.060 | SM6F750S-060 | 16071 | SM6F750SA-060 | 16571 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.000 | SM6F750 | 16072 | SM6F750A | 16572 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.030 | SM6F750-030 | 16073 | SM6F750A-030 | 16573 |
| 3/4 | 3/4 | 1 5/8 | 4 | 0.060 | SM6F750-060 | 16074 | SM6F750A-060 | 16574 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | SM6F750L | 16075 | SM6F750LA | 16575 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SM6F750L-030 | 16076 | SM6F750LA-030 | 16576 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | SM6F750L-060 | 16077 | SM6F750LA-060 | 16577 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | SM6F750XL | 16078 | SM6F750XLA | 16578 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | SM6F750XL-030 | 16079 | SM6F750XLA-030 | 16579 |
| 3/4 | 3/4 | 3 | 6 | 0.060 | SM6F750XL-060 | 16080 | SM6F750XLA-060 | 16580 |
| 3/4 | 3/4 | 4 | 7 | 0.000 | SM6F750XXL | 16081 | SM6F750XXLA | 16581 |
| 3/4 | 3/4 | 4 | 7 | 0.030 | SM6F750XXL-030 | 16082 | SM6F750XXLA-030 | 16582 |
| 3/4 | 3/4 | 4 | 7 | 0.060 | SM6F750XXL-060 | 16083 | SM6F750XXLA-060 | 16583 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | SM6F1.0 | 16084 | SM6F1.0A | 16584 |
| 1 | 1 | 1 1/2 | 4 | 0.030 | SM6F1.0-030 | 16085 | SM6F1.0A-030 | 16585 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | SM6F1.0-060 | 16086 | SM6F1.0A-060 | 16586 |
| 1 | 1 | 2 | 4 | 0.000 | SM6F1.0L | 16087 | SM6F1.0LA | 16587 |
| 1 | 1 | 2 | 4 | 0.030 | SM6F1.0L-030 | 16088 | SM6F1.0LA-030 | 16588 |

Series *SM6F & SM6F-NB*

High Performance Carbide End Mill for Light Profiling & Finishing Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|----------------|------------|-----------------|---------------|
| | | | | | SM6F Tool # | SM6F EDP # | SM6F-NB Tool # | SM6F-NB EDP # |
| 1 | 1 | 2 | 4 | 0.060 | SM6F1.0L-060 | 16089 | SM6F1.0LA-060 | 16589 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | SM6F1.0XL | 16090 | SM6F1.0XLA | 16590 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | SM6F1.0XL-030 | 16091 | SM6F1.0XLA-030 | 16591 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | SM6F1.0XL-060 | 16092 | SM6F1.0XLA-060 | 16592 |
| 1 | 1 | 3 | 6 | 0.000 | SM6F1.0XXL | 16093 | SM6F1.0XXLA | 16593 |
| 1 | 1 | 3 | 6 | 0.030 | SM6F1.0XXL-030 | 16094 | SM6F1.0XXLA-030 | 16594 |
| 1 | 1 | 3 | 6 | 0.060 | SM6F1.0XXL-060 | 16095 | SM6F1.0XXLA-060 | 16595 |
| 1 | 1 | 4 | 7 | 0.000 | SM6F1.0XXXL | 16096 | SM6F1.0XXXLA | 16596 |



Series AL3F

High Performance Carbide End Mill for Roughing or Finishing Aluminum Alloys using Diamond-like Carbon Coating

ISO CODE
N



- 3 Flute
- 45° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp Corners
- Diamond-like Carbon Coating



Corner radius is available upon request

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Diamond-like Carbon Coating | |
|------------------|----------------|---------------|----------------|-----------------------------|------------|
| | | | | AL3F Tool # | AL3F EDP # |
| 5/32 | 3/16 | 5/16 | 2 | AL3F156S-DLC | 10001 |
| 5/32 | 3/16 | 9/16 | 2 | AL3F156-DLC | 10002 |
| 3/16 | 3/16 | 3/8 | 2 | AL3F187S-DLC | 10003 |
| 3/16 | 3/16 | 9/16 | 2 | AL3F187-DLC | 10004 |
| 7/32 | 1/4 | 1/2 | 2 | AL3F218S-DLC | 10005 |
| 7/32 | 1/4 | 3/4 | 2 1/2 | AL3F218-DLC | 10006 |
| 1/4 | 1/4 | 1/2 | 2 | AL3F250S-DLC | 10007 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | AL3F250-DLC | 10008 |
| 1/4 | 1/4 | 1 1/8 | 3 | AL3F250L-DLC | 10009 |
| 1/4 | 1/4 | 1 1/2 | 4 | AL3F250XL-DLC | 10010 |
| 9/32 | 5/16 | 9/16 | 2 | AL3F281S-DLC | 10011 |
| 9/32 | 5/16 | 13/16 | 2 1/2 | AL3F281-DLC | 10012 |
| 5/16 | 5/16 | 1/2 | 2 | AL3F312S-DLC | 10013 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | AL3F312-DLC | 10014 |
| 5/16 | 5/16 | 1 1/8 | 3 | AL3F312L-DLC | 10015 |
| 3/8 | 3/8 | 5/8 | 2 | AL3F375S-DLC | 10016 |
| 3/8 | 3/8 | 1 | 2 1/2 | AL3F375-DLC | 10017 |
| 3/8 | 3/8 | 1 1/4 | 3 | AL3F375L-DLC | 10018 |
| 3/8 | 3/8 | 1 1/2 | 4 | AL3F375XL-DLC | 10019 |
| 3/8 | 3/8 | 2 | 4 | AL3F375XXL-DLC | 10020 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | AL3F437S-DLC | 10021 |
| 7/16 | 7/16 | 1 | 2 3/4 | AL3F437-DLC | 10022 |
| 7/16 | 7/16 | 2 | 4 | AL3F437L-DLC | 10023 |

See page 72 for Cutting Parameters

Series AL3F

High Performance Carbide End Mill for Roughing or Finishing Aluminum Alloys using Diamond-like Carbon Coating

ISO CODE
N

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Diamond-like Carbon Coating | |
|------------------|----------------|---------------|----------------|-----------------------------|------------|
| | | | | AL3F Tool # | AL3F EDP # |
| 1/2 | 1/2 | 5/8 | 2 1/2 | AL3F500S-DLC | 10024 |
| 1/2 | 1/2 | 1 | 3 | AL3F500-DLC | 10025 |
| 1/2 | 1/2 | 1 1/4 | 3 | AL3F500M-DLC | 10026 |
| 1/2 | 1/2 | 1 1/2 | 4 | AL3F500L-DLC | 10027 |
| 1/2 | 1/2 | 2 | 4 | AL3F500XL-DLC | 10028 |
| 1/2 | 1/2 | 3 | 6 | AL3F500XXL-DLC | 10029 |
| 5/8 | 5/8 | 3/4 | 3 | AL3F625S-DLC | 10030 |
| 5/8 | 5/8 | 1 5/8 | 3 1/2 | AL3F625-DLC | 10031 |
| 5/8 | 5/8 | 2 1/4 | 5 | AL3F625L-DLC | 10032 |
| 3/4 | 3/4 | 1 | 3 | AL3F750S-DLC | 10033 |
| 3/4 | 3/4 | 1 5/8 | 4 | AL3F750-DLC | 10034 |
| 3/4 | 3/4 | 2 1/4 | 5 | AL3F750L-DLC | 10035 |
| 3/4 | 3/4 | 3 | 6 | AL3F750XL-DLC | 10036 |
| 1 | 1 | 1 1/2 | 4 | AL3F1.0-DLC | 10037 |
| 1 | 1 | 2 1/4 | 5 | AL3F1.0L-DLC | 10038 |
| 1 | 1 | 3 | 6 | AL3F1.0XL-DLC | 10039 |



Series XP, XP-NB, MXP, MXP-NB, XPR, XPR-NB, XPB & XPB-NB

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | |
|---------------------------------|----------|---|-----------------------|-------|--------------------------|-------|-------------------------|-------|-----------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 600 | 60.00 | 600 | 50.00 | 600 | 45.00 | 600 | 40.00 |
| Steel Alloys | P | 4140 thru 8820 | 500 | 50.00 | 500 | 45.00 | 500 | 40.00 | 500 | 35.00 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 200 | 30.00 | 200 | 25.00 | 200 | 20.00 | 200 | 15.00 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 250 | 30.00 | 250 | 25.00 | 250 | 20.00 | 250 | 15.00 |
| | H* | AR-450, steels > 45 HRC | 100 | 6.00 | 100 | 5.00 | 100 | 4.00 | 80 | 3.00 |
| Stainless Steel | M | 303,304, 316 | 450 | 40.00 | 450 | 35.00 | 450 | 30.00 | 450 | 25.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 350 | 35.00 | 350 | 30.00 | 350 | 25.00 | 350 | 20.00 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 200 | 10.00 | 200 | 8.00 | 200 | 7.00 | 200 | 6.00 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 80 | 8.00 | 80 | 7.00 | 80 | 6.00 | 80 | 4.00 |
| | | Inconel 625, Waspalloy | 120 | 10.00 | 120 | 9.00 | 120 | 8.00 | 120 | 6.00 |
| | | Monel 400 | 250 | 20.00 | 250 | 18.00 | 250 | 16.00 | 250 | 12.00 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 100 | 8.00 | 100 | 7.00 | 100 | 6.00 | 100 | 5.00 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 70 | 7.00 | 70 | 6.00 | 70 | 5.00 | 70 | 4.00 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Irons | 600 | 60.00 | 600 | 50.00 | 600 | 45.00 | 600 | 40.00 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB." Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series *XP, XP-NB, MXP, MXP-NB, XPR, XPR-NB, XPB & XPB-NB*

Cutting Parameters

Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|---------------------------------|----------|---|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0007 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 |
| Steel Alloys | P | 4140 thru 8820 | 0.0005 | 0.0007 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | Cobalt Chrome | 0.0008 | 0.0010 | 0.0020 | 0.0030 | 0.0050 | 0.0070 | 0.0080 | 0.0100 |
| | | Steel Alloys <45 HRC | 0.0003 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0050 |
| | H* | AR-450, steels >45 HRC | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Stainless Steel | M | 303,304, 316 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0025 | 0.0030 | 0.0040 | 0.0050 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 0.0005 | 0.0008 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0030 | 0.0040 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Inconel 625, Waspalloy | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Monel 400 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 0.0050 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB."
Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series SM3F & SR3F

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | |
|-----------------|----------|---|-----------------------|--------|--------------------------|-------|-------------------------|-------|-----------|-------|--------------------------|-------|-----------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle - 10° | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Stainless Steel | M | 303,304, 316 | 450 | 40.00 | 450 | 35.00 | 450 | 30.00 | 450 | 25.00 | 400 | 35.00 | 400 | 30.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 350 | 35.00 | 350 | 30.00 | 350 | 25.00 | 350 | 20.00 | 300 | 30.00 | 300 | 25.00 |
| Non-Ferrous | N | Aluminum | 1000 | 100.00 | 800 | 80.00 | 700 | 70.00 | 600 | 60.00 | 600 | 60.00 | 600 | 50.00 |
| | | Copper, Brass, Bronze, Plastics, Fibreglass | 500 | 45.00 | 450 | 40.00 | 400 | 35.00 | 400 | 25.00 | 400 | 35.00 | 450 | 30.00 |

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | |
|-----------------|----------|------------------------------------|------------------|--------|--------|--------|--------|--------|--------|
| | | | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Stainless Steel | M | 303,304, 316 | 0.0012 | 0.0016 | 0.0023 | 0.0032 | 0.0042 | 0.0053 | 0.0065 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0012 | 0.0016 | 0.0023 | 0.0032 | 0.0042 | 0.0053 | 0.0065 |
| Non-Ferrous | N | Aluminum, Copper, Brass, Bronze | 0.0016 | 0.0021 | 0.0032 | 0.0043 | 0.0055 | 0.0065 | 0.0085 |
| | | Plastics, Fibreglass | 0.0015 | 0.0019 | 0.0029 | 0.0038 | 0.0048 | 0.0058 | 0.0078 |

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Resources

| Fluting Style | Machine Data |
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| 4-Flute | 5-Flute |
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Series *SM4F & SR4F*

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | |
|--------------------|----------|--|-----------------------|-------|--------------------------|-------|-------------------------|-------|-----------|-------|--------------------------|-------|----------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle - 7° | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 600 | 60.00 | 600 | 50.00 | 600 | 45.00 | 600 | 40.00 | 600 | 50.00 | 600 | 45.00 |
| Steel Alloys | P | 4140 thru 8820 Steel Alloys <45 HRC, Cobalt Chrome | 500 | 50.00 | 500 | 45.00 | 500 | 40.00 | 500 | 35.00 | 500 | 45.00 | 500 | 40.00 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 250 | 30.00 | 250 | 25.00 | 250 | 20.00 | 250 | 15.00 | 250 | 25.00 | 250 | 20.00 |
| Stainless Steel | M | 303,304, 316 | 450 | 40.00 | 450 | 35.00 | 450 | 30.00 | 450 | 25.00 | 450 | 35.00 | 450 | 30.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 350 | 35.00 | 350 | 30.00 | 350 | 25.00 | 350 | 20.00 | 350 | 30.00 | 350 | 25.00 |
| Cast Iron | K | Gray Cast, Malleable, Ductile | 600 | 60.00 | 600 | 50.00 | 600 | 45.00 | 600 | 40.00 | 600 | 50.00 | 600 | 45.00 |

HIGH PERFORMANCE

Series SM4F & SR4F

Cutting Parameters

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | |
|--------------------|----------|--|------------------|--------|--------|--------|--------|--------|--------|
| | | | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0010 | 0.0014 | 0.0020 | 0.0027 | 0.0034 | 0.0044 | 0.0055 |
| Steel Alloys | P | 4140 thru 8820, Cobalt Chrome Steel Alloys <45 HRC | 0.0011 | 0.0015 | 0.0022 | 0.0030 | 0.0036 | 0.0048 | 0.0060 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0012 | 0.0016 | 0.0024 | 0.0032 | 0.0038 | 0.0050 | 0.0062 |
| Stainless Steel | M | 303, 304, 316 | 0.0009 | 0.0012 | 0.0019 | 0.0025 | 0.0031 | 0.0038 | 0.0051 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0010 | 0.0014 | 0.0020 | 0.0027 | 0.0034 | 0.0044 | 0.0055 |
| Cast Iron | K | Gray Cast, Malleable, Ductile | 0.0010 | 0.0014 | 0.0020 | 0.0027 | 0.0034 | 0.0044 | 0.0055 |

HIGH PERFORMANCE

Series SM5F, SM5F-NB, MSM5F, MSM5F-NB

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Facing | |
|---------------------------------|----------|---|-----------------------|-------|--------------------------|-------|-------------------------|-------|--------------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .75D Radial x .25D Axial | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 600 | 75.00 | 600 | 70.00 | 600 | 60.00 | 600 | 70.00 |
| Steel Alloys | P | 4140 thru 8820 | 500 | 60.00 | 500 | 55.00 | 500 | 50.00 | 500 | 55.00 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 300 | 30.00 | 300 | 25.00 | 300 | 20.00 | 300 | 25.00 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 250 | 40.00 | 250 | 35.00 | 250 | 30.00 | 250 | 35.00 |
| | H* | AR-450, Steels >45 HRC | 100 | 8.00 | 100 | 6.00 | 100 | 5.00 | 100 | 6.00 |
| Stainless Steel | M | 303,304, 316 | 450 | 45.00 | 450 | 40.00 | 450 | 35.00 | 450 | 35.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 350 | 40.00 | 350 | 35.00 | 350 | 30.00 | 350 | 35.00 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 200 | 15.00 | 200 | 12.00 | 200 | 10.00 | 200 | 12.00 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 80 | 7.00 | 80 | 6.00 | 80 | 5.00 | 80 | 6.00 |
| | | Inconel 625, Waspalloy | 120 | 10.00 | 120 | 8.00 | 120 | 7.00 | 120 | 8.00 |
| | | Monel 400 | 250 | 16.00 | 250 | 12.00 | 250 | 10.00 | 250 | 12.00 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 100 | 8.00 | 100 | 6.00 | 100 | 5.00 | 100 | 6.00 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 70 | 6.00 | 70 | 5.00 | 70 | 4.00 | 70 | 5.00 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 600 | 75.00 | 600 | 70.00 | 600 | 60.00 | 600 | 70.00 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB." Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series SM5F, SM5F-NB, MSM5F, MSM5F-NB

Cutting Parameters

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|---------------------------------|----------|---|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0007 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 |
| Steel Alloys | P | 4140 thru 8820 | 0.0005 | 0.0007 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | Cobalt Chrome | 0.0008 | 0.0010 | 0.0020 | 0.0030 | 0.0050 | 0.0070 | 0.0080 | 0.0100 |
| | | Steel Alloys <45 HRC | 0.0003 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0050 |
| | H* | AR-450, Steels >45 HRC | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Stainless Steel | M | 303,304, 316 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0025 | 0.0030 | 0.0040 | 0.0050 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 0.0005 | 0.0008 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0030 | 0.0040 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Inconel 625, Waspalloy | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Monel 400 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 0.0050 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB."
Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series SM6F & SM6F-NB

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | High Feed | |
|---------------------------------|----------|---|-----------------------|-------|--------------------------|-------|-------------------------|-------|------------------------|-----|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .05D Radial x 2D Axial | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 600 | 90.00 | n/a | n/a | n/a | n/a | n/a | n/a |
| Steel Alloys | P | 4140 thru 8820 | 500 | 70.00 | n/a | n/a | n/a | n/a | n/a | n/a |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 300 | 35.00 | n/a | n/a | n/a | n/a | n/a | n/a |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 250 | 45.00 | n/a | n/a | n/a | n/a | n/a | n/a |
| | H* | AR-450, Steels >45 HRC | 100 | 12.00 | n/a | n/a | n/a | n/a | n/a | n/a |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 200 | 20.00 | 200 | 16.00 | 200 | 12.00 | n/a | n/a |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 80 | 8.00 | 80 | 7.00 | 80 | 6.00 | 250 | 25 |
| | | Inconel 625, Waspalloy | 120 | 12.00 | 120 | 10.00 | 120 | 8.00 | 350 | 35 |
| | | Monel 400 | 250 | 20.00 | 250 | 16.00 | 250 | 12.00 | 500 | 50 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 100 | 9.00 | 100 | 7.00 | 100 | 6.00 | 300 | 30 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 70 | 7.00 | 70 | 6.00 | 70 | 5.00 | 200 | 20 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 600 | 90.00 | 600 | 80.00 | 600 | 70.00 | n/a | n/a |

**When machining Hardened Materials > 45 HRC, use the Series with "NB." Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series SM6F & SM6F-NB

Cutting Parameters

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|---------------------------------|----------|---|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0007 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 |
| Steel Alloys | P | 4140 thru 8820 | 0.0005 | 0.0007 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | Cobalt Chrome | 0.0008 | 0.0010 | 0.0020 | 0.0030 | 0.0050 | 0.0070 | 0.0080 | 0.0100 |
| | | Steel Alloys <45 HRC | 0.0003 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0050 |
| | H* | AR-450, Steels >45 HRC | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0030 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 0.0005 | 0.0008 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0030 | 0.0040 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Inconel 625, Waspalloy | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| | | Monel 400 | 0.0005 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | 0.0050 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 0.0005 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 | 0.0030 |
| Iron | K | Gray Cast, Malleable and Ductile Iron | 0.0050 | 0.0007 | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB."
Having an AlTiN coating will result in much longer tool life*

HIGH PERFORMANCE

Series AL3F

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | | High Feed | |
|----------------|----------|---|-----------------------|--------|--------------------------|--------|-------------------------|--------|-----------|--------|--------------------------|-----|-----------------------|--------|------------------------|-----|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle - 10° | | .05D Radial x 3D Axial | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Non-Ferrous | N | Aluminum 6061, 6063, 7050, 7075 | 1500 | 400.00 | 1500 | 350.00 | 1500 | 300.00 | 1200 | 250.00 | 1200 | 350 | 1200 | 350.00 | 2000 | 500 |
| | | Copper, Brass, Bronze, Plastics, Fibreglass | 500 | 70.00 | 500 | 50.00 | 500 | 40.00 | 500 | 30.00 | 500 | 50 | 500 | 40.00 | n/a | n/a |

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | |
|----------------|----------|----------------------------------|------------------|--------|--------|--------|--------|--------|--------|
| | | | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Non-Ferrous | N | Aluminium, Copper, Brass, Bronze | 0.0040 | 0.0050 | 0.0070 | 0.0090 | 0.0100 | 0.0120 | 0.0150 |
| | | Plastics, Fibreglass | 0.0020 | 0.0025 | 0.0035 | 0.0045 | 0.0055 | 0.0065 | 0.0080 |

HIGH PERFORMANCE

Customers *On-The-Record*

“We have been purchasing an assortment of Supermills since the spring of 2008 and are very pleased with the performance of these end mills. We used the XPR series end mills in place of cobalt roughing end mills and went from 6 IPM to 36 IPM, not to mention tool life increased 10-fold. We have tested the Supermill against other manufacture’s high performance end mills and Supermill has outperformed all the competitors. All of the different style end mills that we have bought from them have met and exceeded our expectations. We look forward to doing more business with Supermill in the future.”

Wayne LaBreck
Arundel Machine Tool Co.
Arundel, ME

“We at Barnes Aerospace have been doing business with Supermill for the past 20 years. Their commitment to quality, on-time delivery and pricing is second to none. They have continuously met our needs year after year and with the Supermill line of high performance tooling, they have enabled us to keep up with the ever changing environment of the aerospace industry.”

Eric Whitney
Barnes Aerospace
Windsor, CT

“These Supermills are the go-to end mills for our manufacturing department. Every job that we use these little monsters on, the run-times are dramatically reduced. They have amazingly long lives, they hold tight tolerances consistently and they will not break your wallet. Definitely give them a try.”

Barry Space
PMC Industries
Wickliffe, OH

ULTRA PERFORMANCE

Series **SAP** & **SAP-NB**

All Purpose Carbide End Mill for Universal Machining Applications in Ferrous Materials



- 4 Flute
- 35° Helix
- Variable Pitch
- Full Eccentric Relief
- Sharp or Radius Corners
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series SAP** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series SAP-NB** - AlTiN Coated

Series **SAP**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **SAP-NB**

ISO CODE
H

ISO CODE
S

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.000 | SAP125S | 20001 | SAP125SA | 20501 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.010 | SAP125S-010 | 20002 | SAP125SA-010 | 20502 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.020 | SAP125S-020 | 20003 | SAP125SA-020 | 20503 |
| 1/8 | 1/8 | 1/4 | 1 1/2 | 0.030 | SAP125S-030 | 20004 | SAP125SA-030 | 20504 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.000 | SAP125 | 20005 | SAP125A | 20505 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.010 | SAP125-010 | 20006 | SAP125A-010 | 20506 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.020 | SAP125-020 | 20007 | SAP125A-020 | 20507 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | 0.030 | SAP125-030 | 20008 | SAP125A-030 | 20508 |
| 9/64 | 3/16 | 5/16 | 2 | 0.000 | SAP140S | 20009 | SAP140SA | 20509 |
| 9/64 | 3/16 | 9/16 | 2 | 0.000 | SAP140 | 20010 | SAP140A | 20510 |
| 5/32 | 3/16 | 5/16 | 2 | 0.000 | SAP156S | 20011 | SAP156SA | 20511 |
| 5/32 | 3/16 | 9/16 | 2 | 0.000 | SAP156 | 20012 | SAP156A | 20512 |
| 11/64 | 3/16 | 5/8 | 2 | 0.000 | SAP171 | 20013 | SAP171A | 20513 |
| 3/16 | 3/16 | 3/8 | 2 | 0.000 | SAP187S | 20014 | SAP187SA | 20514 |
| 3/16 | 3/16 | 3/8 | 2 | 0.010 | SAP187S-010 | 20015 | SAP187SA-010 | 20515 |
| 3/16 | 3/16 | 3/8 | 2 | 0.020 | SAP187S-020 | 20016 | SAP187SA-020 | 20516 |
| 3/16 | 3/16 | 3/8 | 2 | 0.030 | SAP187S-030 | 20017 | SAP187SA-030 | 20517 |
| 3/16 | 3/16 | 5/8 | 2 | 0.000 | SAP187 | 20018 | SAP187A | 20518 |
| 3/16 | 3/16 | 5/8 | 2 | 0.010 | SAP187-010 | 20019 | SAP187A-010 | 20519 |
| 3/16 | 3/16 | 5/8 | 2 | 0.020 | SAP187-020 | 20020 | SAP187A-020 | 20520 |

See page 86 for Cutting Parameters

Series **SAP & SAP-NB**

All Purpose Carbide End Mill for Universal Machining Applications in Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 3/16 | 3/16 | 5/8 | 2 | 0.030 | SAP187-030 | 20021 | SAP187A-030 | 20521 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.000 | SAP187L | 20022 | SAP187LA | 20522 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.010 | SAP187L-010 | 20023 | SAP187LA-010 | 20523 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.020 | SAP187L-020 | 20024 | SAP187LA-020 | 20524 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | 0.030 | SAP187L-030 | 20025 | SAP187LA-030 | 20525 |
| 13/64 | 1/4 | 5/8 | 2 1/2 | 0.000 | SAP203 | 20026 | SAP203A | 20526 |
| 7/32 | 1/4 | 7/16 | 2 | 0.000 | SAP218S | 20027 | SAP218SA | 20527 |
| 7/32 | 1/4 | 5/8 | 2 1/2 | 0.000 | SAP218 | 20028 | SAP218A | 20528 |
| 15/64 | 1/4 | 3/4 | 2 1/2 | 0.000 | SAP234 | 20029 | SAP234A | 20529 |
| 1/4 | 1/4 | 1/2 | 2 | 0.000 | SAP250S | 20030 | SAP250SA | 20530 |
| 1/4 | 1/4 | 1/2 | 2 | 0.010 | SAP250S-010 | 20031 | SAP250SA-010 | 20531 |
| 1/4 | 1/4 | 1/2 | 2 | 0.020 | SAP250S-020 | 20032 | SAP250SA-020 | 20532 |
| 1/4 | 1/4 | 1/2 | 2 | 0.030 | SAP250S-030 | 20033 | SAP250SA-030 | 20533 |
| 1/4 | 1/4 | 1/2 | 2 | 0.045 | SAP250S-045 | 20034 | SAP250SA-045 | 20534 |
| 1/4 | 1/4 | 1/2 | 2 | 0.060 | SAP250S-060 | 20035 | SAP250SA-060 | 20535 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.000 | SAP250 | 20036 | SAP250A | 20536 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.010 | SAP250-010 | 20037 | SAP250A-010 | 20537 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.015 | SAP250-015 | 20038 | SAP250A-015 | 20538 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.020 | SAP250-020 | 20039 | SAP250A-020 | 20539 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.030 | SAP250-030 | 20040 | SAP250A-030 | 20540 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.045 | SAP250-045 | 20041 | SAP250A-045 | 20541 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | 0.060 | SAP250-060 | 20042 | SAP250A-060 | 20542 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.000 | SAP250M | 20043 | SAP250MA | 20543 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.010 | SAP250M-010 | 20044 | SAP250MA-010 | 20544 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.020 | SAP250M-020 | 20045 | SAP250MA-020 | 20545 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.030 | SAP250M-030 | 20046 | SAP250MA-030 | 20546 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.045 | SAP250M-045 | 20047 | SAP250MA-045 | 20547 |
| 1/4 | 1/4 | 1 1/8 | 3 | 0.060 | SAP250M-060 | 20048 | SAP250MA-060 | 20548 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.000 | SAP250L | 20049 | SAP250LA | 20549 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.010 | SAP250L-010 | 20050 | SAP250LA-010 | 20550 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.020 | SAP250L-020 | 20051 | SAP250LA-020 | 20551 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.030 | SAP250L-030 | 20052 | SAP250LA-030 | 20552 |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.045 | SAP250L-045 | 20053 | SAP250LA-045 | 20553 |



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| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 1/4 | 1/4 | 1 1/2 | 4 | 0.060 | SAP250L-060 | 20054 | SAP250LA-060 | 20554 |
| 17/64 | 5/16 | 3/4 | 2 1/2 | 0.000 | SAP265 | 20055 | SAP265A | 20555 |
| 9/32 | 5/16 | 1/2 | 2 | 0.000 | SAP281S | 20056 | SAP281SA | 20556 |
| 9/32 | 5/16 | 3/4 | 2 1/2 | 0.000 | SAP281 | 20057 | SAP281A | 20557 |
| 19/64 | 5/16 | 13/16 | 2 1/2 | 0.000 | SAP296 | 20058 | SAP296A | 20558 |
| 5/16 | 5/16 | 1/2 | 2 | 0.000 | SAP312S | 20059 | SAP312SA | 20559 |
| 5/16 | 5/16 | 1/2 | 2 | 0.010 | SAP312S-010 | 20060 | SAP312SA-010 | 20560 |
| 5/16 | 5/16 | 1/2 | 2 | 0.020 | SAP312S-020 | 20061 | SAP312SA-020 | 20561 |
| 5/16 | 5/16 | 1/2 | 2 | 0.030 | SAP312S-030 | 20062 | SAP312SA-030 | 20562 |
| 5/16 | 5/16 | 1/2 | 2 | 0.045 | SAP312S-045 | 20063 | SAP312SA-045 | 20563 |
| 5/16 | 5/16 | 1/2 | 2 | 0.060 | SAP312S-060 | 20064 | SAP312SA-060 | 20564 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.000 | SAP312 | 20065 | SAP312A | 20565 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.010 | SAP312-010 | 20066 | SAP312A-010 | 20566 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.020 | SAP312-020 | 20067 | SAP312A-020 | 20567 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.030 | SAP312-030 | 20068 | SAP312A-030 | 20568 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.045 | SAP312-045 | 20069 | SAP312A-045 | 20569 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | 0.060 | SAP312-060 | 20070 | SAP312A-060 | 20570 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.000 | SAP312L | 20071 | SAP312LA | 20571 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.010 | SAP312L-010 | 20072 | SAP312LA-010 | 20572 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.020 | SAP312L-020 | 20073 | SAP312LA-020 | 20573 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.030 | SAP312L-030 | 20074 | SAP312LA-030 | 20574 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.045 | SAP312L-045 | 20075 | SAP312LA-045 | 20575 |
| 5/16 | 5/16 | 1 1/8 | 3 | 0.060 | SAP312L-060 | 20076 | SAP312LA-060 | 20576 |
| 21/64 | 3/8 | 7/8 | 2 1/2 | 0.000 | SAP328 | 20077 | SAP328A | 20577 |
| 11/32 | 3/8 | 7/8 | 2 1/2 | 0.000 | SAP343 | 20078 | SAP343A | 20578 |
| 23/64 | 3/8 | 7/8 | 2 1/2 | 0.000 | SAP359 | 20079 | SAP359A | 20579 |
| 3/8 | 3/8 | 5/8 | 2 | 0.000 | SAP375S | 20080 | SAP375SA | 20580 |
| 3/8 | 3/8 | 5/8 | 2 | 0.010 | SAP375S-010 | 20081 | SAP375SA-010 | 20581 |
| 3/8 | 3/8 | 5/8 | 2 | 0.020 | SAP375S-020 | 20082 | SAP375SA-020 | 20582 |
| 3/8 | 3/8 | 5/8 | 2 | 0.030 | SAP375S-030 | 20083 | SAP375SA-030 | 20583 |
| 3/8 | 3/8 | 5/8 | 2 | 0.045 | SAP375S-045 | 20084 | SAP375SA-045 | 20584 |
| 3/8 | 3/8 | 5/8 | 2 | 0.060 | SAP375S-060 | 20085 | SAP375SA-060 | 20585 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.000 | SAP375 | 20086 | SAP375A | 20586 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.010 | SAP375-010 | 20087 | SAP375A-010 | 20587 |

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| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.020 | SAP375-020 | 20088 | SAP375A-020 | 20588 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.030 | SAP375-030 | 20089 | SAP375A-030 | 20589 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.045 | SAP375-045 | 20090 | SAP375A-045 | 20590 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | 0.060 | SAP375-060 | 20091 | SAP375A-060 | 20591 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.000 | SAP375L | 20092 | SAP375LA | 20592 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.010 | SAP375L-010 | 20093 | SAP375LA-010 | 20593 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.020 | SAP375L-020 | 20094 | SAP375LA-020 | 20594 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.030 | SAP375L-030 | 20095 | SAP375LA-030 | 20595 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.045 | SAP375L-045 | 20096 | SAP375LA-045 | 20596 |
| 3/8 | 3/8 | 1 1/8 | 3 | 0.060 | SAP375L-060 | 20097 | SAP375LA-060 | 20597 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.000 | SAP375XL | 20098 | SAP375XLA | 20598 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.010 | SAP375XL-010 | 20099 | SAP375XLA-010 | 20599 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.020 | SAP375XL-020 | 20100 | SAP375XLA-020 | 20600 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.030 | SAP375XL-030 | 20101 | SAP375XLA-030 | 20601 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.045 | SAP375XL-045 | 20102 | SAP375XLA-045 | 20602 |
| 3/8 | 3/8 | 1 3/4 | 4 | 0.060 | SAP375XL-060 | 20103 | SAP375XLA-060 | 20603 |
| 3/8 | 3/8 | 2 | 4 | 0.000 | SAP375XXL | 20104 | SAP375XXLA | 20604 |
| 25/64 | 7/16 | 7/8 | 2 1/2 | 0.000 | SAP390 | 20105 | SAP390A | 20605 |
| 13/32 | 7/16 | 7/8 | 2 1/2 | 0.000 | SAP406 | 20106 | SAP406A | 20606 |
| 27/64 | 7/16 | 7/8 | 2 1/2 | 0.000 | SAP421 | 20107 | SAP421A | 20607 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.000 | SAP437S | 20108 | SAP437SA | 20608 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.020 | SAP437S-020 | 20109 | SAP437SA-020 | 20609 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.030 | SAP437S-030 | 20110 | SAP437SA-030 | 20610 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | 0.060 | SAP437S-060 | 20111 | SAP437SA-060 | 20611 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | 0.000 | SAP437 | 20112 | SAP437A | 20612 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | 0.020 | SAP437-020 | 20113 | SAP437A-020 | 20613 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | 0.030 | SAP437-030 | 20114 | SAP437A-030 | 20614 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | 0.060 | SAP437-060 | 20115 | SAP437A-060 | 20615 |
| 7/16 | 7/16 | 2 | 4 | 0.000 | SAP437L | 20116 | SAP437LA | 20616 |
| 7/16 | 7/16 | 2 | 4 | 0.020 | SAP437L-020 | 20117 | SAP437LA-020 | 20617 |
| 7/16 | 7/16 | 2 | 4 | 0.030 | SAP437L-030 | 20118 | SAP437LA-030 | 20618 |
| 7/16 | 7/16 | 2 | 4 | 0.060 | SAP437L-060 | 20119 | SAP437LA-060 | 20619 |
| 29/64 | 1/2 | 1 | 3 | 0.000 | SAP453 | 20120 | SAP453A | 20620 |



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| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 15/32 | 1/2 | 1 | 3 | 0.000 | SAP468 | 20121 | SAP468A | 20621 |
| 31/64 | 1/2 | 1 | 3 | 0.000 | SAP484 | 20122 | SAP484A | 20622 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.000 | SAP500S | 20123 | SAP500SA | 20623 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.010 | SAP500S-010 | 20124 | SAP500SA-010 | 20624 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.020 | SAP500S-020 | 20125 | SAP500SA-020 | 20625 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.030 | SAP500S-030 | 20126 | SAP500SA-030 | 20626 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.045 | SAP500S-045 | 20127 | SAP500SA-045 | 20627 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.060 | SAP500S-060 | 20128 | SAP500SA-060 | 20628 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.090 | SAP500S-090 | 20129 | SAP500SA-090 | 20629 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | 0.125 | SAP500S-125 | 20130 | SAP500SA-125 | 20630 |
| 1/2 | 1/2 | 1 | 3 | 0.000 | SAP500 | 20131 | SAP500A | 20631 |
| 1/2 | 1/2 | 1 | 3 | 0.010 | SAP500-010 | 20132 | SAP500A-010 | 20632 |
| 1/2 | 1/2 | 1 | 3 | 0.020 | SAP500-020 | 20133 | SAP500A-020 | 20633 |
| 1/2 | 1/2 | 1 | 3 | 0.030 | SAP500-030 | 20134 | SAP500A-030 | 20634 |
| 1/2 | 1/2 | 1 | 3 | 0.045 | SAP500-045 | 20135 | SAP500A-045 | 20635 |
| 1/2 | 1/2 | 1 | 3 | 0.060 | SAP500-060 | 20136 | SAP500A-060 | 20636 |
| 1/2 | 1/2 | 1 | 3 | 0.090 | SAP500-090 | 20137 | SAP500A-090 | 20637 |
| 1/2 | 1/2 | 1 | 3 | 0.125 | SAP500-125 | 20138 | SAP500A-125 | 20638 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.000 | SAP500M | 20139 | SAP500MA | 20639 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.010 | SAP500M-010 | 20140 | SAP500MA-010 | 20640 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.020 | SAP500M-020 | 20141 | SAP500MA-020 | 20641 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.030 | SAP500M-030 | 20142 | SAP500MA-030 | 20642 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.045 | SAP500M-045 | 20143 | SAP500MA-045 | 20643 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.060 | SAP500M-060 | 20144 | SAP500MA-060 | 20644 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.090 | SAP500M-090 | 20145 | SAP500MA-090 | 20645 |
| 1/2 | 1/2 | 1 1/4 | 3 | 0.125 | SAP500M-125 | 20146 | SAP500MA-125 | 20646 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.000 | SAP500ML | 20147 | SAP500MLA | 20647 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.010 | SAP500ML-010 | 20148 | SAP500MLA-010 | 20648 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.020 | SAP500ML-020 | 20149 | SAP500MLA-020 | 20649 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.030 | SAP500ML-030 | 20150 | SAP500MLA-030 | 20650 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.045 | SAP500ML-045 | 20151 | SAP500MLA-045 | 20651 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.060 | SAP500ML-060 | 20152 | SAP500MLA-060 | 20652 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.090 | SAP500ML-090 | 20153 | SAP500MLA-090 | 20653 |
| 1/2 | 1/2 | 1 1/2 | 4 | 0.125 | SAP500ML-125 | 20154 | SAP500MLA-125 | 20654 |

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| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 1/2 | 1/2 | 2 | 4 | 0.000 | SAP500L | 20155 | SAP500LA | 20655 |
| 1/2 | 1/2 | 2 | 4 | 0.010 | SAP500L-010 | 20156 | SAP500LA-010 | 20656 |
| 1/2 | 1/2 | 2 | 4 | 0.020 | SAP500L-020 | 20157 | SAP500LA-020 | 20657 |
| 1/2 | 1/2 | 2 | 4 | 0.030 | SAP500L-030 | 20158 | SAP500LA-030 | 20658 |
| 1/2 | 1/2 | 2 | 4 | 0.045 | SAP500L-045 | 20159 | SAP500LA-045 | 20659 |
| 1/2 | 1/2 | 2 | 4 | 0.050 | SAP500L-050 | 20160 | SAP500LA-050 | 20660 |
| 1/2 | 1/2 | 2 | 4 | 0.060 | SAP500L-060 | 20161 | SAP500LA-060 | 20661 |
| 1/2 | 1/2 | 2 | 4 | 0.090 | SAP500L-090 | 20162 | SAP500LA-090 | 20662 |
| 1/2 | 1/2 | 2 | 4 | 0.125 | SAP500L-125 | 20163 | SAP500LA-125 | 20663 |
| 1/2 | 1/2 | 3 | 6 | 0.000 | SAP500XL | 20164 | SAP500XLA | 20664 |
| 1/2 | 1/2 | 3 | 6 | 0.010 | SAP500XL-010 | 20165 | SAP500XLA-010 | 20665 |
| 1/2 | 1/2 | 3 | 6 | 0.020 | SAP500XL-020 | 20166 | SAP500XLA-020 | 20666 |
| 1/2 | 1/2 | 3 | 6 | 0.030 | SAP500XL-030 | 20167 | SAP500XLA-030 | 20667 |
| 1/2 | 1/2 | 3 | 6 | 0.045 | SAP500XL-045 | 20168 | SAP500XLA-045 | 20668 |
| 1/2 | 1/2 | 3 | 6 | 0.060 | SAP500XL-060 | 20169 | SAP500XLA-060 | 20669 |
| 1/2 | 1/2 | 3 | 6 | 0.090 | SAP500XL-090 | 20170 | SAP500XLA-090 | 20670 |
| 1/2 | 1/2 | 3 | 6 | 0.125 | SAP500XL-125 | 20171 | SAP500XLA-125 | 20671 |
| 9/16 | 9/16 | 1 1/4 | 3 | 0.000 | SAP562 | 20172 | SAP562A | 20672 |
| 5/8 | 5/8 | 3/4 | 3 | 0.000 | SAP625S | 20173 | SAP625SA | 20673 |
| 5/8 | 5/8 | 3/4 | 3 | 0.020 | SAP625S-020 | 20174 | SAP625SA-020 | 20674 |
| 5/8 | 5/8 | 3/4 | 3 | 0.030 | SAP625S-030 | 20175 | SAP625SA-030 | 20675 |
| 5/8 | 5/8 | 3/4 | 3 | 0.045 | SAP625S-045 | 20176 | SAP625SA-045 | 20676 |
| 5/8 | 5/8 | 3/4 | 3 | 0.060 | SAP625S-060 | 20177 | SAP625SA-060 | 20677 |
| 5/8 | 5/8 | 3/4 | 3 | 0.090 | SAP625S-090 | 20178 | SAP625SA-090 | 20678 |
| 5/8 | 5/8 | 3/4 | 3 | 0.125 | SAP625S-125 | 20179 | SAP625SA-125 | 20679 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.000 | SAP625 | 20180 | SAP625A | 20680 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.020 | SAP625-020 | 20181 | SAP625A-020 | 20681 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.030 | SAP625-030 | 20182 | SAP625A-030 | 20682 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.045 | SAP625-045 | 20183 | SAP625A-045 | 20683 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.060 | SAP625-060 | 20184 | SAP625A-060 | 20684 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.090 | SAP625-090 | 20185 | SAP625A-090 | 20685 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | 0.125 | SAP625-125 | 20186 | SAP625A-125 | 20686 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.000 | SAP625L | 20187 | SAP625LA | 20687 |



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| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.020 | SAP625L-020 | 20188 | SAP625LA-020 | 20688 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.030 | SAP625L-030 | 20189 | SAP625LA-030 | 20689 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.045 | SAP625L-045 | 20190 | SAP625LA-045 | 20690 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.060 | SAP625L-060 | 20191 | SAP625LA-060 | 20691 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.090 | SAP625L-090 | 20192 | SAP625LA-090 | 20692 |
| 5/8 | 5/8 | 2 1/4 | 5 | 0.125 | SAP625L-125 | 20193 | SAP625LA-125 | 20693 |
| 3/4 | 3/4 | 1 | 3 | 0.000 | SAP750S | 20194 | SAP750SA | 20694 |
| 3/4 | 3/4 | 1 | 3 | 0.020 | SAP750S-020 | 20195 | SAP750SA-020 | 20695 |
| 3/4 | 3/4 | 1 | 3 | 0.030 | SAP750S-030 | 20196 | SAP750SA-030 | 20696 |
| 3/4 | 3/4 | 1 | 3 | 0.045 | SAP750S-045 | 20197 | SAP750SA-045 | 20697 |
| 3/4 | 3/4 | 1 | 3 | 0.060 | SAP750S-060 | 20198 | SAP750SA-060 | 20698 |
| 3/4 | 3/4 | 1 | 3 | 0.090 | SAP750S-090 | 20199 | SAP750SA-090 | 20699 |
| 3/4 | 3/4 | 1 | 3 | 0.125 | SAP750S-125 | 20200 | SAP750SA-125 | 20700 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.000 | SAP750 | 20201 | SAP750A | 20701 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.020 | SAP750-020 | 20202 | SAP750A-020 | 20702 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.030 | SAP750-030 | 20203 | SAP750A-030 | 20703 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.045 | SAP750-045 | 20204 | SAP750A-045 | 20704 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.060 | SAP750-060 | 20205 | SAP750A-060 | 20705 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.090 | SAP750-090 | 20206 | SAP750A-090 | 20706 |
| 3/4 | 3/4 | 1 1/2 | 4 | 0.125 | SAP750-125 | 20207 | SAP750A-125 | 20707 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.000 | SAP750L | 20208 | SAP750LA | 20708 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.020 | SAP750L-020 | 20209 | SAP750LA-020 | 20709 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.030 | SAP750L-030 | 20210 | SAP750LA-030 | 20710 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.045 | SAP750L-045 | 20211 | SAP750LA-045 | 20711 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.060 | SAP750L-060 | 20212 | SAP750LA-060 | 20712 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.090 | SAP750L-090 | 20213 | SAP750LA-090 | 20713 |
| 3/4 | 3/4 | 2 1/4 | 5 | 0.125 | SAP750L-125 | 20214 | SAP750LA-125 | 20714 |
| 3/4 | 3/4 | 3 | 6 | 0.000 | SAP750XL | 20215 | SAP750XLA | 20715 |
| 3/4 | 3/4 | 3 | 6 | 0.030 | SAP750XL-030 | 20216 | SAP750XLA-030 | 20716 |
| 3/4 | 3/4 | 3 | 6 | 0.060 | SAP750XL-060 | 20217 | SAP750XLA-060 | 20717 |
| 3/4 | 3/4 | 3 | 6 | 0.125 | SAP750XL-125 | 20218 | SAP750XLA-125 | 20718 |
| 7/8 | 7/8 | 1 1/2 | 4 | 0.000 | SAP875 | 20219 | SAP875A | 20719 |
| 1 | 1 | 1 1/2 | 4 | 0.000 | SAP1.0 | 20220 | SAP1.0A | 20720 |
| 1 | 1 | 1 1/2 | 4 | 0.020 | SAP1.0-020 | 20221 | SAP1.0A-020 | 20721 |

Series **SAP & SAP-NB**

All Purpose Carbide End Mill for Universal Machining Applications in Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-----------|---------------|--------------|
| | | | | | SAP Tool # | SAP EDP # | SAP-NB Tool # | SAP-NB EDP # |
| 1 | 1 | 1 1/2 | 4 | 0.030 | SAP1.0-030 | 20222 | SAP1.0A-030 | 20722 |
| 1 | 1 | 1 1/2 | 4 | 0.060 | SAP1.0-060 | 20223 | SAP1.0A-060 | 20723 |
| 1 | 1 | 1 1/2 | 4 | 0.090 | SAP1.0-090 | 20224 | SAP1.0A-090 | 20724 |
| 1 | 1 | 1 1/2 | 4 | 0.125 | SAP1.0-125 | 20225 | SAP1.0A-125 | 20725 |
| 1 | 1 | 1 1/2 | 4 | 0.250 | SAP1.0-250 | 20226 | SAP1.0A-250 | 20726 |
| 1 | 1 | 2 1/4 | 5 | 0.000 | SAP1.0L | 20227 | SAP1.0LA | 20727 |
| 1 | 1 | 2 1/4 | 5 | 0.020 | SAP1.0L-020 | 20228 | SAP1.0LA-020 | 20728 |
| 1 | 1 | 2 1/4 | 5 | 0.030 | SAP1.0L-030 | 20229 | SAP1.0LA-030 | 20729 |
| 1 | 1 | 2 1/4 | 5 | 0.060 | SAP1.0L-060 | 20230 | SAP1.0LA-060 | 20730 |
| 1 | 1 | 2 1/4 | 5 | 0.090 | SAP1.0L-090 | 20231 | SAP1.0LA-090 | 20731 |
| 1 | 1 | 2 1/4 | 5 | 0.125 | SAP1.0L-125 | 20232 | SAP1.0LA-125 | 20732 |
| 1 | 1 | 2 1/4 | 5 | 0.250 | SAP1.0L-250 | 20233 | SAP1.0LA-250 | 20733 |
| 1 | 1 | 3 | 6 | 0.000 | SAP1.0XL | 20234 | SAP1.0XLA | 20734 |
| 1 | 1 | 3 | 6 | 0.020 | SAP1.0XL-020 | 20235 | SAP1.0XLA-020 | 20735 |
| 1 | 1 | 3 | 6 | 0.030 | SAP1.0XL-030 | 20236 | SAP1.0XLA-030 | 20736 |
| 1 | 1 | 3 | 6 | 0.060 | SAP1.0XL-060 | 20237 | SAP1.0XLA-060 | 20737 |
| 1 | 1 | 3 | 6 | 0.090 | SAP1.0XL-090 | 20238 | SAP1.0XLA-090 | 20738 |
| 1 | 1 | 3 | 6 | 0.125 | SAP1.0XL-125 | 20239 | SAP1.0XLA-125 | 20739 |
| 1 | 1 | 3 | 6 | 0.250 | SAP1.0XL-250 | 20240 | SAP1.0XLA-250 | 20740 |



Series *SAPB & SAPB-NB*

All Purpose Carbide End Mill for Universal Ball Nose Machining Applications in Ferrous Materials

Series **SAPB**

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series **SAPB-NB**

ISO CODE
H

ISO CODE
S

- 4 Flute
- Ball Nose
- 35° Helix
- Variable Pitch
- Primary & Secondary Relief
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series SAPB** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series SAPB-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|----------------|---------------|
| | | | | | SAPB Tool # | SAPB EDP # | SAPB-NB Tool # | SAPB-NB EDP # |
| 1/8 | 1/8 | 1/4 | 1 1/2 | Ball Nose | SAPB125S | 21001 | SAPB125SA | 21501 |
| 1/8 | 1/8 | 1/2 | 1 1/2 | Ball Nose | SAPB125 | 21002 | SAPB125A | 21502 |
| 9/64 | 3/16 | 5/16 | 2 | Ball Nose | SAPB140S | 21003 | SAPB140SA | 21503 |
| 9/64 | 3/16 | 9/16 | 2 | Ball Nose | SAPB140 | 21004 | SAPB140A | 21504 |
| 5/32 | 3/16 | 5/16 | 2 | Ball Nose | SAPB156S | 21005 | SAPB156SA | 21505 |
| 5/32 | 3/16 | 9/16 | 2 | Ball Nose | SAPB156 | 21006 | SAPB156A | 21506 |
| 11/64 | 3/16 | 5/8 | 2 | Ball Nose | SAPB171 | 21007 | SAPB171A | 21507 |
| 3/16 | 3/16 | 3/8 | 2 | Ball Nose | SAPB187S | 21008 | SAPB187SA | 21508 |
| 3/16 | 3/16 | 5/8 | 2 | Ball Nose | SAPB187 | 21009 | SAPB187A | 21509 |
| 3/16 | 3/16 | 3/4 | 2 1/2 | Ball Nose | SAPB187L | 21010 | SAPB187LA | 21510 |
| 13/64 | 1/4 | 5/8 | 2 1/2 | Ball Nose | SAPB203 | 21011 | SAPB203A | 21511 |
| 7/32 | 1/4 | 7/16 | 2 | Ball Nose | SAPB218S | 21012 | SAPB218SA | 21512 |
| 7/32 | 1/4 | 5/8 | 2 1/2 | Ball Nose | SAPB218 | 21013 | SAPB218A | 21513 |
| 15/64 | 1/4 | 3/4 | 2 1/2 | Ball Nose | SAPB234 | 21014 | SAPB234A | 21514 |
| 1/4 | 1/4 | 1/2 | 2 | Ball Nose | SAPB250S | 21015 | SAPB250SA | 21515 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | Ball Nose | SAPB250 | 21016 | SAPB250A | 21516 |
| 1/4 | 1/4 | 1 1/8 | 3 | Ball Nose | SAPB250M | 21017 | SAPB250MA | 21517 |
| 1/4 | 1/4 | 1 1/2 | 4 | Ball Nose | SAPB250L | 21018 | SAPB250LA | 21518 |
| 17/64 | 5/16 | 3/4 | 2 1/2 | Ball Nose | SAPB265 | 21019 | SAPB265A | 21519 |
| 9/32 | 5/16 | 3/4 | 2 1/2 | Ball Nose | SAPB281 | 21020 | SAPB281A | 21520 |
| 19/64 | 5/16 | 13/16 | 2 1/2 | Ball Nose | SAPB296 | 21021 | SAPB296A | 21521 |
| 5/16 | 5/16 | 1/2 | 2 | Ball Nose | SAPB312S | 21022 | SAPB312SA | 21522 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | Ball Nose | SAPB312 | 21023 | SAPB312A | 21523 |

See page 86 for Cutting Parameters

Series **SAPB & SAPB-NB**

All Purpose Carbide End Mill for Universal Ball Nose Machining Applications in Ferrous Materials

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|------------|----------------|---------------|
| | | | | | SAPB Tool # | SAPB EDP # | SAPB-NB Tool # | SAPB-NB EDP # |
| 5/16 | 5/16 | 1 1/8 | 3 | Ball Nose | SAPB312L | 21024 | SAPB312LA | 21524 |
| 21/64 | 3/8 | 7/8 | 2 1/2 | Ball Nose | SAPB328 | 21025 | SAPB328A | 21525 |
| 11/32 | 3/8 | 7/8 | 2 1/2 | Ball Nose | SAPB343 | 21026 | SAPB343A | 21526 |
| 23/64 | 3/8 | 7/8 | 2 1/2 | Ball Nose | SAPB359 | 21027 | SAPB359A | 21527 |
| 3/8 | 3/8 | 5/8 | 2 | Ball Nose | SAPB375S | 21028 | SAPB375SA | 21528 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | Ball Nose | SAPB375 | 21029 | SAPB375A | 21529 |
| 3/8 | 3/8 | 1 1/8 | 3 | Ball Nose | SAPB375L | 21031 | SAPB375LA | 21530 |
| 3/8 | 3/8 | 1 1/2 | 4 | Ball Nose | SAPB375ML | 21030 | SAPB375MLA | 21531 |
| 3/8 | 3/8 | 1 3/4 | 4 | Ball Nose | SAPB375XL | 21032 | SAPB375XLA | 21532 |
| 25/64 | 7/16 | 7/8 | 2 1/2 | Ball Nose | SAPB390 | 21033 | SAPB390A | 21533 |
| 13/32 | 7/16 | 7/8 | 2 1/2 | Ball Nose | SAPB406 | 21034 | SAPB406A | 21534 |
| 27/64 | 7/16 | 7/8 | 2 1/2 | Ball Nose | SAPB421 | 21035 | SAPB421A | 21535 |
| 7/16 | 7/16 | 5/8 | 2 1/2 | Ball Nose | SAPB437S | 21036 | SAPB437SA | 21536 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | Ball Nose | SAPB437 | 21037 | SAPB437A | 21537 |
| 7/16 | 7/16 | 2 | 4 | Ball Nose | SAPB437L | 21038 | SAPB437LA | 21538 |
| 29/64 | 1/2 | 1 | 3 | Ball Nose | SAPB453 | 21039 | SAPB453A | 21539 |
| 15/32 | 1/2 | 1 | 3 | Ball Nose | SAPB468 | 21040 | SAPB468A | 21540 |
| 31/64 | 1/2 | 1 | 3 | Ball Nose | SAPB484 | 21041 | SAPB484A | 21541 |
| 1/2 | 1/2 | 5/8 | 2 1/2 | Ball Nose | SAPB500S | 21042 | SAPB500SA | 21542 |
| 1/2 | 1/2 | 1 | 3 | Ball Nose | SAPB500 | 21043 | SAPB500A | 21543 |
| 1/2 | 1/2 | 1 | 4 | Ball Nose | SAPB500E | 21044 | SAPB500EA | 21544 |
| 1/2 | 1/2 | 1 1/4 | 3 | Ball Nose | SAPB500M | 21045 | SAPB500MA | 21545 |
| 1/2 | 1/2 | 1 1/2 | 4 | Ball Nose | SAPB500ML | 21046 | SAPB500MLA | 21546 |
| 1/2 | 1/2 | 2 | 4 | Ball Nose | SAPB500L | 21047 | SAPB500LA | 21547 |
| 1/2 | 1/2 | 3 | 6 | Ball Nose | SAPB500XL | 21048 | SAPB500XLA | 21548 |
| 9/16 | 9/16 | 1 1/4 | 3 | Ball Nose | SAPB562 | 21049 | SAPB562A | 21549 |
| 5/8 | 5/8 | 3/4 | 3 | Ball Nose | SAPB625S | 21050 | SAPB625SA | 21550 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | Ball Nose | SAPB625 | 21051 | SAPB625A | 21551 |
| 5/8 | 5/8 | 2 1/4 | 5 | Ball Nose | SAPB625L | 21052 | SAPB625LA | 21552 |
| 3/4 | 3/4 | 1 | 3 | Ball Nose | SAPB750S | 21053 | SAPB750SA | 21553 |
| 3/4 | 3/4 | 1 1/2 | 4 | Ball Nose | SAPB750 | 21054 | SAPB750A | 21554 |
| 3/4 | 3/4 | 2 1/4 | 5 | Ball Nose | SAPB750L | 21055 | SAPB750LA | 21555 |
| 3/4 | 3/4 | 3 | 6 | Ball Nose | SAPB750XL | 21056 | SAPB750XLA | 21556 |
| 7/8 | 7/8 | 1 1/2 | 4 | Ball Nose | SAPB875 | 21057 | SAPB875A | 21557 |
| 1 | 1 | 1 1/2 | 4 | Ball Nose | SAPB1.0 | 21058 | SAPB1.0A | 21558 |
| 1 | 1 | 2 1/4 | 5 | Ball Nose | SAPB1.0L | 21059 | SAPB1.0LA | 21559 |
| 1 | 1 | 3 | 6 | Ball Nose | SAPB1.0XL | 21060 | SAPB1.0XLA | 21560 |



Series *SAPBR & SAPBR-NB*

All Purpose Carbide End Mill with Ball Nose and Chipbreakers for Slotting & Heavy Profiling Ferrous Materials

Series SAPBR

ISO CODE
P

ISO CODE
M

ISO CODE
S

ISO CODE
K

Series SAPBR-NB

ISO CODE
H

ISO CODE
S

- 4 Flute
- Ball Nose
- 35° Helix
- Variable Pitch with Chipbreakers
- Primary & Secondary Relief
- AlCrN or AlTiN Coating



- For Ferrous Materials <45 HRC, use **Series SAPBR** - AlCrN Coated
- For Nickel Based Alloys & Hardened Materials > 45 HRC, use **Series SAPBR-NB** - AlTiN Coated

| Cutting Diameter | Shank Diameter | Length of Cut | Overall Length | Radius Size | AlCrN Coated | | AlTiN Coated | |
|------------------|----------------|---------------|----------------|-------------|--------------|-------------|-----------------|----------------|
| | | | | | SAPBR Tool # | SAPBR EDP # | SAPBR-NB Tool # | SAPBR-NB EDP # |
| 3/16 | 3/16 | 5/8 | 2 | Ball Nose | SAPBR187 | 22001 | SAPBR187A | 22501 |
| 1/4 | 1/4 | 3/4 | 2 1/2 | Ball Nose | SAPBR250 | 22002 | SAPBR250A | 22502 |
| 5/16 | 5/16 | 13/16 | 2 1/2 | Ball Nose | SAPBR312 | 22003 | SAPBR312A | 22503 |
| 3/8 | 3/8 | 7/8 | 2 1/2 | Ball Nose | SAPBR375 | 22004 | SAPBR375A | 22504 |
| 7/16 | 7/16 | 7/8 | 2 3/4 | Ball Nose | SAPBR437 | 22005 | SAPBR437A | 22505 |
| 1/2 | 1/2 | 1 | 3 | Ball Nose | SAPBR500 | 22006 | SAPBR500A | 22506 |
| 1/2 | 1/2 | 1 1/4 | 3 | Ball Nose | SAPBR500M | 22007 | SAPBR500MA | 22507 |
| 5/8 | 5/8 | 1 1/4 | 3 1/2 | Ball Nose | SAPBR625 | 22008 | SAPBR625A | 22508 |
| 3/4 | 3/4 | 1 1/2 | 4 | Ball Nose | SAPBR750 | 22009 | SAPBR750A | 22509 |
| 1 | 1 | 1 1/2 | 4 | Ball Nose | SAPBR1.0 | 22010 | SAPBR1.0A | 22510 |

See page 86 for Cutting Parameters

Performance Reviews

Series XP-NB (4 Flute) machining Nickel Chrome Molly

A ¾" tool, [XP750RA] profiling .023" radial depth by 1.220" axial depth at 500 SFM with .004" chipload per tooth

CUSTOMER COMMENT

"The tool ran so well and for so long, we didn't remember when we put the tool in the machining center"

Series SM5F (5 Flute) machining 422 Stainless

A ¾" long length end mill [SM5F750L-030] made a 0.030 radial x 2" axial profiling cut at 900 RPM and 16"IPM

CUSTOMER COMMENT

"Great finish and tools lasted forever. No one else performs even close"

Series SR3F (3 Flute with chipbreakers) machining G-3500 Cast Iron

A ½" diameter tool [SR3F500R] made a heavy cut on a double wall slot operation at over 80" IPM & 4200 RPM. Then the same tool made a spring pass that held the tight tolerance so well they were able to avoid a grinding operation.

CUSTOMER COMMENT

"We couldn't make a profit on these parts by using anyone else's tool. Supermill's Super-Ruff [SR3F] was a job-saver and a customer saver"

Series XP-NB (4 Flute) machining Waspoly

A ½" diameter end mill [XP500RA] machined efficiently in a variety of cuts at 1,000 RPM and 4.4" IPM

CUSTOMER COMMENT

"We could have pushed these harder, but we were already 60% faster and twice the tool life of the tool we were using, plus getting a better finish."

HIGH PERFORMANCE

Series SAP, SAP-NB, SAPB, SAPB-NB, SAPBR & SAPBR-NB

Cutting Parameters

Suggested Starting Speeds & Feed Rates

| Material Group | ISO Code | Material Examples | Finishing Cuts | | Medium Cuts | | Heavy Cuts | | Slotting | | Facing | | Ramping | |
|---------------------------------|----------|---|-----------------------|-------|--------------------------|-------|-------------------------|-------|-----------|-------|--------------------------|-------|----------------------|-------|
| | | | .1D Radial x 2D Axial | | .25D Radial x 1.5D Axial | | .5D Radial x 1.5D Axial | | .5D Axial | | .75D Radial x .25D Axial | | Max. Ramp Angle - 7° | |
| | | | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM | SFM | IPM |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 500 | 50.00 | 500 | 45.00 | 500 | 40.00 | 500 | 35.00 | 500 | 45.00 | 500 | 40.00 |
| Steel Alloys | P | 4140 thru 8820 | 400 | 40.00 | 400 | 40.00 | 400 | 35.00 | 400 | 30.00 | 400 | 40.00 | 400 | 35.00 |
| | | Steel Alloys <45 HRC, Cobalt Chrome | 200 | 30.00 | 200 | 25.00 | 200 | 20.00 | 200 | 15.00 | 200 | 25.00 | 200 | 15.00 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 250 | 30.00 | 250 | 25.00 | 250 | 20.00 | 250 | 15.00 | 250 | 25.00 | 250 | 20.00 |
| | H* | AR-450, Steels >45 HRC | 100 | 6.00 | 100 | 5.00 | 100 | 4.00 | 80 | 3.00 | 100 | 5.00 | 100 | 4.00 |
| Stainless Steel | M | 303,304, 316 | 400 | 35.00 | 400 | 30.00 | 400 | 25.00 | 400 | 20.00 | 400 | 30.00 | 400 | 25.00 |
| | | 410, 420, 440, 13-8, 15-5, 17-4 Ph | 300 | 30.00 | 300 | 25.00 | 300 | 20.00 | 300 | 15.00 | 300 | 25.00 | 300 | 20.00 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 200 | 10.00 | 200 | 8.00 | 200 | 7.00 | 200 | 6.00 | 200 | 8.00 | 200 | 7.00 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 80 | 8.00 | 80 | 7.00 | 80 | 6.00 | 80 | 4.00 | 80 | 5.00 | 80 | 4.00 |
| | | Inconel 625, Waspalloy | 120 | 10.00 | 120 | 9.00 | 120 | 8.00 | 120 | 6.00 | 120 | 7.00 | 120 | 6.00 |
| | | Monel 400 | 250 | 20.00 | 250 | 18.00 | 250 | 16.00 | 250 | 12.00 | 250 | 14.00 | 250 | 12.00 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 100 | 8.00 | 100 | 7.00 | 100 | 6.00 | 100 | 5.00 | 100 | 7.00 | 100 | 6.00 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite SF12 | 70 | 7.00 | 70 | 6.00 | 70 | 5.00 | 70 | 4.00 | 70 | 6.00 | 70 | 5.00 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 500 | 50.00 | 500 | 45.00 | 500 | 40.00 | 500 | 35.00 | 500 | 45.00 | 500 | 40.00 |
| Non-Ferrous | N | Aluminum | 600 | 50.00 | 600 | 40.00 | 600 | 30.00 | 600 | 25.00 | 600 | 40 | 600 | 30.00 |
| | | Copper, Brass, Bronze, Plastics, Fibreglass | 300 | 25.00 | 300 | 20.00 | 300 | 20.00 | 300 | 15.00 | 300 | 20 | 300 | 20.00 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB." Having an AlTiN coating will result in much longer tool life*

ALL PURPOSE

Series *SAP, SAP-NB, SAPB, SAPB-NB, SAPBR & SAPBR-NB*

Cutting Parameters

Recommended Chip Loads

| Material Group | ISO Code | Material Examples | Cutting Diameter | | | | | | | |
|---------------------------------|----------|---|------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| Steel | P | 1018 thru 1095, 12L14, A-36, Hot Rolled | 0.0006 | 0.0008 | 0.0015 | 0.0025 | 0.0033 | 0.0040 | 0.0050 | 0.0060 |
| Steel Alloys | P | 4140 thru 8820 | 0.0004 | 0.0006 | 0.0010 | 0.0016 | 0.0025 | 0.0033 | 0.0040 | 0.0050 |
| | | Cobalt Chrome | 0.0006 | 0.0008 | 0.0016 | 0.0025 | 0.0040 | 0.0060 | 0.0070 | 0.0080 |
| | | Steel Alloys <45 HRC | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0020 | 0.0030 |
| Tool & Mold Steels | P | H-13, O-1, A-2, D-2, S7, P20 | 0.0040 | 0.0006 | 0.0010 | 0.0016 | 0.0025 | 0.0033 | 0.0040 | 0.0050 |
| | H* | AR-450, Steels >45 HRC | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0020 | 0.0030 |
| Stainless Steel | M | 303,304, 316, 410, 420, 440, 13-8, 15-5, 17-4 Ph | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0035 | 0.0040 | 0.0050 |
| High Temp - Titanium | S | 6Al4V, 5553, 99 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0012 | 0.0020 | 0.0030 | 0.0040 |
| High Temp - Nickel Based Alloys | S | Inconel 100, 718, Hastelloy-B, Rene 77, Jethete M252, Haynes 75 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0030 | 0.0030 |
| | | Inconel 625, Waspalloy | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0030 | 0.0030 |
| | | Monel 400 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0030 | 0.0030 |
| High Temp - Iron Based Alloys | S | Aeromet 100, A286, Jethete M152 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0030 | 0.0030 |
| High Temp - Cobalt Based Alloys | S | Kovar, L-405, L-605, Stellite, SF12 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0030 | 0.0030 |
| Cast Iron | K | Gray Cast, Malleable and Ductile Iron | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0025 | 0.0035 | 0.0045 |
| Non-Ferrous Materials | N | Aluminium | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 | 0.0080 |
| | | Copper, Brass, Bronze, Plastics, Fibreglass | 0.0008 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | 0.0070 |

**When machining Hardened Materials > 45 HRC, use the Series with "NB."
Having an AlTiN coating will result in much longer tool life*

ALL PURPOSE

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SFM to RPM Conversion Chart

| SFM to RPM Conversion Chart by Cutter Diameter | | | | | | | | |
|--|------------------------------|--------|--------|-------|-------|-------|-------|-------|
| Cutting Diameter | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 |
| Speed (SFM) | Revolutions Per Minute (RPM) | | | | | | | |
| 50 | 1,527 | 763 | 509 | 382 | 305 | 244 | 218 | 191 |
| 60 | 1,832 | 916 | 611 | 458 | 366 | 305 | 262 | 229 |
| 70 | 2,137 | 1,069 | 712 | 534 | 427 | 356 | 305 | 267 |
| 80 | 2,443 | 1,221 | 814 | 611 | 489 | 407 | 349 | 305 |
| 90 | 2,748 | 1,374 | 916 | 687 | 550 | 458 | 393 | 344 |
| 100 | 3,053 | 1,527 | 1,018 | 763 | 611 | 509 | 436 | 382 |
| 150 | 4,580 | 2,290 | 1,527 | 1,145 | 916 | 763 | 654 | 573 |
| 200 | 6,107 | 3,053 | 2,036 | 1,527 | 1,221 | 1,018 | 872 | 763 |
| 250 | 7,634 | 3,817 | 2,545 | 1,908 | 1,527 | 1,272 | 1,091 | 954 |
| 300 | 9,160 | 4,580 | 3,053 | 2,290 | 1,832 | 1,527 | 1,309 | 1,145 |
| 350 | 10,687 | 5,344 | 3,562 | 2,672 | 2,137 | 1,781 | 1,527 | 1,336 |
| 400 | 12,214 | 6,107 | 4,071 | 3,053 | 2,443 | 2,036 | 1,745 | 1,527 |
| 450 | 13,740 | 6,870 | 4,580 | 3,435 | 2,748 | 2,290 | 1,963 | 1,718 |
| 500 | 15,267 | 7,634 | 5,089 | 3,817 | 3,053 | 2,545 | 2,181 | 1,908 |
| 600 | 18,321 | 9,160 | 6,107 | 4,580 | 3,664 | 3,053 | 2,617 | 2,290 |
| 700 | 21,374 | 10,687 | 7,125 | 5,344 | 4,275 | 3,562 | 3,053 | 2,672 |
| 800 | 24,427 | 12,214 | 8,142 | 6,107 | 4,885 | 4,071 | 3,490 | 3,053 |
| 900 | 27,481 | 13,740 | 9,160 | 6,870 | 5,496 | 4,580 | 3,926 | 3,453 |
| 1000 | 30,534 | 15,267 | 10,178 | 7,634 | 6,107 | 5,089 | 4,362 | 3,817 |
| 1100 | 33,588 | 16,794 | 11,196 | 8,397 | 6,718 | 5,598 | 4,798 | 4,198 |
| 1200 | 36,641 | 18,321 | 12,214 | 9,160 | 7,328 | 6,107 | 5,234 | 4,580 |

To calculate Surface Footage to RPM's, $S.F. \times 3.82 \div \text{Tool Diameter} = \text{RPM}$

To calculate RPM's to Surface Footage, $\text{Tool Diameter} \times 2.618 \times \text{RPM} = S.F.$

Test Tool Performance Results

Date _____

Customer (end user) _____ Contact Name _____

Distributor _____ Dist. Salesman _____

Job Reference # or name _____

Workpiece Material _____ Hardness _____ Machine _____ HP _____

Spindle Taper _____ Holder Type _____ Coolant Type _____

Coating _____ Flat(s) on Shank? yes no Length of Tool Extending out from holder _____

Supermill Series _____ Competitor #1 Series _____ Competitor #2 Series _____

| | Tool or EDP # | Cutting Diameter | LOC | Reach Length (if any) | OAL | Corner Condition | Axial Depth of Cut | Radial Width of Cut |
|---------------|---------------|------------------|-----|-----------------------|-----|------------------|--------------------|---------------------|
| Supermill | | | | | | | | |
| Competitor #1 | | | | | | | | |
| Competitor #2 | | | | | | | | |

| Results | Supermill | Competitor # 1 | Competitor # 2 |
|--------------------------------------|-----------|----------------|----------------|
| Number of Parts to be Produced | | | |
| Spindle Speed (RPM) | | | |
| Cutting Speed (SFM) | | | |
| Feed Rate (IPM) | | | |
| Chip Load per Tooth | | | |
| # of Passes x Length of Cut Per Pass | | | |
| Quality of Workpiece Surface Finish | | | |
| Minutes "in-the-cut" Per Tool | | | |
| Number of Parts Per Tool | | | |

Notes and Comments: _____

Please copy this page, complete the information and send to info@supermill.com, or fax to 860-828-9573



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