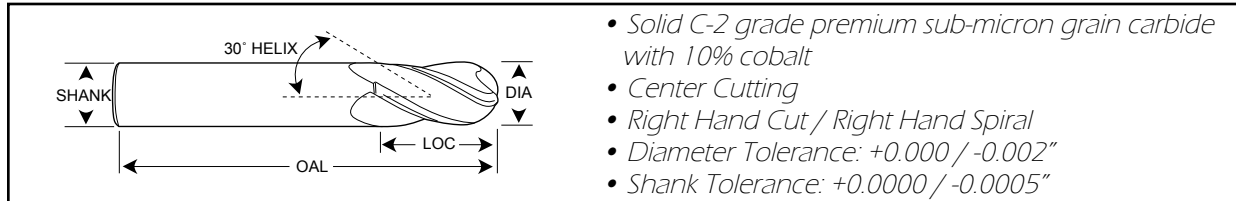


STANDARD ENDMILLS 4 FLUTE BALLNOSE



4 flute geometry offers increased core strength



Applications:

- Profiling, slotting, production milling and finishing applications
- Ball end allows for three axis contour slotting and contour finishing

Materials:

- A wide range of ferrous metals, including stainless steels and high temperature alloys

STUB LENGTH: Reduces tool deflection and promotes rigidity - Maintains excellent surface finishes

REGULAR LENGTH: Standard flute lengths for general all purpose milling

LONG, XLONG & EXTENDED LENGTHS: For deep pocket milling and long reach applications

4 FLUTE BALLNOSE

| DIA | Decimal Inches | LOC | SHANK | OAL | LENGTH | UNCOATED | TiN Coated | TiCN Coated | TiAlN Coated |
|--------|----------------|---------|--------|---------|---------|------------|------------|-------------|--------------|
| 1/64 | 0.0156 | 3/64 | 1/8 | 1-1/2 | Regular | 223-000998 | 223-000995 | 223-020998 | 223-001007 |
| 1/32 | 0.0312 | 1/16 | 1/8 | 1-1/2 | Stub | 220-001001 | 220-001002 | 220-001003 | 220-001004 |
| 1/32 | 0.0312 | 1/8 | 1/8 | 1-1/2 | Regular | 223-000999 | 223-001003 | 223-000996 | 223-001009 |
| 1.0 mm | 0.0394 | 4.0 mm | 3.0 mm | 39.0 mm | Regular | 223-001400 | — | — | 223-001400B |
| 1.0 mm | 0.0394 | 5.5 mm | 3.0 mm | 39.0 mm | Regular | 223-001401 | — | — | — |
| 3/64 | 0.0469 | 3/32 | 1/8 | 1-1/2 | Stub | 220-001010 | 220-001011 | 220-001012 | 220-001013 |
| 3/64 | 0.0469 | 1/8 | 1/8 | 1-1/2 | Regular | 223-001000 | 223-001004 | 223-021000 | 223-001014 |
| 1.5 mm | 0.0591 | 5.0 mm | 3.0 mm | 39.0 mm | Regular | 223-001405 | — | — | 223-001410B |
| 1.5 mm | 0.0591 | 6.5 mm | 3.0 mm | 39.0 mm | Regular | 223-001410 | — | — | — |
| 1/16 | 0.0625 | 1/8 | 1/8 | 1-1/2 | Stub | 220-001020 | 220-001022 | 220-001021 | 220-001023 |
| 1/16 | 0.0625 | 1/4 | 1/8 | 1-1/2 | Regular | 223-001001 | 223-001002 | 223-001015 | 223-001016 |
| 5/64 | 0.0781 | 5/32 | 1/8 | 1-1/2 | Stub | 220-001025 | 220-011025 | 220-021025 | 220-031025 |
| 5/64 | 0.0781 | 1/4 | 1/8 | 1-1/2 | Regular | 223-001005 | 223-001006 | 223-001008 | 223-001019 |
| 2.0 mm | 0.0787 | 8.0 mm | 3.0 mm | 39.0 mm | Regular | 223-001421 | — | — | 223-001420B |
| 3/32 | 0.0938 | 3/16 | 1/8 | 1-1/2 | Stub | 220-001030 | 220-001032 | 220-001031 | 220-001033 |
| 3/32 | 0.0938 | 3/8 | 1/8 | 1-1/2 | Regular | 223-001010 | 223-001011 | 223-001012 | 223-001013 |
| 2.5 mm | 0.0984 | 9.5 mm | 3.0 mm | 39.0 mm | Regular | 223-001425 | — | — | 223-001425B |
| 7/64 | 0.1094 | 7/32 | 1/8 | 1-1/2 | Stub | 220-001035 | 220-011035 | 220-021035 | 220-031035 |
| 7/64 | 0.1094 | 3/8 | 1/8 | 1-1/2 | Regular | 223-001017 | 223-001052 | 223-021051 | 223-001039 |
| 3.0 mm | 0.1181 | 12.0 mm | 3.0 mm | 39.0 mm | Regular | 223-001430 | — | — | 223-001430B |
| 1/8 | 0.1250 | 1/4 | 1/8 | 1-1/2 | Stub | 220-001040 | 220-001042 | 220-001041 | 220-001043 |
| 1/8 | 0.1250 | 1/2 | 1/8 | 1-1/2 | Regular | 223-001020 | 223-001021 | 223-001023 | 223-001028 |
| 1/8 | 0.1250 | 3/4 | 1/8 | 2-1/4 | Long | 226-001001 | 226-001002 | 226-001003 | 226-001004 |
| 1/8 | 0.1250 | 1 | 1/8 | 3 | XL | 229-001001 | 229-001002 | 229-001003 | 229-001004 |
| 3.5 mm | 0.1378 | 12.0 mm | 4.0 mm | 51.0 mm | Regular | 223-001435 | — | — | 223-001435B |

MILL MONSTER



MILL MONSTER



PROUDLY MADE
IN THE USA



4 FLUTE BALLNOSE *Continued*

| DIA | Decimal Inches | LOC | SHANK | OAL | LENGTH | Coatings | | | |
|--------|----------------|---------|---------|---------|---------|------------|-------------|-------------|--------------|
| | | | | | | UNCOATED | TiN Coated | TiCN Coated | TiAlN Coated |
| 9/64 | 0.1406 | 9/32 | 3/16 | 2 | Stub | 220-001045 | 220-011045 | 220-021045 | 220-031045 |
| 9/64 | 0.1406 | 9/16 | 3/16 | 2 | Regular | 223-001025 | 223-001026 | 223-001027 | 223-001029 |
| 5/32 | 0.1562 | 5/16 | 3/16 | 2 | Stub | 220-001050 | 220-001052 | 220-001051 | 220-001053 |
| 5/32 | 0.1562 | 9/16 | 3/16 | 2 | Regular | 223-001030 | 223-001031 | 223-001033 | 223-001032 |
| 5/32 | 0.1562 | 3/4 | 3/16 | 2-1/2 | Long | 226-001005 | 226-001006 | 226-001008 | 226-001007 |
| 5/32 | 0.1562 | 1-1/8 | 3/16 | 3 | XL | 229-001005 | 229-001006 | 229-001008 | 229-001009 |
| 4.0 mm | 0.1575 | 14.0 mm | 4.0 mm | 51.0 mm | Regular | 223-001440 | — | — | 223-001440B |
| 11/64 | 0.1719 | 5/16 | 3/16 | 2 | Stub | 220-001055 | 220-011055 | 220-021055 | 220-031055 |
| 11/64 | 0.1719 | 9/16 | 3/16 | 2 | Regular | 223-001035 | 223-001055 | 223-021054 | 223-001043 |
| 4.5 mm | 0.1772 | 16.0 mm | 5.0 mm | 51.0 mm | Regular | 223-001445 | — | — | 223-001445B |
| 3/16 | 0.1875 | 3/8 | 3/16 | 2 | Stub | 220-001060 | 220-001062 | 220-001061 | 220-001063 |
| 3/16 | 0.1875 | 5/8 | 3/16 | 2 | Regular | 223-001040 | 223-001041 | 223-001042 | 223-001034 |
| 3/16 | 0.1875 | 3/4 | 3/16 | 2-1/2 | Long | 226-001012 | 226-001013 | 226-001014 | 226-001016 |
| 3/16 | 0.1875 | 1 | 3/16 | 4 | Ext XL | 229-001015 | — | — | — |
| 3/16 | 0.1875 | 1-1/8 | 3/16 | 3 | XL | 229-001010 | 229-001011 | 229-001012 | 229-001014 |
| 5.0 mm | 0.1969 | 16.0 mm | 5.0 mm | 51.0 mm | Regular | 223-001450 | — | — | 223-001450B |
| 13/64 | 0.2031 | 3/8 | 1/4 | 2 | Stub | 220-001065 | 220-011065 | 220-021065 | 220-031065 |
| 13/64 | 0.2031 | 5/8 | 1/4 | 2-1/2 | Regular | 223-001046 | 223-001059 | 223-021058 | 223-001047 |
| 7/32 | 0.2188 | 7/16 | 1/4 | 2 | Stub | 220-001070 | 220-001072 | 220-001071 | 220-001073 |
| 7/32 | 0.2188 | 5/8 | 1/4 | 2-1/2 | Regular | 223-001050 | 223-001056 | 223-001037 | 223-001036 |
| 15/64 | 0.2344 | 7/16 | 1/4 | 2 | Stub | 220-001075 | 220-011075 | 220-021075 | 220-031075 |
| 15/64 | 0.2344 | 3/4 | 1/4 | 2-1/2 | Regular | 223-001053 | 223-001057 | 223-021053 | 223-001045 |
| 6.0 mm | 0.2362 | 19.0 mm | 6.0 mm | 63.0 mm | Regular | 223-001460 | — | — | 223-001460B |
| 1/4 | 0.2500 | 1/2 | 1/4 | 2 | Stub | 220-001080 | 220-001082 | 220-001081 | 220-001083 |
| 1/4 | 0.2500 | 3/4 | 1/4 | 2-1/2 | Regular | 223-001060 | 223-001062 | 223-001063 | 223-001066 |
| 1/4 | 0.2500 | 1 | 1/4 | 4 | Ext XL | 229-001019 | — | — | — |
| 1/4 | 0.2500 | 1-1/8 | 1/4 | 3 | Long | 226-001020 | 226-001021 | 226-001022 | 226-001024 |
| 1/4 | 0.2500 | 1-1/2 | 1/4 | 4 | XL | 229-001020 | 229-001021 | 229-001022 | 229-001024 |
| 1/4 | 0.2500 | 1-1/2 | 1/4 | 6 | Ext XXL | 229-001026 | 229-001026A | 229-001026C | 229-001027 |
| 17/64 | 0.2656 | 3/4 | 5/16 | 2-1/2 | Regular | 223-001061 | 223-001064 | 223-021061 | 223-031061 |
| 7.0 mm | 0.2756 | 19.0 mm | 8.0 mm | 63.0 mm | Regular | 223-001470 | — | — | 223-001470B |
| 9/32 | 0.2812 | 3/4 | 5/16 | 2-1/2 | Regular | 223-001070 | 223-001065 | 223-001067 | 223-001068 |
| 19/64 | 0.2969 | 13/16 | 5/16 | 2-1/2 | Regular | 223-001071 | 223-001072 | 223-021071 | 223-031071 |
| 5/16 | 0.3125 | 1/2 | 5/16 | 2 | Stub | 220-001090 | 220-001092 | 220-001091 | 220-001093 |
| 5/16 | 0.3125 | 13/16 | 5/16 | 2-1/2 | Regular | 223-001080 | 223-001082 | 223-001083 | 223-001073 |
| 5/16 | 0.3125 | 1-1/8 | 5/16 | 3 | Long | 226-001030 | 226-001031 | 226-001032 | 226-001034 |
| 5/16 | 0.3125 | 1-1/2 | 5/16 | 6 | Ext XXL | 229-001035 | 229-001035A | 229-001035C | 229-001036 |
| 5/16 | 0.3125 | 1-5/8 | 5/16 | 4 | XL | 229-001030 | 229-001031 | 229-001032 | 229-001034 |
| 8.0 mm | 0.3150 | 20.0 mm | 8.0 mm | 63.0 mm | Regular | 223-001480 | — | — | 223-001480B |
| 21/64 | 0.3281 | 1 | 3/8 | 2-1/2 | Regular | 223-001084 | 223-001085 | 223-021084 | 223-031084 |
| 11/32 | 0.3438 | 1 | 3/8 | 2-1/2 | Regular | 223-001086 | 223-001087 | 223-001169 | 223-001115 |
| 9.0 mm | 0.3543 | 22.0 mm | 10.0 mm | 63.0 mm | Regular | 223-001490 | — | — | 223-001490B |
| 23/64 | 0.3594 | 1 | 3/8 | 2-1/2 | Regular | 223-001088 | 223-001089 | 223-021088 | 223-031088 |

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