

SPECIAL USE CARBIDE END MILLS

MULTI FLUTE • BACK CHAMFER END MILLS

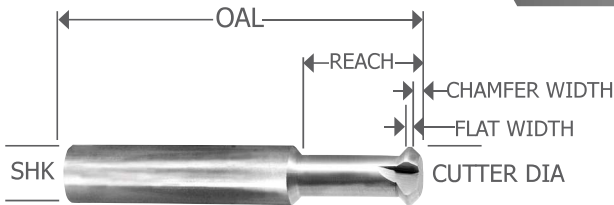


| | | | | | | | | | | | | |
|---------|--------------|--|--------|--------------------------|------------|------------------------------------------------------------------------------------------------------------------|---|---|---|---|--|---|
| Carbide | MULTI FLUTES | | BRIGHT | +.0000 -.0050 O.D. | HRC <48 | <table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table> | P | K | M | S | | N |
| P | K | | | | | | | | | | | |
| M | S | | | | | | | | | | | |
| | N | | | | | | | | | | | |

SERIES: BC

| CUTTER DIA | SHANK DIA | OAL | WIDTH | FLAT | NECK DIA | NECK WIDTH | FLUTES | TOOL | BRIGHT EDP |
|------------|-----------|---------|-------|-------|----------|------------|--------|--------|------------|
| 3/8 | 1/4 | 2-5/8 | .125 | 0.031 | .220 | .365 | 4 | BC-3/8 | 12340 |
| 1/2 | 5/16 | 2-5/8 | .125 | 0.031 | .295 | .365 | 5 | BC-1/2 | 12341 |
| 3/4 | 3/8 | 2-21/32 | .156 | 0.031 | ---- | ---- | 6 | BC-3/4 | 12342 |
| 1 | 1/2 | 3-3/16 | .188 | 0.031 | ---- | ---- | 7 | BC-1 | 12343 |

1 FLUTE • BACK CHAMFER FOR LATHES



| | | | | | | | | | | | | |
|---------|---|--|--------|--------------------------|------------|------------------------------------------------------------------------------------------------------------------|---|---|---|---|--|---|
| Carbide | | | BRIGHT | +.0000 -.0050 O.D. | HRC <48 | <table border="1"><tr><td>P</td><td>K</td></tr><tr><td>M</td><td>S</td></tr><tr><td></td><td>N</td></tr></table> | P | K | M | S | | N |
| P | K | | | | | | | | | | | |
| M | S | | | | | | | | | | | |
| | N | | | | | | | | | | | |

SERIES: BCL

| CUTTER DIA | SHANK DIA | OAL | CHAMFER WIDTH | FLAT WIDTH | NECK DIA | REACH | TOOL | BRIGHT EDP |
|------------|-----------|-------|---------------|------------|----------|-------|-----------|------------|
| .177 | 3/16 | 2-1/2 | 0.026 | 0.031 | 0.125 | 0.775 | BCL-3/16 | 12333 |
| 1/4 | 1/4 | 2-1/2 | 0.035 | 0.031 | 0.170 | 0.775 | BCL-1/4 | 12334 |
| 1/4 | 1/4 | 2-1/2 | 0.035 | 0.031 | 0.170 | 1.275 | BCL-1/4-L | 12335 |
| .300 | 5/16 | 2-1/2 | 0.045 | 0.031 | 0.210 | 0.775 | BCL-5/16 | 12336 |
| .360 | 3/8 | 2-1/2 | 0.055 | 0.031 | 0.250 | 0.775 | BCL-3/8 | 12337 |
| .360 | 3/8 | 2-1/2 | 0.055 | 0.031 | 0.250 | 1.275 | BCL-3/8-L | 12338 |
| .490 | 1/2 | 3 | 0.070 | 0.031 | 0.350 | 1.000 | BCL-1/2 | 12339 |

General Purpose Carbide End Mills

SERIES: General Purpose Carbide End Mills

| MATERIAL | CONDITIONS | CUTTING DIAMETER | | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|-------------|--------|--------|--------|--------|--------|--------|----------------|--------|--|--|
| | | 1/8" | 1/4" | 5/16" | 3/8" | 1/2" | 5/8" | 3/4" | 1" | CHIP PER TOOTH | | | |
| | | Under 32 HRc | Over 32 HRc | | | | | | | | | | |
| STAINLESS STEELS ISO-M | | | | | | | | | | | | | |
| Precipitation 13-8, 15-5, 17-4PH | Slotting .5 x Dia. | 110-200 | 80-115 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| | Profiling ≤ .5 x Dia. | 110-200 | 80-115 | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | | |
| Austenitic 302, 303, 304L, 316L | Slotting .5 x Dia. | 150-275 | 80-180 | 0.0005 | 0.0011 | 0.0014 | 0.0016 | 0.0023 | 0.0029 | 0.0035 | 0.0046 | | |
| | Profiling ≤ .5 x Dia. | 150-275 | 80-180 | 0.0007 | 0.0014 | 0.0018 | 0.0021 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | | |
| Martensitic 403, 410, 416 | Slotting .5 x Dia. | 200-400 | 80-160 | 0.0005 | 0.0011 | 0.0014 | 0.0016 | 0.0023 | 0.0029 | 0.0035 | 0.0046 | | |
| | Profiling ≤ .5 x Dia. | 200-400 | 80-160 | 0.0007 | 0.0014 | 0.0018 | 0.0021 | 0.0030 | 0.0038 | 0.0045 | 0.0060 | | |
| HIGH TEMP ALLOYS ISO-S | | | | | | | | | | | | | |
| Cobalt Base Stellite, Haynes 25, 188, X-40, L-605 | Slotting .5 x Dia. | 60-125 | 60-125 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| | Profiling ≤ .5 x Dia. | 60-125 | 60-125 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| Nickel Base Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Incoly 600 | Slotting .5 x Dia. | 60-125 | 60-125 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| | Profiling ≤ .5 x Dia. | 60-125 | 60-125 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| Iron Base Incoloy 800-802, Multimet N-155, Timken 16-26-6 | Slotting .5 x Dia. | 60-125 | 60-125 | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0030 | | |
| | Profiling ≤ .5 x Dia. | 60-125 | 60-125 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| STEELS ISO-P | | | | | | | | | | | | | |
| High Strength Steels 4140, 4340, 52100 | Slotting .5 x Dia. | 150-300 | 80-180 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.004 | | |
| | Profiling ≤ .5 x Dia. | 150-300 | 80-180 | 0.0006 | 0.0010 | 0.0012 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.005 | | |
| High Alloy Steels - Mold & Die A-2, P20, 01, 02, D2, H-13 | Slotting .5 x Dia. | 150-275 | 80-185 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.004 | | |
| | Profiling ≤ .5 x Dia. | 150-275 | 80-185 | 0.0006 | 0.0010 | 0.0012 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.005 | | |
| Medium Alloy Steels 200, 250, 300 | Slotting .5 x Dia. | 175-350 | 100-225 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.004 | | |
| | Profiling ≤ .5 x Dia. | 175-350 | 100-225 | 0.0006 | 0.0010 | 0.0012 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.005 | | |
| Low Alloy Steels-Maraging 10XX, 11XX, 13XX | Slotting .5 x Dia. | 200-450 | 100-250 | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.005 | | |
| | Profiling ≤ .5 x Dia. | 200-450 | 100-250 | 0.0007 | 0.0014 | 0.0018 | 0.0021 | 0.0030 | 0.0038 | 0.0045 | 0.006 | | |
| CAST IRONS ISO-K | | | | | | | | | | | | | |
| Ductile Iron Ductile Cast Iron | Slotting .5 x Dia. | 120-325 | 80-140 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| | Profiling ≤ .5 x Dia. | 120-325 | 80-140 | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | | |
| Cast Iron Grey Cast Iron | Slotting .5 x Dia. | 250-425 | 125-285 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| | Profiling ≤ .5 x Dia. | 250-425 | 125-285 | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | | |
| TITANIUMS ISO-S | | | | | | | | | | | | | |
| Titanium Alloys 6AL-4V, ASTM 1, 2, 3, 6AL-2S For 5553, decrease SFM and IPM by 25% | Slotting .5 x Dia. | 140-200 | 90-145 | 0.0005 | 0.0010 | 0.0012 | 0.0014 | 0.0020 | 0.0025 | 0.0030 | 0.0040 | | |
| | Profiling ≤ .5 x Dia. | 140-200 | 90-145 | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.0025 | 0.0031 | 0.0038 | 0.0050 | | |
| ALUMINUM ISO-N | | | | | | | | | | | | | |
| Aluminum Alloys 6061-T6, 7075 | Slotting .5 x Dia. | 600-1000 | NA | 0.0006 | 0.0012 | 0.0015 | 0.0018 | 0.003 | 0.005 | 0.006 | 0.0080 | | |
| | Profiling ≤ .5 x Dia. | 600-1000 | NA | 0.0007 | 0.0014 | 0.0018 | 0.0025 | 0.0035 | 0.006 | 0.0068 | 0.0100 | | |

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

SPEED & FEED INFORMATION

Calculations

End mill speed & feed formulas are the various individual equations that determine the proper overall machining setup or more specifically the speed of the cutting tool and the rate which it is fed into the work piece. Each individual formula is distinct in what it determines but coordinates with the others to ensure successful cutting tool application. You can visit the TECHNICAL section on www.melintool.com for more information.

INCH

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{3.82 \times \text{SFM} / \text{Tool Dia}}$$

$$\text{SFM} = \frac{\text{Surface Foot Per Minute}}{.262 \times \text{RPM} \times \text{Tool Dia}}$$

$$\text{CPT or IPT} = \frac{\text{Chip-Load Per Tooth}}{\text{IPM} / \text{RPM} / \text{No. Of Flutes}}$$

$$\text{IPM} = \frac{\text{Inches Per Minute}}{\text{CPT} \times \text{RPM} \times \text{No. Of Flutes}}$$

$$\text{MRRCI} = \frac{\text{Metal Removal Rate Cubic Inches}}{\text{IPM} \times \text{Axial Doc} \times \text{Radial Woc}}$$

$$\text{IPR} = \frac{\text{Inches Per Revolution}}{\text{IPM} / \text{RPM}}$$

METRIC

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{1000 \times \text{M/MIN} / (3.14 \times \text{D})}$$

$$\text{M/MIN} = \frac{\text{Meters Per Minute}}{(3.14 \times \text{D} \times \text{RPM}) / 1000}$$

$$\text{Fz OR CPT} = \frac{\text{Chip-Load Per Tooth}}{\text{Feedrate (mm) per MIN} / (\text{Z} \times \text{RPM})}$$

$$\text{VF OR FPM} = \frac{\text{Feedrate (mm) Per Minute}}{\text{Feedrate (mm) per Tooth} \times \text{Z} \times \text{RPM}}$$

D = Cutter Dia.
Z = No. Of Teeth.

EQUIVALENTS & CONVERSIONS:

ABBREVIATIONS

| | |
|----------------|----------------------------|
| RPM | Revolutions Per Minute |
| SFM | Surface Feet Per Minute |
| CPT | Chip Load Per Tooth |
| IPM | Inches Per Minute |
| V _f | Millimeters Per Minute |
| ae | Radial Width of Cut |
| ap | Axial Depth of Cut |
| Vc | Surface Meters Per Minute |
| Fz | Metric Chip Load Per Tooth |

$$N, n \text{ or } \text{Min}^{-1} = \text{RPM}$$

$$Vc \text{ or } \text{M/MIN} = \text{SFM}$$

$$Fz \text{ or } \text{mm/TOOTH} = \text{CPT}$$

$$V_f \text{ or } \text{mm/MIN} = \text{IPM}$$

$$\text{SFM} / 3.281 = \text{M/MIN}$$

$$\text{M/MIN} \times 3.281 = \text{SFM}$$

$$\text{mm/MIN} / 25.4 = \text{IPM}$$

$$\text{mm/TOOTH} / 25.4 = \text{CPT}$$



IMPERIAL METRIC

$$\text{Inch} \times 25.4 = \text{Millimeter}$$

$$\text{Millimeter} \times .03937 = \text{Inch}$$