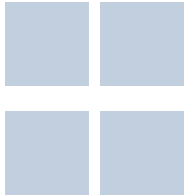
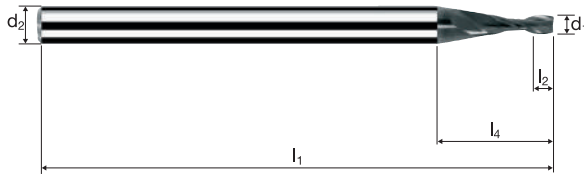
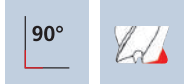


Cylindrical end mills

Shank \varnothing 3mm, 3xd



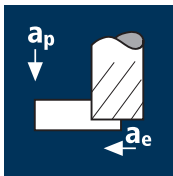
HM λ 30°
MG10 γ 12°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | Copper Aluminium |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Example: Order-N°. | | | | | | | | | MICRO | |
|-----------------------|---------------------|-------------|-------|-------|-------|----------|-----|---|-------|--------|
| | | | | | | | | | 5710 | M45710 |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | l_1 | l_2 | l_4 | α | z | | | |
| 030 | 0.30 | 3.00 | 40 | 1.00 | 8.97 | 9.0° | 2 | ● | ● | |
| 040 | 0.40 | 3.00 | 40 | 1.00 | 8.69 | 9.0° | 2 | ● | ● | |
| 050 | 0.50 | 3.00 | 40 | 1.50 | 8.90 | 8.5° | 2 | ● | ● | |
| 060 | 0.60 | 3.00 | 40 | 1.50 | 8.62 | 8.5° | 2 | ● | ● | |
| 070 | 0.70 | 3.00 | 40 | 2.00 | 8.83 | 8.0° | 2 | ● | ● | |
| 080 | 0.80 | 3.00 | 40 | 2.00 | 8.55 | 8.0° | 2 | ● | ● | |
| 090 | 0.90 | 3.00 | 40 | 2.50 | 8.77 | 7.5° | 2 | ● | ● | |
| 100 | 1.00 | 3.00 | 40 | 3.00 | 8.98 | 7.0° | 2 | ● | ● | |
| 104 | 1.10 | 3.00 | 40 | 3.00 | 8.75 | 6.5° | 2 | ● | ● | |
| 108 | 1.20 | 3.00 | 40 | 4.00 | 9.47 | 6.0° | 2 | ● | ● | |
| 112 | 1.30 | 3.00 | 40 | 4.00 | 9.18 | 5.5° | 2 | ● | ● | |
| 116 | 1.40 | 3.00 | 40 | 4.00 | 8.90 | 5.5° | 2 | ● | ● | |
| 120 | 1.50 | 3.00 | 40 | 4.00 | 8.62 | 5.5° | 2 | ● | ● | |
| 123 | 1.60 | 3.00 | 40 | 5.00 | 9.33 | 4.5° | 2 | ● | ● | |
| 126 | 1.70 | 3.00 | 40 | 5.00 | 7.41 | 5.5° | 2 | ● | ● | |
| 130 | 1.80 | 3.00 | 40 | 5.00 | 7.28 | 5.5° | 2 | ● | ● | |
| 135 | 1.90 | 3.00 | 40 | 5.00 | 7.14 | 5.0° | 2 | ● | ● | |
| 140 | 2.00 | 3.00 | 40 | 5.00 | 7.00 | 4.5° | 2 | ● | ● | |
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Application



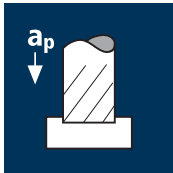
Material

Steel
< 850 N/mm²

Steel
850 - 1100 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Titanium alloys
up to 300 HB
[Ti5Al2.5Sn]



Steel
< 850 N/mm²

Steel
850 - 1100 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Titanium alloys
up to 300 HB
[Ti5Al2.5Sn]

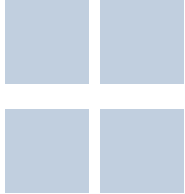
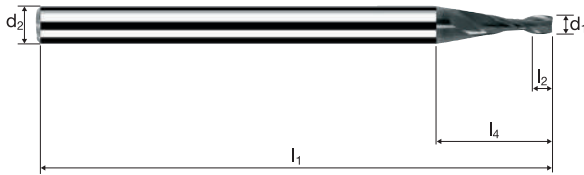
| d1 [mm] | z | v _r [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 0.30 | 2 | 40 | 0.006 | 0.240 | 0.050 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.60 | 2 | 79 | 0.010 | 0.480 | 0.090 | 41910 | 840 | 36.2 |
| 0.80 | 2 | 106 | 0.014 | 0.640 | 0.120 | 42175 | 1180 | 90.7 |
| 1.00 | 2 | 132 | 0.018 | 0.800 | 0.150 | 42015 | 1515 | 181.5 |
| 1.20 | 2 | 158 | 0.022 | 0.960 | 0.180 | 41910 | 1845 | 318.7 |
| 1.50 | 2 | 180 | 0.028 | 1.200 | 0.230 | 38195 | 2140 | 590.4 |
| 1.80 | 2 | 180 | 0.032 | 1.440 | 0.270 | 31830 | 2035 | 792.1 |
| 2.00 | 2 | 180 | 0.036 | 1.600 | 0.300 | 28650 | 2065 | 990.1 |
| 0.30 | 2 | 40 | 0.006 | 0.240 | 0.050 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.60 | 2 | 79 | 0.010 | 0.480 | 0.090 | 41910 | 840 | 36.2 |
| 0.80 | 2 | 106 | 0.012 | 0.640 | 0.120 | 42175 | 1010 | 77.7 |
| 1.00 | 2 | 132 | 0.016 | 0.800 | 0.150 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 158 | 0.020 | 0.960 | 0.180 | 41910 | 1675 | 289.7 |
| 1.50 | 2 | 160 | 0.026 | 1.200 | 0.230 | 33955 | 1765 | 487.3 |
| 1.80 | 2 | 160 | 0.028 | 1.440 | 0.270 | 28295 | 1585 | 616.0 |
| 2.00 | 2 | 160 | 0.032 | 1.600 | 0.300 | 25465 | 1630 | 782.3 |
| 0.30 | 2 | 40 | 0.004 | 0.240 | 0.050 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 66 | 0.008 | 0.400 | 0.080 | 42015 | 670 | 21.5 |
| 0.60 | 2 | 70 | 0.008 | 0.480 | 0.090 | 37135 | 595 | 25.7 |
| 0.80 | 2 | 70 | 0.012 | 0.640 | 0.120 | 27850 | 670 | 51.3 |
| 1.00 | 2 | 70 | 0.014 | 0.800 | 0.150 | 22280 | 625 | 74.9 |
| 1.20 | 2 | 70 | 0.018 | 0.960 | 0.180 | 18570 | 670 | 115.5 |
| 1.50 | 2 | 70 | 0.022 | 1.200 | 0.230 | 14855 | 655 | 180.4 |
| 1.80 | 2 | 70 | 0.026 | 1.440 | 0.270 | 12380 | 645 | 250.3 |
| 2.00 | 2 | 70 | 0.028 | 1.600 | 0.300 | 11140 | 625 | 299.5 |
| 0.30 | 2 | 40 | 0.004 | 0.240 | 0.050 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 60 | 0.008 | 0.400 | 0.080 | 38195 | 610 | 19.6 |
| 0.60 | 2 | 60 | 0.008 | 0.480 | 0.090 | 31830 | 510 | 22.0 |
| 0.80 | 2 | 60 | 0.010 | 0.640 | 0.120 | 23875 | 475 | 36.7 |
| 1.00 | 2 | 60 | 0.012 | 0.800 | 0.150 | 19100 | 460 | 55.0 |
| 1.20 | 2 | 60 | 0.016 | 0.960 | 0.180 | 15915 | 510 | 88.0 |
| 1.50 | 2 | 60 | 0.020 | 1.200 | 0.230 | 12730 | 510 | 140.6 |
| 1.80 | 2 | 60 | 0.022 | 1.440 | 0.270 | 10610 | 465 | 181.5 |
| 2.00 | 2 | 60 | 0.026 | 1.600 | 0.300 | 9550 | 495 | 238.4 |
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.016 | 0.120 | 1.000 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 158 | 0.020 | 0.140 | 1.200 | 41910 | 1675 | 281.6 |
| 1.50 | 2 | 160 | 0.026 | 0.180 | 1.500 | 33955 | 1765 | 476.7 |
| 1.80 | 2 | 160 | 0.030 | 0.220 | 1.800 | 28295 | 1700 | 672.3 |
| 2.00 | 2 | 160 | 0.034 | 0.240 | 2.000 | 25465 | 1730 | 831.2 |
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.016 | 0.120 | 1.000 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 140 | 0.020 | 0.140 | 1.200 | 37135 | 1485 | 249.6 |
| 1.50 | 2 | 140 | 0.024 | 0.180 | 1.500 | 29710 | 1425 | 385.0 |
| 1.80 | 2 | 140 | 0.028 | 0.220 | 1.800 | 24755 | 1385 | 549.0 |
| 2.00 | 2 | 140 | 0.032 | 0.240 | 2.000 | 22280 | 1425 | 684.5 |
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 60 | 0.008 | 0.060 | 0.500 | 38195 | 610 | 18.3 |
| 0.60 | 2 | 60 | 0.008 | 0.070 | 0.600 | 31830 | 510 | 21.4 |
| 0.80 | 2 | 60 | 0.012 | 0.100 | 0.800 | 23875 | 575 | 45.8 |
| 1.00 | 2 | 60 | 0.014 | 0.120 | 1.000 | 19100 | 535 | 64.2 |
| 1.20 | 2 | 60 | 0.018 | 0.140 | 1.200 | 15915 | 575 | 96.3 |
| 1.50 | 2 | 60 | 0.022 | 0.180 | 1.500 | 12730 | 560 | 151.3 |
| 1.80 | 2 | 60 | 0.026 | 0.220 | 1.800 | 10610 | 550 | 218.5 |
| 2.00 | 2 | 60 | 0.030 | 0.240 | 2.000 | 9550 | 575 | 275.0 |
| 0.30 | 2 | 40 | 0.004 | 0.040 | 0.300 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 50 | 0.006 | 0.060 | 0.500 | 31830 | 380 | 11.5 |
| 0.60 | 2 | 50 | 0.008 | 0.070 | 0.600 | 26525 | 425 | 17.8 |
| 0.80 | 2 | 50 | 0.012 | 0.100 | 0.800 | 19895 | 475 | 38.2 |
| 1.00 | 2 | 50 | 0.012 | 0.120 | 1.000 | 15915 | 380 | 45.8 |
| 1.20 | 2 | 50 | 0.016 | 0.140 | 1.200 | 13265 | 425 | 71.3 |
| 1.50 | 2 | 50 | 0.020 | 0.180 | 1.500 | 10610 | 425 | 114.6 |
| 1.80 | 2 | 50 | 0.024 | 0.220 | 1.800 | 8840 | 425 | 168.1 |
| 2.00 | 2 | 50 | 0.028 | 0.240 | 2.000 | 7960 | 445 | 213.9 |

Cylindrical end mills

Shank \varnothing 3mm, 3xd



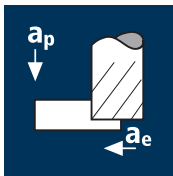
HM λ 30°
MG10 γ 12°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | Copper Aluminium |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Example: Order-N°. | | | | | | | | | MICRO | |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|------------|---|---|-------------|---------------|
| | | Coating | | Article-N° | | ø-Code | | | 5710 | M45710 |
| | | M | | 45710 | | 143 | | | | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | | | |
| 143 | 2.10 | 3.00 | 40 | 6.00 | 7.87 | 4.0° | 2 | ● | ● | ● |
| 146 | 2.20 | 3.00 | 40 | 6.00 | 7.73 | 3.5° | 2 | ● | ● | ● |
| 150 | 2.30 | 3.00 | 40 | 6.00 | 7.59 | 3.0° | 2 | ● | ● | ● |
| 155 | 2.40 | 3.00 | 40 | 6.00 | 7.45 | 2.5° | 2 | ● | ● | ● |
| 160 | 2.50 | 3.00 | 40 | 7.00 | 8.32 | 2.0° | 2 | ● | ● | ● |
| 180 | 3.00 | 4.00 | 44 | 10.00 | 12.36 | 2.5° | 2 | ● | ● | ● |
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Application



Material

Steel
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.10 | 2 | 180 | 0.038 | 1.680 | 0.320 | 27285 | 2075 | 1.1 |
| 2.20 | 2 | 180 | 0.040 | 1.760 | 0.330 | 26045 | 2085 | 1.2 |
| 2.30 | 2 | 180 | 0.042 | 1.840 | 0.350 | 24910 | 2095 | 1.3 |
| 2.40 | 2 | 180 | 0.044 | 1.920 | 0.360 | 23875 | 2100 | 1.5 |
| 2.50 | 2 | 180 | 0.046 | 2.000 | 0.380 | 22920 | 2110 | 1.6 |
| 3.00 | 2 | 180 | 0.054 | 2.400 | 0.450 | 19100 | 2065 | 2.2 |

Steel
850 - 1100 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 160 | 0.034 | 1.680 | 0.320 | 24250 | 1650 | 0.9 |
| 2.20 | 2 | 160 | 0.036 | 1.760 | 0.330 | 23150 | 1665 | 1.0 |
| 2.30 | 2 | 160 | 0.038 | 1.840 | 0.350 | 22145 | 1685 | 1.1 |
| 2.40 | 2 | 160 | 0.040 | 1.920 | 0.360 | 21220 | 1700 | 1.2 |
| 2.50 | 2 | 160 | 0.042 | 2.000 | 0.380 | 20370 | 1710 | 1.3 |
| 3.00 | 2 | 160 | 0.048 | 2.400 | 0.450 | 16975 | 1630 | 1.8 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

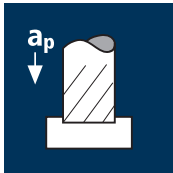


| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-----|
| 2.10 | 2 | 70 | 0.030 | 1.680 | 0.320 | 10610 | 635 | 0.3 |
| 2.20 | 2 | 70 | 0.032 | 1.760 | 0.330 | 10130 | 650 | 0.4 |
| 2.30 | 2 | 70 | 0.034 | 1.840 | 0.350 | 9690 | 660 | 0.4 |
| 2.40 | 2 | 70 | 0.036 | 1.920 | 0.360 | 9285 | 670 | 0.5 |
| 2.50 | 2 | 70 | 0.036 | 2.000 | 0.380 | 8915 | 640 | 0.5 |
| 3.00 | 2 | 70 | 0.044 | 2.400 | 0.450 | 7425 | 655 | 0.7 |

Titanium alloys
up to 300 HB
[Ti5Al2.5Sn]



| | | | | | | | | |
|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 60 | 0.026 | 1.680 | 0.320 | 9095 | 475 | 0.3 |
| 2.20 | 2 | 60 | 0.028 | 1.760 | 0.330 | 8680 | 485 | 0.3 |
| 2.30 | 2 | 60 | 0.030 | 1.840 | 0.350 | 8305 | 500 | 0.3 |
| 2.40 | 2 | 60 | 0.030 | 1.920 | 0.360 | 7960 | 475 | 0.3 |
| 2.50 | 2 | 60 | 0.032 | 2.000 | 0.380 | 7640 | 490 | 0.4 |
| 3.00 | 2 | 60 | 0.038 | 2.400 | 0.450 | 6365 | 485 | 0.5 |



Steel
< 850 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 160 | 0.036 | 0.250 | 2.100 | 24250 | 1745 | 0.9 |
| 2.20 | 2 | 160 | 0.036 | 0.260 | 2.200 | 23150 | 1665 | 1.0 |
| 2.30 | 2 | 160 | 0.038 | 0.280 | 2.300 | 22145 | 1685 | 1.1 |
| 2.40 | 2 | 160 | 0.040 | 0.290 | 2.400 | 21220 | 1700 | 1.2 |
| 2.50 | 2 | 160 | 0.042 | 0.300 | 2.500 | 20370 | 1710 | 1.3 |
| 3.00 | 2 | 160 | 0.050 | 0.360 | 3.000 | 16975 | 1700 | 1.8 |

Steel
850 - 1100 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 140 | 0.034 | 0.250 | 2.100 | 21220 | 1445 | 0.8 |
| 2.20 | 2 | 140 | 0.034 | 0.260 | 2.200 | 20255 | 1375 | 0.8 |
| 2.30 | 2 | 140 | 0.036 | 0.280 | 2.300 | 19375 | 1395 | 0.9 |
| 2.40 | 2 | 140 | 0.038 | 0.290 | 2.400 | 18570 | 1410 | 1.0 |
| 2.50 | 2 | 140 | 0.040 | 0.300 | 2.500 | 17825 | 1425 | 1.1 |
| 3.00 | 2 | 140 | 0.048 | 0.360 | 3.000 | 14855 | 1425 | 1.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 60 | 0.032 | 0.250 | 2.100 | 9095 | 580 | 0.3 |
| 2.20 | 2 | 60 | 0.032 | 0.260 | 2.200 | 8680 | 555 | 0.3 |
| 2.30 | 2 | 60 | 0.034 | 0.280 | 2.300 | 8305 | 565 | 0.4 |
| 2.40 | 2 | 60 | 0.036 | 0.290 | 2.400 | 7960 | 575 | 0.4 |
| 2.50 | 2 | 60 | 0.036 | 0.300 | 2.500 | 7640 | 550 | 0.4 |
| 3.00 | 2 | 60 | 0.044 | 0.360 | 3.000 | 6365 | 560 | 0.6 |

Titanium alloys
up to 300 HB
[Ti5Al2.5Sn]



| | | | | | | | | |
|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 50 | 0.028 | 0.250 | 2.100 | 7580 | 425 | 0.2 |
| 2.20 | 2 | 50 | 0.028 | 0.260 | 2.200 | 7235 | 405 | 0.2 |
| 2.30 | 2 | 50 | 0.030 | 0.280 | 2.300 | 6920 | 415 | 0.3 |
| 2.40 | 2 | 50 | 0.032 | 0.290 | 2.400 | 6630 | 425 | 0.3 |
| 2.50 | 2 | 50 | 0.034 | 0.300 | 2.500 | 6365 | 435 | 0.3 |
| 3.00 | 2 | 50 | 0.040 | 0.360 | 3.000 | 5305 | 425 | 0.5 |