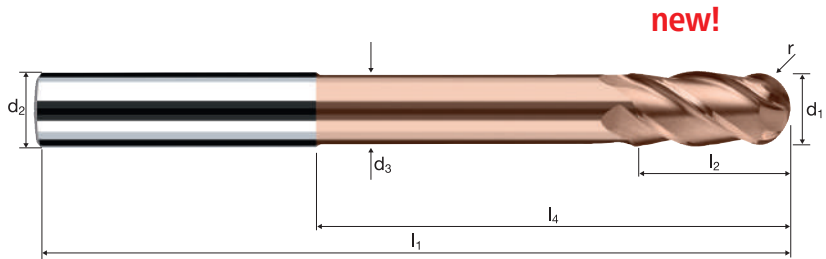


Ball nose end mills SpheroX

Tolerance $r \pm 0.005$, 6xd



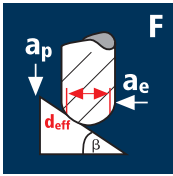
| | |
|----------|------------------------------|
| HM XA | λ 40° γ 0° |
| h4 | SC |
| Vario | r |
| R | F |



| | | | | | | | |
|--|-----------------|-----------------|--------------|--------------|-------------|----------------|-----|
| | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS |
|--|-----------------|-----------------|--------------|--------------|-------------|----------------|-----|

| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | DURO-Si | |
|----------------------------------------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|--------------|--|
| | | | | | | | | | | | | |
| Example: Order-N°: H 7494 100 | | | | | | | | | | | | |
| | | | | | | | | | | | H7494 | |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 2.00 | 6.00 | 16.08 | 0.500 | 9.5° | 4 | ● | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 4.00 | 12.00 | 20.31 | 1.000 | 6.1° | 4 | ● | |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 6.00 | 18.00 | 24.63 | 1.500 | 3.9° | 4 | ● | |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 8.00 | 24.00 | 28.95 | 2.000 | 2.2° | 4 | ● | |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 10.00 | 30.00 | 33.27 | 2.500 | 1.0° | 4 | ● | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 12.00 | 42.34 | 43.00 | 3.000 | 0.0° | 4 | ● | |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 16.00 | 52.29 | 53.00 | 4.000 | 0.0° | 4 | ● | |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 20.00 | 63.20 | 64.00 | 5.000 | 0.0° | 4 | ● | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 24.00 | 73.13 | 74.00 | 6.000 | 0.0° | 4 | ● | |
| 610 | 16.00 | 16.00 | 15.00 | 135 | 32.00 | 85.13 | 86.00 | 8.000 | 0.0° | 4 | ● | |

Application



Material

Hardened tool steel
52 - 56 HRC



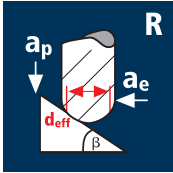
Hardened tool steel
56 - 60 HRC



Hardened tool steel
> 60 HRC



High speed steel,
hardened
64 - 70 HRC



Hardened tool steel
52 - 56 HRC



Hardened tool steel
56 - 60 HRC



Hardened tool steel
> 60 HRC



High speed steel,
hardened
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 4 | 120 | 0.014 | 0.030 | 0.090 | 0.91 | 41975 | 2350 | 45° |
| 2.00 | 4 | 130 | 0.022 | 0.030 | 0.120 | 1.72 | 24060 | 2115 | 45° |
| 3.00 | 4 | 160 | 0.034 | 0.050 | 0.150 | 2.59 | 19665 | 2675 | 45° |
| 4.00 | 4 | 160 | 0.042 | 0.050 | 0.180 | 3.39 | 15025 | 2525 | 45° |
| 5.00 | 4 | 160 | 0.048 | 0.050 | 0.210 | 4.17 | 12215 | 2345 | 45° |
| 6.00 | 4 | 160 | 0.052 | 0.050 | 0.230 | 4.94 | 10310 | 2145 | 45° |
| 8.00 | 4 | 160 | 0.056 | 0.080 | 0.280 | 6.67 | 7635 | 1710 | 45° |
| 10.00 | 4 | 160 | 0.060 | 0.080 | 0.310 | 8.22 | 6195 | 1485 | 45° |
| 12.00 | 4 | 160 | 0.066 | 0.100 | 0.340 | 9.89 | 5150 | 1360 | 45° |
| 1.00 | 4 | 100 | 0.014 | 0.030 | 0.090 | 0.91 | 34980 | 1960 | 45° |
| 2.00 | 4 | 100 | 0.022 | 0.030 | 0.120 | 1.72 | 18505 | 1630 | 45° |
| 3.00 | 4 | 130 | 0.034 | 0.050 | 0.150 | 2.59 | 15975 | 2175 | 45° |
| 4.00 | 4 | 130 | 0.042 | 0.050 | 0.180 | 3.39 | 12205 | 2050 | 45° |
| 5.00 | 4 | 130 | 0.048 | 0.050 | 0.210 | 4.17 | 9925 | 1905 | 45° |
| 6.00 | 4 | 130 | 0.052 | 0.050 | 0.230 | 4.94 | 8375 | 1740 | 45° |
| 8.00 | 4 | 130 | 0.056 | 0.080 | 0.280 | 6.67 | 6205 | 1390 | 45° |
| 10.00 | 4 | 130 | 0.060 | 0.080 | 0.310 | 8.22 | 5035 | 1210 | 45° |
| 12.00 | 4 | 130 | 0.066 | 0.100 | 0.340 | 9.89 | 4185 | 1105 | 45° |
| 1.00 | 4 | 60 | 0.014 | 0.030 | 0.090 | 0.91 | 20985 | 1175 | 45° |
| 2.00 | 4 | 60 | 0.022 | 0.030 | 0.120 | 1.72 | 11105 | 975 | 45° |
| 3.00 | 4 | 80 | 0.034 | 0.050 | 0.150 | 2.59 | 9830 | 1335 | 45° |
| 4.00 | 4 | 80 | 0.042 | 0.050 | 0.180 | 3.39 | 7510 | 1260 | 45° |
| 5.00 | 4 | 80 | 0.048 | 0.050 | 0.210 | 4.17 | 6105 | 1170 | 45° |
| 6.00 | 4 | 80 | 0.052 | 0.050 | 0.230 | 4.94 | 5155 | 1070 | 45° |
| 8.00 | 4 | 80 | 0.056 | 0.080 | 0.280 | 6.67 | 3820 | 855 | 45° |
| 10.00 | 4 | 80 | 0.060 | 0.080 | 0.310 | 8.22 | 3100 | 745 | 45° |
| 12.00 | 4 | 80 | 0.066 | 0.100 | 0.340 | 9.89 | 2575 | 680 | 45° |
| 1.00 | 4 | 40 | 0.014 | 0.030 | 0.090 | 0.91 | 13990 | 785 | 45° |
| 2.00 | 4 | 40 | 0.022 | 0.030 | 0.120 | 1.72 | 7405 | 650 | 45° |
| 3.00 | 4 | 50 | 0.034 | 0.050 | 0.150 | 2.59 | 6145 | 835 | 45° |
| 4.00 | 4 | 50 | 0.042 | 0.050 | 0.180 | 3.39 | 4695 | 790 | 45° |
| 5.00 | 4 | 50 | 0.048 | 0.050 | 0.210 | 4.17 | 3815 | 735 | 45° |
| 6.00 | 4 | 50 | 0.052 | 0.050 | 0.230 | 4.94 | 3220 | 670 | 45° |
| 8.00 | 4 | 50 | 0.056 | 0.080 | 0.280 | 6.67 | 2385 | 535 | 45° |
| 10.00 | 4 | 50 | 0.060 | 0.080 | 0.310 | 8.22 | 1935 | 465 | 45° |
| 12.00 | 4 | 50 | 0.066 | 0.100 | 0.340 | 9.89 | 1610 | 425 | 45° |
| 1.00 | 4 | 52 | 0.023 | 0.130 | 0.130 | 0.95 | 17425 | 1605 | 30° |
| 2.00 | 4 | 52 | 0.039 | 0.200 | 0.200 | 1.84 | 8995 | 1405 | 30° |
| 3.00 | 4 | 52 | 0.049 | 0.250 | 0.250 | 2.69 | 6155 | 1205 | 30° |
| 4.00 | 4 | 52 | 0.058 | 0.340 | 0.340 | 3.59 | 4610 | 1070 | 30° |
| 5.00 | 4 | 52 | 0.065 | 0.420 | 0.420 | 4.48 | 3695 | 960 | 30° |
| 6.00 | 4 | 52 | 0.070 | 0.500 | 0.500 | 5.37 | 3080 | 865 | 30° |
| 8.00 | 4 | 52 | 0.086 | 0.670 | 0.670 | 7.17 | 2310 | 795 | 30° |
| 10.00 | 4 | 52 | 0.098 | 0.840 | 0.840 | 8.96 | 1845 | 725 | 30° |
| 12.00 | 4 | 52 | 0.101 | 1.010 | 1.010 | 10.76 | 1540 | 620 | 30° |
| 1.00 | 4 | 24 | 0.014 | 0.130 | 0.130 | 0.95 | 8040 | 450 | 30° |
| 2.00 | 4 | 24 | 0.023 | 0.200 | 0.200 | 1.84 | 4150 | 380 | 30° |
| 3.00 | 4 | 24 | 0.029 | 0.250 | 0.250 | 2.69 | 2840 | 330 | 30° |
| 4.00 | 4 | 24 | 0.035 | 0.340 | 0.340 | 3.59 | 2130 | 300 | 30° |
| 5.00 | 4 | 24 | 0.039 | 0.420 | 0.420 | 4.48 | 1705 | 265 | 30° |
| 6.00 | 4 | 24 | 0.042 | 0.500 | 0.500 | 5.37 | 1425 | 240 | 30° |
| 8.00 | 4 | 24 | 0.051 | 0.670 | 0.670 | 7.17 | 1065 | 215 | 30° |
| 10.00 | 4 | 24 | 0.058 | 0.840 | 0.840 | 8.96 | 855 | 200 | 30° |
| 12.00 | 4 | 24 | 0.061 | 1.010 | 1.010 | 10.76 | 710 | 175 | 30° |
| 1.00 | 4 | 18 | 0.011 | 0.130 | 0.130 | 0.95 | 6030 | 265 | 30° |
| 2.00 | 4 | 18 | 0.019 | 0.200 | 0.200 | 1.84 | 3115 | 235 | 30° |
| 3.00 | 4 | 18 | 0.023 | 0.250 | 0.250 | 2.69 | 2130 | 195 | 30° |
| 4.00 | 4 | 18 | 0.028 | 0.340 | 0.340 | 3.59 | 1595 | 180 | 30° |
| 5.00 | 4 | 18 | 0.031 | 0.420 | 0.420 | 4.48 | 1280 | 160 | 30° |
| 6.00 | 4 | 18 | 0.034 | 0.500 | 0.500 | 5.37 | 1065 | 145 | 30° |
| 8.00 | 4 | 18 | 0.041 | 0.670 | 0.670 | 7.17 | 800 | 130 | 30° |
| 10.00 | 4 | 18 | 0.047 | 0.840 | 0.840 | 8.96 | 640 | 120 | 30° |
| 12.00 | 4 | 18 | 0.049 | 1.010 | 1.010 | 10.76 | 530 | 105 | 30° |
| 1.00 | 4 | 12 | 0.007 | 0.130 | 0.130 | 0.95 | 4020 | 115 | 30° |
| 2.00 | 4 | 12 | 0.012 | 0.200 | 0.200 | 1.84 | 2075 | 100 | 30° |
| 3.00 | 4 | 12 | 0.015 | 0.250 | 0.250 | 2.69 | 1420 | 85 | 30° |
| 4.00 | 4 | 12 | 0.018 | 0.340 | 0.340 | 3.59 | 1065 | 75 | 30° |
| 5.00 | 4 | 12 | 0.020 | 0.420 | 0.420 | 4.48 | 855 | 70 | 30° |
| 6.00 | 4 | 12 | 0.022 | 0.500 | 0.500 | 5.37 | 710 | 65 | 30° |
| 8.00 | 4 | 12 | 0.026 | 0.670 | 0.670 | 7.17 | 535 | 55 | 30° |
| 10.00 | 4 | 12 | 0.030 | 0.840 | 0.840 | 8.96 | 425 | 50 | 30° |
| 12.00 | 4 | 12 | 0.031 | 1.010 | 1.010 | 10.76 | 355 | 45 | 30° |