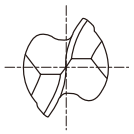
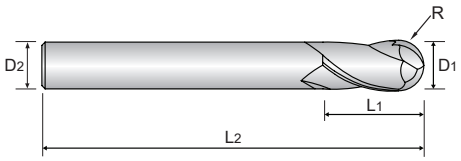
## CARBIDE, 2 FLUTE 30° HELIX BALL NOSE

▶ Designed for general purposes to carbon steels, tool steels, alloy steels, and stainless steels.
▶ Suitable for high speed machining in wet or dry condition.
▶ Designed for milling of radius bottom slots, fillets and special contours.





R1.0~R3.0 R4.0~R10.0

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| Mill Dia.Tolerance (mm) | Shank Dia.Tolerance |
|---|---|
| 0 ~ - 0.030 | h6 |

## G9F44 SERIES

Unit : mm

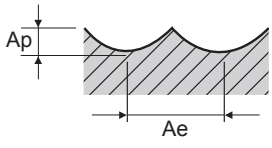
| EDP No. | Radius of Ball Nose | Mill Diameter | Shank Diameter | Length of Cut | Overall Length |
|---|---|---|---|---|---|
| | R | D1 | D2 | L1 | L2 |
| G9F44020N | R1.0 | **2.0** | 4 | 5 | 50 |
| G9F44030N | R1.5 | **3.0** | 4 | 6 | 50 |
| G9F44040N | R2.0 | **4.0** | 6 | 8 | 50 |
| G9F44050N | R2.5 | **5.0** | 6 | 10 | 50 |
| G9F44060N | R3.0 | **6.0** | 6 | 12 | 50 |
| G9F44080N | R4.0 | **8.0** | 8 | 14 | 60 |
| G9F44100N | R5.0 | **10.0** | 10 | 20 | 75 |
| G9F44120N | R6.0 | **12.0** | 12 | 24 | 75 |

# RECOMMENDED CUTTING CONDITIONS

## G9F44 / G9J56 SERIES — 2 FLUTE BALL NOSE

Vc = (m/min.)
fz = (mm/tooth)
RPM = (rev./min.)
FEED = (mm/min.)

| ISO | VDI 3323 | Material Description | Ae(mm) | Ap(mm) | Parameter | Diameter (Ø) 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 10.0 | 12.0 | 16.0 | 20.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 1-4 | Non-alloy steel | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 84 | 116 | 121 | 132 | 148 | 166 | 185 | 204 | 221 | 242 |
| | | | | | fz | 0.026 | 0.025 | 0.035 | 0.045 | 0.060 | 0.089 | 0.122 | 0.150 | 0.181 | 0.200 |
| | | | | | RPM | 13350 | 12300 | 9650 | 8400 | 7850 | 6600 | 5900 | 5400 | 4400 | 3850 |
| | | | | | FEED | 690 | 620 | 680 | 755 | 940 | 1180 | 1435 | 1620 | 1590 | 1540 |
| | 5 | | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 62 | 87 | 97 | 105 | 120 | 133 | 148 | 160 | 173 | 188 |
| | | | | | fz | 0.023 | 0.023 | 0.031 | 0.040 | 0.060 | 0.080 | 0.100 | 0.121 | 0.141 | 0.159 |
| | | | | | RPM | 9900 | 9250 | 7700 | 6700 | 6350 | 5300 | 4700 | 4250 | 3450 | 3000 |
| | | | | | FEED | 450 | 420 | 485 | 530 | 760 | 850 | 940 | 1026 | 975 | 955 |
| | 6-7 | Low alloy steel | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 84 | 116 | 121 | 132 | 148 | 166 | 185 | 204 | 221 | 242 |
| | | | | | fz | 0.026 | 0.025 | 0.035 | 0.045 | 0.060 | 0.089 | 0.122 | 0.150 | 0.181 | 0.200 |
| | | | | | RPM | 13350 | 12300 | 9650 | 8400 | 7850 | 6600 | 5900 | 5400 | 4400 | 3850 |
| | | | | | FEED | 690 | 620 | 680 | 755 | 940 | 1180 | 1435 | 1620 | 1590 | 1540 |
| | 8-9 | | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 62 | 87 | 97 | 105 | 120 | 133 | 148 | 160 | 173 | 188 |
| | | | | | fz | 0.023 | 0.023 | 0.031 | 0.040 | 0.060 | 0.080 | 0.100 | 0.121 | 0.141 | 0.159 |
| | | | | | RPM | 9900 | 9250 | 7700 | 6700 | 6350 | 5300 | 4700 | 4250 | 3450 | 3000 |
| | | | | | FEED | 450 | 420 | 485 | 530 | 760 | 850 | 940 | 1026 | 975 | 955 |
| | 10 | High alloyed steel, and tool steel | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 84 | 116 | 121 | 132 | 148 | 166 | 185 | 204 | 221 | 242 |
| | | | | | fz | 0.026 | 0.025 | 0.035 | 0.045 | 0.060 | 0.089 | 0.122 | 0.150 | 0.181 | 0.200 |
| | | | | | RPM | 13350 | 12300 | 9650 | 8400 | 7850 | 6600 | 5900 | 5400 | 4400 | 3850 |
| | | | | | FEED | 690 | 620 | 680 | 755 | 940 | 1180 | 1435 | 1620 | 1590 | 1540 |
| | 11.1 ~ 11.2 | | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 62 | 87 | 97 | 105 | 120 | 133 | 148 | 160 | 173 | 188 |
| | | | | | fz | 0.023 | 0.023 | 0.031 | 0.040 | 0.060 | 0.080 | 0.100 | 0.121 | 0.141 | 0.159 |
| | | | | | RPM | 9900 | 9250 | 7700 | 6700 | 6350 | 5300 | 4700 | 4250 | 3450 | 3000 |
| | | | | | FEED | 450 | 420 | 485 | 530 | 760 | 850 | 940 | 1026 | 975 | 955 |
| K | 15-16 | Grey cast iron | 0.7D | 0.3D | Vc | 71 | 72 | 70 | 71 | 69 | 68 | 69 | 72 | 70 | 72 |
| | | | | | fz | 0.011 | 0.016 | 0.028 | 0.039 | 0.053 | 0.092 | 0.113 | 0.130 | 0.177 | 0.196 |
| | | | | | RPM | 11350 | 7600 | 5550 | 4500 | 3650 | 2700 | 2200 | 1900 | 1400 | 1150 |
| | | | | | FEED | 240 | 250 | 310 | 355 | 390 | 495 | 495 | 495 | 495 | 450 |
| | 17-18 | Nodular cast iron | 0.7D | 0.3D | Vc | 71 | 72 | 70 | 71 | 69 | 68 | 69 | 72 | 70 | 72 |
| | | | | | fz | 0.011 | 0.016 | 0.028 | 0.039 | 0.053 | 0.092 | 0.113 | 0.130 | 0.177 | 0.196 |
| | | | | | RPM | 11350 | 7600 | 5550 | 4500 | 3650 | 2700 | 2200 | 1900 | 1400 | 1150 |
| | | | | | FEED | 240 | 250 | 310 | 355 | 390 | 495 | 495 | 495 | 495 | 450 |
| | 19-20 | Malleable cast iron | 0.7D | 0.3D | Vc | 71 | 72 | 70 | 71 | 69 | 68 | 69 | 72 | 70 | 72 |
| | | | | | fz | 0.011 | 0.016 | 0.028 | 0.039 | 0.053 | 0.092 | 0.113 | 0.130 | 0.177 | 0.196 |
| | | | | | RPM | 11350 | 7600 | 5550 | 4500 | 3650 | 2700 | 2200 | 1900 | 1400 | 1150 |
| | | | | | FEED | 240 | 250 | 310 | 355 | 390 | 495 | 495 | 495 | 495 | 450 |
| H | 38.1 | Hardened steel | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 62 | 87 | 97 | 105 | 120 | 133 | 148 | 160 | 173 | 188 |
| | | | | | fz | 0.023 | 0.023 | 0.031 | 0.040 | 0.060 | 0.080 | 0.100 | 0.121 | 0.141 | 0.159 |
| | | | | | RPM | 9900 | 9250 | 7700 | 6700 | 6350 | 5300 | 4700 | 4250 | 3450 | 3000 |
| | | | | | FEED | 450 | 420 | 485 | 530 | 760 | 850 | 940 | 1026 | 975 | 955 |
| | 38.2 | | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 27 | 39 | 49 | 53 | 55 | 55 | 60 | 60 | 63 | 66 |
| | | | | | fz | 0.016 | 0.016 | 0.021 | 0.024 | 0.029 | 0.047 | 0.054 | 0.070 | 0.090 | 0.107 |
| | | | | | RPM | 4300 | 4100 | 3900 | 3350 | 2900 | 2200 | 1900 | 1600 | 1250 | 1050 |
| | | | | | FEED | 135 | 135 | 160 | 160 | 170 | 205 | 205 | 225 | 225 | 225 |
| | 40 | Chilled Cast Iron | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 62 | 87 | 97 | 105 | 120 | 133 | 148 | 160 | 173 | 188 |
| | | | | | fz | 0.023 | 0.023 | 0.031 | 0.040 | 0.060 | 0.080 | 0.100 | 0.121 | 0.141 | 0.159 |
| | | | | | RPM | 9900 | 9250 | 7700 | 6700 | 6350 | 5300 | 4700 | 4250 | 3450 | 3000 |
| | | | | | FEED | 450 | 420 | 485 | 530 | 760 | 850 | 940 | 1026 | 975 | 955 |
| | 41 | Hardened Cast Iron | 0.2D | D1~D6 =0.2mm D8~D20 =0.3mm | Vc | 27 | 39 | 49 | 53 | 55 | 55 | 60 | 60 | 63 | 66 |
| | | | | | fz | 0.016 | 0.016 | 0.021 | 0.024 | 0.029 | 0.047 | 0.054 | 0.070 | 0.090 | 0.107 |
| | | | | | RPM | 4300 | 4100 | 3900 | 3350 | 2900 | 2200 | 1900 | 1600 | 1250 | 1050 |
| | | | | | FEED | 135 | 135 | 160 | 160 | 170 | 205 | 205 | 225 | 225 | 225 |



# SOLID CARBIDE, END MILLS for General

A highly effective solution
for enhancing productivity and efficiency when cutting various materials

◎ : Excellent ○ : Good

| | | | | | | | SERIES | G9F44 | G9J56 | G9J62 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | FLUTE | 2 | 2 | 2 |
| | | | | | | | HELIX ANGLE | 30° | 30° | 30° |
| | | | | | | | CUTTING EDGE SHAPE | BALL NOSE | BALL NOSE | BALL NOSE |
| | | | | | | | SIZE MIN | R1.0 | R1.5 | R0.25 |
| | | | | | | | SIZE MAX | R6.0 | R6.0 | R2.0 |
| | | | | | | | PAGE | 34 | 35 | 36 |
| | | | | | | | | SHORT LENGTH | - | - |
| | | | | | | | | X-Coating | X-Coating | X-Coating |
| ISO | VDI 3323 | Material Description | Composition / Structure / Heat Treatment | | HB | HRc | | | | |
| P | 1 | Non-alloy steel | About 0.15% C | Annealed | 125 | | | ◎ | ◎ | ◎ |
| | 2 | | About 0.45% C | Annealed | 190 | 13 | | ◎ | ◎ | ◎ |
| | 3 | | About 0.45% C | Quenched & Tempered | 250 | 25 | | ◎ | ◎ | ◎ |
| | 4 | | About 0.75% C | Annealed | 270 | 28 | | ◎ | ◎ | ◎ |
| | 5 | | About 0.75% C | Quenched & Tempered | 300 | 32 | | ◎ | ◎ | ◎ |
| | 6 | Low alloy steel | | Annealed | 180 | 10 | | ◎ | ◎ | ◎ |
| | 7 | | | Quenched & Tempered | 275 | 29 | | ◎ | ◎ | ◎ |
| | 8 | | | Quenched & Tempered | 300 | 32 | | ◎ | ◎ | ◎ |
| | 9 | | | Quenched & Tempered | 350 | 38 | | ◎ | ◎ | ◎ |
| | 10 | High alloyed steel, and tool steel | | Annealed | 200 | 15 | | ◎ | ◎ | ◎ |
| | 11 | | | Quenched & Tempered | 325 | 35 | | ◎ | ◎ | ◎ |
| M | 12 | Stainless steel | Ferritic / Martensitic | Annealed | 200 | 15 | | | | |
| | 13 | | Martensitic | Quenched & Tempered | 240 | 23 | | | | |
| | 14 | | Austenitic | | 180 | 10 | | | | |
| K | 15 | Grey cast iron | Pearlitic / ferritic | | 180 | 10 | | ○ | ○ | |
| | 16 | | Pearlitic (Martensitic) | | 260 | 26 | | ○ | ○ | |
| | 17 | Nodular cast iron | Ferritic | | 160 | 3 | | ○ | ○ | |
| | 18 | | Pearlitic | | 250 | 25 | | ○ | ○ | |
| | 19 | Malleable cast iron | Ferritic | | 130 | | | ○ | ○ | |
| | 20 | | Pearlitic | | 230 | 21 | | ○ | ○ | |
| N | 21 | Aluminum-wrought alloy | Not Curable | | 60 | | | | | |
| | 22 | | Curable | Hardened | 100 | | | | | |
| | 23 | Aluminum-cast, alloyed | ≤ 12% Si, Not Curable | | 75 | | | | | |
| | 24 | | ≤ 12% Si, Curable | Hardened | 90 | | | | | |
| | 25 | | > 12% Si, Not Curable | | 130 | | | | | |
| | 26 | Copper and Copper Alloys (Bronze / Brass) | Cutting Alloys, PB>1% | | 110 | | | | | |
| | 27 | | CuZn, CuSnZn (Brass) | | 90 | | | | | |
| | 28 | | CuSn, lead-free copper and electrolytic copper | | 100 | | | | | |
| | 29 | Non Metallic Materials | Duroplastic, Fiber Reinforced Plastic | | | | | | | |
| | 30 | | Rubber, Wood, etc. | | | | | | | |
| S | 31 | Heat Resistant Super Alloys | Fe Based | Annealed | 200 | 15 | | | | |
| | 32 | | | Cured | 280 | 30 | | | | |
| | 33 | | Ni or Co Based | Annealed | 250 | 25 | | | | |
| | 34 | | | Cured | 350 | 38 | | | | |
| | 35 | | | Cast | 320 | 34 | | | | |
| | 36 | Titanium Alloys | Pure Titanium | | 400 Rm | | | | | |
| | 37 | | Alpha + Beta Alloys | Hardened | 1050 Rm | | | | | |
| H | 38.1 | Hardened steel | | Hardened | 550 | 55 | | ◎ | ◎ | ◎ |
| | 38.2 | | | Hardened | 630 | 60 | | ○ | ○ | ○ |
| | 40 | Chilled Cast Iron | | Cast | 400 | 42 | | ◎ | ◎ | ◎ |
| | 41 | Hardened Cast Iron | | Hardened | 550 | 55 | | ○ | ○ | ○ |

Recommended cutting conditions : p.47~58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