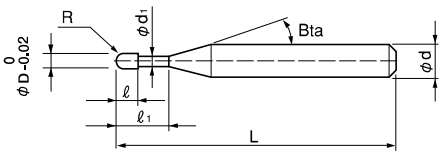
Size **R0.3~R3**

# CFLB

Super MG | UT COAT | 30° | R ±0.005 (R0.3~R1.5) | R ±0.007 (R2~R3) | Shank Dia 0/-0.005 | Variable Pitch (R2~R3)

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

| Work Material | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | | | | Cast Iron | Aluminum Alloys | Graphite | Copper | Plastics | Glass Filled Plastics | Titanium Alloys | Heat Resistant Alloys | Cemented Carbide | Hard Brittle (Non-Metallic) Materials |
| S45C S55C | SK / SCM SUS | NAK HPM | ~ 50HRC | ~ 55HRC | ~ 60HRC | ~ 65HRC | ~ 70HRC | | | | | | | | | | |
| ● | ● | ● | ● | ● | | | | ○ | ● | | ● | ○ | | ● | ● | | |




The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

**Features** **Suited for various heat-resistant alloys including Titanium and Inconel due to large pocket, variable pitch and high lubricity coating.**
**Tip slot design offers clean milling surfaces even for Copper, Aluminum and Acrylic.**


Copper C1100


Acrylic


Aluminum A7075

## 3 series of tip slot ball

Raw materials — 40 — 50 — 55 — 60 — 65 Hardness (HRC)

**CFB** 3 flute ball, Flute design: Positive
**CFLB** 3 flute long neck ball

**HFB** 4 flute ball, Flute design: Negative

**3 flute ball CFB series (P442) and 4 flute ball HFB series for hard materials (P452) are also available.**

Total 47 models

Unit (mm)

| Model Number | Radius of Ball Nose R | Effective Length ℓ1 | Length of Cut ℓ | Neck Diameter φd1 | Shank Taper Angle Bta | Overall Length L | Shank Diameter φd | Suggested Retail Price ¥ | Effective Length by Inclined Angles | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 30′ | 1° | 1°30′ | 2° | 3° |
| **CFLB 3006-020** | R0.3 | 2 | 0.48 | 0.58 | 16° | 50 | 4 | 6,970 | 2.16 | 2.23 | 2.30 | 2.37 | 2.53 |
| **CFLB 3006-030** | | 3 | | | | 50 | 4 | 7,130 | 3.20 | 3.30 | 3.40 | 3.51 | 3.76 |
| **CFLB 3006-040** | | 4 | | | | 50 | 4 | 7,380 | 4.23 | 4.36 | 4.50 | 4.65 | 4.98 |
| **CFLB 3006-060** | | 6 | | | | 50 | 4 | 7,380 | 6.30 | 6.49 | 6.70 | 6.93 | 7.43 |
| **CFLB 3008-040** | R0.4 | 4 | 0.64 | 0.78 | 16° | 50 | 4 | 7,380 | 4.23 | 4.36 | 4.49 | 4.64 | 4.96 |
| **CFLB 3008-060** | | 6 | | | | 50 | 4 | 7,380 | 6.29 | 6.49 | 6.69 | 6.91 | 7.41 |
| **CFLB 3008-080** | | 8 | | | | 50 | 4 | 7,380 | 8.36 | 8.62 | 8.89 | 9.19 | 9.85 |
| **CFLB 3010-025** | R0.5 | 2.5 | 0.8 | 0.96 | 16° | 50 | 4 | 6,310 | 2.71 | 2.79 | 2.87 | 2.95 | 3.14 |
| **CFLB 3010-030** | | 3 | | | | 50 | 4 | 6,310 | 3.23 | 3.32 | 3.42 | 3.52 | 3.75 |
| **CFLB 3010-040** | | 4 | | | | 50 | 4 | 6,560 | 4.26 | 4.38 | 4.52 | 4.66 | 4.98 |
| **CFLB 3010-050** | | 5 | | | | 50 | 4 | 6,560 | 5.29 | 5.45 | 5.62 | 5.80 | 6.20 |
| **CFLB 3010-060** | | 6 | | | | 50 | 4 | 6,970 | 6.32 | 6.51 | 6.72 | 6.94 | 7.42 |
| **CFLB 3010-080** | | 8 | | | | 50 | 4 | 6,970 | 8.39 | 8.64 | 8.92 | 9.21 | 9.87 |
| **CFLB 3010-100** | | 10 | | | | 50 | 4 | 6,970 | 10.45 | 10.77 | 11.12 | 11.49 | 12.32 |
| **CFLB 3010-120** | | 12 | | | | 50 | 4 | 6,970 | 12.51 | 12.90 | 13.32 | 13.77 | 14.76 |
| **CFLB 3015-040** | R0.75 | 4 | 1.2 | 1.43 | 16° | 50 | 4 | 6,970 | 4.18 | 4.29 | 4.41 | 4.54 | 4.83 |
| **CFLB 3015-060** | | 6 | | | | 50 | 4 | 6,970 | 6.24 | 6.42 | 6.61 | 6.82 | 7.28 |
| **CFLB 3015-080** | | 8 | | | | 50 | 4 | 7,220 | 8.30 | 8.55 | 8.82 | 9.10 | 9.73 |
| **CFLB 3015-100** | | 10 | | | | 50 | 4 | 7,380 | 10.37 | 10.68 | 11.02 | 11.38 | 12.18 |
| **CFLB 3015-120** | | 12 | | | | 50 | 4 | 7,950 | 12.43 | 12.81 | 13.22 | 13.65 | 14.62 |
| **CFLB 3015-160** | | 16 | | | | 50 | 4 | 7,950 | 16.56 | 17.07 | 17.62 | 18.21 | 19.52 |
| **CFLB 3020-040** | R1 | 4 | 1.6 | 1.83 | 16° | 50 | 4 | 6,300 | 4.35 | 4.46 | 4.58 | 4.71 | 4.99 |
| **CFLB 3020-060** | | 6 | | | | 50 | 4 | 6,810 | 6.41 | 6.59 | 6.78 | 6.99 | 7.44 |
| **CFLB 3020-080** | | 8 | | | | 50 | 4 | 6,970 | 8.48 | 8.72 | 8.98 | 9.26 | 9.89 |
| **CFLB 3020-100** | | 10 | | | | 50 | 4 | 6,970 | 10.54 | 10.85 | 11.18 | 11.54 | 12.33 |
| **CFLB 3020-120** | | 12 | | | | 50 | 4 | 7,220 | 12.60 | 12.98 | 13.38 | 13.82 | 14.78 |
| **CFLB 3020-140** | | 14 | | | | 50 | 4 | 7,220 | 14.66 | 15.11 | 15.59 | 16.09 | 17.23 |
| **CFLB 3020-160** | | 16 | | | | 50 | 4 | 7,220 | 16.73 | 17.24 | 17.79 | 18.37 | 19.68 |
| **CFLB 3020-180** | | 18 | | | | 55 | 4 | 7,220 | 18.79 | 19.37 | 19.99 | 20.65 | No Interference |
| **CFLB 3020-200** | | 20 | | | | 55 | 4 | 7,220 | 20.85 | 21.50 | 22.19 | 22.93 | No Interference |
| **CFLB 3030-080** | R1.5 | 8 | 2.4 | 2.73 | 16° | 60 | 6 | 6,970 | 8.64 | 8.87 | 9.13 | 9.39 | 9.99 |
| **CFLB 3030-100** | | 10 | | | | 60 | 6 | 7,630 | 10.70 | 11.00 | 11.33 | 11.67 | 12.44 |
| **CFLB 3030-120** | | 12 | | | | 60 | 6 | 7,630 | 12.77 | 13.14 | 13.53 | 13.96 | 14.89 |
| **CFLB 3030-160** | | 16 | | | | 60 | 6 | 7,950 | 16.89 | 17.39 | 17.93 | 18.50 | 19.78 |
| **CFLB 3030-200** | | 20 | | | | 70 | 6 | 8,040 | 21.02 | 21.65 | 22.33 | 23.06 | 24.68 |
| **CFLB 3030-250** | | 25 | | | | 70 | 6 | 8,040 | 26.17 | 26.98 | 27.83 | 28.75 | No Interference |
| **CFLB 3040-100** | R2 | 10 | 3.2 | 3.63 | 16° | 70 | 6 | 7,200 | 10.87 | 11.16 | 11.47 | 11.80 | 12.54 |
| **CFLB 3040-120** | | 12 | | | | 70 | 6 | 7,380 | 12.93 | 13.29 | 13.67 | 14.08 | 14.99 |
| **CFLB 3040-160** | | 16 | | | | 70 | 6 | 7,710 | 17.06 | 17.55 | 18.07 | 18.63 | 19.89 |
| **CFLB 3040-200** | | 20 | | | | 70 | 6 | 8,200 | 21.18 | 21.81 | 22.47 | 23.19 | No Interference |
| **CFLB 3040-250** | | 25 | | | | 70 | 6 | 8,200 | 26.34 | 27.13 | 27.98 | 28.88 | No Interference |
| **CFLB 3040-300** | | 30 | | | | 70 | 6 | 8,200 | 31.50 | 32.45 | 33.48 | No Interference | No Interference |
| **CFLB 3060-200** | R3 | 20 | 4.8 | 5.42 | — | 80 | 6 | 9,840 | No Interference | No Interference | No Interference | No Interference | No Interference |
| **CFLB 3060-250** | | 25 | | | | 80 | 6 | 9,840 | No Interference | No Interference | No Interference | No Interference | No Interference |
| **CFLB 3060-300** | | 30 | | | | 80 | 6 | 10,090 | No Interference | No Interference | No Interference | No Interference | No Interference |
| **CFLB 3060-350** | | 35 | | | | 80 | 6 | 10,500 | No Interference | No Interference | No Interference | No Interference | No Interference |
| **CFLB 3060-400** | | 40 | | | | 90 | 6 | 11,070 | No Interference | No Interference | No Interference | No Interference | No Interference |

## Milling Conditions for CFLB

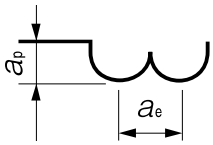
| WORK MATERIAL | | | COPPER ALUMINUM ALLOYS C1100 / A5052 / A7075 etc. | | | | CARBON STEELS / ALLOY STEELS / HARDENED STEELS S50C / NAK80 etc. (~45HRC) | | | | HARDENED STEELS STAVAX / SKD61 etc. (~55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coolant | | | WET | | | | WET／DRY | | | | WET／DRY | | | |
| Model Number | Outside Diameter (mm) | Effective Length (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) |
| 3006-020 | R0.3 | 2 | 30,000 | 1,000 | 0.03 | 0.13 | 30,000 | 1,000 | 0.03 | 0.13 | 30,000 | 700 | 0.03 | 0.13 |
| 3006-030 | | 3 | 30,000 | 1,000 | 0.03 | 0.13 | 30,000 | 1,000 | 0.03 | 0.13 | 30,000 | 700 | 0.03 | 0.13 |
| 3006-040 | | 4 | 30,000 | 700 | 0.02 | 0.1 | 30,000 | 700 | 0.02 | 0.1 | 30,000 | 480 | 0.02 | 0.1 |
| 3006-060 | | 6 | 30,000 | 475 | 0.01 | 0.05 | 30,000 | 475 | 0.01 | 0.05 | 30,000 | 300 | 0.01 | 0.05 |
| 3008-040 | R0.4 | 4 | 30,000 | 1,250 | 0.04 | 0.17 | 30,000 | 1,250 | 0.04 | 0.17 | 30,000 | 850 | 0.04 | 0.17 |
| 3008-060 | | 6 | 30,000 | 1,000 | 0.03 | 0.14 | 30,000 | 1,000 | 0.03 | 0.14 | 30,000 | 680 | 0.03 | 0.14 |
| 3008-080 | | 8 | 27,000 | 770 | 0.018 | 0.12 | 27,000 | 770 | 0.018 | 0.12 | 27,000 | 510 | 0.018 | 0.12 |
| 3010-025 | R0.5 | 2.5 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,000 | 0.05 | 0.21 |
| 3010-030 | | 3 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,000 | 0.05 | 0.21 |
| 3010-040 | | 4 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,000 | 0.05 | 0.21 |
| 3010-050 | | 5 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,500 | 0.05 | 0.21 | 30,000 | 1,000 | 0.05 | 0.21 |
| 3010-060 | | 6 | 30,000 | 1,500 | 0.04 | 0.19 | 30,000 | 1,500 | 0.04 | 0.19 | 30,000 | 1,000 | 0.04 | 0.19 |
| 3010-080 | | 8 | 25,200 | 1,200 | 0.03 | 0.17 | 25,200 | 1,200 | 0.03 | 0.17 | 25,200 | 800 | 0.03 | 0.17 |
| 3010-100 | | 10 | 24,100 | 930 | 0.023 | 0.15 | 24,100 | 930 | 0.023 | 0.15 | 24,100 | 620 | 0.023 | 0.155 |
| 3010-120 | | 12 | 23,000 | 660 | 0.017 | 0.135 | 23,000 | 660 | 0.017 | 0.135 | 23,000 | 440 | 0.017 | 0.135 |
| 3015-040 | R0.75 | 4 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 1,700 | 0.075 | 0.32 |
| 3015-060 | | 6 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 1,700 | 0.075 | 0.32 |
| 3015-080 | | 8 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 2,500 | 0.075 | 0.32 | 30,000 | 1,700 | 0.075 | 0.32 |
| 3015-100 | | 10 | 24,000 | 2,000 | 0.05 | 0.26 | 24,000 | 2,000 | 0.05 | 0.26 | 24,000 | 1,350 | 0.05 | 0.26 |
| 3015-120 | | 12 | 20,800 | 1,400 | 0.035 | 0.25 | 20,800 | 1,400 | 0.035 | 0.25 | 20,800 | 925 | 0.035 | 0.23 |
| 3015-160 | | 16 | 17,500 | 800 | 0.025 | 0.24 | 17,500 | 800 | 0.025 | 0.24 | 17,500 | 500 | 0.017 | 0.2 |
| 3020-040 | R1 | 4 | 30,000 | 3,200 | 0.2 | 0.6 | 30,000 | 3,200 | 0.2 | 0.6 | 30,000 | 2,500 | 0.2 | 0.6 |
| 3020-060 | | 6 | 30,000 | 3,200 | 0.2 | 0.6 | 30,000 | 3,200 | 0.2 | 0.6 | 30,000 | 2,500 | 0.2 | 0.6 |
| 3020-080 | | 8 | 30,000 | 3,200 | 0.2 | 0.6 | 30,000 | 3,200 | 0.2 | 0.6 | 29,150 | 2,400 | 0.2 | 0.6 |
| 3020-100 | | 10 | 27,000 | 3,000 | 0.2 | 0.6 | 27,000 | 3,000 | 0.2 | 0.6 | 24,300 | 2,000 | 0.2 | 0.6 |
| 3020-120 | | 12 | 21,600 | 2,400 | 0.15 | 0.5 | 21,600 | 2,400 | 0.15 | 0.5 | 21,000 | 1,600 | 0.14 | 0.5 |
| 3020-140 | | 14 | 16,200 | 1,600 | 0.12 | 0.45 | 16,200 | 1,600 | 0.12 | 0.45 | 16,200 | 1,200 | 0.08 | 0.35 |
| 3020-160 | | 16 | 12,600 | 1,200 | 0.1 | 0.4 | 12,600 | 1,200 | 0.1 | 0.4 | 12,600 | 1,200 | 0.05 | 0.3 |
| 3020-180 | | 18 | 12,350 | 1,060 | 0.07 | 0.375 | 12,350 | 1,060 | 0.07 | 0.375 | 12,350 | 900 | 0.035 | 0.285 |
| 3020-200 | | 20 | 12,050 | 930 | 0.04 | 0.35 | 12,050 | 930 | 0.04 | 0.35 | 12,050 | 600 | 0.017 | 0.27 |
| 3030-080 | R1.5 | 8 | 24,000 | 4,000 | 0.3 | 0.9 | 24,000 | 4,000 | 0.3 | 0.9 | 21,600 | 2,700 | 0.3 | 0.9 |
| 3030-100 | | 10 | 24,000 | 4,000 | 0.3 | 0.9 | 24,000 | 4,000 | 0.3 | 0.9 | 21,600 | 2,700 | 0.3 | 0.9 |
| 3030-120 | | 12 | 24,000 | 3,600 | 0.3 | 0.9 | 24,000 | 3,600 | 0.3 | 0.9 | 21,600 | 2,450 | 0.3 | 0.9 |
| 3030-160 | | 16 | 16,800 | 2,800 | 0.27 | 0.85 | 16,800 | 2,800 | 0.27 | 0.85 | 15,100 | 1,900 | 0.27 | 0.85 |
| 3030-200 | | 20 | 12,000 | 2,000 | 0.24 | 0.75 | 12,000 | 2,000 | 0.24 | 0.75 | 10,800 | 1,350 | 0.24 | 0.75 |
| 3030-250 | | 25 | 8,400 | 1,200 | 0.15 | 0.65 | 8,400 | 1,200 | 0.15 | 0.65 | 7,500 | 800 | 0.15 | 0.65 |

## Milling Conditions for CFLB

| WORK MATERIAL | | | TITANIUM ALLOYS STAINLESS STEELS Ti-6Al-4V / SUS etc. | | | | HEAT RESISTANT ALLOYS Inconel718 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Coolant | | | WET | | | | WET | | | |
| Model Number | Outside Diameter (mm) | Effective Length (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) |
| 3006-020 | R0.3 | 2 | 20,000 | 1,000 | 0.015 | 0.09 | 9,000 | 225 | 0.015 | 0.09 |
| 3006-030 | | 3 | 20,000 | 1,000 | 0.015 | 0.09 | 7,500 | 185 | 0.012 | 0.08 |
| 3006-040 | | 4 | 20,000 | 700 | 0.01 | 0.07 | 4,500 | 100 | 0.01 | 0.07 |
| 3006-060 | | 6 | 20,000 | 200 | 0.005 | 0.035 | 2,400 | 30 | 0.004 | 0.035 |
| 3008-040 | R0.4 | 4 | 20,000 | 1,250 | 0.02 | 0.12 | 10,000 | 310 | 0.02 | 0.12 |
| 3008-060 | | 6 | 20,000 | 950 | 0.013 | 0.075 | 7,200 | 200 | 0.013 | 0.075 |
| 3008-080 | | 8 | 18,000 | 600 | 0.007 | 0.06 | 4,450 | 95 | 0.007 | 0.06 |
| 3010-025 | R0.5 | 2.5 | 20,000 | 1,500 | 0.025 | 0.15 | 10,000 | 375 | 0.025 | 0.15 |
| 3010-030 | | 3 | 20,000 | 1,500 | 0.025 | 0.15 | 10,000 | 375 | 0.025 | 0.15 |
| 3010-040 | | 4 | 20,000 | 1,500 | 0.025 | 0.15 | 9,000 | 330 | 0.025 | 0.15 |
| 3010-050 | | 5 | 20,000 | 1,500 | 0.025 | 0.15 | 7,500 | 280 | 0.02 | 0.14 |
| 3010-060 | | 6 | 20,000 | 1,500 | 0.02 | 0.14 | 6,000 | 220 | 0.02 | 0.13 |
| 3010-080 | | 8 | 16,800 | 1,200 | 0.015 | 0.12 | 3,500 | 110 | 0.015 | 0.11 |
| 3010-100 | | 10 | 16,050 | 930 | 0.011 | 0.1 | 3,350 | 85 | 0.011 | 0.095 |
| 3010-120 | | 12 | 15,300 | 660 | 0.008 | 0.095 | 3,200 | 60 | 0.008 | 0.085 |
| 3015-040 | R0.75 | 4 | 20,000 | 2,500 | 0.035 | 0.22 | 9,000 | 380 | 0.03 | 0.22 |
| 3015-060 | | 6 | 20,000 | 2,500 | 0.035 | 0.22 | 9,000 | 380 | 0.03 | 0.22 |
| 3015-080 | | 8 | 20,000 | 2,500 | 0.035 | 0.22 | 6,000 | 250 | 0.025 | 0.18 |
| 3015-100 | | 10 | 16,000 | 2,000 | 0.025 | 0.19 | 4,500 | 170 | 0.02 | 0.17 |
| 3015-120 | | 12 | 14,000 | 1,370 | 0.02 | 0.18 | 4,100 | 135 | 0.017 | 0.17 |
| 3015-160 | | 16 | 12,000 | 730 | 0.013 | 0.17 | 3,600 | 100 | 0.013 | 0.165 |
| 3020-040 | R1 | 4 | 20,000 | 3,200 | 0.1 | 0.43 | 12,000 | 1,000 | 0.1 | 0.4 |
| 3020-060 | | 6 | 20,000 | 3,200 | 0.1 | 0.43 | 12,000 | 1,000 | 0.1 | 0.4 |
| 3020-080 | | 8 | 20,000 | 3,200 | 0.1 | 0.43 | 10,800 | 900 | 0.1 | 0.4 |
| 3020-100 | | 10 | 18,000 | 3,000 | 0.1 | 0.43 | 9,000 | 750 | 0.08 | 0.36 |
| 3020-120 | | 12 | 14,400 | 2,400 | 0.075 | 0.38 | 7,200 | 600 | 0.08 | 0.34 |
| 3020-140 | | 14 | 10,800 | 1,600 | 0.06 | 0.34 | 5,400 | 400 | 0.07 | 0.32 |
| 3020-160 | | 16 | 8,400 | 1,200 | 0.05 | 0.34 | 4,200 | 300 | 0.06 | 0.3 |
| 3020-180 | | 18 | 8,250 | 1,000 | 0.035 | 0.26 | 4,100 | 250 | 0.035 | 0.26 |
| 3020-200 | | 20 | 8,050 | 800 | 0.017 | 0.245 | 4,000 | 200 | 0.015 | 0.23 |
| 3030-080 | R1.5 | 8 | 16,000 | 4,000 | 0.15 | 0.65 | 8,000 | 1,000 | 0.15 | 0.65 |
| 3030-100 | | 10 | 16,000 | 4,000 | 0.15 | 0.65 | 7,200 | 900 | 0.15 | 0.65 |
| 3030-120 | | 12 | 16,000 | 3,600 | 0.15 | 0.65 | 7,200 | 800 | 0.15 | 0.65 |
| 3030-160 | | 16 | 11,200 | 2,800 | 0.135 | 0.62 | 4,800 | 600 | 0.12 | 0.55 |
| 3030-200 | | 20 | 8,000 | 2,000 | 0.12 | 0.58 | 3,600 | 400 | 0.1 | 0.52 |
| 3030-250 | | 25 | 5,600 | 1,200 | 0.075 | 0.46 | 2,800 | 300 | 0.09 | 0.48 |

## Milling Conditions for CFLB

| WORK MATERIAL | | | COPPER ALUMINUM ALLOYS C1100 / A5052 / A7075 etc. | | | | CARBON STEELS / ALLOY STEELS / HARDENED STEELS S50C / NAK80 etc (~45HRC) | | | | HARDENED STEELS STAVAX / SKD61 etc. (~55HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coolant | | | WET | | | | WET／DRY | | | | WET／DRY | | | |
| Model Number | Outside Diameter (mm) | Effective Length (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) |
| **3040-100** | R2 | 10 | 18,000 | 4,000 | 0.4 | 1.2 | 18,000 | 4,000 | 0.4 | 1.2 | 16,200 | 2,700 | 0.4 | 1.2 |
| **3040-120** | | 12 | 18,000 | 4,000 | 0.4 | 1.2 | 18,000 | 4,000 | 0.4 | 1.2 | 16,200 | 2,700 | 0.4 | 1.2 |
| **3040-160** | | 16 | 16,200 | 3,600 | 0.4 | 1.2 | 16,200 | 3,600 | 0.4 | 1.2 | 14,600 | 2,450 | 0.4 | 1.2 |
| **3040-200** | | 20 | 13,500 | 3,000 | 0.4 | 1.2 | 13,500 | 3,000 | 0.4 | 1.2 | 12,200 | 2,000 | 0.4 | 1.2 |
| **3040-250** | | 25 | 9,900 | 2,200 | 0.32 | 1.05 | 9,900 | 2,200 | 0.32 | 1.05 | 8,900 | 1,450 | 0.32 | 1.05 |
| **3040-300** | | 30 | 7,200 | 1,400 | 0.2 | 0.85 | 7,200 | 1,400 | 0.2 | 0.85 | 6,500 | 950 | 0.2 | 0.85 |
| **3060-200** | R3 | 20 | 12,000 | 4,000 | 0.6 | 1.8 | 12,000 | 4,000 | 0.6 | 1.8 | 10,800 | 2,700 | 0.6 | 1.8 |
| **3060-250** | | 25 | 10,500 | 3,500 | 0.6 | 1.8 | 10,500 | 3,500 | 0.6 | 1.8 | 9,450 | 2,350 | 0.6 | 1.8 |
| **3060-300** | | 30 | 9,000 | 3,000 | 0.6 | 1.8 | 9,000 | 3,000 | 0.6 | 1.8 | 8,100 | 2,000 | 0.6 | 1.8 |
| **3060-350** | | 35 | 7,500 | 2,500 | 0.6 | 1.8 | 7,500 | 2,500 | 0.5 | 1.6 | 6,750 | 1,650 | 0.5 | 1.6 |
| **3060-400** | | 40 | 6,000 | 2,000 | 0.4 | 1.4 | 6,000 | 2,000 | 0.4 | 1.4 | 5,400 | 1,350 | 0.4 | 1.4 |




Note:
- Decrease the feed rate more than 50% from the milling parameters when slot milling.
- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machines maximum speed, or when the tool is chattering and heats up to a red color.
- Recommend wet coolant for Copper.
- DRY: air blow, WET: water soluble or oil coolant.

## Milling Conditions for CFLB

| WORK MATERIAL | | | TITANIUM ALLOYS STAINLESS STEELS Ti-6Al-4V / SUS etc. | | | | HEAT RESISTANT ALLOYS Inconel718 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Coolant | | | WET | | | | WET | | | |
| Model Number | Outside Diameter (mm) | Effective Length (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) | Spindle Speed ($min^{-1}$) | Feed Rate (mm/min) | $a_p$ Axial Depth (mm) | $a_e$ Radial Depth (mm) |
| 3040-100 | R2 | 10 | 12,000 | 4,000 | 0.2 | 0.87 | 6,000 | 1,000 | 0.2 | 0.85 |
| 3040-120 | | 12 | 12,000 | 4,000 | 0.2 | 0.87 | 6,000 | 1,000 | 0.2 | 0.85 |
| 3040-160 | | 16 | 10,800 | 3,600 | 0.2 | 0.87 | 5,400 | 900 | 0.2 | 0.85 |
| 3040-200 | | 20 | 9,000 | 3,000 | 0.2 | 0.87 | 4,500 | 750 | 0.17 | 0.76 |
| 3040-250 | | 25 | 6,600 | 2,200 | 0.16 | 0.78 | 2,700 | 400 | 0.14 | 0.68 |
| 3040-300 | | 30 | 4,800 | 1,400 | 0.1 | 0.62 | 2,100 | 300 | 0.12 | 0.63 |
| 3060-200 | R3 | 20 | 8,000 | 4,000 | 0.3 | 1.3 | 3,600 | 900 | 0.3 | 1.3 |
| 3060-250 | | 25 | 7,000 | 3,500 | 0.3 | 1.3 | 3,300 | 820 | 0.27 | 1.2 |
| 3060-300 | | 30 | 6,000 | 3,000 | 0.3 | 1.3 | 3,000 | 750 | 0.25 | 1.17 |
| 3060-350 | | 35 | 5,000 | 2,500 | 0.25 | 1.15 | 2,400 | 570 | 0.23 | 1.1 |
| 3060-400 | | 40 | 4,000 | 2,000 | 0.2 | 1.05 | 1,800 | 400 | 0.21 | 1.04 |

## Tool Life Comparison with Conventional Model (2 flutes) R0.3 x EL3 mm S50C

### S50C Pocket Milling

■ Milling Conditions

| | |
|---|---|
| Spindle Speed | 30,000 $min^{-1}$ |
| Feed Rate | 1,000 mm/min |
| $a_p$ | 0.03 mm |
| $a_e$ | 0.13 mm |
| Coolant | Air Blow (Through Spindle) |
| Overhang Length | 12 mm |
| Pocket Size | $\phi$5 × 3 mm |
| Cycle Time | 14 min/pocket |