

MRB230

切削条件参考表 Recommended Milling Conditions

| 被削材 Work Material | 炭素鋼・調質鋼 Carbon Steels・Prehardened Steels S50C・NAK・HPM-1 (~45HRC) | | | | | 焼き入れ鋼 Hardened Steels SKD・STAVAX・HPM-38 (~55HRC) | | | | 焼き入れ鋼 Hardened Steels SKD11 (~62HRC) | | | | 銅 Copper | | | | | |
|----------------------|---|-------------------------|-----------------|-----------------------|--------------|---|-----------------------|--------------|----------------------|---|-------------------|----------------------|-----------------------|--------------|----------------------|-------|-------|--------|-------------------|
| | Rサイズ Radius | 有効長 Effective Length | 刃径と有効長の比 L/D | 切り込み量 Depth of Cut | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | 送り速度 Feed | 回転数 Spindle Speed | | | | |
| | | | | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ |
| 0.05 | 0.3 | 3 | | 0.005 | 0.005 | 80 | 20,000~50,000 | 0.003 | 0.003 | 60 | 20,000~50,000 | 0.003 | 0.003 | 50 | 20,000~50,000 | 0.005 | 0.005 | 80 | 20,000~50,000 |
| | 0.5 | 5 | | 0.003 | 0.003 | 70 | 20,000~50,000 | 0.003 | 0.003 | 40 | 20,000~50,000 | 0.003 | 0.003 | 40 | 20,000~50,000 | 0.005 | 0.005 | 70 | 20,000~50,000 |
| 0.075 | 0.3 | 2 | | 0.005 | 0.015 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.005 | 90 | 20,000~50,000 | 0.008 | 0.01 | 150 | 20,000~50,000 |
| | 0.5 | 3.33 | | 0.004 | 0.007 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.005 | 90 | 20,000~50,000 | 0.007 | 0.008 | 150 | 20,000~50,000 |
| 0.1 | 1 | 6.67 | | 0.003 | 0.005 | 100 | 20,000~50,000 | 0.002 | 0.003 | 70 | 20,000~50,000 | 0.001 | 0.003 | 60 | 20,000~50,000 | 0.005 | 0.007 | 100 | 20,000~50,000 |
| | 0.5 | 2.5 | | 0.01 | 0.02 | 250 | 20,000~50,000 | 0.01 | 0.01 | 210 | 20,000~50,000 | 0.007 | 0.007 | 170 | 20,000~50,000 | 0.01 | 0.02 | 250 | 20,000~50,000 |
| | 0.75 | 3.75 | | 0.007 | 0.01 | 250 | 20,000~50,000 | 0.005 | 0.01 | 210 | 20,000~50,000 | 0.004 | 0.007 | 170 | 20,000~50,000 | 0.01 | 0.015 | 250 | 20,000~50,000 |
| | 1 | 5 | | 0.005 | 0.01 | 250 | 20,000~50,000 | 0.003 | 0.005 | 210 | 20,000~50,000 | 0.002 | 0.004 | 170 | 20,000~50,000 | 0.008 | 0.015 | 250 | 20,000~50,000 |
| | 1.25 | 6.25 | | 0.003 | 0.01 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.004 | 100 | 20,000~50,000 | 0.005 | 0.015 | 150 | 20,000~50,000 |
| | 1.5 | 7.5 | | 0.003 | 0.01 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.004 | 100 | 20,000~50,000 | 0.005 | 0.015 | 150 | 20,000~50,000 |
| | 1.75 | 8.75 | | 0.003 | 0.007 | 150 | 20,000~50,000 | 0.002 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.003 | 100 | 20,000~50,000 | 0.005 | 0.01 | 150 | 20,000~50,000 |
| | 2 | 10 | | 0.003 | 0.005 | 100 | 20,000~50,000 | 0.002 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.003 | 70 | 20,000~50,000 | 0.005 | 0.007 | 100 | 20,000~50,000 |
| | 2.5 | 12.5 | | 0.003 | 0.005 | 100 | 20,000~50,000 | 0.002 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.003 | 70 | 20,000~50,000 | 0.005 | 0.007 | 100 | 20,000~50,000 |
| | 3 | 15 | | 0.002 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.002 | 60 | 20,000~50,000 | 0.002 | 0.002 | 50 | 20,000~50,000 | 0.003 | 0.004 | 80 | 20,000~50,000 |
| 0.15 | 0.5 | 1.7 | | 0.01 | 0.02 | 250 | 20,000~50,000 | 0.01 | 0.015 | 210 | 20,000~50,000 | 0.007 | 0.01 | 170 | 20,000~50,000 | 0.012 | 0.025 | 250 | 20,000~50,000 |
| | 0.6 | 2 | | 0.01 | 0.02 | 250 | 20,000~50,000 | 0.01 | 0.015 | 210 | 20,000~50,000 | 0.007 | 0.01 | 170 | 20,000~50,000 | 0.012 | 0.025 | 250 | 20,000~50,000 |
| | 0.75 | 2.5 | | 0.008 | 0.015 | 250 | 20,000~50,000 | 0.007 | 0.01 | 210 | 20,000~50,000 | 0.005 | 0.007 | 170 | 20,000~50,000 | 0.01 | 0.02 | 250 | 20,000~50,000 |
| | 1 | 3.3 | | 0.007 | 0.01 | 250 | 20,000~50,000 | 0.005 | 0.01 | 210 | 20,000~50,000 | 0.004 | 0.007 | 170 | 20,000~50,000 | 0.01 | 0.02 | 250 | 20,000~50,000 |
| | 1.25 | 4.2 | | 0.005 | 0.01 | 250 | 20,000~50,000 | 0.005 | 0.005 | 210 | 20,000~50,000 | 0.004 | 0.004 | 170 | 20,000~50,000 | 0.008 | 0.015 | 250 | 20,000~50,000 |
| | 1.5 | 5 | | 0.005 | 0.01 | 200 | 20,000~50,000 | 0.005 | 0.005 | 170 | 20,000~50,000 | 0.004 | 0.004 | 140 | 20,000~50,000 | 0.008 | 0.015 | 200 | 20,000~50,000 |
| | 1.75 | 5.8 | | 0.005 | 0.01 | 200 | 20,000~50,000 | 0.005 | 0.005 | 170 | 20,000~50,000 | 0.004 | 0.004 | 140 | 20,000~50,000 | 0.008 | 0.015 | 200 | 20,000~50,000 |
| | 2 | 6.7 | | 0.003 | 0.01 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.003 | 100 | 20,000~50,000 | 0.005 | 0.012 | 150 | 20,000~50,000 |
| | 2.25 | 7.5 | | 0.003 | 0.01 | 150 | 20,000~50,000 | 0.003 | 0.005 | 120 | 20,000~50,000 | 0.002 | 0.003 | 100 | 20,000~50,000 | 0.005 | 0.012 | 150 | 20,000~50,000 |
| | 2.5 | 8.3 | | 0.003 | 0.007 | 150 | 20,000~50,000 | 0.003 | 0.003 | 120 | 20,000~50,000 | 0.002 | 0.002 | 100 | 20,000~50,000 | 0.005 | 0.01 | 150 | 20,000~50,000 |
| 0.2 | 2.75 | 9.2 | | 0.003 | 0.007 | 150 | 20,000~50,000 | 0.003 | 0.003 | 120 | 20,000~50,000 | 0.002 | 0.002 | 100 | 20,000~50,000 | 0.005 | 0.01 | 150 | 20,000~50,000 |
| | 3 | 10 | | 0.003 | 0.005 | 150 | 20,000~50,000 | 0.003 | 0.003 | 120 | 20,000~50,000 | 0.002 | 0.002 | 100 | 20,000~50,000 | 0.005 | 0.007 | 150 | 20,000~50,000 |
| | 3.5 | 11.7 | | 0.003 | 0.005 | 100 | 20,000~50,000 | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.002 | 70 | 20,000~50,000 | 0.005 | 0.007 | 100 | 20,000~50,000 |
| | 4 | 13.3 | | 0.003 | 0.005 | 100 | 20,000~50,000 | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.002 | 70 | 20,000~50,000 | 0.005 | 0.007 | 100 | 20,000~50,000 |
| | 4.5 | 15 | | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.002 | 50 | 20,000~50,000 | 0.005 | 0.005 | 80 | 20,000~50,000 |
| | 5 | 16.7 | | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.003 | 0.003 | 80 | 20,000~50,000 | 0.002 | 0.002 | 50 | 20,000~50,000 | 0.005 | 0.005 | 80 | 20,000~50,000 |
| | 0.5 | 1.25 | | 0.02 | 0.05 | 800 | 20,000~50,000 | 0.02 | 0.03 | 650 | 20,000~50,000 | 0.015 | 0.02 | 560 | 20,000~50,000 | 0.03 | 0.07 | 800 | 20,000~50,000 |
| | 0.75 | 1.9 | | 0.02 | 0.05 | 800 | 20,000~50,000 | 0.02 | 0.03 | 650 | 20,000~50,000 | 0.015 | 0.02 | 560 | 20,000~50,000 | 0.03 | 0.07 | 800 | 20,000~50,000 |
| | 1 | 2.5 | | 0.02 | 0.05 | 800 | 20,000~50,000 | 0.02 | 0.03 | 650 | 20,000~50,000 | 0.015 | 0.02 | 560 | 20,000~50,000 | 0.03 | 0.07 | 800 | 20,000~50,000 |
| | 1.5 | 3.8 | | 0.02 | 0.03 | 700 | 20,000~50,000 | 0.01 | 0.02 | 600 | 20,000~50,000 | 0.007 | 0.015 | 490 | 20,000~50,000 | 0.03 | 0.05 | 700 | 20,000~50,000 |
| 0.25 | 2 | 5 | | 0.015 | 0.02 | 600 | 20,000~50,000 | 0.01 | 0.015 | 500 | 20,000~50,000 | 0.007 | 0.01 | 420 | 20,000~50,000 | 0.02 | 0.03 | 600 | 20,000~50,000 |
| | 2.5 | 6.3 | | 0.015 | 0.02 | 450 | 20,000~50,000 | 0.01 | 0.015 | 380 | 20,000~50,000 | 0.007 | 0.01 | 310 | 20,000~50,000 | 0.02 | 0.03 | 450 | 20,000~50,000 |
| | 3 | 7.5 | | 0.01 | 0.02 | 400 | 20,000~30,000 | 0.01 | 0.01 | 340 | 20,000~30,000 | 0.007 | 0.007 | 280 | 20,000~30,000 | 0.015 | 0.03 | 400 | 20,000~30,000 |
| | 3.5 | 8.8 | | 0.01 | 0.015 | 350 | 20,000~30,000 | 0.01 | 0.01 | 300 | 20,000~30,000 | 0.007 | 0.007 | 240 | 20,000~30,000 | 0.015 | 0.02 | 350 | 20,000~30,000 |
| | 4 | 10 | | 0.005 | 0.01 | 250 | 20,000~30,000 | 0.005 | 0.007 | 210 | 20,000~30,000 | 0.004 | 0.004 | 170 | 20,000~30,000 | 0.008 | 0.015 | 250 | 20,000~30,000 |
| | 4.5 | 11.3 | | 0.005 | 0.007 | 200 | 20,000~30,000 | 0.005 | 0.005 | 170 | 20,000~30,000 | 0.004 | 0.004 | 140 | 20,000~30,000 | 0.008 | 0.01 | 200 | 20,000~30,000 |
| | 5 | 12.5 | | 0.003 | 0.005 | 150 | 20,000~30,000 | 0.003 | 0.005 | 120 | 20,000~30,000 | 0.002 | 0.003 | 100 | 20,000~30,000 | 0.005 | 0.007 | 150 | 20,000~30,000 |
| | 5.5 | 13.8 | | 0.003 | 0.005 | 100 | 20,000~30,000 | 0.003 | 0.005 | 80 | 20,000~30,000 | 0.002 | 0.003 | 70 | 20,000~30,000 | 0.005 | 0.007 | 100 | 20,000~30,000 |
| | 6 | 15 | | 0.003 | 0.003 | 80 | 20,000~30,000 | 0.003 | 0.003 | 60 | 20,000~30,000 | 0.002 | 0.002 | 50 | 20,000~30,000 | 0.005 | 0.005 | 80 | 20,000~30,000 |
| | 1 | 2 | | 0.03 | 0.05 | 800 | 20,000~50,000 | 0.02 | 0.05 | 680 | 20,000~50,000 | 0.015 | 0.035 | 560 | 20,000~50,000 | 0.045 | 0.07 | 800 | 20,000~50,000 |
| 0.25 | 1.5 | 3 | | 0.03 | 0.05 | 700 | 20,000~50,000 | 0.02 | 0.04 | 600 | 20,000~50,000 | 0.015 | 0.03 | 490 | 20,000~50,000 | 0.04 | 0.07 | 700 | 20,000~50,000 |
| | 2 | 4 | | 0.02 | 0.04 | 600 | 20,000~50,000 | 0.02 | 0.03 | 510 | 20,000~50,000 | 0.015 | 0.02 | 420 | 20,000~50,000 | 0.03 | 0.06 | 600 | 20,000~50,000 |
| | 2.5 | 5 | | 0.015 | 0.04 | 600 | 20,000~50,000 | 0.01 | 0.03 | 510 | 20,000~50,000 | 0.007 | 0.02 | 420 | 20,000~50,000 | 0.02 | 0.06 | 600 | 20,000~50,000 |
| | 3 | 6 | | 0.015 | 0.035 | 500 | 20,000~50,000 | 0.01 | 0.025 | 420 | 20,000~50,000 | 0.007 | 0.015 | 350 | 20,000~50,000 | 0.02 | 0.05 | 500 | 20,000~50,000 |
| | 3.5 | 7 | | 0.015 | 0.03 | 400 | 20,000~50,000 | 0.01 | 0.02 | 340 | 20,000~50,000 | 0.007 | 0.015 | 280 | 20,000~50,000 | 0.02 | 0.045 | 400 | 20,000~50,000 |

| 被削材 Work Material | | | 炭素鋼・調質鋼 Carbon Steels・Prehardened Steels S50C・NAK・HPM-1 (~45HRC) | | | | 焼き入れ鋼 Hardened Steels SKD・STAVAX・HPM-38 (~55HRC) | | | | 焼き入れ鋼 Hardened Steels SKD11 (~62HRC) | | | | 銅 Copper | | | |
|----------------------|-------------------------|-----------------|---|-------|---------------|----------------------|---|-------|---------------|----------------------|---|-------|---------------|----------------------|-----------------------|-------|---------------|----------------------|
| Rサイズ Radius | 有効長 Effective Length | 刃径と有効長の比 L/D | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed |
| | | | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ |
| 0.25 | 4 | 8 | 0.012 | 0.02 | 400 | 20,000~50,000 | 0.005 | 0.01 | 340 | 20,000~50,000 | 0.004 | 0.007 | 280 | 20,000~50,000 | 0.018 | 0.03 | 400 | 20,000~50,000 |
| | 4.5 | 9 | 0.008 | 0.01 | 320 | 20,000~50,000 | 0.005 | 0.005 | 270 | 20,000~50,000 | 0.004 | 0.004 | 220 | 20,000~50,000 | 0.012 | 0.015 | 320 | 20,000~50,000 |
| | 5 | 10 | 0.005 | 0.01 | 250 | 20,000~30,000 | 0.005 | 0.005 | 210 | 20,000~30,000 | 0.003 | 0.003 | 170 | 20,000~30,000 | 0.008 | 0.015 | 250 | 20,000~30,000 |
| | 5.5 | 11 | 0.005 | 0.007 | 200 | 20,000~30,000 | 0.003 | 0.003 | 170 | 20,000~30,000 | 0.002 | 0.002 | 140 | 20,000~30,000 | 0.008 | 0.01 | 200 | 20,000~30,000 |
| | 6 | 12 | 0.005 | 0.005 | 150 | 20,000~30,000 | 0.003 | 0.003 | 120 | 20,000~30,000 | 0.002 | 0.002 | 100 | 20,000~30,000 | 0.008 | 0.008 | 150 | 20,000~30,000 |
| | 7 | 14 | 0.003 | 0.005 | 120 | 20,000~30,000 | 0.003 | 0.003 | 100 | 20,000~30,000 | 0.002 | 0.002 | 80 | 20,000~30,000 | 0.005 | 0.008 | 120 | 20,000~30,000 |
| | 8 | 16 | 0.003 | 0.003 | 120 | 20,000~30,000 | 0.002 | 0.002 | 100 | 20,000~30,000 | 0.002 | 0.002 | 80 | 20,000~30,000 | 0.005 | 0.005 | 120 | 20,000~30,000 |
| | 9 | 18 | 0.002 | 0.002 | 100 | 18,000~24,000 | 0.002 | 0.002 | 80 | 18,000~24,000 | 0.002 | 0.002 | 70 | 18,000~24,000 | 0.003 | 0.003 | 100 | 18,000~24,000 |
| 0.3 | 10 | 20 | 0.002 | 0.002 | 80 | 18,000~24,000 | 0.002 | 0.002 | 60 | 18,000~24,000 | 0.002 | 0.002 | 50 | 18,000~24,000 | 0.003 | 0.003 | 80 | 18,000~24,000 |
| | 1 | 1.7 | 0.05 | 0.1 | 1,200 | 20,000~50,000 | 0.05 | 0.07 | 1,000 | 20,000~50,000 | 0.035 | 0.05 | 840 | 20,000~50,000 | 0.07 | 0.12 | 1,200 | 20,000~50,000 |
| | 1.5 | 2.5 | 0.05 | 0.1 | 1,200 | 20,000~50,000 | 0.05 | 0.07 | 1,000 | 20,000~50,000 | 0.035 | 0.05 | 840 | 20,000~50,000 | 0.07 | 0.12 | 1,200 | 20,000~50,000 |
| | 2 | 3.3 | 0.05 | 0.1 | 1,200 | 20,000~50,000 | 0.04 | 0.07 | 1,000 | 20,000~50,000 | 0.028 | 0.05 | 840 | 20,000~50,000 | 0.07 | 0.12 | 1,200 | 20,000~50,000 |
| | 2.5 | 4.2 | 0.035 | 0.1 | 1,200 | 20,000~50,000 | 0.03 | 0.06 | 1,000 | 20,000~50,000 | 0.02 | 0.04 | 840 | 20,000~50,000 | 0.05 | 0.12 | 1,200 | 20,000~50,000 |
| | 3 | 5 | 0.025 | 0.1 | 1,000 | 20,000~50,000 | 0.03 | 0.05 | 850 | 20,000~50,000 | 0.02 | 0.035 | 700 | 20,000~50,000 | 0.04 | 0.1 | 1,000 | 20,000~50,000 |
| | 3.5 | 5.8 | 0.025 | 0.08 | 1,000 | 20,000~50,000 | 0.02 | 0.05 | 850 | 20,000~50,000 | 0.015 | 0.035 | 700 | 20,000~50,000 | 0.04 | 0.1 | 1,000 | 20,000~50,000 |
| | 4 | 6.7 | 0.025 | 0.05 | 800 | 20,000~50,000 | 0.02 | 0.04 | 680 | 20,000~50,000 | 0.015 | 0.03 | 560 | 20,000~50,000 | 0.035 | 0.08 | 800 | 20,000~50,000 |
| | 4.5 | 7.5 | 0.025 | 0.05 | 750 | 20,000~50,000 | 0.01 | 0.03 | 630 | 20,000~50,000 | 0.007 | 0.02 | 520 | 20,000~50,000 | 0.035 | 0.08 | 750 | 20,000~50,000 |
| | 5 | 8.3 | 0.02 | 0.04 | 500 | 20,000~30,000 | 0.01 | 0.02 | 420 | 20,000~30,000 | 0.007 | 0.015 | 350 | 20,000~30,000 | 0.03 | 0.06 | 500 | 20,000~30,000 |
| | 5.5 | 9.2 | 0.013 | 0.02 | 500 | 20,000~30,000 | 0.01 | 0.01 | 420 | 20,000~30,000 | 0.007 | 0.007 | 350 | 20,000~30,000 | 0.02 | 0.03 | 500 | 20,000~30,000 |
| | 6 | 10 | 0.01 | 0.02 | 450 | 20,000~30,000 | 0.005 | 0.01 | 380 | 20,000~30,000 | 0.004 | 0.007 | 310 | 20,000~30,000 | 0.015 | 0.03 | 450 | 20,000~30,000 |
| | 6.5 | 10.8 | 0.008 | 0.02 | 450 | 20,000~30,000 | 0.005 | 0.005 | 380 | 20,000~30,000 | 0.004 | 0.004 | 310 | 20,000~30,000 | 0.012 | 0.03 | 450 | 20,000~30,000 |
| | 7 | 11.7 | 0.008 | 0.02 | 400 | 20,000~30,000 | 0.005 | 0.005 | 340 | 20,000~30,000 | 0.004 | 0.004 | 280 | 20,000~30,000 | 0.012 | 0.03 | 400 | 20,000~30,000 |
| | 7.5 | 12.5 | 0.005 | 0.02 | 350 | 20,000~30,000 | 0.003 | 0.005 | 300 | 20,000~30,000 | 0.003 | 0.004 | 250 | 20,000~30,000 | 0.008 | 0.03 | 350 | 20,000~30,000 |
| | 8 | 13.3 | 0.005 | 0.01 | 300 | 18,000~24,000 | 0.003 | 0.005 | 250 | 18,000~24,000 | 0.002 | 0.004 | 210 | 18,000~24,000 | 0.008 | 0.015 | 300 | 18,000~24,000 |
| 8.5 | 14.2 | 0.005 | 0.01 | 250 | 18,000~24,000 | 0.003 | 0.003 | 210 | 18,000~24,000 | 0.002 | 0.002 | 170 | 18,000~24,000 | 0.008 | 0.015 | 250 | 18,000~24,000 | |
| 9 | 15 | 0.005 | 0.01 | 250 | 18,000~24,000 | 0.003 | 0.003 | 210 | 18,000~24,000 | 0.002 | 0.002 | 170 | 18,000~24,000 | 0.007 | 0.015 | 250 | 18,000~24,000 | |
| 9.5 | 15.8 | 0.003 | 0.005 | 200 | 18,000~24,000 | 0.003 | 0.003 | 170 | 18,000~24,000 | 0.002 | 0.002 | 140 | 18,000~24,000 | 0.007 | 0.008 | 200 | 18,000~24,000 | |
| 10 | 16.7 | 0.003 | 0.005 | 150 | 18,000~24,000 | 0.002 | 0.003 | 120 | 18,000~24,000 | 0.002 | 0.002 | 100 | 18,000~24,000 | 0.005 | 0.008 | 150 | 18,000~24,000 | |
| 11 | 18.3 | 0.003 | 0.003 | 110 | 16,000~20,000 | 0.002 | 0.002 | 90 | 16,000~20,000 | 0.002 | 0.002 | 80 | 16,000~20,000 | 0.005 | 0.005 | 110 | 16,000~20,000 | |
| 12 | 20 | 0.003 | 0.003 | 80 | 16,000~20,000 | 0.002 | 0.002 | 60 | 16,000~20,000 | 0.002 | 0.002 | 50 | 16,000~20,000 | 0.005 | 0.005 | 80 | 16,000~20,000 | |
| 0.35 | 2 | 2.9 | 0.08 | 0.12 | 1,800 | 20,000~50,000 | 0.07 | 0.08 | 1,300 | 20,000~50,000 | 0.04 | 0.06 | 1,000 | 20,000~30,000 | 0.1 | 0.15 | 1,500 | 20,000~30,000 |
| | 4 | 5.7 | 0.05 | 0.11 | 1,300 | 20,000~50,000 | 0.03 | 0.06 | 1,100 | 20,000~50,000 | 0.02 | 0.04 | 700 | 20,000~30,000 | 0.06 | 0.12 | 1,200 | 20,000~30,000 |
| | 6 | 8.6 | 0.03 | 0.05 | 700 | 20,000~30,000 | 0.01 | 0.02 | 600 | 20,000~30,000 | 0.008 | 0.015 | 450 | 20,000~30,000 | 0.04 | 0.07 | 600 | 20,000~30,000 |
| | 8 | 11.4 | 0.005 | 0.01 | 400 | 18,000~24,000 | 0.003 | 0.005 | 330 | 18,000~24,000 | 0.002 | 0.003 | 250 | 14,000~21,000 | 0.008 | 0.01 | 400 | 18,000~24,000 |
| 0.4 | 2 | 2.5 | 0.1 | 0.15 | 2,000 | 20,000~50,000 | 0.1 | 0.12 | 1,700 | 20,000~50,000 | 0.07 | 0.085 | 1,400 | 14,000~35,000 | 0.15 | 0.2 | 2,000 | 20,000~50,000 |
| | 3 | 3.8 | 0.07 | 0.15 | 1,800 | 20,000~50,000 | 0.07 | 0.1 | 1,500 | 20,000~50,000 | 0.05 | 0.07 | 1,200 | 14,000~35,000 | 0.12 | 0.2 | 1,800 | 20,000~50,000 |
| | 4 | 5 | 0.05 | 0.12 | 1,500 | 20,000~50,000 | 0.05 | 0.08 | 1,300 | 20,000~50,000 | 0.035 | 0.055 | 1,000 | 14,000~35,000 | 0.1 | 0.2 | 1,500 | 20,000~50,000 |
| | 5 | 6.3 | 0.05 | 0.1 | 1,200 | 20,000~50,000 | 0.04 | 0.07 | 1,000 | 20,000~50,000 | 0.03 | 0.05 | 840 | 14,000~35,000 | 0.08 | 0.15 | 1,200 | 20,000~50,000 |
| | 6 | 7.5 | 0.05 | 0.08 | 900 | 20,000~30,000 | 0.03 | 0.05 | 750 | 20,000~30,000 | 0.02 | 0.035 | 630 | 14,000~21,000 | 0.07 | 0.12 | 900 | 20,000~30,000 |
| | 7 | 8.8 | 0.03 | 0.05 | 700 | 20,000~30,000 | 0.02 | 0.03 | 600 | 20,000~30,000 | 0.015 | 0.02 | 490 | 14,000~21,000 | 0.05 | 0.08 | 700 | 20,000~30,000 |
| | 8 | 10 | 0.015 | 0.03 | 500 | 18,000~24,000 | 0.01 | 0.01 | 420 | 18,000~24,000 | 0.007 | 0.007 | 350 | 12,600~16,800 | 0.02 | 0.05 | 500 | 18,000~24,000 |
| | 9 | 11.3 | 0.005 | 0.01 | 400 | 18,000~24,000 | 0.003 | 0.005 | 340 | 18,000~24,000 | 0.002 | 0.003 | 280 | 12,600~16,800 | 0.008 | 0.01 | 400 | 18,000~24,000 |
| 10 | 12.5 | 0.005 | 0.01 | 350 | 18,000~24,000 | 0.003 | 0.005 | 300 | 18,000~24,000 | 0.002 | 0.003 | 240 | 12,600~16,800 | 0.008 | 0.008 | 350 | 18,000~24,000 | |
| 12 | 15 | 0.005 | 0.005 | 250 | 16,000~20,000 | 0.003 | 0.003 | 210 | 16,000~20,000 | 0.002 | 0.002 | 170 | 11,200~14,000 | 0.008 | 0.008 | 250 | 16,000~20,000 | |
| 0.45 | 2 | 2.2 | 0.15 | 0.2 | 2,500 | 20,000~50,000 | 0.1 | 0.2 | 2,000 | 20,000~50,000 | 0.07 | 0.15 | 1,800 | 14,000~35,000 | 0.2 | 0.3 | 2,800 | 20,000~50,000 |
| | 4 | 4.4 | 0.1 | 0.2 | 2,000 | 20,000~50,000 | 0.05 | 0.12 | 1,500 | 20,000~50,000 | 0.04 | 0.08 | 1,100 | 14,000~35,000 | 0.15 | 0.25 | 2,000 | 20,000~50,000 |
| | 6 | 6.7 | 0.07 | 0.15 | 1,300 | 20,000~30,000 | 0.035 | 0.05 | 1,000 | 20,000~30,000 | 0.025 | 0.035 | 650 | 14,000~21,000 | 0.1 | 0.2 | 1,300 | 20,000~30,000 |
| | 8 | 8.9 | 0.035 | 0.05 | 800 | 20,000~30,000 | 0.025 | 0.04 | 700 | 20,000~30,000 | 0.015 | 0.025 | 550 | 12,600~16,800 | 0.055 | 0.08 | 800 | 18,000~24,000 |

CBN
Cubic Boron Nitride

| | | | | | | | | | | | | | |
|----------------------------|-------------------|-------------------|------------------------------------|-------------------|---------------------------------|-------------------|------------------------------------|-------------------|--------------------------|-----------------------------|-------------------|------------------------|-------------------|
| PCD・単結晶 PCD-Monocrystal | ダイヤモンド Diamond | スクエア Square | ロングネック スクエア Long Neck Square | ボール Ball | ロングネック ボール Long Neck Ball | ラジウス Radius | ロングネック ラジウス Long Neck Radius | テーパ Taper | テーパ ボール Taper Ball | テーパ ラジウス Taper Radius | ドリル Drilling | ねじ切り Thread milling | 面取り Chamfering |
| | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating | コートヤング Coating |

MRB230

切削条件参考表 Recommended Milling Conditions

| 被削材 Work Material | 炭素鋼・調質鋼 Carbon Steels・Prehardened Steels S50C・NAK・HPM-1 (~45HRC) | | | | 焼き入れ鋼 Hardened Steels SKD・STAVAX・HPM-38 (~55HRC) | | | | 焼き入れ鋼 Hardened Steels SKD11 (~62HRC) | | | | 銅 Copper | | | | | | | | | | |
|----------------------|---|-------------------------|-----------------|-----------------------|---|--------------|----------------------|-----------------------|---|--------------|----------------------|-----------------------|---------------|--------------|----------------------|-------|---------------|-------|---------------|-------|---------------|-------|---------------|
| | Rサイズ Radius | 有効長 Effective Length | 刃径と有効長の比 L/D | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | | | | | | | | |
| | | | | ap mm | ae mm | | | ap mm | ae mm | | | ap mm | ae mm | | | | | | | | | | |
| ダイヤモンド Diamond | 0.5 | 2 | 2 | 0.25 | 0.35 | 3,200 | 20,000~50,000 | 0.12 | 0.3 | 2,500 | 20,000~50,000 | 0.085 | 0.2 | 2,300 | 14,000~35,000 | 0.25 | 0.4 | 3,500 | 20,000~50,000 | | | | |
| | | 2.5 | 2.5 | 0.25 | 0.3 | 3,000 | 20,000~50,000 | 0.12 | 0.3 | 2,500 | 20,000~50,000 | 0.08 | 0.2 | 2,300 | 14,000~35,000 | 0.25 | 0.4 | 3,200 | 20,000~50,000 | | | | |
| | | 3 | 3 | 0.2 | 0.3 | 3,000 | 20,000~50,000 | 0.12 | 0.3 | 2,500 | 20,000~50,000 | 0.08 | 0.2 | 2,100 | 14,000~35,000 | 0.25 | 0.4 | 3,000 | 20,000~50,000 | | | | |
| | | 4 | 4 | 0.15 | 0.25 | 2,500 | 20,000~50,000 | 0.1 | 0.2 | 2,100 | 20,000~50,000 | 0.07 | 0.14 | 1,700 | 14,000~35,000 | 0.2 | 0.4 | 2,500 | 20,000~50,000 | | | | |
| | | 5 | 5 | 0.1 | 0.25 | 2,000 | 20,000~50,000 | 0.08 | 0.17 | 1,700 | 20,000~50,000 | 0.055 | 0.12 | 1,400 | 14,000~35,000 | 0.15 | 0.35 | 2,000 | 20,000~50,000 | | | | |
| | | 6 | 6 | 0.1 | 0.2 | 1,500 | 20,000~50,000 | 0.07 | 0.12 | 1,200 | 20,000~50,000 | 0.05 | 0.085 | 1,000 | 14,000~35,000 | 0.15 | 0.3 | 1,500 | 20,000~50,000 | | | | |
| | | 7 | 7 | 0.08 | 0.2 | 1,300 | 20,000~30,000 | 0.06 | 0.1 | 1,100 | 20,000~30,000 | 0.04 | 0.07 | 910 | 14,000~21,000 | 0.12 | 0.3 | 1,300 | 20,000~30,000 | | | | |
| | | 8 | 8 | 0.05 | 0.1 | 1,200 | 20,000~30,000 | 0.05 | 0.08 | 1,000 | 20,000~30,000 | 0.035 | 0.055 | 840 | 14,000~21,000 | 0.08 | 0.15 | 1,200 | 20,000~30,000 | | | | |
| | | 9 | 9 | 0.04 | 0.06 | 1,000 | 20,000~30,000 | 0.05 | 0.05 | 850 | 20,000~30,000 | 0.035 | 0.035 | 700 | 14,000~21,000 | 0.06 | 0.1 | 1,000 | 20,000~30,000 | | | | |
| | | 10 | 10 | 0.03 | 0.05 | 800 | 20,000~30,000 | 0.03 | 0.05 | 680 | 20,000~30,000 | 0.02 | 0.035 | 560 | 14,000~21,000 | 0.05 | 0.08 | 800 | 20,000~30,000 | | | | |
| スクエア Square | 0.5 | 12 | 12 | 0.015 | 0.025 | 600 | 16,000~20,000 | 0.01 | 0.03 | 510 | 16,000~20,000 | 0.007 | 0.02 | 420 | 11,200~14,000 | 0.02 | 0.04 | 600 | 16,000~20,000 | | | | |
| | | 13 | 13 | 0.012 | 0.025 | 600 | 16,000~20,000 | 0.007 | 0.02 | 450 | 16,000~20,000 | 0.005 | 0.01 | 400 | 11,200~14,000 | 0.015 | 0.03 | 600 | 16,000~20,000 | | | | |
| | | 14 | 14 | 0.01 | 0.02 | 500 | 16,000~20,000 | 0.005 | 0.01 | 420 | 16,000~20,000 | 0.004 | 0.007 | 350 | 11,200~14,000 | 0.015 | 0.03 | 500 | 16,000~20,000 | | | | |
| | | 16 | 16 | 0.005 | 0.01 | 250 | 12,000~16,000 | 0.005 | 0.01 | 210 | 12,000~16,000 | 0.004 | 0.007 | 170 | 8,400~11,200 | 0.01 | 0.015 | 250 | 12,000~16,000 | | | | |
| | | 18 | 18 | 0.005 | 0.005 | 150 | 12,000~16,000 | 0.003 | 0.003 | 120 | 12,000~16,000 | 0.002 | 0.002 | 100 | 8,400~11,200 | 0.008 | 0.01 | 150 | 12,000~16,000 | | | | |
| | | 20 | 20 | 0.005 | 0.005 | 100 | 12,000~16,000 | 0.003 | 0.003 | 80 | 12,000~16,000 | 0.002 | 0.002 | 70 | 8,400~11,200 | 0.008 | 0.008 | 100 | 12,000~16,000 | | | | |
| | | 22 | 22 | 0.003 | 0.005 | 80 | 12,000~16,000 | 0.002 | 0.003 | 60 | 12,000~16,000 | 0.002 | 0.002 | 50 | 8,400~11,200 | 0.005 | 0.008 | 80 | 12,000~16,000 | | | | |
| | | ボール Ball | 0.6 | 2.4 | 2 | 0.25 | 0.35 | 3,400 | 20,000~30,000 | 0.12 | 0.3 | 2,500 | 20,000~30,000 | 0.09 | 0.21 | 2,500 | 14,000~21,000 | 0.3 | 0.45 | 3,400 | 20,000~30,000 | | |
| | | | | 4 | 3.3 | 0.2 | 0.3 | 3,000 | 20,000~30,000 | 0.12 | 0.3 | 2,500 | 20,000~30,000 | 0.085 | 0.21 | 2,100 | 14,000~21,000 | 0.28 | 0.45 | 3,000 | 20,000~30,000 | | |
| | | | | 6 | 5 | 0.1 | 0.25 | 2,000 | 20,000~30,000 | 0.08 | 0.17 | 1,700 | 20,000~30,000 | 0.055 | 0.12 | 1,400 | 14,000~21,000 | 0.15 | 0.4 | 2,000 | 20,000~30,000 | | |
| 8 | 6.7 | | | 0.08 | 0.2 | 1,300 | 20,000~30,000 | 0.06 | 0.15 | 1,100 | 20,000~30,000 | 0.04 | 0.1 | 910 | 14,000~21,000 | 0.12 | 0.3 | 1,300 | 20,000~30,000 | | | | |
| 10 | 8.3 | | | 0.05 | 0.1 | 1,200 | 14,000~20,000 | 0.03 | 0.08 | 1,000 | 14,000~20,000 | 0.02 | 0.055 | 840 | 9,800~14,000 | 0.08 | 0.15 | 1,200 | 14,000~20,000 | | | | |
| 12 | 10 | | | 0.03 | 0.05 | 800 | 14,000~20,000 | 0.02 | 0.04 | 680 | 14,000~20,000 | 0.015 | 0.03 | 560 | 9,800~14,000 | 0.05 | 0.08 | 800 | 14,000~20,000 | | | | |
| 14 | 11.7 | | | 0.015 | 0.025 | 600 | 14,000~20,000 | 0.01 | 0.02 | 510 | 14,000~20,000 | 0.007 | 0.015 | 420 | 9,800~14,000 | 0.02 | 0.04 | 600 | 14,000~20,000 | | | | |
| 16 | 13.3 | | | 0.01 | 0.02 | 400 | 14,000~20,000 | 0.01 | 0.01 | 340 | 14,000~20,000 | 0.007 | 0.007 | 280 | 9,800~14,000 | 0.015 | 0.03 | 400 | 14,000~20,000 | | | | |
| 18 | 15 | | | 0.005 | 0.01 | 250 | 12,000~18,000 | 0.005 | 0.01 | 210 | 12,000~18,000 | 0.005 | 0.005 | 170 | 8,400~12,600 | 0.012 | 0.015 | 250 | 12,000~18,000 | | | | |
| 20 | 16.7 | | | 0.005 | 0.007 | 200 | 12,000~18,000 | 0.005 | 0.005 | 170 | 12,000~18,000 | 0.003 | 0.003 | 140 | 8,400~12,600 | 0.01 | 0.01 | 200 | 12,000~18,000 | | | | |
| ボール Ball | 0.6 | 24 | 20 | 0.005 | 0.005 | 100 | 12,000~18,000 | 0.003 | 0.003 | 80 | 12,000~18,000 | 0.002 | 0.002 | 70 | 8,400~12,600 | 0.008 | 0.01 | 100 | 12,000~18,000 | | | | |
| | | ラジウス Radius | 0.7 | 8 | 5.7 | 0.1 | 0.3 | 2,500 | 20,000~30,000 | 0.1 | 0.2 | 2,100 | 20,000~30,000 | 0.07 | 0.14 | 1,700 | 14,000~21,000 | 0.15 | 0.45 | 2,500 | 20,000~30,000 | | |
| | | | | 12 | 8.6 | 0.07 | 0.12 | 1,200 | 14,000~20,000 | 0.05 | 0.1 | 1,000 | 14,000~20,000 | 0.035 | 0.07 | 840 | 9,800~14,000 | 0.1 | 0.18 | 1,200 | 14,000~20,000 | | |
| | | | | 16 | 11.4 | 0.03 | 0.05 | 600 | 14,000~20,000 | 0.015 | 0.03 | 510 | 14,000~20,000 | 0.01 | 0.02 | 420 | 9,800~14,000 | 0.05 | 0.08 | 600 | 14,000~20,000 | | |
| | | | | ボール Ball | 0.7 | 3 | 2 | 0.2 | 0.35 | 4,000 | 20,000~30,000 | 0.15 | 0.3 | 3,400 | 20,000~30,000 | 0.1 | 0.18 | 2,800 | 14,000~21,000 | 0.3 | 0.5 | 4,000 | 20,000~30,000 |
| | | | | | | 4 | 2.7 | 0.2 | 0.3 | 4,000 | 20,000~30,000 | 0.15 | 0.25 | 3,400 | 20,000~30,000 | 0.09 | 0.15 | 2,800 | 14,000~21,000 | 0.3 | 0.45 | 4,000 | 20,000~30,000 |
| | | | | | | 6 | 4 | 0.15 | 0.3 | 3,000 | 20,000~30,000 | 0.12 | 0.2 | 2,500 | 20,000~30,000 | 0.07 | 0.12 | 2,100 | 14,000~21,000 | 0.2 | 0.45 | 3,000 | 20,000~30,000 |
| | | | | | | 8 | 5.3 | 0.1 | 0.25 | 2,400 | 20,000~30,000 | 0.08 | 0.18 | 2,000 | 20,000~30,000 | 0.05 | 0.11 | 1,700 | 14,000~21,000 | 0.15 | 0.4 | 2,400 | 20,000~30,000 |
| | | | | | | 10 | 6.7 | 0.08 | 0.2 | 1,800 | 20,000~30,000 | 0.06 | 0.12 | 1,500 | 20,000~30,000 | 0.035 | 0.07 | 1,200 | 14,000~21,000 | 0.12 | 0.3 | 1,800 | 20,000~30,000 |
| | | | | | | 12 | 8 | 0.07 | 0.13 | 1,200 | 18,000~24,000 | 0.05 | 0.09 | 1,000 | 18,000~24,000 | 0.03 | 0.055 | 840 | 12,600~16,800 | 0.1 | 0.2 | 1,200 | 18,000~24,000 |
| 14 | 9.3 | | | | | 0.06 | 0.1 | 1,200 | 18,000~24,000 | 0.04 | 0.07 | 1,000 | 18,000~24,000 | 0.025 | 0.04 | 840 | 12,600~16,800 | 0.1 | 0.15 | 1,200 | 18,000~24,000 | | |
| 16 | 10.7 | 0.05 | 0.08 | | | 800 | 12,000~18,000 | 0.035 | 0.06 | 680 | 12,000~18,000 | 0.02 | 0.035 | 560 | 8,400~12,600 | 0.07 | 0.12 | 800 | 12,000~18,000 | | | | |
| 18 | 12 | 0.03 | 0.05 | | | 500 | 12,000~18,000 | 0.02 | 0.04 | 420 | 12,000~18,000 | 0.012 | 0.025 | 350 | 8,400~12,600 | 0.05 | 0.08 | 500 | 12,000~18,000 | | | | |
| ドリル Drilling | 0.75 | 20 | 13.3 | | | 0.02 | 0.04 | 400 | 12,000~18,000 | 0.015 | 0.03 | 340 | 12,000~18,000 | 0.01 | 0.02 | 280 | 8,400~12,600 | 0.03 | 0.06 | 400 | 12,000~18,000 | | |
| | | 22 | 14.7 | 0.01 | 0.02 | 250 | 10,000~14,000 | 0.005 | 0.005 | 210 | 10,000~14,000 | 0.003 | 0.003 | 170 | 7,000~9,800 | 0.02 | 0.03 | 250 | 10,000~14,000 | | | | |
| | | 30 | 20 | 0.005 | 0.005 | 100 | 10,000~14,000 | 0.003 | 0.005 | 80 | 10,000~14,000 | 0.002 | 0.003 | 70 | 7,000~9,800 | 0.01 | 0.008 | 100 | 10,000~14,000 | | | | |
| | | ねじ切り Thread milling | 0.8 | 4 | 2.5 | 0.2 | 0.3 | 4,000 | 18,000~24,000 | 0.17 | 0.25 | 3,400 | 18,000~24,000 | 0.1 | 0.15 | 2,800 | 12,600~16,800 | 0.3 | 0.45 | 4,000 | 18,000~24,000 | | |
| 8 | 5 | | | 0.1 | 0.3 | 3,000 | 18,000~24,000 | 0.09 | 0.2 | 2,500 | 18,000~24,000 | 0.055 | 0.12 | 2,100 | 12,600~16,800 | 0.15 | 0.45 | 3,000 | 18,000~24,000 | | | | |
| 12 | 7.5 | | | 0.07 | 0.15 | 1,800 | 18,000~24,000 | 0.06 | 0.12 | 1,500 | 18,000~24,000 | 0.035 | 0.07 | 1,300 | 12,600~16,800 | 0.1 | 0.25 | 1,800 | 18,000~24,000 | | | | |
| 16 | 10 | | | 0.05 | 0.1 | 650 | 12,000~18,000 | 0.035 | 0.07 | 550 | 12,000~18,000 | 0.02 | 0.04 | 450 | 8,400~12,600 | 0.08 | 0.15 | 650 | 12,000~18,000 | | | | |
| 20 | 12.5 | | | 0.03 | 0.05 | 450 | 12,000~18,000 | 0.02 | 0.04 | 380 | 12,000~18,000 | 0.01 | 0.025 | 310 | 8,400~12,600 | 0.05 | 0.08 | 450 | 12,000~18,000 | | | | |

| 被削材 Work Material | | | 炭素鋼・調質鋼 Carbon Steels・Prehardened Steels S50C・NAK・HPM-1 (~45HRC) | | | | 焼き入れ鋼 Hardened Steels SKD・STAVAX・HPM-38 (~55HRC) | | | | 焼き入れ鋼 Hardened Steels SKD11 (~62HRC) | | | | 銅 Copper | | | |
|----------------------|-------------------------|-----------------|---|-------|--------------|----------------------|---|-------|--------------|----------------------|---|-------|--------------|----------------------|-----------------------|-------|--------------|----------------------|
| Rサイズ Radius | 有効長 Effective Length | 刃径と有効長の比 L/D | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed | 切り込み量 Depth of Cut | | 送り速度 Feed | 回転数 Spindle Speed |
| | | | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ | ap mm | ae mm | mm/min | min ⁻¹ |
| 0.9 | 8 | 4.4 | 0.15 | 0.3 | 2,500 | 16,000~20,000 | 0.12 | 0.2 | 2,100 | 16,000~20,000 | 0.07 | 0.12 | 1,750 | 11,200~14,000 | 0.2 | 0.45 | 2,500 | 16,000~20,000 |
| | 12 | 6.7 | 0.1 | 0.2 | 1,800 | 12,000~16,000 | 0.07 | 0.15 | 1,500 | 12,000~16,000 | 0.04 | 0.09 | 1,300 | 8,400~11,200 | 0.15 | 0.3 | 1,800 | 12,000~16,000 |
| | 16 | 8.9 | 0.08 | 0.13 | 1,600 | 10,000~14,000 | 0.06 | 0.1 | 1,400 | 10,000~14,000 | 0.035 | 0.06 | 1,100 | 7,000~9,800 | 0.12 | 0.2 | 1,600 | 10,000~14,000 |
| | 20 | 11.1 | 0.05 | 0.1 | 1,000 | 8,000~12,000 | 0.04 | 0.08 | 850 | 8,000~12,000 | 0.025 | 0.05 | 700 | 5,600~8,400 | 0.08 | 0.15 | 1,000 | 8,000~12,000 |
| 1 | 3 | 1.5 | 0.3 | 0.5 | 4,000 | 20,000~30,000 | 0.2 | 0.5 | 3,400 | 20,000~30,000 | 0.12 | 0.3 | 2,800 | 14,000~21,000 | 0.45 | 0.7 | 4,000 | 20,000~30,000 |
| | 4 | 2 | 0.3 | 0.5 | 4,000 | 20,000~30,000 | 0.2 | 0.45 | 3,400 | 20,000~30,000 | 0.12 | 0.27 | 2,800 | 14,000~21,000 | 0.45 | 0.7 | 4,000 | 20,000~30,000 |
| | 6 | 3 | 0.25 | 0.5 | 3,000 | 20,000~30,000 | 0.2 | 0.4 | 2,500 | 20,000~30,000 | 0.12 | 0.24 | 2,100 | 14,000~21,000 | 0.38 | 0.7 | 3,000 | 20,000~30,000 |
| | 8 | 4 | 0.2 | 0.3 | 2,500 | 16,000~20,000 | 0.15 | 0.3 | 2,100 | 16,000~20,000 | 0.09 | 0.18 | 1,700 | 11,200~14,000 | 0.3 | 0.45 | 2,500 | 16,000~20,000 |
| | 10 | 5 | 0.15 | 0.3 | 2,500 | 16,000~20,000 | 0.1 | 0.2 | 2,100 | 16,000~20,000 | 0.06 | 0.12 | 1,700 | 11,200~14,000 | 0.23 | 0.45 | 2,500 | 16,000~20,000 |
| | 12 | 6 | 0.13 | 0.2 | 1,800 | 12,000~16,000 | 0.1 | 0.15 | 1,500 | 12,000~16,000 | 0.06 | 0.09 | 1,300 | 8,400~11,200 | 0.2 | 0.3 | 1,800 | 12,000~16,000 |
| | 13 | 6.5 | 0.12 | 0.2 | 1,800 | 12,000~16,000 | 0.08 | 0.13 | 1,500 | 12,000~16,000 | 0.05 | 0.08 | 1,300 | 8,400~11,200 | 0.2 | 0.3 | 1,800 | 12,000~16,000 |
| | 14 | 7 | 0.1 | 0.2 | 1,800 | 12,000~16,000 | 0.07 | 0.13 | 1,500 | 12,000~16,000 | 0.04 | 0.08 | 1,300 | 8,400~11,200 | 0.15 | 0.3 | 1,800 | 12,000~16,000 |
| | 16 | 8 | 0.1 | 0.15 | 1,600 | 10,000~14,000 | 0.06 | 0.11 | 1,400 | 10,000~14,000 | 0.035 | 0.065 | 1,100 | 7,000~9,800 | 0.15 | 0.25 | 1,600 | 10,000~14,000 |
| | 18 | 9 | 0.07 | 0.12 | 1,600 | 10,000~14,000 | 0.05 | 0.1 | 1,400 | 10,000~14,000 | 0.03 | 0.06 | 1,100 | 7,000~9,800 | 0.1 | 0.2 | 1,600 | 10,000~14,000 |
| | 20 | 10 | 0.06 | 0.1 | 1,000 | 8,000~12,000 | 0.05 | 0.07 | 850 | 8,000~12,000 | 0.03 | 0.04 | 700 | 5,600~8,400 | 0.1 | 0.15 | 1,000 | 8,000~12,000 |
| | 22 | 11 | 0.05 | 0.1 | 1,000 | 8,000~12,000 | 0.04 | 0.06 | 850 | 8,000~12,000 | 0.025 | 0.035 | 700 | 5,600~8,400 | 0.08 | 0.15 | 1,000 | 8,000~12,000 |
| | 25 | 12.5 | 0.03 | 0.05 | 800 | 8,000~12,000 | 0.03 | 0.04 | 680 | 8,000~12,000 | 0.02 | 0.025 | 560 | 5,600~8,400 | 0.05 | 0.08 | 800 | 8,000~12,000 |
| | 30 | 15 | 0.02 | 0.04 | 420 | 6,000~10,000 | 0.02 | 0.04 | 360 | 6,000~10,000 | 0.01 | 0.025 | 300 | 4,200~7,000 | 0.03 | 0.06 | 420 | 6,000~10,000 |
| 35 | 17.5 | 0.02 | 0.03 | 140 | 6,000~10,000 | 0.015 | 0.02 | 120 | 6,000~10,000 | 0.01 | 0.01 | 100 | 4,200~7,000 | 0.03 | 0.04 | 140 | 6,000~10,000 | |
| 40 | 20 | 0.007 | 0.01 | 100 | 6,000~10,000 | 0.004 | 0.007 | 80 | 6,000~10,000 | 0.002 | 0.004 | 70 | 4,200~7,000 | 0.01 | 0.015 | 100 | 6,000~10,000 | |
| 1.25 | 6 | 2.4 | 0.35 | 0.5 | 4,000 | 16,000~20,000 | 0.3 | 0.4 | 3,400 | 16,000~20,000 | 0.18 | 0.24 | 2,800 | 11,200~14,000 | 0.5 | 0.8 | 4,000 | 16,000~20,000 |
| | 10 | 4 | 0.2 | 0.5 | 3,000 | 16,000~20,000 | 0.25 | 0.35 | 2,500 | 16,000~20,000 | 0.15 | 0.21 | 2,100 | 11,200~14,000 | 0.3 | 0.8 | 3,000 | 16,000~20,000 |
| | 15 | 6 | 0.15 | 0.3 | 2,500 | 16,000~20,000 | 0.1 | 0.2 | 2,100 | 16,000~20,000 | 0.06 | 0.12 | 1,700 | 11,200~14,000 | 0.25 | 0.45 | 2,500 | 16,000~20,000 |
| | 20 | 8 | 0.1 | 0.2 | 1,800 | 12,000~16,000 | 0.08 | 0.15 | 1,500 | 12,000~16,000 | 0.05 | 0.09 | 1,300 | 8,400~11,200 | 0.15 | 0.3 | 1,800 | 12,000~16,000 |
| | 25 | 10 | 0.075 | 0.14 | 1,100 | 10,000~14,000 | 0.05 | 0.1 | 930 | 10,000~14,000 | 0.03 | 0.06 | 770 | 7,000~9,800 | 0.1 | 0.2 | 1,100 | 10,000~14,000 |
| | 30 | 12 | 0.04 | 0.08 | 800 | 8,000~12,000 | 0.02 | 0.06 | 680 | 8,000~12,000 | 0.012 | 0.035 | 560 | 5,600~8,400 | 0.06 | 0.15 | 800 | 8,000~12,000 |
| 1.5 | 35 | 14 | 0.03 | 0.07 | 450 | 6,000~10,000 | 0.01 | 0.03 | 380 | 6,000~10,000 | 0.006 | 0.018 | 310 | 4,200~7,000 | 0.05 | 0.1 | 450 | 6,000~10,000 |
| | 6 | 2 | 0.35 | 0.6 | 4,000 | 16,000~20,000 | 0.25 | 0.5 | 3,400 | 16,000~20,000 | 0.15 | 0.3 | 2,800 | 11,200~14,000 | 0.5 | 1 | 4,000 | 16,000~20,000 |
| | 8 | 2.7 | 0.3 | 0.5 | 4,000 | 16,000~20,000 | 0.2 | 0.5 | 3,400 | 16,000~20,000 | 0.12 | 0.3 | 2,800 | 11,200~14,000 | 0.45 | 0.8 | 4,000 | 16,000~20,000 |
| | 10 | 3.3 | 0.3 | 0.5 | 4,000 | 16,000~20,000 | 0.2 | 0.45 | 3,400 | 16,000~20,000 | 0.12 | 0.27 | 2,800 | 11,200~14,000 | 0.45 | 0.8 | 4,000 | 16,000~20,000 |
| | 12 | 4 | 0.2 | 0.4 | 3,000 | 16,000~20,000 | 0.2 | 0.4 | 2,500 | 16,000~20,000 | 0.12 | 0.24 | 2,100 | 11,200~14,000 | 0.3 | 0.6 | 3,000 | 16,000~20,000 |
| | 14 | 4.7 | 0.2 | 0.4 | 3,000 | 16,000~20,000 | 0.15 | 0.35 | 2,500 | 16,000~20,000 | 0.09 | 0.21 | 2,100 | 11,200~14,000 | 0.3 | 0.6 | 3,000 | 16,000~20,000 |
| | 15 | 5 | 0.15 | 0.4 | 3,000 | 16,000~20,000 | 0.13 | 0.35 | 2,500 | 16,000~20,000 | 0.08 | 0.21 | 2,100 | 11,200~14,000 | 0.23 | 0.6 | 3,000 | 16,000~20,000 |
| | 16 | 5.3 | 0.15 | 0.35 | 3,000 | 16,000~20,000 | 0.13 | 0.35 | 2,500 | 16,000~20,000 | 0.07 | 0.21 | 2,100 | 11,200~14,000 | 0.23 | 0.5 | 3,000 | 16,000~20,000 |
| | 20 | 6.7 | 0.15 | 0.3 | 1,800 | 12,000~16,000 | 0.1 | 0.2 | 1,500 | 12,000~16,000 | 0.06 | 0.12 | 1,300 | 8,400~11,200 | 0.23 | 0.45 | 1,800 | 12,000~16,000 |
| | 25 | 8.3 | 0.13 | 0.27 | 1,200 | 12,000~16,000 | 0.1 | 0.16 | 1,000 | 12,000~16,000 | 0.06 | 0.09 | 840 | 8,400~11,200 | 0.2 | 0.4 | 1,200 | 12,000~16,000 |
| | 30 | 10 | 0.1 | 0.2 | 800 | 8,000~12,000 | 0.07 | 0.12 | 680 | 8,000~12,000 | 0.04 | 0.07 | 560 | 5,600~8,400 | 0.15 | 0.3 | 800 | 8,000~12,000 |
| | 35 | 11.7 | 0.07 | 0.15 | 600 | 8,000~12,000 | 0.05 | 0.1 | 510 | 8,000~12,000 | 0.03 | 0.06 | 420 | 5,600~8,400 | 0.1 | 0.2 | 600 | 8,000~12,000 |
| | 40 | 13.3 | 0.05 | 0.1 | 460 | 6,000~10,000 | 0.05 | 0.07 | 390 | 6,000~10,000 | 0.03 | 0.04 | 320 | 4,200~7,000 | 0.08 | 0.15 | 460 | 6,000~10,000 |
| | 1.75 | 10 | 2.9 | 0.35 | 0.6 | 4,000 | 16,000~20,000 | 0.25 | 0.5 | 3,400 | 16,000~20,000 | 0.15 | 0.3 | 2,800 | 11,200~14,000 | 0.5 | 1 | 4,000 |
| 15 | | 4.3 | 0.3 | 0.4 | 4,000 | 16,000~20,000 | 0.2 | 0.45 | 3,400 | 16,000~20,000 | 0.12 | 0.27 | 2,800 | 11,200~14,000 | 0.45 | 0.6 | 4,000 | 16,000~20,000 |
| 20 | | 5.7 | 0.2 | 0.3 | 2,400 | 14,000~18,000 | 0.13 | 0.35 | 2,000 | 14,000~18,000 | 0.08 | 0.21 | 1,680 | 9,800~12,600 | 0.3 | 0.45 | 2,400 | 14,000~18,000 |
| 25 | | 7.1 | 0.17 | 0.3 | 2,000 | 14,000~18,000 | 0.1 | 0.3 | 1,800 | 14,000~18,000 | 0.08 | 0.15 | 1,400 | 8,400~9,800 | 0.25 | 0.42 | 2,000 | 14,000~18,000 |
| 30 | | 8.6 | 0.15 | 0.27 | 1,600 | 8,000~12,000 | 0.1 | 0.2 | 1,400 | 8,000~12,000 | 0.06 | 0.12 | 1,120 | 5,600~8,400 | 0.23 | 0.4 | 1,600 | 8,000~12,000 |
| 35 | | 10 | 0.1 | 0.2 | 1,200 | 8,000~12,000 | 0.07 | 0.15 | 1,000 | 8,000~12,000 | 0.05 | 0.08 | 800 | 5,600~8,400 | 0.15 | 0.3 | 1,200 | 8,000~12,000 |
| 40 | | 11.4 | 0.07 | 0.13 | 800 | 6,000~10,000 | 0.05 | 0.1 | 680 | 6,000~10,000 | 0.03 | 0.06 | 560 | 4,200~7,000 | 0.1 | 0.2 | 800 | 6,000~10,000 |
| 45 | 12.9 | 0.05 | 0.1 | 800 | 6,000~10,000 | 0.05 | 0.05 | 680 | 6,000~10,000 | 0.03 | 0.03 | 560 | 4,200~7,000 | 0.08 | 0.15 | 800 | 6,000~10,000 | |

Cubic Boron Nitride
CBN

ダイヤモンド
Diamond

スクエア
Square

ロングネック
スクエア
Long Neck Square

ボール
Ball

ロングネック
ボール
Long Neck Ball

ラジウス
Radius

ロングネック
ラジウス
Long Neck Radius

テーパ
Taper

テーパ
ボール
Taper Ball

テーパ
ラジウス
Taper Radius

ドリル
Drilling

ねじ切り
Thread milling

面取り
Chamfering

PCD・単結晶
PCD・Monocrystal

コーティング
Coating

ノンコーティング
Non-Coating

MRB230

切削条件参考表 Recommended Milling Conditions

| 被削材 Work Material | 炭素鋼・調質鋼 Carbon Steels・Prehardened Steels S50C・NAK・HPM-1 (~45HRC) | | | | 焼き入れ鋼 Hardened Steels SKD・STAVAX・HPM-38 (~55HRC) | | | | 焼き入れ鋼 Hardened Steels SKD11 (~62HRC) | | | | 銅 Copper | | | | | | |
|---|--|-----------------------------------|-----------------------|-------|---|---|-----------------------|-------|---|---|-----------------------|-------|------------------------|---|---------------|-------|--------------|-------|---------------|
| | Rサイズ Radius | 有効長 Effective Length L/D | 切り込み量 Depth of Cut | | 送り速度 Feed mm/min | 回転数 Spindle Speed min ⁻¹ | 切り込み量 Depth of Cut | | 送り速度 Feed mm/min | 回転数 Spindle Speed min ⁻¹ | 切り込み量 Depth of Cut | | 送り速度 Feed mm/min | 回転数 Spindle Speed min ⁻¹ | | | | | |
| | | | ap mm | ae mm | | | ap mm | ae mm | | | ap mm | ae mm | | | | | | | |
| ダイヤモンド Diamond PCD・Monocrystal Coating コーティング | 2 | 10 | 2.5 | 0.35 | 0.8 | 4,000 | 16,000~20,000 | 0.25 | 0.7 | 3,400 | 16,000~20,000 | 0.15 | 0.42 | 2,800 | 11,200~14,000 | 0.55 | 1.2 | 4,000 | 16,000~20,000 |
| | | 12 | 3 | 0.35 | 0.7 | 4,000 | 16,000~20,000 | 0.25 | 0.7 | 3,400 | 16,000~20,000 | 0.15 | 0.42 | 2,800 | 11,200~14,000 | 0.53 | 1 | 4,000 | 16,000~20,000 |
| | | 14 | 3.5 | 0.3 | 0.6 | 4,000 | 16,000~20,000 | 0.2 | 0.5 | 3,400 | 16,000~20,000 | 0.12 | 0.3 | 2,800 | 11,200~14,000 | 0.45 | 1 | 4,000 | 16,000~20,000 |
| | | 15 | 3.8 | 0.25 | 0.55 | 3,500 | 16,000~20,000 | 0.2 | 0.4 | 3,000 | 16,000~20,000 | 0.12 | 0.24 | 2,500 | 11,200~14,000 | 0.38 | 0.8 | 3,500 | 16,000~20,000 |
| | | 16 | 4 | 0.2 | 0.5 | 3,500 | 16,000~20,000 | 0.2 | 0.3 | 3,000 | 16,000~20,000 | 0.12 | 0.18 | 2,500 | 11,200~14,000 | 0.3 | 0.8 | 3,500 | 16,000~20,000 |
| | | 20 | 5 | 0.2 | 0.35 | 3,300 | 16,000~20,000 | 0.15 | 0.3 | 2,800 | 16,000~20,000 | 0.09 | 0.18 | 2,300 | 11,200~14,000 | 0.3 | 0.5 | 3,300 | 16,000~20,000 |
| | | 25 | 6.3 | 0.15 | 0.3 | 2,600 | 12,000~16,000 | 0.12 | 0.25 | 2,200 | 12,000~16,000 | 0.07 | 0.15 | 1,800 | 8,400~11,200 | 0.23 | 0.45 | 2,600 | 12,000~16,000 |
| | | 30 | 7.5 | 0.12 | 0.25 | 2,600 | 12,000~16,000 | 0.1 | 0.2 | 2,200 | 12,000~16,000 | 0.06 | 0.12 | 1,800 | 8,400~11,200 | 0.2 | 0.4 | 2,600 | 12,000~16,000 |
| | | 35 | 8.8 | 0.12 | 0.2 | 1,800 | 10,000~14,000 | 0.07 | 0.15 | 1,500 | 10,000~14,000 | 0.04 | 0.09 | 1,300 | 7,000~9,800 | 0.18 | 0.3 | 1,800 | 10,000~14,000 |
| | | 40 | 10 | 0.1 | 0.15 | 1,200 | 10,000~14,000 | 0.07 | 0.12 | 1,000 | 10,000~14,000 | 0.04 | 0.07 | 840 | 7,000~9,800 | 0.15 | 0.2 | 1,200 | 10,000~14,000 |
| ボール Ball コーティング コーティング | 2.5 | 10 | 2 | 0.4 | 1.2 | 4,000 | 16,000~20,000 | 0.3 | 1 | 3,400 | 16,000~20,000 | 0.18 | 0.6 | 2,800 | 11,200~14,000 | 0.6 | 1.8 | 4,000 | 16,000~20,000 |
| | | 15 | 3 | 0.35 | 1 | 4,000 | 16,000~20,000 | 0.3 | 0.9 | 3,400 | 16,000~20,000 | 0.18 | 0.54 | 2,800 | 11,200~14,000 | 0.55 | 1.5 | 4,000 | 16,000~20,000 |
| | | 20 | 4 | 0.3 | 0.7 | 4,000 | 16,000~20,000 | 0.25 | 0.7 | 3,400 | 16,000~20,000 | 0.15 | 0.42 | 2,800 | 11,200~14,000 | 0.45 | 1 | 4,000 | 16,000~20,000 |
| | | 25 | 5 | 0.25 | 0.6 | 3,000 | 14,000~16,000 | 0.2 | 0.5 | 2,500 | 14,000~16,000 | 0.12 | 0.3 | 2,100 | 9,800~11,200 | 0.38 | 0.9 | 3,000 | 14,000~16,000 |
| | | 30 | 6 | 0.2 | 0.5 | 2,400 | 14,000~16,000 | 0.15 | 0.4 | 2,000 | 14,000~16,000 | 0.09 | 0.24 | 1,700 | 9,800~11,200 | 0.3 | 0.8 | 2,400 | 14,000~16,000 |
| | | 35 | 7 | 0.15 | 0.4 | 1,600 | 10,000~14,000 | 0.15 | 0.3 | 1,400 | 10,000~14,000 | 0.09 | 0.18 | 1,100 | 7,000~9,800 | 0.23 | 0.6 | 1,600 | 10,000~14,000 |
| | | 40 | 8 | 0.15 | 0.3 | 1,200 | 8,000~12,000 | 0.12 | 0.2 | 1,000 | 8,000~12,000 | 0.07 | 0.12 | 840 | 5,600~8,400 | 0.23 | 0.45 | 1,200 | 8,000~12,000 |
| | | 45 | 9 | 0.12 | 0.2 | 1,000 | 8,000~12,000 | 0.1 | 0.15 | 850 | 8,000~12,000 | 0.06 | 0.09 | 700 | 5,600~8,400 | 0.18 | 0.3 | 1,000 | 8,000~12,000 |
| | | 50 | 10 | 0.1 | 0.15 | 680 | 6,000~10,000 | 0.07 | 0.1 | 570 | 6,000~10,000 | 0.04 | 0.06 | 470 | 4,200~7,000 | 0.15 | 0.25 | 680 | 6,000~10,000 |
| | | ボール Ball コーティング コーティング | 3 | 10 | 1.7 | 0.5 | 1.5 | 4,000 | 14,000~18,000 | 0.35 | 1.2 | 3,400 | 14,000~18,000 | 0.21 | 0.72 | 2,800 | 9,800~12,600 | 0.75 | 2.3 |
| 15 | 2.5 | | | 0.5 | 1.3 | 4,000 | 14,000~18,000 | 0.35 | 1.2 | 3,400 | 14,000~18,000 | 0.21 | 0.68 | 2,800 | 9,800~12,600 | 0.75 | 2 | 4,000 | 14,000~18,000 |
| 20 | 3.3 | | | 0.5 | 1.2 | 4,000 | 14,000~18,000 | 0.35 | 1.1 | 3,400 | 14,000~18,000 | 0.21 | 0.66 | 2,800 | 9,800~12,600 | 0.75 | 1.8 | 4,000 | 14,000~18,000 |
| 25 | 4.2 | | | 0.4 | 1 | 4,000 | 14,000~18,000 | 0.3 | 0.8 | 3,400 | 14,000~18,000 | 0.18 | 0.48 | 2,800 | 9,800~12,600 | 0.6 | 1.5 | 4,000 | 14,000~18,000 |
| 30 | 5 | | | 0.35 | 0.7 | 3,000 | 8,000~12,000 | 0.25 | 0.6 | 2,500 | 8,000~12,000 | 0.15 | 0.36 | 2,100 | 5,600~8,400 | 0.53 | 1 | 3,000 | 8,000~12,000 |
| 35 | 5.8 | | | 0.35 | 0.5 | 2,500 | 8,000~12,000 | 0.2 | 0.5 | 2,100 | 8,000~12,000 | 0.12 | 0.3 | 1,700 | 5,600~8,400 | 0.53 | 0.8 | 2,500 | 8,000~12,000 |
| 40 | 6.7 | | | 0.25 | 0.4 | 2,300 | 8,000~12,000 | 0.2 | 0.4 | 1,900 | 8,000~12,000 | 0.12 | 0.24 | 1,600 | 5,600~8,400 | 0.38 | 0.6 | 2,300 | 8,000~12,000 |
| 45 | 7.5 | | | 0.25 | 0.4 | 1,500 | 6,000~8,000 | 0.2 | 0.35 | 1,200 | 6,000~8,000 | 0.12 | 0.21 | 1,000 | 4,200~5,600 | 0.38 | 0.6 | 1,500 | 6,000~8,000 |
| 50 | 8.3 | | | 0.2 | 0.4 | 1,500 | 6,000~8,000 | 0.2 | 0.3 | 1,200 | 6,000~8,000 | 0.12 | 0.18 | 1,000 | 4,200~5,600 | 0.3 | 0.6 | 1,500 | 6,000~8,000 |
| 備考 Notes | <p>※本切削条件は参考値です。実際の加工形状および使用機械等にて切削条件を調整してください。</p> <p>※切り込み量の ap は深さ方向の切り込み量、ae はピックフィードを示します。</p> <p>※ビビリが発生する場合は、回転数と送り速度を同じ割合で下げてください。</p> <p>また、主軸回転数が足りない場合も同様に同じ割合で下げてください。</p> <p>※L(有効長)/D(刃径)が、15倍を超える様な場合は、加工形状等で大きく左右される場合がありますので調整してください。</p> <p>※焼き入れ鋼を加工する場合は、オイルミストをお奨めします。</p> <p>※Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status.</p> <p>※Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut.</p> <p>※Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.</p> <p>※In case L/D exceeds 15, find an adequate condition considering machining profile.</p> <p>※Oil mist coolant is recommended for the machining of hardened steels.</p> | | | | | | | | | | | | | | | | | | |