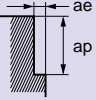
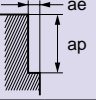


RECOMMENDED CUTTING CONDITIONS

Side milling

| Dia. (mm) | Carbon steel, Alloy steel, Mild Steel, Copper, Copper alloys | | | | | | Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel | | | | | | Austenitic stainless steel, Ferritic, Precipitation hardening stainless steel, Titanium alloy | | | | | |
|--------------|---|---------------------------------|-----------------|--------------------|----------------------|----------------------|---|---------------------------------|-----------------|--------------------|----------------------|----------------------|---|---------------------------------|-----------------|--------------------|----------------------|----------------------|
| | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Depth of cut ae (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Depth of cut ae (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Depth of cut ae (mm) |
| 10 | 150 | 4800 | 0.09 | 1300 | 8 | 2 | 120 | 3800 | 0.06 | 680 | 8 | 2 | 100 | 3200 | 0.075 | 720 | 8 | 2 |
| 12 | 150 | 4000 | 0.09 | 1100 | 9.6 | 2.4 | 120 | 3200 | 0.065 | 620 | 9.6 | 2.4 | 100 | 2700 | 0.08 | 650 | 9.6 | 2.4 |
| 16 | 150 | 3000 | 0.1 | 900 | 12.8 | 3.2 | 120 | 2400 | 0.075 | 540 | 12.8 | 3.2 | 100 | 2000 | 0.09 | 540 | 12.8 | 3.2 |
| 20 | 150 | 2400 | 0.1 | 720 | 16 | 4 | 120 | 1900 | 0.075 | 430 | 16 | 4 | 100 | 1600 | 0.09 | 430 | 16 | 4 |
| 25 | 150 | 1900 | 0.12 | 680 | 20 | 5 | 120 | 1500 | 0.075 | 340 | 20 | 5 | 100 | 1300 | 0.09 | 350 | 20 | 5 |
| Depth of cut |  | | | | | | | | | | | | | | | | | |

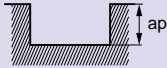
| Dia. (mm) | Precipitation hardening stainless steel, Cobalt chromium alloy | | | | | | Heat resistant alloys Inconel718 | | | | | |
|--------------|---|---------------------------------|-----------------|--------------------|----------------------|----------------------|-------------------------------------|---------------------------------|-----------------|--------------------|----------------------|----------------------|
| | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Depth of cut ae (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Depth of cut ae (mm) |
| 10 | 75 | 2400 | 0.06 | 430 | 8 | 2 | 40 | 1300 | 0.04 | 160 | 8 | 1 |
| 12 | 75 | 2000 | 0.065 | 390 | 9.6 | 2.4 | 40 | 1100 | 0.045 | 150 | 9.6 | 1.2 |
| 16 | 75 | 1500 | 0.075 | 340 | 12.8 | 3.2 | 40 | 800 | 0.05 | 120 | 12.8 | 1.6 |
| 20 | 75 | 1200 | 0.075 | 270 | 16 | 4 | 40 | 640 | 0.05 | 96 | 16 | 2 |
| 25 | 75 | 950 | 0.075 | 210 | 20 | 5 | 40 | 510 | 0.05 | 77 | 20 | 2.5 |
| Depth of cut |  | | | | | | | | | | | |

- 1) For stainless steel, titanium alloy and heat resistant alloy, the use of water-soluble coolant is effective.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

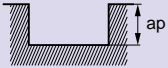
RECOMMENDED CUTTING CONDITIONS

Slotting

| Work material | Carbon steel, Alloy steel, Mild Steel, Copper, Copper alloys | | | | | Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel | | | | | Austenitic stainless steel, Ferritic, Precipitation hardening stainless steel, Titanium alloy | | | | |
|---------------|--|-----------------------|---------------------------------|-----------------|--------------------|---|-----------------------|---------------------------------|-----------------|--------------------|---|-----------------------|---------------------------------|-----------------|--------------------|
| | Dia. (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) |
| 10 | 150 | 4800 | 0.06 | 860 | 5 | 120 | 3800 | 0.04 | 460 | 5 | 100 | 3200 | 0.05 | 480 | 5 |
| 12 | 150 | 4000 | 0.06 | 720 | 6 | 120 | 3200 | 0.045 | 430 | 6 | 100 | 2700 | 0.055 | 450 | 6 |
| 16 | 150 | 3000 | 0.07 | 630 | 8 | 120 | 2400 | 0.05 | 360 | 8 | 100 | 2000 | 0.06 | 360 | 8 |
| 20 | 150 | 2400 | 0.07 | 500 | 10 | 120 | 1900 | 0.05 | 290 | 10 | 100 | 1600 | 0.06 | 290 | 10 |
| 25 | 150 | 1900 | 0.08 | 460 | 12 | 120 | 1500 | 0.05 | 230 | 12 | 100 | 1300 | 0.06 | 230 | 12 |

Depth of cut 

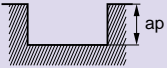
| Work material | Precipitation hardening stainless steel, Cobalt chromium alloy | | | | | Heat resistant alloys Inconel718 | | | | |
|---------------|--|-----------------------|---------------------------------|-----------------|--------------------|-------------------------------------|-----------------------|---------------------------------|-----------------|--------------------|
| | Dia. (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) |
| 10 | 60 | 1900 | 0.04 | 230 | 5 | 30 | 950 | 0.04 | 110 | 2 |
| 12 | 60 | 1600 | 0.045 | 220 | 6 | 30 | 800 | 0.045 | 110 | 2.4 |
| 16 | 60 | 1200 | 0.05 | 180 | 8 | 30 | 600 | 0.05 | 90 | 3.2 |
| 20 | 60 | 950 | 0.05 | 140 | 10 | 30 | 480 | 0.05 | 72 | 4 |
| 25 | 60 | 760 | 0.05 | 110 | 12 | 30 | 380 | 0.05 | 57 | 5 |

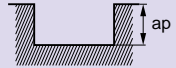
Depth of cut 

- 1) For stainless steel, titanium alloy and heat resistant alloy, the use of water-soluble coolant is effective.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

RECOMMENDED CUTTING CONDITIONS

Slotting

| Work material | Carbon steel, Alloy steel, Mild Steel, Copper, Copper alloys | | | | | Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel | | | | | Austenitic stainless steel, Ferritic, Precipitation hardening stainless steel, Titanium alloy | | | | |
|---------------|---|-----------------------|---------------------------------|-----------------|--------------------|---|-----------------------|---------------------------------|-----------------|--------------------|---|-----------------------|---------------------------------|-----------------|--------------------|
| | Dia. (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) |
| 10 | 150 | 4800 | 0.06 | 860 | 5 | 120 | 3800 | 0.04 | 460 | 5 | 100 | 3200 | 0.05 | 480 | 5 |
| 12 | 150 | 4000 | 0.06 | 720 | 6 | 120 | 3200 | 0.045 | 430 | 6 | 100 | 2700 | 0.055 | 450 | 6 |
| 16 | 150 | 3000 | 0.07 | 630 | 8 | 120 | 2400 | 0.05 | 360 | 8 | 100 | 2000 | 0.06 | 360 | 8 |
| 20 | 150 | 2400 | 0.07 | 500 | 10 | 120 | 1900 | 0.05 | 290 | 10 | 100 | 1600 | 0.06 | 290 | 10 |
| 25 | 150 | 1900 | 0.08 | 460 | 12 | 120 | 1500 | 0.05 | 230 | 12 | 100 | 1300 | 0.06 | 230 | 12 |
| Depth of cut |  | | | | | | | | | | | | | | |

| Work material | Precipitation hardening stainless steel, Cobalt chromium alloy | | | | | Heat resistant alloys Inconel718 | | | | | |
|---------------|---|-----------------------|---------------------------------|-----------------|--------------------|-------------------------------------|-----------------------|---------------------------------|-----------------|--------------------|----------------------|
| | Dia. (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) | Cutting speed (m/min) | Revolution (min ⁻¹) | Feed (mm/tooth) | Feed rate (mm/min) | Depth of cut ap (mm) |
| 10 | 60 | 1900 | 0.04 | 230 | 5 | 30 | 950 | 0.04 | 110 | 2 | |
| 12 | 60 | 1600 | 0.045 | 220 | 6 | 30 | 800 | 0.045 | 110 | 2.4 | |
| 16 | 60 | 1200 | 0.05 | 180 | 8 | 30 | 600 | 0.05 | 90 | 3.2 | |
| 20 | 60 | 950 | 0.05 | 140 | 10 | 30 | 480 | 0.05 | 72 | 4 | |
| 25 | 60 | 760 | 0.05 | 110 | 12 | 30 | 380 | 0.05 | 57 | 5 | |
| Depth of cut |  | | | | | | | | | | |

- 1) For stainless steel, titanium alloy and heat resistant alloy, the use of water-soluble coolant is effective.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) The irregular helix flute end mill has a large effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.