

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed V_c (m/min)	Feed per Tooth f_z (mm/t.)	Depth of Cut a_p (mm)
P	Mild Steel	≤180HB	EP6120	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
	Carbon Steel, Alloy Steel	180–280HB	EP6120	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
			VP15TF	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
	Carbon Steel, Alloy Steel	280–350HB	EP6120	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
	Pre-Hardened Steel	35–45HRC	EP6120	150 (80–200)	0.2 (0.1–0.3)	≤0.05DC
			VP15TF	150 (80–200)	0.2 (0.1–0.3)	≤0.05DC
	Alloy Tool Steel	≤350HB	EP6120	150 (80–200)	0.2 (0.1–0.3)	≤0.05DC
			VP15TF	150 (80–200)	0.2 (0.1–0.3)	≤0.05DC
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (80–450)	0.2 (0.1–0.3)	≤0.05DC
	Ductile Cast Iron	Tensile Strength ≤450MPa	MP8010	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
	Ductile Cast Iron	Tensile Strength ≤800MPa	MP8010	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
N	Copper, Copper alloys	—	EP6120	200 (80–300)	0.2 (0.1–0.3)	≤0.05DC
H	Hardened Steel	45–55HRC	MP8010	100 (60–120)	0.2 (0.1–0.3)	≤0.05DC
	Hardened Steel	55–65HRC	MP8010	80 (60–120)	0.2 (0.1–0.3)	≤0.01DC

Note 1) The above values are average condition values at actual cutting speeds. The values change slightly according to the state of a machine to be used and method of workholding. Adjust the values depending on actual machine condition, referring to the above values.

Note 2) For end mills with a carbide shank, it is possible to set about 20% higher cutting conditions.

Note 3) Please note the following when machining hardened steel with MP8010.

- Shorten the overhang length as much as possible.
- Carbide shank type is recommended.
- Please note especially the setting of the depth of cut to prevent fracturing.

RECOMMENDED CUTTING CONDITIONS

■ SHOULDER MILLING (When small width of cut.*)

	Work Material	Hardness	Grade	Cutting Speed V _c (m/min)	Depth of Cut a _p (mm)	Cutting Width a _e (mm)	Feed per Tooth f _z (mm/t.)
P	Carbon Steel Alloy Steel	180–280HB	VP15TF	200 (80–300)	≤0.05DC	≤0.05DC	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	VP15TF	150 (80–200)	≤0.05DC	≤0.05DC	0.15 (≤0.3)
	Alloy Tool Steel	180–380HB	VP15TF	150 (80–200)	≤0.05DC	≤0.05DC	0.15 (≤0.3)
M	Stainless Steel	≤270HB	VP15TF	150 (100–200)	≤0.05DC	≤0.05DC	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (180–450)	≤0.05DC	≤0.1DC	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤800MPa	MP8010	200 (80–300)	≤0.05DC	≤0.1DC	0.3 (≤0.4)
H	Hardened Steel	45–55HRC	MP8010	100 (80–120)	≤0.05DC	≤0.02DC	0.1 (≤0.2)
	Hardened Steel	55–65HRC	MP8010	80 (60–100)	≤0.05DC	≤0.02DC	0.1 (≤0.2)

* When the pick feed direction is along the axis of the tool such as finish machining at the wall part.

■ SLOTTING-SHOULDER MILLING (When large width of cut.*)

	Work Material	Hardness	Grade	Cutting Speed V _c (m/min)	Depth of Cut a _p (mm)	Cutting Width a _e (mm)	Feed per Tooth f _z (mm/t.)
P	Carbon Steel Alloy Steel	180–280HB	VP15TF	200 (80–300)	≤0.02DC	≤DC	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	VP15TF	150 (80–200)	≤0.02DC	≤DC	0.15 (≤0.3)
	Alloy Tool Steel	180–380HB	VP15TF	150 (80–200)	≤0.02DC	≤DC	0.15 (≤0.3)
M	Stainless Steel	≤270HB	VP15TF	150 (100–200)	≤0.02DC	≤DC	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (180–450)	≤0.03DC	≤DC	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤800MPa	MP8010	200 (80–300)	≤0.03DC	≤DC	0.3 (≤0.4)
H	Hardened Steel	45–55HRC	MP8010	100 (80–120)	≤0.01DC	≤DC	0.1 (≤0.2)
	Hardened Steel	55–65HRC	MP8010	70 (60–80)	≤0.01DC	≤DC	0.1 (≤0.2)

* When the pick feed direction is along the axis of the tool such as finish machining at the wall part.

Note 1) This cutting condition is the standard condition when using the steel standard shank type. If vibration or chipping of the insert occurs on the cutting edge, please decrease the cutting condition as width of cut, depth of cut and feed per tooth depending on the situation.

Note 2) Cutting speed is calculated at the peripheral edge of the tool. Calculate spindle speed in the following way.

$$\text{Spindle speed of cutting tool } n(\text{min}^{-1}) = 1000 \times \text{Cutting speed } V_c \div \text{Diameter of cutting tool } DC \div 3.14$$

Note 3) Please note the following when machining hardened steel with MP8010.

- Shorten the overhang length as much as possible.
- Use with carbide shank recommended.
- Note the setting of the depth of cut especially to prevent the fracture.