Milling

Trouble	Trouble Item	Tool Grade: Change to Harder Grade	Tool Grade: Change to Tougher Grade	Tool Grade: Change to More Thermal Shock Resistant Grade	Tool Grade: Change to More Welding Resistant Grade	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: Cutter Dia. Cutting Width Review	Cutting Conditions: Tool Path Review	Cutting Conditions: Coolant: Usage of Mist	Cutting Conditions: Coolant: Dry	Tool Geometry: Insert with Chipbreaker	Tool Geometry: Relief Angle (Larger ↑ Smaller ↓)	Tool Geometry: Corner Angle (Larger ↑ Smaller ↓)	Tool Geometry: Edge Strength / Honing (Larger ↑ Smaller ↓)	Tool Geometry: Insert Number (More ↑ Less ↓)	Tool Geometry: Insert Pocket (Larger ↑ Smaller ↓)	Tool Geometry: Wiper Edge (Relief Angle) Review	Tool Geometry: Insert Runout Check	Tool Geometry: Cutter Rigidity	Setting: Workpiece / Tool Installation	Setting: Overhang Length	Machine: Power, Rigidity
Edge Damage	Flank Wear Increase	Unsuitable Cutting Conditions					● ↓					●												
		Unsuitable Tool Geometry	●												● ↑		● ↓			●					
	Rake Face Wear Increase	Unsuitable Cutting Conditions					● ↓	● ↓	● ↓			●													
		Unsuitable Tool Geometry	●												● ↑	● ↑	● ↓								
	Chipping, Cracking	Unsuitable Cutting Conditions						● ↓	● ↓	●	●														
		Unsuitable Tool Geometry		●											● ↓	● ↑	● ↑			●	●	●	●	●	●
	Edge Breakage by Thermal Shock	Unsuitable Cutting Conditions					● ↓	● ↓	● ↓				●												
		Unsuitable Tool Geometry			●										● ↑		● ↓								
	Built-up Edge	Unsuitable Cutting Conditions					● ↑	● ↑				●													
		Unsuitable Tool Geometry				●									● ↑		● ↓								
Machining Accuracy	Poor Surface Finish	Unsuitable Cutting Conditions					● ↑	● ↓	● ↓			●													
		Unsuitable Tool Geometry	●			●											● ↓	● ↓		●	●		●	●	●
	Burr	Unsuitable Cutting Conditions					● ↓	● ↓	● ↓	●	●														
		Unsuitable Tool Geometry													● ↑	● ↓	● ↓			●					
	Workpiece Chip Off	Unsuitable Cutting Conditions						● ↓	● ↓		●														
		Unsuitable Tool Geometry													● ↑	● ↑	● ↓	● ↑		●					
	Poor Planeness / Parallelness	Tool and Workpiece Evacuation						● ↓	● ↓			*5 ●		●	● ↑	● ↓	● ↓	● ↓		●	●	●	●	●	●
Others	Heavy Chattering, Vibration	Unsuitable Cutting Conditions, Installation					● ↓	*1 ● ↓	*2 ● ↓	●	*4 ●			●	● ↑	● ↓	● ↓	● ↓				●	●	●	●
	Damaging Chips	Unsuitable Cutting Conditions					● ↑	*3 ● ↓		●		*6 ●	●												
		Unsuitable Tool Geometry												●	● ↑			● ↓	●						

*1) To prevent chattering, the higher fz may be suitable.
*2) To prevent chattering, the larger *a*p may be suitable.
*3) Higher fz may be suitable.
*4) Down-cut method is recommended for Helical Endmilling.
*5) If the surface is warped by cutting heat.
*6) Compressed air is recommended.