

## Milling with NTK Grades by Application

### General Guidelines for Successful Milling

- Select the best grade for the application
- Select cutter diameter 1.5 times greater than the workpiece width
- Eliminate any overhang to increase stability
- Choose the strongest nose radius
- No Coolant. Use compressed air
- Check clamp and part rigidity



### Guidelines for Successful Milling by Material

#### Heat resistant alloy / PH stainless steel

- Down or climb milling where the chip thins upon exit is the preferred method for HNBA materials
- Reduce feed rate 50% upon entrance and exit
- Do not recut side walls as this can cause work hardening
- Use balanced shell mill adapter or shrink fit for end-mills
- As DOC gets thinner the feed must be increased to compensate for heat loss
- Use RPG geometries if tool pressure is a problem
- E01, E02 edge preparation recommended

#### Hardened Steel / Die mold / Chilled iron / Overlay

- Larger edge preparations need to be used
- Speed is reduced as hardness goes up

#### Cast iron / Ductile cast iron

- Parts that are cast are more difficult to machine than forged • decrease feed rates by 25%
- Maximize feed rates for gray cast irons

### ● Trouble shooting

Material	Insert Grade	NTK Grade	Problem	Solution					
				Speed	Feed	DOC	Edge Prep.	Insert Grade	Others
Stainless Steel	Cermet	C7X	Chipping	—	⬇	—	—	—	—
			BUE	⬆	—	—	—	—	
			Break	—	⬇	⬇	—	—	
Hardened Steel	Ceramic	HC7 WA1	Chipping	—	⬇	—	Wider	—	
			Break	⬇	⬇	—	—	—	
Cast Iron	Silicon Nitride	SX6 SP9	Chipping	⬇	⬇	—	Wider	—	
			Break	⬇	⬇	⬇	Tougher	Larger radius	
			Thermal Crack	⬇	⬇	—	—	—	
			Crater Wear	—	—	—	Sharper	—	
Heat Resistant Alloy	SiAlON	SX9 SX7	Notching	⬆	⬆	Vary / ⬇	Wider	—	Pre-chamfer parts
			Flank Wear	⬇	⬆	—	—	Harder	—
			Chipping	—	—	—	Wider	Tougher	—
			Break	⬇	—	⬇	—	Tougher	—
			Tool Pressure	—	—	—	—	—	Use RPG insert