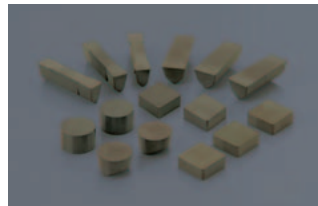


Our technical service personnel at each **NTK** sales office are available to answer any technical questions.

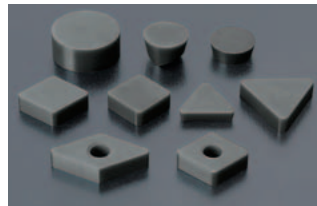
SX5



SX7



SX9



WA1



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NTK CUTTING TOOLS

Solutions for the Aerospace Industry

Machining High Temperature Alloys with Ceramics

Introducing New Silicon Nitride SX7 !

NTK Produces The World's Most Advanced Ceramic
Cutting Tool Materials for the Aerospace Industry

SX7 SiAlON Ceramic

New

■ Features

- Better notching resistance compared to Whisker Ceramics
- No need to program ramping like Whisker Ceramics require
- Better flank wear resistance compared to SiAlON Ceramics
- Best grade for pre-machined Waspaloy
- Best grade for high-speed milling

■ Recommended Work Materials

- Inco 718
- Waspaloy
- Inco 625
- Udimet 720

■ Recommended Applications

- Semi-Finish
- Milling
- Profiling

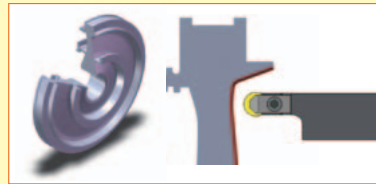
■ Profiling of Inco 718



Competitor's Whisker Ceramic



SX7



Turbine Disk

Tool Life : 4.5min
RCGX45, 800sfm .006ipr, .040", Wet
RCGX120700, 240m/min, 0.15mm/rev, 1.00mm, Wet
Inco 718 (pre-machined)

WA1 Whisker-Reinforced Ceramic

■ Features

- Versatile grade for machining of high temperature alloys
- Better flank wear resistance compared to SiAlON Ceramics
- Better notching resistance compared to competitors' Whisker Ceramics

■ Recommended Work Materials

- Inco 718
- Inco 625

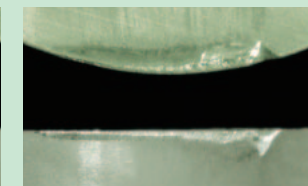
■ Recommended Applications

- Semi-Finish
- Grooving
- Profiling

■ Profiling of Inco 718



Competitor's Whisker Ceramic



WA1



Turbine Case

Tool Life : 5.0min
RPGX45, 800sfm .006ipr, .040", Wet
RPGX120700, 240m/min, 0.15mm/rev, 1.00mm, Wet
Inco 718 (pre-machined)

SX5 SiAlON Ceramic

■ Features

- Tougher when compared to Whisker Ceramics
- Best grade for machining Waspaloy with scale

■ Recommended Work Materials

- Waspaloy
- 718Plus
- Udimet 720
- Rene 41

■ Recommended Applications

- Rough Turning with scale and interruptions

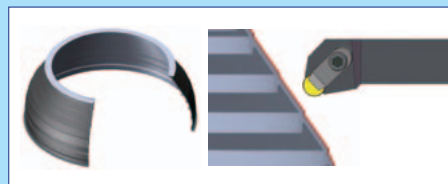
■ Rough Turning of Waspaloy with Scale



Competitor's Whisker Ceramic



SX5



Turbine Case

Tool Life : 2.0min
RNG65, 950sfm .012ipr, .150", Wet
RNGN190700, 285m/min, 0.30mm/rev, 3.80mm, Wet
Waspaloy with Scale

SX9 SiAlON Ceramic

■ Features

- Tougher when compared to Whisker Ceramics
- Extreme toughness makes higher feed and heavier D.O.C machining possible
- Best grade for machining Inco 718 with scale

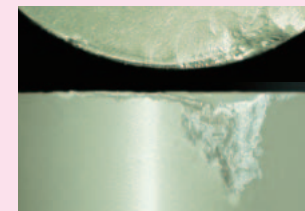
■ Recommended Work Materials

- Inco 718
- Inco 713
- Inco 706

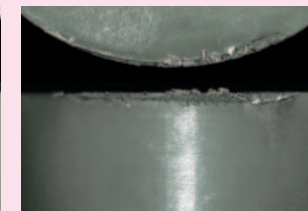
■ Recommended Applications

- Rough turning with scale
- Milling

■ Rough Turning of Inco 718 with Scale



Competitor's Whisker Ceramic

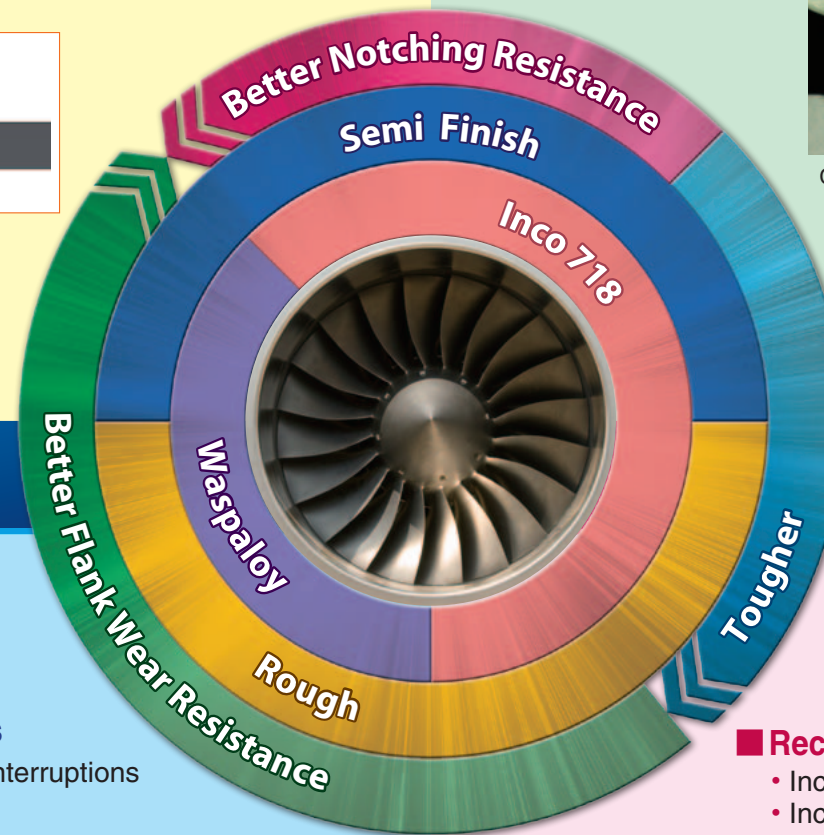


SX9



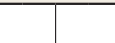
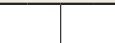
Cover Shield

Tool Life : 3.0min
RNG65, 800sfm .010ipr, .150", Wet
RNGN190700, 240m/min, 0.25mm/rev, 3.80mm, Wet
Inco 718 with Scale



Solutions for Aerospace Industry

Recommended Cutting Conditions by Application

Application	Grade	Coolant	Cutting Speeds					Feed					Depth of Cut				
			400 120	600 180	800 240	1000 300	1200 360	.004 0.1	.008 0.2	.012 0.3	.016 0.4	.020 0.5	.040 1.0	.060 1.5	.080 2.0	.100 2.5	.120 3.0
Rough Turning Scale 	SX5	WET 															
			650 (450-800) sfm 200 (130-240) m/min					.012 (.008-.014) ipr 0.30 (0.20-0.35) mm/rev					.080 (.040-.200)" 2.0 (1.0-5.0) mm				
	SX7																
			800 (600-1000) sfm 240 (180-300) m/min					.008 (.004-.010) ipr 0.20 (0.10-0.25) mm/rev					.080 (.040-.200)" 2.0 (1.0-5.0) mm				
Rough no Scale 	SX5	WET 															
			700 (600-900) sfm 210 (180-270) m/min					.014 (.008-.016) ipr 0.35 (0.20-0.40) mm/rev					.080 (.040-.100)" 2.0 (1.0-2.5) mm				
	SX7																
			900 (700-1100) sfm 270 (210-330) m/min					.010 (.006-.014) ipr 0.25 (0.15-0.35) mm/rev					.080 (.040-.100)" 2.0 (1.0-2.5) mm				
Profiling & Semi-Finish 	SX5	WET 															
			700 (600-900) sfm 210 (180-270) m/min					.008 (.004-.012) ipr 0.20 (0.10-0.30) mm/rev					.060 (.040-.080)" 1.5 (1.0-2.0) mm				
	SX7																
			900 (700-1100) sfm 270 (210-330) m/min					.006 (.003-.010) ipr 0.15 (0.08-0.25) mm/rev					.060 (.040-.080)" 1.5 (1.0-2.0) mm				
Grooving 	SX9	WET 															
			700 (600-900) sfm 210 (180-270) m/min					.008 (.004-.012) ipr 0.20 (0.10-0.30) mm/rev					.060 (.040-.080)" 1.5 (1.0-2.0) mm				
Grooving 	WA1	WET 															
			900 (600-1200) sfm 270 (180-360) m/min					.002 (.002-.004) ipr 0.05 (0.05-0.10) mm/rev									

Application	Grade	Coolant	Cutting Speeds					Feed					Depth of Cut				
			2000 600	2500 750	3000 900	3500 1050	4000 1200	.002 0.05	.003 0.08	.004 0.10	.005 0.12	.006 0.15	.020 0.5	.040 1.0	.060 1.5	.080 2.0	.100 2.5
Milling 	SX7	DRY 															
			3500 (2500-4000) sfm 1050 (750-1200) m/min					.004 (.003-.005) ipr 0.10 (0.08-0.12) mm/rev					.060 (.040-.100)" 1.5 (1.0-2.5) mm				
Milling 	SX9	DRY 															
			3000 (2000-3500) sfm 900 (600-1050) m/min					.006 (.004-.006) ipr 0.15 (0.10-0.15) mm/rev					.060 (.040-.100)" 1.5 (1.0-2.5) mm				

Recommended Insert Grade by Work Material

Application	Grade	Inco625	Inco706	Inco713	Inco718	Inco901	Inco903	IN100	Udimet720	Rene41	Waspaloy	718Plus
Rough Turning Scale 	SX5											
	SX7											
	SX9											
Rough no Scale 	SX5											
	SX7											
	SX9											
Profiling & Semi-Finish 	SX5											
	SX7											
	SX9											
Grooving 	WA1											
												

Application	Grade	Inco625	Inco706	Inco713	Inco718	Inco901	Inco903	IN100	Udimet720	Rene41	Waspaloy	718Plus
Milling 	SX7											
	SX9											

 1st Choice  2nd Choice