



AUTOMOTIVE



AEROSPACE



GEAR & BEARING



ENGINEERING



WIND ENERGY

CUTTING TOOLS FOR DIFFICULT TO CUT MATERIALS

N E W A P P L I C A T I O N S

SiAlON (SN950)



Grade	Application Range & Characteristics
NEW SN950	- Roughing & Semi-finishing for HRSA (Heat Resistant Super Alloys) - Reinforced toughness and β' -SiAlON phase
SN800	- High Speed roughing of high temperature alloy and Inconel
SN1000	- Ni-based alloys, Co-based alloys in medium or low speed cutting

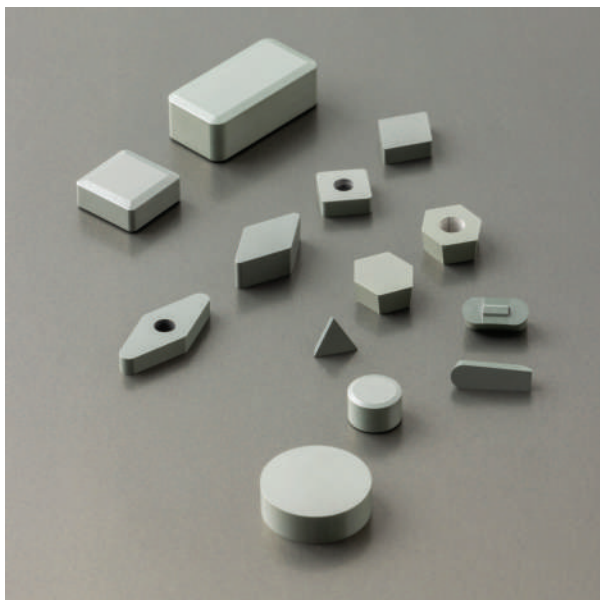
SN950 Application

- Workpiece : Inconel 718
- Insert Shape : RNGN 120700 E020 (RNG 45 T01020)
- Test conditions : Vc 230 m/min, Feed 0.2 mm/rev
DOC 1.0 mm, WET
- Cutting Distance : 1.5 km

Union SN950		0.267mm			
	0.1	0.2	0.3	0.4	
Competitor		0.429mm			
	0.1	0.2	0.3	0.4	

Flank Wear (Vbmax. mm)

Whisker Grade (SW400/SW800)

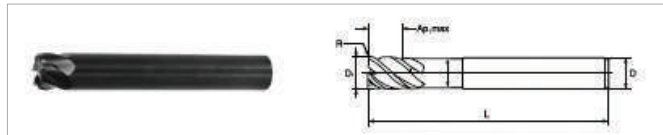


Grade	Application Range & Characteristics
SW400	- High Speed Steel, High Chrome Steel in medium or low speed cutting - Roughing & Medium cutting with heavy interruption
SW800	- Ni-based alloys, Co-based alloys in high speed cutting - Roughing & Finishing with continuous or light interruption

- Best Performance for HRSA (Inconel, Waspaloy, Stellite)
- For High-Speed machining of HRSA with Optimized Heat and Fracture resistance

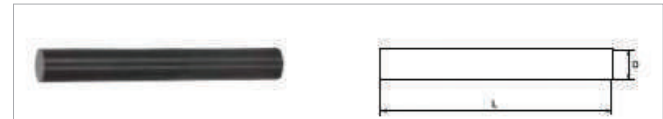
Solid Ceramic End Mill & Rod

End mill(Finished)



Type	Flute F	Mill Diameter x Corner R ØD1xR	Length of Cut L1	Effective Length L2	Neck Diameter Ød2	Overall Length L	Shank Diameter ØD	SN1000	SW800
SYC 8040 R1.0	4	Ø8 x R1.0	5	16	7.7	60	Ø8	○	
SYC 10040 R1.25	4	Ø10 x R1.25	7.5	20	9.7	65	Ø10	○	
SYC 12040 R1.5	4	Ø12 x R1.25	9	24	11.7	70	Ø12	○	
SYC 6060 R0.5	6	Ø6 x R0.5	4.5	12	5.8	60	Ø6	○	
SYC 8060 R1.0	6	Ø8 x R1.0	5	16	7.7	60	Ø8	○	
SYC 10060 R1.25	6	Ø10 x R1.25	7.5	20	9.7	65	Ø10	○	
SYC 12060 R1.5	6	Ø12 x R1.5	9	24	11.7	70	Ø12	○	

End mill(Blank)



Type	Dimensions(mm)		SN1000	SW800
	D	L		
ROD 060-600S	6	60	○	
ROD 080-600S	8	60		
ROD 100-650S	10	65	○	
ROD 100-720S	10	72	○	○
ROD 120-700S	12	70		
ROD 140-850S	14	85	○	
ROD 160-900S	16	90		
ROD 180-1000S	18	100		
ROD 200-1050S	20	105		

Application	Flutes	Diameter	Cutting Speed Vc	RPM N	Feed Vf	Processing Depth ap	Processing Width DOC	Infeed fn	Feed per cutting edges fz	Coolant
		D8.0	24,868	2,387	2.5 (0-6.0)	8	0.096	0.024 (0.012~0.036)		
		D10.0	19,894	2,068	3 (0-7.5)	10	0.104	0.026 (0.013~0.039)		
		D12.0	16,579	1,785	6 (0-9.0)	12	0.168	0.028 (0.02~0.059)		

Application	Flutes	Diameter	Cutting Speed Vc	RPM N	Feed Vf	Processing Depth ap	Processing Width ae	Infeed fn	Feed per cutting edges fz	Coolant
		D8.0	24,868	4,923	4.5 (0-6.0)	0.4 (0-8)	0.198	0.033 (0.017~0.05)		
		D10.0	19,894	4,297	5 (0-7.5)	0.5 (0-10)	0.216	0.036 (0.018~0.054)		
		D12.0	16,579	1,856	6 (0-9.0)	1.2 (0-12)	0.112	0.028 (0.014~0.042)		

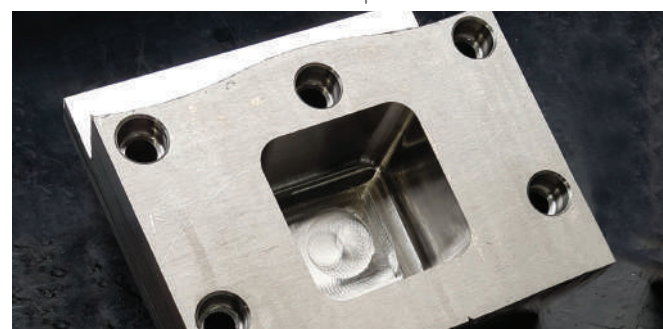
Inconel 718	
Blade Machining	
V(m/min)	628
f(mm/rev)	0.03
ap & ae	ap=0.7, ae=1.2
Coolant	Dry & Air blow

Inconel 718	
Pocket Machining	
V(m/min)	700
f(mm/rev)	0.06
ap & ae	ap=1.5, ae=5.0
Coolant	Dry & Air blow

Turbine Blade

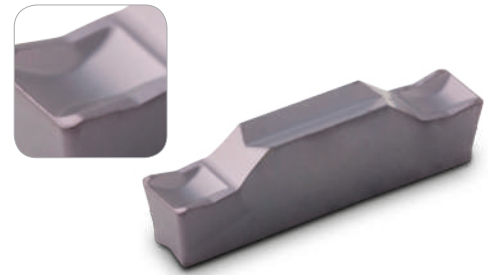


Pocket Component





Grooving Insert & Holder

- Stable clamping system for specially designed grooving machining
- Various machining available (grooving, parting off, turning)
- High quality and efficiency machining in aerospace and automobile industry



Workpiece name	Aerospace parts (CASE, HPT STTR)	Workpiece material	Inconel 718
Machining Type	Ring shape / Vertical lathe (O.D roughing) / Wet		
Cutting Codition	Max.dia 630mm vc35m/min, fn 0.04~0.13mm/rev ap 10.0mm		
Item	2NG50N-08G-F1M UF102		

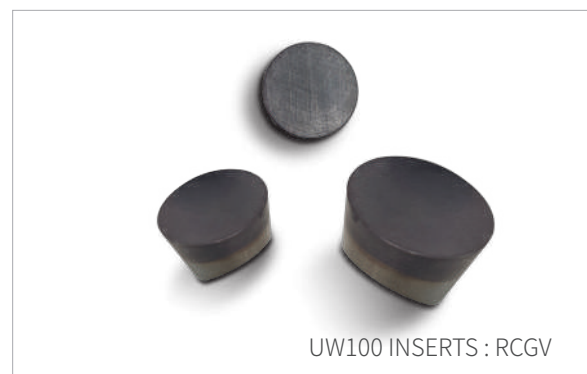
Division	Union Materials	Competitor
Tool life / Wear image (15 min)		
Status comparison	Normal wear	Large wear at corner
Result	Wear and damage comparison → Better wear resistance performance than competitor	

UW100

Grade	Application Range
UW100	- Finishing & medium cutting of super alloys (HRSA, Ti-Alloy etc) - High temperature oxidation resistance and predictable wear tendency

Recommended Cutting Condition

Work Material	Machining	Vc (m/min)	Feed (mm/rev)	DOC (mm)	Coolant
HRSA(Inconel 718)	Finishing	100 - 300	0.05~0.2	~1.0	○
Ti - Alloy(Ti6Al4V)	Finishing	50 - 150	0.05~0.2	~1.0	○

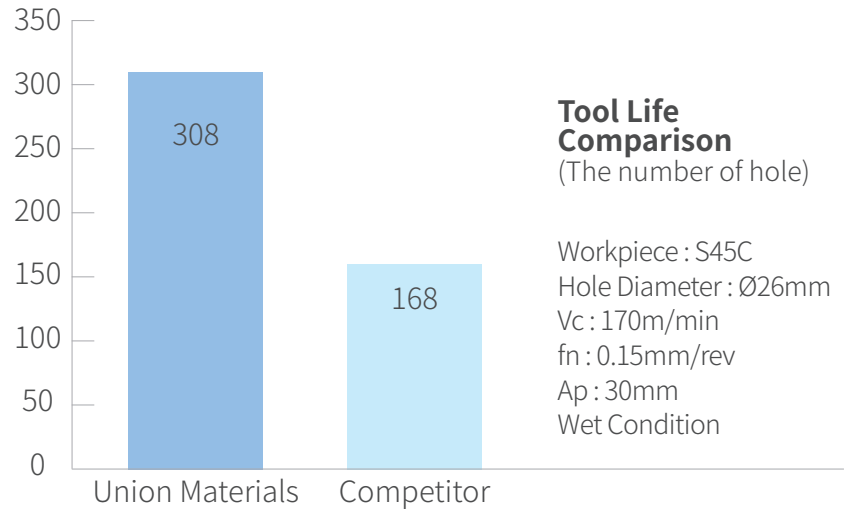


Drilling Inserts



- Optimized for machining Steel & Stainless steel
- Superior Cost-Effectiveness
- Application of Specialized Coating Technique

Better Tool life (VS Competitor)



Drilling Inserts Series

S-Type

Description	Designation	Grade	Dimension (mm)				Configuration
		UF606	D	T	r	d1	
	SPMT050204-SD1	○	5.00	2.38	0.4	2.27	
	SPMT050204-SD1	○	6.00	2.38	0.4	2.61	
	SPMT07T308-SD1	○	7.94	3.97	0.8	2.78	
	SPMT090408-SD1	○	9.80	4.30	0.8	4.00	
	SPMT110408-SD1	○	11.50	4.80	0.8	4.45	
	SPMT140512-SD1	○	14.30	5.20	1.2	5.75	

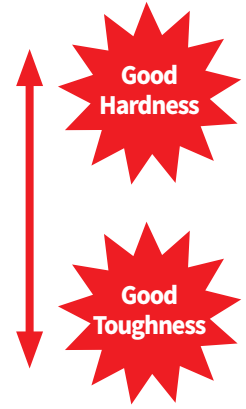
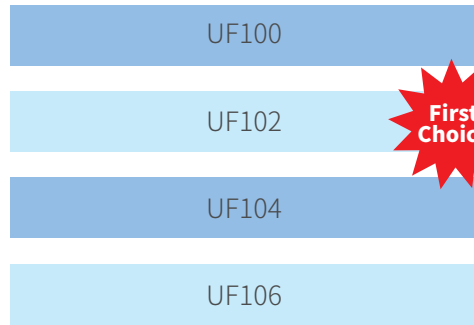
W-Type

Description	Designation	Grade	Dimension (mm)				Configuration
		UF606	D	T	r	d1	
	WCMT030208-SD1	○	5.00	2.38	0.4	2.27	
	WCMT030208-SD2	○	6.00	2.38	0.4	2.61	
	WCMT040208-SD1	○	7.94	3.97	0.8	2.78	
	WCMT050308-SD1	○	9.80	4.30	0.8	4.00	
	WCMT06t308-SD1	○	11.50	4.80	0.8	4.45	
	WCMT080412-SD1	○	14.30	5.20	1.2	5.75	

Turning Insert for ISO S, M



- Excellent hardness and wear resistance
- Designed for ISO S, M (Prevent built up edge and burrs)
- Various geometries finishing to roughing



- Grade -

Division	Union Materials	Competitor
Tool life / Wear image(15 min)		
Status comparison	Normal wear(Edge fine Chipping)	Breakage by edge chipping
Result	Wear and damage comparison → Better wear resistance performance than competitor	

M Stainless steel

Roughing: R11

Medium: M11, M51

Finishing: F11

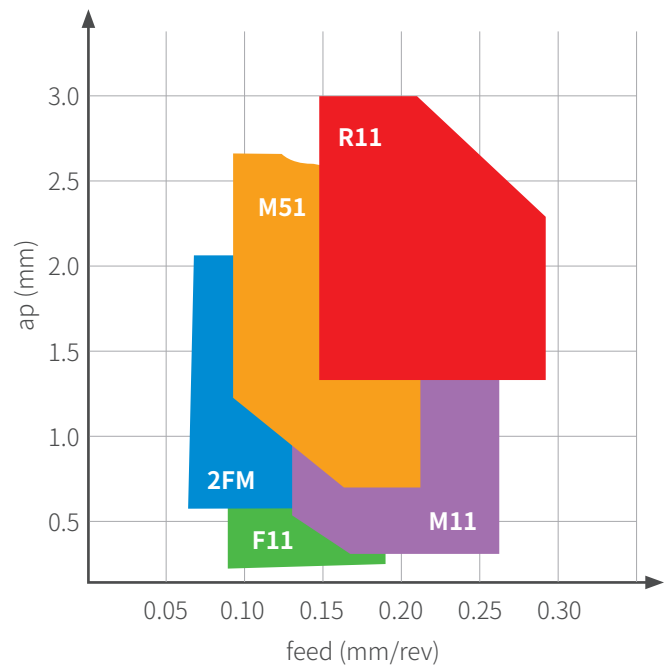
S HRSA

Roughing: R11

Medium: M51, M11

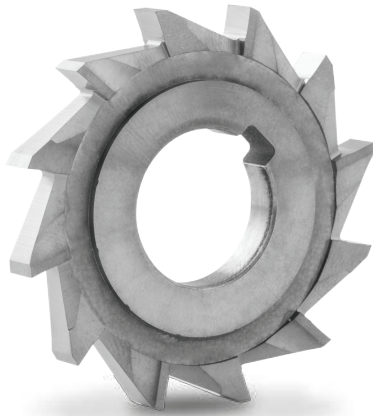
Finishing: F11

- Work piece : Stainless steel -



UF T-Slot Cutters (Solid Carbide)

T-slot cutter generally applies to edge grooving, Keyway grooving, T-slot grooving.

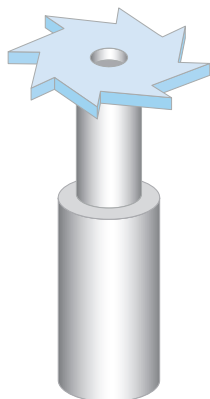


Dia. 2-12mm / 250mm

Note : Please inquire for special size



UF indexbale T-slot cutter : Same shank fits but various carbide inserts

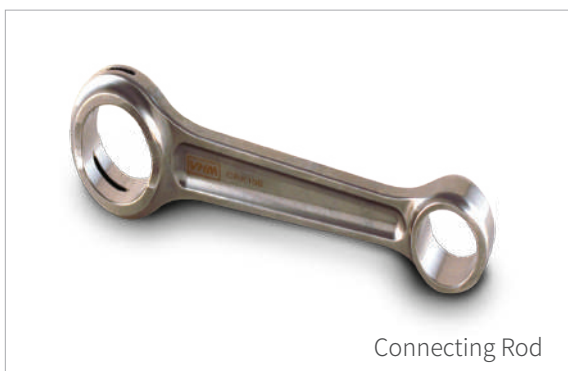


Solid carbide T-slots, the one drawback those cutters have in common is each individual cutter has their own size and single application, users must throw away the entire cutter when it was damaged.

For example, someday when they get a new project needs a cutter in $\text{Ø}20\text{mm}$ with shank size $\text{Ø}16\text{mm}$; if none of their existing cutters fit the requirement, they have no choice but to buy an all-new cutter.

Therefore, we offer customization options as well, such as, T-Slot inserts with special corner radius, chamfers .. and so on.

Application



Connecting Rod

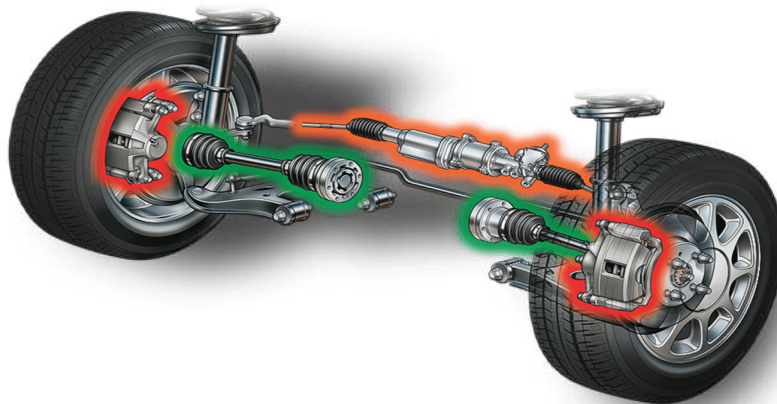


Crankshaft

CBN Ball Cutter / End Mill

Automobile CV Joint machining

(Constant Velocity Joint : Core Parts of drive shaft for transmitting a driving force from transmission to the wheels)



Material
CF 53
Inductive hardened
HRC 60±2



Material
16MnCr5 or 25MnCr5
Case hardened
HRC 60±2



Material
CF53
Inductive hardened
HRC 60±2



Union Materials Corporation www.unionmaterials.com

OCI building 12FL. #94, Sogong-ro Jung-gu, Seoul 04532, Korea

TEL : (82)2-2251-4141~4149 FAX : (82)2-318-1995 E-mail : ceramic@unionmaterials.com