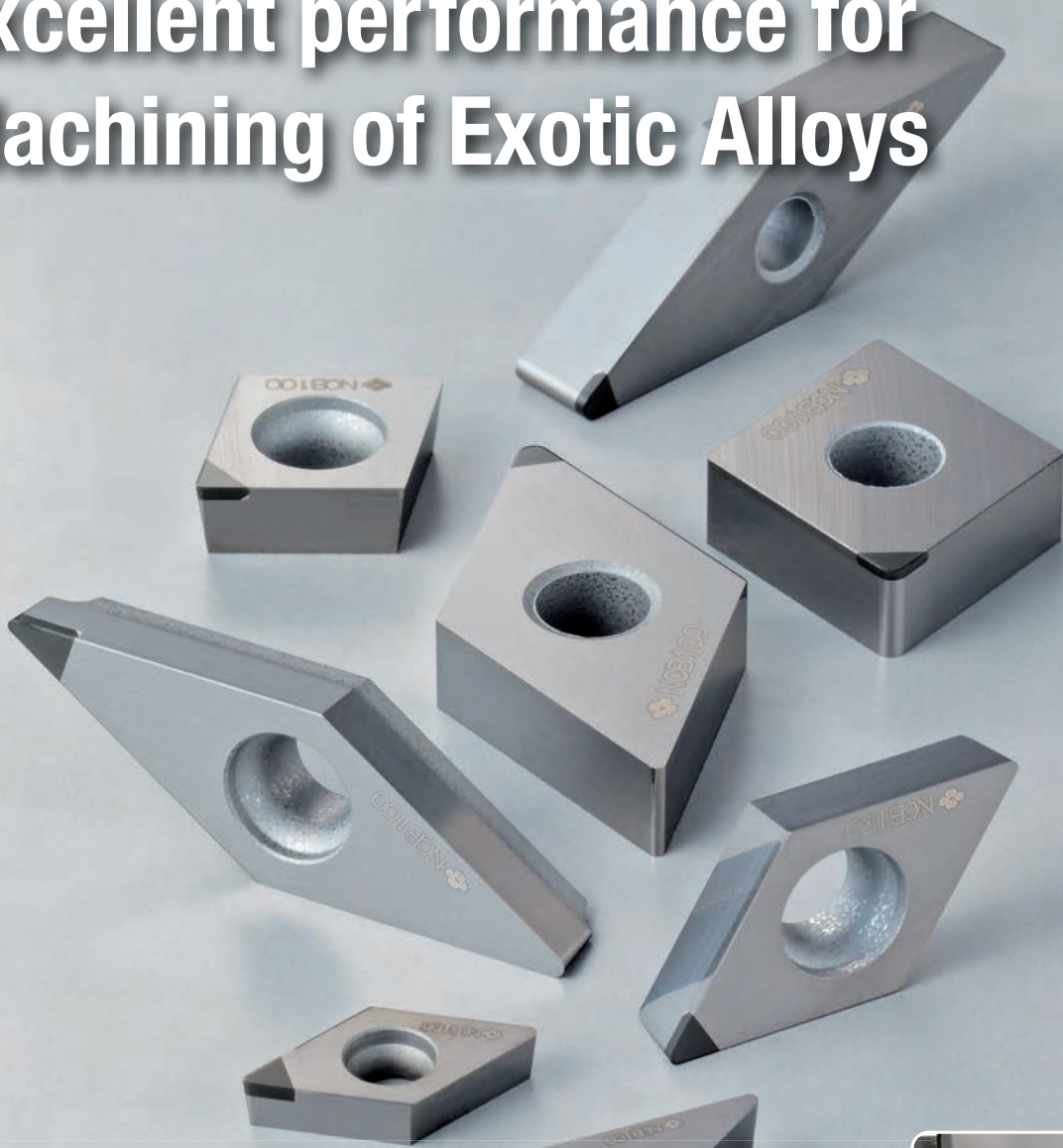


Nano-polycrystalline CBN Grade

SUMIBORON BINDERLESS **NCB100**

Rev. 2

Excellent performance for Machining of Exotic Alloys



Adopt **SUMIBORON BINDERLESS,**
nano-polycrystalline CBN, for cutting edges

High efficiency and high precision machining are possible
due to the use of the CBN tools with no binders



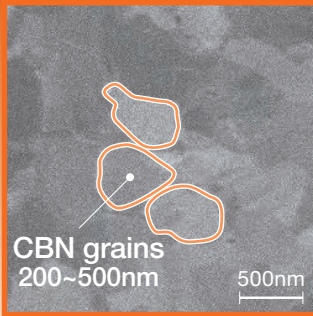
Nano-polycrystalline CBN

SUMIBORON BINDERLESS

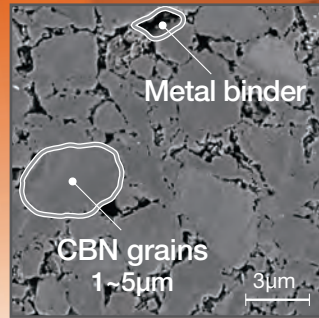
SUMIBORON BINDERLESS are CBN with nano to submicron CBN grains bound tight and no binders.

The higher hardness and improved thermal conductivity compared to conventional CBN grades ensure higher efficiency and longer tool life for use with exotic alloys such as titanium alloy and Co-Cr alloy.

● Comparison of Structure (SEM image)



SUMIBORON BINDERLESS



Conventional CBN

● Characteristic Values

	SUMIBORON BINDERLESS	Conventional CBN
CBN content (vol%)	100	90 ~ 95
Binder	-	WC-Co
Hardness Hv (GPa)	51 ~ 54	41 ~ 44
Thermal conductivity (W/m·K)	180 ~ 200	100 ~ 120

Nano-polycrystalline CBN Grade

SUMIBORON BINDERLESS NCB100

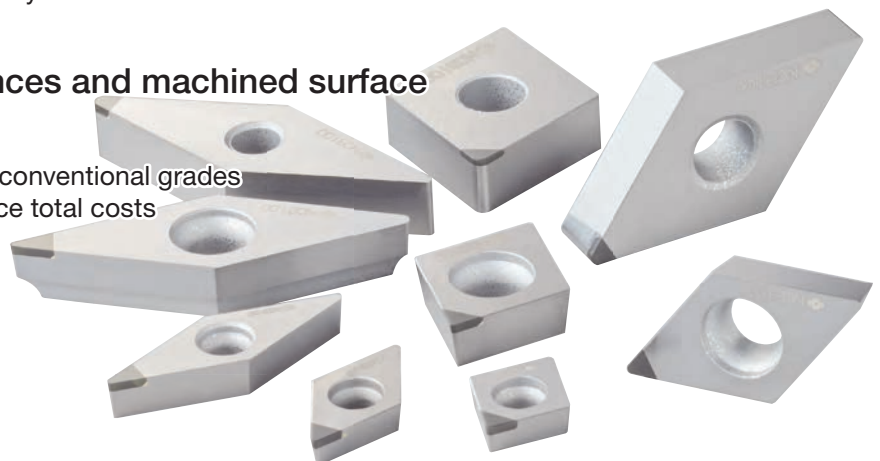
The cutting edge in NCB100 adopts nano-polycrystalline CBN with higher hardness and improved thermal conductivity compared to conventional CBN. This ensures higher efficiency, improved accuracy, and impressively longer tool life for machining exotic alloys such as titanium alloy and Co-Cr alloy.

● Suitable for high efficiency finishing of exotic alloys such as titanium alloy, Co-Cr alloy, etc.

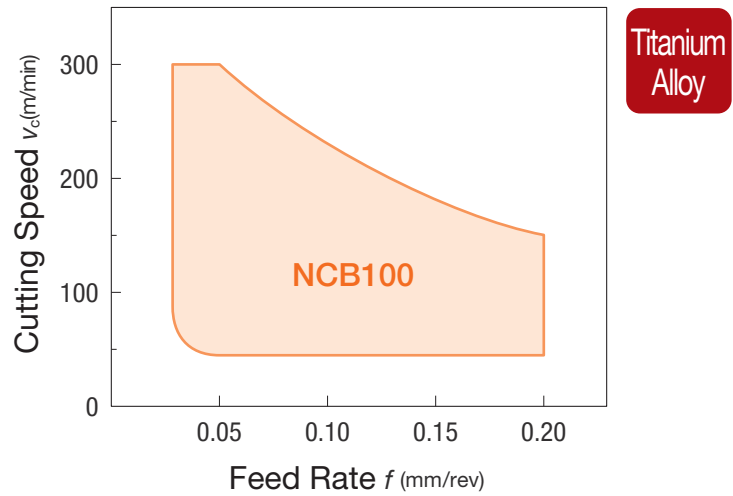
Outstanding wear resistance are achieved by the excellent hardness and thermal conductivity of nano-polycrystalline CBN

● Superior dimensional tolerances and machined surface roughness over many hours

Less tool replacements compared to conventional grades will improve work efficiency and reduce total costs

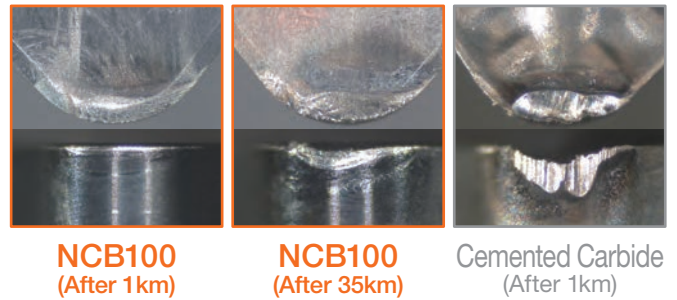
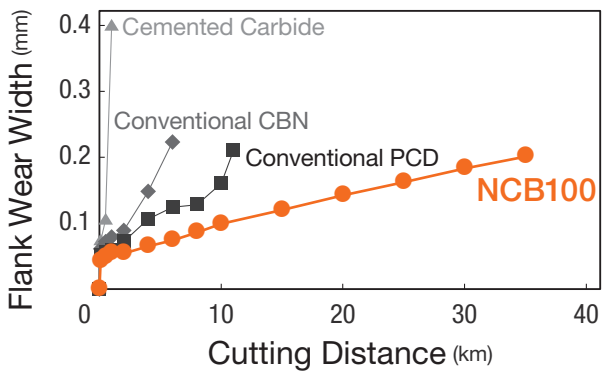


Application Range (Titanium Alloy Machining)



Wear Resistance (Titanium Alloy Machining)

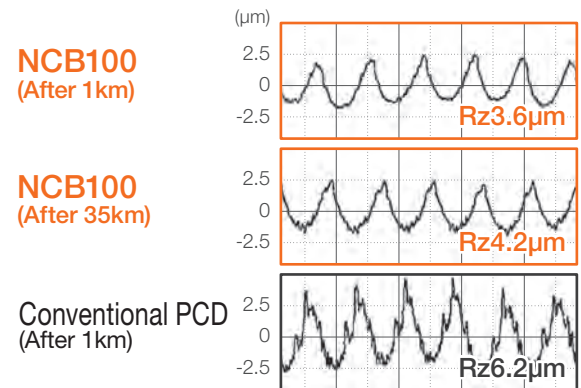
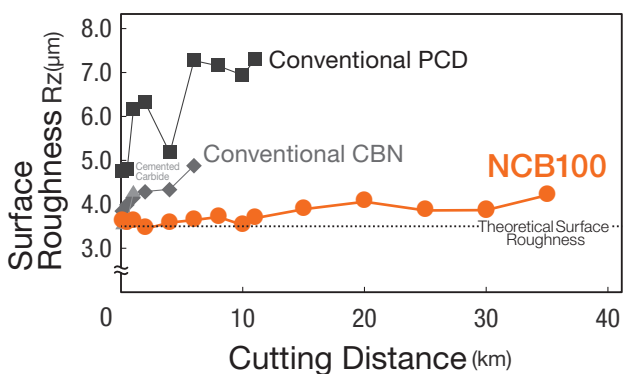
Up to 53 times better wear resistance against cemented carbide tools with high-speed machining, and simple lifetime management with uniform wear progression



Work Material : Titanium Alloy (Ti-6Al-4V) Tool : NU-CNGA120408
Cutting Conditions : $v_c=150\text{m/min}$ $f=0.15\text{mm/rev}$ $a_p=0.5\text{mm}$ Wet (High-pressure coolant)

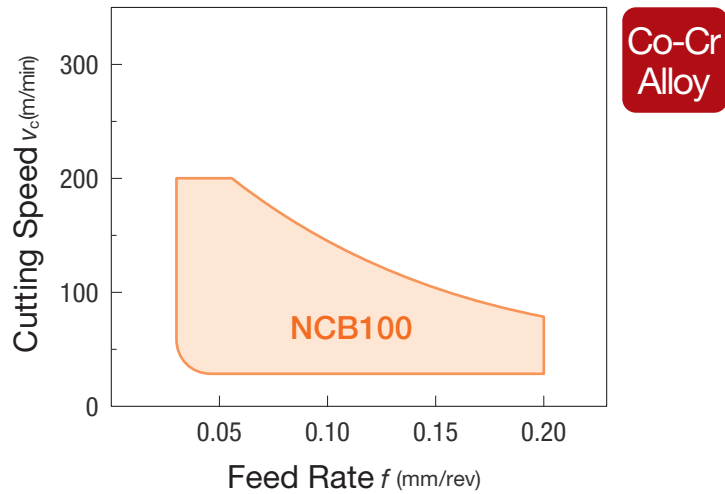
Machined Surface Roughness (Titanium Alloy Machining)

Stable surface roughness profile with values maintained close to theoretical surface roughness for extended periods



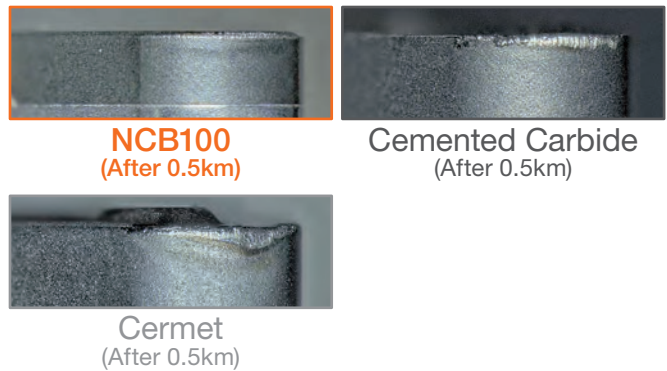
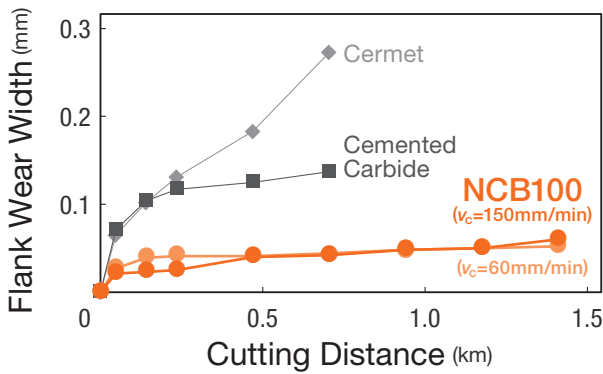
Work Material : Titanium Alloy (Ti-6Al-4V) Tool : NU-CNGA120408
Cutting Conditions : $v_c=150\text{m/min}$ $f=0.15\text{mm/rev}$ $a_p=0.5\text{mm}$ Wet (High-pressure coolant)

Application Range (Co-Cr Alloy Machining)



Wear Resistance (Co-Cr Alloy Machining)

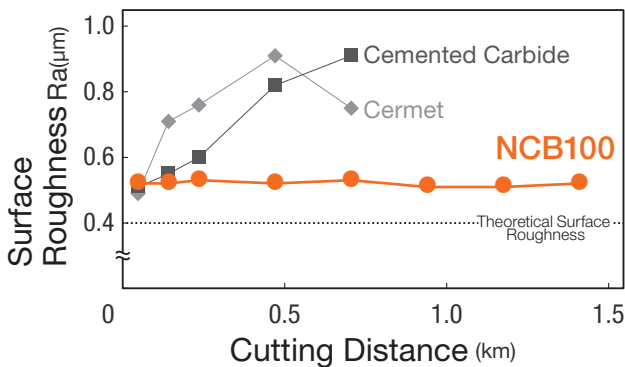
Increased efficiency through consistent wear resistance even with high-speed machining of 150m/min



Work Material : Co-Cr alloy (forged material) Tool : NU-VNGA160408
Cutting Conditions : v_c=60,150m/min f=0.1mm/rev a_p=0.4mm Wet

Machined Surface Roughness (Co-Cr Alloy Machining)

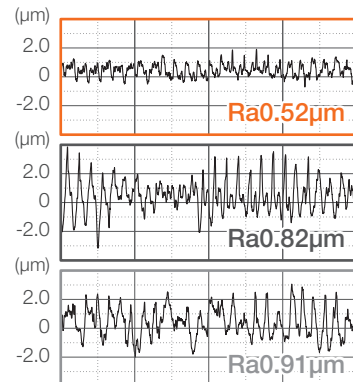
Maintains stable machined surface roughness



NCB100 (After 0.5km)

Cemented Carbide (After 0.5km)

Cermet (After 0.5km)



Work Material : Co-Cr alloy (forged material) Tool : NU-VNGA160408
Cutting Conditions : v_c=60m/min f=0.1mm/rev a_p=0.4mm Wet

Recommended Cutting Conditions

● Titanium Alloy



Work Material		Grade	Cutting Conditions		
Composition	Hardness(HRC)		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
Ti-6Al-4V	30 - 35	NCB100	0.10-0.30-0.50	0.05-0.15-0.20	50 - 200 - 300
Ti-5Al-5V-5Mo-3Cr	32 - 38	NCB100	0.10-0.30-0.50	0.05-0.10-0.20	50 - 150 - 250
Ti-10V-2Fe-3Al	32 - 38	NCB100	0.10-0.30-0.50	0.05-0.10-0.20	50 - 150 - 250

● Co-Cr Alloy



Work Material		Grade	Cutting Conditions		
Composition	Hardness(HRC)		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
Co-30Cr-5Mo	35 - 45	NCB100	0.10-0.15-0.30	0.05-0.15-0.20	50 - 100 - 200

● Cemented Carbide



Work Material		Grade	Cutting Conditions		
Composition	Hardness(HRA)		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
WC-20Co	Below 85	NCB100	0.03-0.10-0.20	0.03-0.10-0.20	5 - 20 - 40

* SUMIDIA BINDERLESS NPD10 recommended for carbide machining at 85HRA or higher.

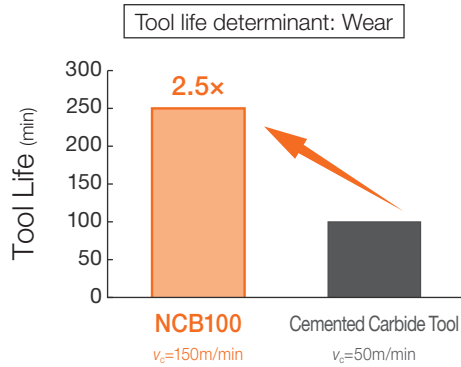
● Others

Work Material		Grade	Cutting Conditions		
Composition/Material	Hardness(HV)		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
Pure Titanium	130 - 230	NCB100	0.10-0.30-0.50	0.05-0.10-0.20	100 - 250 - 400
Cermet Material (Iron-based metal included in binder)	1,000 - 1,500	NCB100	0.10-0.20-0.30	0.05-0.10-0.20	10 - 30 - 50

Application Examples

Titanium Alloy Aeronautic Turbine Parts

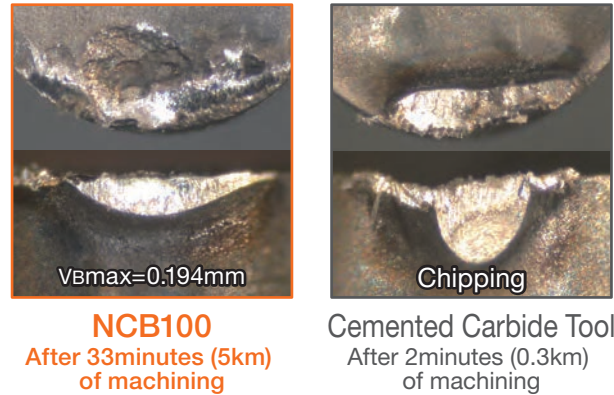
Impressive tool life with three times the efficiency



Tool : NU-CNGA120408 (NCB100)
Cutting Conditions : $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$
 $a_p=0.2\text{mm}$ Wet

Ti-5Al-5V-5Mo-3Cr Aeronautic Leg Components

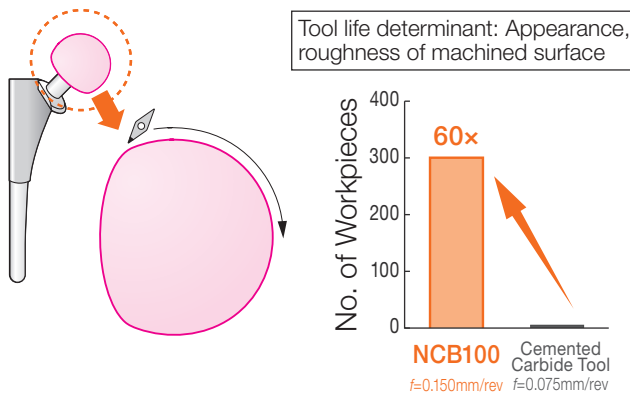
Excellent wear and crater resistance



Tool : NU-CNGA120408 (NCB100)
Cutting Conditions : $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$
 $a_p=0.4\text{mm}$ Wet (High-pressure coolant)

Co-Cr Alloy Artificial Hip Joint Head

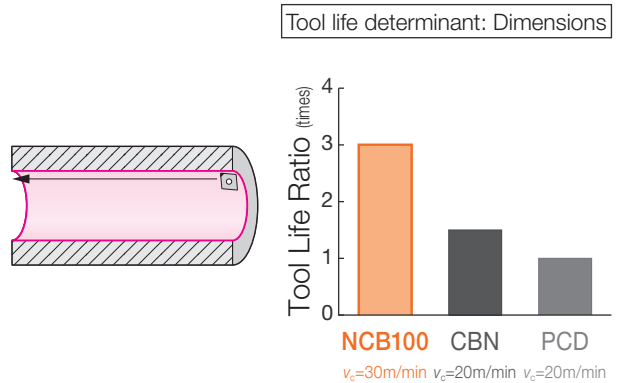
Impressive tool life with two times the efficiency



Tool : NU-VNGA160408 (NCB100)
Cutting Conditions : $v_c=65\text{m/min}$ $f=0.15\text{mm/rev}$
 $a_p=0.2\text{mm}$ Wet

Carbide (WC-20Co) Internal Machining of Die

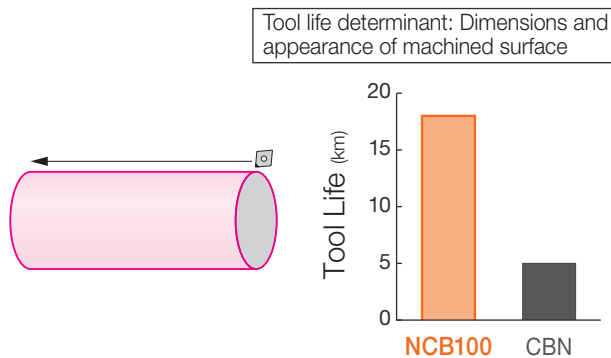
Excellent wear resistance when machining carbides with high Co content



Tool : NU-CCGW09T304 (NCB100)
Cutting Conditions : $v_c=30\text{m/min}$ $f=0.1\text{mm/rev}$
 $a_p=0.1\text{mm}$ Dry

Cermet Material Parts

Excellent wear resistance when machining hard cermet material



Tool : NU-CNGA120412 (NCB100)
Cutting Conditions : $v_c=30\text{m/min}$ $f=0.10\text{mm/rev}$
 $a_p=0.25\text{mm}$ Dry

Stocks

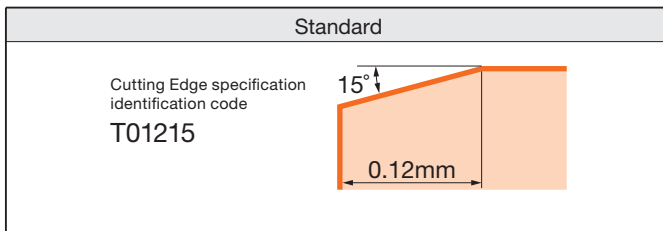
One-use / Negative (With Hole)

Shape	Cat. No.	Stock		Dimensions (mm)				
		NCB100	No. of Corners	Cutting Edge Length	Inscribed Circle	Thickness	Hole Size	Corner Radius
	NU-CNGA 120404	●	1	2.5	12.7	4.76	5.16	0.4
	120408	●		2.4				0.8
	120412	●		2.3				1.2
	NU-DNGA 150404	●	1	2.5	12.7	4.76	5.16	0.4
	150408	●		2.1				0.8
	150412	●		2.0				1.2
	NU-VNGA 160404	●	1	2.5	9.525	4.76	3.81	0.4
	160408	●		1.6				0.8

One-use/Positive (With Hole)

Shape	Relief Angle	Cat. No.	Stock		Dimensions (mm)				
			NCB100	No. of Corners	Cutting Edge Length	Inscribed Circle	Thickness	Hole Size	Corner Radius
	7°	NU-CCGW 060204	●	1	2.3	6.35	2.38	2.8	0.4
			●						
	7°	NU-CCGW 09T304	●	1	2.5	9.525	3.97	4.4	0.4
		09T308	●		2.4				0.8
	7°	NU-DCGW 070204	●	1	2.5	6.35	2.38	2.8	0.4
			●						
	7°	NU-DCGW 11T304	●	1	2.5	9.525	3.97	4.4	0.4
		11T308	●		2.1				0.8
	5°	NU-VBGW 110304	●	1	2.5	6.35	3.18	2.8	0.4
		110308	●		1.6				0.8
	5°	NU-VBGW 160404	●	1	2.5	9.525	4.76	4.4	0.4
		160408	●		1.6				0.8
	7°	NU-VCGW 160404	●	1	2.5	9.525	4.76	4.4	0.4
		160408	●		1.6				0.8

Cutting Edge Figure



Sumitomo Electric Cutting Tools Official Apps for iOS/Android



Cutting calculation App

SumiTool Calculator



Grade & chipbreaker comparison App

SumiTool Converter



< SAFETY NOTES >



- Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.

- Please handle with care as this product has sharp edges.
- Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.

- When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.

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<https://www.sumitool.com/global>