

Coated SUMIBORON for Hardened Steel Machining

# BNC2010 / BNC2020



- **BNC2010** - for high precision
- **BNC2020** - for general purpose
- Grades for high-efficiency machining, longer tool life
- One-use insert break master with chipbreaker types:  
**NFV** - for finishing, **NLV** - for light cutting, **NSV** - for carburised layer removal
- **WG/WH** wiper for high efficiency, good surface quality

 **SUMITOMO**

CARBIDE - CBN - DIAMOND

# Coated SUMIBORON BNC2010 / BNC2020



## ■ Characteristics

### BNC2010 - High Precision

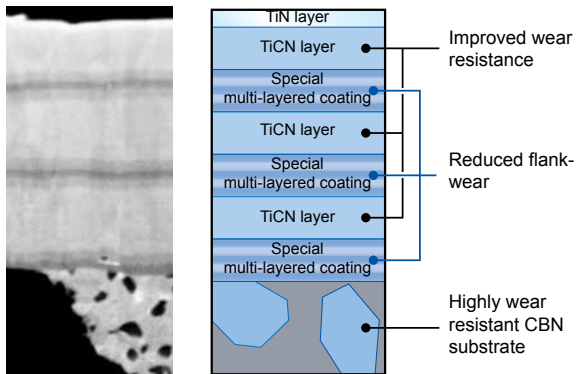
A grade for high-precision machining applicable for finishing requiring good surface roughness and dimensional accuracy. Provides further improved wear resistance thanks to a newly developed CBN substrate coated with a TiCN layer. Reduces flank wear and achieves excellent surface finish thanks to newly developed special stable multi-layered coating.

### BNC2020 - General Purpose & High Efficiency

A general-purpose grade applicable to general hardened steel machining. A newly developed tough CBN-substrate coated with a highly wear-resistant TiAlN layer. Achieves more stable machining and longer tool life by employing a highly adhesive layer for high chipping resistance.

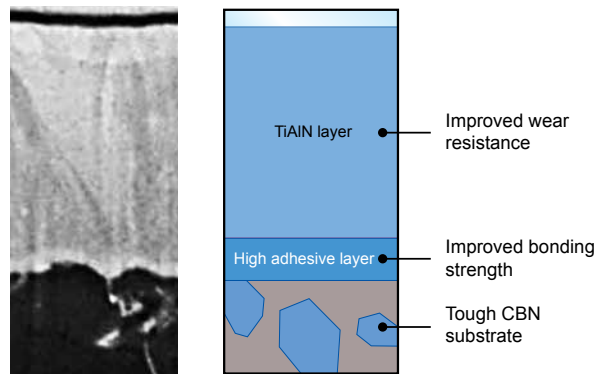
## ■ CBN-Substrate and Coating Structure of BNC2010 and BNC2020

### BNC2010



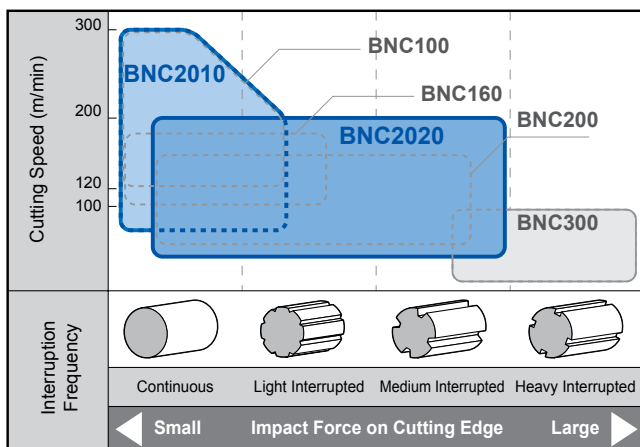
Achieves excellent flank wear resistance thanks to a laminated structure of a TiCN-layer and special multi-layer coating.

### BNC2020



Achieves further stability thanks to TiAlN coating layers with high bonding strength.

## ■ Application Range



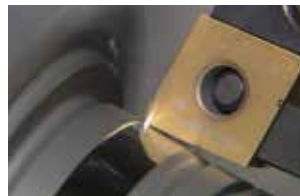
## ■ Recommended Cutting Conditions

### BNC2010

Cutting Speed (m/min)	
120	150 200 250 300
----- ----- ----- -----	
Feed Rate (mm/rev)	Depth of Cut (mm)
0.03 ~ 0.25	0.03 ~ 0.35

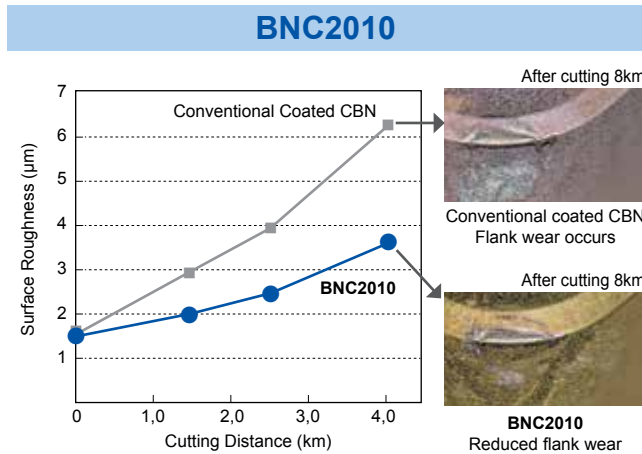
### BNC2020

Cutting Speed (m/min)	
50	100 150 200 220
----- ----- ----- -----	
Feed Rate (mm/rev)	Depth of Cut (mm)
0.03 ~ 0.40	0.03 ~ 0.50

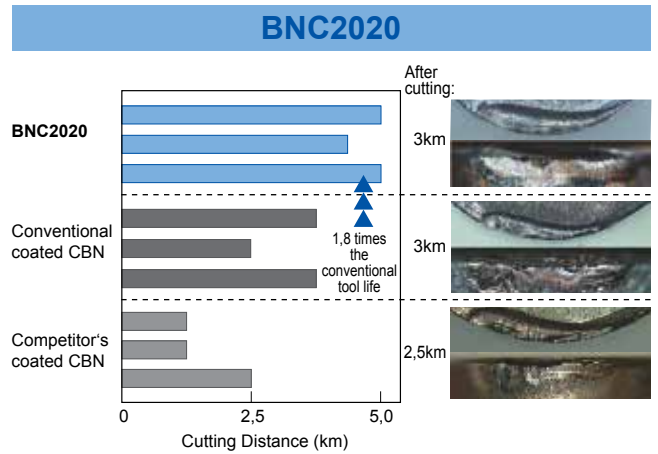


# Coated SUMIBORON BNC2010 / BNC2020

## Cutting Performance



Work Material: 15CrMo5, 58-62HRC, Continuous  
 Insert: DNGA150408NC4 (BNC2010)  
 Cutting Edge Treatment: S01225  
 Cutting Conditions:  $v_c=160\text{m/min}$ ,  $f=0,08\text{mm/rev}$ ,  $a_p=0,1\text{mm}$ , Wet

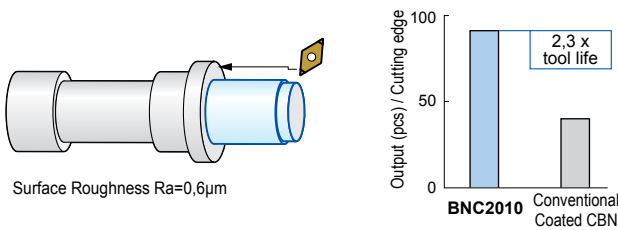


Work Material: SCM415-5V, 58-62HRC, Interrupted  
 Insert: CNGA120412NC4 (BNC2020)  
 Cutting Edge Treatment: S01225  
 Cutting Conditions:  $v_c=130\text{m/min}$ ,  $f=0,1\text{mm/rev}$ ,  $a_p=0,6\text{mm}$ , Dry

## Application Example

### Continuous External Turning of Main Shaft

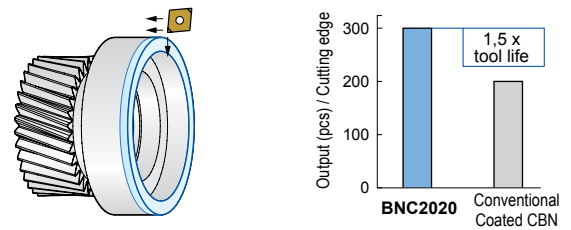
BNC2010 provides excellent wear resistance and achieves excellent surface roughness.



Insert: DNGA150408NC4 (BNC2010)  
 Cutting Conditions:  $v_c=200\text{m/min}$ ,  $f=0,10\text{mm/rev}$ ,  $a_p=0,35\text{mm}$ , Dry

### Carburised Layer Removal for Sun Gears

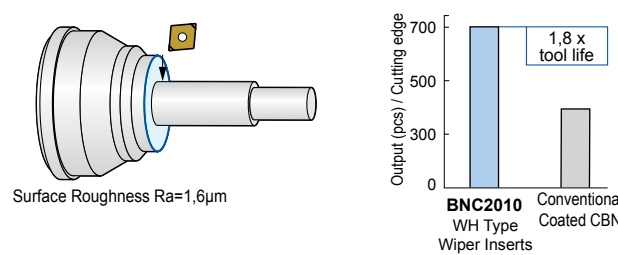
BNC2020 achieves a longer tool life in high load cutting.



Insert: DNGA120408NC4 (BNC2020)  
 Cutting Conditions:  $v_c=100\text{m/min}$ ,  $f=0,15\text{mm/rev}$ ,  $a_p=0,5\text{mm}$ , Wet

### Facing of CVJ Outer Race

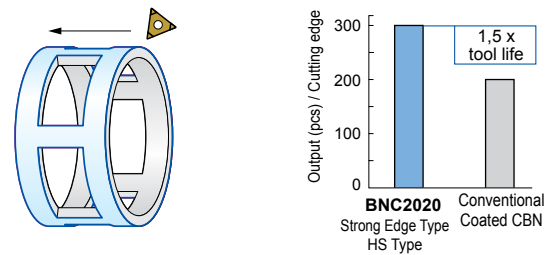
BNC2010 with a WH type wiper insert maintains excellent surface finish for an extended time.



Insert: CNGA120412NCWH2 (BNC2010)  
 Cutting Conditions:  $v_c=150\text{m/min}$ ,  $f=0,2\text{mm/rev}$ ,  $a_p=0,2\text{mm}$ , Dry

### Interrupted Machining of CVJ Cage Window

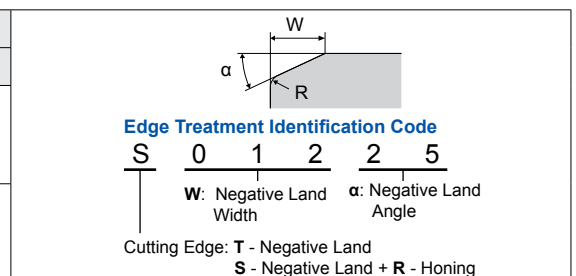
BNC2020 strong edge HS type provides stable performance in interrupted cutting.



Insert: TNGA160420HSNC3 (BNC2020)  
 Cutting Conditions:  $v_c=120\text{m/min}$ ,  $f=0,10\text{mm/rev}$ ,  $a_p=0,15\text{mm}$ , Dry

## Cutting Edge Preparation

Grade	General Edge Treatment	Strong Edge Type: HS
	Edge Treatment	Edge Treatment
BNC2010	S01225	S01730
BNC2020	S01225	S02735



# Coated SUMIBORON

## BNC2010 / BNC2020

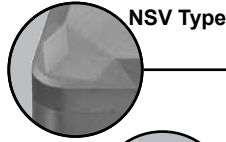
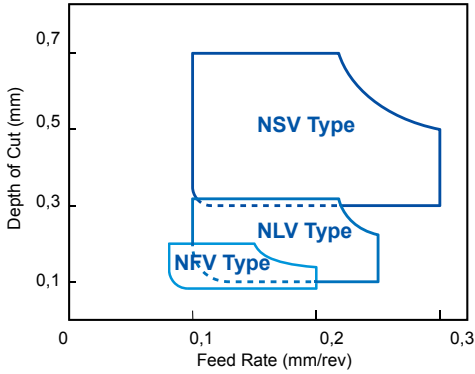
### Sumiboron Break Master NFV Type / NLV Type / NSV Type

A chipbreaker ideal for chip control in hardened steel machining.

NFV type and NLV type are ideal for finishing and light cutting of hardened steel.

NSV type is ideal for carburised layer removal and is applicable for hardened and non-hardened parts with effective chip control thanks to its unique chipbreaker design.

#### Application Range



**NSV Type for Carburised Layer Removal**  
Perfect for carburised layer removal. No constant stoppage or incorrect part dimension problems.



**NLV Type for Light Cutting**  
Delivers outstanding chip control in conditions with a  $\leq 0,3$ mm depth of cut.



**NFV Type for Finishing**  
Delivers outstanding chip control in finishing conditions with a  $\leq 0,2$ mm depth of cut.

### Cutting Edge Preparation

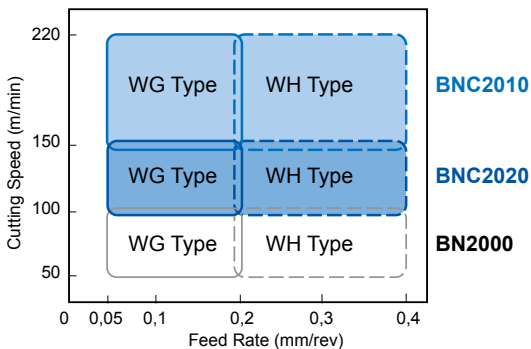
Grade	Break Master NFV Type	Break Master NLV Type	Break Master NSV Type	<p><b>Edge Treatment Identification Code</b> S 0 1 2 2 5 W: Negative Land Width    alpha: Negative Land Angle Cutting Edge: T - Negative Land    S - Negative Land + R - Honing</p>
	Edge Treatment	Edge Treatment	Edge Treatment	
BNC2010	-	S00535	S01235	
BNC2020	-	S00535	S01235	

### Sumiboron One-Use Wiper Inserts WG Type / WH Type

By using wiper inserts for hardened steel machining achieves excellent surface roughness on the same level achieved with grinding. WG type for low-feed machining and WH type for high-feed machining are available.

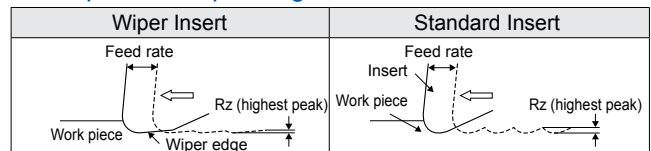
#### Application Range

(Surface roughness  $R_z = 1,6\mu\text{m}$  to  $3,2\mu\text{m}$ )



For optimum effectiveness, use wiper inserts for continuous cutting. In case chattering occurs, please check rigidity of work piece, clamping and machine.

#### Purpose of Wiper Edge



#### Surface Roughness of Wiper Insert

	Wiper Insert (WG Type / WH Type)		Standard Insert (No Wiper)	
	Low feed cutting (f=0,10mm/rev)	High feed cutting (f=0,30mm/rev)	Low feed cutting (f=0,10mm/rev)	High feed cutting (f=0,30mm/rev)
Surface Roughness Profile				
Surface Roughness $R_z$	0,63 $\mu\text{m}$	1,39 $\mu\text{m}$	1,98 $\mu\text{m}$	9,20 $\mu\text{m}$

### Cutting Edge Preparation for Wiper Type

Grade	Wiper Insert: WG Type	Wiper Insert: WH Type	<p><b>Edge Treatment Identification Code</b> S 0 1 2 2 5 W: Negative Land Width    alpha: Negative Land Angle Cutting Edge: T - Negative Land    S - Negative Land + R - Honing</p>
	Edge Treatment	Edge Treatment	
BNC2010	S01215	S01215	
BNC2020	S01215	S01215	

■ Multi Corner, One-use Type

Shape	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)			
		BNC2010	BNC2020			Inscribed Circle	Thick-ness	Screw Hole Ø	Nose Radius
	CNGA 120404NC4	●	●	4	2,5	12,7	4,76	5,16	0,4
	120408NC4	●	●	4	2,4				0,8
	120412NC4	●	●	4	2,3				1,2
	CNGA 120404NCWG4	●	●	4	2,4	12,7	4,76	5,16	0,4
	120408NCWG4	●	●	4	2,4				0,8
	120412NCWG4	●	●	4	2,3				1,2
	CNGA 120404NCWH4	●	●	4	2,4	12,7	4,76	5,16	0,4
	120408NCWH4	●	●	4	2,3				0,8
	120412NCWH4	●	●	4	2,2				1,2
	DNGA 110404NC2	●	●	2	2,4	9,525	4,76	3,91	0,4
	110408NC2	●	●	2	2,0				0,8
	DNGA 150404NC4	○	○	4	2,4	12,7	4,76	5,16	0,4
	150408NC4	○	○	4	2,0				0,8
	150412NC4	○	○	4	2,0				1,2
	DNGA 150604NC4	●	●	4	2,4	12,7	6,35	5,16	0,4
	150608NC4	●	●	4	2,0				0,8
	150612NC4	●	●	4	2,0				1,2
	DNGA 150604NCWG4	●	●	4	2,3	12,7	6,35	5,16	0,4
	150608NCWG4	●	●	4	2,0				0,8
	150612NCWG4	●	●	4	2,1				1,2
	DNGA 150604NCWH4	●	●	4	2,1	12,7	6,35	5,16	0,4
	150608NCWH4	●	●	4	1,8				0,8
	150612NCWH4	●	●	4	1,5				1,2
	SNGA 120408NC4	●	●	4	2,3	12,7	4,76	5,16	0,8
	120412NC4	●	●	4	2,1				1,2
	TNGA 160404NC6	●	●	6	2,3	9,525	4,76	3,81	0,4
	160408NC6	●	●	6	2,0				0,8
	160412NC6	●	●	6	2,0				1,2
	VNGA 160404NC2	●	●	2	2,8	9,525	4,76	3,81	0,4
	160408NC2	●	●	2	2,0				0,8
	VNGA 160404NC4	●	●	4	2,8	9,525	4,76	3,81	0,4
	160408NC4	●	●	4	2,0				0,8
	WNGA 080404NC6	●	●	6	2,3	12,7	4,76	5,16	0,4
	080408NC6	●	●	6	2,0				0,8
	080412NC6	●	●	6	2,0				1,2
	WNGA 080408NCWH6	●	●	6	1,9	12,7	4,76	5,16	0,8
	WNGA 080408NCWG6	●	●	6	2,0	12,7	4,76	5,16	0,8

■ Multi Corner, One-use Type, Break Master

Shape	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)			
		BNC2010	BNC2020			Inscribed Circle	Thick-ness	Screw Hole Ø	Nose Radius
	CNGG 120404NFVNC4	●	●	4	2,5	12,7	4,76	5,16	0,4
	120408NFVNC4	●	●	4	2,4				0,8
	120412NFVNC4	●	●	4	2,3				1,2
	CNGG 120404NLVNC4	●	●	4	2,5	12,7	4,76	5,16	0,4
	120408NLVNC4	●	●	4	2,4				0,8
	120412NLVNC4	●	●	4	2,3				1,2
	CNGG 120404NSVNC4	○	○	4	2,5	12,7	4,76	5,16	0,4
	120408NSVNC4	○	○	4	2,4				0,8
	120412NSVNC4	○	○	4	2,4				1,2
	DNGG 150404NFVNC4	○	○	4	2,5	12,7	4,76	5,16	0,4
	150408NFVNC4	○	○	4	2,1				0,8
	150412NFVNC4	○	○	4	2,0				1,2
	DNGG 150404NLVNC4	○	○	4	2,5	12,7	4,76	5,16	0,4
	150408NLVNC4	○	○	4	2,1				0,8
	150412NLVNC4	○	○	4	2,0				1,2
	DNGG 150408NSVNC4	○	○	4	2,1	12,7	4,76	5,16	0,8
	150412NSVNC4	○	○	4	2,0				1,2
	DNGG 150604NFVNC4	●	●	4	2,4	12,7	6,35	5,16	0,4
	150608NFVNC4	●	●	4	2,0				0,8
	150612NFVNC4	●	●	4	1,9				1,2
	DNGG 150604NLVNC4	●	●	4	2,8	12,7	6,35	5,16	0,4
	150608NLVNC4	●	●	4	2,0				0,8
	150612NLVNC4	●	●	4	1,9				1,2
	DNGG 150608NSVNC4	●	●	4	2,0	12,7	6,35	5,16	0,8
	150612NSVNC4	●	●	4	1,9				1,2
	TNGG 160404NFVNC6	●	●	6	2,3	9,525	4,76	3,81	0,4
	160408NFVNC6	●	●	6	2,0				0,8
	160412NFVNC6	●	●	6	2,0				1,2
	TNGG 160404NLVNC6	●	●	6	2,3	9,525	4,76	3,81	0,4
	160408NLVNC6	●	●	6	2,0				0,8
	160412NLVNC6	●	●	6	2,0				1,2
	TNGG 160408NSVNC6	○	○	6	2,0	9,525	4,76	3,81	0,8
	160412NSVNC6	○	○	6	2,0				1,2
	VNGG 160404NFVNC4	●	●	4	2,8	9,525	4,76	3,81	0,4
	160408NFVNC4	●	●	4	2,0				0,8
	VNGG 160404NLVNC4	●	●	4	2,8	9,525	4,76	3,81	0,4
	160408NLVNC4	●	●	4	2,0				0,8

■ Multi Corner, One-use Type, Strong Edge Type HS

Shape	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)			
		BNC2010	BNC2020			Inscribed Circle	Thick-ness	Screw Hole Ø	Nose Radius
	CNGA 120404HSNC2	●	●	2	2,5	12,7	4,76	5,16	0,4
	120408HSNC2	●	●	2	2,4				0,8
	120412HSNC2	●	●	2	2,3				1,2
	SNGA 120408HSNC4	○	○	4	2,3	12,7	4,76	5,16	0,8
	120412HSNC4	○	○	4	2,1				1,2
	DNGA 150604HSNC2	●	●	2	2,4	12,7	6,35	5,16	0,4
	150608HSNC2	●	●	2	2,0				0,8
	150612HSNC2	●	●	2	2,0				1,2
	TNGA 160404HSNC3	●	●	3	2,3	9,525	4,76	3,81	0,4
	160408HSNC3	●	●	3	2,0				0,8
	160412HSNC3	●	●	3	2,0				1,2

■ One-use Type

Shape	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)			
		BNC2010	BNC2020			Inscribed Circle	Thick-ness	Screw Hole Ø	Nose Radius
	ZNEX 040102NC	●	●	1	2,4	4,76	1,59	2,3	0,2
	040104NC	●	●	1	2,3				0,4

● Euro stock  
○ Japan stock

### Multi Corner, One-use Type

Shape	Relief Angle	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)					
			BNC2010	BNC2020			Inscribed Circle	Thickness	Screw Hole Ø	Nose Radius		
	7°	CCGW 060202NC2	●	●	2	2,4	6,35	2,38	2,8	0,2		
		060204NC2	●	●							2,3	0,4
		060208NC2	●	●							2,3	0,8
	7°	CCGW 09T302NC2	●	●	2	2,5	9,525	3,97	4,4	0,2		
		09T304NC2	●	●							2,5	0,4
		09T308NC2	●	●							2,4	0,8
	7°	CCGW 09T304NCWG2	●	●	2	2,4	9,525	3,97	4,4	0,4		
		09T308NCWG2	●	●							2,4	0,8
	7°	CCGW 09T304NCWH2	●	●	2	2,4	9,525	3,97	4,4	0,4		
		09T308NCWH2	●	●							2,3	0,8
	7°	DCGW 070202NC2	●	●	2	2,6	6,35	2,38	2,8	0,2		
		070204NC2	●	●							2,5	0,4
		070208NC2	●	●							2,1	0,8
	7°	DCGW 11T302NC2	●	●	2	2,7	9,525	3,97	4,4	0,2		
		11T304NC2	●	●							2,5	0,4
		11T308NC2	●	●							2,1	0,8
	7°	DCGW 11T304NCWG2	●	●	2	2,3	9,525	3,97	4,4	0,4		
		11T308NCWG2	●	●							2,1	0,8
	7°	DCGW 11T304NCWH2	●	●	2	2,1	9,525	3,97	4,4	0,4		
		11T308NCWH2	●	●							1,8	0,8
	7°	TCGW 16T304NC3	●	●	3	2,3	9,525	3,97	4,3	0,4		
		16T308NC3	●	●							2,0	0,8
	5°	VBGW 110204NC2	○	○	2		6,35	2,38	2,8	0,4		
	5°	VBGW 160404NC2	●	●	2	3,3	9,525	4,76	4,4	0,4		
		160408NC2	●	●							2,5	0,8
		160412NC2	○	○							2,2	1,2

### Multi Corner, One-use Type, Strong Edge Type HS

Shape	Relief Angle	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)			
			BNC2010	BNC2020			Inscribed Circle	Thickness	Screw Hole Ø	Nose Radius
	7°	CCGW 09T304HSNC2	●	●	2	2,4	9,525	3,97	4,4	0,4
		09T308HSNC2	●	●						
	7°	DCGW 11T304HSNC2	●	●	2	2,4	9,525	3,97	4,4	0,4
		11T308HSNC2	●	●						
	5°	VBGW 160404HSNC2	●	●	2	3,2	9,525	4,76	4,4	0,4
		160408HSNC2	●	●						

### Multi Corner, One-use Type, Break Master

Shape	Relief Angle	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)					
			BNC2010	BNC2020			Inscribed Circle	Thickness	Screw Hole Ø	Nose Radius		
	7°	CCGT 060204NFVNC2	●	●	2	2,3	6,35	2,38	2,8	0,4		
	7°	CCGT 09T304NFVNC2	●	●	2	2,4	9,525	3,97	4,4	0,4		
		09T308NFVNC2	●	●							2,3	0,8
	7°	CCGT 09T304NLVNC2	●	●	2	2,4	9,525	3,97	4,4	0,4		
		09T308NLVNC2	●	●							2,3	0,8
	7°	DCGT 070204NFVNC2	●	●	2	2,5	6,35	2,38	2,8	0,4		
		11T304NFVNC2	●	●							2,4	0,4
		11T308NFVNC2	●	●							2,0	0,8
	7°	DCGT 11T304NLVNC2	●	●	2	2,4	9,525	3,97	4,4	0,4		
		11T308NLVNC2	●	●							2,0	0,8
	11°	TPGT 110304NFVNC3	●	●	3	2,3	6,35	3,97	3,4	0,4		
		110308NFVNC3	●	●							2,0	0,8

### One-use Type

Shape	Relief Angle	Cat. No.	Stock		No. of Cutt. Edges	Cutt. Edge Length	Dimensions (mm)					
			BNC2010	BNC2020			Inscribed Circle	Thickness	Screw Hole Ø	Nose Radius		
	7°	TCGW 090204NC	●	●	1	2,2	5,56	2,38	2,8	0,4		
		090208NC	●	●							1,9	0,8
	7°	TCGW 110202NC	●	●	1	2,5	6,35	2,38	2,8	0,2		
		110204NC	●	●							2,4	0,4
		110208NC	●	●							2,1	0,8
	11°	TPGW 080202NC	●	●	1	2,6	4,76	2,39	2,3	0,2		
		080204NC	●	●							2,4	0,4
	11°	TPGW 110304NC	●	●	1	2,4	6,35	3,18	3,4	0,4		
		110308NC	●	●							2,2	0,8
	5°	VBGW 110202NC	●	●	1	3,3	6,35	2,38	2,8	0,2		
		110204NC	●	●							2,8	0,4
		110208NC	●	●							2,0	0,8

● Euro stock  
○ Japan stock



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