

CBN Grade for Turning Hardened Steel

# BC8200 Series

Chip  
Breaker  
Add.

## Excellent Coated CBN Grade for Next Generation Turning of Hardened Steels



## CBN Grade for Turning Hardened Steel

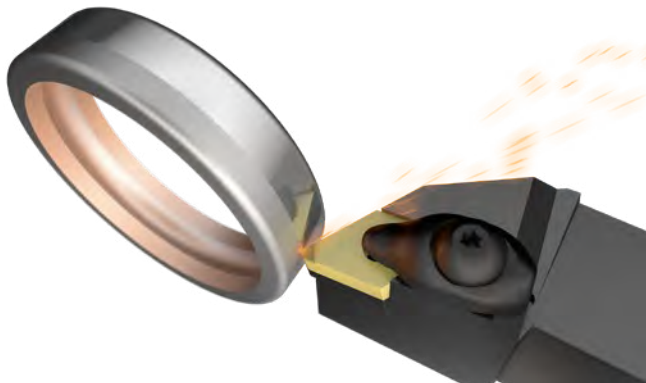
# BC8200 Series

**NEW**

**BC8210** For Continuous and Light Interrupted Cutting

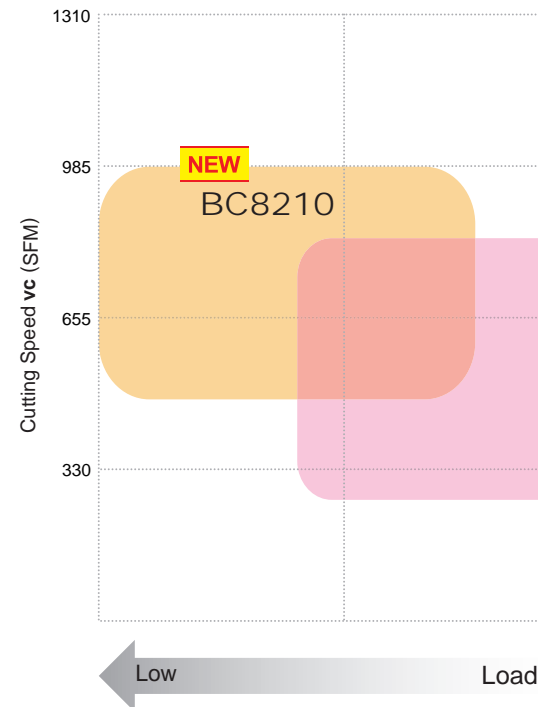
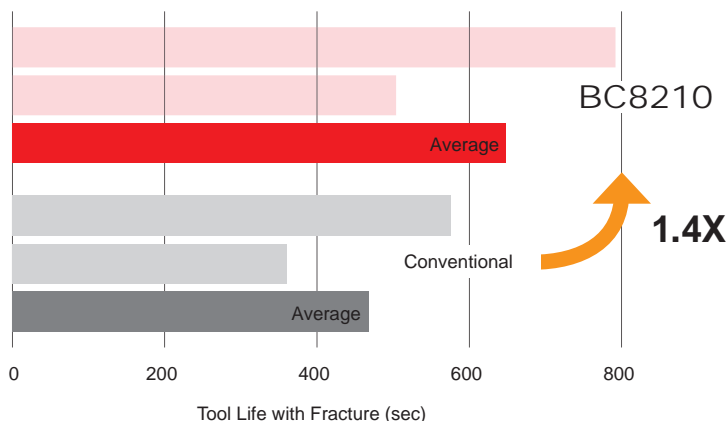
### Outstanding Tool Life with High-speed Machining

Suitable for continuous cutting and Light interrupted cutting. BC8210 exhibits excellent chipping, flank and crater wear resistance, thereby providing a stable machining process at high speed cutting conditions.

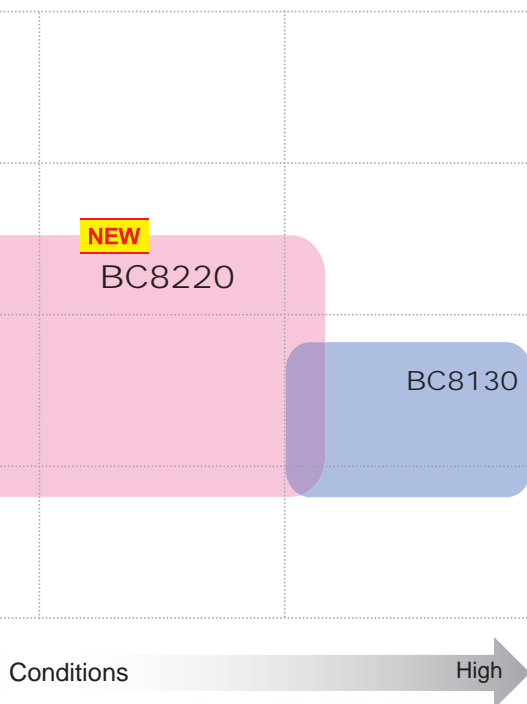


### Comparison of Wear Resistance During Continuous Cutting

Defects due to crater wear are suppressed and tool life is improved when compared to conventional products.



<Cutting Conditions>  
Workpieces Material : AISI 5120 (60 HRC)  
Inserts : NP-CNGA432-GS2  
Cutting Speed :  $vc=655$  SFM  
Feed per Rev. :  $f=.004$  IPR  
Depth of Cut :  $ap=.008$  inch  
Cutting Mode : Dry Cutting



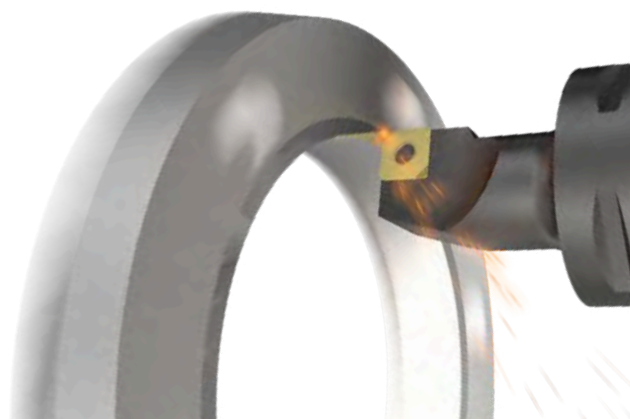
<Cutting Conditions>  
 Workpieces Material : AISI 5120 (60 HRC)  
 Inserts : NP-CNGA432-VA2  
 Cutting Speed :  $v_c=820$  SFM  
 Feed per Rev. :  $f=.006$  IPR  
 Depth of Cut :  $a_p=.004$  inch  
 Cutting Mode : Dry Cutting

**NEW**

## BC8220 General Applications

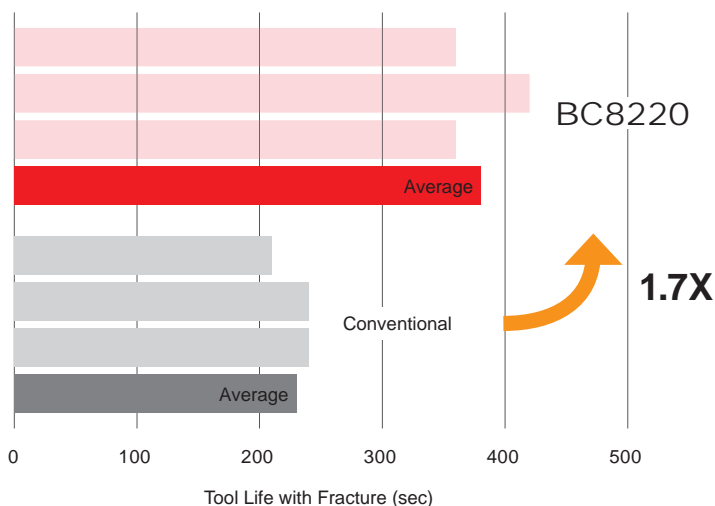
### Achieves Impressive Tool Life Over a Wide Range of Cutting Conditions.

Highly suited to a wide application area from continuous through to heavy interrupted cutting. It also has excellent crater wear and fracture resistance due to the new CBN base material combined with a new coating to dramatically extend tool life.



### Comparison of Fracture Resistance During Medium Interrupted Cutting

Excelling in suppression of chipping and cracks, it also improves fracture resistance after crater wear providing stable cutting action that improves tool life.



## Features

### BC8210

The newly developed, impact absorbing, AlCrSiN-base coating combined with the excellent wear-resistant, TiAlSiN-base coating, provides stable wear and chip resistance from continuous through to low interrupted cutting.

**NEW**



Gold color aids easy identification of edge use.

Excellent chipping resistance  
Absorbs impact forces

Excellent wear resistance  
Abrasion resistant layer

Improved strength of adhesion to the  
CBN substrate prevents peeling  
High adhesion layer for BC8210

Excellent crater wear and chipping resistance  
Exclusive BC8210 sintered body



## Ultra Micro-particle/ Heat Resistant Binder Technology

The new CBN substrate contains a new ultra micro-particle and heat resistant binder. This suppresses both chipping and crater wear that promote longer tool life.

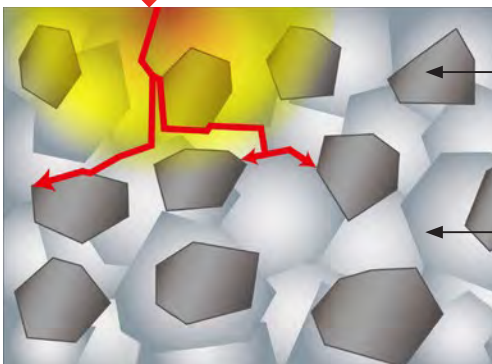
## Optimized Substrate Technology with Ultra Micro-particle Binder

The ultra micro-particle binder prevents linear crack development to avoid sudden fracturing.

### Conventional

Cutting Resistance

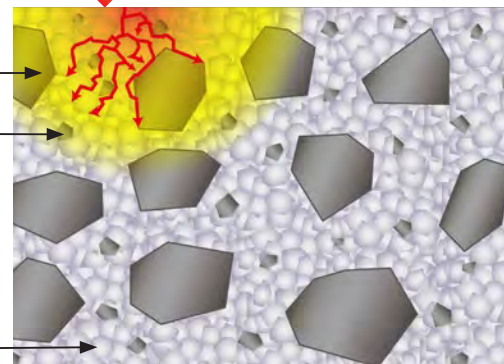
Forces Dispersed in a Linear Pattern



### BC8200, BC8100 Series

Cutting Resistance

Forces Dispersed Radially



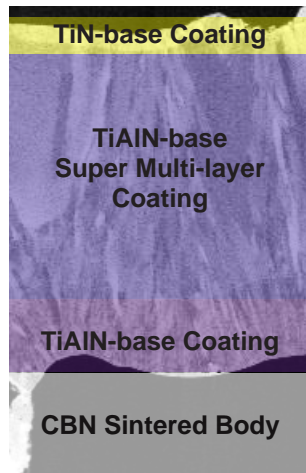


# BC8220

TiAlN-base coating, which has excellent wear resistance and a fine multi-layered structure suppresses the growth of cracks in the coating and thereby reduces edge chipping. This allows for stable cutting in a wide variety of applications.



**NEW**



Gold color aids easy identification of edge use.

High wear and chipping resistance Super Multi-layer

Improved strength of adhesion to the CBN substrate prevents peeling High adhesion layer for BC8220

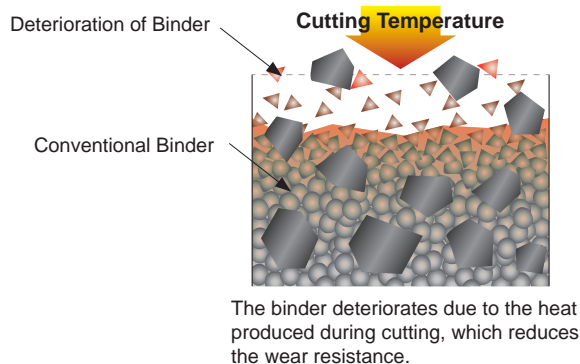
Excellent crater wear and chipping resistance Exclusive BC8220 Sintered body

**NEW**

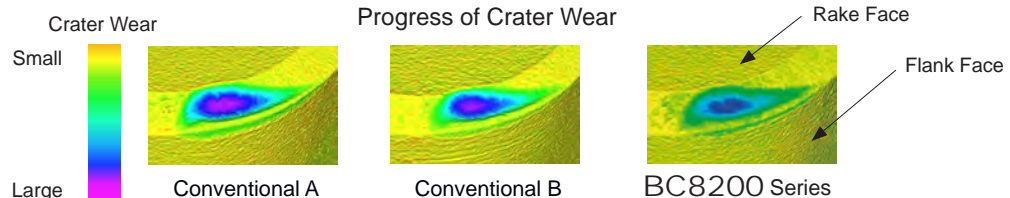
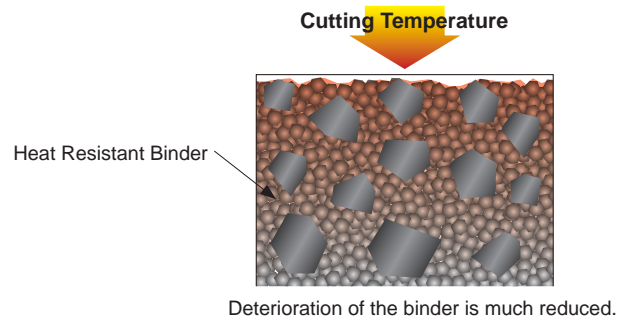
## Positive Effect of the Newly Developed Heat Resistant Binder

By increasing the heat resistance of the binder, wear resistance due to the deterioration of the binder component is increased, thereby suppressing crater wear, chipping and fracturing.

### Conventional



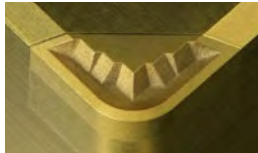
### BC8200 Series



# Features of the Insert

## Chip Breaker

A BR breaker has been added to achieve better chip control at higher depths of cut. A versatile range of chip breakers are available for a wide range of applications.



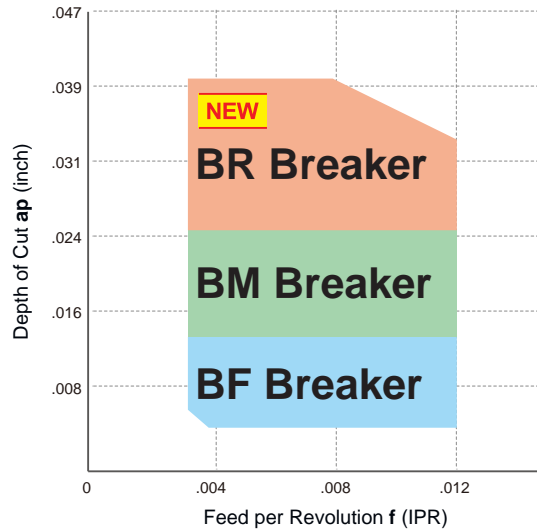
**BR Breaker**



**BM Breaker**



**BF Breaker**

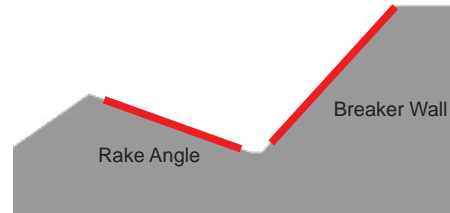
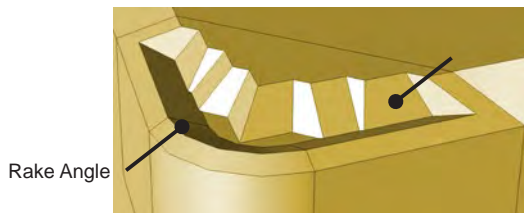


## BR Breaker (BC8220)

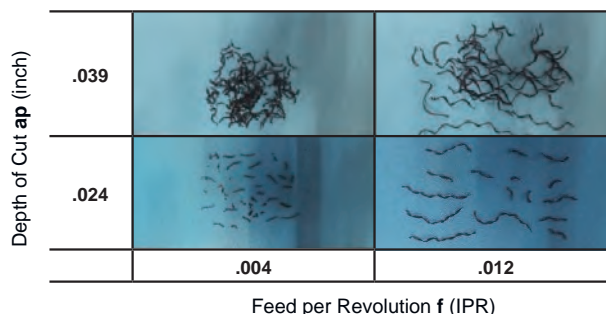
**NEW**

A reduced number of passes needed and improved chip control during high depth of cut. Chips are formed with the effect from the rake angle, and the multi stage breaker wall supports a wide range of cuts.

Recommended Cutting Conditions :  $vc=260-655$  SFM,  $f \leq .012$  IPR,  $ap=.024-.039$  inch



**Achieves ideal chip control even at high depths of cut.**

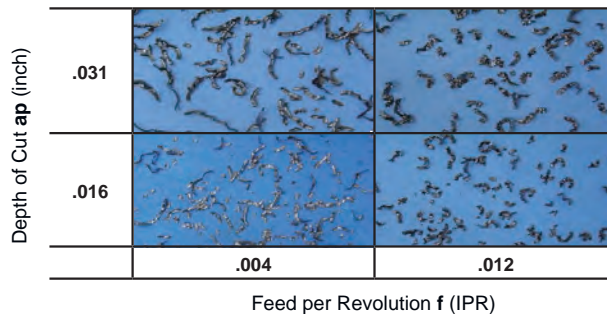
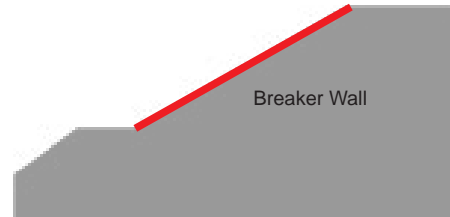
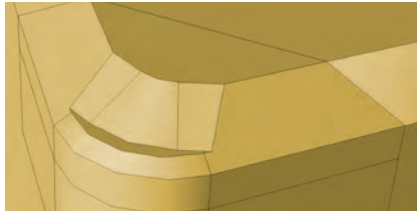


<Cutting Conditions>  
 Workpiece Material : AISI 5120H (60 HRC)  
 Inserts : BR-CNGM432-TA2  
 Cutting Speed :  $vc=655$  SFM  
 Feed per Rev. :  $f=.004$  IPR  
                       .012 IPR  
 Depth of Cut :  $ap=.024$  inch  
                       .039 inch  
 Cutting Mode : Dry Cutting

## BM Breaker (BC8220)

Great chip control when machining at medium depths of cut. (.012-.031 inch)

Recommended Cutting Conditions :  $vc=260-655$  SFM,  $f \leq .012$  IPR,  $ap=.012-.031$  inch

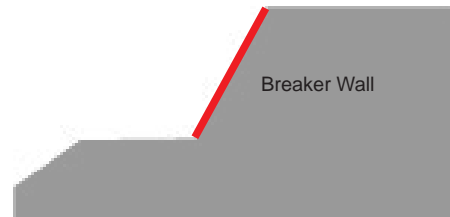
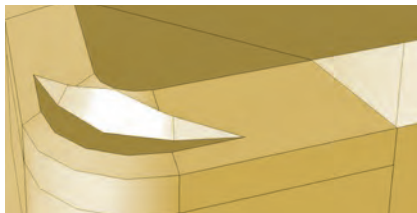


<Cutting Conditions>  
 Workpiece Material : JIS SCM415 (60 HRC)  
 Inserts : BM-CNGM432-TA2  
 Cutting Speed :  $vc=525$  SFM  
 Feed per Rev. :  $f=.004$  IPR  
                               .012 IPR  
 Depth of Cut :  $ap=.016$  inch  
                               .031 inch  
 Cutting Mode : Dry Cutting

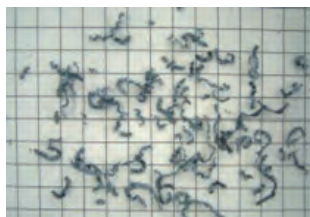
## BF Breaker (BC8210, BC8220)

Achieves excellent chip control while finish cutting at depths of .012 inch or less.

Recommended Cutting Conditions :  $vc=260-655$  SFM,  $f \leq .012$  IPR,  $ap=.004-.012$  inch

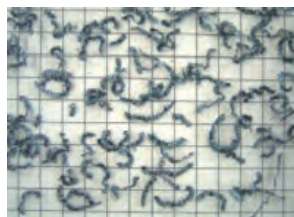


External Turning



Cutting Speed :  $vc = 330$  SFM  
 Feed per Rev. :  $f=.008$  IPR  
 Depth of Cut :  $ap = .012$  inch

Boring

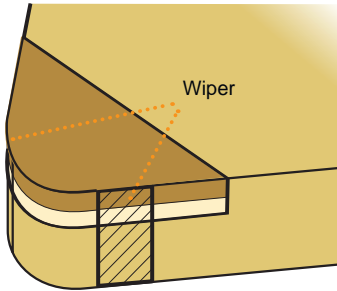


Cutting Speed :  $vc = 395$  SFM  
 Feed per Rev. :  $f = .008$  IPR  
 Depth of Cut :  $ap = .012$  inch

<Cutting Conditions>  
 Workpiece Material : JIS SCM415 (60 HRC)  
 Inserts : BF-CNGM432-TS2  
 Cutting Mode : Dry Cutting

# Wiper Insert

## ■ Features



### Improving Surface Finish

Under the same machining conditions as conventional chip breakers, but with the feed rate increased, the surface finish of the workpiece can be improved.

### Improving Efficiency

High feed rates not only shorten machining times but also make it possible to combine roughing and finishing operations.

### Increased Tool Life

When using at high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing, thereby, delaying the progression of wear and increasing tool life.

### Improving Chip Control

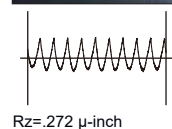
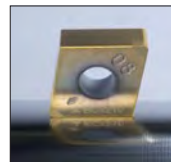
Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.

## ■ Recommended Cutting Conditions and Performance



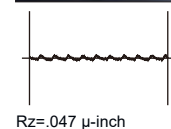
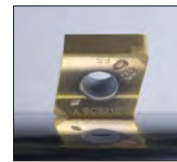
Cutting Speed:  $vc=490$  SFM    Feed per Rev.:  $f = .012$  IPR  
Depth of Cut:  $a_p=.004$  inch    Cutting Mode: Dry Cutting

Without Wiper



$R_z=.272$   $\mu$ -inch

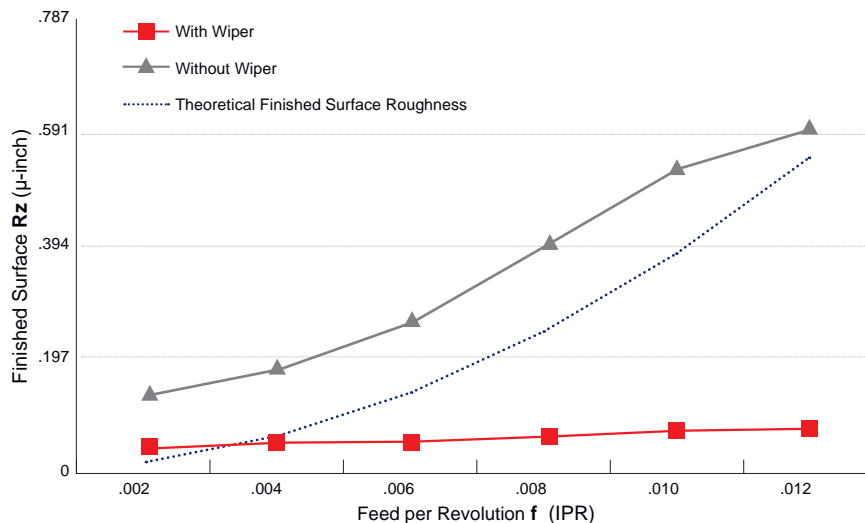
With Wiper



$R_z=.047$   $\mu$ -inch

## ■ Cutting Performance

### WL Wiper (External Turning)







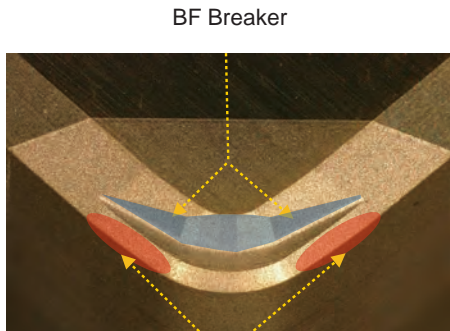
<Cutting Conditions>

Workpiece Material : Hardened Steel (60HRC)  
Insert : NP-CNGA432  
Machining Methods : Continuous  
Cutting Speed :  $vc = 395$  SFM  
Depth of Cut :  $a_p = .004$  inch  
Cutting Mode : Dry Cutting

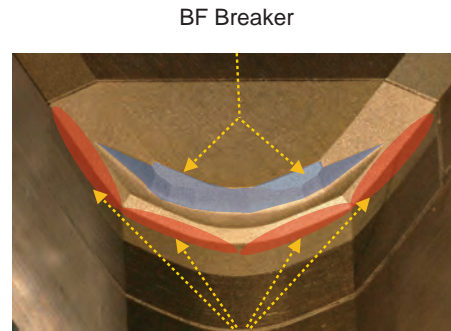


# Combination of BF Breaker and WS Wiper Insert

CNGM and DNGM types are now available with new inserts that combine a BF chip breaker with a WS wiper Insert. ( BC8210 : BF-CNGMTSWS2, BC8220 : BF-DNGMTAWS2 ) It is effective for chip control and improvement of finished surface roughness without concerns about the hand of the tool even when continuous external or internal turning and facing.



WS Wiper Insert (Neutral)  
BF-CNGM432-TSWS2



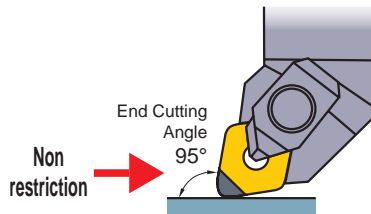
WS Wiper Insert (Neutral)  
BF-DNGM433-TAWS2

## Notes for Use

### When using CNGM type

#### No Restriction for Holders

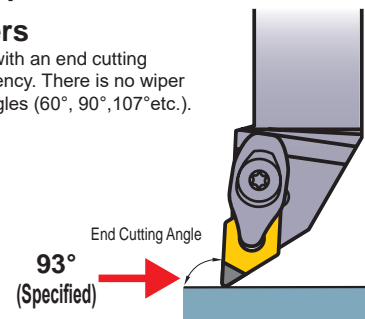
A standard holder can be used.  
(★A double clamp, high rigidity tool is recommended.)



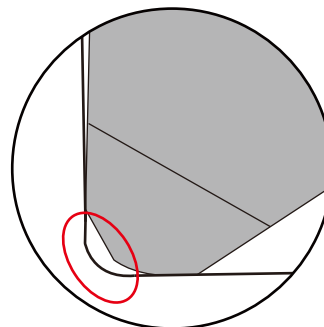
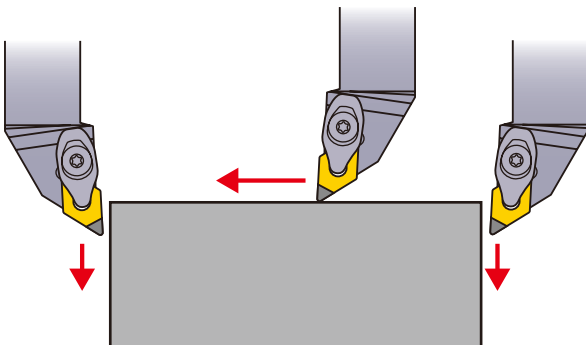
### When using DNGM type

#### Restriction for Holders

Use PDJN holder or DDJN holder with an end cutting angle 93° for improving wiper efficiency. There is no wiper efficiency with other end cutting angles (60°, 90°, 107° etc.).



Displays great wiper efficiency when machining the end face and outer diameter in both right-hand and left-hand machining.

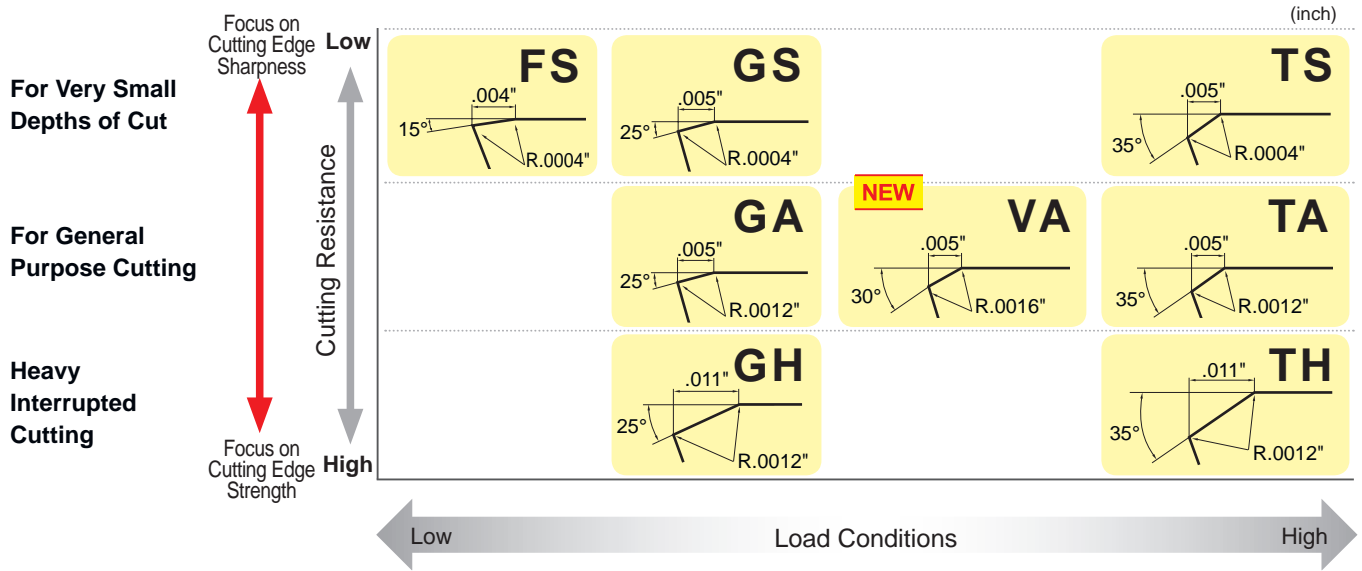


\*The DNGM type is not suitable for machining the R that connects the end face and the outer diameter because it will leave uncut parts.

# Features of the Insert

## Edge Preparation (Honing)

New VA honing type with improved fracture resistance for high speeds and feed.  
In addition, a range of different honing types that can be used for various applications is available.



	Continuous Cutting	General Purpose		For Fracture Resistance	Interrupted Cutting	
	General Cutting	General Cutting	High Feed and Depth	High Speeds and Feed	General Cutting	High Feed and Depth
BC8210	<b>FS</b>	<b>GS</b>	<b>GH</b>		<b>TS</b>	
BC8220		<b>GA</b>	<b>GH</b>	<b>VA</b>	<b>TA</b>	<b>TH</b>

## Identification

**BF** - **C N G M 4 3 2** - **TA** **WS** **2** **--**

Insert Geometry	
<b>BR</b>	For High Depth of Cut Chip Breaker
<b>BM</b>	For Medium Depth of Cut Chip Breaker
<b>BF</b>	For Finish Cutting Chip Breaker
<b>NP</b>	New Petit Cut

Edge Preparation	
Symbol	Application
<b>FS</b>	Continuous Cutting
<b>GS</b> <b>GA</b> <b>GH</b>	General Cutting
<b>VA</b>	For High Speed, High Feed Cutting
<b>TS</b> <b>TA</b> <b>TH</b>	Interrupted Cutting

Wiper	
<b>WS</b>	For High Rigidity Workpiece Material
<b>No Mark</b>	Without Wiper

Cutting Direction		
Symbol	Hand	Figure
<b>JR</b>	Right	
<b>JL</b>	Left	
<b>No mark</b>	Neutral	

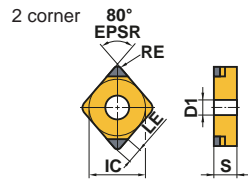
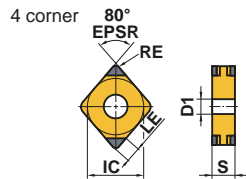







# BC8200 Series NEW

## Negative Inserts (With Hole)

G Class

CNGA, CNGM



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_004	NP_00WS4	NP_002	NP_00WS2
			
	(With Wiper)		(With Wiper)
NEW PETIT CUT	NEW PETIT CUT		
BF_, BM_	BR_		
			
(With Breaker)	(With Breaker)		

Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-CNGA431-GA4	●					4	.500	.187	.016	.203	.071
NP-CNGA432-GA4	●					4	.500	.187	.031	.203	.079
NP-CNGA433-GA4	●					4	.500	.187	.047	.203	.087
NP-CNGA431-GS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-GS4	●					4	.500	.187	.031	.203	.079
NP-CNGA433-GS4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-GH4	★	★				4	.500	.187	.016	.203	.071
NP-CNGA432-GH4	●	●				4	.500	.187	.031	.203	.079
NP-CNGA433-GH4	★	★				4	.500	.187	.047	.203	.087
NP-CNGA431-FS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-FS4	★					4	.500	.187	.031	.203	.079
NP-CNGA433-FS4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-VA4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-VA4	●					4	.500	.187	.031	.203	.079
NP-CNGA433-VA4	●					4	.500	.187	.047	.203	.087
NP-CNGA431-TA4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-TA4	★					4	.500	.187	.031	.203	.079
NP-CNGA433-TA4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-TS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-TS4	★					4	.500	.187	.031	.203	.079
NP-CNGA433-TS4	★					4	.500	.187	.047	.203	.087
NP-CNGA432-TH4	★					4	.500	.187	.031	.203	.079
NP-CNGA433-TH4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-FSWS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-FSWS4	●					4	.500	.187	.031	.203	.079
NP-CNGA433-FSWS4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-GAWS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-GAWS4	●					4	.500	.187	.031	.203	.079
NP-CNGA433-GAWS4	★					4	.500	.187	.047	.203	.087
NP-CNGA431-GSWS4	★					4	.500	.187	.016	.203	.071
NP-CNGA432-GSWS4	★					4	.500	.187	.031	.203	.079
NP-CNGA433-GSWS4	★					4	.500	.187	.047	.203	.087
NP-CNGA430.5-GA2	●					2	.500	.187	.008	.203	.067
NP-CNGA431-GA2	●					2	.500	.187	.016	.203	.071
NP-CNGA432-GA2	●					2	.500	.187	.031	.203	.079
NP-CNGA433-GA2	●					2	.500	.187	.047	.203	.087

(inch)



(inch)

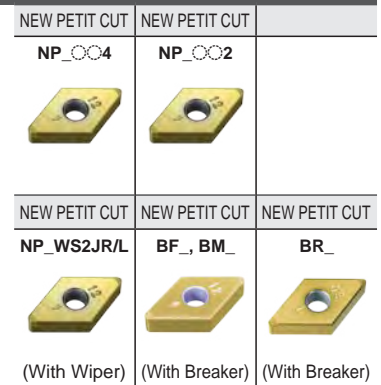
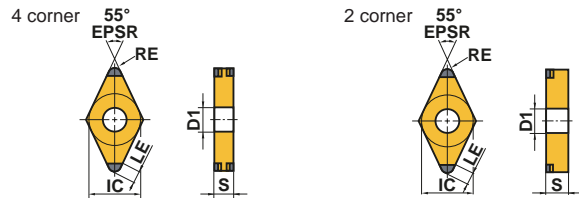
Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-CNGA430.5-GS2	●						2	.500	.187	.008	.203	.067
NP-CNGA431-GS2	●						2	.500	.187	.016	.203	.071
NP-CNGA432-GS2	●						2	.500	.187	.031	.203	.079
NP-CNGA433-GS2	●						2	.500	.187	.047	.203	.087
NP-CNGA431-GH2	★	★					2	.500	.187	.016	.203	.071
NP-CNGA432-GH2	●	●					2	.500	.187	.031	.203	.079
NP-CNGA433-GH2	★	★					2	.500	.187	.047	.203	.087
NP-CNGA430.5-FS2	●						2	.500	.187	.008	.203	.067
NP-CNGA431-FS2	●						2	.500	.187	.016	.203	.071
NP-CNGA432-FS2	●						2	.500	.187	.031	.203	.079
NP-CNGA433-FS2	★						2	.500	.187	.047	.203	.087
NP-CNGA431-VA2		●					2	.500	.187	.016	.203	.071
NP-CNGA432-VA2		●					2	.500	.187	.031	.203	.079
NP-CNGA433-VA2		●					2	.500	.187	.047	.203	.087
NP-CNGA431-TA2		●					2	.500	.187	.016	.203	.071
NP-CNGA432-TA2		●					2	.500	.187	.031	.203	.079
NP-CNGA433-TA2		●					2	.500	.187	.047	.203	.087
NP-CNGA431-TS2	★						2	.500	.187	.016	.203	.071
NP-CNGA432-TS2	★						2	.500	.187	.031	.203	.079
NP-CNGA433-TS2	★						2	.500	.187	.047	.203	.087
NP-CNGA432-TH2		★					2	.500	.187	.031	.203	.079
NP-CNGA433-TH2		●					2	.500	.187	.047	.203	.087
NP-CNGA431-FSWS2	★						2	.500	.187	.016	.203	.071
NP-CNGA432-FSWS2	★						2	.500	.187	.031	.203	.079
NP-CNGA433-FSWS2	★						2	.500	.187	.047	.203	.087
NP-CNGA431-GAWS2		●					2	.500	.187	.016	.203	.071
NP-CNGA432-GAWS2		●					2	.500	.187	.031	.203	.079
NP-CNGA433-GAWS2		●					2	.500	.187	.047	.203	.087
NP-CNGA431-GSWS2	●						2	.500	.187	.016	.203	.071
NP-CNGA432-GSWS2	●						2	.500	.187	.031	.203	.079
NP-CNGA433-GSWS2	★						2	.500	.187	.047	.203	.087
BF-CNGM432-TAWS2		●					2	.500	.187	.031	.203	.079
BF-CNGM433-TAWS2		●					2	.500	.187	.047	.203	.087
BF-CNGM431-TS2	★						2	.500	.187	.016	.203	.071
BF-CNGM432-TS2	★						2	.500	.187	.031	.203	.079
BF-CNGM433-TS2	★						2	.500	.187	.047	.203	.087
BF-CNGM432-TSWS2	★						2	.500	.187	.031	.203	.079
BF-CNGA433-TSWS2	★						2	.500	.187	.047	.203	.087
BM-CNGM431-TA2		★					2	.500	.187	.016	.203	.071
BM-CNGM432-TA2		●					2	.500	.187	.031	.203	.079
BM-CNGM433-TA2		●					2	.500	.187	.047	.203	.087
NEW BR-CNGM431-TA2		★					2	.500	.187	.016	.203	.071
NEW BR-CNGM432-TA2		★					2	.500	.187	.031	.203	.079
NEW BR-CNGM433-TA2		★					2	.500	.187	.047	.203	.087

# BC8200 Series NEW

## Negative Inserts (With Hole)

G Class

DNGA, DNGM



Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-DNGA431-GA4	●					4	.500	.187	.016	.203	.083
NP-DNGA432-GA4	●					4	.500	.187	.031	.203	.079
NP-DNGA433-GA4	★					4	.500	.187	.047	.203	.071
NP-DNGA441-GA4	★					4	.500	.250	.016	.203	.083
NP-DNGA442-GA4	★					4	.500	.250	.031	.203	.079
NP-DNGA443-GA4	★					4	.500	.250	.047	.203	.071
NP-DNGA431-GS4	★					4	.500	.187	.016	.203	.083
NP-DNGA432-GS4	★					4	.500	.187	.031	.203	.079
NP-DNGA433-GS4	★					4	.500	.187	.047	.203	.071
NP-DNGA441-GS4	★					4	.500	.250	.016	.203	.083
NP-DNGA442-GS4	★					4	.500	.250	.031	.203	.079
NP-DNGA443-GS4	★					4	.500	.250	.047	.203	.071
NP-DNGA431-GH4	★	●				4	.500	.187	.016	.203	.083
NP-DNGA432-GH4	★	★				4	.500	.187	.031	.203	.079
NP-DNGA433-GH4	★	★				4	.500	.187	.047	.203	.071
NP-DNGA441-GH4	★	★				4	.500	.250	.016	.203	.083
NP-DNGA442-GH4	★	★				4	.500	.250	.031	.203	.079
NP-DNGA443-GH4	★	★				4	.500	.250	.047	.203	.071
NP-DNGA431-FS4	★					4	.500	.187	.016	.203	.083
NP-DNGA432-FS4	★					4	.500	.187	.031	.203	.079
NP-DNGA433-FS4	★					4	.500	.187	.047	.203	.071
NP-DNGA441-FS4	★					4	.500	.250	.016	.203	.083
NP-DNGA442-FS4	★					4	.500	.250	.031	.203	.079
NP-DNGA443-FS4	★					4	.500	.250	.047	.203	.071
NP-DNGA431-VA4	★					4	.500	.187	.016	.203	.083
NP-DNGA432-VA4	●					4	.500	.187	.031	.203	.079
NP-DNGA433-VA4	★					4	.500	.187	.047	.203	.071
NP-DNGA441-VA4	★					4	.500	.250	.016	.203	.083
NP-DNGA442-VA4	★					4	.500	.250	.031	.203	.079
NP-DNGA443-VA4	★					4	.500	.250	.047	.203	.071
NP-DNGA431-TA4	★					4	.500	.187	.016	.203	.083
NP-DNGA432-TA4	★					4	.500	.187	.031	.203	.079
NP-DNGA433-TA4	●					4	.500	.187	.047	.203	.071
NP-DNGA441-TA4	★					4	.500	.250	.016	.203	.083
NP-DNGA442-TA4	★					4	.500	.250	.031	.203	.079
NP-DNGA443-TA4	★					4	.500	.250	.047	.203	.071

(inch)

(inch)

Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-DNGA431-TS4	★						4	.500	.187	.016	.203	.083
NP-DNGA432-TS4	★						4	.500	.187	.031	.203	.079
NP-DNGA433-TS4	★						4	.500	.187	.047	.203	.071
NP-DNGA441-TS4	★						4	.500	.250	.016	.203	.083
NP-DNGA442-TS4	★						4	.500	.250	.031	.203	.079
NP-DNGA443-TS4	★						4	.500	.250	.047	.203	.071
NP-DNGA432-TH4		★					4	.500	.187	.031	.203	.079
NP-DNGA433-TH4		★					4	.500	.187	.047	.203	.071
NP-DNGA442-TH4		★					4	.500	.250	.031	.203	.079
NP-DNGA443-TH4		★					4	.500	.250	.047	.203	.071
NP-DNGA332-GA2		●					2	.375	.187	.031	.150	.079
NP-DNGA430.5-GA2		●					2	.500	.187	.008	.203	.087
NP-DNGA431-GA2		●					2	.500	.187	.016	.203	.083
NP-DNGA432-GA2		●					2	.500	.187	.031	.203	.079
NP-DNGA433-GA2		●					2	.500	.187	.047	.203	.071
NP-DNGA441-GA2		★					2	.500	.250	.016	.203	.083
NP-DNGA442-GA2		★					2	.500	.250	.031	.203	.079
NP-DNGA443-GA2		★					2	.500	.250	.047	.203	.071
NP-DNGA430.5-GS2		●					2	.500	.187	.008	.203	.087
NP-DNGA431-GS2		●					2	.500	.187	.016	.203	.083
NP-DNGA432-GS2		●					2	.500	.187	.031	.203	.079
NP-DNGA433-GS2		★					2	.500	.187	.047	.203	.071
NP-DNGA441-GS2		★					2	.500	.250	.016	.203	.083
NP-DNGA442-GS2		★					2	.500	.250	.031	.203	.079
NP-DNGA443-GS2		★					2	.500	.250	.047	.203	.071
NP-DNGA431-GH2	★	★					2	.500	.187	.016	.203	.083
NP-DNGA432-GH2	★	★					2	.500	.187	.031	.203	.079
NP-DNGA433-GH2	★	★					2	.500	.187	.047	.203	.071
NP-DNGA441-GH2	★	★					2	.500	.250	.016	.203	.083
NP-DNGA442-GH2	★	★					2	.500	.250	.031	.203	.079
NP-DNGA443-GH2	★	★					2	.500	.250	.047	.203	.071
NP-DNGA430.5-FS2		●					2	.500	.187	.008	.203	.087
NP-DNGA431-FS2		●					2	.500	.187	.016	.203	.083
NP-DNGA432-FS2		●					2	.500	.187	.031	.203	.079
NP-DNGA433-FS2		●					2	.500	.187	.047	.203	.071
NP-DNGA441-FS2		★					2	.500	.250	.016	.203	.083
NP-DNGA442-FS2		★					2	.500	.250	.031	.203	.079
NP-DNGA443-FS2		★					2	.500	.250	.047	.203	.071
NP-DNGA431-VA2		●					2	.500	.187	.016	.203	.083
NP-DNGA432-VA2		●					2	.500	.187	.031	.203	.079
NP-DNGA433-VA2		●					2	.500	.187	.047	.203	.071
NP-DNGA441-VA2		★					2	.500	.250	.016	.203	.083
NP-DNGA442-VA2		★					2	.500	.250	.031	.203	.079
NP-DNGA443-VA2		★					2	.500	.250	.047	.203	.071

# BC8200 Series NEW

(inch)

Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-DNGA431-TA2	●					2	.500	.187	.016	.203	.083
NP-DNGA432-TA2	●					2	.500	.187	.031	.203	.079
NP-DNGA433-TA2	●					2	.500	.187	.047	.203	.071
NP-DNGA441-TA2	★					2	.500	.250	.016	.203	.083
NP-DNGA442-TA2	★					2	.500	.250	.031	.203	.079
NP-DNGA443-TA2	★					2	.500	.250	.047	.203	.071
NP-DNGA431-TS2	★					2	.500	.187	.016	.203	.083
NP-DNGA432-TS2	★					2	.500	.187	.031	.203	.079
NP-DNGA433-TS2	★					2	.500	.187	.047	.203	.071
NP-DNGA441-TS2	★					2	.500	.250	.016	.203	.083
NP-DNGA442-TS2	★					2	.500	.250	.031	.203	.079
NP-DNGA443-TS2	★					2	.500	.250	.047	.203	.071
NP-DNGA432-TH2	★					2	.500	.187	.031	.203	.079
NP-DNGA433-TH2	★					2	.500	.187	.047	.203	.071
NP-DNGA442-TH2	★					2	.500	.250	.031	.203	.079
NP-DNGA443-TH2	★					2	.500	.250	.047	.203	.071
NP-DNGA431-GAWS2JR	★					2	.500	.187	.016	.203	.071
NP-DNGA431-GAWS2JL	★					2	.500	.187	.016	.203	.071
NP-DNGA432-GAWS2JR	●					2	.500	.187	.031	.203	.067
NP-DNGA432-GAWS2JL	●					2	.500	.187	.031	.203	.067
NP-DNGA441-GAWS2JR	★					2	.500	.250	.016	.203	.071
NP-DNGA441-GAWS2JL	★					2	.500	.250	.016	.203	.071
NP-DNGA442-GAWS2JR	★					2	.500	.250	.031	.203	.067
NP-DNGA442-GAWS2JL	●					2	.500	.250	.031	.203	.067
NP-DNGA431-GSWS2JR	★					2	.500	.187	.016	.203	.071
NP-DNGA431-GSWS2JL	★					2	.500	.187	.016	.203	.071
NP-DNGA432-GSWS2JR	★					2	.500	.187	.031	.203	.067
NP-DNGA432-GSWS2JL	★					2	.500	.187	.031	.203	.067
NP-DNGA441-GSWS2JR	★					2	.500	.250	.016	.203	.071
NP-DNGA441-GSWS2JL	★					2	.500	.250	.016	.203	.071
NP-DNGA442-GSWS2JR	★					2	.500	.250	.031	.203	.067
NP-DNGA442-GSWS2JL	★					2	.500	.250	.031	.203	.067
BF-DNGM432-TAWS2	●					2	.500	.187	.031	.203	.094
BF-DNGM433-TAWS2	●					2	.500	.187	.047	.203	.102
BF-DNGM431-TS2	★					2	.500	.187	.016	.203	.083
BF-DNGM432-TS2	★					2	.500	.187	.031	.203	.079
BF-DNGM433-TS2	●					2	.500	.187	.047	.203	.071
BF-DNGM432-TSWS2	★					2	.500	.187	.031	.203	.094
BF-DNGM433-TSWS2	★					2	.500	.187	.047	.203	.102
BM-DNGM431-TA2	●					2	.500	.187	.016	.203	.083
BM-DNGM432-TA2	★					2	.500	.187	.031	.203	.079
BM-DNGM433-TA2	●					2	.500	.187	.047	.203	.071
<span style="background-color: yellow;">NEW</span> BR-DNGM431-TA2	★					2	.500	.187	.016	.203	.083
<span style="background-color: yellow;">NEW</span> BR-DNGM432-TA2	★					2	.500	.187	.031	.203	.079
<span style="background-color: yellow;">NEW</span> BR-DNGM433-TA2	★					2	.500	.187	.047	.203	.071
<span style="background-color: yellow;">NEW</span> BR-DNGM441-TA2	★					2	.500	.250	.016	.203	.083
<span style="background-color: yellow;">NEW</span> BR-DNGM442-TA2	★					2	.500	.250	.031	.203	.079
<span style="background-color: yellow;">NEW</span> BR-DNGM443-TA2	★					2	.500	.250	.047	.203	.071

● : USA Stock ★ : Stocked in Japan  
(1 insert in one case)



## Negative Inserts (With Hole)

G Class

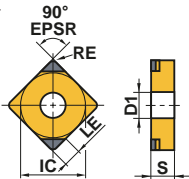
SNGA

NEW PETIT CUT

NP\_002



2 corner



(inch)

Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-SNGA432-GA2	★						2	.500	.187	.031	.203	.087
NP-SNGA433-GA2	★						2	.500	.187	.047	.203	.098

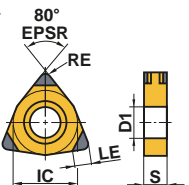
## Negative Inserts (With Hole)

G Class

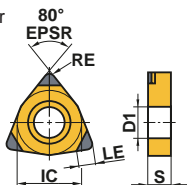
WNGA

NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_006	NP_003	NP_00WS3
		(With Wiper)

6 corner



3 corner



(inch)

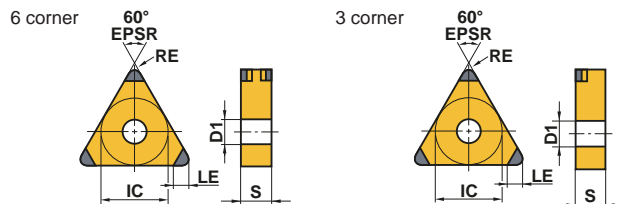
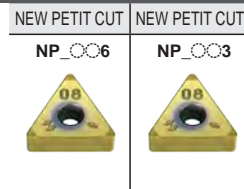
Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-WNGA432-GS6	★						6	.500	.187	.031	.203	.079
NP-WNGA432-FS6	★						6	.500	.187	.031	.203	.079
NP-WNGA432-TS6	★						6	.500	.187	.031	.203	.079
NP-WNGA432-GA3		●					3	.500	.187	.031	.203	.079
NP-WNGA432-GS3	●						3	.500	.187	.031	.203	.079
NP-WNGA432-FS3	★						3	.500	.187	.031	.203	.079
NP-WNGA432-TA3		★					3	.500	.187	.031	.203	.079
NP-WNGA432-TS3	★						3	.500	.187	.031	.203	.079
NP-WNGA432-GSWS3	★						3	.500	.187	.031	.203	.079

# BC8200 Series NEW

## Negative Inserts (With Hole)

G Class

TNGA



Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-TNGA331-GA6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-GA6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-GA6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-GS6	●						6	.375	.187	.016	.150	.063
NP-TNGA332-GS6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-GS6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-GH6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-GH6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-GH6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-FS6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-FS6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-FS6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-VA6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-VA6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-VA6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-TA6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-TA6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-TA6	★						6	.375	.187	.047	.150	.075
NP-TNGA331-TS6	★						6	.375	.187	.016	.150	.063
NP-TNGA332-TS6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-TS6	★						6	.375	.187	.047	.150	.075
NP-TNGA332-TH6	★						6	.375	.187	.031	.150	.067
NP-TNGA333-TH6	★						6	.375	.187	.047	.150	.075
NP-TNGA330.5-GA3	★						3	.375	.187	.008	.150	.059
NP-TNGA331-GA3	●						3	.375	.187	.016	.150	.063
NP-TNGA332-GA3	●						3	.375	.187	.031	.150	.067
NP-TNGA333-GA3	●						3	.375	.187	.047	.150	.075
NP-TNGA330.5-GS3	★						3	.375	.187	.008	.150	.059
NP-TNGA331-GS3	★						3	.375	.187	.016	.150	.063
NP-TNGA332-GS3	★						3	.375	.187	.031	.150	.067
NP-TNGA333-GS3	★						3	.375	.187	.047	.150	.075
NP-TNGA331-GH3	●						3	.375	.187	.016	.150	.063
NP-TNGA332-GH3	★						3	.375	.187	.031	.150	.067
NP-TNGA333-GH3	★						3	.375	.187	.047	.150	.075

● : USA Stock ★ : Stocked in Japan  
(1 insert in one case)

(inch)

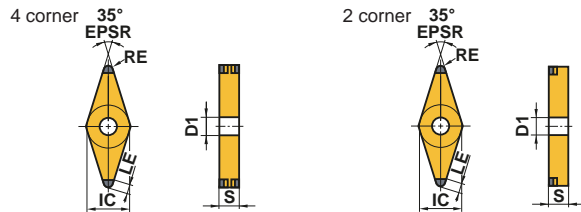
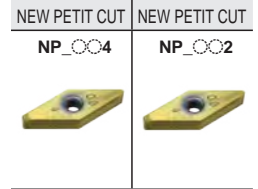
Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-TNGA330.5-FS3	★						3	.375	.187	.008	.150	.059
NP-TNGA331-FS3	★						3	.375	.187	.016	.150	.063
NP-TNGA332-FS3	★						3	.375	.187	.031	.150	.067
NP-TNGA333-FS3	★						3	.375	.187	.047	.150	.075
NP-TNGA331-VA3		●					3	.375	.187	.016	.150	.063
NP-TNGA332-VA3		●					3	.375	.187	.031	.150	.067
NP-TNGA333-VA3		●					3	.375	.187	.047	.150	.075
NP-TNGA331-TA3	★						3	.375	.187	.016	.150	.063
NP-TNGA332-TA3	★						3	.375	.187	.031	.150	.067
NP-TNGA333-TA3	★						3	.375	.187	.047	.150	.075
NP-TNGA331-TS3	★						3	.375	.187	.016	.150	.063
NP-TNGA332-TS3	★						3	.375	.187	.031	.150	.067
NP-TNGA333-TS3	★						3	.375	.187	.047	.150	.075
NP-TNGA332-TH3		★					3	.375	.187	.031	.150	.067
NP-TNGA333-TH3		★					3	.375	.187	.047	.150	.075

# BC8200 Series NEW

## Negative Inserts (With Hole)

G Class

VNGA



(inch)

Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-VNGA331-GA4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-GA4	★					4	.375	.187	.031	.150	.079
NP-VNGA333-GA4	★					4	.375	.187	.047	.150	.059
NP-VNGA331-GS4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-GS4	★					4	.375	.187	.031	.150	.079
NP-VNGA333-GS4	★					4	.375	.187	.047	.150	.059
NP-VNGA331-GH4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-GH4	★					4	.375	.187	.031	.150	.079
NP-VNGA331-FS4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-FS4	★					4	.375	.187	.031	.150	.079
NP-VNGA331-VA4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-VA4	★					4	.375	.187	.031	.150	.079
NP-VNGA333-VA4	★					4	.375	.187	.047	.150	.059
NP-VNGA331-TA4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-TA4	★					4	.375	.187	.031	.150	.079
NP-VNGA331-TS4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-TS4	★					4	.375	.187	.031	.150	.079
NP-VNGA331-TH4	★					4	.375	.187	.016	.150	.098
NP-VNGA332-TH4	★					4	.375	.187	.031	.150	.079
NP-VNGA330.5-GA2	●					2	.375	.187	.008	.150	.098
NP-VNGA331-GA2	●					2	.375	.187	.016	.150	.098
NP-VNGA332-GA2	●					2	.375	.187	.031	.150	.079
NP-VNGA333-GA2	●					2	.375	.187	.047	.150	.059
NP-VNGA330.5-GS2	●					2	.375	.187	.008	.150	.098
NP-VNGA331-GS2	●					2	.375	.187	.016	.150	.098
NP-VNGA332-GS2	●					2	.375	.187	.031	.150	.079
NP-VNGA333-GS2	★					2	.375	.187	.047	.150	.059
NP-VNGA331-GH2	★					2	.375	.187	.016	.150	.098
NP-VNGA332-GH2	★					2	.375	.187	.031	.150	.079
NP-VNGA330.5-FS2	★					2	.375	.187	.008	.150	.098
NP-VNGA331-FS2	●					2	.375	.187	.016	.150	.098
NP-VNGA332-FS2	●					2	.375	.187	.031	.150	.079
NP-VNGA331-VA2	●					2	.375	.187	.016	.150	.098
NP-VNGA332-VA2	★					2	.375	.187	.031	.150	.079
NP-VNGA333-VA2	★					2	.375	.187	.047	.150	.059
NP-VNGA331-TA2	★					2	.375	.187	.016	.150	.098
NP-VNGA332-TA2	★					2	.375	.187	.031	.150	.079
NP-VNGA331-TS2	★					2	.375	.187	.016	.150	.098
NP-VNGA332-TS2	★					2	.375	.187	.031	.150	.079
NP-VNGA331-TH2	★					2	.375	.187	.016	.150	.098
NP-VNGA332-TH2	★					2	.375	.187	.031	.150	.079

● : USA Stock ★ : Stocked in Japan  
(1 insert in one case)



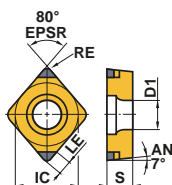
## Positive Inserts (With Hole)

G Class

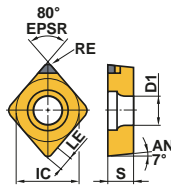
CCGW 7°, CCGT 7°,

CPGB 11°

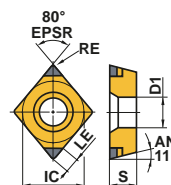
2 corner



1 corner



2 corner



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_002	NP_00W02	BF_, BM_	NP
	(With Wiper)	(With Breaker)	(Non-ISO) *

Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-CCGW21.50.5-GA2	●					2	.250	.094	.008	.110	.067
NP-CCGW21.51-GA2	●					2	.250	.094	.016	.110	.071
NP-CCGW21.52-GA2	●					2	.250	.094	.031	.110	.079
NP-CCGW32.50.5-GA2	●					2	.375	.156	.008	.173	.067
NP-CCGW32.51-GA2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-GA2	●					2	.375	.156	.031	.173	.079
NP-CCGW21.50.5-GS2	●					2	.250	.094	.008	.110	.067
NP-CCGW21.51-GS2	●					2	.250	.094	.016	.110	.071
NP-CCGW21.52-GS2	●					2	.250	.094	.031	.110	.079
NP-CCGW32.50.5-GS2	●					2	.375	.156	.008	.173	.067
NP-CCGW32.51-GS2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-GS2	●					2	.375	.156	.031	.173	.079
NP-CCGW21.50.5-FS2	●					2	.250	.094	.008	.110	.067
NP-CCGW21.51-FS2	●					2	.250	.094	.016	.110	.071
NP-CCGW21.52-FS2	★					2	.250	.094	.031	.110	.079
NP-CCGW32.50.5-FS2	●					2	.375	.156	.008	.173	.067
NP-CCGW32.51-FS2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-FS2	●					2	.375	.156	.031	.173	.079
NP-CCGW32.51-VA2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-VA2	●					2	.375	.156	.031	.173	.079
NP-CCGW32.51-TA2	★					2	.375	.156	.016	.173	.071
NP-CCGW32.52-TA2	★					2	.375	.156	.031	.173	.079
NP-CCGW32.51-FSWS2	★					2	.375	.156	.016	.173	.071
NP-CCGW32.52-FSWS2	★					2	.375	.156	.031	.173	.079
NP-CCGW32.51-GAWS2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-GAWS2	●					2	.375	.156	.031	.173	.079
NP-CCGW32.51-GSWS2	●					2	.375	.156	.016	.173	.071
NP-CCGW32.52-GSWS2	★					2	.375	.156	.031	.173	.079
BF-CCGT32.51-TS2	★					2	.375	.156	.016	.173	.071
BF-CCGT32.52-TS2	●					2	.375	.156	.031	.173	.079
BM-CCGT32.51-TA2	★					2	.375	.156	.016	.173	.071
BM-CCGT32.52-TA2	★					2	.375	.156	.031	.173	.079
NP-CCGW03S102FS	●					1	.141*	.055	.008	.079	.043
NP-CCGW03S104FS	●					1	.141*	.055	.016	.079	.039
NP-CCGW04T002FS	●					1	.172*	.070	.008	.094	.059
NP-CCGW04T004FS	●					1	.172*	.070	.016	.094	.055

\* Diameter of inscribed circle is non-ISO standard. (For SCLC type)

# BC8200 Series NEW

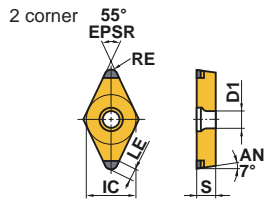
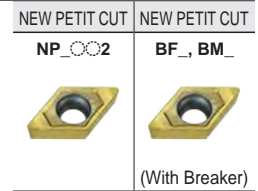
(inch)

Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-CPGB2.51.51-GA2	★						2	.313	.094	.016	.138	.071
NP-CPGB2.51.52-GA2	★						2	.313	.094	.031	.138	.079
NP-CPGB2.51.53-GA2	★						2	.313	.094	.047	.138	.087
NP-CPGB320.5-GA2	★						2	.375	.125	.008	.177	.067
NP-CPGB321-GA2	★						2	.375	.125	.016	.177	.071
NP-CPGB322-GA2	★						2	.375	.125	.031	.177	.079
NP-CPGB323-GA2	●						2	.375	.125	.047	.177	.087
NP-CPGB2.51.51-GS2	●						2	.313	.094	.016	.138	.071
NP-CPGB2.51.52-GS2	★						2	.313	.094	.031	.138	.079
NP-CPGB320.5-GS2	★						2	.375	.125	.008	.177	.067
NP-CPGB321-GS2	★						2	.375	.125	.016	.177	.071
NP-CPGB322-GS2	★						2	.375	.125	.031	.177	.079
NP-CPGB321-VA2	★						2	.375	.125	.016	.177	.071
NP-CPGB322-VA2	★						2	.375	.125	.031	.177	.079
NP-CPGB323-VA2	★						2	.375	.125	.047	.177	.087
NP-CPGB321-TA2	★						2	.375	.125	.016	.177	.071
NP-CPGB322-TA2	★						2	.375	.125	.031	.177	.079
NP-CPGB323-TA2	★						2	.375	.125	.047	.177	.087

## Positive Inserts (With Hole)

G Class

DCGW 7°, DCGT 7°



Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-DCGW21.50.5-GA2	★						2	.250	.094	.008	.110	.087
NP-DCGW21.51-GA2	★						2	.250	.094	.016	.110	.083
NP-DCGW21.52-GA2	★						2	.250	.094	.031	.110	.079
NP-DCGW32.50.5-GA2	★						2	.375	.156	.008	.173	.087
NP-DCGW32.51-GA2	●						2	.375	.156	.016	.173	.083
NP-DCGW32.52-GA2	●						2	.375	.156	.031	.173	.079
NP-DCGW21.50.5-GS2	★						2	.250	.094	.008	.110	.087
NP-DCGW21.51-GS2	●						2	.250	.094	.016	.110	.083
NP-DCGW21.52-GS2	★						2	.250	.094	.031	.110	.079
NP-DCGW32.50.5-GS2	★						2	.375	.156	.008	.173	.087
NP-DCGW32.51-GS2	★						2	.375	.156	.016	.173	.083
NP-DCGW32.52-GS2	●						2	.375	.156	.031	.173	.079
NP-DCGW21.50.5-FS2	★						2	.250	.094	.008	.110	.087
NP-DCGW21.51-FS2	●						2	.250	.094	.016	.110	.083
NP-DCGW21.52-FS2	★						2	.250	.094	.031	.110	.079
NP-DCGW32.50.5-FS2	★						2	.375	.156	.008	.173	.087
NP-DCGW32.51-FS2	●						2	.375	.156	.016	.173	.083
NP-DCGW32.52-FS2	●						2	.375	.156	.031	.173	.079
NP-DCGW32.51-VA2	★						2	.375	.156	.016	.173	.083
NP-DCGW32.52-VA2	●						2	.375	.156	.031	.173	.079
NP-DCGW32.51-TA2	★						2	.375	.156	.016	.173	.083
NP-DCGW32.52-TA2	★						2	.375	.156	.031	.173	.079
BF-DCGT32.51-TS2	★						2	.375	.156	.016	.173	.083
BF-DCGT32.52-TS2	★						2	.375	.156	.031	.173	.079
BM-DCGT32.51-TA2	●						2	.375	.156	.016	.173	.083
BM-DCGT32.52-TA2	●						2	.375	.156	.031	.173	.079

# BC8200 Series

NEW

## Positive Inserts (With Hole)

G Class

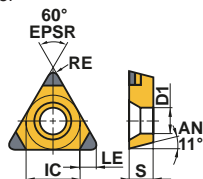
TPGB 11°

NEW PETIT CUT

NP\_003



3 corner



(inch)

Order Number	Coated CBN						Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220										
NP-TPGB1.81.51-GA3	★						3	.219	.094	.016	.114	.063
NP-TPGB1.81.52-GA3	★						3	.219	.094	.031	.114	.067
NP-TPGB220.5-GA3	★						3	.250	.125	.008	.134	.059
NP-TPGB221-GA3	●						3	.250	.125	.016	.134	.063
NP-TPGB222-GA3	●						3	.250	.125	.031	.134	.067
NP-TPGB321-GA3	●						3	.375	.125	.016	.173	.063
NP-TPGB322-GA3	★						3	.375	.125	.031	.173	.067
NP-TPGB1.51.51-GS3	★						3	.187	.094	.016	.094	.063
NP-TPGB1.51.52-GS3	★						3	.187	.094	.031	.094	.067
NP-TPGB1.81.51-GS3	●						3	.219	.094	.016	.114	.063
NP-TPGB1.81.52-GS3	★						3	.219	.094	.031	.114	.067
NP-TPGB220.5-GS3	●						3	.250	.125	.008	.134	.059
NP-TPGB221-GS3	★						3	.250	.125	.016	.134	.063
NP-TPGB222-GS3	★						3	.250	.125	.031	.134	.067
NP-TPGB321-GS3	●						3	.375	.125	.016	.173	.063
NP-TPGB322-GS3	★						3	.375	.125	.031	.173	.067
NP-TPGB220.5-FS3	★						3	.250	.125	.008	.134	.059
NP-TPGB221-FS3	★						3	.250	.125	.016	.134	.063
NP-TPGB222-FS3	★						3	.250	.125	.031	.134	.067
NP-TPGB221-VA3	★						3	.250	.125	.016	.134	.063
NP-TPGB222-VA3	●						3	.250	.125	.031	.134	.067
NP-TPGB221-TA3	★						3	.250	.125	.016	.134	.063
NP-TPGB222-TA3	●						3	.250	.125	.031	.134	.067



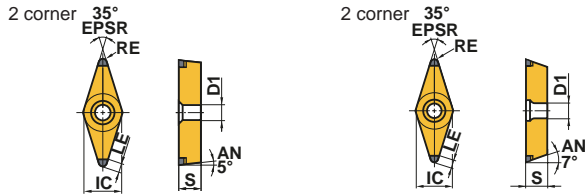
# Positive Inserts (With Hole)

G Class

VBGW 5°, VCGW 7°

NEW PETIT CUT

NP\_002

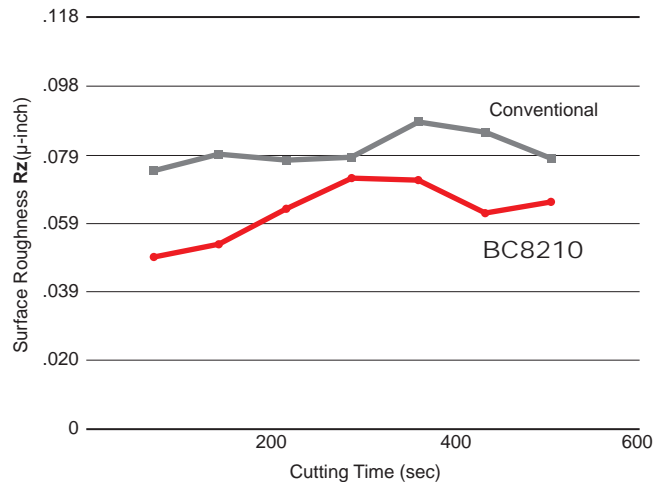
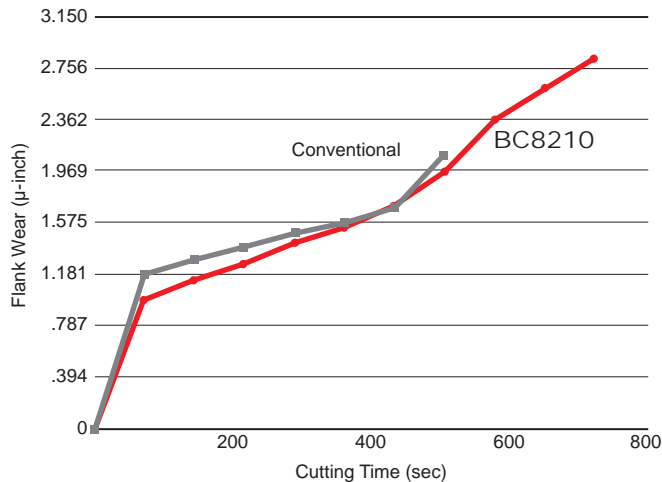


Order Number	Coated CBN					Cutting Edges	IC	S	RE	D1	LE
	BC8210	BC8220									
NP-VBGW220.5-GA2	★					2	.250	.125	.008	.112	.098
NP-VBGW221-GA2	●					2	.250	.125	.016	.112	.098
NP-VBGW222-GA2	●					2	.250	.125	.031	.112	.079
NP-VBGW330.5-GA2	★					2	.375	.187	.008	.174	.098
NP-VBGW331-GA2	●					2	.375	.187	.016	.174	.098
NP-VBGW332-GA2	★					2	.375	.187	.031	.174	.079
NP-VBGW220.5-GS2	●					2	.250	.125	.008	.112	.098
NP-VBGW221-GS2	★					2	.250	.125	.016	.112	.098
NP-VBGW222-GS2	★					2	.250	.125	.031	.112	.079
NP-VBGW330.5-GS2	●					2	.375	.187	.008	.174	.098
NP-VBGW331-GS2	●					2	.375	.187	.016	.174	.098
NP-VBGW332-GS2	●					2	.375	.187	.031	.174	.079
NP-VBGW220.5-FS2	★					2	.250	.125	.008	.112	.098
NP-VBGW221-FS2	●					2	.250	.125	.016	.112	.098
NP-VBGW222-FS2	★					2	.250	.125	.031	.112	.079
NP-VBGW330.5-FS2	●					2	.375	.187	.008	.174	.098
NP-VBGW331-VA2	★					2	.375	.187	.016	.174	.098
NP-VBGW332-VA2	★					2	.375	.187	.031	.174	.079
NP-VBGW331-TA2	★					2	.375	.187	.016	.174	.098
NP-VBGW332-TA2	★					2	.375	.187	.031	.174	.079
NP-VCGW331-GA2	●					2	.375	.187	.016	.173	.098
NP-VCGW332-GA2	★					2	.375	.187	.031	.173	.079
NP-VCGW331-GS2	●					2	.375	.187	.016	.173	.098
NP-VCGW332-GS2	●					2	.375	.187	.031	.173	.079
NP-VCGW331-VA2	★					2	.375	.187	.016	.173	.098
NP-VCGW332-VA2	★					2	.375	.187	.031	.173	.079
NP-VCGW331-TA2	★					2	.375	.187	.016	.173	.098
NP-VCGW332-TA2	★					2	.375	.187	.031	.173	.079

# BC8210 For Continuous and Light Interrupted Cutting

## Machining 5120(60 HRC):Comparison of Continuous Cutting

BC8210 reduces flank wear and maintains a good surface finish.



<Cutting Conditions>

Workpiece Material : AISI 5120 (60 HRC)

Inserts : NP-CNGA432-GS2

Cutting Speed :  $vc=655$  SFM

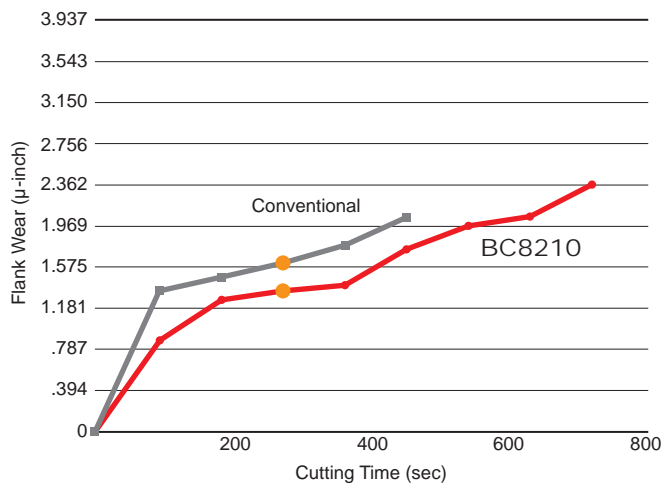
Feed per Rev. :  $f=.004$  IPR

Depth of Cut :  $ap=.008$  inch

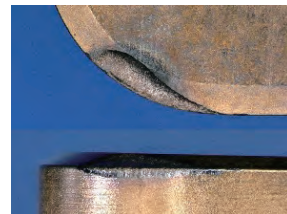
Cutting Mode : Dry Cutting

## Machining 5120(60 HRC):Comparison of Light Interrupted Cutting

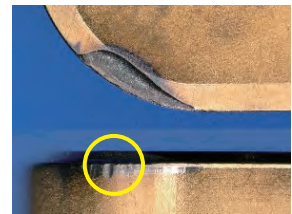
BC8210 provides excellent chipping resistance.



After machining 360 seconds



BC8210



Conventional Product is Chipping

<Cutting Conditions>

Workpiece Material : AISI 5120 (60 HRC)

Inserts : NP-CNGA432-GS2

Cutting Speed :  $vc=525$  SFM

Feed per Rev. :  $f=.004$  IPR

Depth of Cut :  $ap=.008$  inch

Cutting Mode : Dry Cutting

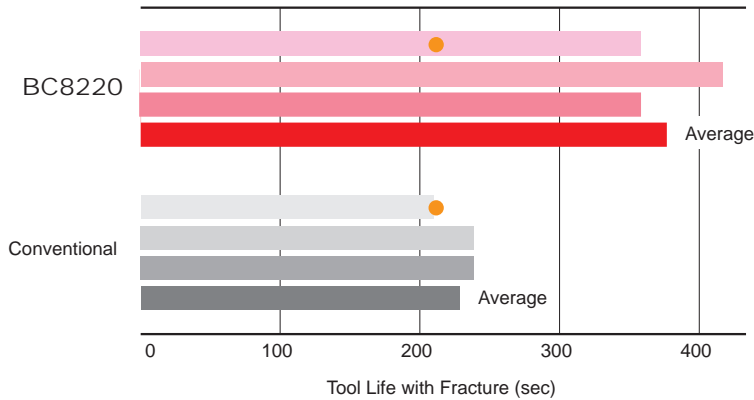
### Recommended Cutting Conditions

Grade	Workpiece Material	Machining Methods	Cutting Speed $vc$ (SFM)					Feed per Rev. $f$ (IPR)	Depth of Cut $ap$ (inch)	Cutting Mode
			330	490	655	820	985			
BC8210	Hardened Steels	Continuous Cutting	[Red bar from 490 to 820 SFM]					$\leq .008$	$\leq .014$	Dry, Wet
		Light Interrupted Cutting	[Red bar from 330 to 655 SFM]					$\leq .008$	$\leq .014$	Dry, Wet

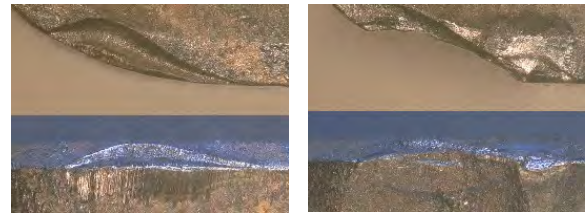
# BC8220 General Applications

## Machining 5120(60HRC): Comparison of Fracture Resistance During Medium Interrupted Cutting

Stable cutting is achieved with excellent fracture resistance in medium interrupted cutting.



After machining 210 seconds



BC8220

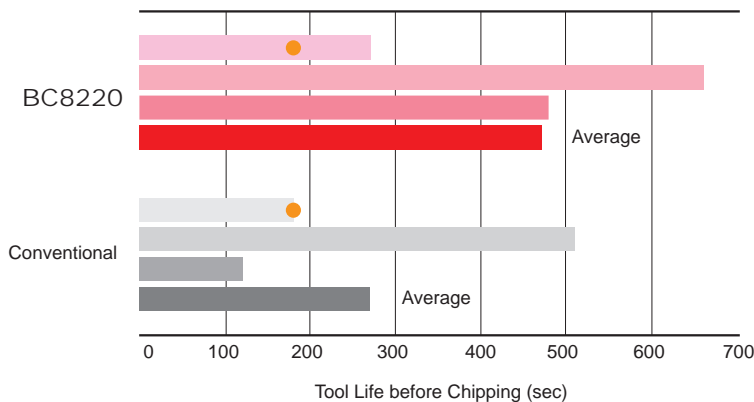
Conventional

<Cutting Conditions>

Workpiece Material : AISI 5120 (60 HRC)  
 Inserts : NP-CNGA432-VA2  
 Cutting Speed :  $vc=820$  SFM  
 Feed per Rev. :  $f=.006$  IPR  
 Depth of Cut :  $ap=.004$  inch  
 Cutting Mode : Dry Cutting

## Machining 5120(60HRC): Comparison of Fracture Resistance During Heavy Interrupted Cutting

Achieves excellent chipping resistance during heavy interrupted cutting.



After machining 180 seconds



BC8220

Conventional Product is Chipping

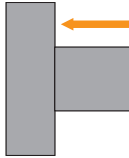
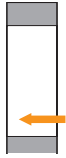




<Cutting Conditions>

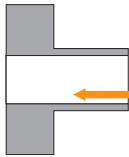
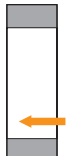




Workpiece Material : AISI 5120 (60 HRC)  
 Inserts : NP-CNGA432-VA2  
 Cutting Speed :  $vc=655$  SFM  
 Feed per Rev. :  $f=.002$  IPR  
 Depth of Cut :  $ap=.004$  inch  
 Cutting Mode : Wet Cutting

### Recommended Cutting Conditions


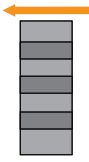




Grade	Workpiece Material	Machining Methods	Cutting Speed $vc$ (SFM)					Feed per Rev. $f$ (IPR)	Depth of Cut $ap$ (inch)	Cutting Mode
			330	490	655	820	985			
BC8220	Hardened Steels	Continuous Cutting						$\leq .008$	$\leq .020$	Dry, Wet
		Light to Medium Interrupted Cutting						$\leq .008$	$\leq .012$	Dry, Wet


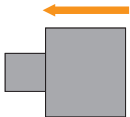




## Examples of Usage

Insert		NP-CNGA433-GSWS2	NP-DCGW32.51-GS2
Workpiece Material		Non-microalloyed Steel 	16MnCr5 
Component		Automobile Parts	Automobile Parts
Application		External Continuous Cutting	Internal Continuous Cutting
Cutting Conditions	Cutting Speed $v_c$ (SFM)	850	785
	Feed per Rev. $f$ (IPR)	.008	.003
	Depth of Cut $a_p$ (inch)	.006	.008
Cutting Mode		Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p> <p>200 400 600 800 1000</p> <p>BC8210 </p> <p>Conventional </p> <p>In continuous cutting, it was possible to maintain good surface roughness and to achieve a tool life extension of 1.6 X or more compared to conventional products.</p>	<p>Number of Workpieces</p> <p>10 20 30 40 50</p> <p>BC8210 </p> <p>Conventional </p> <p>The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was maintained.</p>

Insert		NP-CCGW32.52-GS2	NP-CCGW32.51-FS2
Workpiece Material		16MnCr5 	Alloy Steel 
Component		Automobile Parts	Automobile Parts
Application		Internal Continuous Cutting	Internal Continuous Cutting
Cutting Conditions	Cutting Speed $v_c$ (SFM)	460	920
	Feed per Rev. $f$ (IPR)	.003	.003
	Depth of Cut $a_p$ (inch)	.004	.004
Cutting Mode		Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p> <p>200 400 600 800 1000</p> <p>BC8210 </p> <p>Conventional </p> <p>By significantly suppressing the deterioration of the surface of the insert, tool life was extended 1.8 X longer than that of conventional products in continuous cutting.</p>	<p>Number of Workpieces</p> <p>50 100 150 200 250</p> <p>BC8210 </p> <p>Conventional </p> <p>Tool life is 4 X longer than that of conventional products during continuous cutting in high speeds.</p>

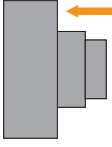
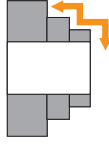




The application examples are from customers workpieces and can therefore differ from the recommended cutting conditions.

Insert		NP-TNGA333-TA3	NP-TNGA33 (RE2.0)-TA3
Workpiece Material		16MnCr5 	16MnCr5 
Component		Automobile Parts	Automobile Parts
Application		Heavy Interrupted Boring	Heavy Interrupted Turning
Cutting Conditions	Cutting Speed vc (SFM)	395	425
	Feed per Rev. f (IPR)	.007	.005
	Depth of Cut ap (inch)	.006-.010	.010
Cutting Mode		Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p> <p>100 200 300 400 500 600</p> <p>BC8220 </p> <p>Conventional </p> <p>BC8220, which has excellent fracture resistance, has a tool life 1.5 times longer than that of conventional products.</p>	<p>Number of Workpieces</p> <p>100 200 300 400</p> <p>BC8220 </p> <p>Conventional </p> <p>BC8220, which has excellent fracture resistance, has a tool life 1.25 times longer than that of conventional products.</p>

Insert		NP-CNGA431-TA2	NP-DNGA334-GA2
Workpiece Material		JIS SCM415 	AISI 1050 (58HRC) 
Component		Automobile Parts	Automobile Parts
Application		External Continuous Cutting	External Continuous Cutting
Cutting Conditions	Cutting Speed vc (SFM)	490	460
	Feed per Rev. f (IPR)	Rough .005 Finish .004	.006
	Depth of Cut ap (inch)	Rough .004 Finish .002	.006
Cutting Mode		Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p> <p>100 200 300 400</p> <p>BC8220 </p> <p>Conventional </p> <p>Tool life for continuous cutting is 2.5 times longer than that of conventional products.</p>	<p>Number of Workpieces</p> <p>100 200 300 400 500</p> <p>BC8220 </p> <p>Conventional </p> <p>Tool life for continuous cutting is 1.2 times longer than that of conventional products.</p>

The application examples are from customers workpieces and can therefore differ from the recommended cutting conditions.

## Examples of Usage

Insert		BR-CNGM432-TA2	BR-DNGM432-TA2
Workpiece Material		Steel (62-64HRC)	JIS SMnC420 (59-63HRC)
			
Component		Gear	Gear
Application		External Continuous Cutting	External Continuous Interrupted Turning
Cutting Conditions	Cutting Speed $v_c$ (m/min)	490-560	590
	Feed per Rev. $f$ (mm/rev)	.004-.008	.001→.005
	Depth of Cut $a_p$ (mm)	.028	.039-.043
Cutting Mode		Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p> <p>100 200 300 400 500</p> <p>BC8220 </p> <p>Conventional </p> <p>While conventional products can machine up to 300 pieces, BC8220 can machine up to 450 pieces.</p>	<p>Number of Workpieces</p> <p>50 100 150 200</p> <p>BC8220 </p> <p>Conventional </p> <p>The BR breaker removed the required material in one pass compared to a conventional product that took 4 passes. This gave the BR breaker a tool life 1.5 times greater than the conventional product.</p>

The application examples are from customers workpieces and can therefore differ from the recommended cutting conditions.







## CBN Grade for Turning Hardened Steel

# BC8200 Series

### For your safety

●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching inserts or spare parts, please use the attached wrench or driver. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

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(Tool specifications subject to change without notice.)

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