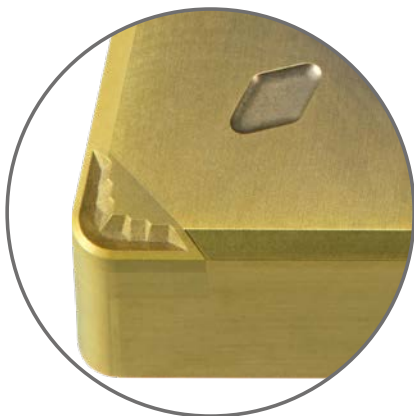


# BC8200 / MB8200 SERIES

THE NEXT GENERATION OF COATED AND UNCOATED PCBN GRADES FOR MACHINING HARDENED STEELS



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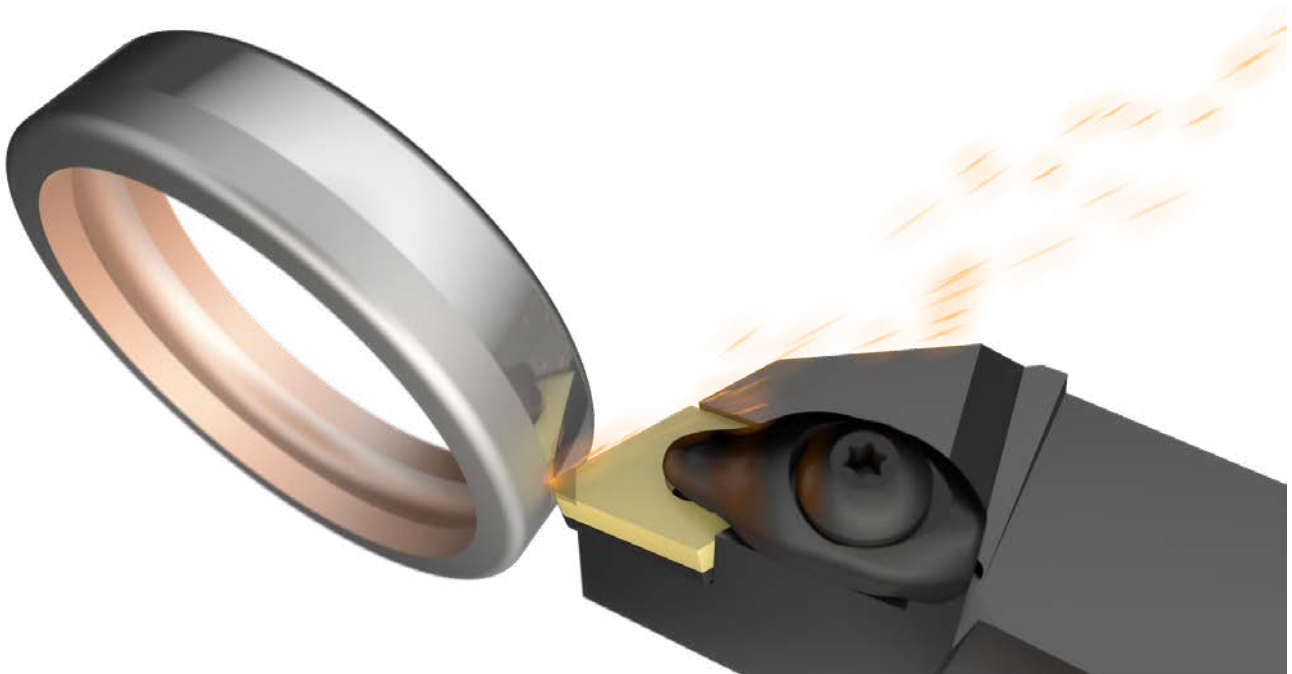
# BC8200 SERIES

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## BC8210

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FOR CONTINUOUS AND LIGHT INTERRUPTED CUTTING



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### HIGH-SPEED MACHINING WITH OUTSTANDING TOOL LIFE

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

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### NEW PVD COATING FOR LONG TOOL LIFE

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A combination of the newly developed AlCrSiN-base coating that absorbs impacts, and the TiAlSiN-base coating which has excellent wear resistance, provide stability during continuous through to low interrupted cutting applications.



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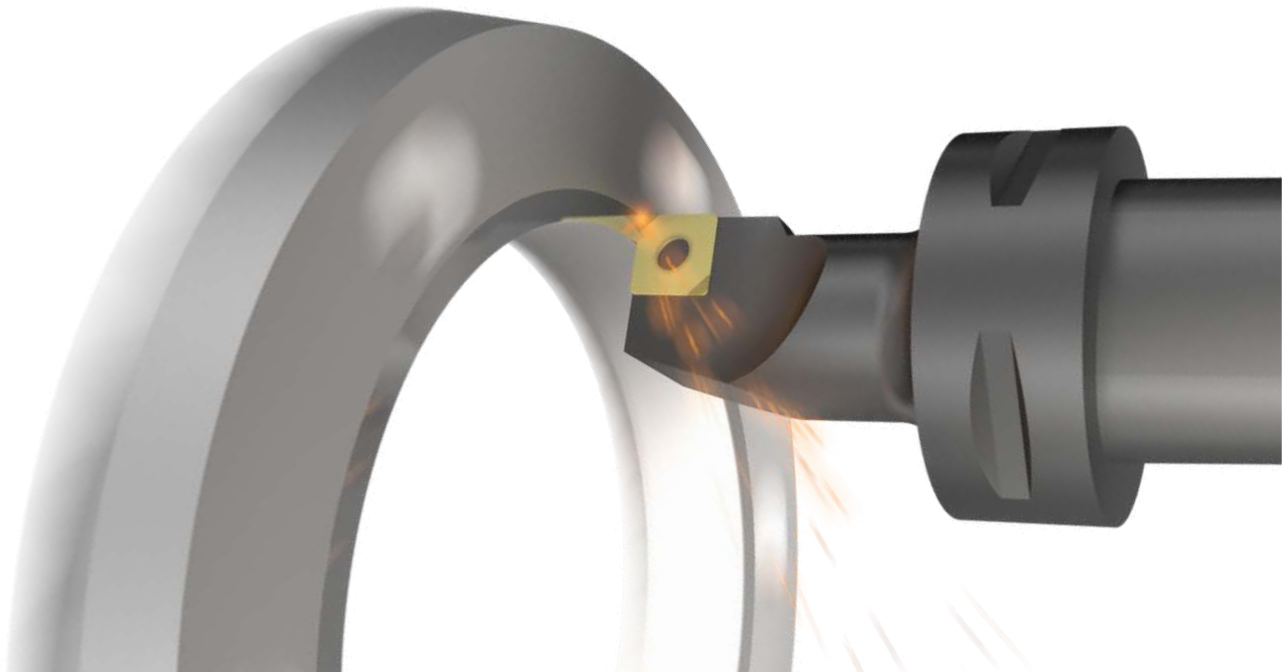
# BC8200 SERIES

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## BC8220

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FOR GENERAL APPLICATIONS



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### 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 PcBN base material and together with a new coating, tool life is dramatically extended.

---

### NEW PVD COATING WITH IDEAL BALANCE OF WEAR AND CHIPPING RESISTANCE

---

BC8220 utilises a new specially developed, super multi-layer PVD coating. The high level of both chipping and wear resistance is achieved by a much improved adhesion between the substrate and coating. Together with the easy identification of edges used due to the gold coloured TiN top coating, BC8220 achieves high performance and reliability over a wide range of hardened steel machining applications.



..... Gold colour aids easy identification of used edges.

..... High wear and chipping resistance.

..... Improved strength of the adhesion to the PcBN substrate prevents peeling.

..... Excellent crater wear and chipping resistance. Exclusive BC8220 sintered body.

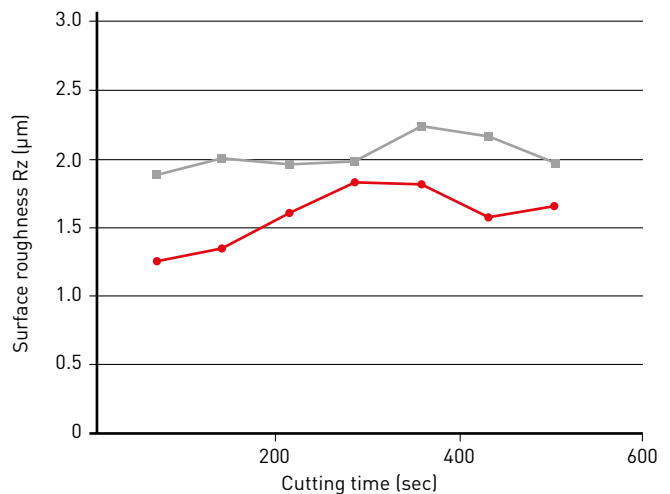
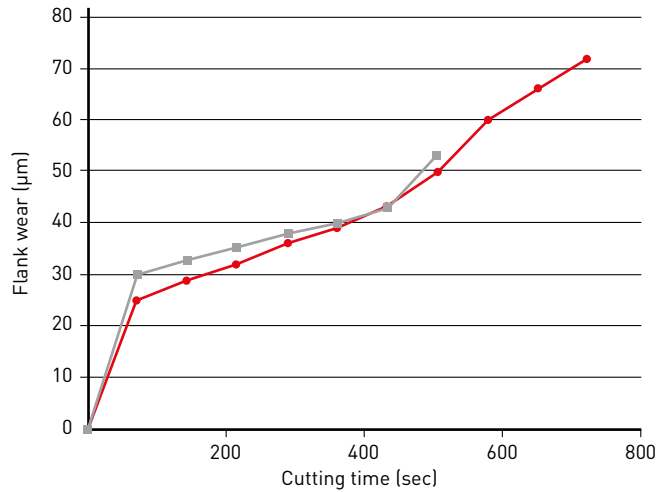
# BC8210

## CUTTING PERFORMANCE

### COMPARISON OF CONTINUOUS CUTTING

BC8210 reduces flank wear and maintains good surface finishes.

Insert	NP-CNGA120408GS2 BC8210
Material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Dry cutting



### COMPARISON OF LIGHT INTERRUPTED CUTTING

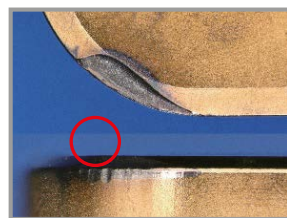
BC8210 provides excellent chipping resistance.

Insert	NP-CNGA120408VA2 BC8210
Material	DIN 20Cr4
Vc (m/min)	160
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Dry cutting

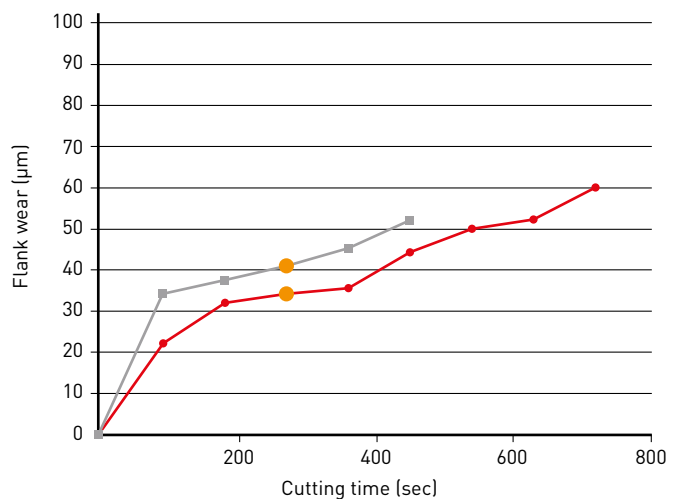
#### CHIPPING AFTER MACHINING 360 SECONDS



BC8210



Conventional



# BC8220

## CUTTING PERFORMANCE

### COMPARISON OF FRACTURE RESISTANCE DURING MEDIUM INTERRUPTED CUTTING

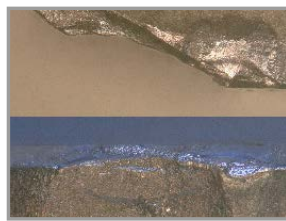
BC8220 has excellent chipping and fracture resistance.

Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	250
f (mm/rev)	0.15
ap (mm)	0.1
Cutting mode	Dry cutting

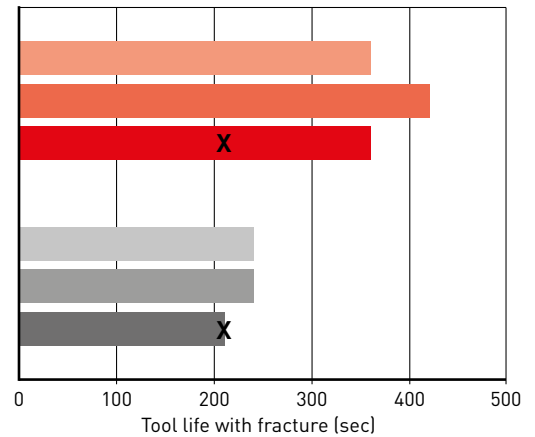
FRACTURE AFTER MACHINING 210 SECONDS



BC8220



Conventional



### COMPARISON OF FRACTURE RESISTANCE DURING HEAVY INTERRUPTED CUTTING

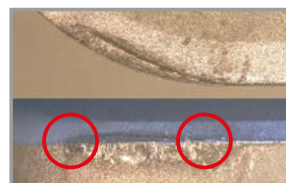
BC8220 has improved chipping resistance when compared to conventional products.

Insert	NP-CNGA120408VA2 BC8220
Material	DIN 20Cr4
Vc (m/min)	200
f (mm/rev)	0.05
ap (mm)	0.1
Cutting mode	Wet cutting

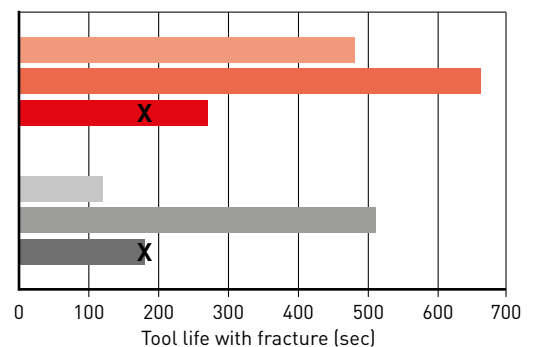
CHIPPING AFTER MACHINING 180 SECONDS



BC8220

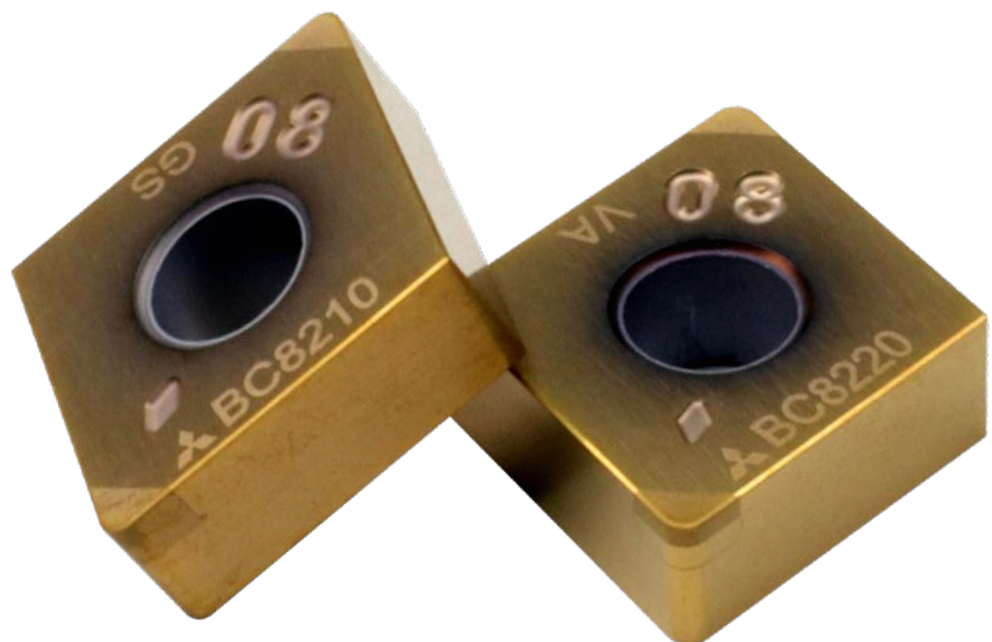
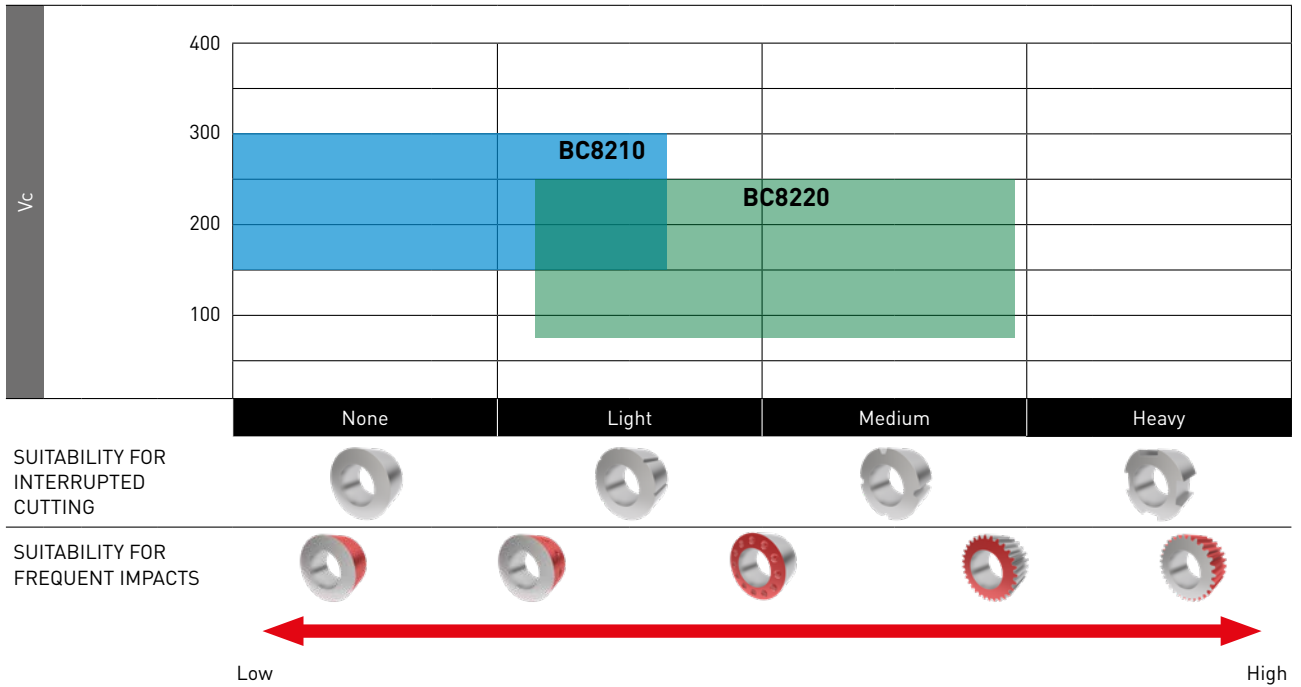


Conventional



# BC8200 SERIES

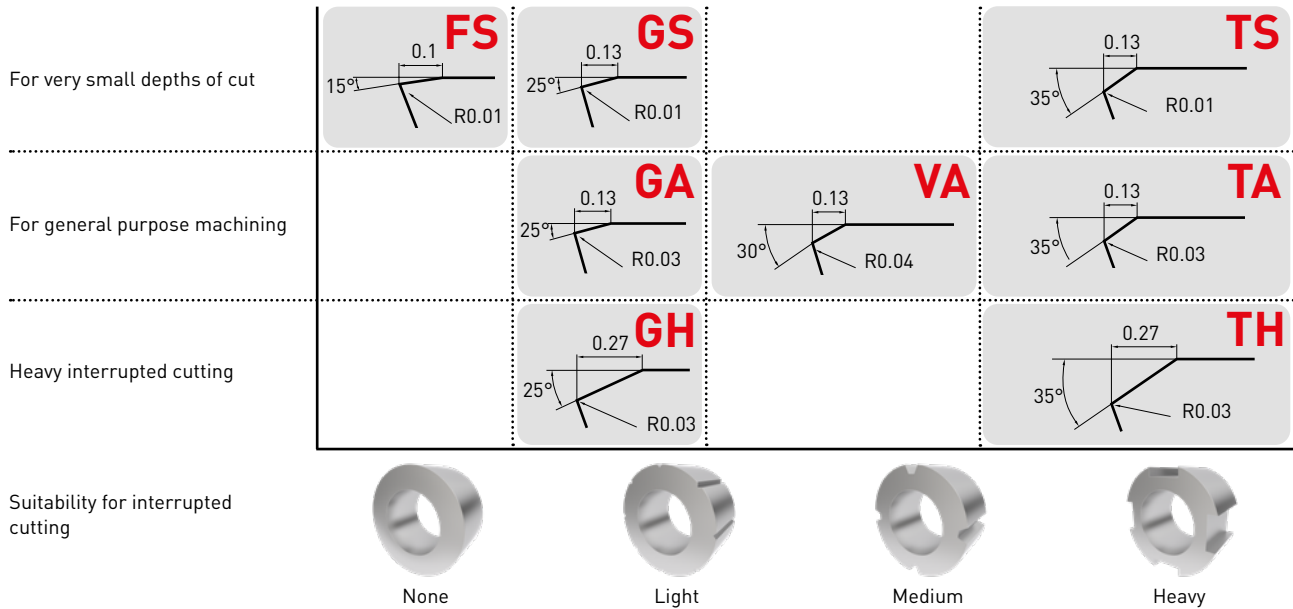
## BC8200 COATED PCBN SERIES



# BC8200 SERIES

## EDGE PREPARATION (HONING)

A wide variety of cutting edge preparations are available for all applications.  
**VA honing type with improved fracture resistance for high speeds and feeds.**



	Continuous cutting	General purpose		For fracture resistance	Interrupted cutting	
	General cutting	General cutting	High feed and depth	High speed and feed	General cutting	High feed and depth
<b>BC8210</b>	FS	GS	GH		TS	
<b>BC8220</b>		GA	GH	VA	TA	TH

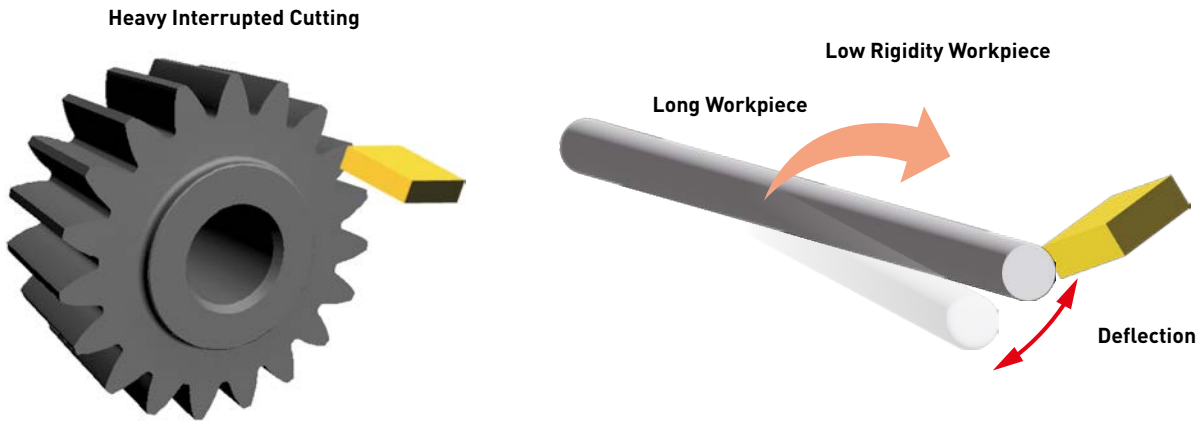
**NEW**

# MB8200 SERIES

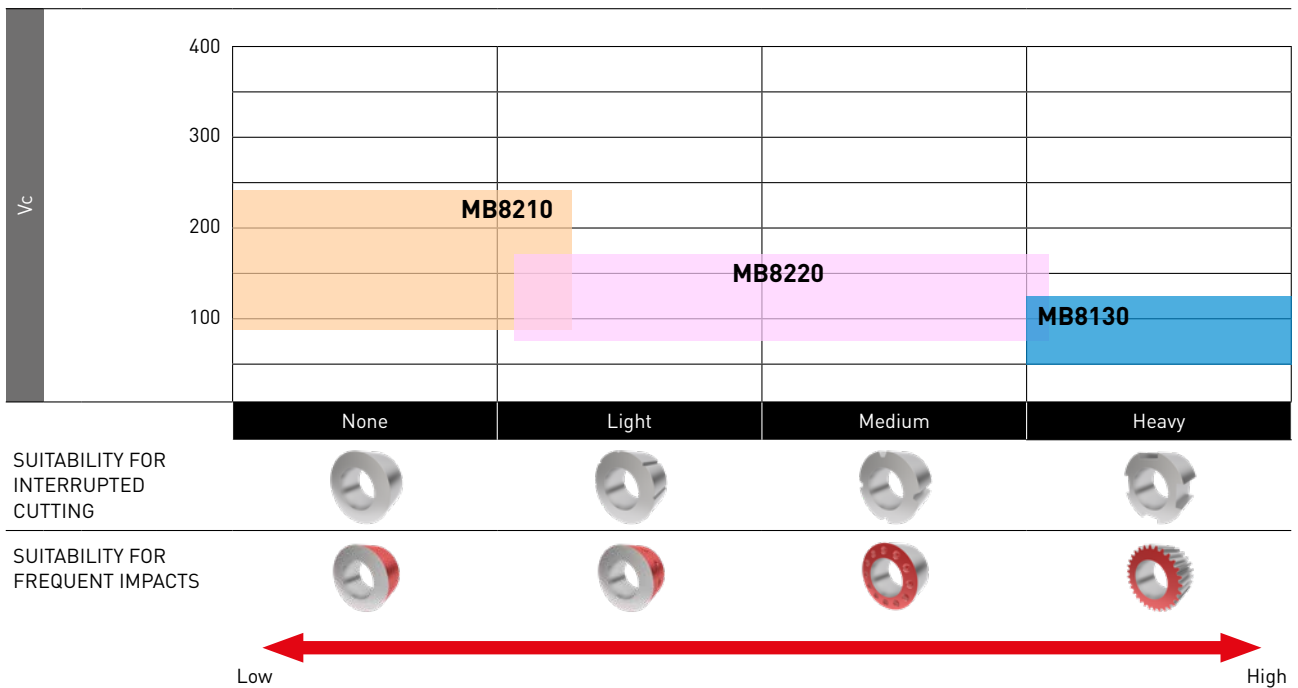
## UNCOATED PCBN GRADE FOR TURNING HARDENED STEEL

DISPLAYS EXCELLENT CUTTING PERFORMANCE DURING MEDIUM INTERRUPTED MACHINING

### RECOMMENDED MACHINING



### RECOMMENDED APPLICATION AREA



#### MB8210

Enables stable machining during continuous and light intermittent cutting of low rigidity applications.

#### MB8220

Displays excellent cutting performance during medium interrupted machining.



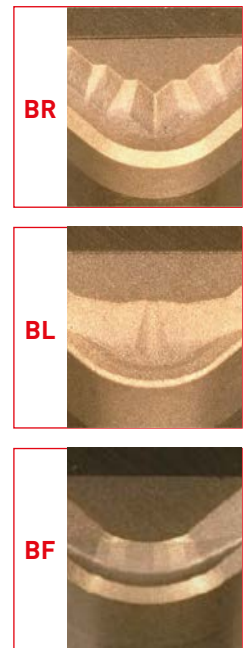
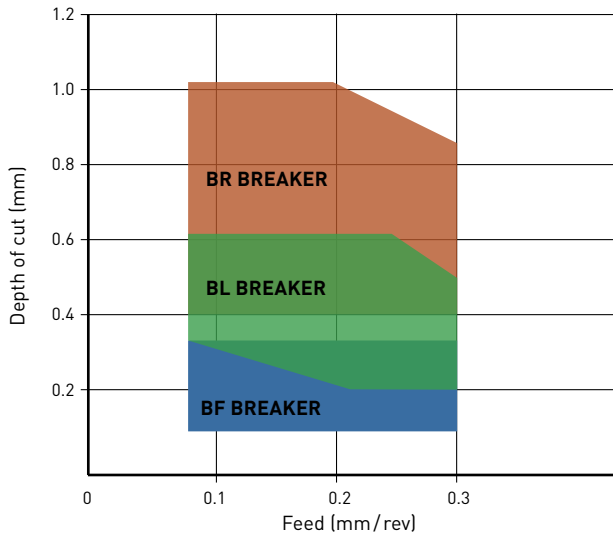
**NEW**

# BC8200 SERIES

## FEATURES OF THE INSERT

### CHIPBREAKER

The new BL chipbreaker provides good chip control at medium to light depths of cut. A versatile range of chipbreakers are available for a wide range of applications.



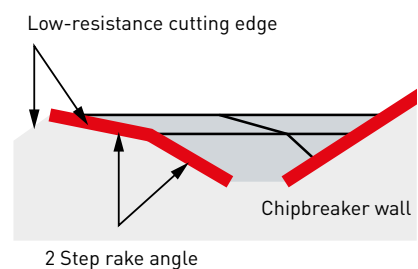
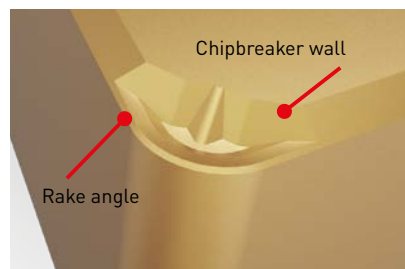
**Breaker system for excellent chip control when finishing, removing carburized layers, high load machining and for hard-soft machining.**

### BL BREAKER (BC8220)

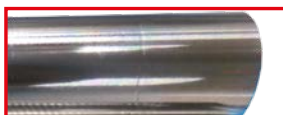
It exhibits excellent chip control performance at cutting depths of 0.2 to 0.6 mm. Combined with the dedicated honing, a low resistance cutting edge is created that suppresses chatter and vibration.

#### Cutting Performance

Material	20Cr4 (60HRC)
Insert	BL-CNGM120412TN2
Vc (m/min)	150
f (mm/rev)	0.2
ap (mm)	0.4
Cutting mode	Dry cutting



### CONDITION OF THE FINISHED SURFACE



BL



Conventional A



Conventional B

### CHIP SHAPE



BL



Conventional A



Conventional B

# BC8200 SERIES

## FEATURES OF THE INSERT

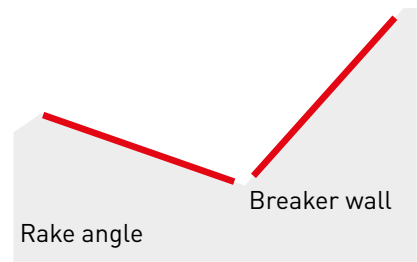
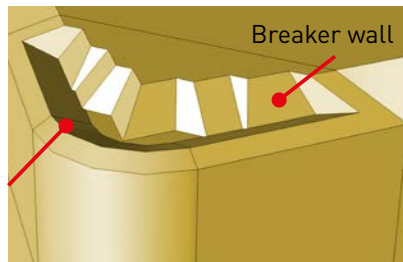
### BR BREAKER (BC8220)

A reduced number of passes needed and improved chip control during high depths 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 (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.6 – 1.0

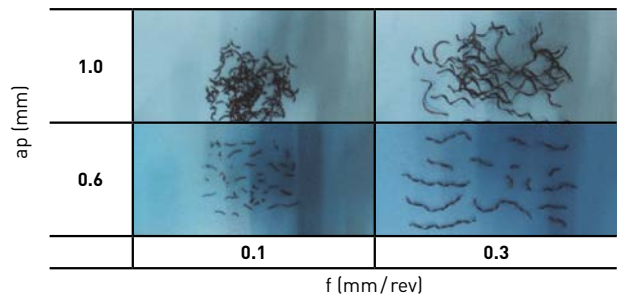
Rake angle



Achieves ideal chip control even at high depths of cut.

#### Cutting Performance

Material	DIN 20Cr4 (60 HRC)
Insert	BR-CNGM120408TA2
Vc (m/min)	200
f (mm/rev)	0.1 / 0.3
ap (mm)	0.6 / 1.0
Cutting mode	Dry cutting

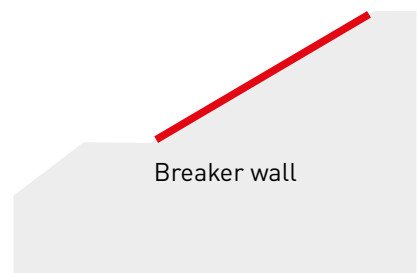
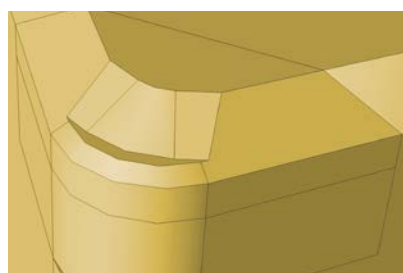


### BM BREAKER (BC8220)

Great chip control when machining at medium depths of cut. (0.3–0.8 mm)

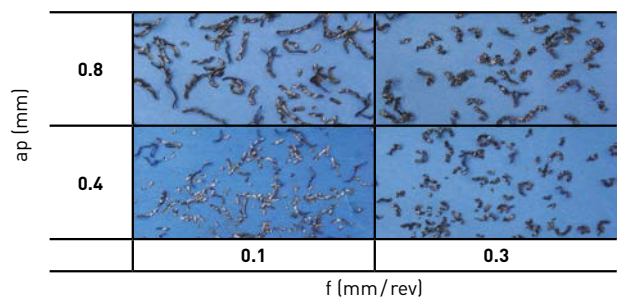
#### Recommended cutting conditions:

Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.3 – 0.8



#### Cutting Performance

Material	DIN 15Cr3 (60 HRC)
Insert	BM-CNGM120408TA2
Vc (m/min)	160
f (mm/rev)	0.1 / 0.3
ap (mm)	0.4 / 0.8
Cutting mode	Dry cutting



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# BC8200 SERIES

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## FEATURES OF THE INSERT

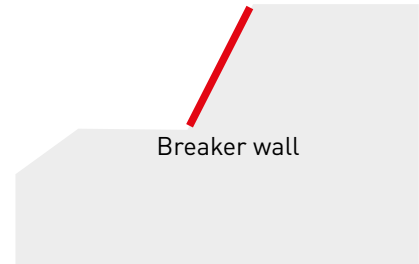
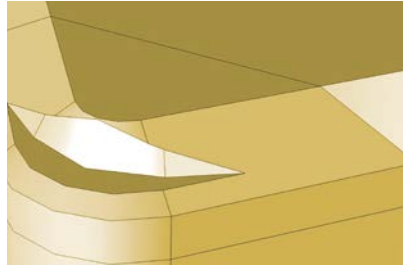
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### BF BREAKER (BC8210, BC8220)

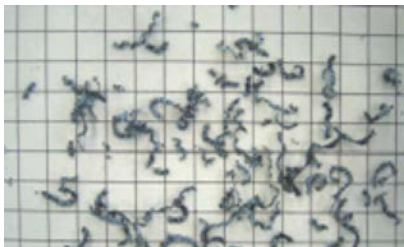
Achieves excellent chip control while finish cutting at depths of 0.3 mm or less.

#### Recommended cutting conditions:

Vc (m/min)	80 – 200
f (mm/rev)	<0.3
ap (mm)	0.1 – 0.3

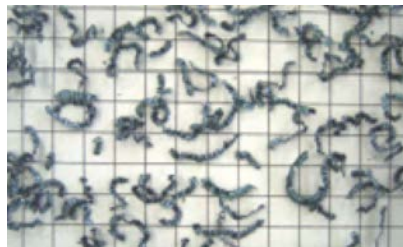


#### External turning



Vc (m/min)	100
f (mm/rev)	0.3
ap (mm)	0.2

#### Boring



Vc (m/min)	120
f (mm/rev)	0.3
ap (mm)	0.2

#### Cutting Performance

Material	DIN 15Cr3 (60 HRC)
Insert	BF-CNGM120408TS2
Cutting mode	Dry cutting

---

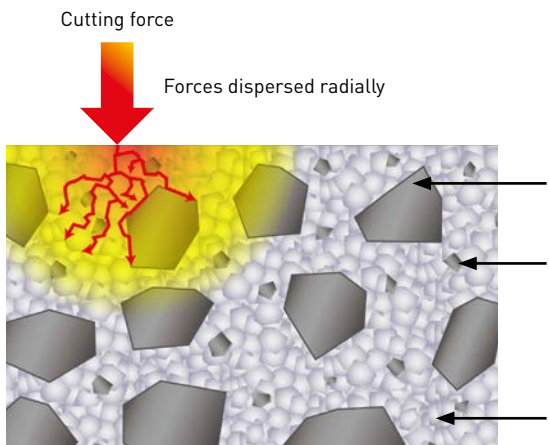
# BC8200 / MB8200 SERIES

## OPTIMISED SUBSTRATE TECHNOLOGY

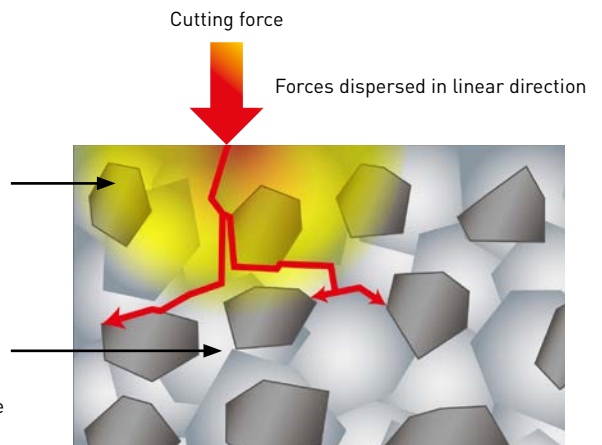
### PCBN SUBSTRATE FEATURING TOUGHNESS AND CRATER WEAR RESISTANCE

The PcBN substrate contains a ultra-fine grain, heat resistant binder. This suppresses both chipping and crater wear and promotes longer tool life.

#### BC8200 / BC8100 SERIES



#### CONVENTIONAL

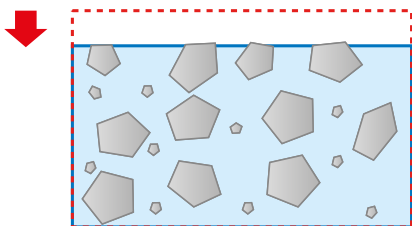


The ultra micro-particle binder for coated and uncoated PcBN inserts prevents linear crack development to avoid sudden fracturing.

### POSITIVE EFFECT OF THE NEWLY DEVELOPED, HEAT RESISTANT BINDER

The progress of crater wear is greatly reduced due to the use of a heat resistant binder. This suppresses chipping, crater wear and fracturing.

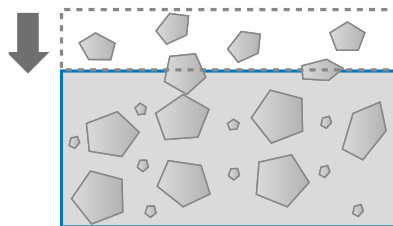
#### BC8200 / MB8200 SERIES



#### Reduce crater wear

Suppresses the binder wear caused by cutting heat.

#### CONVENTIONAL

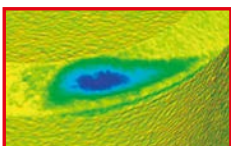


#### Crater wear progress

As binder wear progresses, the CBN particles are exposed and lost.

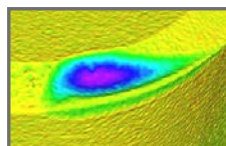
#### BC8200 / MB8200 SERIES

#### Small crater wear



#### CONVENTIONAL

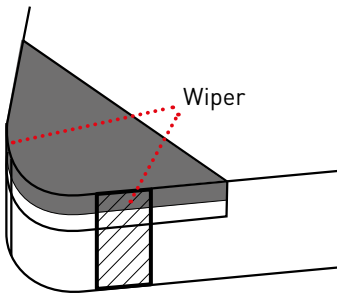
#### Large crater wear



#### Crater wear

Small Large

# WIPER INSERT



## IMPROVING SURFACE FINISHES

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

## MORE 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 in 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 which delays the progression of wear, thereby increasing tool life.

## BETTER CHIP CONTROL

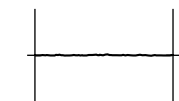
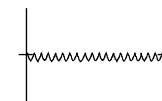
Under high feed conditions, the chips generated become thicker and are more easily broken, thereby improving chip control.

## RECOMMENDED CUTTING CONDITIONS AND PERFORMANCE

### HIGH PRECISION FINISHING

Without wiper

With wiper



Ry=3.2 μm

Ry=1.0 μm

Vc (m/min) 100

f (mm/rev) 0.1

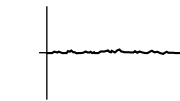
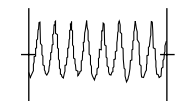
ap (mm) 0.1

Cutting mode Dry cutting

### HIGH FEED MACHINING

Without wiper

With wiper



Ry=12.2 μm

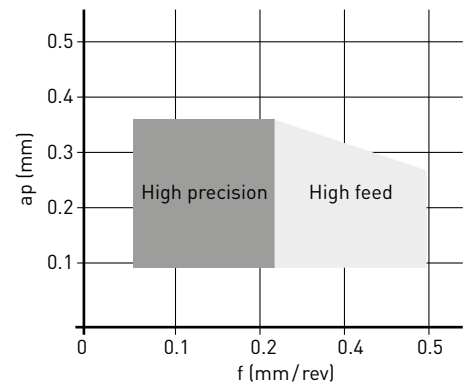
Ry=1.2 μm

Vc (m/min) 100

f (mm/rev) 0.3

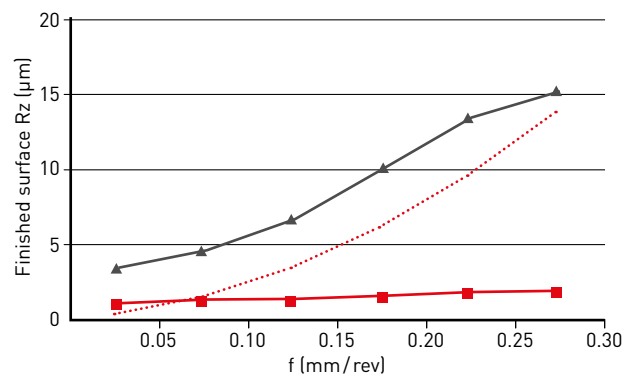
ap (mm) 0.1

Cutting mode Dry cutting



## CUTTING PERFORMANCE

Insert	NP-CNGA120408
Material	Hardened steel (HRC60)
Cutting mode	Continuous
Vc (m/min)	120
f (mm/rev)	Various
ap (mm)	0.1
Cutting mode	Dry cutting

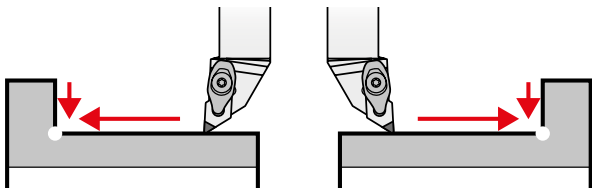


- WL-Wiper
- ▲ No wiper
- ..... Theoretical finished surface roughness

# COMBINATION OF BF CHIPBREAKER BREAKER AND WS WIPER INSERT

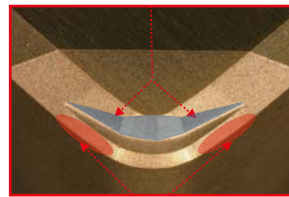
CNGM and DNGM types are now available with new inserts that combine a BF chipbreaker with a WS wiper Insert (BF-CNGM120408TSAWS2). It is effective for chip control and improvement of finished surface roughness without concern about the hand of the tool even during continuous external turning or internal turning and facing.

Effect of chipbreaker and wiper insert



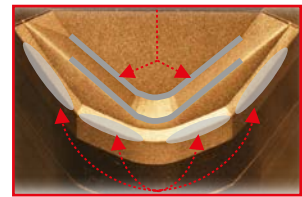
Demonstrates the effects of breaker and wiper Insert in both right handed and left handed cutting.

BF CHIPBREAKER



WS Wiper Insert (Neutral)  
BF-CNGM120408TSAWS2

BF CHIPBREAKER



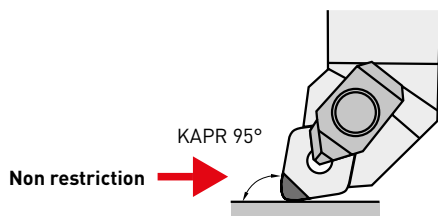
WS Wiper Insert (Neutral)  
BF-DNGM150412TSAWS2

## NOTES FOR USE

### WHEN USING A CNGM TYPE

#### No Restriction for Holders

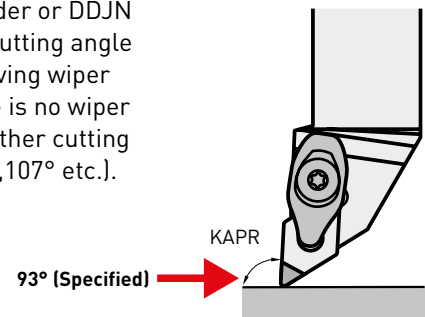
A standard holder can be used.  
(\*A double clamp, high rigidity tool is recommended.)



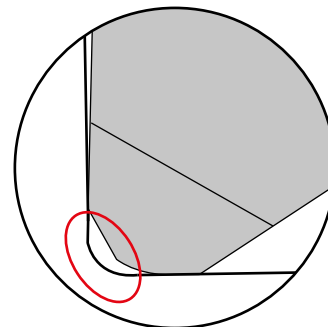
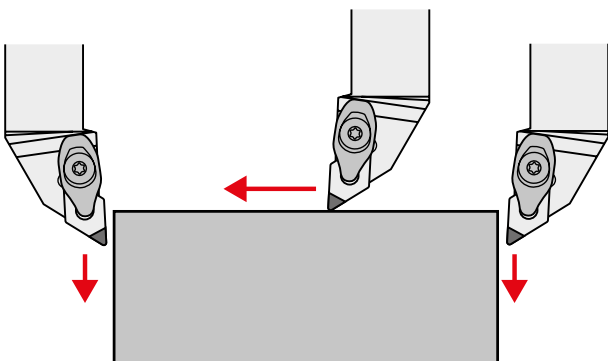
### WHEN USING A DNGM TYPE

#### Restriction for Holders

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

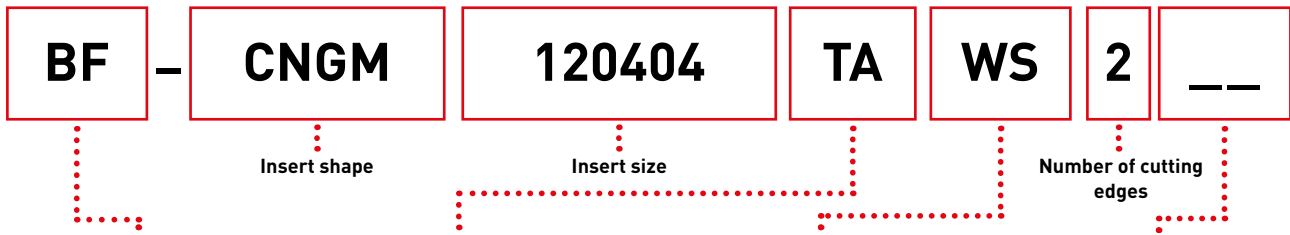


Displays great wiper efficiency when machining the end face and outer diameter in both right-hand and left-hand machining.



\* 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.

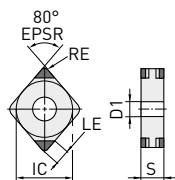
# IDENTIFICATION

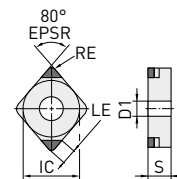
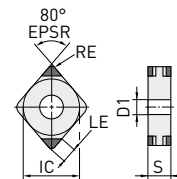


Insert geometry	Cutting edge preparation	Wiper	Cutting direction*								
BR For high depth of cut chipbreaker	FS Continuous cutting	WS With wiper	<table border="1"> <thead> <tr> <th>Figure</th> <th>Symbol</th> </tr> </thead> <tbody> <tr> <td></td> <td>JR Right</td> </tr> <tr> <td></td> <td>JL Left</td> </tr> <tr> <td></td> <td>No mark Neutral</td> </tr> </tbody> </table>	Figure	Symbol		JR Right		JL Left		No mark Neutral
Figure	Symbol										
	JR Right										
	JL Left										
	No mark Neutral										
BL For medium depth of cut chipbreaker	GS GA General cutting GH	No mark Without wiper									
BF For finish cutting chipbreaker	VA For high speed, High feed cutting										
NP New petit cut	TS TA Interrupted cutting TH										

# CNGA, CNGM

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120404GA4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GA4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GH4	★	★			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GH4	★	★			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GH4	●	★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FS4	★				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS4	★				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404VA4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408VA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412VA4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TA4		★			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TA4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TA4		★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TS4	★				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TS4	★				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120408TH4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TH4		★			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FSWS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FSWS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FSWS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GAWS4		●			4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GAWS4		●			4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GAWS4		●			4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GSWS4	●				4	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GSWS4	●				4	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GSWS4	●				4	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120402GA2		★			2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404GA2	●	●		●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GA2	●	●		●	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GA2	●	●		●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120402GS2	★				2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404GS2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GS2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GH2	★	★			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GH2	●	★			2	12.7	4.76	1.2	5.16	2.2	



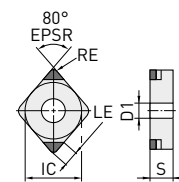
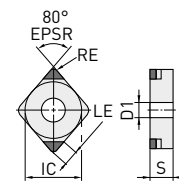
● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.



**CNGA, CNGM – NEGATIVE INSERTS (WITH HOLE)**

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
	●	●	●	●							
NP-CNGA120402FS2	★				2	12.7	4.76	0.2	5.16	1.7	
NP-CNGA120404FS2	●	●	●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS2	●	●	●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS2	●	●	●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404VA2		●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408VA2		●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412VA2		●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TA2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TA2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TA2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404TS2	●	●			2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408TS2	●	●			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TS2	●	●			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120408TH2	●	★			2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412TH2	●	★			2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404FSWS2	●		●		2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FSWS2	●		●		2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FSWS2	●		●		2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GAWS2		●		●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GAWS2		●		★	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GAWS2		●		●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GSWS2	●				2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TAWS2		●			2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TAWS2		●			2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120404TS2	●				2	12.7	4.76	0.4	5.16	1.8	
BF-CNGM120408TS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TS2	●				2	12.7	4.76	1.2	5.16	2.2	
BF-CNGM120408TSWS2	●				2	12.7	4.76	0.8	5.16	2.0	
BF-CNGM120412TSWS2	●				2	12.7	4.76	1.2	5.16	2.2	
<b>NEW</b> BL-CNGM120404TN2		●			2	12.7	4.76	0.4	5.16	1.8	
<b>NEW</b> BL-CNGM120408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
<b>NEW</b> BL-CNGM120412TN2		●			2	12.7	4.76	1.2	5.16	2.2	
BM-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BM-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BM-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	
BR-CNGM120404TA2		●			2	12.7	4.76	0.4	5.16	1.8	
BR-CNGM120408TA2		●			2	12.7	4.76	0.8	5.16	2.0	
BR-CNGM120412TA2		●			2	12.7	4.76	1.2	5.16	2.2	



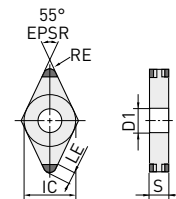
● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# DNGA, DNGM

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404GA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GA4		●			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GA4		●			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GA4		●			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GS4	★				4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GS4	●				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GS4	●				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GS4	●				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GH4	★	★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GH4	★	★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GH4	★	★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GH4	★	★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GH4	★	★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GH4	★	★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404FS4	★				4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408FS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412FS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604FS4	★				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608FS4	★				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612FS4	★				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404VA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408VA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412VA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604VA4		★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608VA4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612VA4		★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404TA4		★			4	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TA4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TA4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TA4		★			4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TA4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TA4		★			4	12.7	6.35	1.2	5.16	1.8	



1/4

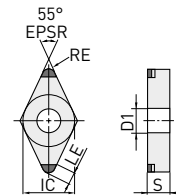
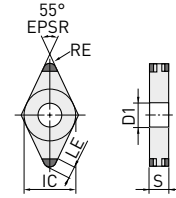


● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

**DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)**

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TS4	★				4	12.7	4.76		5.16	2.1	
NP-DNGA150408TS4	★				4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TS4	★				4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TS4	★				4	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TS4	★				4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TS4	★				4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150408TH4		★			4	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TH4		★			4	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150608TH4		★			4	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TH4		★			4	12.7	6.35	1.2	5.16	1.8	
NP-DNGA110408GA2		●		●	2	9.525	4.76	0.8	3.81	2.0	
NP-DNGA150402GA2		★			2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404GA2	★	★		●	2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GA2	★	★		●	2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GA2	★	★		★	2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GA2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GA2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GA2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150402GS2	★				2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404GS2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GS2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GS2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GH2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412GH2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604GH2	★	★			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608GH2	★	★			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612GH2	★	★			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150402FS2	★		★		2	12.7	4.76	0.2	5.16	2.2	
NP-DNGA150404FS2	★	★	●		2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408FS2	★	★	●		2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412FS2	★	★	●		2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604FS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608FS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612FS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404VA2		★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408VA2		★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412VA2		★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604VA2		●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608VA2		●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612VA2		●			2	12.7	6.35	1.2	5.16	1.8	

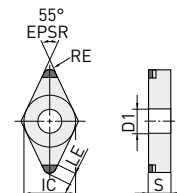


● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DNGA150404TA2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TA2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TA2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TA2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TA2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TA2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404TS2	★	★			2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408TS2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TS2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150604TS2	●	●			2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608TS2	●	●			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TS2	●	●			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150408TH2	★	★			2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150412TH2	★	★			2	12.7	4.76	1.2	5.16	1.8	
NP-DNGA150608TH2	●	★			2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150612TH2	●	★			2	12.7	6.35	1.2	5.16	1.8	
NP-DNGA150404GAWS2JR		★			2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150404GAWS2JL		★			2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150408GAWS2JR		★			2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150408GAWS2JL		★			2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150604GAWS2JR		●			2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150604GAWS2JL		●			2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150608GAWS2JR		●			2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150608GAWS2JL		●			2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150404GSWS2JR	★				2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150404GSWS2JL	★				2	12.7	4.76	0.4	5.16	1.8	
NP-DNGA150408GSWS2JR	★				2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150408GSWS2JL	★				2	12.7	4.76	0.8	5.16	1.7	
NP-DNGA150604GSWS2JR	●				2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150604GSWS2JL	●				2	12.7	6.35	0.4	5.16	1.8	
NP-DNGA150608GSWS2JR	●				2	12.7	6.35	0.8	5.16	1.7	
NP-DNGA150608GSWS2JL	●				2	12.7	6.35	0.8	5.16	1.7	



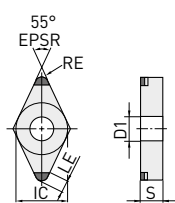
3/4



● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
BF-DNGM150408TAWS2		●			2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TAWS2		●			2	12.7	4.76	1.2	5.16	2.6	
BF-DNGM150404TS2	★				2	12.7	4.76	0.4	5.16	2.1	
BF-DNGM150408TS2	★				2	12.7	4.76	0.8	5.16	2.0	
BF-DNGM150412TS2	★				2	12.7	4.76	1.2	5.16	1.8	
BF-DNGM150408TSWS2	★				2	12.7	4.76	0.8	5.16	2.4	
BF-DNGM150412TSWS2	★				2	12.7	4.76	1.2	5.16	2.6	
NEW BL-DNGM150404TN2		●			2	12.7	4.76	0.4	5.16	2.1	
NEW BL-DNGM150408TN2		●			2	12.7	4.76	0.8	5.16	2.0	
NEW BL-DNGM150412TN2		●			2	12.7	4.76	1.2	5.16	1.8	
BM-DNGM150404TA2		★			2	12.7	4.76	0.4	5.16	2.1	
BM-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BM-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150404TA2		●			2	12.7	4.76	0.4	5.16	2.1	
BR-DNGM150408TA2		★			2	12.7	4.76	0.8	5.16	2.0	
BR-DNGM150412TA2		★			2	12.7	4.76	1.2	5.16	1.8	
BR-DNGM150604TA2		●			2	12.7	6.35	0.4	5.16	2.1	
BR-DNGM150608TA2		●			2	12.7	6.35	0.8	5.16	2.0	
BR-DNGM150612TA2		●			2	12.7	6.35	1.2	5.16	1.8	

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● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# SNGA

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-SNGA120408GA2		●		★	2	12.7	4.76	0.8	5.16	2.2	
NP-SNGA120412GA2		★		●	2	12.7	4.76	1.2	5.16	2.5	

1/1



# WNGA

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-WNGA080408GS6	●				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408FS6	★				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TS6	★				6	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GA3		★			3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408FS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TA3		★			3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408TS3	★				3	12.7	4.76	0.8	5.16	2.0	
NP-WNGA080408GSWS3	●				3	12.7	4.76	0.8	5.16	2.0	

1/1



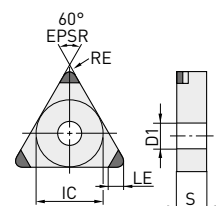
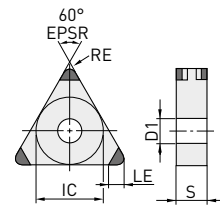
● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# TNGA, TNGM

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TNGA160404GA6		●			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GA6		●			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GA6		●			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GS6	●				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GS6	●				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GS6	●				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GH6		★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GH6		★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GH6		★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404FS6	★				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408FS6	★				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412FS6	★				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404VA6		★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408VA6		★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412VA6		★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TA6		★			6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TA6		★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TA6		★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TS6	★				6	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TS6	★				6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TS6	★				6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160408TH6		★			6	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TH6		★			6	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402GA3		★			3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404GA3		●		★	3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GA3		●		●	3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GA3		★		●	3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402GS3	★				3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404GS3	★				3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GS3	★				3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GS3	★				3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GH3		★			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GH3		★			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GH3		★			3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160402FS3	★				3	9.525	4.76	0.2	3.81	1.5	
NP-TNGA160404FS3	●		●		3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408FS3	●		●		3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412FS3	●		●		3	9.525	4.76	1.2	3.81	1.9	



1/2

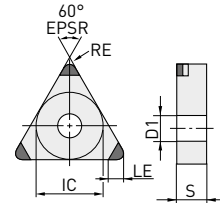


● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

**TNGA, TNGM – NEGATIVE INSERTS (WITH HOLE)**

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TNGA160404VA3		★			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408VA3		●			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412VA3		★			3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TA3		●			3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TA3		●			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TA3		●			3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404TS3	●				3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408TS3	●				3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TS3	●				3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160408TH3		★			3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412TH3		★			3	9.525	4.76	1.2	3.81	1.9	
NEW BL-TNGM160404TN3		★			3	9.525	4.76	0.4	3.81	1.6	
NEW BL-TNGM160408TN3		★			3	9.525	4.76	0.8	3.81	1.7	
NEW BL-TNGM160412TN3		★			3	9.525	4.76	1.2	3.81	1.9	



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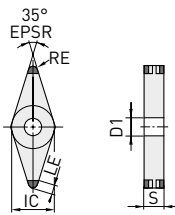
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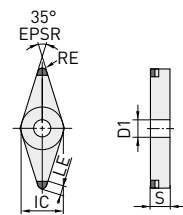
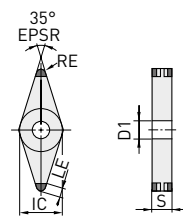
● : Inventory maintained. ★ : Inventory maintained in Japan.



# VNGA, VNGM

## NEGATIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-VNGA160404GA4		●			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GA4		●			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GA4		●			4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GS4	●				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GS4	★				4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GH4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GH4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404FS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408FS4	★				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404VA4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408VA4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412VA4		★			4	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404TA4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TA4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TS4	★				4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TS4	★				4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TH4		★			4	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TH4		★			4	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160402GA2		●			2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404GA2		●		●	2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GA2		●		●	2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GA2		★		★	2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160402GS2	★				2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404GS2	●				2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GS2	●				2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412GS2	★				2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404GH2		★			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408GH2		★			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160402FS2	★		●		2	9.525	4.76	0.2	3.81	2.5	
NP-VNGA160404FS2	★		●		2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408FS2	★		●		2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404VA2		●			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408VA2		●			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160412VA2		★			2	9.525	4.76	1.2	3.81	1.5	
NP-VNGA160404TA2		●			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TA2		●			2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TS2	★				2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TS2	★				2	9.525	4.76	0.8	3.81	2.0	
NP-VNGA160404TH2		★			2	9.525	4.76	0.4	3.81	2.5	
NP-VNGA160408TH2		★			2	9.525	4.76	0.8	3.81	2.0	
NEW BL-VNGM160404TN2		●			2	9.525	4.76	0.4	3.81	2.5	
NEW BL-VNGM160408TN2		●			2	9.525	4.76	0.8	3.81	2.0	



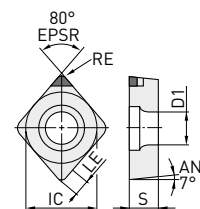
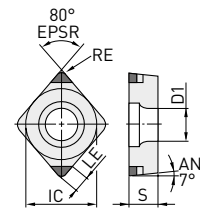
● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# CCGW 7°, CCGT 7°, CPGB 11°

## POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CCGW060202GA2		●			2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204GA2		●		●	2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208GA2		●		●	2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302GA2		●			2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304GA2	●	●		●	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GA2	●	●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW060202GS2	★				2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204GS2	●				2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208GS2	●				2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302GS2	★				2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304GS2	●	●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GS2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW060202FS2	●		●		2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204FS2	●		●		2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW060208FS2	●		●		2	6.35	2.38	0.8	2.8	2.0	
NP-CCGW09T302FS2	●		●		2	9.525	3.97	0.2	4.4	1.7	
NP-CCGW09T304FS2	●	●	●		2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308FS2	●	●	●		2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304VA2		●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308VA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304TA2	●	●			2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308TA2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304FSWS2	●		●		2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308FSWS2	●		●		2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304GAWS2		●		●	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GAWS2		●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW09T304GSWS2	●				2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GSWS2	●				2	9.525	3.97	0.8	4.4	2.0	
BF-CCGT09T304TS2	●				2	9.525	3.97	0.4	4.4	1.8	
BF-CCGT09T308TS2	●				2	9.525	3.97	0.8	4.4	2.0	
NEW BL-CCGT09T304TN2		●			2	9.525	3.97	0.4	4.4	1.8	
NEW BL-CCGT09T308TN2		●			2	9.525	3.97	0.8	4.4	2.0	
BM-CCGT09T304TA2		●			2	9.525	3.97	0.4	4.4	1.8	
BM-CCGT09T308TA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW03S102FS	●		●		1	3.57*	1.39	0.2	2.0	1.1	
NP-CCGW03S104FS	●		●		1	3.57*	1.39	0.4	2.0	1.0	
NP-CCGW04T002FS	●		●		1	4.37*	1.79	0.2	2.4	1.5	
NP-CCGW04T004FS	●		●		1	4.37*	1.79	0.4	2.4	1.4	



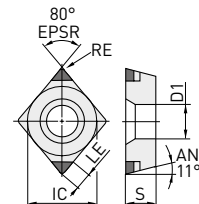
1/2

● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

**CCGW 7°, CCGT 7°, CPGB 11° - POSITIVE INSERTS (WITH HOLE)**

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CPGB080204GA2		●			2	7.94	2.38	0.4	3.5	1.8	
NP-CPGB080208GA2		●			2	7.94	2.38	0.8	3.5	2.0	
NP-CPGB080212GA2		★			2	7.94	2.38	1.2	3.5	2.2	
NP-CPGB090302GA2		★			2	9.525	3.18	0.2	4.5	1.7	
NP-CPGB090304GA2		●			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308GA2		●			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312GA2		★			2	9.525	3.18	1.2	4.5	2.2	
NP-CPGB080204GS2	★				2	7.94	2.38	0.4	3.5	1.8	
NP-CPGB080208GS2	★				2	7.94	2.38	0.8	3.5	2.0	
NP-CPGB090302GS2	★				2	9.525	3.18	0.2	4.5	1.7	
NP-CPGB090304GS2	★				2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308GS2	★				2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090304VA2		●			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308VA2		●			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312VA2		★			2	9.525	3.18	1.2	4.5	2.2	
NP-CPGB090304TA2		★			2	9.525	3.18	0.4	4.5	1.8	
NP-CPGB090308TA2		★			2	9.525	3.18	0.8	4.5	2.0	
NP-CPGB090312TA2		★			2	9.525	3.18	1.2	4.5	2.2	



2/2



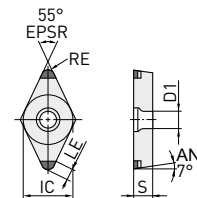
● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# DCGW 7°, DCGT 7°

## POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-DCGW070202GA2		●			2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204GA2		●		●	2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208GA2		★			2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302GA2		●			2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304GA2	●	●		●	2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308GA2	●	●		●	2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070202GS2	●				2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204GS2	●				2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208GS2	●				2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302GS2	●				2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304GS2	●	●			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308GS2	●	●			2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070202FS2	●		●		2	6.35	2.38	0.2	2.8	2.2	
NP-DCGW070204FS2	●		●		2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW070208FS2	★		●		2	6.35	2.38	0.8	2.8	2.0	
NP-DCGW11T302FS2	●		●		2	9.525	3.97	0.2	4.4	2.2	
NP-DCGW11T304FS2	●	●	●		2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308FS2	●	●	●		2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW11T304VA2		●			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308VA2		●			2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW11T304TA2	●	★			2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308TA2	●	★			2	9.525	3.97	0.8	4.4	2.0	
BF-DCGT11T304TS2	●				2	9.525	3.97	0.4	4.4	2.1	
BF-DCGT11T308TS2	●				2	9.525	3.97	0.8	4.4	2.0	
NEW BL-DCGT11T304TN2		●			2	9.525	3.97	0.4	4.4	2.1	
NEW BL-DCGT11T308TN2		●			2	9.525	3.97	0.8	4.4	2.0	
BM-DCGT11T304TA2		●			2	9.525	3.97	0.4	4.4	2.1	
BM-DCGT11T308TA2		●			2	9.525	3.97	0.8	4.4	2.0	



1/1



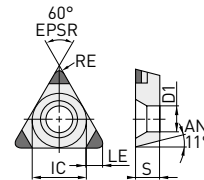
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# TPGB 11°

## POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-TPGB090204GA3		★		●	3	5.56	2.38	0.4	2.9	1.6	
NP-TPGB090208GA3		★		★	3	5.56	2.38	0.8	2.9	1.7	
NP-TPGB110302GA3		★			3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304GA3		●		●	3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308GA3		●		★	3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB160304GA3		●		★	3	9.525	3.18	0.4	4.4	1.6	
NP-TPGB160308GA3		●		★	3	9.525	3.18	0.8	4.4	1.7	
NP-TPGB080204GS3	★				3	4.76	2.38	0.4	2.4	1.6	
NP-TPGB080208GS3	★				3	4.76	2.38	0.8	2.4	1.7	
NP-TPGB090204GS3	★				3	5.56	2.38	0.4	2.9	1.6	
NP-TPGB090208GS3	★				3	5.56	2.38	0.8	2.9	1.7	
NP-TPGB110302GS3	★				3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304GS3	★				3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308GS3	★				3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB160304GS3	★				3	9.525	3.18	0.4	4.4	1.6	
NP-TPGB160308GS3	★				3	9.525	3.18	0.8	4.4	1.7	
NP-TPGB110302FS3	★		★		3	6.35	3.18	0.2	3.4	1.5	
NP-TPGB110304FS3	★		●		3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308FS3	★		●		3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB110304VA3		●			3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308VA3		●			3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB110304TA3		★			3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308TA3		★			3	6.35	3.18	0.8	3.4	1.7	



1/1



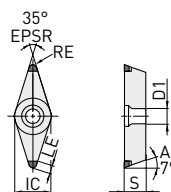
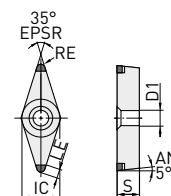
● / ★ = Expansion

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# VBGW 5°, VBGT 5°, VCGW 7°

## POSITIVE INSERTS (WITH HOLE)

Order number	BC8210	BC8220	NEW MB8210	NEW MB8220	ZEFF	IC	S	RE	D1	LE	Geometry
NP-VBGW110302GA2		●			2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304GA2		●		★	2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308GA2		★		★	2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402GA2		★			2	9.525	4.76	0.2	4.43	2.5	
NP-VBGW160404GA2		●		●	2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408GA2		●		●	2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW110302GS2	★				2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304GS2	★				2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308GS2	★				2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402GS2	●				2	9.525	4.76	0.2	4.43	2.5	
NP-VBGW160404GS2	●				2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408GS2	●				2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW110302FS2	●		●		2	6.35	3.18	0.2	2.85	2.5	
NP-VBGW110304FS2	★		●		2	6.35	3.18	0.4	2.85	2.5	
NP-VBGW110308FS2	★		●		2	6.35	3.18	0.8	2.85	2.0	
NP-VBGW160402FS2	★		●		2	9.525	4.76	0.2	4.43	2.5	
NEW NP-VBGW160404FS2			●		2	9.525	4.76	0.4	4.43	2.5	
NEW NP-VBGW160408FS2			●		2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW160404VA2		●			2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408VA2		●			2	9.525	4.76	0.8	4.43	2.0	
NP-VBGW160404TA2		●			2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408TA2		★			2	9.525	4.76	0.8	4.43	2.0	
NEW BL-VBGT110304TN2		●			2	6.35	3.18	0.4	2.85	2.5	
NEW BL-VBGT110304TN2		●			2	6.35	3.18	0.8	2.85	2.0	
NEW BL-VBGT160404TN2		●			2	9.525	4.76	0.4	4.43	2.5	
NEW BL-VBGT160408TN2		●			2	9.525	4.76	0.8	4.43	2.0	
NP-VCGW160404GA2		●			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408GA2		●			2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404GS2	●				2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408GS2	●				2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404VA2		●			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408VA2		●			2	9.525	4.76	0.8	4.4	2.0	
NP-VCGW160404TA2		★			2	9.525	4.76	0.4	4.4	2.5	
NP-VCGW160408TA2		★			2	9.525	4.76	0.8	4.4	2.0	



1/1



● / ★ = Expansion

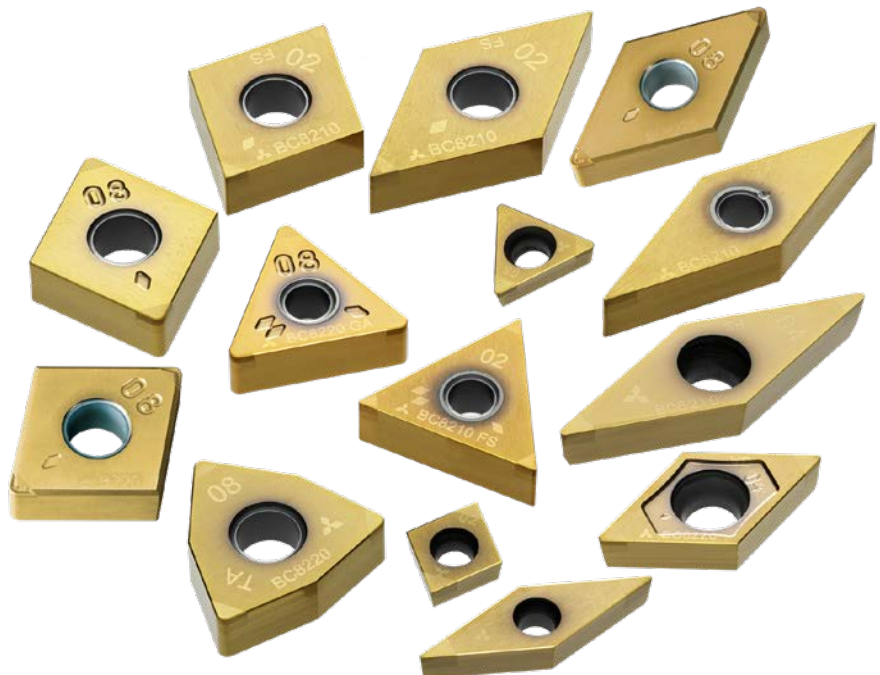
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# BC8200 / MB8200 SERIES

## RECOMMENDED CUTTING CONDITIONS

Material	Grade	Cutting mode	Vc	f	ap	Coolant
H Hardened steels	BC8210	Continuous cutting	150 – 250 (90 – 300)	≤0.2	≤0.35	Dry, wet
		Light interrupted cutting	100 – 180 (50 – 200)	≤0.2	≤0.35	
	BC8220	Continuous cutting	150 – 200 (80 – 250)	≤0.2	≤0.5	
		Light to medium interrupted cutting	100 – 180 (50 – 200)	≤0.2	≤0.3	

1/1



**NEW**

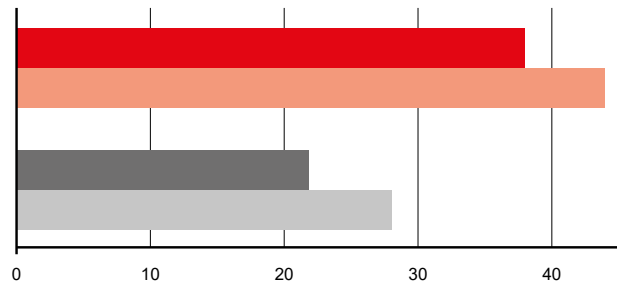
# MB8200 SERIES

## CUTTING PERFORMANCE

### COMPARISON OF CONTINUOUS CUTTING : SCR420 (60HRC)

MB8210 achieves stable machining during continuous cutting.

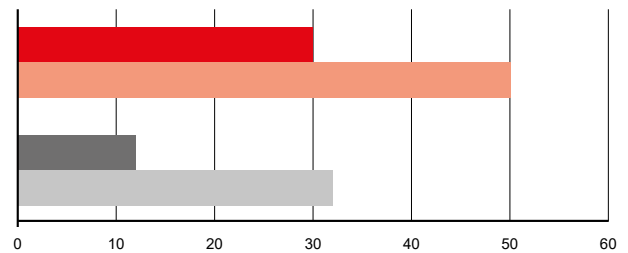
Material	20Cr4 (60HRC)
Insert	CNGA120408
Vc (m/min)	180
f (mm/rev)	0.15
ap (mm)	0.2
Cutting mode	Dry cutting



### COMPARISON OF LIGHT INTERRUPTED CUTTING : SCR420 (60HRC)

MB8220 achieves stable cutting and is ideal for light interrupted cutting.

Material	20Cr4 (60HRC)
Insert	CNGA120408
Vc (m/min)	130
f (mm/rev)	0.15
ap (mm)	0.2
Cutting mode	Dry cutting



## RECOMMENDED CUTTING CONDITIONS

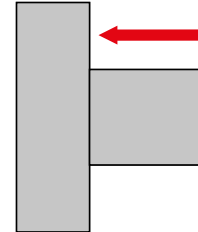
Material	Grade	Cutting mode	Vc	f	ap	Coolant
H Hardened steels (Heat treated steels)	MB8210	External continuous cutting	100 - 250	-0.20	-0.30	Dry, wet
	MB8220	External interrupted cutting	100 - 150	-0.20	-0.50	



# BC8200 SERIES

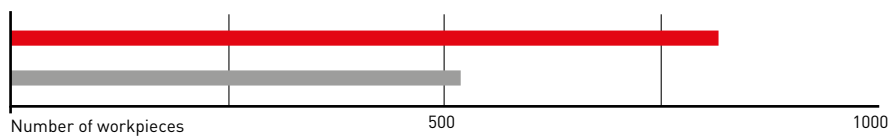
## APPLICATION EXAMPLES

Insert	NP-CNGA120412GSWS2 BC8210
Material	Non-micro alloyed Steel
Cutting mode	External continuous cutting
Vc (m/min)	260
f (mm/rev)	0.20
ap (mm)	0.15
Cutting mode	Dry cutting

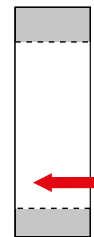


### Result

During continuous cutting, it was possible to maintain a good surface roughness and achieve a tool life of 1.6 X or more when compared to conventional products.

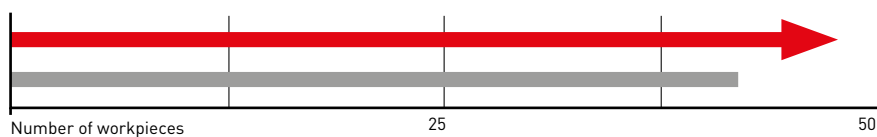


Insert	NP-DCGW11T304GS2 BC8210
Material	DIN 16MnCr5
Cutting mode	Internal continuous cutting
Vc (m/min)	240
f (mm/rev)	0.08
ap (mm)	0.20
Cutting mode	Dry cutting

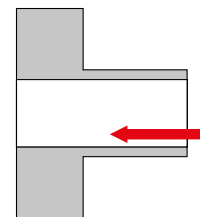


### Result

The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was also maintained.

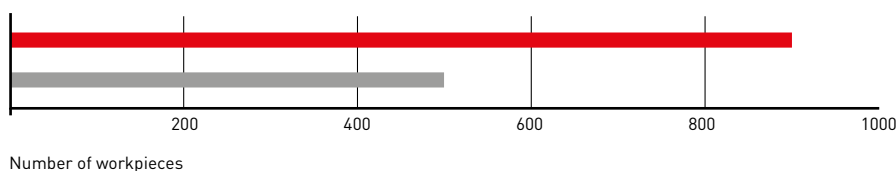


Insert	NP-CCGW09T308GS2 BC8210
Material	DIN 16MnCr5
Component	Automobile parts
Cutting mode	Internal continuous cutting
Vc (m/min)	140
f (mm/rev)	0.07
ap (mm)	0.10
Cutting mode	Dry cutting



### Result

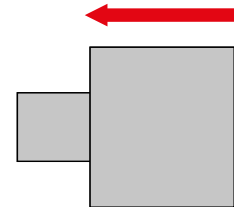
By significantly suppressing the deterioration of the surface of the insert, tool life was extended during continuous cutting to 1.8 x longer than that of conventional products.



# BC8200 SERIES

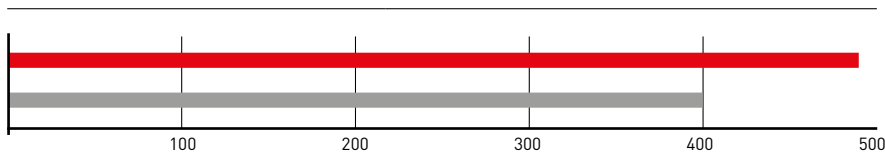
## APPLICATION EXAMPLES

Insert	NP-DNGA110416GA2 BC8220
Material	DIN Cf53 (58HRC)
Component	Automobile parts
Cutting mode	External continuous cutting
Vc (m/min)	140
f (mm/rev)	0.15
ap (mm)	0.15
Cutting mode	Dry cutting



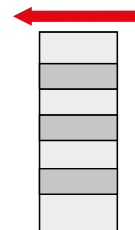
Result

Tool life for continuous cutting is 1.2 times longer than that of conventional products.



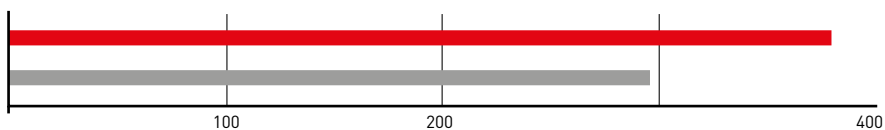
Number of workpieces

Insert	NP-TNGA160420TA3 BC8220
Material	DIN 16MnCr5
Cutting mode	Heavy interrupted boring
Vc (m/min)	130
f (mm/rev)	0.12
ap (mm)	0.25
Cutting mode	Dry cutting



Result

BC8220 has excellent fracture resistance and a tool life 1.25 times longer than conventional products.

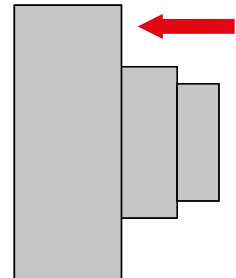


Number of workpieces

# BC8200 SERIES

## APPLICATION EXAMPLES

Insert	BR-CNGM120408TA2 BC8220
Material	Steel (62-64HRC)
Component	Gear
Cutting mode	External continuous cutting
Vc (m/min)	150 - 170
f (mm/rev)	0.1 - 0.2
ap (mm)	0.7
Cutting mode	Dry cutting

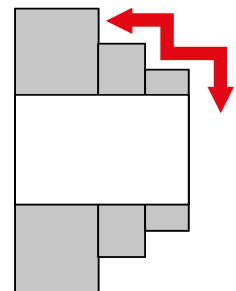


**Result** While conventional products can machine up to 300 pieces, BC8220 can machine up to 450 pieces.

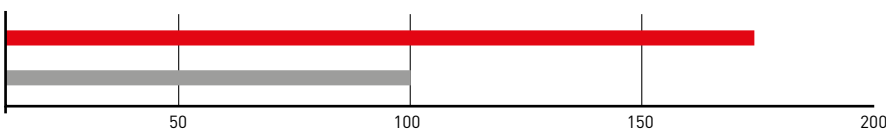


Number of workpieces

Insert	BR-DNGM150408TA2 BC8220
Material	SMnC420 (59-63HRC)
Component	Gear
Cutting mode	External continuous interrupted turning
Vc (m/min)	180
f (mm/rev)	0.03 - 0.13
ap (mm)	1.0 - 1.1
Cutting mode	Dry cutting



**Result** 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.



Number of workpieces

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### POLAND

MMC HARDMETAL POLAND SP. Z O.O  
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Phone +48 71335 1620 . Fax +48 71335 1621  
Email sales@mitsubishicarbide.com.pl

### ITALY

MMC ITALIA S.R.L.  
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