DIA EDGE
TOOL NEWS
2019.8 Update
B215A

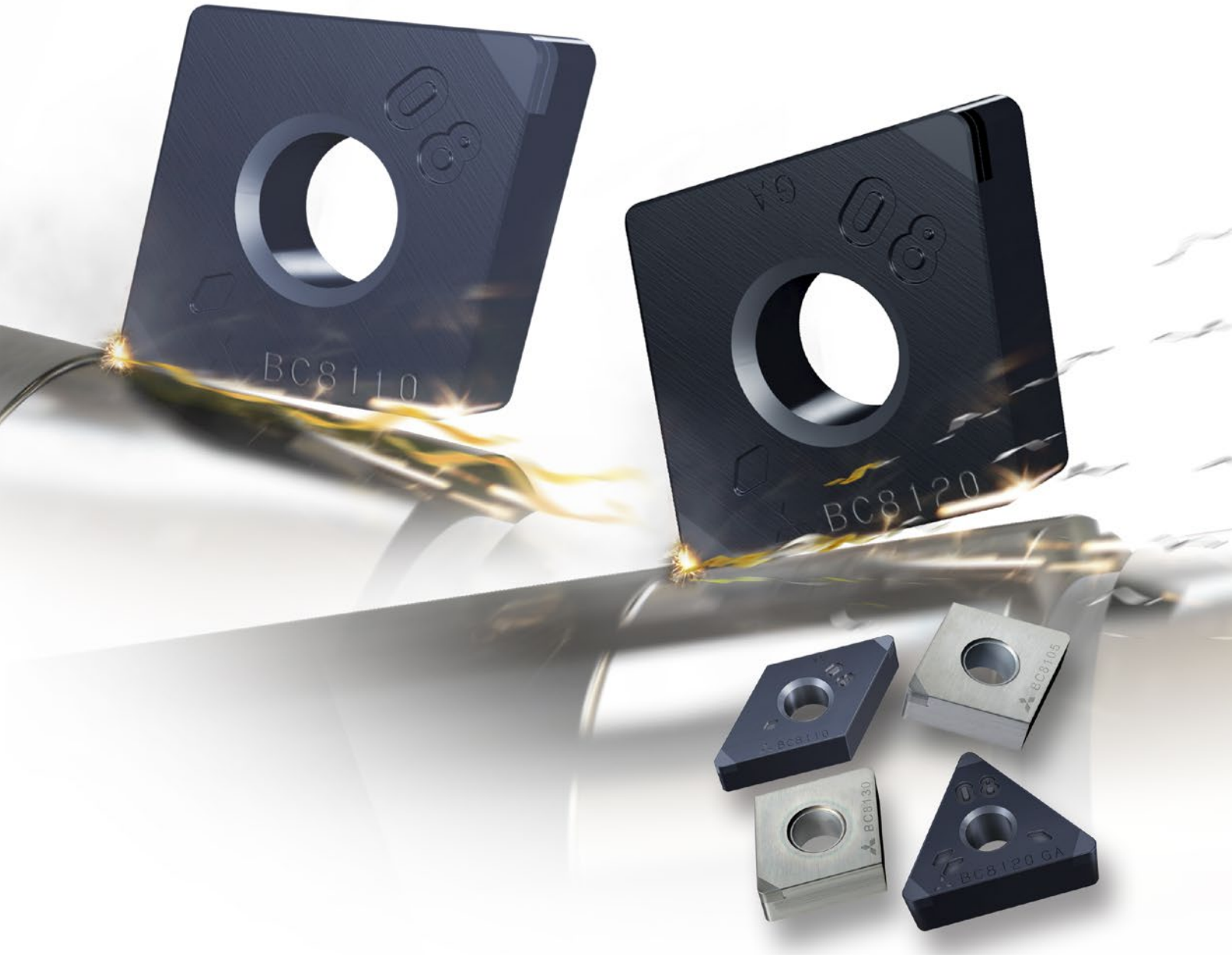
CBN-Series for Hardened Steel Turning

BC8100/MB8100 Series

Series Expansion

New Generation CBN Grades

Wear and fracture resistance greatly improved for a wide range of continuous and interrupted applications.



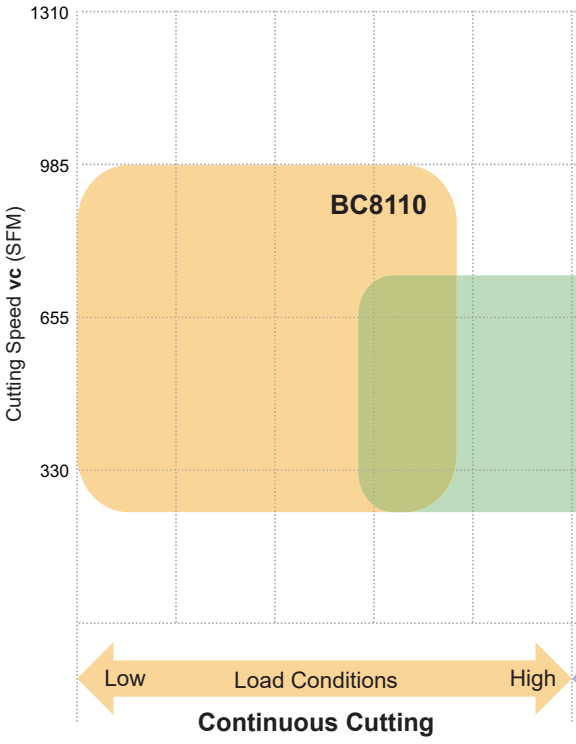
MITSUBISHI MATERIALS CORPORATION

CBN-Series for Hardened Steel Turning

BC8100 Series

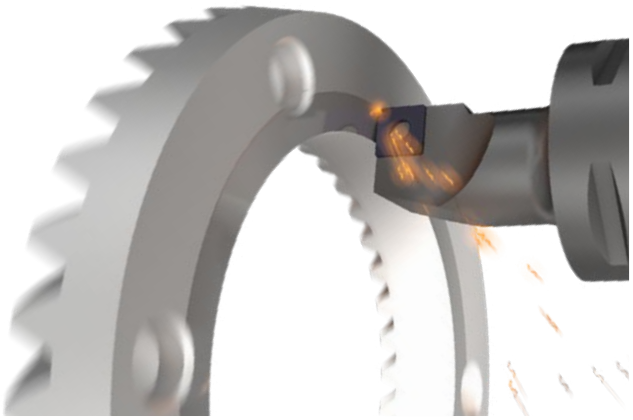
BC8110 High Speed Turning

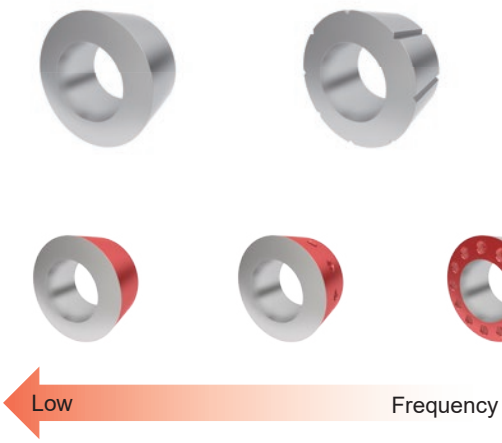
For Continous Cutting



BC8120 General Applications

For Continuous to Medium Interrupted Cutting
1st choice for roughing and pre-finishing.

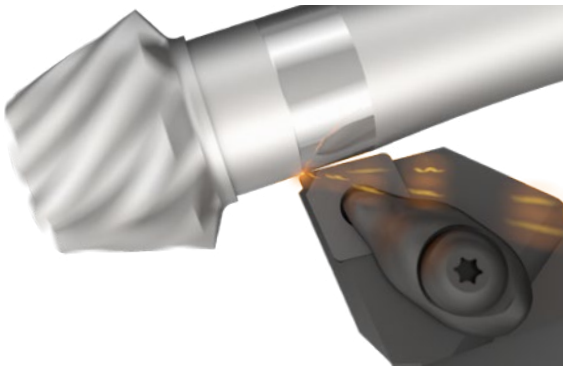


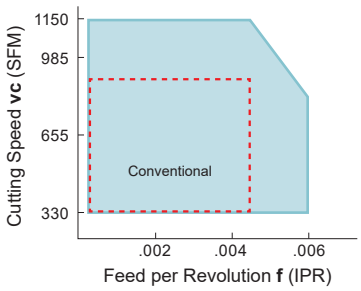


For Excellent Surface Finishes

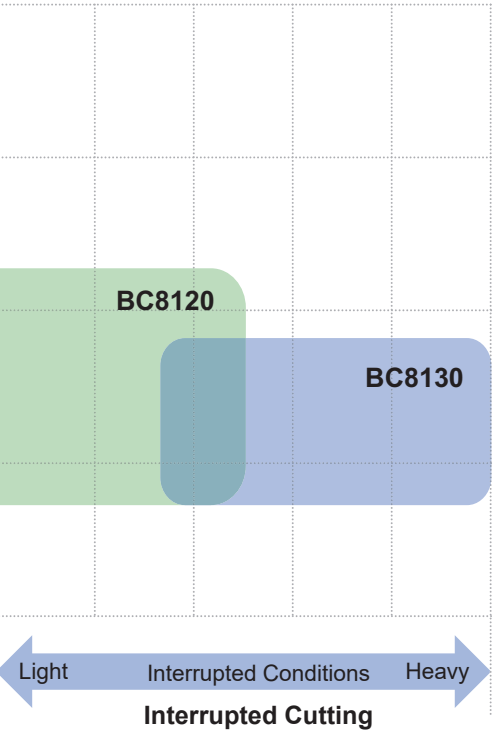
BC8105 Highest Accuracy

For Super Finish Cutting
Excellent surface finishes and close tolerances with long tool life.
For surface finishes up to Rz 94.5 µ-inch (Ra 23.6 µ-inch).



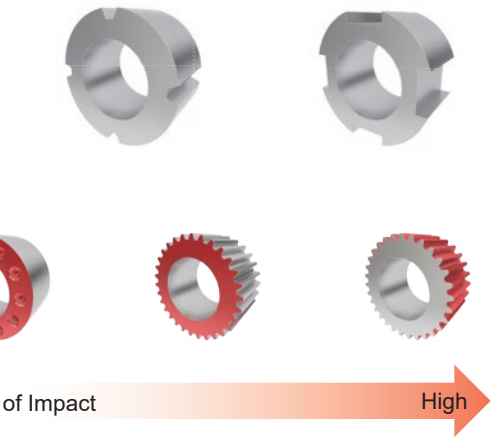


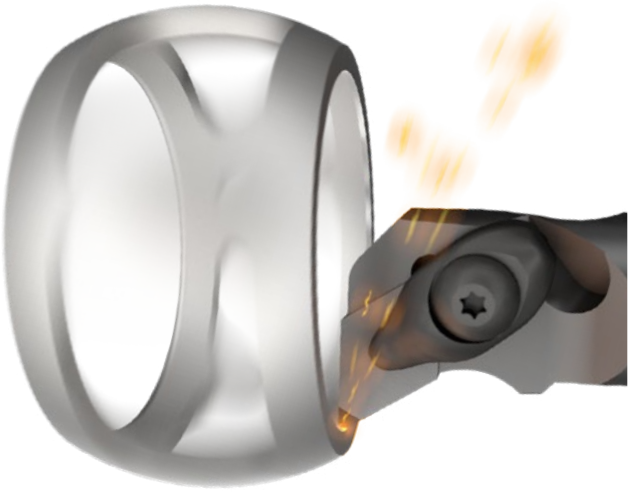
***BC8110 is recommended to improve wear resistance.**



BC8130 Tough Machining

For Unstable Applications and Heavy Interrupted Cutting
Tolerance accuracy held over a high no. of impacts.

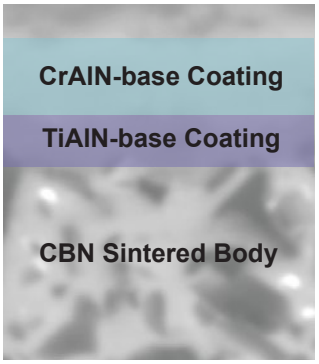




Features of the Grade

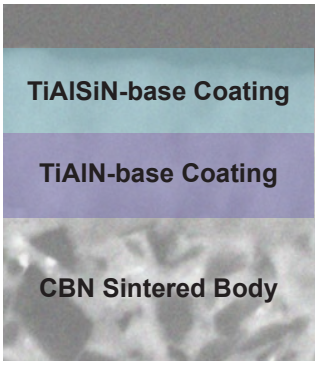
Newly Developed Special PVD Coating

BC8105



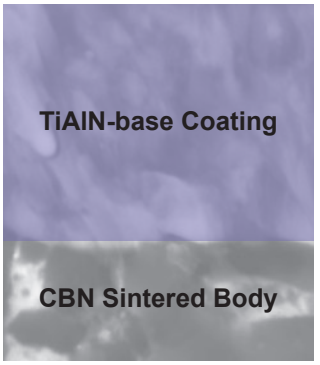
Offers excellent surface finishes.
Peeling resistance and adhesion strength are improved by having both lubricity and wear resistance.

BC8110



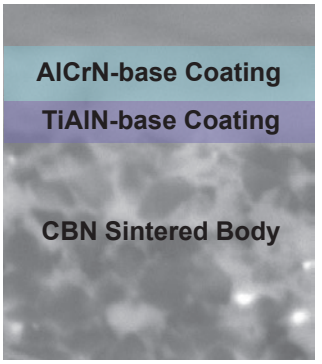
Chipping caused by built up edge is prevented with improved welding resistance.
Improved wear and adhesion strength to the CBN surface.

BC8120



Chipping caused by built up edge is prevented with improved welding resistance.
Improved adhesion to the coating to the CBN surface enhances peeling resistance.
The CBN is also improved in toughness by adopting new binder and sintering method.

BC8130

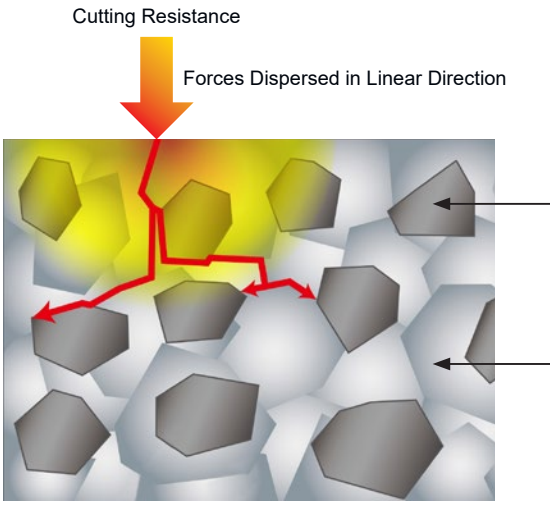


Peeling caused by severe impact and chipping are prevented with high fracture resistances.
Improved adhesion strength to the CBN surface.

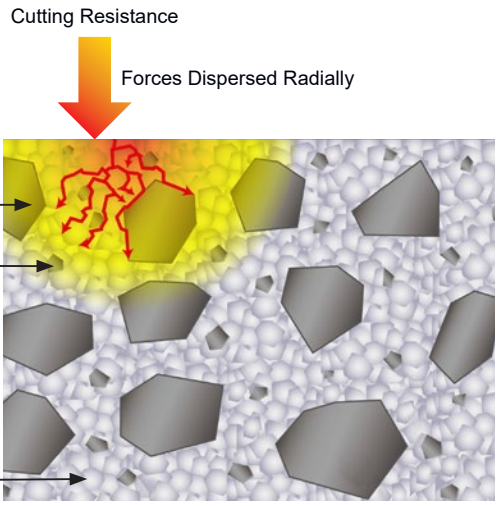
*Graphical representation.

Optimized Substrate Technology

Conventional



BC8100 Series



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

NEW **CBN-Series for Hardened Steel Turning**

MB8100 Series

Non-coated CBN Grades Applied Ultra Micro-Particle Binder Technology

MB8110 For Continuous Cutting

MB8100 having a most excellent wear resistance on this is ideal for continuous cutting.

MB8120 For General Cutting

MB8120 provides excellent wear and fracture resistance and is suitable for wider range of applications.

MB8130 For Heavy Interrupted Cutting

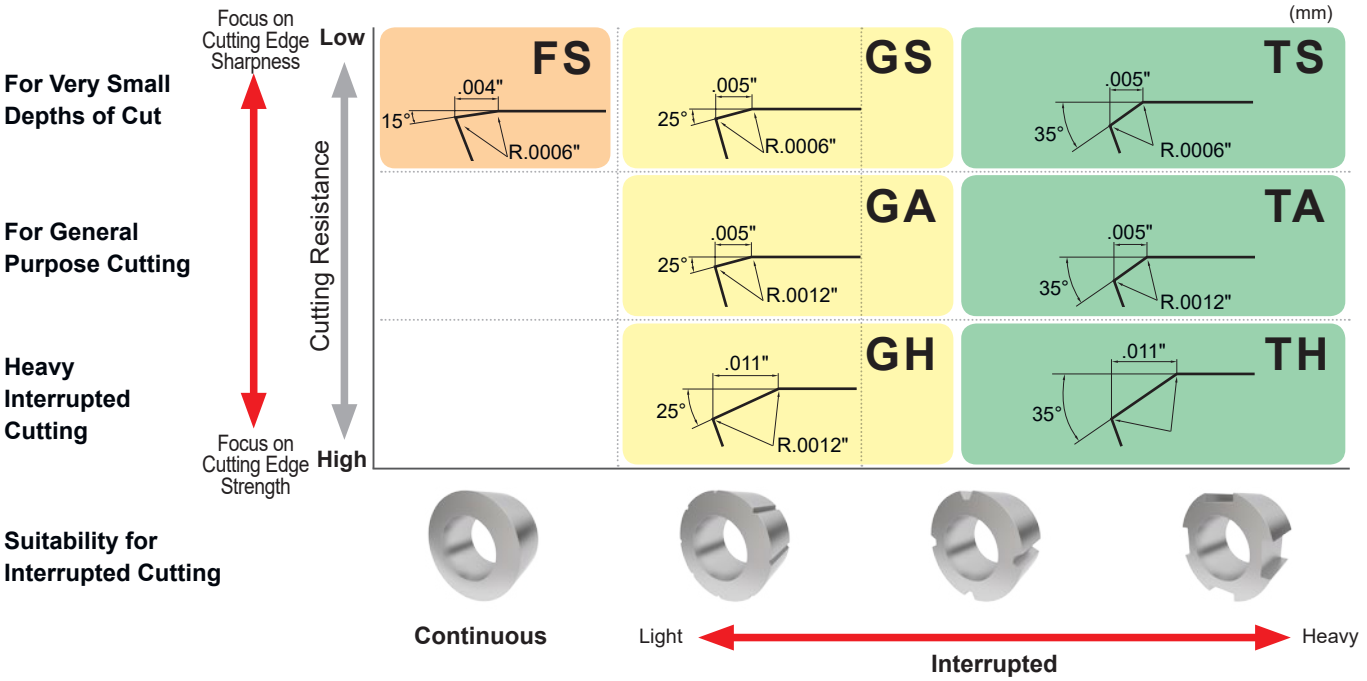
MB8130 having a most excellent fracture resistance on this series is ideal for heavy interrupted machining and in an unstable cutting condition.

Recommended Cutting Conditions

Grade	Workpiece Material	Machining Methods	Cutting Speed vc (SFM) 165 330 490 655 985	f (IPR)	ap (inch)	Cutting Mode
MB8110	Hardened Steels (Heat Treated Steels etc)	External Continuous Cutting		.008	.012	Dry, Wet
MB8120	Hardened Steels (Heat Treated Steels etc)	External Continuous Cutting		.008	.020	Dry, Wet
		External Interrupted Cutting		.008	.012	Dry, Wet
MB8130	Hardened Steels (Heat Treated Steels etc)	External Interrupted Cutting		.008	.012	Dry, Wet

Features of the Insert

Edge Preparation (Honing)



A variety of cutting edge preparations for all application.

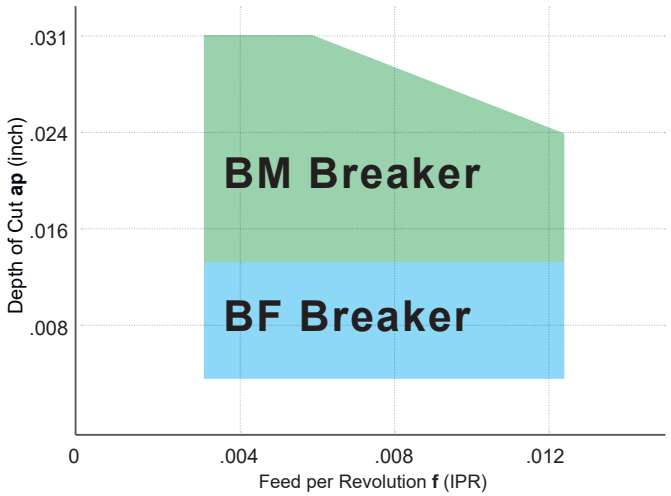
Chip Breaker

BM

Removal of Carburized Layer
For Deep Depth of Cut

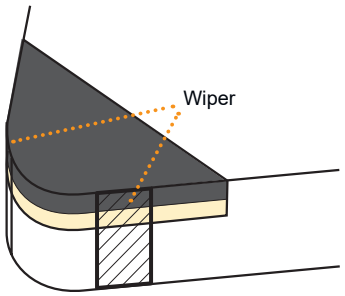
BF

Finishing Applications



Chip breaker system for excellent chip control when finishing, removing carburized layers and hard-soft cutting.

Wiper Insert



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.

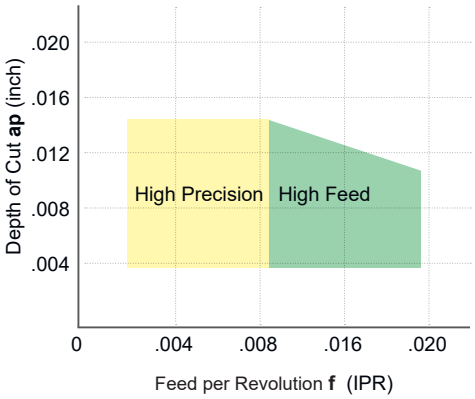
Increased Tool Life

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, therefore, delaying the progression of wear and increasing tool life.

Improving Chip Control

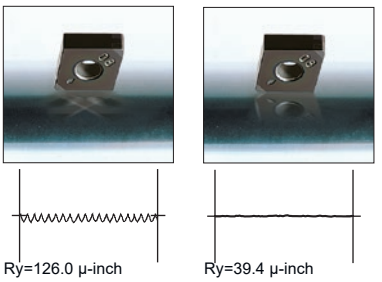
Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.

Recommended Cutting Conditions and Performance



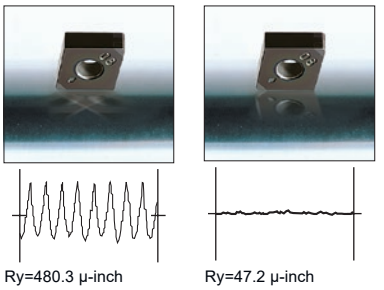
High Precision Finishing

Cutting Speed: vc=330 SFM
Depth of Cut: ap=.004 inch
Feed per Rev.: f=.004 IPR
Cutting Mode: Dry Cutting



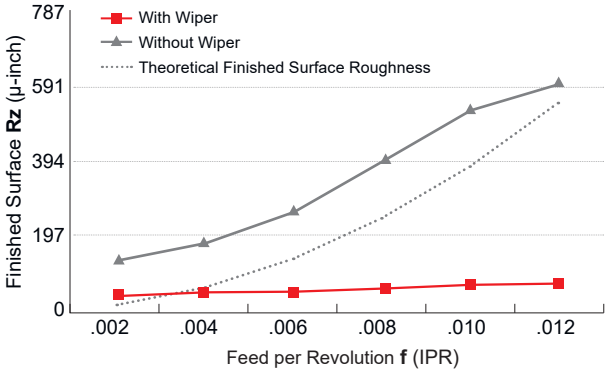
High Feed Machining

Cutting Speed: vc=330 SFM
Depth of Cut: ap=.004 inch
Feed per Rev.: f=.012 IPR
Cutting Mode: Dry Cutting



Cutting Performance

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



WL Wiper Insert

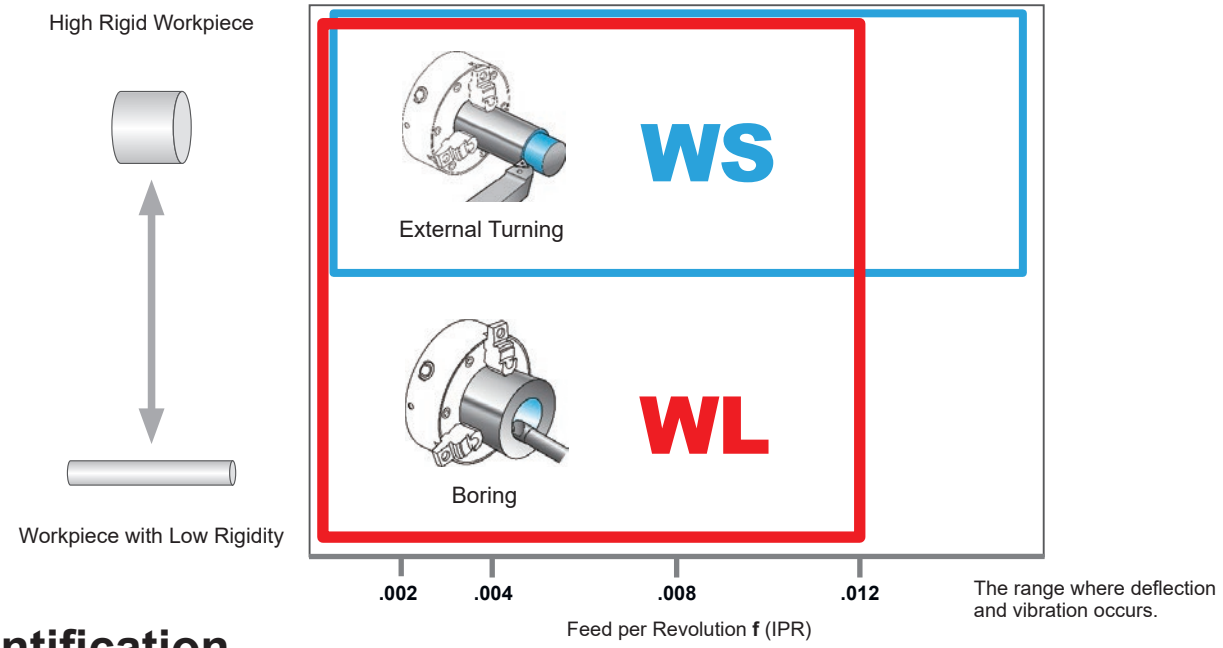
Preventing the cutting edge from vibration during boring and turning of small diameter workpiece materials as well as providing excellent finish surface roughness.

Inclination of the Wiper

The Optimum Wiper Width

Applying slight slope on the wiper cutting edge reduces cutting resistance.

Application of Wiper Inserts



Identification

NP-CNGA431-FBWL2

Edge Preperation	
Symbol	Application
GS GA GH GB	General Cutting
FS FB	Continuous Cutting
TS TA TH	Interrupted Cutting

Wiper	
WS	For High Rigidity Workpiece Material
WL	For Deflection and Vibration Prevention
No Mark	Without Wiper

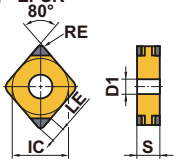
Memo

Negative Inserts (With Hole)

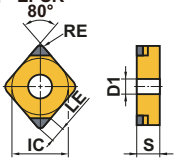
G Class

CNGA, CNGM

4 corner EPSR



2 corner EPSR



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_○○4	NP_○○WS4	NP_○○2	NP_○○W○2
			
	(With Wiper)		(With Wiper)
NEW PETIT CUT			
BF_, BM_			
			
(With Breaker)			

(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-CNGA431-GA4			★	★		●		4	.500	.187	.016	.203	.075
NP-CNGA432-GA4			★	★		●		4	.500	.187	.031	.203	.083
NP-CNGA433-GA4			★	★		●		4	.500	.187	.047	.203	.091
NP-CNGA431-GS4	●	★						4	.500	.187	.016	.203	.075
NP-CNGA432-GS4	●	★						4	.500	.187	.031	.203	.083
NP-CNGA433-GS4	●	★						4	.500	.187	.047	.203	.091
NP-CNGA431-GH4		●	●	●				4	.500	.187	.016	.203	.075
NP-CNGA432-GH4		●	●	●				4	.500	.187	.031	.203	.083
NP-CNGA433-GH4		●	●	●				4	.500	.187	.047	.203	.091
NP-CNGA431-FS4	●	★	★		●			4	.500	.187	.016	.203	.075
NP-CNGA432-FS4	●	★	★		●			4	.500	.187	.031	.203	.083
NP-CNGA433-FS4	●	★	★		●			4	.500	.187	.047	.203	.091
NP-CNGA431-TA4			★	★		●	●	4	.500	.187	.016	.203	.075
NP-CNGA432-TA4			★	★		●	●	4	.500	.187	.031	.203	.083
NP-CNGA433-TA4			★	★		●	●	4	.500	.187	.047	.203	.091
NP-CNGA431-TS4		★						4	.500	.187	.016	.203	.075
NP-CNGA432-TS4		★						4	.500	.187	.031	.203	.083
NP-CNGA433-TS4		★						4	.500	.187	.047	.203	.091
NP-CNGA431-TH4			●	★			●	4	.500	.187	.016	.203	.075
NP-CNGA432-TH4			●	★			●	4	.500	.187	.031	.203	.083
NP-CNGA433-TH4			●	★			●	4	.500	.187	.047	.203	.091
NP-CNGA431-FSWS4	●	●	●		●			4	.500	.187	.016	.203	.075
NP-CNGA432-FSWS4	●	●	●		●			4	.500	.187	.031	.203	.083
NP-CNGA433-FSWS4	●	●	●		●			4	.500	.187	.047	.203	.091
NP-CNGA431-GAWS4			★	★		●		4	.500	.187	.016	.203	.075
NP-CNGA432-GAWS4			★	★		●		4	.500	.187	.031	.203	.083
NP-CNGA433-GAWS4			★	★		●		4	.500	.187	.047	.203	.091
NP-CNGA431-GSWS4	●	★						4	.500	.187	.016	.203	.075
NP-CNGA432-GSWS4	●	★						4	.500	.187	.031	.203	.083
NP-CNGA433-GSWS4	●	★						4	.500	.187	.047	.203	.091
NP-CNGA430.5-GA2			●			●		2	.500	.187	.008	.203	.071
NP-CNGA431-GA2			●	●		●		2	.500	.187	.016	.203	.075
NP-CNGA432-GA2			●	●		●		2	.500	.187	.031	.203	.083
NP-CNGA433-GA2			●	●		●		2	.500	.187	.047	.203	.091
NP-CNGA430.5-GS2		●						2	.500	.187	.008	.203	.071
NP-CNGA431-GS2	●	●						2	.500	.187	.016	.203	.075
NP-CNGA432-GS2	●	●						2	.500	.187	.031	.203	.083
NP-CNGA433-GS2	●	●						2	.500	.187	.047	.203	.091
NP-CNGA431-GH2		●	●	●				2	.500	.187	.016	.203	.075
NP-CNGA432-GH2		●	●	●				2	.500	.187	.031	.203	.083
NP-CNGA433-GH2		●	●	●				2	.500	.187	.047	.203	.091
NP-CNGA430.5-FS2		●			●			2	.500	.187	.008	.203	.071

●: Inventory maintained. ★: Inventory maintained in Japan.
(1 insert in one case)

(inch)

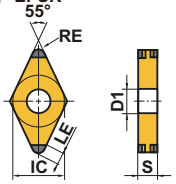
Order Number	Coated CBN				CBN			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-CNGA431-FS2	●	●	●		●			2	.500	.187	.016	.203	.075
NP-CNGA432-FS2	●	●	●		●			2	.500	.187	.031	.203	.083
NP-CNGA433-FS2	●	●	●		●			2	.500	.187	.047	.203	.091
NP-CNGA431-TA2			●	●		●	●	2	.500	.187	.016	.203	.075
NP-CNGA432-TA2			●	●		●	●	2	.500	.187	.031	.203	.083
NP-CNGA433-TA2			●	●		●	●	2	.500	.187	.047	.203	.091
NP-CNGA431-TS2		★						2	.500	.187	.016	.203	.075
NP-CNGA432-TS2		★						2	.500	.187	.031	.203	.083
NP-CNGA433-TS2		★						2	.500	.187	.047	.203	.091
NP-CNGA431-TH2			●	●			●	2	.500	.187	.016	.203	.075
NP-CNGA432-TH2			●	●			●	2	.500	.187	.031	.203	.083
NP-CNGA433-TH2			●	●			●	2	.500	.187	.047	.203	.091
NP-CNGA431-FBWL2	●	●	●		●			2	.500	.187	.016	.203	.075
NP-CNGA432-FBWL2	●	●	●		●			2	.500	.187	.031	.203	.083
NP-CNGA433-FBWL2	●	●	●		●			2	.500	.187	.047	.203	.091
NP-CNGA431-FSWS2	●	●	●		●			2	.500	.187	.016	.203	.075
NP-CNGA432-FSWS2	●	●	●		●			2	.500	.187	.031	.203	.083
NP-CNGA433-FSWS2	●	●	●		●			2	.500	.187	.047	.203	.091
NP-CNGA431-GAWS2			●	●		●		2	.500	.187	.016	.203	.075
NP-CNGA432-GAWS2			●	●		●		2	.500	.187	.031	.203	.083
NP-CNGA433-GAWS2			●	●		●		2	.500	.187	.047	.203	.091
NP-CNGA431-GBWL2	●	●	●			●		2	.500	.187	.016	.203	.075
NP-CNGA432-GBWL2	●	●	●			●		2	.500	.187	.031	.203	.083
NP-CNGA433-GBWL2	●	●	●			●		2	.500	.187	.047	.203	.091
NP-CNGA431-GSWS2	●	●						2	.500	.187	.016	.203	.075
NP-CNGA432-GSWS2	●	●						2	.500	.187	.031	.203	.083
NP-CNGA433-GSWS2	●	●						2	.500	.187	.047	.203	.091
BF-CNGM431-TS2		★						2	.500	.187	.016	.203	.075
BF-CNGM432-TS2		★						2	.500	.187	.031	.203	.083
BF-CNGM433-TS2		★						2	.500	.187	.047	.203	.091
BM-CNGM431-TA2			●					2	.500	.187	.016	.203	.075
BM-CNGM432-TA2			●					2	.500	.187	.031	.203	.083
BM-CNGM433-TA2			●					2	.500	.187	.047	.203	.091

Negative Inserts (With Hole)

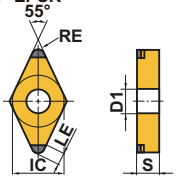
G Class

DNGA, DNGM

4 corner EPSR



2 corner EPSR

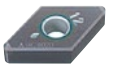


NEW PETIT CUT NP_○○4

NEW PETIT CUT NP_○○2

NEW PETIT CUT NP_ GAWS2JR/L (With Wiper)

NEW PETIT CUT BF_, BM_ (With Breaker)



(inch)

Order Number	Coated CBN BC8105	Coated CBN BC8110	Coated CBN BC8120	Coated CBN BC8130	CBN (NEW) MB8110	CBN (NEW) MB8120	CBN (NEW) MB8130	Cutting Edges	IC	S	RE	D1	LE
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
NP-DNGA431-TH4			●	★			●	4	.500	.187	.016	.203	.083
NP-DNGA432-TH4			●	★			●	4	.500	.187	.031	.203	.079
NP-DNGA433-TH4			●	★			●	4	.500	.187	.047	.203	.075
NP-DNGA441-TH4			★	★				4	.500	.250	.016	.203	.083
NP-DNGA442-TH4			★	★				4	.500	.250	.031	.203	.079
NP-DNGA443-TH4			★	★				4	.500	.250	.047	.203	.075

●: Inventory maintained. ★: Inventory maintained in Japan.
(1 insert in one case)

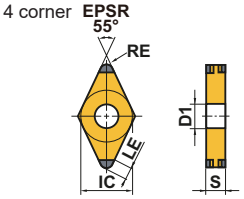
(inch)

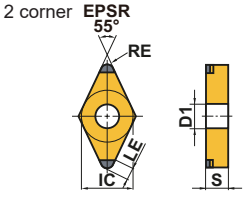
Order Number	Coated CBN				CBN			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-DNGA332-GA2			●	●		●		2	.375	.187	.031	.150	.079
NP-DNGA430.5-GA2			●					2	.500	.187	.008	.203	.091
NP-DNGA431-GA2			●	●		●		2	.500	.187	.016	.203	.083
NP-DNGA432-GA2			●	●		●		2	.500	.187	.031	.203	.079
NP-DNGA433-GA2			●	●		●		2	.500	.187	.047	.203	.075
NP-DNGA440.5-GA2			★					2	.500	.250	.008	.203	.091
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	.075
NP-DNGA430.5-GS2		●						2	.500	.187	.008	.203	.091
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	.075
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	.075
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	.075
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	.075
NP-DNGA430.5-FS2		●			●			2	.500	.187	.008	.203	.091
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	.075
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	.075
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	.075
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	.075
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	.075
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	.075
NP-DNGA431-TH2			●	●			●	2	.500	.187	.016	.203	.083
NP-DNGA432-TH2			●	●			●	2	.500	.187	.031	.203	.079
NP-DNGA433-TH2			●	●			●	2	.500	.187	.047	.203	.075
NP-DNGA441-TH2			★	★				2	.500	.250	.016	.203	.083
NP-DNGA442-TH2			★	★				2	.500	.250	.031	.203	.079
NP-DNGA443-TH2			★	★				2	.500	.250	.047	.203	.075
NP-DNGA431-GAWS2JR			●			●		2	.500	.187	.016	.203	.075
NP-DNGA431-GAWS2JL			●			●		2	.500	.187	.016	.203	.075
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	.075
NP-DNGA441-GAWS2JL			★			●		2	.500	.250	.016	.203	.075
NP-DNGA442-GAWS2JR			★			●		2	.500	.250	.031	.203	.067
NP-DNGA442-GAWS2JL			●			●		2	.500	.250	.031	.203	.067

Negative Inserts (With Hole)

G Class

DNGA, DNGM





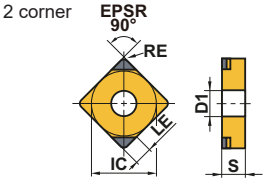
(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
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	.075
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	.075
BM-DNGM441-TA2			★					2	.500	.250	.016	.203	.083
BM-DNGM442-TA2			★					2	.500	.250	.031	.203	.079
BM-DNGM443-TA2			★					2	.500	.250	.047	.203	.075

Negative Inserts (With Hole)

G Class

SNGA



(inch)

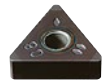
Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-SNGA432-GA2			●	●		●		2	.500	.187	.031	.203	.091
NP-SNGA433-GA2			●	●		●		2	.500	.187	.047	.203	.098

● : Inventory maintained. ★ : Inventory maintained in Japan.
(1 insert in one case)

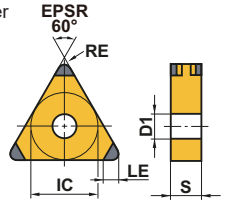
Negative Inserts (With Hole)

G Class

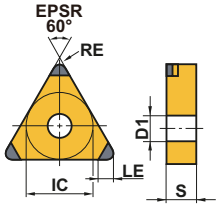
TNGA, TNGM

NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_○○6	NP_○○3	BM_○○3
		
		(With Breaker)

6 corner



3 corner



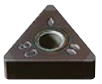
(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-TNGA331-GA6			★	★		●		6	.375	.187	.016	.150	.063
NP-TNGA332-GA6			★	★		●		6	.375	.187	.031	.150	.071
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	.071
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	.071
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	.071
NP-TNGA333-FS6	●	★	★		●			6	.375	.187	.047	.150	.075
NP-TNGA331-TA6			★	★		●	●	6	.375	.187	.016	.150	.063
NP-TNGA332-TA6			★	★		●	●	6	.375	.187	.031	.150	.071
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	.071
NP-TNGA333-TS6		★						6	.375	.187	.047	.150	.075
NP-TNGA331-TH6			●	★			●	6	.375	.187	.016	.150	.063
NP-TNGA332-TH6			●	★			●	6	.375	.187	.031	.150	.071
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	.071
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	.071
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	.071
NP-TNGA333-GH3		●	●	●				3	.375	.187	.047	.150	.075
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	.071
NP-TNGA333-FS3	●	●	●		●			3	.375	.187	.047	.150	.075
NP-TNGA331-TA3			●	●		●	●	3	.375	.187	.016	.150	.063
NP-TNGA332-TA3			●	●		●	●	3	.375	.187	.031	.150	.071
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	.071
NP-TNGA333-TS3		★						3	.375	.187	.047	.150	.075

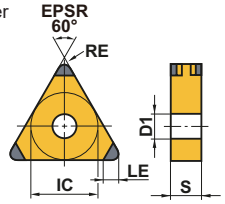
Negative Inserts (With Hole)

G Class

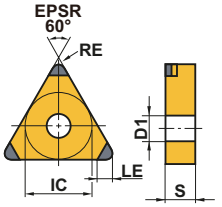
TNGA, TNGM

NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_○○6	NP_○○3	BM_○○3
		
		(With Breaker)

6 corner



3 corner



(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-TNGA331-TH3			●	●			●	3	.375	.187	.016	.150	.063
NP-TNGA332-TH3			●	●			●	3	.375	.187	.031	.150	.071
NP-TNGA333-TH3			●	●			●	3	.375	.187	.047	.150	.075
BM-TNGM332-TA3			●					3	.375	.187	.031	.150	.071
BM-TNGM333-TA3			●					3	.375	.187	.047	.150	.075

● : Inventory maintained. ★ : Inventory maintained in Japan.
(1 insert in one case)

Negative Inserts (With Hole)

G Class

VNGA

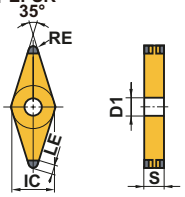
NEW PETIT CUT

NP_○○4

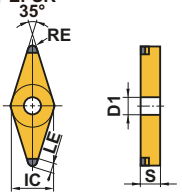
NEW PETIT CUT

NP_○○2

4 corner **EPSR**



2 corner **EPSR**



(inch)

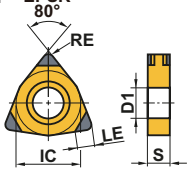
Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-VNGA331-GA4			★	★		●		4	.375	.187	.016	.150	.098
NP-VNGA332-GA4			★	★		●		4	.375	.187	.031	.150	.079
NP-VNGA333-GA4			★	★		●		4	.375	.187	.047	.150	.063
NP-VNGA331-GS4	●	★						4	.375	.187	.016	.150	.098
NP-VNGA332-GS4	●	★						4	.375	.187	.031	.150	.079
NP-VNGA333-GS4		★						4	.375	.187	.047	.150	.063
NP-VNGA331-GH4		●	●	●				4	.375	.187	.016	.150	.098
NP-VNGA332-GH4		●	●	●				4	.375	.187	.031	.150	.079
NP-VNGA333-GH4		●	●	●				4	.375	.187	.047	.150	.063
NP-VNGA331-FS4	●	★	★		●			4	.375	.187	.016	.150	.098
NP-VNGA332-FS4	●	★	★		●			4	.375	.187	.031	.150	.079
NP-VNGA333-FS4			★					4	.375	.187	.047	.150	.063
NP-VNGA331-TA4			★	★		●		4	.375	.187	.016	.150	.098
NP-VNGA332-TA4			★	★		●		4	.375	.187	.031	.150	.079
NP-VNGA333-TA4			★	★		●		4	.375	.187	.047	.150	.063
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-VNGA333-TH4			●	★				4	.375	.187	.047	.150	.063
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	.063
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	.063
NP-VNGA331-GH2		●	●	●				2	.375	.187	.016	.150	.098
NP-VNGA332-GH2		●	●	●				2	.375	.187	.031	.150	.079
NP-VNGA333-GH2		●	●	●				2	.375	.187	.047	.150	.063
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-VNGA333-FS2			●					2	.375	.187	.047	.150	.063
NP-VNGA331-TA2			●	●		●		2	.375	.187	.016	.150	.098
NP-VNGA332-TA2			●	●		●		2	.375	.187	.031	.150	.079
NP-VNGA333-TA2			●	●		●		2	.375	.187	.047	.150	.063
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
NP-VNGA333-TH2			●	●				2	.375	.187	.047	.150	.063

Negative Inserts (With Hole)

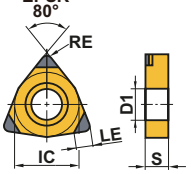
G Class

WNGA

6 corner EPSR 80°



3 corner EPSR 80°



NEW PETIT CUT NP_○○6

NEW PETIT CUT NP_○○3

NEW PETIT CUT NP_GSWS3

(With Wiper)

(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-WNGA432-GS6	●	★						6	.500	.187	.031	.203	.083
NP-WNGA432-FS6	●	★						6	.500	.187	.031	.203	.083
NP-WNGA432-TS6		★						6	.500	.187	.031	.203	.083
NP-WNGA432-GA3			●	●				3	.500	.187	.031	.203	.083
NP-WNGA432-GS3	●	★						3	.500	.187	.031	.203	.083
NP-WNGA432-GH3		●	●	●				3	.500	.187	.031	.203	.083
NP-WNGA432-FS3	●	★	●					3	.500	.187	.031	.203	.083
NP-WNGA432-TA3			●	●				3	.500	.187	.031	.203	.083
NP-WNGA432-TS3		★						3	.500	.187	.031	.203	.083
NP-WNGA432-TH3			●	●				3	.500	.187	.031	.203	.083
NP-WNGA432-GSWS3		★						3	.500	.187	.031	.203	.083

● : Inventory maintained. ★ : Inventory maintained in Japan.
(1 insert in one case)

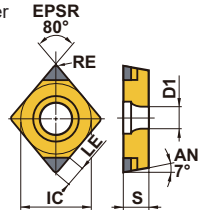
Positive Inserts (With Hole)

G Class

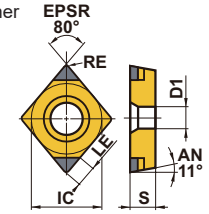
CCGW 7°, CCGT 7°, CPGB 11°

NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_○○2	NP_○○W○2	BF_, BM_	NP
			 *
	(With Wiper)	(With Breaker)	(Non-ISO)
NEW PETIT CUT			
NP_○○2			
			

2 corner EPSR 80°



2 corner EPSR 80°



(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-CCGW21.50.5-GA2			●			●		2	.250	.094	.008	.110	.071
NP-CCGW21.51-GA2			●	●		●		2	.250	.094	.016	.110	.075
NP-CCGW21.52-GA2			●	●		●		2	.250	.094	.031	.110	.083
NP-CCGW32.50.5-GA2			●			●		2	.375	.156	.008	.173	.071
NP-CCGW32.51-GA2			●	●		●		2	.375	.156	.016	.173	.075
NP-CCGW32.52-GA2			●	●		●		2	.375	.156	.031	.173	.083
NP-CCGW21.50.5-GS2	●	●						2	.250	.094	.008	.110	.071
NP-CCGW21.51-GS2	●	●						2	.250	.094	.016	.110	.075
NP-CCGW21.52-GS2	●	●						2	.250	.094	.031	.110	.083
NP-CCGW32.50.5-GS2	●	●						2	.375	.156	.008	.173	.071
NP-CCGW32.51-GS2	●	●						2	.375	.156	.016	.173	.075
NP-CCGW32.52-GS2	●	●						2	.375	.156	.031	.173	.083
NP-CCGW32.51-GH2		●	●	●				2	.375	.156	.016	.173	.075
NP-CCGW32.52-GH2		●	●	●				2	.375	.156	.031	.173	.083
NP-CCGW21.50.5-FS2		●			●			2	.250	.094	.008	.110	.071
NP-CCGW21.51-FS2		●			●			2	.250	.094	.016	.110	.075
NP-CCGW21.52-FS2		●			●			2	.250	.094	.031	.110	.083
NP-CCGW32.50.5-FS2	●	●			●			2	.375	.156	.008	.173	.071
NP-CCGW32.51-FS2	●	●	●		●			2	.375	.156	.016	.173	.075
NP-CCGW32.52-FS2	●	●	●		●			2	.375	.156	.031	.173	.083
NP-CCGW21.51-TA2				●			●	2	.250	.094	.016	.110	.075
NP-CCGW21.52-TA2				●			●	2	.250	.094	.031	.110	.083
NP-CCGW32.51-TA2			●	●		●	●	2	.375	.156	.016	.173	.075
NP-CCGW32.52-TA2			●	●		●	●	2	.375	.156	.031	.173	.083
NP-CCGW32.51-TH2			●	●			●	2	.375	.156	.016	.173	.075
NP-CCGW32.52-TH2			●	●			●	2	.375	.156	.031	.173	.083
NP-CCGW32.51-FBWL2	●	●	●		●			2	.375	.156	.016	.173	.075
NP-CCGW32.52-FBWL2	●	●	●		●			2	.375	.156	.031	.173	.083
NP-CCGW32.51-FSWS2	●	●	●		●			2	.375	.156	.016	.173	.075
NP-CCGW32.52-FSWS2	●	●	●		●			2	.375	.156	.031	.173	.083
NP-CCGW32.51-GAWS2			●	●		●		2	.375	.156	.016	.173	.075
NP-CCGW32.52-GAWS2			●	●		●		2	.375	.156	.031	.173	.083
NP-CCGW32.51-GBWL2	●	●	●			●		2	.375	.156	.016	.173	.075
NP-CCGW32.52-GBWL2	●	●	●			●		2	.375	.156	.031	.173	.083
NP-CCGW32.51-GSWS2	●	●						2	.375	.156	.016	.173	.075
NP-CCGW32.52-GSWS2	●	●						2	.375	.156	.031	.173	.083
BF-CCGT32.51-TS2		★						2	.375	.156	.016	.173	.075
BF-CCGT32.52-TS2		★						2	.375	.156	.031	.173	.083
BM-CCGT32.51-TA2			●					2	.375	.156	.016	.173	.075
BM-CCGT32.52-TA2			●					2	.375	.156	.031	.173	.083
NP-CCGW03S102GS	●							1	.156*	.055	.008	.079	.043
NP-CCGW03S104GS	●							1	.156*	.055	.016	.079	.043

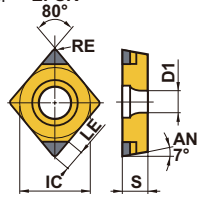
* Diameter of inscribed circle is non-ISO standard. (For SCLC type)

Positive Inserts (With Hole)

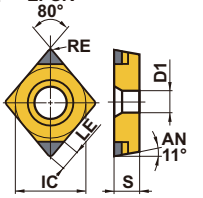
G Class

CCGW 7°, CCGT 7°, CPGB 11°

2 corner EPSR 80°



2 corner EPSR 80°



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT
NP_○○2	NP_○○W○2	BF_, BM_	NP
			 *
	(With Wiper)	(With Breaker)	(Non-ISO)
NEW PETIT CUT			
NP_○○2			
			

(inch)

Order Number	Coated CBN				CBN			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-CCGW04T002GS	●							1	.187*	.070	.008	.094	.059
NP-CCGW04T004GS	●							1	.187*	.070	.016	.094	.059
NP-CCGW03S102FS		●			●			1	.156*	.055	.008	.079	.043
NP-CCGW03S104FS		●			●			1	.156*	.055	.016	.079	.043
NP-CCGW04T002FS		●			●			1	.187*	.070	.008	.094	.059
NP-CCGW04T004FS		●			●			1	.187*	.070	.016	.094	.059
NP-CPGB2.51.51-GA2			★	●				2	.313	.094	.016	.138	.075
NP-CPGB2.51.52-GA2			★	●				2	.313	.094	.031	.138	.083
NP-CPGB2.51.53-GA2			★	●				2	.313	.094	.047	.138	.091
NP-CPGB320.5-GA2			●					2	.375	.125	.008	.177	.071
NP-CPGB321-GA2			●	●				2	.375	.125	.016	.177	.075
MP-CPGB322-GA2			●	●				2	.375	.125	.031	.177	.083
NP-CPGB323-GA2			●	●				2	.375	.125	.047	.177	.091
NP-CPGB2.51.51-GS2	●	★						2	.313	.094	.016	.138	.075
NP-CPGB2.51.52-GS2	●	★						2	.313	.094	.031	.138	.083
NP-CPGB320.5-GS2	●	●						2	.375	.125	.008	.177	.071
NP-CPGB321-GS2	●	★						2	.375	.125	.016	.177	.075
NP-CPGB322-GS2	●	★						2	.375	.125	.031	.177	.083
NP-CPGB2.51.51-FS2		★						2	.313	.094	.016	.138	.075
NP-CPGB2.51.52-FS2		★						2	.313	.094	.031	.138	.083
NP-CPGB320.5-FS2	●	●						2	.375	.125	.008	.177	.071
NP-CPGB321-FS2	●		●					2	.375	.125	.016	.177	.075
NP-CPGB322-FS2	●		●					2	.375	.125	.031	.177	.083
NP-CPGB323-FS2			●					2	.375	.125	.047	.177	.091
NP-CPGB2.51.51-TA2				●				2	.313	.094	.016	.138	.075
NP-CPGB2.51.52-TA2				●				2	.313	.094	.031	.138	.083
NP-CPGB2.51.53-TA2				●				2	.313	.094	.047	.138	.091
NP-CPGB321-TA2			●	●				2	.375	.125	.016	.177	.075
NP-CPGB322-TA2			●	●				2	.375	.125	.031	.177	.083
NP-CPGB323-TA2			●	●				2	.375	.125	.047	.177	.091

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

● : Inventory maintained. ★ : Inventory maintained in Japan.
(1 insert in one case)

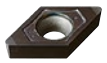
Positive Inserts (With Hole)

G Class

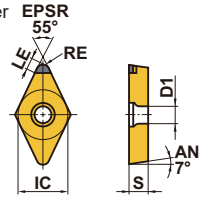
DCGW 7°, DCGT 7°

NEW PETIT CUT

NP_○○2

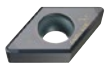


2 corner **EPSR**



NEW PETIT CUT

BF_, BM_



(With Breaker)

(inch)

Order Number	Coated CBN				CBN			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-DCGW21.50.5-GA2			●			●		2	.250	.094	.008	.110	.091
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	.091
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	.091
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	.091
NP-DCGW32.51-GS2	●	●						2	.375	.156	.016	.173	.083
NP-DCGW32.52-GS2	●	●						2	.375	.156	.031	.173	.079
NP-DCGW32.51-GH2		●	●	●				2	.375	.156	.016	.173	.083
NP-DCGW32.52-GH2		●	●	●				2	.375	.156	.031	.173	.079
NP-DCGW21.50.5-FS2		●			●			2	.250	.094	.008	.110	.091
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	.091
NP-DCGW32.51-FS2	●	●	●		●			2	.375	.156	.016	.173	.083
NP-DCGW32.52-FS2	●	●	●		●			2	.375	.156	.031	.173	.079
NP-DCGW21.51-TA2			●	●		●	●	2	.250	.094	.016	.110	.083
NP-DCGW21.52-TA2				●			●	2	.250	.094	.031	.110	.079
NP-DCGW32.51-TA2			●	●		●	●	2	.375	.156	.016	.173	.083
NP-DCGW32.52-TA2			●	●		●	●	2	.375	.156	.031	.173	.079
NP-DCGW32.51-TH2			●	●			●	2	.375	.156	.016	.173	.083
NP-DCGW32.52-TH2			●	●			●	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

Positive Inserts (With Hole)

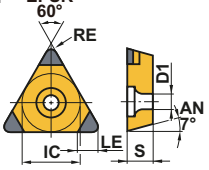
G Class

TCGW 7°, TPGB 11°

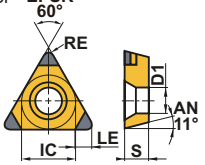
NEW PETIT CUT

NP_TCGW

3 corner EPSR 60°



3 corner EPSR 60°



NEW PETIT CUT

NP-TPGB

(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-TCGW1.81.51-GS3		★						3	.219	.094	.016	.098	.063
NP-TCGW1.81.52-GS3		★						3	.219	.094	.031	.098	.071
NP-TCGW21.50.5-GS3		●						3	.250	.094	.008	.110	.059
NP-TCGW21.51-GS3		●						3	.250	.094	.016	.110	.063
NP-TCGW21.52-GS3		●						3	.250	.094	.031	.110	.071
NP-TCGW2.521-GS3		★						3	.313	.125	.016	.134	.063
NP-TCGW2.522-GS3		★						3	.313	.125	.031	.134	.071
NP-TCGW32.51-GS3		●						3	.375	.156	.016	.173	.063
NP-TCGW32.52-GS3		●						3	.375	.156	.031	.173	.071
NP-TPGB1.51.51-GA3				●				3	.187	.094	.016	.094	.063
NP-TPGB1.51.52-GA3				●				3	.187	.094	.031	.094	.071
NP-TPGB1.81.51-GA3			★	●		●		3	.219	.094	.016	.114	.063
NP-TPGB1.81.52-GA3			★	●		●		3	.219	.094	.031	.114	.071
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	.071
NP-TPGB321-GA3			★	●		●		3	.375	.125	.016	.173	.063
NP-TPGB322-GA3			★	●		●		3	.375	.125	.031	.173	.071
NP-TPGB1.51.51-GS3	●	★						3	.187	.094	.016	.094	.063
NP-TPGB1.51.52-GS3	●	★						3	.187	.094	.031	.094	.071
NP-TPGB1.81.51-GS3	●	★						3	.219	.094	.016	.114	.063
NP-TPGB1.81.52-GS3	●	★						3	.219	.094	.031	.114	.071
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	.071
NP-TPGB321-GS3	●	★						3	.375	.125	.016	.173	.063
NP-TPGB322-GS3	●	★						3	.375	.125	.031	.173	.071
NP-TPGB321-GH3		●	●	●				3	.375	.125	.016	.173	.063
NP-TPGB322-GH3		●	●	●				3	.375	.125	.031	.173	.071
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	.071
NP-TPGB321-FS3			★					3	.375	.125	.016	.173	.063
NP-TPGB322-FS3			★					3	.375	.125	.031	.173	.071
NP-TPGB1.51.51-TA3				●			●	3	.187	.094	.016	.094	.063
NP-TPGB1.51.52-TA3				●			●	3	.187	.094	.031	.094	.071
NP-TPGB1.81.51-TA3				●			●	3	.219	.094	.016	.114	.063
NP-TPGB1.81.52-TA3				●			●	3	.219	.094	.031	.114	.071
NP-TPGB221-TA3			★	●		●	●	3	.250	.125	.016	.134	.063
NP-TPGB222-TA3			★	●		●	●	3	.250	.125	.031	.134	.071
NP-TPGB321-TA3			★	●		●	●	3	.375	.125	.016	.173	.063
NP-TPGB322-TA3			★	●		●	●	3	.375	.125	.031	.173	.071
NP-TPGB321-TH3			●	●			●	3	.375	.125	.016	.173	.063
NP-TPGB322-TH3			●	●			●	3	.375	.125	.031	.173	.071

●: Inventory maintained. ★: Inventory maintained in Japan.
(1 insert in one case)

Positive Inserts (With Hole)

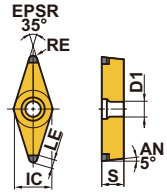
G Class

VBGW 5°, VCGW 7°

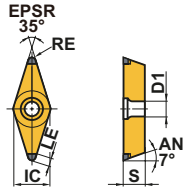
NEW PETIT CUT

NP_VBGW

2 corner EPSR



2 corner EPSR



NEW PETIT CUT

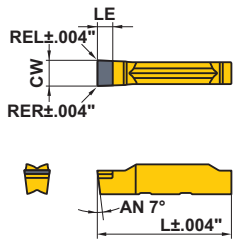
NP-VCGW

(inch)

Order Number	Coated CBN				CBN (NEW)			Cutting Edges	IC	S	RE	D1	LE
	BC8105	BC8110	BC8120	BC8130	MB8110	MB8120	MB8130						
NP-VBGW220.5-GA2			●			●		2	.250	.125	.008	.114	.098
NP-VBGW221-GA2			●	●		●		2	.250	.125	.016	.114	.098
NP-VBGW222-GA2			●	●		●		2	.250	.125	.031	.114	.079
NP-VBGW330.5-GA2			●			●		2	.375	.187	.008	.173	.098
NP-VBGW331-GA2			●	●		●		2	.375	.187	.016	.173	.098
NP-VBGW332-GA2			●	●		●		2	.375	.187	.031	.173	.079
NP-VBGW220.5-GS2	●	●						2	.250	.125	.008	.114	.098
NP-VBGW221-GS2	●	●						2	.250	.125	.016	.114	.098
NP-VBGW222-GS2	●	●						2	.250	.125	.031	.114	.079
NP-VBGW330.5-GS2	●	●						2	.375	.187	.008	.173	.098
NP-VBGW331-GS2	●	●						2	.375	.187	.016	.173	.098
NP-VBGW332-GS2	●	●						2	.375	.187	.031	.173	.079
NP-VBGW331-GH2		●	●	●				2	.375	.187	.016	.173	.098
NP-VBGW332-GH2		●	●	●				2	.375	.187	.031	.173	.079
NP-VBGW220.5-FS2		●			●			2	.250	.125	.008	.114	.098
NP-VBGW221-FS2		●			●			2	.250	.125	.016	.114	.098
NP-VBGW222-FS2		●			●			2	.250	.125	.031	.114	.079
NP-VBGW330.5-FS2		●			●			2	.375	.187	.008	.173	.098
NP-VBGW331-FS2			●					2	.375	.187	.016	.173	.098
NP-VBGW332-FS2			●					2	.375	.187	.031	.173	.079
NP-VBGW221-TA2				●				2	.250	.125	.016	.114	.098
NP-VBGW222-TA2				●				2	.250	.125	.031	.114	.079
NP-VBGW331-TA2			●	●		●		2	.375	.187	.016	.173	.098
NP-VBGW332-TA2			●	●		●		2	.375	.187	.031	.173	.079
NP-VBGW331-TH2			●	●				2	.375	.187	.016	.173	.098
NP-VBGW332-TH2			●	●				2	.375	.187	.031	.173	.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-GH2		●	●	●				2	.375	.187	.016	.173	.098
NP-VCGW332-GH2		●	●	●				2	.375	.187	.031	.173	.079
NP-VCGW331-FS2		●	●		●			2	.375	.187	.016	.173	.098
NP-VCGW332-FS2		●	●		●			2	.375	.187	.031	.173	.079
NP-VCGW331-TA2			●	●				2	.375	.187	.016	.173	.098
NP-VCGW332-TA2			●	●				2	.375	.187	.031	.173	.079
NP-VCGW331-TS2		●						2	.375	.187	.016	.173	.098
NP-VCGW332-TS2		●						2	.375	.187	.031	.173	.079
NP-VCGW331-TH2			●	●				2	.375	.187	.016	.173	.098
NP-VCGW332-TH2			●	●				2	.375	.187	.031	.173	.079

Inserts

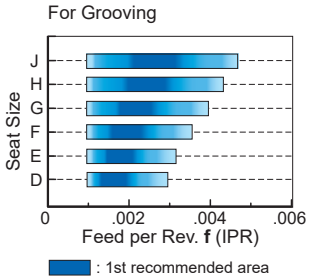
(inch)

Applications	Geometry	Order Number	Stock CBN BC8110	Seat Size	CW Grooving Width	CW Tolerance	RER/L	L	LE
For Grooving	**Flat Top** (For Hardened Material) 	**GY1G0200D020N-GFGS**	●	**D**	.079	±.0012	.008	.815	.106
		GY1G0239E020N-GFGS	●	**E**	.094	±.0012	.008	.815	.106
		GY1G0250E020N-GFGS	●	**E**	.098	±.0012	.008	.815	.106
		GY1G0300F020N-GFGS	●	**F**	.118	±.0012	.008	.815	.106
		GY1G0318F020N-GFGS	●	**F**	.125	±.0012	.008	.815	.106
		GY1G0400G020N-GFGS	●	**G**	.157	±.0012	.008	1.010	.106
		GY1G0475H020N-GFGS	●	**H**	.187	±.0012	.008	1.010	.106
		GY1G0500H020N-GFGS	●	**H**	.197	±.0012	.008	1.010	.106
		GY1G0600J020N-GFGS	●	**J**	.236	±.0012	.008	1.010	.106

Recommended Cutting Conditions

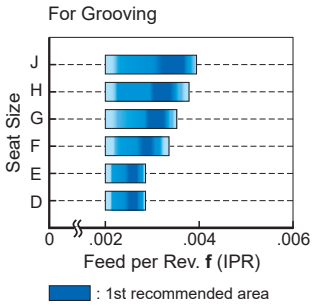
● For External Grooving
Recommended Cutting Speed **vc** (SFM)

	Workpiece Material	Properties	Cutting Speed **vc** (SFM) 165 / 330 / 490
H	Hardened Steels	Hardness ≥50HRC	**260 – 395**



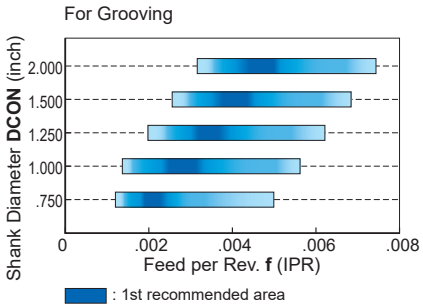
● For Face Grooving
Recommended Cutting Speed **vc** (SFM)

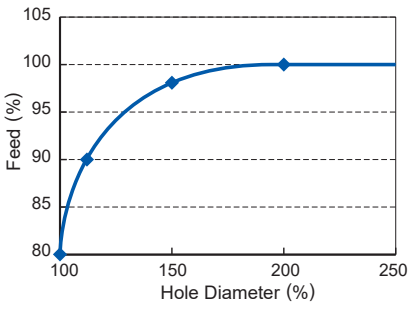
	Workpiece Material	Properties	Cutting Speed **vc** (SFM) 165 / 330 / 490
H	Hardened Steels	Hardness ≥50HRC	**195 – 330**



● For Internal Grooving
Recommended Cutting Speed **vc** (SFM)

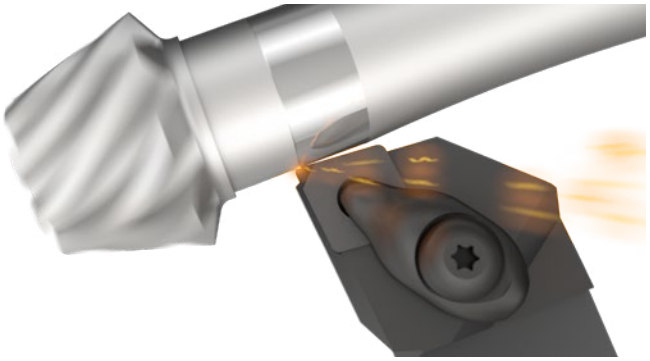
	Workpiece Material	Properties	Cutting Speed **vc** (SFM) 165 / 330 / 490
H	Hardened Steels	Hardness ≥50HRC	**195 – 330**



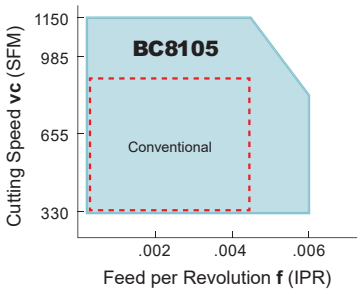


● : **Inventory maintained.**
(1 insert in one case)

BC8105 Highest Accuracy



Application Range

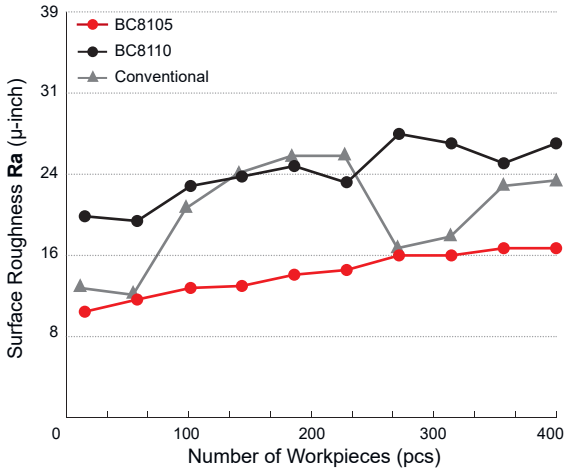


Excellent surface finishes and close tolerances with long tool life
For surface finishes up to Rz 94.5 µ-inch (Ra 23.6 µ-inch).

Surface Finish

Insert	NP-DNGA442-GS2
Workpiece Material	AISI 1534 (60HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	575
Feed per Rev. **f** (IPR)	.004
Depth of Cut **ap** (inch)	.006
Cutting Mode	Wet Cutting (Emulsion)

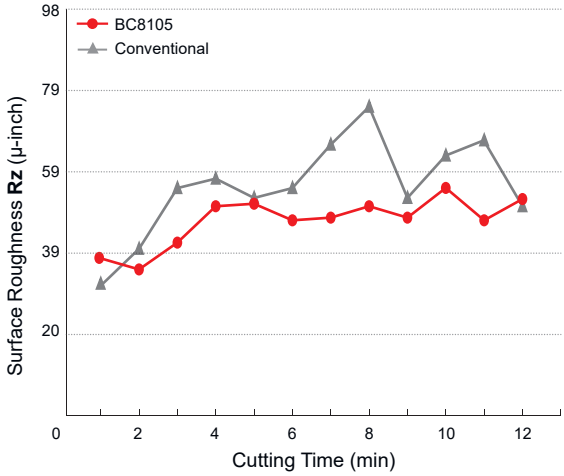
BC8105 is first choice for superior surface finishes.



Surface Finish

Insert	NP-CNGA432-GS2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	655
Feed per Rev. **f** (IPR)	.002
Depth of Cut **ap** (inch)	.002
Cutting Mode	Dry Cutting

BC8105 reduces the notch wear and provides an excellent surface finish.



Recommended Cutting Conditions

Workpiece Material	Machining Methods	Cutting Speed vc (SFM)	f (IPR)	ap (inch)	Cutting Mode
		165 330 655 985 1310			
Hardened Steels (Heat Treated Steels etc)	External Continuous Cutting		≦ .006	≦ .008	Dry, Wet

BC8110 High Speed Turning

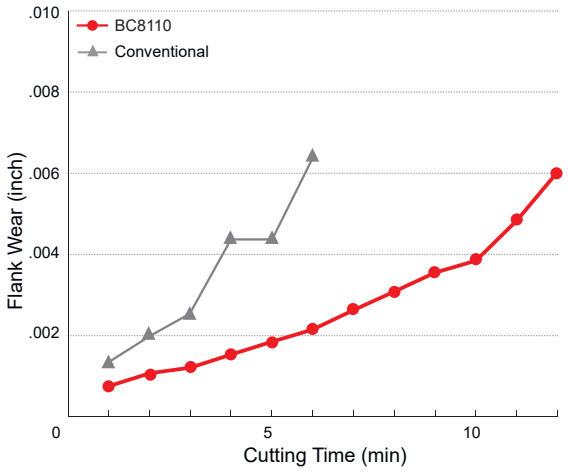
For Continuous Cutting

Covers a wide application range for continuous cutting.

Tool Life (Flank Wear)

Insert	NP-CNGA432-GS2
Workpiece Material	AISI 5120 (60HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.004
Depth of Cut **ap** (inch)	.008
Cutting Mode	Dry Cutting

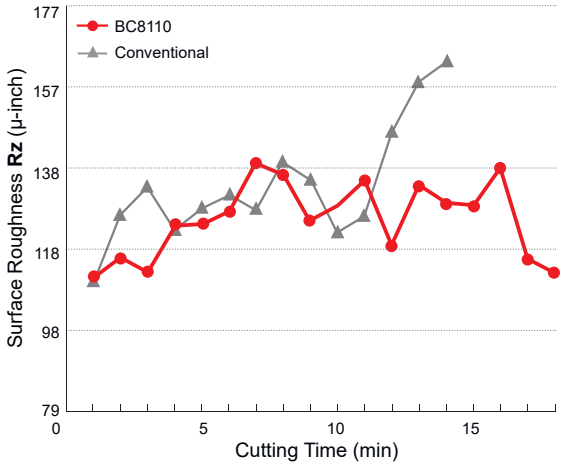
BC8110 is first choice for high speed finishing.



Surface Finish

Insert	NP-CNGA432-GS2
Workpiece Material	AISI 5120 (60HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.004
Depth of Cut **ap** (inch)	.008
Cutting Mode	Dry Cutting

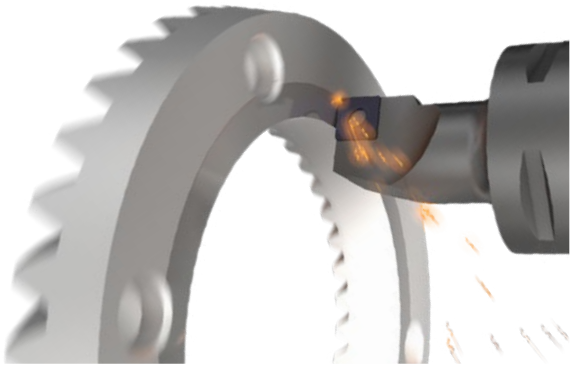
Excellent surface finishes maintained during long continuous cutting.



Recommended Cutting Conditions

Workpiece Material	Machining Methods	Cutting Speed vc (SFM)	f (IPR)	ap (inch)	Cutting Mode
		165 330 655 985 1310			
Hardened Steels (Heat Treated Steels etc)	External Continuous Cutting		≦ .008	≦ .014	Dry, Wet

BC8120 General Application

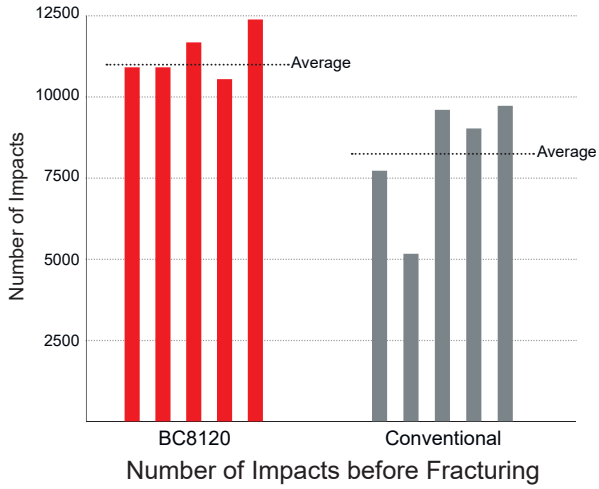


For Continuous and Light Interrupted Cutting

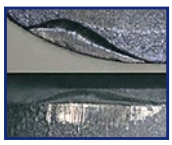
1st choice for roughing and pre-finishing.
Covers a wide application range between continuous and light-interrupted machining.

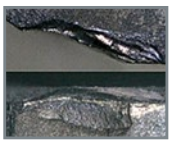
Test of Interrupted Cutting

Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60HRC)
Machining Methods	External Interrupted Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.006
Depth of Cut **ap** (inch)	.004
Cutting Mode	Dry Cutting



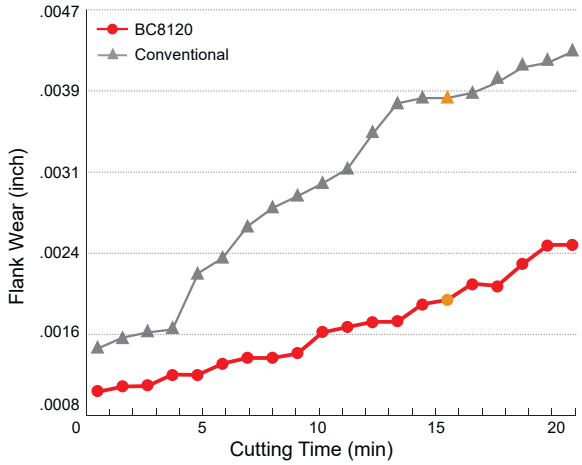
Cutting Edge Condition after 8000 Impacts


BC8120


Conventional

Tool Life (Flank Wear)

Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	490
Feed per Rev. **f** (IPR)	.004
Depth of Cut **ap** (inch)	.008
Cutting Mode	Dry Cutting



Cutting edge after 15 min.


BC8120

Conventional

Recommended Cutting Conditions

Workpiece Material	Machining Methods	Cutting Speed vc (SFM) 165 330 655 985	f (IPR)	ap (inch)	Cutting Mode
Hardened Steels (Heat Treated Steels etc)	External Continuous Cutting		≤ .012	≤ .020	Dry, Wet
	External Interrupted Cutting		≤ .008	≤ .012	Dry, Wet

BC8130 Tough Machining

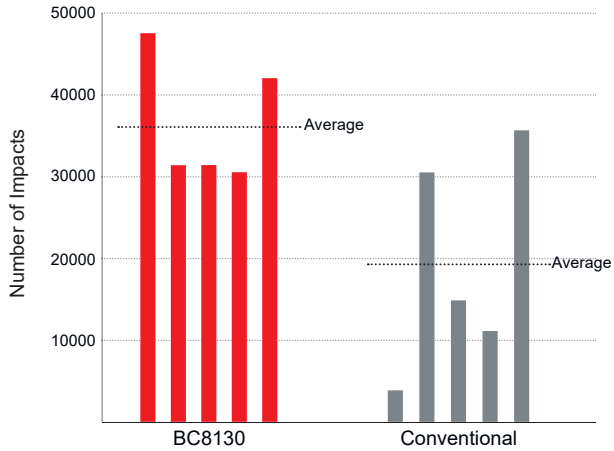
For Unstable Applications and Heavy Interrupted Cutting

Tolerance accuracy maintained over a high number of impacts.

Heavy Interrupted Cutting (Laboratory Test)

Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Heavy Interrupted Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.002
Depth of Cut **ap** (inch)	.004
Cutting Mode	Wet Cutting

BC8130 provides stability up to 30000 impacts.

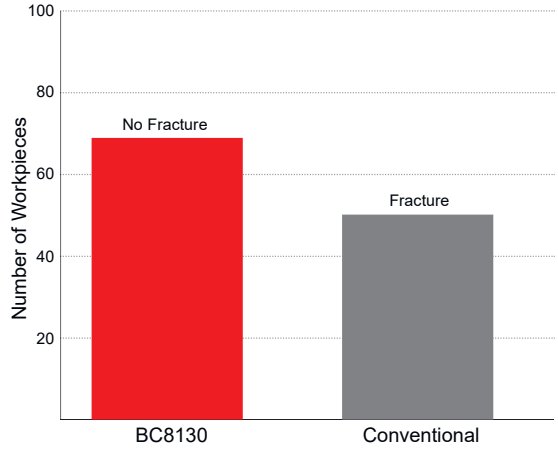


Number of Impacts before Fracturing

Heavy Cutting

Insert	NP-CNGA432-TH2
Workpiece Material	AISI 1045 (58HRC)
Machining Methods	External Heavy Interrupted Cutting
Cutting Speed **vc** (SFM)	425
Feed per Rev. **f** (IPR)	.003
Depth of Cut **ap** (inch)	.006
Cutting Mode	Wet Cutting

No fracturing after machining 70 pcs.



Recommended Cutting Conditions

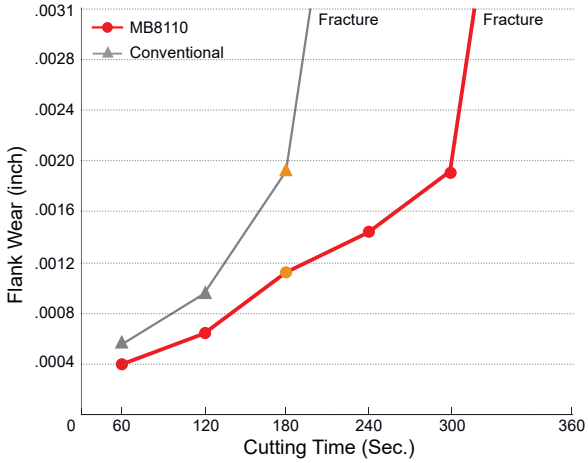
Workpiece Material	Machining Methods	Cutting Speed vc (SFM)	f (IPR)	ap (inch)	Cutting Mode
		0 165 330 490 655			
Hardened Steels (Heat Treated Steels etc)	External Interrupted Cutting		≦ .008	≦ .012	Dry, Wet

MB8100 Series

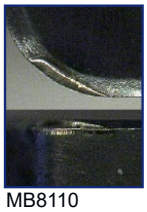
Non-coated CBN Grades Applied Ultra Micro-particle Binder Technology

Tool Life (Flank Wear)

Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Continuous Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.004
Depth of Cut **ap** (inch)	.008
Cutting Mode	Dry Cutting



Cutting Edge after 180 sec.

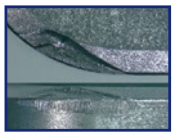

MB8110

Conventional

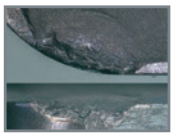
Heavy Cutting

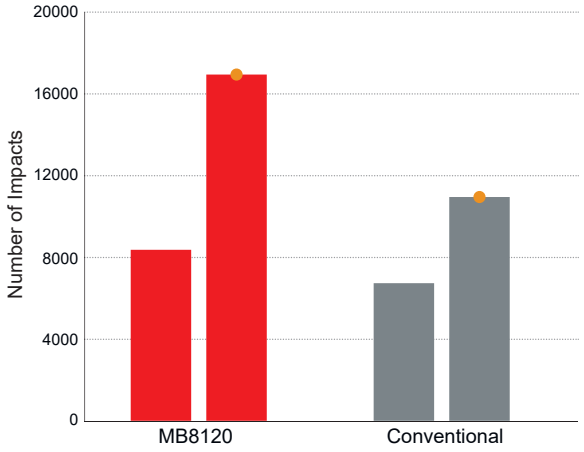
Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Interrupted Cutting
Cutting Speed **vc** (SFM)	820
Feed per Rev. **f** (IPR)	.006
Depth of Cut **ap** (inch)	.004
Cutting Mode	Dry Cutting

17000 Impacts


MB8120

11000 Impacts

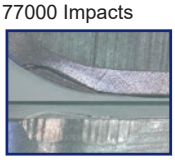

Conventional



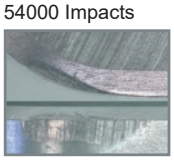
Heavy Cutting

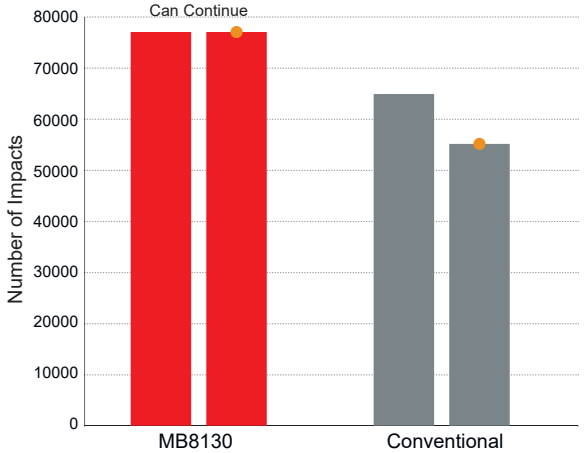
Insert	NP-CNGA432-GA2
Workpiece Material	AISI 5120 (60 HRC)
Machining Methods	External Heavy Interrupted Cutting
Cutting Speed **vc** (SFM)	490
Feed per Rev. **f** (IPR)	.002
Depth of Cut **ap** (inch)	.004
Cutting Mode	Wet Cutting

77000 Impacts

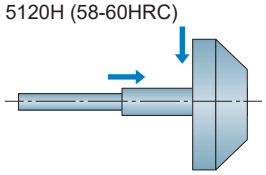
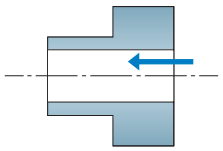
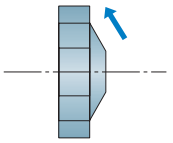
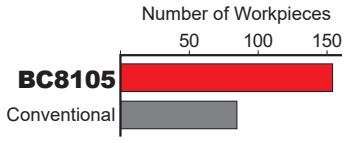
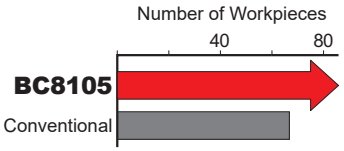
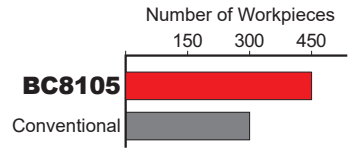

MB8130

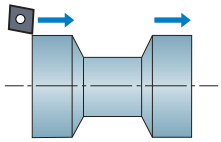
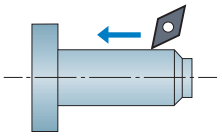
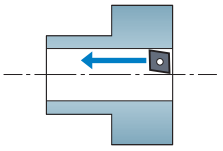
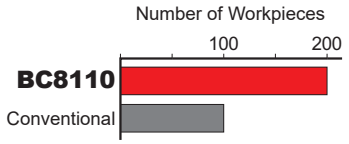
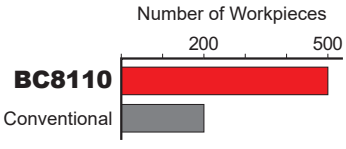
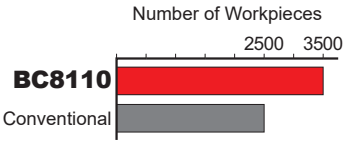
54000 Impacts

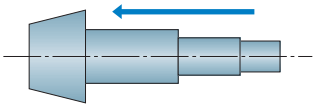
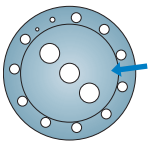
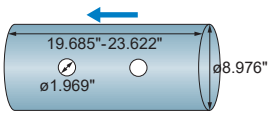
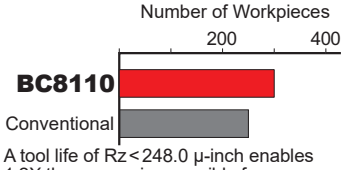
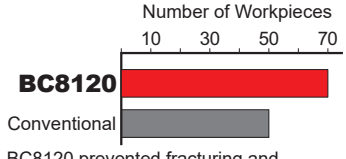
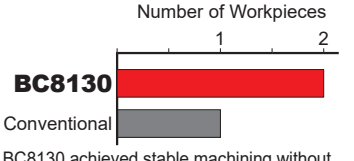

Conventional



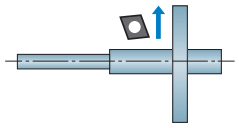
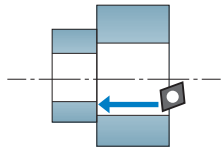
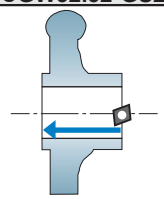
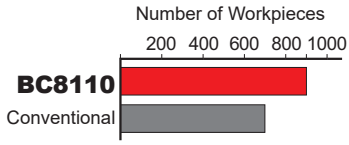
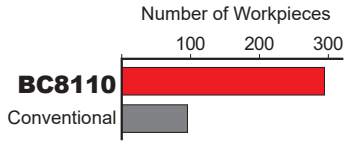
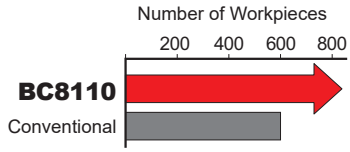
Application Examples

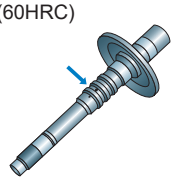
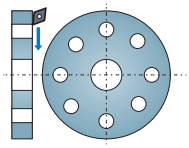
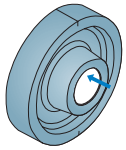
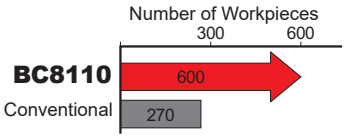
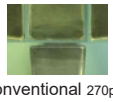
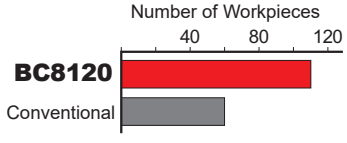
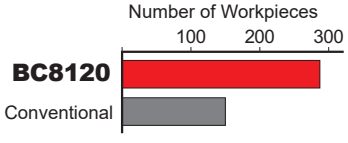
Insert	NP-CNGA432-GSWS2	NP-DCGW32.52-GS2	NP-CNGA432-FBWL2
Workpiece	AISI 5120H (58-60HRC) 	AISI 4419 (58-60HRC) 	JIS 19CrNi5 (58-62HRC) 
Component	Pinion Gear	Shaft (Internal Continuous Cutting)	Differential Pinion Gear(Continuous Facing)
Cutting Conditions: Cutting Speed **vc** (SFM)	525	540	510
Cutting Conditions: Feed per Rev. **f** (IPR)	.014	.003	.005
Cutting Conditions: Depth of Cut **ap** (inch)	.006	.004	.006
Cutting Mode	Dry Cutting	Dry Cutting	Dry Cutting
Results	 Due to excellent surfaces, number of workpieces per cutting edge increased 1.5X compared to conventional product. Rz max : 185.0 µ-inch	 BC8105 achieved 1.1X longer tool life compared to conventional product.	 The surface roughness is more stable compared to conventional products, achieving 1.5X longer tool life. Ra < 31.5 µ-inch

Insert	NP-CNGA432-GS2	NP-DNGA431-FS2	NP-CCGW32.52-GS2
Workpiece	AISI 1049 (55-65HRC) 	AISI 1049 (55-65HRC) 	AISI 5115 (60-65HRC) 
Component	Shaft (External Continuous Cutting)	Shaft (External Continuous Cutting)	Gear (Internal Continuous Cutting)
Cutting Conditions: Cutting Speed **vc** (SFM)	820	525	360
Cutting Conditions: Feed per Rev. **f** (IPR)	.006	.008	.006
Cutting Conditions: Depth of Cut **ap** (inch)	.012	.008	.008
Cutting Mode	Wet Cutting	Wet Cutting	Dry Cutting
Results	 Increased efficiency with BC8110 due to fewer tool changes required.	 BC8110 achieved 2.5X longer tool life and could continue machining.	 Longer tool life meant reduced insert indexing.

Insert	NP-CNGA432-GBWL2	NP-CNGA432-TH2	NP-DNGA432-GH2
Workpiece	Alloy Steel (60-63HRC) 	AISI 1045 (58HRC) 	JIS SCM815 
Component	Pinion Drive (External Continuous Cutting)	Gear (Interrupted Facing)	Shaft (Tough Machining)
Cutting Conditions: Cutting Speed **vc** (SFM)	260	425	490
Cutting Conditions: Feed per Rev. **f** (IPR)	.008–.009	.003	.006
Cutting Conditions: Depth of Cut **ap** (inch)	.006	.006	.006
Cutting Mode	Wet Cutting	Wet Cutting	Dry Cutting
Results	 A tool life of Rz < 248.0 µ-inch enables 1.2X the processing possible for conventional product.	 BC8120 prevented fracturing and extended 1.4X longer tool life when high-load interrupted cutting.	 BC8130 achieved stable machining without fracture even under heavy interrupted cutting when machining big workpiece.

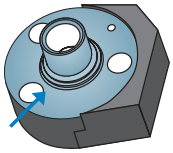
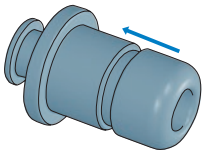
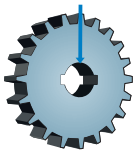
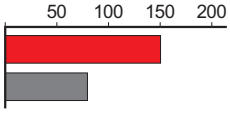
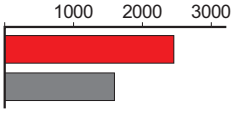
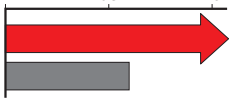
The above application examples are customer's applications, so it can be different from the recommended conditions.

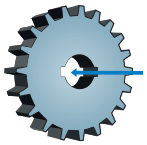
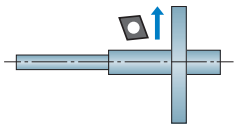
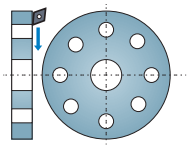
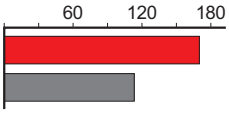
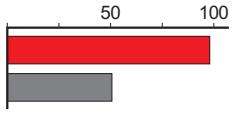
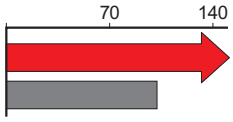
Insert		BF-DNGM431-TS2	NP-CNGA432-FS2	NP-CCGW32.52-GS2
Workpiece		AISI 5120 (61-65HRC) 	AISI 5120H (60HRC) 	Forged Steel (60HRC) 
Component		Input Shaft (Continuous Facing)	Gear (Internal Continuous Cutting)	Locker Arm (Internal Continuous Cutting)
Cutting Conditions	Cutting Speed **vc** (SFM)	490	655	460
	Feed per Rev. **f** (IPR)	.005	.003	.001
	Depth of Cut **ap** (inch)	.006	.006	.006
Cutting Mode		Wet Cutting	Dry Cutting	Dry Cutting
Results		 BC8110 achieved 1.3X longer tool life.	 Surface finish tolerance was maintained even when 3X the number of components were machined.	 BC8110 with excellent wear resistance achieved 1.2X longer tool life compared to conventional product.

Insert		GY1G0200D020N-GFGS	NP-CNGA432-TA2	NP-CNGA433-TA2
Workpiece		AISI 4118 (60HRC) 	ASTM (50HRC) 	AISI 5120 (60HRC) 
Component		Input Shaft (Grooving)	Clamp Cylinder (Interrupted Facing)	Automobile Parts (Internal Continuous)
Cutting Conditions	Cutting Speed **vc** (SFM)	425	425	590
	Feed per Rev. **f** (IPR)	.004	.003	.009
	Depth of Cut **ap** (inch)	.005	.020	.002 ─ .004
Cutting Mode		Wet Cutting	Wet Cutting	Wet Cutting
Results		  **BC8110** 600pcs  Conventional 270pcs	 BC8120 achieved 1.5X longer tool life.	 BC8120 achieved stable machining due to improved surfaces.

The above application examples are customer's applications, so it can be different from the recommended conditions.

Application Examples

Insert	NP-CNGA432-GA2	BM-DNGM442-TA2	NP-CNGA432-TH2
Workpiece	ASTM C90500 (55-58HRC) 	AISI 4142 (56-59HRC) 	AISI 1045 (58HRC) 
Component	Automobile Parts (Interrupted Facing)	Shaft (External Interrupted Cutting)	Gear (Interrupted Facing)
Cutting Conditions: Cutting Speed **vc** (SFM)	490	560	425
Cutting Conditions: Feed per Rev. **f** (IPR)	.006	.006	.003
Cutting Conditions: Depth of Cut **ap** (inch)	.004	.003 – .004	.006
Cutting Mode	Dry Cutting	Dry Cutting	Wet Cutting
Results	Number of Workpieces 50 100 150 200 **BC8120** Conventional  Tool life was 2X and no sudden fracturing occurred.	Number of Workpieces 1000 2000 3000 **BC8120** Conventional  BC8120 achieved 1.5X longer tool life.	Number of Workpieces 35 70 **BC8130** Conventional  BC8130 achieved 1.5X longer tool life without abnormal damage.

Insert	NP-CCGW32.52-TA2	NP-DNGA432-TA2	NP-CNGA433-TA2
Workpiece	AISI 5115 (58-60HRC) 	AISI 5120H (60HRC) 	AISI 431 (58-60HRC) 
Component	Gear (Internal Interrupted Cutting)	Shaft	Automobile Parts
Cutting Conditions: Cutting Speed **vc** (SFM)	520 – 575	520	330
Cutting Conditions: Feed per Rev. **f** (IPR)	.004	.004	.004
Cutting Conditions: Depth of Cut **ap** (inch)	.005	.007	.006
Cutting Mode	Dry Cutting	Dry Cutting	Dry Cutting
Results	Number of Workpieces 60 120 180 **BC8130** Conventional  BC8130 increased 1.5X number of workpieces per cutting edge.	Number of Workpieces 50 100 **BC8130** Conventional  BC8130 achieved 2X longer tool life without any cutting edge chipping.	Number of Workpieces 70 140 **BC8130** Conventional  BC8130 achieved 1.5X longer tool life without abnormal damage.

The above application examples are customer's applications, so it can be different from the recommended conditions.

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.

MITSUBISHI MATERIALS U.S.A. CORPORATION

Customer Service : 800-523-0800
Technical Service : 800-486-2341

LOS ANGELES HEAD OFFICE
11250 Slater Avenue, Fountain Valley, CA 92708
TEL : 714-352-6100 FAX : 714-668-1320

NORTH CAROLINA OFFICE
105 Corporate Center Drive Suite A, Mooresville, NC 28117
TEL : 980-312-3100 FAX : 704-746-9292

CHICAGO OFFICE
1314B North Plum Grove Road, Schaumburg, IL 60173
TEL : 847-252-6300 FAX : 847-519-1732

TORONTO OFFICE
3535 Laird Road, Units 15 & 16, Mississauga, Ontario, L5L 5Y7, Canada
TEL : 905-814-0240 FAX : 905-814-0245

MMC METAL DE MEXICO, S.A. DE C.V.
Av. La Cañada No.16, Parque Industrial Bernardo Quintana,
El Marques, Queretaro, CP76246, Mexico
TEL : +52-442-221-6136 FAX : +52-442-221-6134

URL : http://www.mitsubishicarbide.com

(Tool specifications subject to change without notice.)

EXP-14-E004
Printed in U.S.A. 8/19