

HOW TO READ THE STANDARD OF CBN & PCD TURNING INSERTS

●How this section page is organized

①Organized according to turning insert shape.

(Refer to the index on the next page.)

②Inserts are arranged in order of :

- Negative inserts (with hole→without hole)
- Positive inserts (with hole→without hole)

GRADE APPLICATION RECOMMENDED FOR EACH WORK MATERIAL

cutting conditions suitable for each type of work material is shown as a general guide to select the grade.

●: Stable Cutting ●: General Cutting ⊕: Unstable Cutting

SHAPE & ANGLE MARK

PRODUCT SECTION

● CBN TURNING INSERTS [NEGATIVE]

 80° **CN** TYPE INSERT
WITH HOLE

**TITLE OF PRODUCT
ACCORDING TO THE
INSERT TYPE**

**TITLE OF PRODUCT
ACCORDING TO THE
INSERT TYPE**

INSERT CORNER RADIUS

— INSERT NUMBER

STOCK STATUS

■ INSERT GRADES

[illegible]

* Please refer to page B018 before using the wiper insert

B028 ● : USA Stock ★ : Stocked in Japan
 <1 insert in one case>

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of
each double-page spread.

PHOTO OF INSERT

PRODUCT NAME

		Cutting Conditions		Stability	Cutting	General Cutting	Unstable Cutting			
Work Material	H Hardened Materials K Cast Iron L Heat-resistant Alloy, Titanium Alloy B Barbed Alloy									
Shape	Order Number	(ISO) Number	Corner Radius R (mm)	Cutting Edge Length LE (inch)	General Cutting	Stability	Cutting	General Cutting	Unstable Cutting	Applicable Holder Type
NEW PETIT	NP-CNGA430.5-FS2	NP-CNGA120402F-S2	0.08	0.71	●	●	●	●	●	CBN
	NP-CNGA431-FS2	NP-CNGA120404F-S2	0.10	0.75	●	●	●	●	●	B
	NP-CNGA432-FS2	NP-CNGA120408F-S2	0.16	0.75	●	●	●	●	●	CBN & FOR TURNING INSERTS
	NP-CNGA433-FS2	NP-CNGA120412F-S2	0.24	0.91	●	●	●	●	●	NEG
	NP-CNGA430.5-GS2	NP-CNGA120402G-S2	0.08	0.71	●	●	●	●	●	WITH HSS
	NP-CNGA431-GS2	NP-CNGA120404G-S2	0.10	0.75	●	●	●	●	●	C
	NP-CNGA432-GS2	NP-CNGA120408G-S2	0.16	0.75	●	●	●	●	●	COG
	NP-CNGA433-GS2	NP-CNGA120412G-S2	0.24	0.91	●	●	●	●	●	EO1
	NP-CNGA430.5-GA2	NP-CNGA120402GA2	0.08	0.71	●	●	●	●	●	EO2
	NP-CNGA431-GA2	NP-CNGA120404GA2	0.10	0.75	●	●	●	●	●	EO3
	NP-CNGA432-GA2	NP-CNGA120408GA2	0.16	0.75	●	●	●	●	●	EO4
	NP-CNGA433-GA2	NP-CNGA120412GA2	0.24	0.91	●	●	●	●	●	EO5
	NP-CNGA431-GH2	NP-CNGA120404GH2	0.10	0.75	●	●	●	●	●	EO6
	NP-CNGA432-GH2	NP-CNGA120408GH2	0.16	0.75	●	●	●	●	●	EO7
	NP-CNGA433-GH2	NP-CNGA120412GH2	0.24	0.91	●	●	●	●	●	EO8
	NP-CNGA431-TS2	NP-CNGA120408TS2	0.16	0.75	●	●	●	●	●	EO9
	NP-CNGA432-TS2	NP-CNGA120412TS2	0.24	0.91	●	●	●	●	●	EO10
	NP-CNGA431-TA2	NP-CNGA120404TA2	0.10	0.75	●	●	●	●	●	EO11
	NP-CNGA432-TA2	NP-CNGA120408TA2	0.16	0.75	●	●	●	●	●	EO12
	NP-CNGA433-TA2	NP-CNGA120412TA2	0.24	0.91	●	●	●	●	●	EO13
	NP-CNGA431-TH2	NP-CNGA120408TH2	0.16	0.75	●	●	●	●	●	EO14
	NP-CNGA432-TH2	NP-CNGA120412TH2	0.24	0.91	●	●	●	●	●	EO15
	NP-CNGA431-GN2	NP-CNGA120404GN2	0.10	0.75	●	●	●	●	●	EO16
	NP-CNGA432-GN2	NP-CNGA120408GN2	0.16	0.75	●	●	●	●	●	EO17
	NP-CNGA433-GN2	NP-CNGA120412GN2	0.24	0.91	●	●	●	●	●	EO18
	NP-CNGA431-SF2	NP-CNGA120408SF2	0.16	0.75	●	●	●	●	●	EO19
	NP-CNGA432-SF2	NP-CNGA120412SF2	0.24	0.91	●	●	●	●	●	EO20
	NP-CNGA431-SE2	NP-CNGA120404SE2	0.10	0.75	●	●	●	●	●	EO21
	NP-CNGA432-SE2	NP-CNGA120408SE2	0.16	0.75	●	●	●	●	●	EO22
	NP-CNGA433-SE2	NP-CNGA120412SE2	0.24	0.91	●	●	●	●	●	EO23
	NP-CNGA432-GZ	NP-CNGA120408GZ	0.16	0.75	●	●	●	●	●	EO24
NEW PETIT * NEW TOOL	NP-CNGA430-FSWS2	NP-CNGA120408FSWS2	0.16	0.75	●	●	●	●	●	EO25
	NP-CNGA432-FSWS2	NP-CNGA120408FSWS2	0.16	0.75	●	●	●	●	●	EO26
	NP-CNGA431-FBW1L	NP-CNGA120404FBW1L	0.10	0.75	●	●	●	●	●	EO27
	NP-CNGA432-FBW1L	NP-CNGA120408FBW1L	0.16	0.75	●	●	●	●	●	EO28
	NP-CNGA431-FBW1L	NP-CNGA120412FBW1L	0.24	0.91	●	●	●	●	●	EO29
* Please refer to page B018 before using the wiper insert.										

★ Please refer to page B018 before using the wiper inser

PAGE REFERENCE

- GRADES
- TECHNICAL DATA

indicates reference pages, on the right hand page of each double-page spread.

■ APPLICABLE HOLDER PAGE

indicates reference pages for details of applicable holders.

●To Order : Please specify insert number and grade.

TURNING TOOLS

CBN & PCD INSERT STANDARDS

CBN & PCD INSERT GRADES

IDENTIFICATION	B002
CLASSIFICATION OF CBN & PCD GRADES	B004
CBN (CUBIC BORON NITRIDE)	B006
PCD (SINTERED DIAMOND)	B021
CLASSIFICATION OF CBN & PCD INSERTS	B022

STANDARD OF CBN TURNING INSERTS

NEGATIVE INSERTS WITH HOLE

CN $\circ\circ$ TYPE	RHOMBIC 80°	B028
DN $\circ\circ$ TYPE	RHOMBIC 55°	B031
SN $\circ\circ$ TYPE	SQUARE 90°	B035
TN $\circ\circ$ TYPE	TRIANGULAR 60°	B036
VN $\circ\circ$ TYPE	RHOMBIC 35°	B038
WN $\circ\circ$ TYPE	TRIGON 80°	B040

NEGATIVE INSERTS WITHOUT HOLE

CN $\circ\circ$ TYPE	RHOMBIC 80°	B041
DN $\circ\circ$ TYPE	RHOMBIC 55°	B041
RN $\circ\circ$ TYPE	ROUND	B042
SN $\circ\circ$ TYPE	SQUARE 90°	B042
TN $\circ\circ$ TYPE	TRIANGULAR 60°	B043

POSITIVE INSERTS WITH HOLE

CC $\circ\circ$ TYPE	RHOMBIC 80°	B044
CP $\circ\circ$ TYPE	RHOMBIC 80°	B047
DC $\circ\circ$ TYPE	RHOMBIC 55°	B048
TC $\circ\circ$ TYPE	TRIANGULAR 60°	B050
TP $\circ\circ$ TYPE	TRIANGULAR 60°	B051
VB $\circ\circ$ TYPE	RHOMBIC 35°	B053
VC $\circ\circ$ TYPE	RHOMBIC 35°	B054
WC $\circ\circ$ TYPE	TRIGON 80°	B055

POSITIVE INSERTS WITHOUT HOLE

SP $\circ\circ$ TYPE	SQUARE 90°	B056
TB $\circ\circ$ TYPE	TRIANGULAR 60°	B057
TP $\circ\circ$ TYPE	TRIANGULAR 60°	B057
GY TYPE		B058

STANDARD OF PCD TURNING INSERTS

NEGATIVE INSERTS WITH HOLE

CN $\circ\circ$ TYPE	RHOMBIC 80°	B059
DN $\circ\circ$ TYPE	RHOMBIC 55°	B059
SN $\circ\circ$ TYPE	SQUARE 90°	B060
TN $\circ\circ$ TYPE	TRIANGULAR 60°	B060
VN $\circ\circ$ TYPE	RHOMBIC 35°	B061

NEGATIVE INSERTS WITHOUT HOLE

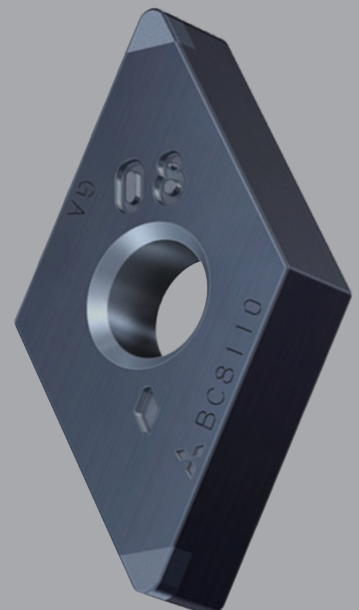
SN $\circ\circ$ TYPE	SQUARE 90°	B062
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POSITIVE INSERTS WITH HOLE

CC $\circ\circ$ TYPE	RHOMBIC 80°	B063
CP $\circ\circ$ TYPE	RHOMBIC 80°	B063
DC $\circ\circ$ TYPE	RHOMBIC 55°	B064
SP $\circ\circ$ TYPE	SQUARE 90°	B064
TC $\circ\circ$ TYPE	TRIANGULAR 60°	B065
TP $\circ\circ$ TYPE	TRIANGULAR 60°	B066
VB $\circ\circ$ TYPE	RHOMBIC 35°	B068
VC $\circ\circ$ TYPE	RHOMBIC 35°	B068
WC $\circ\circ$ TYPE	TRIGON 80°	B069
WP $\circ\circ$ TYPE	TRIGON 80°	B069
DE $\circ\circ$ TYPE	RHOMBIC 55°	B070
TE $\circ\circ$ TYPE	TRIANGULAR 60°	B070
VD $\circ\circ$ TYPE	RHOMBIC 35°	B071

POSITIVE INSERTS WITHOUT HOLE

SP $\circ\circ$ TYPE	SQUARE 90°	B072
TP $\circ\circ$ TYPE	TRIANGULAR 60°	B072



IDENTIFICATION

B

CBN & PCD TURNING INSERTS

Symbol	Insert Shape	
S	Square	
T	Triangular	
C	Rhombic 80°	
D	Rhombic 55°	
V	Rhombic 35°	
W	Trigon	
R	Round	

② Symbol for Insert Shape

BM	With Breaker
BF	With Breaker
NP	Petit Tip
No mark	Standard Type

① Insert Geometry

				Detail of M Class Insert Tolerance ●Tolerance of Nose Height M (inch)						
Symbol	Tolerance of Nose Height M (inch)	Tolerance of Inscribed Circle IC (inch)	Tolerance of Thickness S (inch)	I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
G	±.001	±.001	±.005	.250	±.003	±.003	±.003	±.004	±.0063	—
				.375	±.003	±.003	±.003	±.004	±.0063	—
M*	±.003 – ±.0063	±.002 – ±.003	±.005	.500	±.005	±.005	±.005	±.006	—	—
★As a rule, the sides of these inserts are as sintered. Tolerance differs with insert size. For the accuracy of class M, refer to the table on the right.				●Tolerance of Inscribed Circle IC (inch)						
Symbol	Tolerance of Nose Height M (inch)	Tolerance of Inscribed Circle IC (inch)	Tolerance of Thickness S (inch)	I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
				.250	±.002	±.002	±.002	±.002	±.002	—
				.375	±.002	±.002	±.002	±.002	±.002	±.002
				.500	±.003	±.003	±.003	±.003	—	±.003

④ Symbol for Tolerance Class

INCH	① NP	-	② C	N	④ G	A
METRIC	NP	-	C	N	G	A

Symbol	Relief Angle
B	5°
C	7°
D	15°
E	20°
N	0°
P	11°

③ Symbol for Relief Angle

⑤ Symbol for Chipbreaker and Clamping System											
Inch			Metric								
Figure	I.C. .250" and over	I.C. under .250"	Symbol	Hole	Hole Configuration	Chip Breaker	Figure	Symbol	Hole	Hole Configuration	Chip Breaker
	A	D	W	With Hole	Cylindrical Hole + One Countersink (40—60°)	No		A	With Hole	Cylindrical Hole	No
	M	P	T	With Hole	One Countersink (40—60°)	One Sided		M	With Hole	Cylindrical Hole	One Sided
	N	E	B	With Hole	Cylindrical Hole + One Countersink (70—90°)	No		N	Without Hole	—	No
Special Design	X	X	H	With Hole	One Countersink (70—90°)	One Sided		X	—	—	—

Inch		Diameter of Inscribed Circle (inch)	Metric						
I.C. .250" and over	I.C. under .250"								
	1.2	.156		02		04	03	03	06
	1.5	.187		L3	08	05	04	04	08
	1.8	.219		03	09	06	05	05	09
2		.250		04	11	07	06	06	11
2.5		.313		05	13	09	08	07	13
3		.375	09	06	16	11	09	09	16
4		.500	12	08	22	15	12	12	22

⑥ Symbol for Insert Size

Inch		Thickness (inch)	Metric
I.C. .250" and over	I.C. under .250"		
—	0.9	.055	S1
—	1	.063	01
—	1.1	.070	T0
—	1.5	.094	02
—	1.8	.109	T2
2	—	.125	03
2.5	—	.156	T3
3	—	.187	04

⑦ Symbol for Insert Thickness

⑥	⑦				
4	3	1	GA	WS	2
12	04	04	GA	WS	2

⑧ Symbol for Insert Corner Configuration		
Inch	Corner Radius (inch)	Metric
0.5	.008	02
1	.016	04
2	.031	08
3	.047	12
4	.063	16

⑨ Application (Honing)	
F FA FB FS	Continuous Cutting
G GA GB GH GS GN	General Cutting
T TA TH TS	Interrupted Cutting
SF SE	Edge Treatment for Sintered Alloy

⑩ Wiper	
WS	For High Rigidity Work Material
WL	For Deflection and Vibration Prevention
No mark	Without Wiper

⑪ Number of Tips	
2	2
3	3
⋮	⋮
No mark	1

Please refer to page B016 for further information.

CLASSIFICATION OF CBN & PCD GRADES

FEATURES

NON-COATED CBN MATERIALS

CBN sintered materials base cutting tools are produced by binding CBN (Cubic Boron Nitride) and ceramic having hardness next to diamond and sintering under ultra-high pressure and high temperature.

CBN has lower affinity to iron than diamond. The low affinity and high hardness properties means that sintered CBN delivers a superior cutting performance especially during high speed machining of materials such hardened steel, cast iron and sintered alloys etc.

COATED CBN MATERIALS

To achieve longer tool life, Mitsubishi uses a unique "Particle-activated Sintering Method", combined with increased cutting edge strength. With high crater wear resistance CBN grades and a wear resistant ceramic coatings, longer tool life and improved machine efficiency are obtained.

PCD MATERIALS (Sintered Diamond)

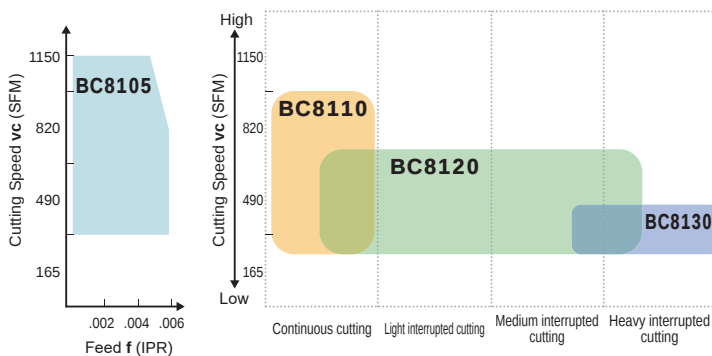
Suitable for cutting materials such as nonferrous metals and fiber reinforced plastics (FRP) including aluminum alloys. It supports ultra high speed finish cutting.

Work Materials for Turning Grades/Application Area

● Hardened Materials

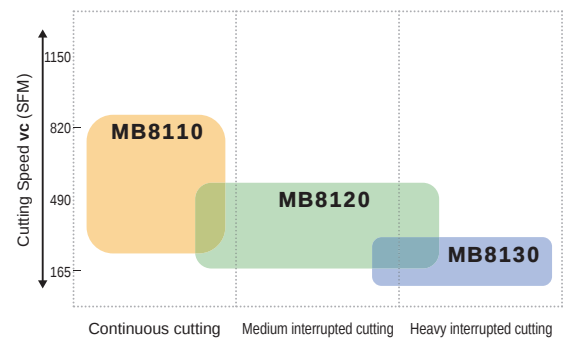
ISO	COATED CBN SERIES	NON-COATED CBN SERIES
H	BC8105 BC8110 BC8120 BC8130	NEW MB8110 NEW MB8120 NEW MB8130
10		
20		
30		

COATED CBN MATERIALS



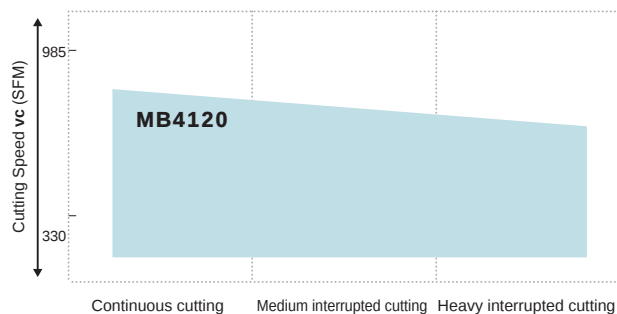
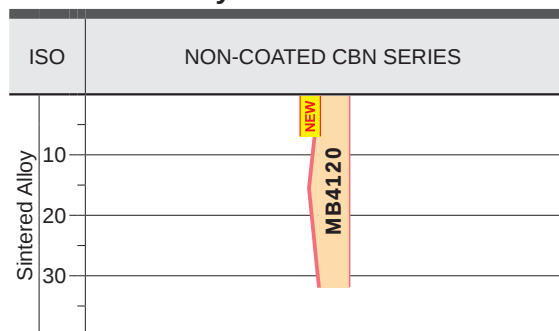
Suitable for finishing with surface roughness Ra .024 pinch or Rz .094 pinch or less.

NON-COATED CBN MATERIALS



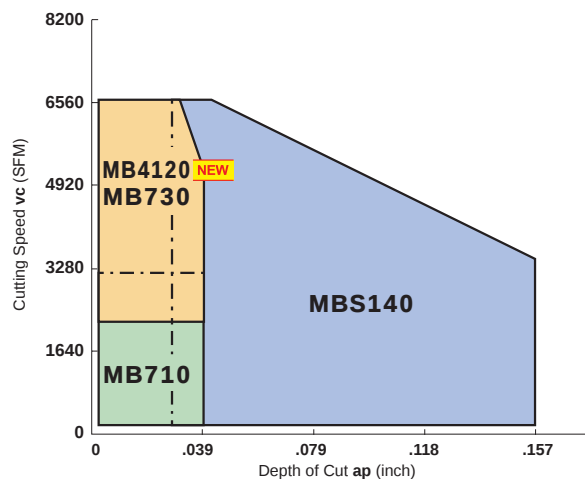
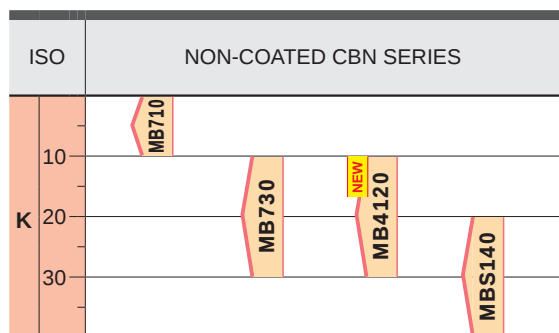
Coated CBN Grade BC8100 and Non-coated CBN Grade MB8100 for high-hardness steel processing are available in a wide range of areas from finishing to continuous cutting of hardened steels and strongly interrupted machining.

● Sintered Alloy



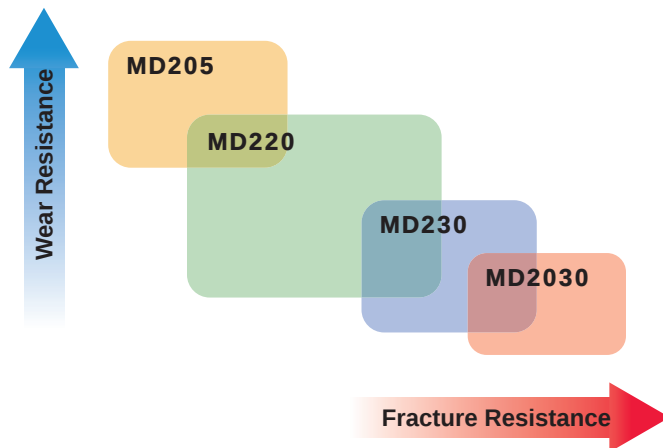
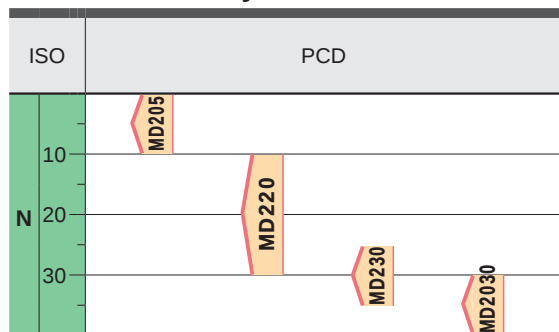
The CBN grade “MB4120” for sintered alloy and cast iron cutting can be used widely from continuous cutting to interrupted cutting in the processing of cast irons such as sintered alloys for valve mechanism parts and oil pump parts.

● Cast Iron



Lineup of grades available from general cutting to deep depth cutting for high efficiency machining.

● Aluminum Alloy



Suitable for cutting materials such as nonferrous metals and fiber reinforced plastics (FRP) including aluminum alloys. It supports ultra high speed finish cutting.

COATED CBN

BC8100 series for machining of hardened steel

FEATURES

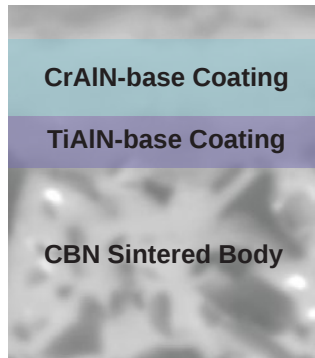
The coated CBN grade BC8100 series and non-coated CBN grade MB8100 series for cutting of hardened steel uses newly developed optimized substrate technology CBN base material. The new ultra-micro-binder prevents sudden fracturing and longer tool life. The BC8100 series coating exhibits excellent fracture resistance and wear resistance by using a special PVD coating suitable for each cutting mode.

B

CBN & PCD TURNING INSERTS

■ Newly Developed Special PVD Coating

BC8105



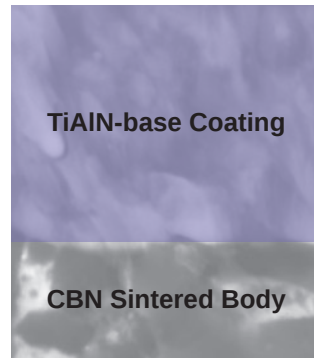
Offers excellent surface finishes.
Peeling resistance and adhesion strength are improved by having both lubricity and wear resistance.

BC8110



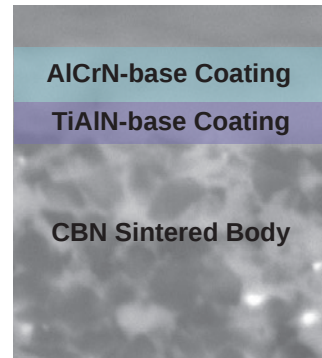
Chipping caused by built up edge is prevented with improved welding resistance. Improved wear and adhesion strength to the CBN surface.

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.

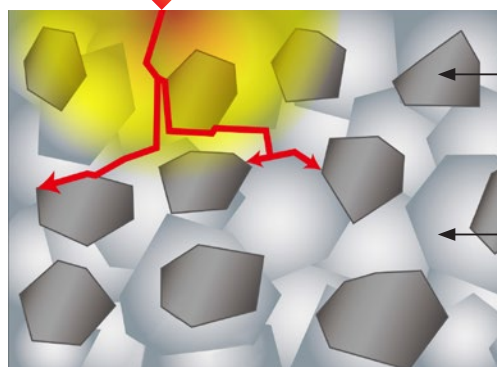
*Graphical representation.

■ The newly developed Ultra Micro-particle Binder prevents sudden fracture

● Conventional

Cutting Resistance

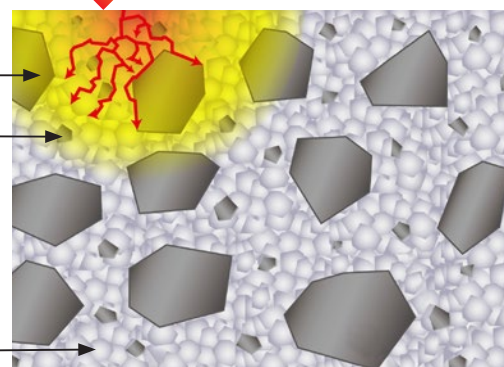
Forces Dispersed in Linear Direction



● BC8100 Series

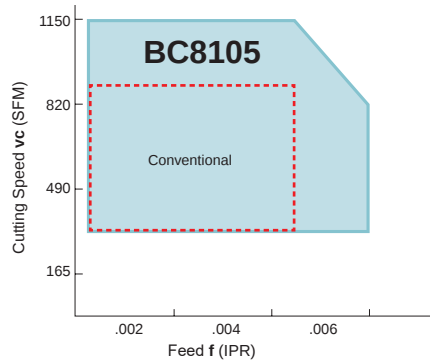
Cutting Resistance

Forces Dispersed Radially

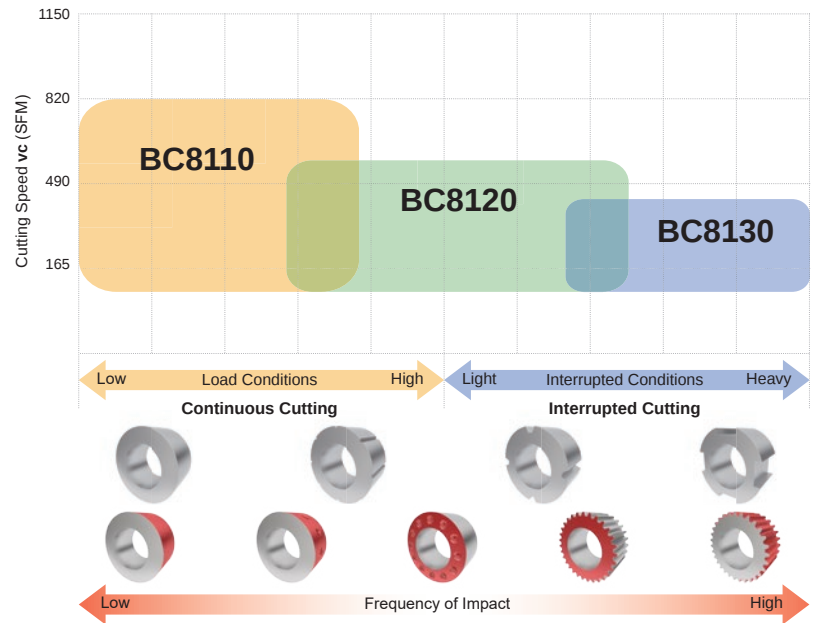


Dispersal of the newly developed Ultra Micro-particle Binder for sintered CBN and Micro Grain CBN suppresses cracking to prevent sudden fracturing.

Application Range



★BC8110 is recommended to improve wear resistance.



B

CBN & PCD TURNING INSERTS

Recommended Cutting Conditions

Grade	Cutting mode	Cutting Speed v_c (SFM)				Feed f (IPR)	Depth of Cut a_p (inch)	Cutting Mode
		165	490	820	1150			
BC8100 Series	BC8105 Continuous					$\leq .006$	$\leq .008$	Dry, Wet
	BC8110 Continuous					$\leq .008$	$\leq .014$	Dry, Wet
	BC8120 Continuous					$\leq .012$	$\leq .020$	Dry, Wet
	BC8120 Interrupted					$\leq .008$	$\leq .012$	Dry, Wet
	BC8130 Interrupted					$\leq .008$	$\leq .012$	Dry, Wet

COATED CBN

BC8100 series for machining of hardened steel

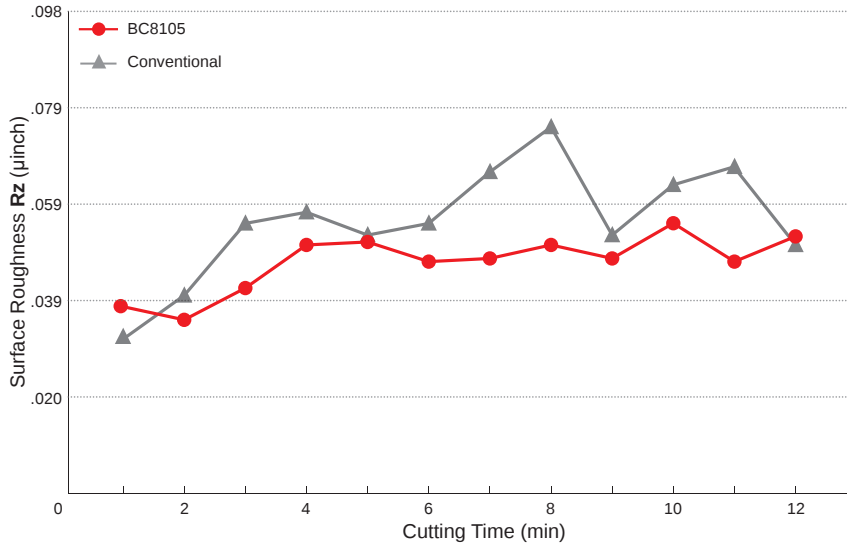
■ Cutting Example and Application Example

BC8105 Highest Accuracy

CBN substrate with excellent wear resistance and chipping resistance, together with a high-lubricity coating film, controls the occurrence of boundary wear and exhibits outstanding surface finish.

Suitable for finishing with surface roughness Ra .024 μinch or Rz .094 μinch or less.

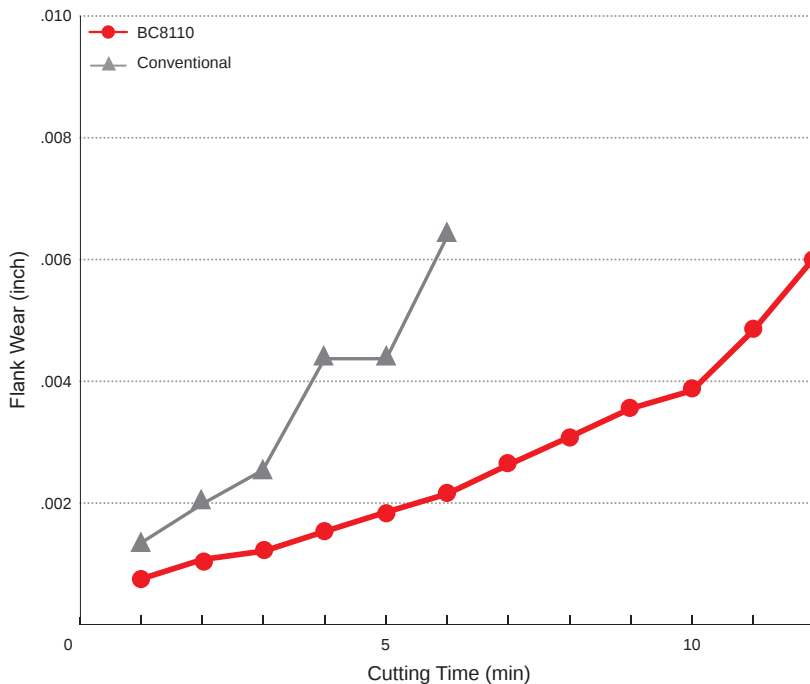
CBN & PCD TURNING INSERTS



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

BC8110 High Speed Turning

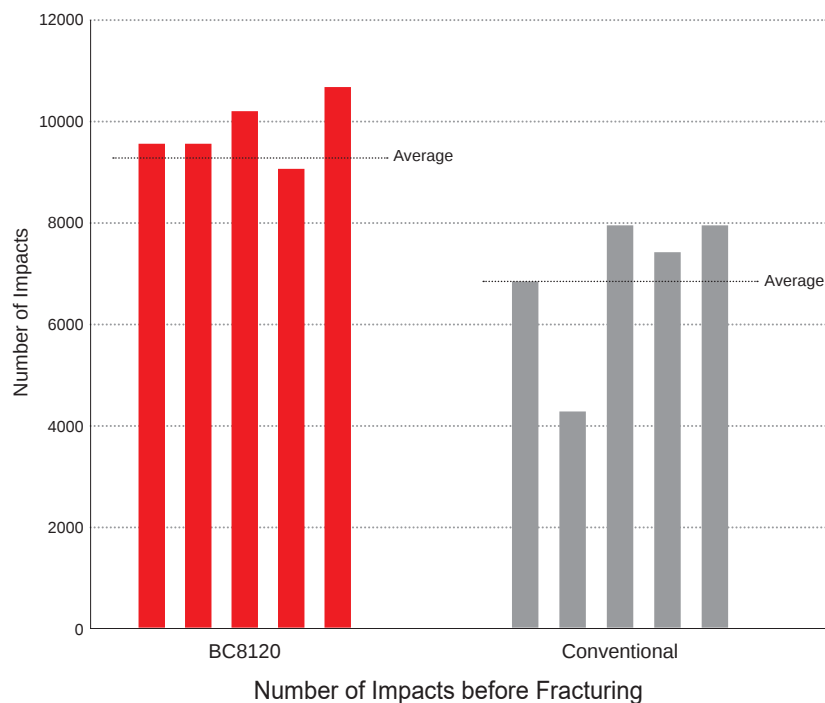
CBN substrate with excellent wear resistance and chipping resistance, together with an extremely hard coating film, provides the highest flank wear resistance of the entire BC8100 series.



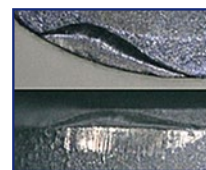
Insert	NP-CNGA432-GS2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Continuous Cutting
Cutting Speed vc (SFM)	820
Feed f (IPR)	.004
Depth of Cut ap (inch)	.008
Cutting Mode	Dry Cutting

BC8120 General Application

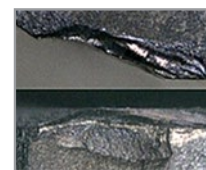
CBN substrate with excellent fracture resistance and crater wear resistance, together with a coating film having superior wear resistance, combines both fracture resistance and wear resistance while exhibiting outstanding crater wear resistance.



Cutting Edge Condition after 8000 Impacts



BC8120

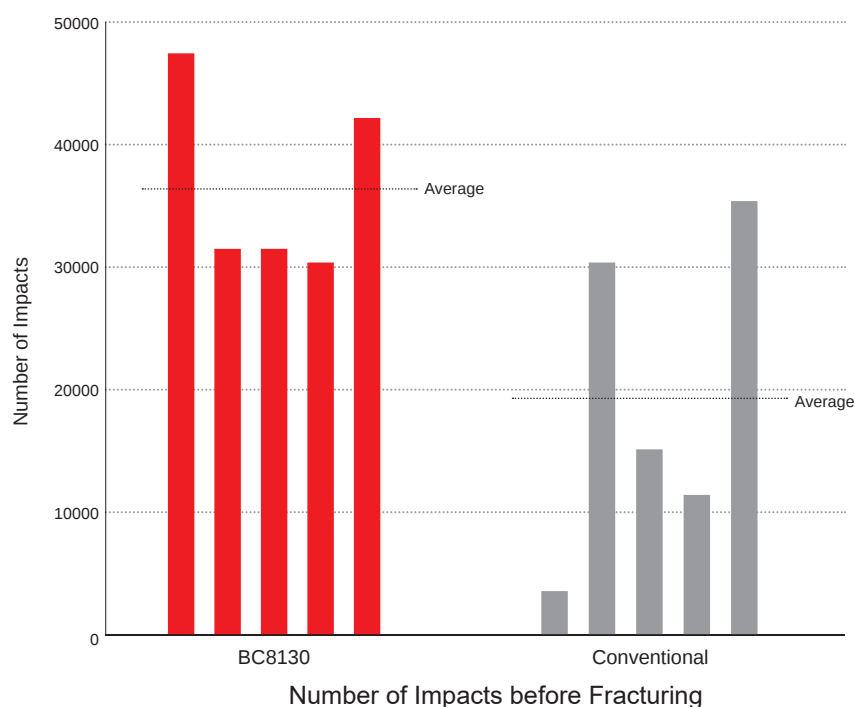


Conventional

Insert	NP-CNGA432-GA2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Interrupted Cutting
Cutting Speed v_c (SFM)	820
Feed f (IPR)	.006
Depth of Cut a_p (inch)	.004
Cutting Mode	Dry Cutting

BC8130 Tough Machining

CBN substrate with excellent cutting edge strength, together with a coating film that combines hardness with impact resistance, allows it to exhibit outstanding cutting edge strength and fracture resistance.



Insert	NP-CNGA432-GA2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Heavy Interrupted Cutting
Cutting Speed v_c (SFM)	820
Feed f (IPR)	.002
Depth of Cut a_p (inch)	.004
Cutting Mode	Wet Cutting

NON-COATED CBN

MB8100 series for machining of hardened steel

FEATURES

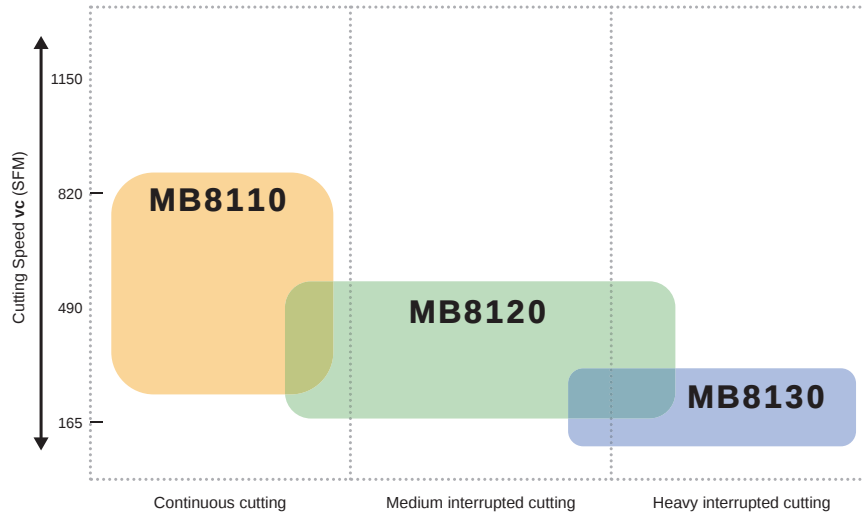
The MB8100 series CBN base material uses the optimized substrate technology (see B006) applied to the BC8100 series to prevent sudden defects during cutting and achieve long life.

The MB8100 series has a lineup of MB8110 for continuous cutting, MB8120 for general cutting, and MB8130 for interrupted cutting, and can be used in a wide range of cutting applications.

B

CBN & PCD TURNING INSERTS

Application Range



Recommended Cutting Conditions

Grade	Cutting mode	Cutting Speed v_c (m/min)					Feed f (IPR)	Depth of Cut a_p (inch)	Cutting Mode
		165	330	490	655	820			
MB8100 Series	MB8110 Continuous						$\leq .008$	$\leq .012$	Dry, Wet
	Continuous						$\leq .008$	$\leq .020$	Dry, Wet
	MB8120 Interrupted						$\leq .008$	$\leq .012$	Dry, Wet
	MB8130 Interrupted						$\leq .008$	$\leq .012$	Dry, Wet

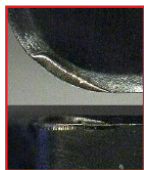
Application Example

MB8110 Continuous cutting

Tool Life (Flank Wear)

Insert	NP-CNGA432-GA2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Continuous Cutting
Cutting Speed v_c (SFM)	820
Feed f (IPR)	.004
Depth of Cut a_p (inch)	.008
Cutting Mode	Dry Cutting

Cutting Edge after 180 sec.

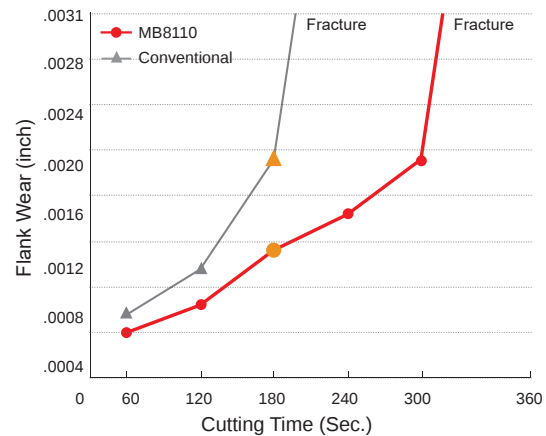


MB8110



Conventional

Large Wear

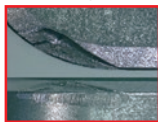


MB8120 General Application

Test of Interrupted Cutting

Insert	NP-CNGA432-GA2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Interrupted Cutting
Cutting Speed v_c (SFM)	820
Feed f (IPR)	.006
Depth of Cut a_p (inch)	.004
Cutting Mode	Dry Cutting

17000 Impacts

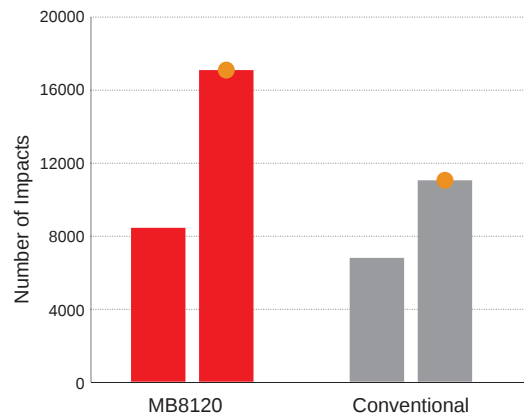


MB8120

11000 Impacts



Conventional



MB8130 Interrupted cutting

Test of Interrupted Cutting

Insert	NP-CNGA432-GA2
Work Material	AISI 5120 (60HRC)
Machining Methods	External Heavy Interrupted Cutting
Cutting Speed v_c (SFM)	490
Feed f (IPR)	.002
Depth of Cut a_p (inch)	.004
Cutting Mode	Wet Cutting

77000 Impacts

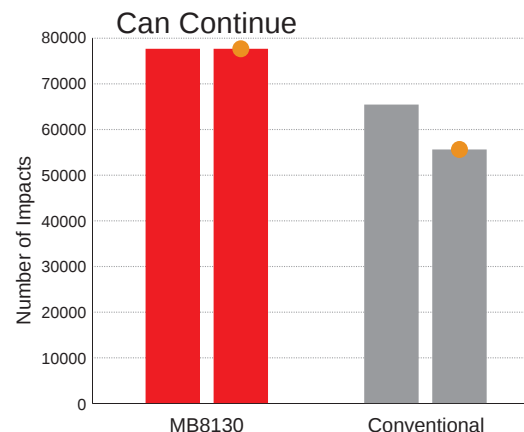


MB8130

54000 Impacts



Conventional



B

CBN & PCD TURNING INSERTS

NON-COATED CBN

Sintered Alloy Machining • Cast Iron Machining

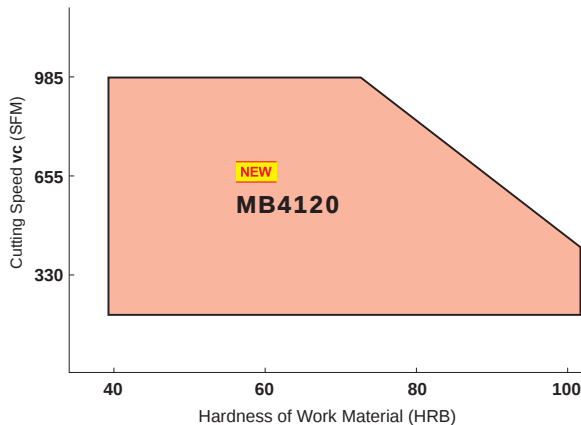
MB4120/MB710/MB730/MBS140

Application Range

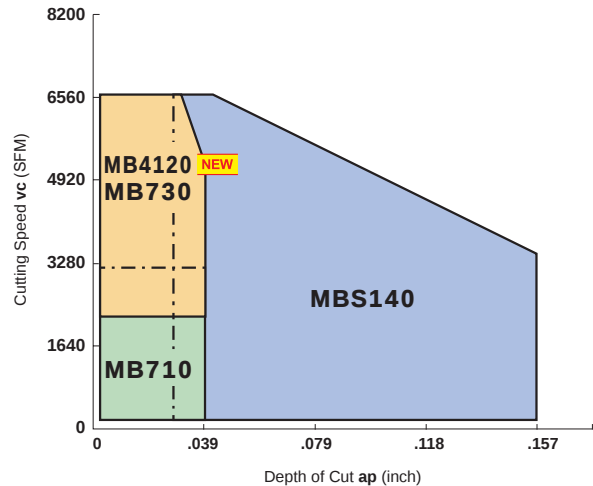
B

CBN & PCD TURNING INSERTS

● Sintered Alloy Machining



● Cast Iron Machining



Recommended Cutting Conditions

● Sintered Alloy Machining

Work Material	Application range	Grade	Cutting Speed vc (SFM)					Feed f (IPR)	Depth of Cut ap (inch)	Cutting Mode
			330	490	655	820	985			
General Sintered Alloy	General Cutting	MB4120 NEW						$\leq .008$	$\leq .012$	Dry, Wet
High Density Sintered Alloy	General Cutting	MB4120 NEW						$\leq .008$	$\leq .012$	Dry, Wet
Sintered Alloy	General Cutting	MB4120 NEW						$\leq .008$	$\leq .012$	Dry, Wet

● Cast Iron Machining

Work Material	Application range	Grade	Cutting Speed vc (SFM)						Feed f (IPR)	Depth of Cut ap (inch)	Cutting Mode
			820	1640	2460	3280	4100	4920			
Gray Cast Iron AISI No 35 B, AISI No 45 B	General Cutting	MB4120 NEW							$\leq .016$	$\leq .020$	Dry, Wet
	General Cutting	MB730							$\leq .020$	$\leq .039$	Dry, Wet
	General Cutting	MB710							$\leq .020$	$\leq .039$	Dry, Wet
	Heavy Cutting	MBS140							$\leq .020$	$\leq .197$	Dry, Wet

MB4120

● The first recommendation that can be widely used for continuous to interrupted cutting of sintered alloy and cast iron.

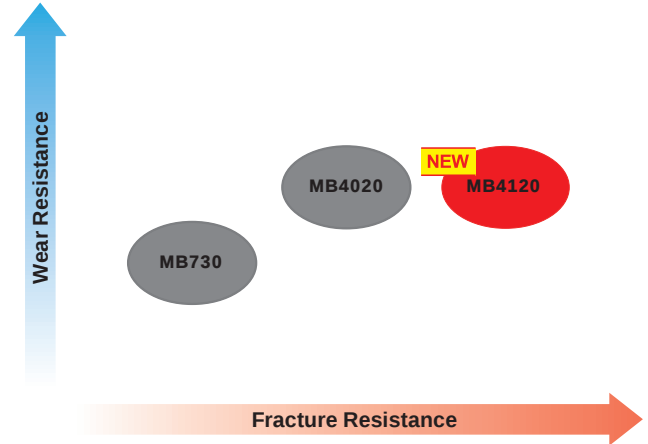
FEATURES

High Fracture Resistance

Fine CBN particles increase cutting edge toughness. The high fracture resistance allows stable performance even during interrupted machining.

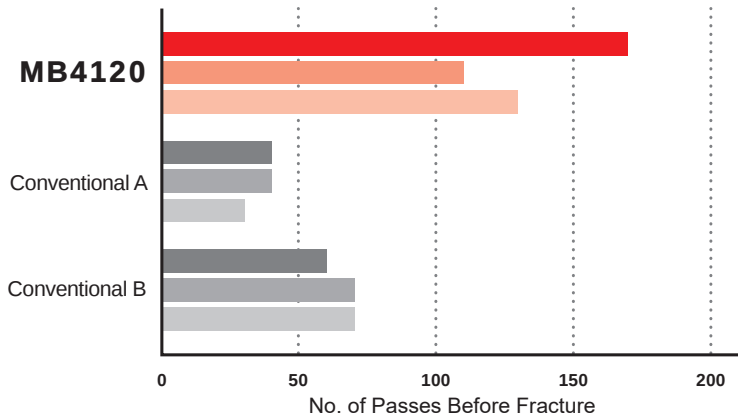
High Adhesion Strength of Fine CBN Particles

Optimization of the sintering conditions strengthens adhesion between fine CBN particles. This increases both fracture resistance and wear resistance.



Application Example

Fracture Resistance Comparison During Interrupted Facing of High Strength Sintered Alloy

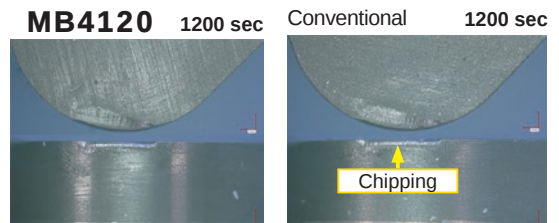
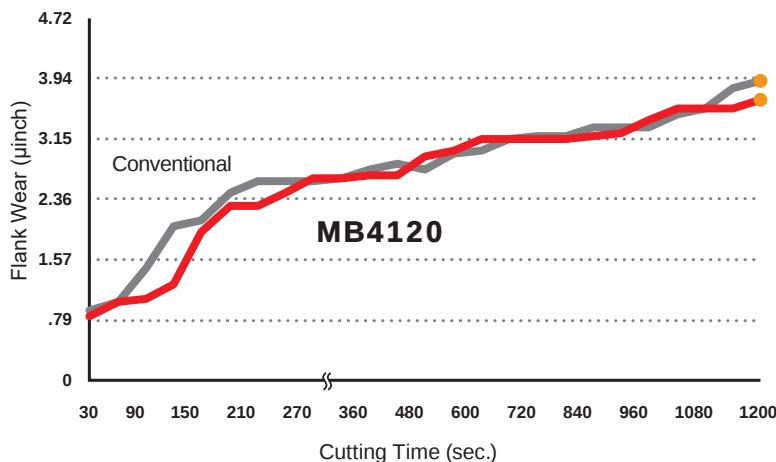


<Cutting Conditions>

Work Material : High Strength Sintered Alloy
 Insert : NP-TNGA332-SE3
 Cutting Speed : $vc=490$ SFM
 Feed : $f=.006$ IPR
 Depth of Cut : $ap=.004$ inch
 Cutting Mode : Wet Cutting

Excellent chipping resistance in interrupted face cutting of gear.

Comparison in Continuous Machining of AISI No 35 B



<Cutting Conditions>

Work Material : AISI No 35 B (Pearlite)
 Insert : NP-TNGA332-SF3
 Cutting Speed : $vc=2625$ SFM
 Feed : $f=.004$ IPR
 Depth of Cut : $ap=.008$ inch
 Cutting Mode : Dry Cutting

It has excellent fracture resistance as compared to conventional products.

SOLID CBN

Cast Iron Machining MBS140

FEATURES

Supports high-efficiency machining with large depths of cut.

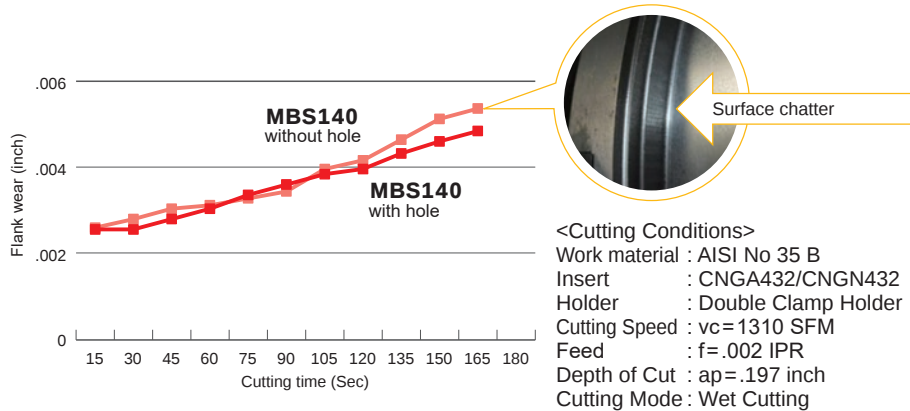
Since all inserts are CBN sintered bodies, there are no limits to the depths of cut as with CBN brazing tools, allowing machining with large depths of cut. For rough machining of cast iron, high-speed, high-efficiency machining, which is a characteristic of CBN tools, can be achieved.

Combines wear resistance and fracture resistance

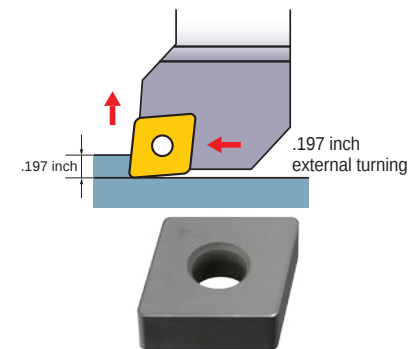
Use of micro-grain CBN with a newly-developed special binder provides high wear resistance.

Use of Mitsubishi's original high-efficiency sintering technology provides high fracture resistance and supports machining with large depths of cut.

CBN & PCD TURNING INSERTS



Addition of insert series equipped with holes
Comparison of depth of cut
 5mm face turning



CBN

FOR CYLINDER LINER MB5015

FEATURES

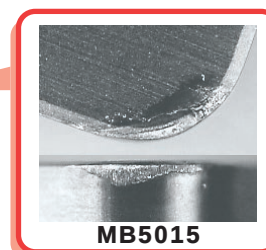
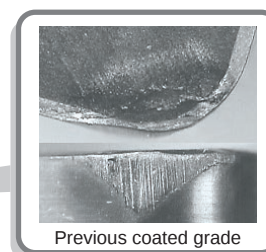
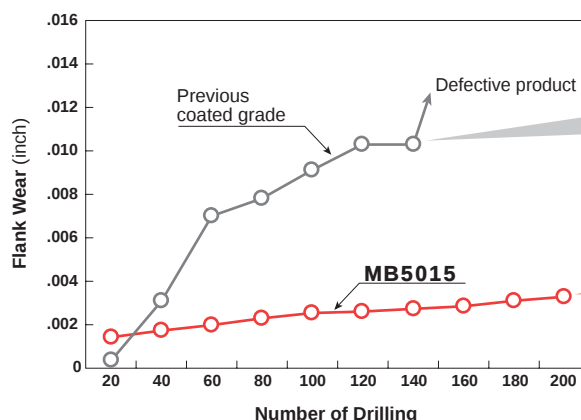
★Produce to order only.

MB5015 is exclusive grade for boring of Centrifugal casting Cylinder liners in semi finishing or finishing applications with high wear resistance.

Recommended Cutting Conditions

Work Material	Cutting Mode	Cutting Speed vc (SFM)				Feed f (IPR)	Depth of Cut ap (inch)	Cutting Mode
		330	1640	3280	4920			
Centrifugal casting	Cast Iron					-.012(Finishing)	-.002(Finishing)	Wet Cutting
						-.031(Semi-finishing)	-.008(Semi-finishing)	

Cutting Performance



<Cutting Conditions>

Work material : AISI No 30 B
 (Centrifugal casting) $\phi 2.48$ "
 Cutting Speed : $vc=2625$ SFM
 Feed : $f=.014$ IPR
 Depth of Cut : $ap=.001$ inch
 Component : Centrifugal casting Cylinder liner
 Hole Depth : 3.94 inch

CBN

- Suitable for high speed finishing of heat treated steel, sintered ferrous alloy and cast iron.
- Low affinity to iron, thus good surface finishes are possible.
- Grinding can be replaced by machining.



● Heat Treated Steel

Work Material		Type	Cutting Mode	Recommended Grade	Recommended Cutting Conditions			
					Cutting Speed vc (SFM)	Feed f (IPR)	Depth of Cut ap (inch)	Cutting Mode
Structural Steel Esp. Carburized Steel High Alloy Steel	35–65 HRC	Coated	High speed finishing cutting	BC8105	820 (330–1150)	≤.006	≤.008	Dry, Wet
			Continuous cutting for general purpose	BC8110	655 (330–985)	≤.008	≤.014	Dry, Wet
				BC8120	655 (330–755)	≤.012	≤.031	Dry, Wet
			Medium interrupted cutting	BC8120	490 (195–655)	≤.008	≤.012	Dry, Wet
		Non-coated	Interrupted cutting	BC8130	390 (195–490)	≤.008	≤.012	Dry, Wet
			Continuous cutting for general purpose	NEW MB8110	655 (330–820)	≤.008	≤.012	Dry, Wet
				NEW MB8120	490 (260–720)	≤.008	≤.020	Dry, Wet
			Medium interrupted cutting	NEW MB8120	425 (280–590)	≤.008	≤.012	Dry, Wet
			Interrupted cutting	NEW MB8130	330 (195–490)	≤.008	≤.012	Dry, Wet

● Cast Iron

Work Material		Work Structure	Cutting Speed vc (SFM)					Feed f (IPR)	Depth of Cut ap (inch)	Cutting Mode
			820	1640	2460	3280	4100			
Gray Cast Iron	AISI No 35 B	Ferritic + Pearlitic	MBS140					–.020	–.039	Dry, Wet
	AISI No 45 B	Pearlitic	MB710 MB730 MB4120 NEW					–.016	–.020	Dry, Wet
Alloy Cast Iron		Pearlitic						–.016	–.020	Dry, Wet
Ductile Cast Iron	AISI 60-40-18	Ferritic	MB710					–.016	–.020	Dry, Wet
	AISI 100-70-03	Ferritic + Pearlitic	MB730					–.016	–.020	Dry, Wet

● Sintered Alloy

Work Material	Recommended Grade	Recommended Cutting Conditions		
		Cutting Speed vc (SFM)	Feed f (IPR)	Depth of Cut ap (inch)
General Sintered Alloy	NEW MB4120	590 (260–985)	–.008	–.012
High Density Sintered Alloy	NEW MB4120	490 (260–755)	–.008	–.012
Sintered Alloy	NEW MB4120	425 (260–590)	–.008	–.012

● Valve Seat

Amount of Hard Particles	None or Small ←————→ Large			
Hardness of Workpiece (HV)	150	250	300	350
Plunge Cut	NEW MB4120, MB4020 MB825 MB835			
Traverse Cut	NEW MB4120, MB4020 MB710 MB825			

● Roll

Work Material	Grade	Recommended Cutting Conditions		
		Cutting Speed vc (SFM)	Feed f (IPR)	Depth of Cut ap (inch)
Cast Steel	MB8025	260 (100–425)	.012 (.004–.020)	.008–.118
Adamite Cast Steel				
Ductile Cast Iron	MB710	260 (100–425)	.012 (.004–.020)	.008–.118
Granular Cast Iron				
Chilled Cast Iron	MB8025	260 (100–425)	.012 (.004–.020)	.008–.118
High Chromium Steel				
High Alloy Steel	MB730	165 (65–230)	.010 (.004–.016)	.004–.118
High Speed Steel				
Cemented Carbide	MB730, MBS140	65 (30–100)	–.008	–.008

● Heat Resistant Alloy

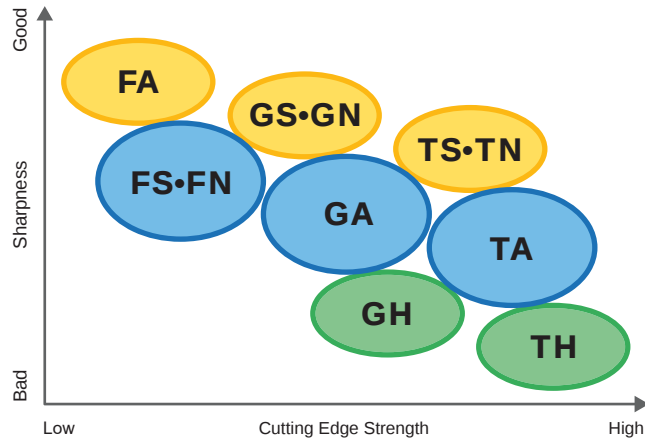
Work Material	Grade	Recommended Cutting Conditions		
		Cutting Speed vc (SFM)	Feed f (IPR)	Depth of Cut ap (inch)
Ni Base Heat Resistant Alloy (e.g. Inconel)	MB730, MB8025	390 (330–490)	–.008	–.020
Co Base Heat Resistant Alloy (e.g. Stellite)	MB730, MB8025	230 (165–330)	–.008	–.020

B

CBN & PCD TURNING INSERTS

HONING

Honing for Machining Hardened Steel



General cutting

- GA Honing : General machining
- GS Honing : Vibration and burr control
- GN Honing : If the crater wear is large.
- GH Honing : For depths of cut of .006 inch or greater

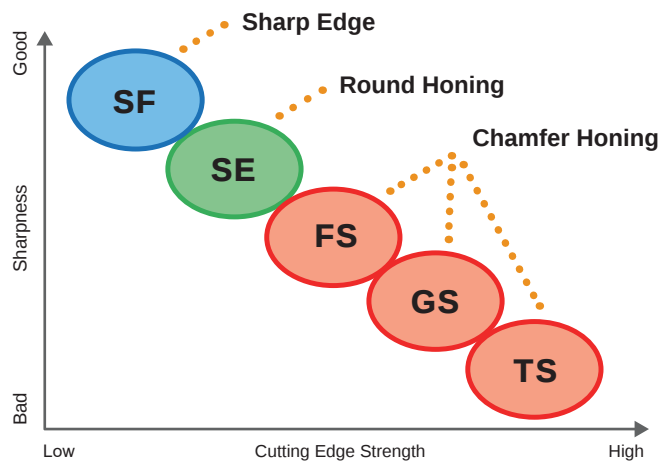
Continuous cutting, Stable cutting

- FS Honing : General machining
- FA Honing : For improved biting compared to FS
- FN Honing : if the crater wear is large.

Medium and heavy interrupted cutting, Unstable cutting

- TA Honing : General machining
- TS Honing : Vibration and burr control
- TN Honing : If the crater wear is large.
- TH Honing : For depths of cut of .006 inch or greater

Honing for Machining Sintered Alloys



Continuous cutting, Stable cutting

- FS Honing : Continuous cutting, General machining

Medium and heavy interrupted cutting, Unstable cutting

- GS, TS Honing : If fracturing occurs at the blade edge during interrupted cutting

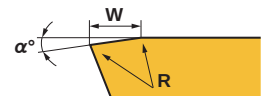
Focus on high-precision cutting, dimensional precision, and surface roughness

- SF Honing : Focus on finished surface roughness
- SE Honing : If chipping occurs

NP-CNGA432- **G** **A** 2

Main Application

Edge Honing Type



(inch)

	A			S			N			H			F			E		
	General			Vibration and burr control			Crater wear control			High efficiency			Focus on dimensional precision			Chipping control		
	α	W	R	α	W	R	α	W	R	α	W	R	α	W	R	α	W	R
F Continuous cutting	15°	.004	0	15°	.004	.0004	15°	.002	.0004	—	—	—	—	—	—	—	—	—
G General cutting	25°	.005	.0012	25°	.005	.0004	25°	.002	.0004	25°	.011	.0012	—	—	—	—	—	—
T Interrupted cutting	35°	.005	.0012	35°	.005	.0004	35°	.002	.0004	35°	.011	.0012	—	—	—	—	—	—
S High-precision cutting	—	—	—	—	—	—	—	—	—	—	—	—	0°	0	0	0°	0	.0004

Conventional honing shapes

F honing : .004 inch×15°+R0

G honing : .005 inch×25°+R.0012

T honing : .005 inch×35°+R.0012

CBN BREAKER INSERT

FEATURES

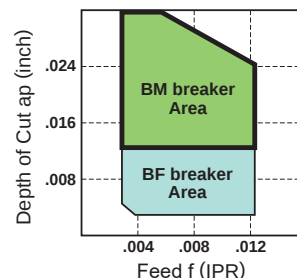
Chip Breaker Geometry Designed for Excellent Chip Control

Radial chip breaker ensures optimization of the cutting point and the chip breaker position. Enables effective chip discharge even when copy machining and prevents the chips from wrapping around the holder under finish cutting conditions.

Long Life Coated CBN Grade

Combination of Coating grade & Breaker, high efficiency and long tool life in wide variety of applications.

Application Area



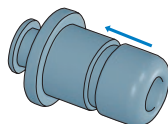
BM Breaker (Deep shoulder Turning) ●Cutting Performance



Good for deep depth cutting of carburized layer.

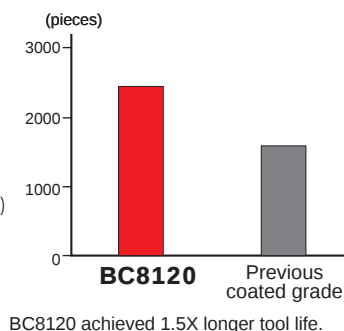
Recommend and under $a_p = .024$ inch

Available in BC8120 grade.

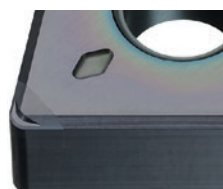


<Cutting Conditions>

Work Material : AISI 4142 (56-59HRC)
 Component : Counter shaft (External interrupted cutting)
 Insert : BM-DNGM442-TA2
 Cutting Speed : $v_c = 555$ SFM
 Feed : $f = .006$ IPR
 Depth of Cut : $a_p = .003 - .004$ inch
 Cutting Mode : Wet Cutting



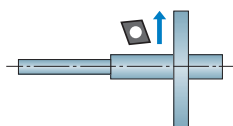
BF Breaker (Light cutting depth) ●Cutting Performance



Good for chip removal under light depth and feed cutting.

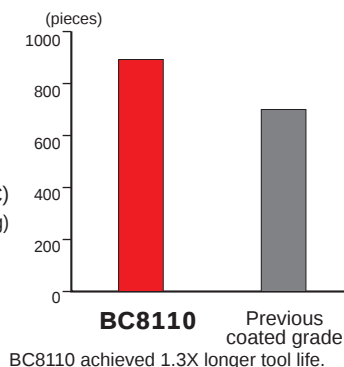
Recommend and under $a_p = .012$ inch

Available in BC8110 grade.



<Cutting Conditions>

Work Material : Hardened Steel (61-65HRC)
 Component : Clutch shaft (Continuous facing)
 Cutting Speed : $v_c = 490$ SFM
 Feed : $f = .005$ IPR
 Depth of Cut : $a_p = .006$ inch
 Wet Cutting



MULTI-CORNER TYPE INSERTS

●A single sided, multi-corner type insert has no cutting edges on the underside.

Double Sided, multi-corner type insert, ex.

NP-CNGA432-GA4

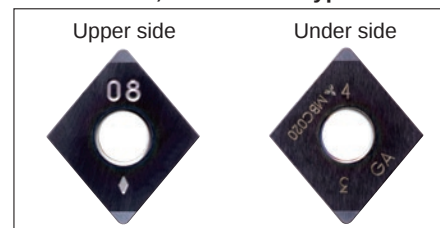
No. of Cutting Edge Corners 4

Single Sided, multi-corner type insert, ex.

NP-CNGA432-GA2

No. of Cutting Edge Corners 2

Double sided, Multi-corner type insert

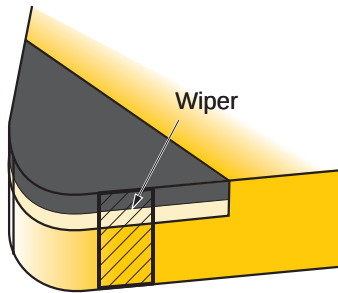


WIPER INSERT

FEATURES

B

CBN & PCD TURNING INSERTS



Improving Surface Finish

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

Improving Efficiency

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

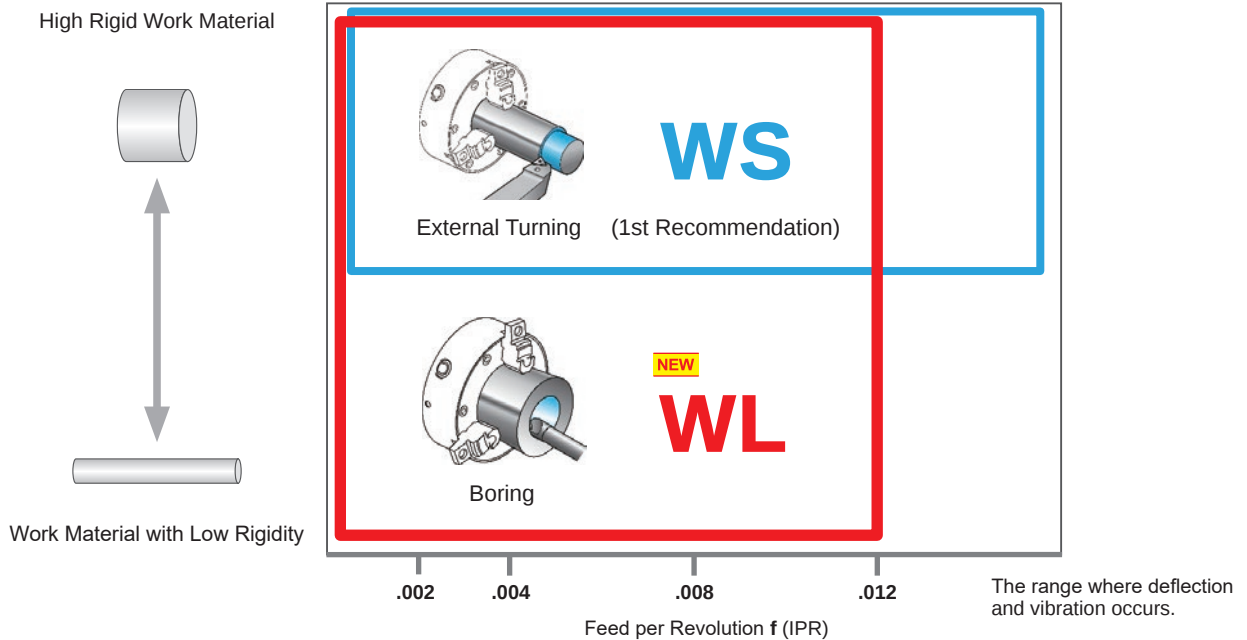
Increased Tool Life

When a change to 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 the tool life of the insert.

Improving Chip Control

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

Application of Wiper Inserts



NEW

WL Wiper Insert

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



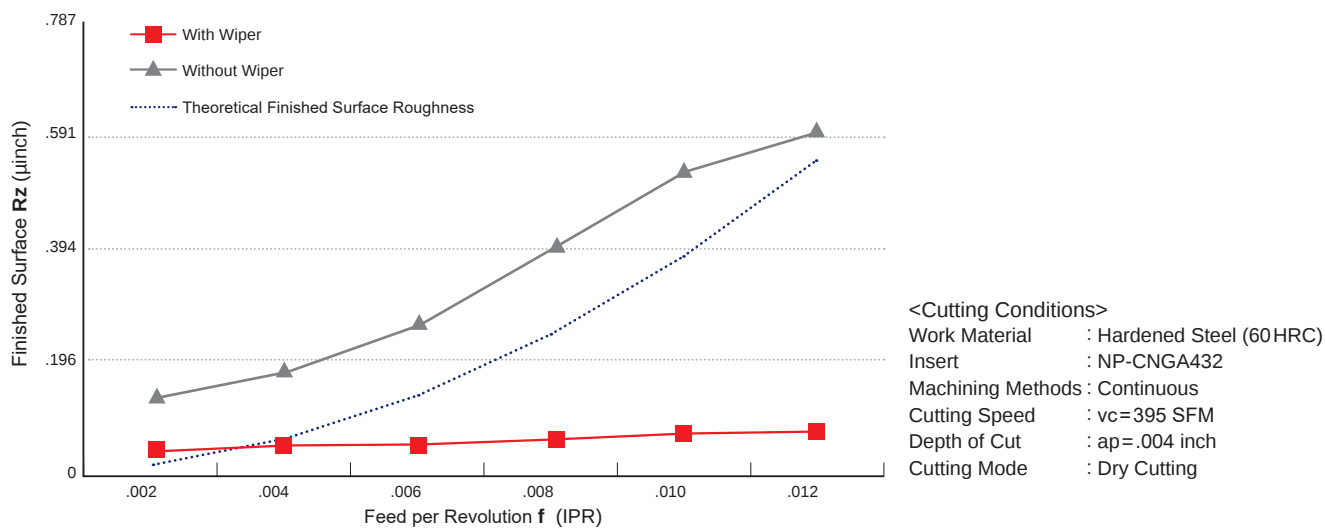
Inclination of the Wiper

The Optimum Wiper Width

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

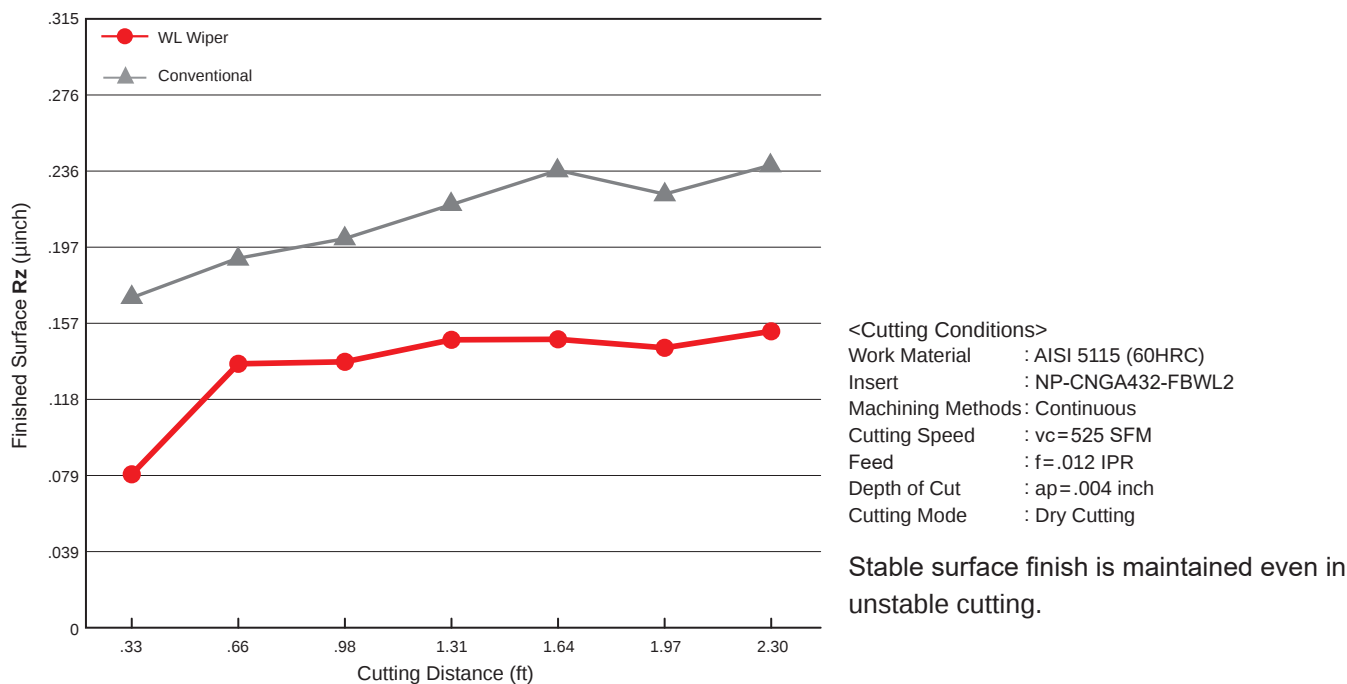
Cutting Performance

WL Wiper (External Turning)



NEW

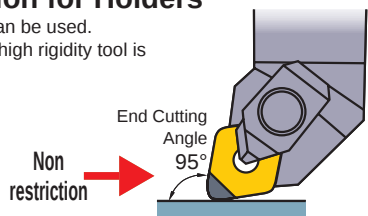
WL Wiper (Boring)



Notes for Use

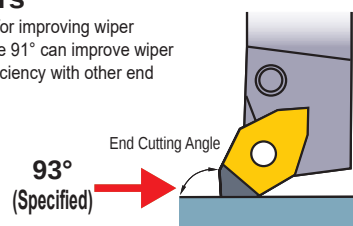
No Restriction for Holders

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



Restriction for Holders

Use a holder with end cutting angle 93° for improving wiper efficiency. A holder with end cutting angle 91° can improve wiper efficiency, however, there is no wiper efficiency with other end cutting angles (60° , 90° , 107° etc.).



CBN GROOVING SERIES

(GY/MG)

FEATURES

A CBN insert combined with a high rigidity holder ensures high accuracy and long tool life.

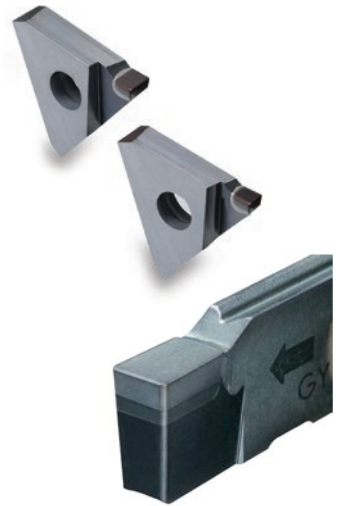
Holder rigidity is essential when grooving hardened steel. The GY series Tri Lock system offers high rigidity equivalent to a 1-piece type despite being a 2-piece type.

MG has a wide insert location face for high gripping force. A CBN insert combined with these holders allows it to deliver excellent performance when grooving hardened steel.

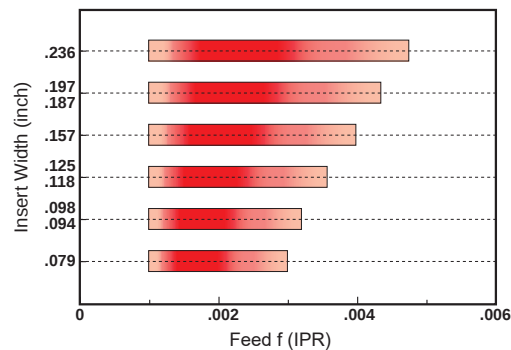
BC8110 coated materials for continuous machining of hardened steel have been added to GY inserts.

BC8110 materials with excellent wear resistance have been added. Compared to conventional materials, they display excellent wear resistance to achieve long tool life.

A blade width of .236" has also been added to the lineup of BC8110.



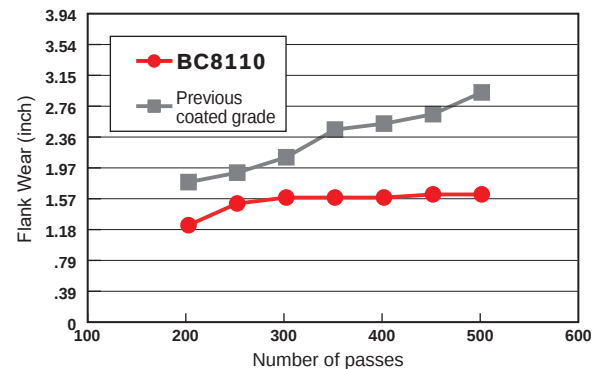
Recommended Cutting Conditions



Work Material	Hardness	Grade	Cutting Speed vc (SFM)	Cutting Mode
H Hardened Steel	35—65HRC	BC8110 MB8025	330 (195—395)	Dry, Wet

Cutting Performance

Tool life evaluation for the GY holder



<Cutting Conditions>

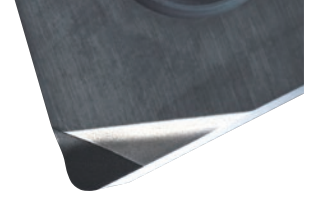
Insert : GY1G0200D020N-GFGS
 Work Material : Hardened Steel (60HRC)
 Cutting Speed : vc=395 SFM
 Feed : f=.004 IPR
 Depth of Cut : ap=.012 inch
 Cutting Mode : Dry Cutting

Application Example

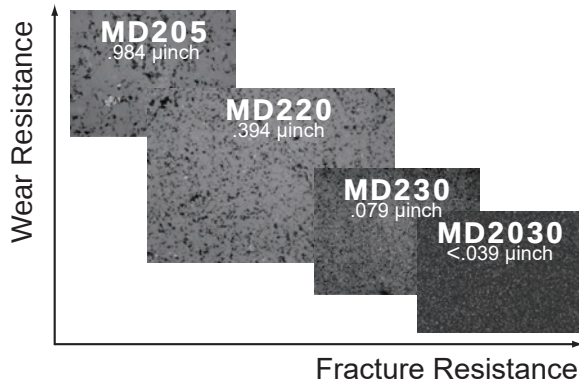
Insert		GY1G0300F020N-GFGS (Grade : BC8110)	
Work Material		 Hardened Steel (58—62HRC)	
Component		Input shaft	
Cutting Conditions	Cutting Speed vc (SFM)	425	
	Feed f (IPR)	.004	
Result		 BC8110 Previous coated grade Tool life over twice as long as conventional products	

PCD (SINTERED DIAMOND)

- Suitable for materials such as aluminum alloy, non-ferrous metals, and fibre strengthened plastic.
- Suitable for extremely high speed finishing.



FEATURES



Grade	Features
MD205	For Continuous Cutting Coarse grain diamond particles are sintered and wear resistance is excellent. Use when wear resistance with MD220 is insufficient.
MD220	Materials for General Machining Sintered medium grain diamond particles. Wear resistance and fracture resistance are superbly balanced. Applicable to general finishing of non-ferrous metals, non-metal cutting, and similar machining.
MD230	For Interrupted Cutting Fine grain diamond particles are used. Fracture resistance and cutting edge sharpness are excellent. Use when fracture and a high quality finished surface is demanded with MD220.
MD2030	For Heavy Interrupted Cutting Strong sintering of ultra micro-grain PCD particles provides exceptional fracture resistance. Chipping during high-speed finish turning can be controlled.

B

CBN & PCD TURNING INSERTS

SELECTION STANDARD

TURNING

Work Material	Recommended Grade			Recommended Cutting Conditions		
	MD205	MD220	MD2030	Cutting Speed v_c (SFM)	Feed f (IPR)	Depth of Cut a_p (inch)
Aluminum Alloy ($Si \leq 12\%$)		◎	○	2625 (655—3935)	— .008	— .039
Aluminum Alloy ($Si \geq 13\%$)	◎	○		1970 (655—3280)	— .008	— .039
Copper Alloy		◎		2295 (655—3935)	— .008	— .039
Strengthened Plastic		◎		1970 (330—3280)	— .016	— .039
Glass Fibre Reinforced Plastic		◎		1640 (330—2625)	— .010	— .039
Carbon	○	◎		1310 (330—1970)	— .012	— .039
Ceramics		○		165 (100—260)	— .004	— .039
Hard Rubber		◎		1970 (985—2625)	— .006	— .039
Wood Inorganic Board		◎		4265 (985—13120)	— .016	—
Cemented Carbide	◎	○		50 (15—65)	— .008	— .020

Note1) ◎ : 1st recommendation. ○ : 2nd recommendation

Note2) Not suitable for steel.

NEW PETIT CUT INSERT SERIES

- **Economical** Low cost is achieved by reducing the area of the diamond sintered body. In addition, tool management is economical because regrounding is unnecessary.
- **With Breaker** Chip breaker formed directly on the PCD portion delivers superior chip control.
- Corner R.002" inserts are available, making it suitable for the machining of small work corner radii.

CLASSIFICATION

NEGATIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type Double Sided	Flat Top		NP-CNGA_04  ➔ B028	NP-DNGA_04  ➔ B031	NP-SNGA_04  ➔ B035	NP-TNGA_06  ➔ B036	NP-VNGA_04  ➔ B038	NP-WNGA_06  ➔ B040
	Multi-corner Type Double Sided With Wiper	Flat Top		NP-CNGA_0WS4  ➔ B028					
	Multi-corner Type Double Sided With Breaker	BF		BF-CNGG_04  ➔ B028	BF-DNGG_04  ➔ B032				
	Multi-corner Type Single Sided	Flat Top		NP-CNGA_02  ➔ B029	NP-DNGA_02  ➔ B032	NP-SNGA_02  ➔ B035	NP-TNGA_03  ➔ B036	NP-VNGA_02  ➔ B038	NP-WNGA_03  ➔ B040
	Multi-corner Type Single Sided With Wiper	Flat Top		NP-CNGA_0W02  ➔ B029	NP-DNGA_0WS2JRL  ➔ B034				NP-WNGA_0WS3  ➔ B040
	Multi-corner Type Single Sided With Breaker	BF		BF-CNGM_02  ➔ B030	BF-DNGM_02  ➔ B034				
	Multi-corner Type Single Sided With Breaker	BM		BM-CNGM_02  ➔ B030	BM-DNGM_02  ➔ B034		BM-TNGM_03  ➔ B037		
	One-corner Type Single Sided With Breaker	R/L F		NP-CNMM_RF  ➔ B059	NP-DNMM_RF  ➔ B059	NP-SNMM_RF  ➔ B060	NP-TNMM_RF  ➔ B060	NP-VNMM_RF  ➔ B061	

NEGATIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
STANDARD	Multi-corner Type Double Sided	G Class	Flat Top 	 CNGA  ➔ B030		 SNGA  ➔ B035	 TNGA  ➔ B037		
	One-corner Type Single Sided		Flat Top 	CNGA  ➔ B030	DNGA  ➔ B059	SNGA  ➔ B035, B060	TNGA  ➔ B037, B060	VNGA  ➔ B039, B061	
	One-corner Type Single Sided	M Class	Flat Top 	CNMA  ➔ B059					

B

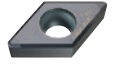
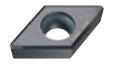
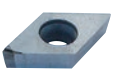
CBN & PCD TURNING INSERTS

5° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type	G Class	Flat Top 					NP-VBGW_02  ➔ B053	
	One-corner Type With Breaker		RF 					NP-VBGT_RF  ➔ B068	

CLASSIFICATION

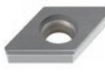
7° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80° 	Rhombic 55° 	Square 90° 	Triangular 60° 	Rhombic 35° 	Trigon 80° 
NEW PETIT CUT	Multi-corner Type	G Class	Flat Top 	NP-CCGW/B_02  ➔ B044	NP-DCGW_02  ➔ B048		NP-TCGW_03  ➔ B050	NP-VCGW_02  ➔ B054	NP-WCGW_03  ➔ B055
	Multi-corner Type With Wiper		Flat Top 	NP-CCGW_0W02  ➔ B045					
	Multi-corner Type With Breaker		BF 	BF-CCGT_02  ➔ B045	BF-DCGT_02  ➔ B049				
	Multi-corner Type With Breaker		BM 	BM-CCGT_02  ➔ B045	BM-DCGT_02  ➔ B049				
	One-corner Type		Flat Top 	NP-CCGW_0  ➔ B046					
	One-corner Type	M Class	Flat Top 	NP-CCMW  ➔ B063					
	One-corner Type With Breaker		Breaker 	NP-CCMH  ➔ B063					
	One-corner Type With Breaker	G Class	RF 					NP-VCGT_RF  ➔ B068	
	One-corner Type With Breaker	M Class	R/L F 		NP-DCMT_R/LF  ➔ B064				

B

CBN & PCD TURNING INSERTS

7° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
STANDARD	Multi-corner Type	G Class	Flat Top	CCGW	DCGW		TCGW		
				 ↻ B046	 ↻ B049		 ↻ B050		
	One-corner Type	G Class	Flat Top	CCGW	DCGW		TCGW		
				 ↻ B046	 ↻ B049		 ↻ B065		
	One-corner Type	M Class	Flat Top	CCMW	DCMW		TCMW		WCMW
				 ↻ B063	 ↻ B064		 ↻ B065		 ↻ B069

B

CBN & PCD TURNING INSERTS

11° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type	G Class	Flat Top	NP-CPGB_02			NP-TPGB_03		
				 ↻ B047			 ↻ B051		
	One-corner Type With Breaker	M Class	Breaker	NP-CPMH					
				 ↻ B063					
	One-corner Type With Breaker	M Class	R/L F				NP-TPMH_R/LF		
							 ↻ B066		
	One-corner Type With Breaker		R/L F				NP-TPMX_R/LF		
							 ↻ B066		

CLASSIFICATION

11° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
STANDARD	One-corner Type With Breaker	G Class	Breaker 	CPGT  ➔ B063					WPGT  ➔ B069
	One-corner Type		Flat Top 			SPGX  ➔ B064	TPGX  ➔ B052, B067		
	One-corner Type With Breaker		R/L F 				TPGT/IV_R/LF  ➔ B066, B067		

15° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 35°
FOR ALUMINUM	One-corner Type With Breaker	G Class	R/L 	VDGX_R/LF  ➔ B071

20° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 55°	Triangular 60°
FOR ALUMINUM	One-corner Type With Breaker	G Class	R/L 		TEGX_R/L  ➔ B070
	One-corner Type With Breaker		R/L F 	DEGX_R/LF  ➔ B070	
	One-corner Type		Flat Top 		TEGX  ➔ B070

NEGATIVE INSERTS WITHOUT HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Round
STANDARD	One-corner Type Single Sided	G Class	Flat Top			SNG	TNG	
					 ⊕ B042, B062	 ⊕ B043		
	Multi-corner Type Double Sided		Flat Top	CNG	DNG	SNG	TNG	RNG
				 ⊕ B041	 ⊕ B041	 ⊕ B042	 ⊕ B043	 ⊕ B042

5° POSITIVE INSERTS WITHOUT HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Triangular 60°	
STANDARD	Multi-corner Type	G Class	Flat Top	TBG	
				 ⊕ B057	

11° POSITIVE INSERTS WITHOUT HOLE

Product Name	Type	Tolerance	Breaker and Cross Section	Square 90°	Triangular 60°
STANDARD	One-corner Type	G Class	Flat Top	SPG	TPG
				 ⊕ B056, B072	 ⊕ B057, B072

CBN TURNING INSERTS [NEGATIVE]



NP-CNGA 4 3 1 FS4

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

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V

W

Work Material	H	Hardened Materials													
	K	Cast Iron													
	S	Heat-resistant Alloy, Titanium Alloy													
		Sintered Alloy													
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN					Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	MB8025	MB4120	
NEW PETIT CUT	NP-CNGA431-FS4	NP-CNGA120404FS4	.016	.075	●	★	★			●					C006 —009 E021 E024 H006 —008
	NP-CNGA432-FS4	NP-CNGA120408FS4	.031	.083	●	★	★			●					
	NP-CNGA433-FS4	NP-CNGA120412FS4	.047	.091	●	★	★			●					
	NP-CNGA431-GS4	NP-CNGA120404GS4	.016	.075	●	★									
	NP-CNGA432-GS4	NP-CNGA120408GS4	.031	.083	●	★									
	NP-CNGA433-GS4	NP-CNGA120412GS4	.047	.091	●	★									
	NP-CNGA431-GA4	NP-CNGA120404GA4	.016	.075			★	★	●	●					
	NP-CNGA432-GA4	NP-CNGA120408GA4	.031	.083			★	★	●	●					
	NP-CNGA433-GA4	NP-CNGA120412GA4	.047	.091			★	★	●	●					
	NP-CNGA431-GH4	NP-CNGA120404GH4	.016	.075	●	●	●								
	NP-CNGA432-GH4	NP-CNGA120408GH4	.031	.083	●	●	●								
	NP-CNGA433-GH4	NP-CNGA120412GH4	.047	.091	●	●	●								
	NP-CNGA431-TS4	NP-CNGA120404TS4	.016	.075	★										
	NP-CNGA432-TS4	NP-CNGA120408TS4	.031	.083	★										
	NP-CNGA433-TS4	NP-CNGA120412TS4	.047	.091	★										
	NP-CNGA431-TA4	NP-CNGA120404TA4	.016	.075			★	★	★	●	●				
	NP-CNGA432-TA4	NP-CNGA120408TA4	.031	.083			★	★	★	●	●				
	NP-CNGA433-TA4	NP-CNGA120412TA4	.047	.091			★	★	★	●	●				
	NP-CNGA431-TH4	NP-CNGA120404TH4	.016	.075		●	★			●					
	NP-CNGA432-TH4	NP-CNGA120408TH4	.031	.083		●	★			●					
	NP-CNGA433-TH4	NP-CNGA120412TH4	.047	.091		●	★			●					
	NP-CNGA431-GN4	NP-CNGA120404GN4	.016	.075					★						
	NP-CNGA432-GN4	NP-CNGA120408GN4	.031	.083					★						
	NP-CNGA433-GN4	NP-CNGA120412GN4	.047	.091					★						
NEW PETIT CUT * (With Wiper)	NP-CNGA431-FSWS4	NP-CNGA120404FSWS4	.016	.075	●	●	●			●					C006 —009 E021 E024 H006 —008
	NP-CNGA432-FSWS4	NP-CNGA120408FSWS4	.031	.083	●	●	●			●					
	NP-CNGA433-FSWS4	NP-CNGA120412FSWS4	.047	.091	●	●	●			●					
	NP-CNGA431-GAWS4	NP-CNGA120404GAWS4	.016	.075			★	★		●					
	NP-CNGA432-GAWS4	NP-CNGA120408GAWS4	.031	.083			★	★		●					
	NP-CNGA433-GAWS4	NP-CNGA120412GAWS4	.047	.091			★	★		●					
	NP-CNGA431-GSWS4	NP-CNGA120404GSWS4	.016	.075	●	★									
	NP-CNGA432-GSWS4	NP-CNGA120408GSWS4	.031	.083	●	★									
NEW PETIT CUT (With breaker)	BF-CNKG431-TA4	BF-CNKG120404TA4	.016	.075				★							C006 —009 E021 E024 H006 —008
	BF-CNKG432-TA4	BF-CNKG120408TA4	.031	.083				★							
	BF-CNKG433-TA4	BF-CNKG120412TA4	.047	.091				★							

★ Please refer to page B018 before using the wiper insert.

● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ✱ Unstable Cutting

Work Material	H	Hardened Materials																																																																																																																																																																						
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★ Please refer to page B018 before using the wiper insert.

● = NEW

IDENTIFICATION > B002
HONING > B016

B029

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

Size Thickness Corner Radius Honing & Wiper
★Please refer to page B002.



55°

DN TYPE INSERTS
WITH HOLE

NP-DNGA 4 3 1 FS4

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	H	Hardened Materials				
---------------	---	--------------------	--	--	--	--

C010
-012
E021
E024
H009
-011

● = NEW

IDENTIFICATION > B002
HONING > B016

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

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D

R

S

T

V

W

B031

CBN TURNING INSERTS [NEGATIVE]



55° DN TYPE INSERTS WITH HOLE

NP-DNGA 4 3 1 GN4

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials				
---------------	---	--------------------	--	--	--	--

● = NEW

Cutting Conditions : ● Stable Cutting

General Cutting

Unstable Cutting



C010
-012
E021
E024
H009
-011

● = NEW

IDENTIFICATION

HONING

➤ B002

➤ B016

B033

B

CBN & PCD TURNING INSERTS

NEG

WITH
HOLE

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55° DN TYPE INSERTS WITH HOLE

Size Thickness Corner Radius Honing & Wiper
★Please refer to page B002.

CBN

B

CBN & PCD TURNING INSERTS

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* Please refer to page B018 before using the wiper insert.

● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	H	Hardened Materials											
	K	Cast Iron											
	S	Heat-resistant Alloy, Titanium Alloy											
		Sintered Alloy											
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN				Solid CBN	Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	
NEW PETIT CUT 	NP-SNGA431-GA4	NP-SNGA120404GA4	.016	.083					★				C014 -017 E022 E025
	NP-SNGA433-GA4	NP-SNGA120408GA4	.031	.091					★				
NEW PETIT CUT 	NP-SNGA431-FS2	NP-SNGA120404FS2	.016	.083							●	●	C014 -017 E022 E025
	NP-SNGA432-FS2	NP-SNGA120408FS2	.031	.091							●	●	
	NP-SNGA433-FS2	NP-SNGA120412FS2	.047	.098							●	●	
	NP-SNGA431-GS2	NP-SNGA120404GS2	.016	.083							●		
	NP-SNGA432-GS2	NP-SNGA120408GS2	.031	.091							●	●	
	NP-SNGA433-GS2	NP-SNGA120412GS2	.047	.098							●	●	
	NP-SNGA431-GA2	NP-SNGA120404GA2	.016	.083					●				
	NP-SNGA432-GA2	NP-SNGA120408GA2	.031	.091		●	●	●		●			
	NP-SNGA433-GA2	NP-SNGA120412GA2	.047	.098		●	●	●		●			
	NP-SNGA431-TS2	NP-SNGA120404TS2	.016	.083							●	●	
	NP-SNGA432-TS2	NP-SNGA120408TS2	.031	.091							●	●	
	NP-SNGA433-TS2	NP-SNGA120412TS2	.047	.098							●	●	
	NP-SNGA431-SF2	NP-SNGA120404SF2	.016	.083							●	●	
	NP-SNGA432-SF2	NP-SNGA120408SF2	.031	.091							●	●	
	NP-SNGA433-SF2	NP-SNGA120412SF2	.047	.098							●	●	
	NP-SNGA431-SE2	NP-SNGA120404SE2	.016	.083							●	●	
	NP-SNGA432-SE2	NP-SNGA120408SE2	.031	.091							●	●	
	NP-SNGA433-SE2	NP-SNGA120412SE2	.047	.098							●	●	
	SNGA432	SNGA120408	.031	.161								●	C014 -017 E022 E025
	SNGA433	SNGA120412	.047	.161								●	
	SNGA432	SNGA120408	.031	.465								●	C014 -017 E022 E025
	SNGA433	SNGA120412	.047	.449								●	

● = NEW

CBN

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CBN & PCD TURNING INSERTS

NEG

WITH HOLE

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CBN TURNING INSERTS [NEGATIVE]



60° TN TYPE INSERTS WITH HOLE

NP-TNGA 3 3 1 FS6

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials													
	K	Cast Iron													
Shape	S	Heat-resistant Alloy, Titanium Alloy													
		Sintered Alloy													
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN				CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	MB8025	NEW MB4120	
NEW PETIT CUT	NP-TNGA331-FS6	NP-TNGA160404FS6	.016	.063	●	★	★			●					C018 -023 E022 E025
	NP-TNGA332-FS6	NP-TNGA160408FS6	.031	.071	●	★	★			●					
	NP-TNGA333-FS6	NP-TNGA160412FS6	.047	.075	●	★	★			●					
	NP-TNGA331-GS6	NP-TNGA160404GS6	.016	.063	●	★									
	NP-TNGA332-GS6	NP-TNGA160408GS6	.031	.071	●	★									
	NP-TNGA333-GS6	NP-TNGA160412GS6	.047	.075	●	★									
	NP-TNGA331-GA6	NP-TNGA160404GA6	.016	.063			★	★	●	●					
	NP-TNGA332-GA6	NP-TNGA160408GA6	.031	.071			★	★	●	●					
	NP-TNGA333-GA6	NP-TNGA160412GA6	.047	.075			★	★	●	●					
	NP-TNGA331-GH6	NP-TNGA160404GH6	.016	.063	●	●	●								
	NP-TNGA332-GH6	NP-TNGA160408GH6	.031	.071	●	●	●								
	NP-TNGA333-GH6	NP-TNGA160412GH6	.047	.075	●	●	●								
	NP-TNGA331-TS6	NP-TNGA160404TS6	.016	.063	★										
	NP-TNGA332-TS6	NP-TNGA160408TS6	.031	.071	★										
	NP-TNGA333-TS6	NP-TNGA160412TS6	.047	.075	★										
	NP-TNGA331-TA6	NP-TNGA160404TA6	.016	.063			★	★	★	●	●				
	NP-TNGA332-TA6	NP-TNGA160408TA6	.031	.071			★	★	★	●	●				
	NP-TNGA333-TA6	NP-TNGA160412TA6	.047	.075			★	★	★	●	●				
	NP-TNGA331-TH6	NP-TNGA160404TH6	.016	.063		●	★			●					
	NP-TNGA332-TH6	NP-TNGA160408TH6	.031	.071		●	★			●					
	NP-TNGA333-TH6	NP-TNGA160412TH6	.047	.075		●	★			●					
NEW PETIT CUT	NP-TNGA331-GN6	NP-TNGA160404GN6	.016	.063					★						C018 -023 E022 E025
	NP-TNGA332-GN6	NP-TNGA160408GN6	.031	.071					★						
	NP-TNGA333-GN6	NP-TNGA160412GN6	.047	.075					★						
	NP-TNGA330.5-FS3	NP-TNGA160402FS3	.008	.059		●				●					
	NP-TNGA331-FS3	NP-TNGA160404FS3	.016	.063	●	●	●			●		●	●		
	NP-TNGA332-FS3	NP-TNGA160408FS3	.031	.071	●	●	●			●		●	●		
	NP-TNGA333-FS3	NP-TNGA160412FS3	.047	.075	●	●	●			●		●	●		
	NP-TNGA330.5-GS3	NP-TNGA160402GS3	.008	.059		●									
	NP-TNGA331-GS3	NP-TNGA160404GS3	.016	.063	●	●						●	●	●	
	NP-TNGA332-GS3	NP-TNGA160408GS3	.031	.071	●	●						●	●	●	
	NP-TNGA333-GS3	NP-TNGA160412GS3	.047	.075	●	●						●	●	●	
	NP-TNGA330.5-GA3	NP-TNGA160402GA3	.008	.059			●	●		●					
	NP-TNGA331-GA3	NP-TNGA160404GA3	.016	.063			●	●	●	●		●			
	NP-TNGA332-GA3	NP-TNGA160408GA3	.031	.071			●	●	●	●		●			
	NP-TNGA333-GA3	NP-TNGA160412GA3	.047	.075			●	●	●	●		●			
	NP-TNGA331-GH3	NP-TNGA160404GH3	.016	.063	●	●	●								
	NP-TNGA332-GH3	NP-TNGA160408GH3	.031	.071	●	●	●								
	NP-TNGA333-GH3	NP-TNGA160412GH3	.047	.075	●	●	●								

● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials																																																																																																																																																																																																																																																																																																																																											
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● = NEW

IDENTIFICATION > B002
HONING > B016

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

B037

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	H	Hardened Materials				●	●	●	✱	●	●	●	✱	●								
	K	Cast Iron																	●	●	●	
	S	Heat-resistant Alloy, Titanium Alloy																	●	●	✱	
		Sintered Alloy																●	●			
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN				CBN						Solid CBN	Applicable Holder Page						
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	NEW MB8025	NEW MB4120	NEW MB4020		MB710	MB730	MBS140			
	NP-VNGA331-TA2	NP-VNGA160404TA2	.016	.098		●	●			●		●									C024 C025 E023 E026	
	NP-VNGA332-TA2	NP-VNGA160408TA2	.031	.079		●	●			●		●										
	NP-VNGA333-TA2	NP-VNGA160412TA2	.047	.063		●	●			●												
	NP-VNGA331-TH2	NP-VNGA160404TH2	.016	.098		●	●															
	NP-VNGA332-TH2	NP-VNGA160408TH2	.031	.079		●	●															
	NP-VNGA333-TH2	NP-VNGA160412TH2	.047	.063		●	●															
	NP-VNGA330.5-GN2	NP-VNGA160402GN2	.008	.098					●													
	NP-VNGA331-SF2	NP-VNGA160404SF2	.016	.098													●	●				
	NP-VNGA332-SF2	NP-VNGA160408SF2	.031	.079													●	●				
	NP-VNGA331-SE2	NP-VNGA160404SE2	.016	.098													●	●				
	NP-VNGA332-SE2	NP-VNGA160408SE2	.031	.079												●	●				C024 C025 E023 E026	
	VNGA332	VNGA160408	.031	.075												●						

● = NEW

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

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IDENTIFICATION > B002
HONING > B016

B039

80°

WN TYPE INSERTS WITH HOLE

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITH
HOLE

C

D

R

S

T

V

W

* Please refer to page B018 before using the wiper insert.

● = NEW

B040

● : USA Stock ★ : Stocked in Japan □ : Made to Order
 <1 insert in one case>

80° CN TYPE INSERTS WITHOUT HOLE

CNG 4 3 1
Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials												
	K	Cast Iron												
	S	Heat-resistant Alloy, Titanium Alloy												
		Sintered Alloy												
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	NEW MB8025	
	CNG431	CNGN120404	.016	.488										-
	CNG432	CNGN120408	.031	.488										
	CNG433	CNGN120412	.047	.488										

● = NEW

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITHOUT HOLE

C

D

R

S

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V

W

55° DN TYPE INSERTS WITHOUT HOLE

DNG 3 2 2
Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials												
	K	Cast Iron												
	S	Heat-resistant Alloy, Titanium Alloy												
		Sintered Alloy												
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	NEW MB8025	
	DNG322	DNGN110308	.031	.362										-
	DNG323	DNGN110312	.047	.362										

● = NEW

IDENTIFICATION > B002
HONING > B016

B041

CBN TURNING INSERTS [NEGATIVE]



RN TYPE INSERTS WITHOUT HOLE

RNG 3 2
Size Thickness

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITHOUT HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials				
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● = NEW



90° SNG TYPE INSERTS WITHOUT HOLE

SNG 3 2 2
Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials				<
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● = NEW



60° TN TYPE INSERTS WITHOUT HOLE

TNG 3 3 2

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	H	Hardened Materials												
	K	Cast Iron												
	S	Heat-resistant Alloy, Titanium Alloy												
		Sintered Alloy												
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN					Solid CBN	Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	MB8110	MB8120	MB8130	MB8025	
	TNG332	TNGN160408	.031	.567										●
	TNG333	TNGN160412	.047	.528										●
	TNG334	TNGN160416	.063	.492										●
	TNG331	TNGN160404	.016	.146										●
	TNG332	TNGN160408	.031	.134										●

● = NEW

CBN

B

CBN & PCD TURNING INSERTS

NEG

WITHOUT HOLE

C

D

R

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W

IDENTIFICATION > B002
HONING > B016

B043

CBN TURNING INSERTS [POSITIVE]



NP-CCGB 2 1.5 1 GA2

Size Thickness Corner Radius Honing & Wiper
★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POSI
7°

WITH
HOLE

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Work Material	H	Hardened Materials				</
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● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	H	Hardened Materials				<
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★ Please refer to page B018 before using the wiper insert.

● = NEW

CBN

B

CBN & PCD TURNING INSERTS

POSI
7°

WITH
HOLE

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IDENTIFICATION > B002
HONING > B016

B045

CBN TURNING INSERTS [POSITIVE]



NP-CCGW 03 S1 02 FS

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POS
7°

WITH
HOLE

C

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W

Work Material	H	Hardened Materials													
	K	Cast Iron													
	S	Heat-resistant Alloy, Titanium Alloy													
		Sintered Alloy													
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN					Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	NEW MB8025	NEW MB4120	
NEW PETIT CUT	*NP-CCGW03S102FS	NP-CCGW03S102FS	.008	.043	●					●					E012 E029
	*NP-CCGW03S104FS	NP-CCGW03S104FS	.016	.043	●					●		●			
	*NP-CCGW04T002FS	NP-CCGW04T002FS	.008	.059	●					●					
	*NP-CCGW04T004FS	NP-CCGW04T004FS	.016	.059	●					●		●			
	NP-CCGW03S102GS	NP-CCGW03S102GS	.008	.043	●										
	NP-CCGW03S104GS	NP-CCGW03S104GS	.016	.043	●										
	NP-CCGW04T002GS	NP-CCGW04T002GS	.008	.059	●										
	NP-CCGW04T004GS	NP-CCGW04T004GS	.016	.059	●										
	NP-CCGW03S102FA	NP-CCGW03S102FA	.008	.043								●			
	NP-CCGW04T002FA	NP-CCGW04T002FA	.008	.059								●			C030 D008 D012 E006 E012 E013 E040
	CCGW21.50.5FS	CCGW060202FS	.008	.240									★		
	CCGW21.51FS	CCGW060204FS	.016	.240									★		
	CCGW21.52FS	CCGW060208FS	.031	.240									★		
	CCGW32.51FS	CCGW09T304FS	.016	.240									★		
	CCGW32.52FS	CCGW09T308FS	.031	.240									★		C030 D008 D012 E012 E013 E040
	CCGW32.51	CCGW09T304	.016	.146							●				
	CCGW32.52	CCGW09T308	.031	.142							●				
	CCGW432	CCGW120408	.031	.142							●				

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

● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	H	Hardened Materials												
	K	Cast Iron												
	S	Heat-resistant Alloy, Titanium Alloy												
		Sintered Alloy												
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN			CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8025	NEW MB4120	
NEW PETIT CUT	NP-CPGB2.51.50.5-FS2	NP-CPGB080202FS2	.008	.071									●	E006 E041
	NP-CPGB2.51.51-FS2	NP-CPGB080204FS2	.016	.075	★								●	
	NP-CPGB2.51.52-FS2	NP-CPGB080208FS2	.031	.083	★								●	
	NP-CPGB320.5-FS2	NP-CPGB090302FS2	.008	.071	●	●							●	
	NP-CPGB321-FS2	NP-CPGB090304FS2	.016	.075	●	●							●	
	NP-CPGB322-FS2	NP-CPGB090308FS2	.031	.083	●	●							●	
	NP-CPGB323-FS2	NP-CPGB090312FS2	.047	.091		●								
	NP-CPGB2.51.51-GS2	NP-CPGB080204GS2	.016	.075	●	★								
	NP-CPGB2.51.52-GS2	NP-CPGB080208GS2	.031	.083	●	★								
	NP-CPGB320.5-GS2	NP-CPGB090302GS2	.008	.071	●	●								
	NP-CPGB321-GS2	NP-CPGB090304GS2	.016	.075	●	★								
	NP-CPGB322-GS2	NP-CPGB090308GS2	.031	.083	●	★								
	NP-CPGB2.51.51-GA2	NP-CPGB080204GA2	.016	.075		★	●	★						
	NP-CPGB2.51.52-GA2	NP-CPGB080208GA2	.031	.083		★	●	★						
	NP-CPGB2.51.53-GA2	NP-CPGB080212GA2	.047	.091		★	●							
	NP-CPGB320.5-GA2	NP-CPGB090302GA2	.008	.071		●								
	NP-CPGB321-GA2	NP-CPGB090304GA2	.016	.075		●	●	★			●			
	NP-CPGB322-GA2	NP-CPGB090308GA2	.031	.083		●	●	★						
	NP-CPGB323-GA2	NP-CPGB090312GA2	.047	.091		●	●							
	NP-CPGB2.51.51-TA2	NP-CPGB080204TA2	.016	.075		●								
	NP-CPGB2.51.52-TA2	NP-CPGB080208TA2	.031	.083		●								
	NP-CPGB2.51.53-TA2	NP-CPGB080212TA2	.047	.091		●								
	NP-CPGB321-TA2	NP-CPGB090304TA2	.016	.075		●	●							
	NP-CPGB322-TA2	NP-CPGB090308TA2	.031	.083		●	●							
	NP-CPGB323-TA2	NP-CPGB090312TA2	.047	.091		●	●							
	NP-CPGB2.51.50.5-SE2	NP-CPGB080202SE2	.008	.071									●	
	NP-CPGB2.51.51-SE2	NP-CPGB080204SE2	.016	.075									●	
	NP-CPGB320.5-SE2	NP-CPGB090302SE2	.008	.071									●	
	NP-CPGB321-SE2	NP-CPGB090304SE2	.016	.075									●	
	NP-CPGB322-SE2	NP-CPGB090308SE2	.031	.083									●	

● = NEW

CBN

B

CBN & PCD TURNING INSERTS

POSI 11°

WITH HOLE

C

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R

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W

CBN TURNING INSERTS [POSITIVE]



NP-DCGW 2 1.5 0.5 GA2

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POSITIVE
7°

WITH
HOLE

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Work Material	H	Hardened Materials																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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C031
C032
D009
D013
D039
D040
E008
E013
E014
E042
E043

● = NEW

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	H	Hardened Materials				<
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● = NEW

CBN

B

CBN & PCD TURNING INSERTS

POSI 7°

WITH HOLE

C

D

R

S

T

V

W

IDENTIFICATION > B002
HONING > B016

B049

CBN TURNING INSERTS [POSITIVE]



60° TC TYPE INSERTS WITH HOLE

NP-TCGW 1.8 1.5 0.5 GA3

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POSITIVE
7°

WITH
HOLE

C

D

R

S

T

V

W



Work Material	H	Hardened Materials				●	●	●	✱	●	●	✱	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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● = NEW

C035
E015
E016
E044

C035
E015
E016
E044

60° TP TYPE INSERTS WITH HOLE

NP-TPGB 1.5 1.5 1 GA3

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials				         	         	         	         	         	         	         	         	         	         	         	         	         
	K	Cast Iron																
	S	Heat-resistant Alloy, Titanium Alloy																
		Sintered Alloy																
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN		CBN				Solid CBN	Applicable Holder Page						
					BC8105 BC8110 BC8120 BC8130 MBC020	MB8110 NEW MB8120 MB8130 MB8025 NEW MB4120 MB4020 MB710 MB730 MBS140												
	NP-TPGB1.51.51-GA3	NP-TPGB080204GA3	.016	.063		●●			●				E007 E045					
	NP-TPGB1.51.52-GA3	NP-TPGB080208GA3	.031	.071		●●												
	NP-TPGB1.81.51-GA3	NP-TPGB090204GA3	.016	.063	★	●●	●	●										
	NP-TPGB1.81.52-GA3	NP-TPGB090208GA3	.031	.071	★	●●	●											
	NP-TPGB220.5-GA3	NP-TPGB110302GA3	.008	.059	★		●											
	NP-TPGB221-GA3	NP-TPGB110304GA3	.016	.063	★●★		●											
	NP-TPGB222-GA3	NP-TPGB110308GA3	.031	.071	★●★		●											
	NP-TPGB321-GA3	NP-TPGB160304GA3	.016	.063	★●★		●	●										
	NP-TPGB322-GA3	NP-TPGB160308GA3	.031	.071	★●★		●											
	NP-TPGB1.51.51-GS3	NP-TPGB080204GS3	.016	.063	●★													
	NP-TPGB1.51.52-GS3	NP-TPGB080208GS3	.031	.071	●★													
	NEW NP-TPGB1.81.50.5-GS3	NP-TPGB090202GS3	.008	.059					●									
	NP-TPGB1.81.51-GS3	NP-TPGB090204GS3	.016	.063	●★				●									
	NP-TPGB1.81.52-GS3	NP-TPGB090208GS3	.031	.071	●★													
	NP-TPGB220.5-GS3	NP-TPGB110302GS3	.008	.059	●●				●									
	NP-TPGB221-GS3	NP-TPGB110304GS3	.016	.063	●★				●									
	NP-TPGB222-GS3	NP-TPGB110308GS3	.031	.071	●★				●									
	NP-TPGB321-GS3	NP-TPGB160304GS3	.016	.063	●★													
	NP-TPGB322-GS3	NP-TPGB160308GS3	.031	.071	●★													
	NP-TPGB321-GH3	NP-TPGB160304GH3	.016	.063		●●●												
	NP-TPGB322-GH3	NP-TPGB160308GH3	.031	.071		●●●												
	NP-TPGB1.81.50.5-FS3	NP-TPGB090202FS3	.008	.059						●●								
	NP-TPGB1.81.51-FS3	NP-TPGB090204FS3	.016	.063						●●								
	NP-TPGB220.5-FS3	NP-TPGB110302FS3	.008	.059	●●		●		●●									
	NP-TPGB221-FS3	NP-TPGB110304FS3	.016	.063	●★★		●		●●									
	NP-TPGB222-FS3	NP-TPGB110308FS3	.031	.071	●★★		●		●●									
	NP-TPGB321-FS3	NP-TPGB160304FS3	.016	.063	★													
	NP-TPGB322-FS3	NP-TPGB160308FS3	.031	.071	★													
	NP-TPGB1.51.51-TA3	NP-TPGB080204TA3	.016	.063			●		●									
	NP-TPGB1.51.52-TA3	NP-TPGB080208TA3	.031	.071			●		●									
	NP-TPGB1.81.51-TA3	NP-TPGB090204TA3	.016	.063			●		●									
	NP-TPGB1.81.52-TA3	NP-TPGB090208TA3	.031	.071			●		●									
	NP-TPGB221-TA3	NP-TPGB110304TA3	.016	.063		★●		●●										
	NP-TPGB222-TA3	NP-TPGB110308TA3	.031	.071		★●		●●										
	NP-TPGB321-TA3	NP-TPGB160304TA3	.016	.063		★●		●●										
	NP-TPGB322-TA3	NP-TPGB160308TA3	.031	.071		★●		●●										

● = NEW

IDENTIFICATION	➤ B002
HONING	➤ B016

CBN

B

CBN & PCD TURNING INSERTS

POSI
11^oWITH
HOLE

C

D

R

S

T

V

W

B051

CBN TURNING INSERTS [POSITIVE]



60°

TP

TYPE INSERTS
WITH HOLE

NP-TPGB 3 2 1 TH3

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POS
11°

WITH
HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials											
	K	Cast Iron											
Shape	S	Heat-resistant Alloy, Titanium Alloy											
		Sintered Alloy											
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN		CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	
NEW PETIT CUT	NP-TPGB321-TH3	NP-TPGB160304TH3	.016	.063	●	●				●			E007 E045
	NP-TPGB322-TH3	NP-TPGB160308TH3	.031	.071	●	●				●			
	NP-TPGB1.81.50.5-SF3	NP-TPGB090202SF3	.008	.059							●	●	
	NP-TPGB1.81.51-SF3	NP-TPGB090204SF3	.016	.063							●	●	
	NP-TPGB220.5-SF3	NP-TPGB110302SF3	.008	.059							●	●	
	NP-TPGB221-SF3	NP-TPGB110304SF3	.016	.063							●	●	
	NP-TPGB222-SF3	NP-TPGB110308SF3	.031	.071							●	●	
	NP-TPGB1.81.50.5-SE3	NP-TPGB090202SE3	.008	.059							●	●	
	NP-TPGB1.81.51-SE3	NP-TPGB090204SE3	.016	.063							●	●	
	NP-TPGB220.5-SE3	NP-TPGB110302SE3	.008	.059							●	●	
	NP-TPGB221-SE3	NP-TPGB110304SE3	.016	.063							●	●	
	NP-TPGB222-SE3	NP-TPGB110308SE3	.031	.071							●	●	
	TPGX1.51.50.5	TPGX080202	.008	.075								★ ★	E007 E045
	TPGX1.51.51	TPGX080204	.016	.067								★ ★	
	TPGX1.81.50.5	TPGX080208	.031	.055								★ ★	
	TPGX1.81.51	TPGX090202	.008	.110								★ ★	
	TPGX221	TPGX090204	.016	.102								● ●	
	TPGX222	TPGX090208	.031	.091								● ●	
	TPGX321	TPGX110302	.008	.110								●	
	TPGX322	TPGX110304	.016	.102								●	

● = NEW



35° VB TYPE INSERTS WITH HOLE

NP-VBGW 2 2 0.5 GA2
 Size Thickness Corner Radius Honing & Wiper
 *Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	H	Hardened Materials				
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C028
C029
D010
D011
D014
D015
E009
E010
H013

CBN

B

CBN & PCD TURNING INSERTS

POSI
5°

WITH
HOLE

C

D

R

S

T

V

W

● = NEW

IDENTIFICATION

➤ B002

HONING

➤ B016

B053

CBN TURNING INSERTS [POSITIVE]



35°

VC TYPE INSERTS
WITH HOLE

NP-VCGW 3 3 1 GA2

Size Thickness Corner Radius Honing & Wiper
★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POS
7°

WITH
HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials													
	K	Cast Iron													
	S	Heat-resistant Alloy, Titanium Alloy													
		Sintered Alloy													
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN				CBN				Solid CBN		Applicable Holder Page
					BC8105	BC8110	BC8120	BC8130	MBC020	NEW MB8110	NEW MB8120	NEW MB8130	MB8025	MB4120	
NEW PETIT CUT	NP-VCGW331-GA2	NP-VCGW160404GA2	.016	.098		●	●	●							C036 E016 E017 E046
	NP-VCGW332-GA2	NP-VCGW160408GA2	.031	.079			●	●	●						
	NP-VCGW331-GS2	NP-VCGW160404GS2	.016	.098	●	●									
	NP-VCGW332-GS2	NP-VCGW160408GS2	.031	.079	●	●									
	NP-VCGW331-GH2	NP-VCGW160404GH2	.016	.098		●	●	●							
	NP-VCGW332-GH2	NP-VCGW160408GH2	.031	.079		●	●	●							
	NP-VCGW331-FS2	NP-VCGW160404FS2	.016	.098		●	●			●					
	NP-VCGW332-FS2	NP-VCGW160408FS2	.031	.079		●	●			●					
	NP-VCGW331-TA2	NP-VCGW160404TA2	.016	.098			●	●							
	NP-VCGW332-TA2	NP-VCGW160408TA2	.031	.079			●	●							
	NP-VCGW331-TS2	NP-VCGW160404TS2	.016	.098		●									
	NP-VCGW332-TS2	NP-VCGW160408TS2	.031	.079		●									
	NP-VCGW331-TH2	NP-VCGW160404TH2	.016	.098			●	●							
	NP-VCGW332-TH2	NP-VCGW160408TH2	.031	.079			●	●							

● = NEW



80° WC TYPE INSERTS WITH HOLE

NP-WCGW 1.5 1.5 0.5 GA3

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	H	Hardened Materials				
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● = NEW

CBN

B

CBN & PCD TURNING INSERTS

POSI 7°

WITH HOLE

C

D

R

S

T

V

W

IDENTIFICATION > B002
HONING > B016

B055

CBN TURNING INSERTS [POSITIVE]



90° SP TYPE INSERTS WITHOUT HOLE

SPG

3

2

1

Size

Thickness

Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting

● General Cutting

✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POS
11°

WITHOUT
HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials				●	●	●	●	
	K	Cast Iron						●	●	
	S	Heat-resistant Alloy, Titanium Alloy						●	●	
		Sintered Alloy							●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN	CBN				Applicable Holder Page
					MBC020	MB8025	MB710	MB730	MB4020	
	SPG321	SPGN090304	.016	.157			●			—
	SPG322	SPGN090308	.031	.161			●			
	SPG421	SPGN120304	.016	.157			●	★		
	SPG422	SPGN120308	.031	.161			●	★		

B056

● : USA Stock ★ : Stocked in Japan
<1 insert in one case>



60° TB TYPE INSERTS WITHOUT HOLE

TBG

1.2 1 1
Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials									
	K	Cast Iron									
	S	Heat-resistant Alloy, Titanium Alloy									
		Sintered Alloy									
Shape	Order Number		(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN	CBN				Applicable Holder Page
						MBC020	MB8025	MB710	MB730	MB4020	
	TBG1.211		TBGN060104	.016	.228			★			—
	TBG1.212		TBGN060108	.031	.189			★			

CBN

B

CBN & PCD TURNING INSERTS

POSI
5°
11°

WITHOUT HOLE

C

D

R

S

T

V

W



60° TP TYPE INSERTS WITHOUT HOLE

TPG

2 2 1
Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	H	Hardened Materials										
	K	Cast Iron										
	S	Heat-resistant Alloy, Titanium Alloy										
		Sintered Alloy										
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN	CBN				Applicable Holder Page		
					MBC020	MB8025	MB710	MB730	MB4020			
	TPG221	TPGN110304	.016	.102			●	●		—		
	TPG321	TPGN160304	.016	.146			●	●				
	TPG322	TPGN160308	.031	.134		●	●	●				

IDENTIFICATION > B002
HONING > B016

B057

CBN TURNING INSERTS [POSITIVE]

GY TYPE INSERTS WITHOUT HOLE

GY1G 0200 D 020 N GFGS

Size Thickness Corner Radius Honing & Wiper
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

CBN

B

CBN & PCD TURNING INSERTS

POS
7°

WITHOUT
HOLE

C

D

R

S

T

V

W

Work Material	H	Hardened Materials										
	K	Cast Iron										
	S	Heat-resistant Alloy, Titanium Alloy										
		Sintered Alloy										
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	Coated CBN	CBN					Applicable Holder Page	
					BC8110 MBC020	MB8025	MB710 MB730 MB4020					
	GY1G0200D020N-GFGS	GY1G0200D020N-GFGS	.008	.106							F012	
	GY1G0239E020N-GFGS	GY1G0239E020N-GFGS	.008	.106								
	GY1G0250E020N-GFGS	GY1G0250E020N-GFGS	.008	.106								
	GY1G0300F020N-GFGS	GY1G0300F020N-GFGS	.008	.106								
	GY1G0318F020N-GFGS	GY1G0318F020N-GFGS	.008	.106								
	GY1G0400G020N-GFGS	GY1G0400G020N-GFGS	.008	.106								
	GY1G0475H020N-GFGS	GY1G0475H020N-GFGS	.008	.106								
	GY1G0500H020N-GFGS	GY1G0500H020N-GFGS	.008	.106								
	GY1G0600J020N-GFGS	GY1G0600J020N-GFGS	.008	.106								

B058

● : USA Stock ★ : Stocked in Japan
<1 insert in one case>

PCD TURNING INSERTS [NEGATIVE]



NP-CNMM 4 3 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	N	Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page	
NEW PETIT CUT 	NP-CNMM430.5RF	NP-CNMM120402R-F	.008	.071	★	C006 -009 E021 E024 H006 -008	
	NP-CNMM431RF	NP-CNMM120404R-F	.016	.075	★		
	NP-CNMM432RF	NP-CNMM120408R-F	.031	.083	★		
	CNMA431	CNMA120404	.016	.146	★	C006 -009 E021 E024 H006 -008	
	CNMA432	CNMA120408	.031	.142	★		

PCD

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W



NP-DNMM 4 3 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	N	Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page	
NEW PETIT CUT 	NP-DNMM430.5RF	NP-DNMM150402R-F	.008	.059	★	C010 -012 E021 E024 H009 H010	
	NP-DNMM431RF	NP-DNMM150404R-F	.016	.059	★		
	NP-DNMM432RF	NP-DNMM150408R-F	.031	.067	★		
	DNMA431	DNMA150404	.016	.114	★	C010 -012 E021 E024 H009 -011	
	DNMA432	DNMA150408	.031	.098	★		

PCD TURNING INSERTS [NEGATIVE]



90° SN TYPE INSERTS WITH HOLE

NP-SNMM 4 3 1 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

PCD

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
NEW PETIT CUT 	NP-SNMM431RF	NP-SNMM120404R-F	.016	.083	★	C014 —017 E022 E025
	NP-SNMM432RF	NP-SNMM120408R-F	.031	.091	★	
	SNGA432	SNGA120408	.031	.150	★	C014 —017 E022 E025



60° TN TYPE INSERTS WITH HOLE

NP-TNMM 3 3 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
NEW PETIT CUT 	NP-TNMM330.5RF	NP-TNMM160402R-F	.008	.059	★	C018 —023 E022 E025
	NP-TNMM331RF	NP-TNMM160404R-F	.016	.063	★	
	NP-TNMM332RF	NP-TNMM160408R-F	.031	.071	★	
	TNGA330.5	TNGA160402	.008	.122	★	C018 —023 E022 E025
	TNGA331	TNGA160404	.016	.118	★	
	TNGA332	TNGA160408	.031	.110	★	

★ : Stocked in Japan
<1 insert in one case>



35° VN TYPE INSERTS WITH HOLE

NP-VNMM 3 3 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	NP-VNMM330.5RF	NP-VNMM160402R-F	.008	.051	★	C024 C025 E023 E026
	NP-VNMM331RF	NP-VNMM160404R-F	.016	.055	★	
	NP-VNMM332RF	NP-VNMM160408R-F	.031	.059	★	
	VNGA331	VNGA160404	.016	.102	★	C024 C025 E023 E026
	VNGA332	VNGA160408	.031	.071	★	

PCD

B

CBN & PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

PCD TURNING INSERTS [NEGATIVE]



90°

SN TYPE INSERTS WITHOUT HOLE

SNG

4

3

2

Size Thickness Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

PCD

B

CBN & PCD TURNING INSERTS

NEG

WITHOUT
HOLE

C

D

R

S

T

V

W

Work Material	Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	SNG432	SNGN120408	.031	.150	★	—

B062

● : USA Stock ★ : Stocked in Japan
<1 insert in one case>

PCD TURNING INSERTS [POSITIVE]

80° CC TYPE INSERTS WITH HOLE

NP-CCMH 2 1.5 0.5

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
NEW PETIT CUT	NP-CCMH21.50.5	NP-CCMH060202	.008	.071	●	C030
	NP-CCMH21.51	NP-CCMH060204	.016	.075	●	D008
						D012
						E006
						E012
						E013
						E040
NEW PETIT CUT	NP-CCMW03S102	NP-CCMW03S102	.008	.071	●	E012
	NP-CCMW03S104	NP-CCMW03S104	.016	.075	●	E029
	NP-CCMW04T002	NP-CCMW04T002	.008	.071	●	
	NP-CCMW04T004	NP-CCMW04T004	.016	.075	●	
	CCMW21.50.5	CCMW060202	.008	.114	●	C030
	CCMW21.51	CCMW060204	.016	.114	●	D008
	CCMW32.50.5	CCMW09T302	.008	.130	●	D012
	CCMW32.51	CCMW09T304	.016	.130	●	E006
						E012
						E013
						E040

PCD

B

CBN & PCD TURNING INSERTS

POSI 7° 11°

WITH HOLE

C

D

R

S

T

V

W

80° CP TYPE INSERTS WITH HOLE

NP-CPMH 2.5 1.5 0.5

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
NEW PETIT CUT	NP-CPMH2.51.50.5	NP-CPMH080202	.008	.071	●	E006
	NP-CPMH2.51.51	NP-CPMH080204	.016	.075	●	E041
	NP-CPMH320.5	NP-CPMH090302	.008	.071	●	
	NP-CPMH321	NP-CPMH090304	.016	.075	●	
	CPGT2.51.50.5	CPGT080202	.008	.146	●	E006
	CPGT2.51.51	CPGT080204	.016	.146	●	E041
	CPGT320.5	CPGT090302	.008	.130	●	
	CPGT321	CPGT090304	.016	.130	●	

PCD TURNING INSERTS [POSITIVE]

55° DC TYPE INSERTS WITH HOLE

NP-DCMT 2 1.5 0.5 RF
Size Thickness Corner Radius
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
NEW PETIT CUT 	NP-DCMT21.50.5RF	NP-DCMT070202R-F	.008	.059	●	C031
	NP-DCMT21.50.5LF	NP-DCMT070202L-F	.008	.059	●	C032
	NP-DCMT21.51RF	NP-DCMT070204R-F	.016	.059	●	D009
	NP-DCMT21.51LF	NP-DCMT070204L-F	.016	.059	●	D013
	NP-DCMT32.50.5RF	NP-DCMT11T302R-F	.008	.059	●	D039
	NP-DCMT32.50.5LF	NP-DCMT11T302L-F	.008	.059	●	D040
	NP-DCMT32.51RF	NP-DCMT11T304R-F	.016	.059	●	E008
	NP-DCMT32.51LF	NP-DCMT11T304L-F	.016	.059	●	E013
	DCMW21.50.5	DCMW070202	.008	.106	★	E014
	DCMW21.51	DCMW070204	.016	.102	●	E042
	DCMW32.50.5	DCMW11T302	.008	.118	●	E043
	DCMW32.51	DCMW11T304	.016	.114	●	

90° SP TYPE INSERTS WITH HOLE

SPGX 3 2 1
Size Thickness Corner Radius
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N	Non-Ferrous Metal				
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	SPGX321	SPGX090304	.016	.150	★	
	SPGX322	SPGX090308	.031	.150	★	



60° TC TYPE INSERTS WITH HOLE

TCMW 2 1.5 0.5

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD	Applicable Holder Page
	TCMW21.50.5	TCMW110202	.008	.110	●	C035 E015 E016 E044
	TCMW21.51	TCMW110204	.016	.102	★	
	TCGW1.210.5	TCGW060102	.008	.059	★	—
	TCGW1.211	TCGW060104	.016	.063	★	
	TCGW1.212	TCGW060108	.031	.055	★	

PCD

B

CBN & PCD TURNING INSERTS

POSI 7°

WITH HOLE

C

D

R

S

T

V

W

PCD TURNING INSERTS [POSITIVE]



60° TP TYPE INSERTS WITH HOLE

NP-TPMX 1.8 1.5 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✕ Unstable Cutting

PCD

B

CBN & PCD TURNING INSERTS

POS 11°

WITH HOLE

C

D

R

S

T

V

W

Work Material	N	Non-Ferrous Metal					●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220		Applicable Holder Page	
NEW PETIT CUT	NP-TPMX1.81.50.5RF	NP-TPMX090202R-F	.008	.059	★		E007 E045	
	NP-TPMX1.81.50.5LF	NP-TPMX090202L-F	.008	.059	★			
	NP-TPMX1.81.51LF	NP-TPMX090204L-F	.016	.063	★			
	NP-TPMX1.81.52LF	NP-TPMX090208L-F	.031	.063	★			
	NP-TPMX220.5LF	NP-TPMX110302L-F	.008	.059	★			
	NP-TPMX221LF	NP-TPMX110304L-F	.016	.063	★			
	NP-TPMX222LF	NP-TPMX110308L-F	.031	.071	★			
	NP-TPMX320.5LF	NP-TPMX160302L-F	.008	.059	★			
	NP-TPMX321LF	NP-TPMX160304L-F	.016	.063	★			
	NP-TPMX322LF	NP-TPMX160308L-F	.031	.071	★			
NEW PETIT CUT	NP-TPMH1.51.50.5RF	NP-TPMH080202R-F	.008	.059	●		E007 E045	
	NP-TPMH1.51.50.5LF	NP-TPMH080202L-F	.008	.059	●			
	NP-TPMH1.51.51RF	NP-TPMH080204R-F	.016	.063	●			
	NP-TPMH1.51.51LF	NP-TPMH080204L-F	.016	.063	●			
	NP-TPMH1.81.50.5RF	NP-TPMH090202R-F	.008	.059	●			
	NP-TPMH1.81.50.5LF	NP-TPMH090202L-F	.008	.059	●			
	NP-TPMH1.81.51RF	NP-TPMH090204R-F	.016	.063	●			
	NP-TPMH1.81.51LF	NP-TPMH090204L-F	.016	.063	●			
	NP-TPMH220.5RF	NP-TPMH110302R-F	.008	.059	●			
	NP-TPMH220.5LF	NP-TPMH110302L-F	.008	.059	●			
	NP-TPMH221RF	NP-TPMH110304R-F	.016	.063	●			
	NP-TPMH221LF	NP-TPMH110304L-F	.016	.063	●			
	NP-TPMH320.5RF	NP-TPMH160302R-F	.008	.059	★			
	NP-TPMH320.5LF	NP-TPMH160302L-F	.008	.059	★			
	NP-TPMH321RF	NP-TPMH160304R-F	.016	.063	★			
	NP-TPMH321LF	NP-TPMH160304L-F	.016	.063	★			
	TPGT320.5RF	TPGT160302R-F	.008	.122	★		—	
	TPGT320.5LF	TPGT160302L-F	.008	.122	★			
	TPGT321RF	TPGT160304R-F	.016	.118	★			
	TPGT321LF	TPGT160304L-F	.016	.118	★			

● : USA Stock ★ : Stocked in Japan
<1 insert in one case>

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	N Non-Ferrous Metal				●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	TPGV1.81.50.5RF	TPGV090202R-F	.008	.110	★	—
	TPGV1.81.50.5LF	TPGV090202L-F	.008	.110	★	
	TPGV1.81.51RF	TPGV090204R-F	.016	.102	★	
	TPGV1.81.51LF	TPGV090204L-F	.016	.102	★	
	TPGV220.5RF	TPGV110302R-F	.008	.110	★	
	TPGV220.5LF	TPGV110302L-F	.008	.110	★	
	TPGV221RF	TPGV110304R-F	.016	.102	★	
	TPGV221LF	TPGV110304L-F	.016	.102	★	
	TPGX1.51.50.5	TPGX080202	.008	.075	★	E007 E045
	TPGX1.51.51	TPGX080204	.016	.067	★	
	TPGX1.51.52	TPGX080208	.031	.055	★	
	TPGX1.81.50.5	TPGX090202	.008	.110	★	
	TPGX1.81.51	TPGX090204	.016	.102	★	
	TPGX1.81.52	TPGX090208	.031	.091	★	
	TPGX220.5	TPGX110302	.008	.110	★	
	TPGX221	TPGX110304	.016	.102	★	
	TPGX222	TPGX110308	.031	.091	★	
	TPGX321	TPGX160304	.016	.118	★	
	TPGX322	TPGX160308	.031	.106	★	

PCD

B

CBN & PCD TURNING INSERTS

POSI
11°

WITH
HOLE

C

D

R

S

T

V

W

PCD TURNING INSERTS [POSITIVE]



35° VB TYPE INSERTS WITH HOLE

NP-VBGT 2 2 V5 RF

Size Thickness Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

PCD

B

CBN & PCD TURNING INSERTS

POS
35°
7°

WITH
HOLE

C

D

R

S

T

V

W

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	NP-VBGT22V5RF	NP-VBGT1103V5R-F	.002	.102	★	C028
	NP-VBGT220.2RF	NP-VBGT110301R-F	.004	.102	★	C029
	NP-VBGT220.5RF	NP-VBGT110302R-F	.008	.098	★	D010
	NP-VBGT221RF	NP-VBGT110304R-F	.016	.098	★	D011
						D014
						D015
						E009
						E010



35° VC TYPE INSERTS WITH HOLE

NP-VC GT 1.5 1.5 V5 RF

Size Thickness Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	NP-VC GT1.51.5V5RF	NP-VC GT0802V5R-F	.002	.102	★	C036
	NP-VC GT1.51.50.2RF	NP-VC GT080201R-F	.004	.102	★	D011
	NP-VC GT1.51.50.5RF	NP-VC GT080202R-F	.008	.098	★	D015
	NP-VC GT1.51.51RF	NP-VC GT080204R-F	.016	.098	★	E009
	NP-VC GT22V5RF	NP-VC GT1103V5R-F	.002	.102	★	E010
	NP-VC GT220.2RF	NP-VC GT110301R-F	.004	.102	★	E016
	NP-VC GT220.5RF	NP-VC GT110302R-F	.008	.098	★	E017
	NP-VC GT221RF	NP-VC GT110304R-F	.016	.098	★	E046

★ : Stocked in Japan

<1 insert in one case>



80° WC TYPE INSERTS WITH HOLE

WCMW 1.5 1.5 0.5

Size Thickness Corner Radius
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	N	Non-Ferrous Metal				●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page	
	WCMW1.51.50.5	WCMWL30202	.008	.063	★	C037 E017 —020 E047	
	WCMW21.50.5	WCMW040202	.008	.114	★		
	WCMW32.51	WCMW06T304	.016	.118	★		

PCD

B

CBN & PCD TURNING INSERTS

POSI
7°
11°

WITH
HOLE

C

D

R

S

T

V

W



80° WP TYPE INSERTS WITH HOLE

WPGT 2 1.5 0.5

Size Thickness Corner Radius
*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	N	Non-Ferrous Metal				●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page	
	WPGT21.50.5	WPGT040202	.008	.114	★	E009	
	WPGT21.51	WPGT040204	.016	.114	★		
	WPGT320.5	WPGT060302	.008	.130	★		
	WPGT321	WPGT060304	.016	.130	★		

PCD TURNING INSERTS [POSITIVE]

55° DE TYPE INSERTS WITH HOLE

DEGX 4 3 0.5 RF

Size Thickness Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	DEGX430.5RF	DEGX150402R-F	.008	.118	★	C041
	DEGX430.5LF	DEGX150402L-F	.008	.118	★	
	DEGX431RF	DEGX150404R-F	.016	.114	★	
	DEGX431LF	DEGX150404L-F	.016	.114	★	

PCD

B

CBN & PCD TURNING INSERTS

POS 20°

WITH HOLE

C

D

R

S

T

V

W

60° TE TYPE INSERTS WITH HOLE

TEGX 3 2 0.5 R

Size Thickness Corner Radius

★Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✖ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	TEGX320.5R	TEGX160302R	.008	.150	★	C042 E028
	TEGX320.5L	TEGX160302L	.008	.150	★	
	TEGX321R	TEGX160304R	.016	.146	★	
	TEGX321L	TEGX160304L	.016	.146	★	
	TEGX320.5	TEGX160302	.008	.122	★	C042 E028
	TEGX321	TEGX160304	.016	.118	★	

★ : Stocked in Japan

<1 insert in one case>

B070



35°

VD TYPE INSERTS
WITH HOLE

VDGX 3 2 0.5 RF

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ✚ Unstable Cutting

Work Material	N Non-Ferrous Metal					●	
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page	
	VDGX320.5RF	VDGX160302R-F	.008	.122	★	C043	
	VDGX320.5LF	VDGX160302L-F	.008	.122	★		
	VDGX321RF	VDGX160304R-F	.016	.106	★		
	VDGX321LF	VDGX160304L-F	.016	.106	★		

PCD

B

CBN & PCD TURNING INSERTS

POSI
15°WITH
HOLE

C

D

R

S

T

V

W

PCD TURNING INSERTS [POSITIVE]



90° SP TYPE INSERTS WITHOUT HOLE

SPG 3 2 0.5

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

PCD

B

CBN & PCD TURNING INSERTS

POS
11°

WITHOUT
HOLE

C

D

R

S

T

V

W

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	SPG320.5	SPGN090302	.008	.150	★	—
	SPG321	SPGN090304	.016	.150	★	
	SPG322	SPGN090308	.031	.150	★	
	SPG421	SPGN120304	.016	.150	★	
	SPG422	SPGN120308	.031	.150	★	
	SPG423	SPGN120312	.047	.150	★	



60° TP TYPE INSERTS WITHOUT HOLE

TPG 2 2 0.5

Size Thickness Corner Radius

*Please refer to page B002.

Cutting Conditions : ● Stable Cutting ● General Cutting ⊕ Unstable Cutting

Work Material	N Non-Ferrous Metal					
Shape	Order Number	(ISO) Number	Corner Radius RE (inch)	Cutting Edge Effective Length LE (inch)	PCD MD220	Applicable Holder Page
	TPG220.5	TPGN110302	.008	.110	★	—
	TPG221	TPGN110304	.016	.102	★	
	TPG222	TPGN110308	.031	.091	★	
	TPG320.5	TPGN160302	.008	.122	★	
	TPG321	TPGN160304	.016	.118	★	
	TPG322	TPGN160308	.031	.106	★	

★ : Stocked in Japan

<1 insert in one case>

B072

IDENTIFICATION

> B002

