

CBN Grade for Sintered Alloy and Cast Iron

# MB4020

Series  
Expansion

**Prevents burr formation and stabilizes dimensional accuracy of finished components.**



# CBN Grade for Sintered Alloy and Cast Iron

# **MB4020**

**Increasing the CBN particle content and bonding strength makes it suitable for machining various sintered materials.**

## High Cutting Edge Strength

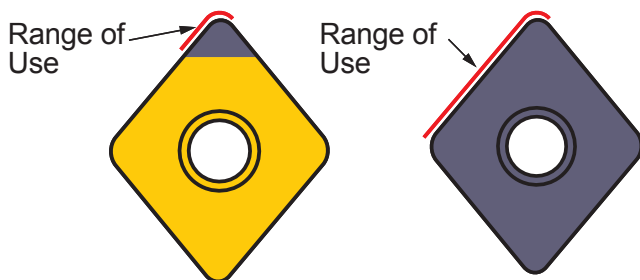
Special binder and the particle- activated sintering method promotes binding of the CBN particles, leading to higher cutting edge strength. MB4020 has high cutting edge strength properties for a sharper edge geometry that is ideal for preventing burrs.

## Excellent Welding Resistance

A chemically stable, high CBN content reduces welding of the work material on the cutting edge and stabilizes dimensional accuracy of finished components.

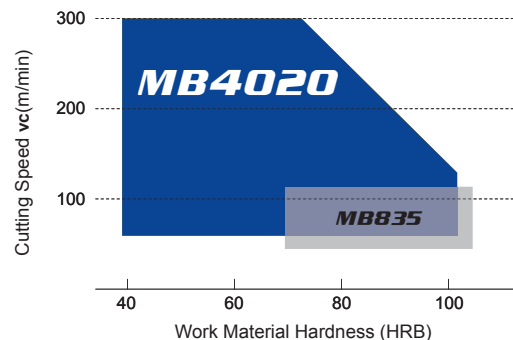
## Full Face CBN

Full face and solid CBN can be used for higher depths of cut and chamfering when conventional brazed tip CBN inserts are not suitable.



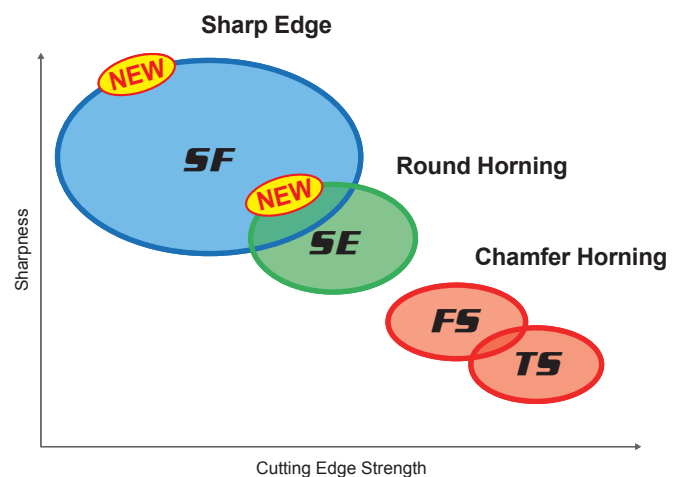
Refer to the cutting conditions on page 9 for the maximum recommended depth of cut.

## Application Range



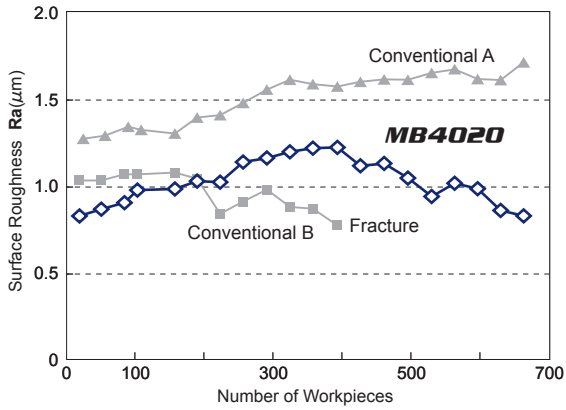
## A Wide Range of Honing Types

It controls the burr the increased sharpness and reduction of cutting resistance with characteristic on the Sharp edge SF. In addition, the improvement of the surface roughness provides the satisfied precision. The SF is thoroughly recommended. SE, FS, TS Honing cutting edge strength must be appropriately exchanged for the troubleshooting such as chipping.



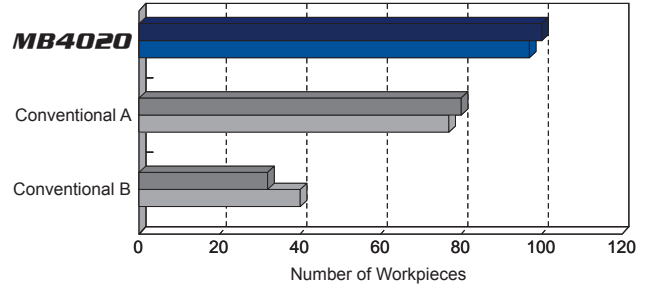
# Cutting Performance

## Continuous Machining of High Strength Sintered Alloys



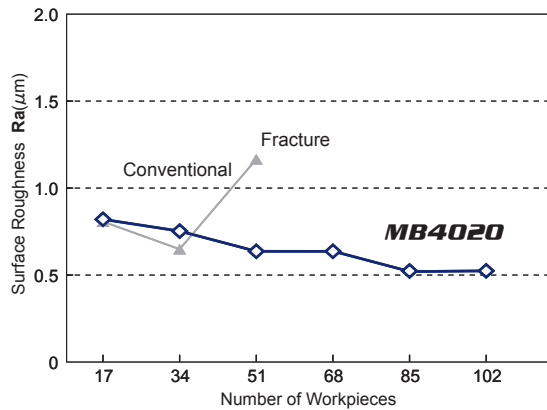
<Cutting Conditions>  
 Work Material : High Strength Sintered Alloys (75HRB)  
 Insert : NP-CNGA120408FS2  
 Cutting Speed : 190m/min  
 Feed Rate : 0.15mm/rev  
 Depth of Cut : 0.1mm  
 Cutting Mode : Wet Cutting

## Interrupted Machining of High Strength Sintered Alloys



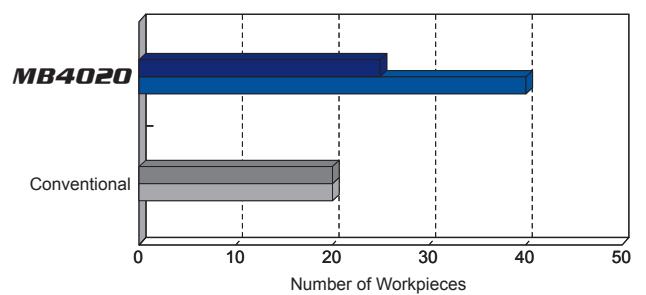
<Cutting Conditions>  
 Work Material : High Strength Sintered Alloys (75HRB)  
 Insert : NP-CNGA120408FS2  
 Cutting Speed : 190m/min  
 Feed Rate : 0.15mm/rev  
 Depth of Cut : 0.1mm  
 Cutting Mode : Wet Cutting

## Continuous Machining of Hardened Sintered Alloys



<Cutting Conditions>  
 Work Material : Hardened Sintered Alloys (40HRC)  
 Insert : NP-CNGA120408FS2  
 Cutting Speed : 100m/min  
 Feed Rate : 0.15mm/rev  
 Depth of Cut : 0.1mm  
 Cutting Mode : Wet Cutting

## Interrupted Machining of Hardened Sintered Alloys

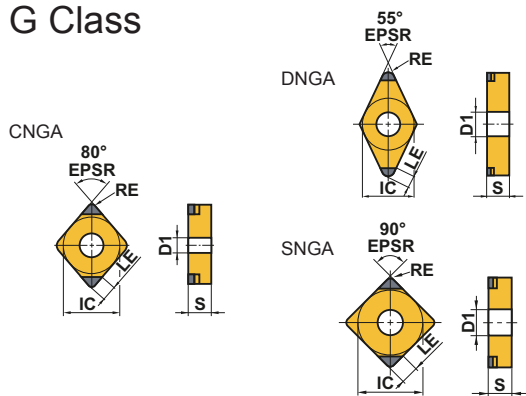


<Cutting Conditions>  
 Work Material : Hardened Sintered Alloys (40HRC)  
 Insert : NP-CNGA120408TS2  
 Cutting Speed : 100m/min  
 Feed Rate : 0.15mm/rev  
 Depth of Cut : 0.1mm  
 Cutting Mode : Wet Cutting

# CBN Grade for Sintered Alloy and Cast Iron

## Negative Inserts (With hole)

### G Class



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	
NP_002	NP_002	NP_002	

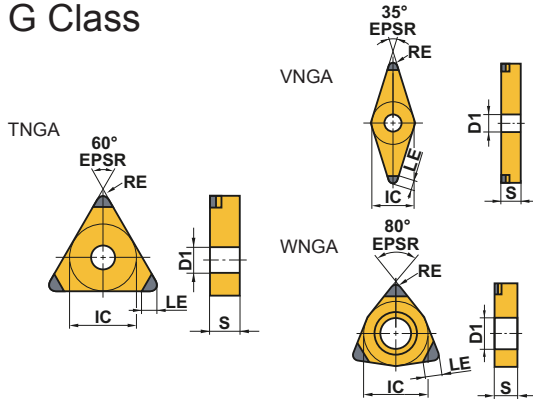
(mm)

Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
NEW NP-CNGA120404SF2	●	2	12.7	4.76	0.4	5.16	1.9
NEW NP-CNGA120408SF2	●	2	12.7	4.76	0.8	5.16	2.1
NEW NP-CNGA120412SF2	●	2	12.7	4.76	1.2	5.16	2.3
NEW NP-CNGA120404SE2	●	2	12.7	4.76	0.4	5.16	1.9
NEW NP-CNGA120408SE2	●	2	12.7	4.76	0.8	5.16	2.1
NEW NP-CNGA120412SE2	●	2	12.7	4.76	1.2	5.16	2.3
NP-CNGA120404GS2	●	2	12.7	4.76	0.4	5.16	1.9
NP-CNGA120408GS2	●	2	12.7	4.76	0.8	5.16	2.1
NP-CNGA120412GS2	●	2	12.7	4.76	1.2	5.16	2.3
NP-CNGA120404FS2	●	2	12.7	4.76	0.4	5.16	1.9
NP-CNGA120408FS2	●	2	12.7	4.76	0.8	5.16	2.1
NP-CNGA120412FS2	●	2	12.7	4.76	1.2	5.16	2.3
NP-CNGA120404TS2	●	2	12.7	4.76	0.4	5.16	1.9
NP-CNGA120408TS2	●	2	12.7	4.76	0.8	5.16	2.1
NP-CNGA120412TS2	●	2	12.7	4.76	1.2	5.16	2.3
NEW NP-DNGA150404SF2	●	2	12.7	4.76	0.4	5.16	2.1
NEW NP-DNGA150408SF2	●	2	12.7	4.76	0.8	5.16	2.0
NEW NP-DNGA150412SF2	●	2	12.7	4.76	1.2	5.16	1.9
NEW NP-DNGA150404SE2	●	2	12.7	4.76	0.4	5.16	2.1
NEW NP-DNGA150408SE2	●	2	12.7	4.76	0.8	5.16	2.0
NEW NP-DNGA150412SE2	●	2	12.7	4.76	1.2	5.16	1.9
NP-DNGA150404FS2	●	2	12.7	4.76	0.4	5.16	2.1
NP-DNGA150408FS2	●	2	12.7	4.76	0.8	5.16	2.0
NP-DNGA150412FS2	●	2	12.7	4.76	1.2	5.16	1.9
NP-DNGA150404TS2	●	2	12.7	4.76	0.4	5.16	2.1
NP-DNGA150408TS2	●	2	12.7	4.76	0.8	5.16	2.0
NP-DNGA150412TS2	●	2	12.7	4.76	1.2	5.16	1.9
NEW NP-SNGA120404SF2	●	2	12.7	4.76	0.4	5.16	2.1
NEW NP-SNGA120408SF2	●	2	12.7	4.76	0.8	5.16	2.3
NEW NP-SNGA120412SF2	●	2	12.7	4.76	1.2	5.16	2.5
NEW NP-SNGA120404SE2	●	2	12.7	4.76	0.4	5.16	2.1
NEW NP-SNGA120408SE2	●	2	12.7	4.76	0.8	5.16	2.3
NEW NP-SNGA120412SE2	●	2	12.7	4.76	1.2	5.16	2.5
NP-SNGA120404FS2	●	2	12.7	4.76	0.4	5.16	2.1
NP-SNGA120408FS2	●	2	12.7	4.76	0.8	5.16	2.3
NP-SNGA120412FS2	●	2	12.7	4.76	1.2	5.16	2.5
NP-SNGA120404TS2	●	2	12.7	4.76	0.4	5.16	2.1
NP-SNGA120408TS2	●	2	12.7	4.76	0.8	5.16	2.3
NP-SNGA120412TS2	●	2	12.7	4.76	1.2	5.16	2.5

● : Inventory maintained.

# Negative Inserts (With hole)

## G Class



NEW PETIT CUT	NEW PETIT CUT	NEW PETIT CUT	
NP_003	NP_002	NP_003	

(mm)

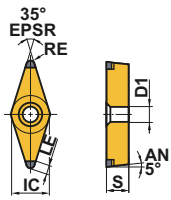
Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
NEW NP-TNGA160404SF3	●	3	9.525	4.76	0.4	3.81	1.6
NEW NP-TNGA160408SF3	●	3	9.525	4.76	0.8	3.81	1.8
NEW NP-TNGA160412SF3	●	3	9.525	4.76	1.2	3.81	1.9
NEW NP-TNGA160404SE3	●	3	9.525	4.76	0.4	3.81	1.6
NEW NP-TNGA160408SE3	●	3	9.525	4.76	0.8	3.81	1.8
NEW NP-TNGA160412SE3	●	3	9.525	4.76	1.2	3.81	1.9
NP-TNGA160404FS3	●	3	9.525	4.76	0.4	3.81	1.6
NP-TNGA160408FS3	●	3	9.525	4.76	0.8	3.81	1.8
NP-TNGA160412FS3	●	3	9.525	4.76	1.2	3.81	1.9
NP-TNGA160404TS3	●	3	9.525	4.76	0.4	3.81	1.6
NP-TNGA160408TS3	●	3	9.525	4.76	0.8	3.81	1.8
NP-TNGA160412TS3	●	3	9.525	4.76	1.2	3.81	1.9
NEW NP-VNGA160404SF2	●	2	9.525	4.76	0.4	3.81	2.5
NEW NP-VNGA160408SF2	●	2	9.525	4.76	0.8	3.81	2.0
NEW NP-VNGA160404SE2	●	2	9.525	4.76	0.4	3.81	2.5
NEW NP-VNGA160408SE2	●	2	9.525	4.76	0.8	3.81	2.0
NP-VNGA160404GS2	●	2	9.525	4.76	0.4	3.81	2.5
NP-VNGA160408GS2	●	2	9.525	4.76	0.8	3.81	2.0
NP-VNGA160404FS2	●	2	9.525	4.76	0.4	3.81	2.5
NP-VNGA160408FS2	●	2	9.525	4.76	0.8	3.81	2.0
NP-VNGA160404TS2	●	2	9.525	4.76	0.4	3.81	2.5
NP-VNGA160408TS2	●	2	9.525	4.76	0.8	3.81	2.0
NEW NP-WNGA080408SF3	●	3	12.7	4.76	0.8	5.16	2.1
NEW NP-WNGA080408SE3	●	3	12.7	4.76	0.8	5.16	2.1
NP-WNGA080408FS3	●	3	12.7	4.76	0.8	5.16	2.1
NP-WNGA080408TS3	●	3	12.7	4.76	0.8	5.16	2.1

# CBN Grade for Sintered Alloy and Cast Iron

## Positive Inserts (With hole)

### G Class

VBGW



NEW PETIT CUT			
NP_002			

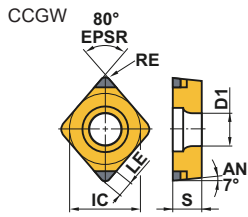
(mm)



Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
NEW NP-VBGW110304SF2	●	2	6.35	3.18	0.4	2.85	2.5
NEW NP-VBGW110308SF2	●	2	6.35	3.18	0.8	2.85	2.0
NEW NP-VBGW160404SF2	●	2	9.525	4.76	0.4	4.43	2.5
NEW NP-VBGW160408SF2	●	2	9.525	4.76	0.8	4.43	2.0
NEW NP-VBGW110304SE2	●	2	6.35	3.18	0.4	2.85	2.5
NEW NP-VBGW110308SE2	●	2	6.35	3.18	0.8	2.85	2.0
NEW NP-VBGW160404SE2	●	2	9.525	4.76	0.4	4.43	2.5
NEW NP-VBGW160408SE2	●	2	9.525	4.76	0.8	4.43	2.0
NP-VBGW110304FS2	●	2	6.35	3.18	0.4	2.85	2.5
NP-VBGW110308FS2	●	2	6.35	3.18	0.8	2.85	2.0
NP-VBGW160404FS2	●	2	9.525	4.76	0.4	4.43	2.5
NP-VBGW160408FS2	●	2	9.525	4.76	0.8	4.43	2.0
NP-VBGW110304TS2	●	2	6.35	3.18	0.4	2.85	2.5
NP-VBGW110308TS2	●	2	6.35	3.18	0.8	2.85	2.0
NP-VBGW160404TS2	●	2	9.525	4.76	0.4	4.43	2.5
NP-VBGW160408TS2	●	2	9.525	4.76	0.8	4.43	2.0

● : Inventory maintained.

# Positive Inserts (With hole)

## G Class



FULL FACE	NEW PETIT CUT		
CCGW_FS	NP_02		
			

(mm)

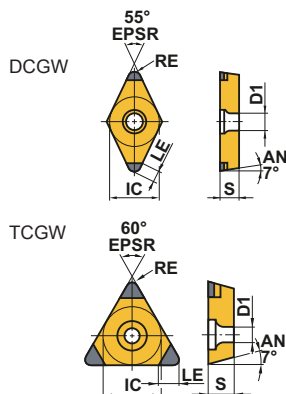
Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
CCGW060202FS	●	2	6.35	2.38	0.2	2.8	—
CCGW060204FS	●	2	6.35	2.38	0.4	2.8	—
CCGW060208FS	●	2	6.35	2.38	0.8	2.8	—
CCGW09T304FS	●	2	9.525	3.97	0.4	4.4	—
CCGW09T308FS	●	2	9.525	3.97	0.8	4.4	—
NEW NP-CCGW060202SF2	●	2	6.35	2.38	0.2	2.8	1.8
NEW NP-CCGW060204SF2	●	2	6.35	2.38	0.4	2.8	1.9
NEW NP-CCGW060208SF2	●	2	6.35	2.38	0.8	2.8	2.1
NEW NP-CCGW09T302SF2	●	2	9.525	3.97	0.2	4.4	1.8
NEW NP-CCGW09T304SF2	●	2	9.525	3.97	0.4	4.4	1.9
NEW NP-CCGW09T308SF2	●	2	9.525	3.97	0.8	4.4	2.1
NEW NP-CCGW060202SE2	●	2	6.35	2.38	0.2	2.8	1.8
NEW NP-CCGW060204SE2	●	2	6.35	2.38	0.4	2.8	1.9
NEW NP-CCGW060208SE2	●	2	6.35	2.38	0.8	2.8	2.1
NEW NP-CCGW09T302SE2	●	2	9.525	3.97	0.2	4.4	1.8
NEW NP-CCGW09T304SE2	●	2	9.525	3.97	0.4	4.4	1.9
NEW NP-CCGW09T308SE2	●	2	9.525	3.97	0.8	4.4	2.1
NP-CCGW060202FS2	●	2	6.35	2.38	0.2	2.8	1.8
NP-CCGW060204FS2	●	2	6.35	2.38	0.4	2.8	1.9
NP-CCGW060208FS2	●	2	6.35	2.38	0.8	2.8	2.1
NP-CCGW09T302FS2	●	2	9.525	3.97	0.2	4.4	1.8
NP-CCGW09T304FS2	●	2	9.525	3.97	0.4	4.4	1.9
NP-CCGW09T308FS2	●	2	9.525	3.97	0.8	4.4	2.1
NP-CCGW060202TS2	●	2	6.35	2.38	0.2	2.8	1.8
NP-CCGW060204TS2	●	2	6.35	2.38	0.4	2.8	1.9
NP-CCGW060208TS2	●	2	6.35	2.38	0.8	2.8	2.1
NP-CCGW09T302TS2	●	2	9.525	3.97	0.2	4.4	1.8
NP-CCGW09T304TS2	●	2	9.525	3.97	0.4	4.4	1.9
NP-CCGW09T308TS2	●	2	9.525	3.97	0.8	4.4	2.1



# CBN Grade for Sintered Alloy and Cast Iron

## Positive Inserts (With hole)

### G Class



FULL FACE	NEW PETIT CUT		
DCGW_FS	NP_02		
TCGW_FS	NP_03		

(mm)

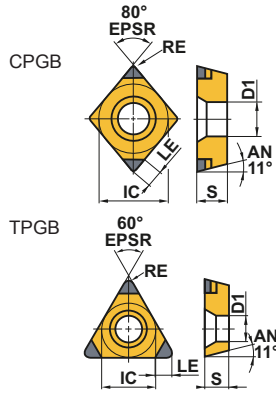
Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
DCGW070204FS	●	2	6.35	2.38	0.4	2.8	—
DCGW070208FS	●	2	6.35	2.38	0.8	2.8	—
NEW NP-DCGW070204SF2	●	2	6.35	2.38	0.4	2.8	2.1
NEW NP-DCGW070208SF2	●	2	6.35	2.38	0.8	2.8	2.0
NEW NP-DCGW11T302SF2	●	2	9.525	3.97	0.2	4.4	1.5
NEW NP-DCGW11T304SF2	●	2	9.525	3.97	0.4	4.4	2.1
NEW NP-DCGW11T308SF2	●	2	9.525	3.97	0.8	4.4	2.0
NEW NP-DCGW070204SE2	●	2	6.35	2.38	0.4	2.8	2.1
NEW NP-DCGW070208SE2	●	2	6.35	2.38	0.8	2.8	2.0
NEW NP-DCGW11T302SE2	●	2	9.525	3.97	0.2	4.4	1.5
NEW NP-DCGW11T304SE2	●	2	9.525	3.97	0.4	4.4	2.1
NEW NP-DCGW11T308SE2	●	2	9.525	3.97	0.8	4.4	2.0
NP-DCGW070204FS2	●	2	6.35	2.38	0.4	2.8	2.1
NP-DCGW070208FS2	●	2	6.35	2.38	0.8	2.8	2.0
NP-DCGW11T302FS2	●	2	9.525	3.97	0.2	4.4	1.5
NP-DCGW11T304FS2	●	2	9.525	3.97	0.4	4.4	2.1
NP-DCGW11T308FS2	●	2	9.525	3.97	0.8	4.4	2.0
NP-DCGW070204TS2	●	2	6.35	2.38	0.4	2.8	2.1
NP-DCGW070208TS2	●	2	6.35	2.38	0.8	2.8	2.0
NP-DCGW11T302TS2	●	2	9.525	3.97	0.2	4.4	1.5
NP-DCGW11T304TS2	●	2	9.525	3.97	0.4	4.4	2.1
NP-DCGW11T308TS2	●	2	9.525	3.97	0.8	4.4	2.0
TCGW090204FS	●	3	5.56	2.38	0.4	2.5	—
TCGW090208FS	●	3	5.56	2.38	0.8	2.5	—
TCGW110204FS	●	3	6.35	2.38	0.4	2.8	—
TCGW110208FS	●	3	6.35	2.38	0.8	2.8	—
NEW NP-TCGW110204SF3	●	3	6.35	2.38	0.4	2.8	2.1
NEW NP-TCGW110208SF3	●	3	6.35	2.38	0.8	2.8	2.0
NEW NP-TCGW110204SE3	●	3	6.35	2.38	0.4	2.8	2.1
NEW NP-TCGW110208SE3	●	3	6.35	2.38	0.8	2.8	2.0
NP-TCGW110204FS3	●	3	6.35	2.38	0.4	2.8	1.6
NP-TCGW110208FS3	●	3	6.35	2.38	0.8	2.8	1.8
NP-TCGW110204TS3	●	3	6.35	2.38	0.4	2.8	1.6
NP-TCGW110208TS3	●	3	6.35	2.38	0.8	2.8	1.8

● : Inventory maintained.



# Positive Inserts (With hole)

## G Class



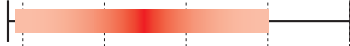
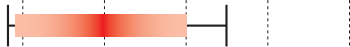

NEW PETIT CUT			
NP_002			
NEW PETIT CUT			
NP_003			

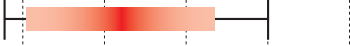
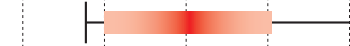
(mm)

Order Number	MB4020	Cutting Edges	IC	S	RE	D1	LE
NEW NP-CPGB080202SE2	●	2	7.94	2.38	0.2	3.5	1.8
NEW NP-CPGB080204SE2	●	2	7.94	2.38	0.4	3.5	1.9
NEW NP-CPGB090302SE2	●	2	9.525	3.18	0.2	4.5	1.8
NEW NP-CPGB090304SE2	●	2	9.525	3.18	0.4	4.5	1.9
NEW NP-CPGB090308SE2	●	2	9.525	3.18	0.8	4.5	2.1
NP-CPGB080202FS2	●	2	7.94	2.38	0.2	3.5	1.8
NP-CPGB080204FS2	●	2	7.94	2.38	0.4	3.5	1.9
NP-CPGB090302FS2	●	2	9.525	3.18	0.2	4.5	1.8
NP-CPGB090304FS2	●	2	9.525	3.18	0.4	4.5	1.9
NP-CPGB090308FS2	●	2	9.525	3.18	0.8	4.5	2.1
NEW NP-TPGB090202SF3	●	3	5.56	2.38	0.2	2.9	1.5
NEW NP-TPGB090204SF3	●	3	5.56	2.38	0.4	2.9	1.6
NEW NP-TPGB110302SF3	●	3	6.35	3.18	0.2	3.4	1.5
NEW NP-TPGB110304SF3	●	3	6.35	3.18	0.4	3.4	1.6
NEW NP-TPGB110308SF3	●	3	6.35	3.18	0.8	3.4	1.8
NEW NP-TPGB090202SE3	●	3	5.56	2.38	0.2	2.9	1.5
NEW NP-TPGB090204SE3	●	3	5.56	2.38	0.4	2.9	1.6
NEW NP-TPGB110302SE3	●	3	6.35	3.18	0.2	3.4	1.5
NEW NP-TPGB110304SE3	●	3	6.35	3.18	0.4	3.4	1.6
NEW NP-TPGB110308SE3	●	3	6.35	3.18	0.8	3.4	1.8
NP-TPGB090202FS3	●	3	5.56	2.38	0.2	2.9	1.5
NP-TPGB090204FS3	●	3	5.56	2.38	0.4	2.9	1.6
NP-TPGB110302FS3	●	3	6.35	3.18	0.2	3.4	1.5
NP-TPGB110304FS3	●	3	6.35	3.18	0.4	3.4	1.6
NP-TPGB110308FS3	●	3	6.35	3.18	0.8	3.4	1.8

# CBN Grade for Sintered Alloy and Cast Iron

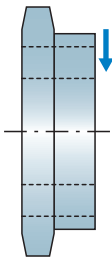
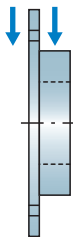
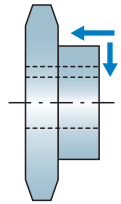
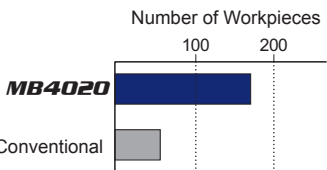
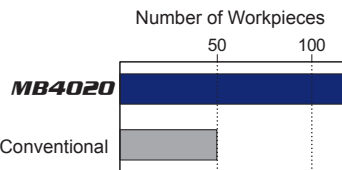
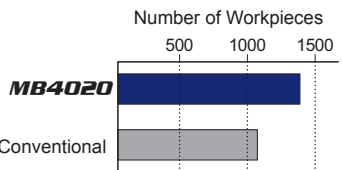
## Recommended Cutting Conditions

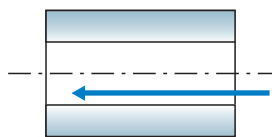
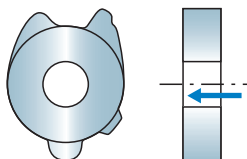
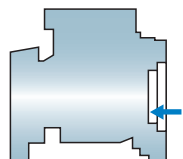
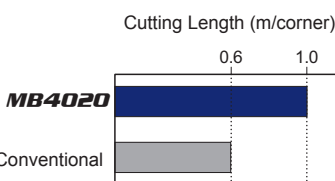
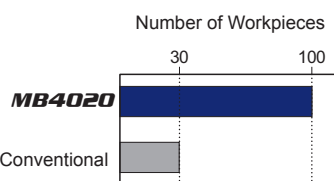
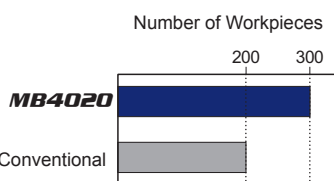
Work Material	Cutting Mode	Cutting Speed $v_c$ (m/min)					Feed Rate $f$ (mm/rev)	Depth of Cut $a_p$ (mm)	Coolant
		100	150	200	250	300			
General Sintered Alloy	Turning						$\leq 0.2$	$\leq 0.3$ ( $\leq 2.0$ )*	Dry, Wet
High-strength Sintered Alloy	Turning						$\leq 0.2$	$\leq 0.3$ ( $\leq 2.0$ )*	Dry, Wet
Hardened Sintered Alloy	Turning						$\leq 0.2$	$\leq 0.3$ ( $\leq 2.0$ )*	Dry, Wet

Work Material	Cutting Mode	Cutting Speed $v_c$ (m/min)					Feed Rate $f$ (mm/rev)	Depth of Cut $a_p$ (mm)	Coolant
		250	500	750	1000	1250			
Cast Iron	Turning						$\leq 0.4$	$\leq 0.5$ ( $\leq 2.0$ )*	Dry, Wet
	Milling						$\leq 0.15$	$\leq 0.5$ ( $\leq 2.0$ )*	Dry

\* Cutting Conditions for Full Face

## Application Examples

Insert		NP-TNGA160404TS3	NP-TNGA160408TS3	NP-CNGA120404FS2
Workpiece		Carburized and Quenched Alloy Interrupt Facing 	Carburized and Quenched Alloy Interrupted Machining of Flange End Faces 	General Sintered Alloy External Interrupted Facing 
Component		Variable Valve Parts	Variable Valve Parts	Sprocket Parts
Cutting Conditions	Cutting Speed (m/min)	140	110	150
	Feed Rate (mm/rev)	0.05	0.1	0.1-0.15
	Depth of Cut (mm)	0.15	0.05	0.2
Cutting Mode		Wet Cutting	Dry Cutting	Dry Cutting
Results		<p>Number of Workpieces</p>  <p>A conventional CBN insert reached the end of tool life after machining 50 parts due to burr formation. MB4020 enabled longer tool life by machining up to 170 parts.</p>	<p>Number of Workpieces</p>  <p>A conventional grade showed unstable tool life after machining 20 – 50 parts. MB4020 enabled stable machining with longer tool life of over 120 parts.</p>	<p>Number of Workpieces</p>  <p>MB4020 maintained a good surface finish after machining 1400 parts compared with only 1100 parts from a conventional grade.</p>

Insert		CCGW060204FS	CCGW09T304FS	CCGW060204FS
Workpiece		Internal Turning (G5 Hv1180) 	Internal Turning (AISI 65-45-12) 	Internal Turning (AISI No 35 B) 
Component		Carbide Die	Bearing Retainer	Crankcase
Cutting Conditions	Cutting Speed (m/min)	30	250	400-450
	Feed Rate (mm/rev)	0.05	0.12	0.30-0.37
	Depth of Cut (mm)	0.15	0.2	0.13
Cutting Mode		Dry Cutting	Wet Cutting	Wet Cutting
Results		<p>Cutting Length (m/corner)</p>  <p>MB4020 achieved 1.6 times longer tool life per corner compared to conventional products.</p>	<p>Number of Workpieces</p>  <p>Resistance to friction enabled 3 times longer tool life compared to conventional products.</p>	<p>Number of Workpieces</p>  <p>MB4020 achieved high efficiency machining and 1.5 times longer tool life compared to conventional products.</p>



CBN Grade for Sintered Alloy and Cast Iron

# MB4020

**For Your Safety**

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

## **MITSUBISHI MATERIALS CORPORATION**

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(Tools specifications subject to change without notice.)