

MB4020

CBN GRADE

FOR SINTERED ALLOY AND CAST IRON



DIAEDGE

 **MITSUBISHI MATERIALS**

MB4020

CBN GRADE FOR SINTERED ALLOY AND CAST IRON

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

HIGH CUTTING EDGE STRENGTH

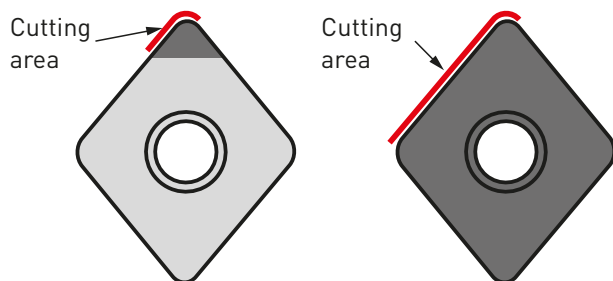
A newly developed special binder and the particle-activated sintering method promotes binding of the CBN particles, leading to higher cutting edge strength. MB4020 has high cutting edge strength properties for a sharper edge geometry that is ideal for preventing burrs.

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.

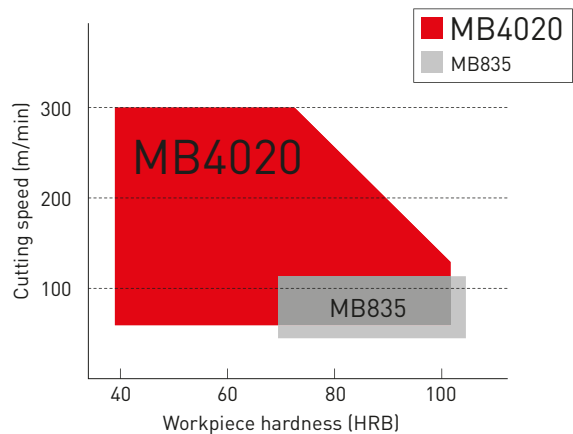
NEW FULL FACE CBN

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



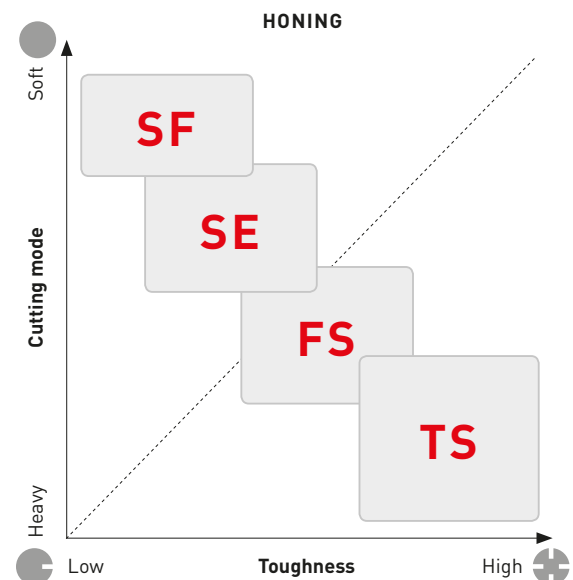
Refer to the cutting conditions on page 5 for the maximum recommended depth of cut.

APPLICATION RANGE



4 HONING TYPES AVAILABLE

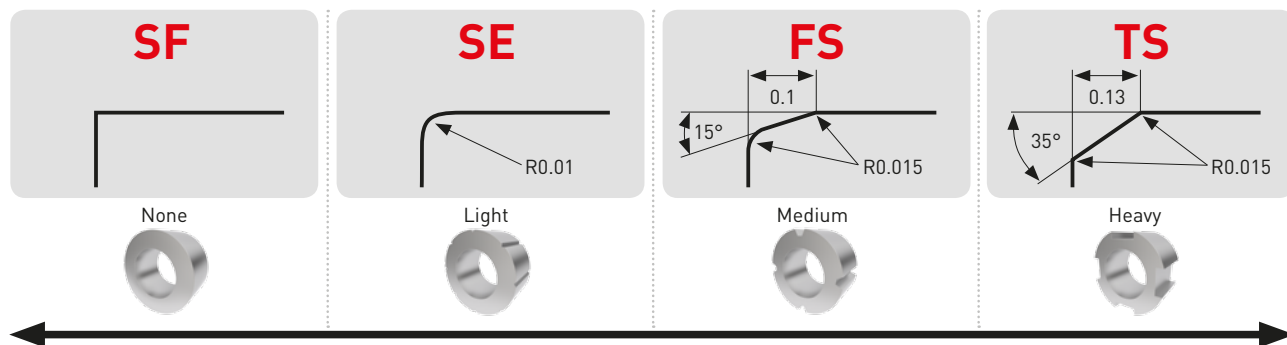
Different types of edge honing to suit all applications.



GEOMETRY

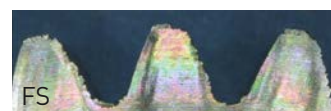
CUTTING EDGE PREPARATION

SUITABILITY FOR INTERRUPTED CUTTING



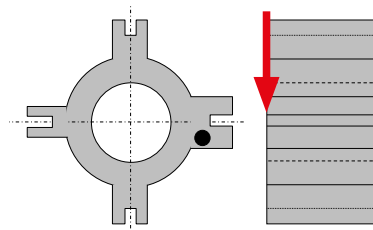
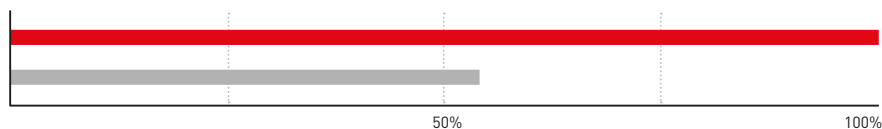
A variety of cutting edge preparations for all application

Insert	NP-TNGA160404SF2
Workpiece Material	Sintered Alloy (Fe-Cu-C)
Cutting mode	Face, Interrupted
Cutting Speed Vc (m/min)	300
Feed f (mm/rev)	0.06
Depth of Cut ap (mm)	0.2
Coolant	Wet cutting
Result	Burr-less and good surface roughness

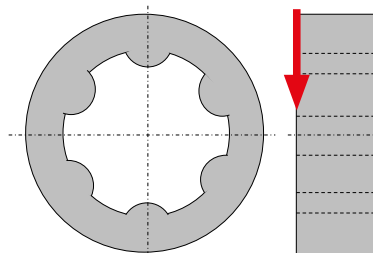
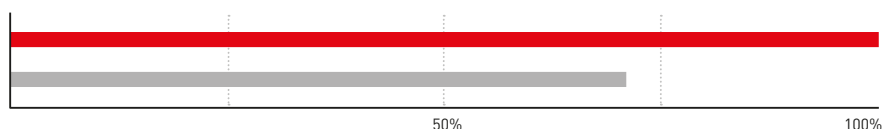


APPLICATION EXAMPLES

Insert	NP-CNGA120404SE3
Workpiece Material	Sintered Alloy (35HRC)
Cutting mode	Face, Interrupted
Cutting Speed Vc (m/min)	250
Feed f (mm/rev)	0.12
Depth of Cut ap (mm)	0.2
Coolant	Wet cutting
Result	Number of work pieces: 450



Insert	NP-TNGA160408TS3
Workpiece Material	Sintered Alloy (70-80HRB)
Cutting mode	Face, Interrupted
Cutting Speed Vc (m/min)	100
Feed f (mm/rev)	0.1
Depth of Cut ap (mm)	0.1
Coolant	Wet cutting
Result	Number of work pieces: 700

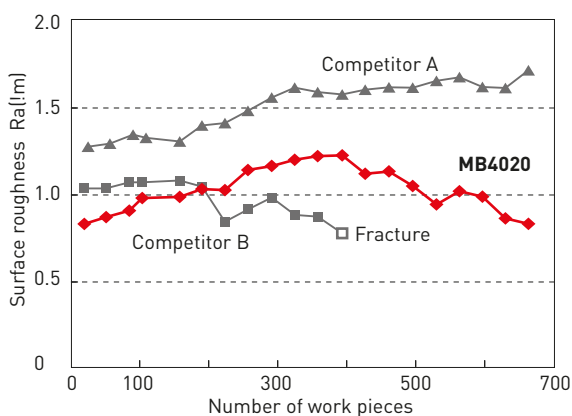


■ : Mitsubishi Materials Tool ■ : Conventional Tool

MB4020 CUTTING PERFORMANCE

Continuous machining of high strength sintered alloys

Insert	NP-CNGA120408FS2
Workpiece Material	High strength sintered alloys (75HRB)
Cutting Speed Vc (m/min)	190
Feed f (mm/rev)	0.15
Depth of Cut ap (mm)	0.1
Coolant	Wet Cutting



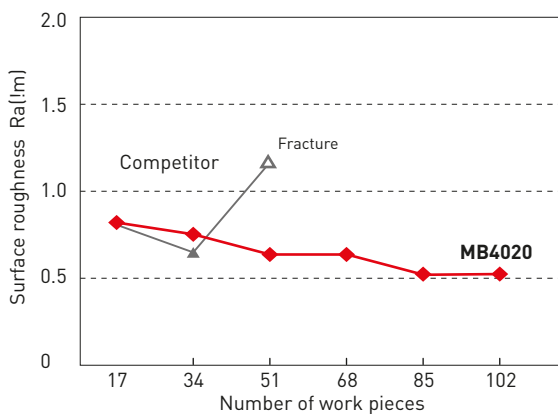
Interrupted machining of high strength sintered alloys

Insert	NP-CNGA120408FS2
Workpiece Material	Hgh strength sintered alloys (75HRB)
Cutting Speed Vc (m/min)	190
Feed f (mm/rev)	0.15
Depth of Cut ap (mm)	0.1
Coolant	Wet Cutting



Continuous machining of hardened sintered alloys

Insert	NP-CNGA120408FS2
Workpiece Material	Hardened sintered alloys (40HRB)
Cutting Speed Vc (m/min)	100
Feed f (mm/rev)	0.15
Depth of Cut ap (mm)	0.1
Coolant	Wet Cutting



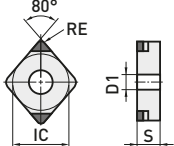
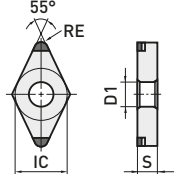
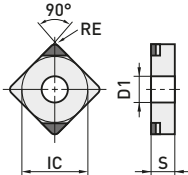
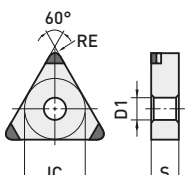
Interrupted machining of hardened sintered alloys

Insert	NP-CNGA120408TS2
Workpiece Material	Hardened sintered alloys (40HRB)
Cutting Speed Vc (m/min)	100
Feed f (mm/rev)	0.15
Depth of Cut ap (mm)	0.1
Coolant	Wet Cutting



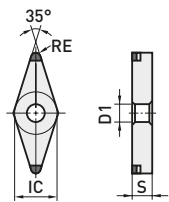
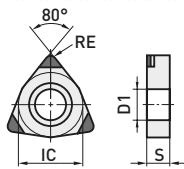
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NEGATIVE INSERTS

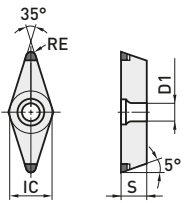
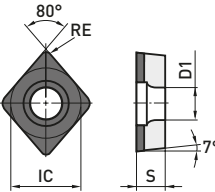
Order Number	Stock	Teeth	IC	S	RE	D1	Shape	Geometry
NEW NP-CNGA120404SF2	★	2	12.7	4.76	0.4	5.16		NEW PETIT CUT 
NEW NP-CNGA120404SF2	★	2	12.7	4.76	0.8	5.16		
NEW NP-CNGA120408SF2	★	2	12.7	4.76	1.2	5.16		
NEW NP-CNGA120404SE2	★	2	12.7	4.76	0.4	5.16		
NEW NP-CNGA120408SE2	★	2	12.7	4.76	0.8	5.16		
NEW NP-CNGA120412SE2	★	2	12.7	4.76	1.2	5.16		
NP-CNGA120404FS2	★	2	12.7	4.76	0.4	5.16		
NP-CNGA120408FS2	★	2	12.7	4.76	0.8	5.16		
NP-CNGA120412FS2	★	2	12.7	4.76	1.2	5.16		
NP-CNGA120404TS2	★	2	12.7	4.76	0.4	5.16		
NP-CNGA120408TS2	★	2	12.7	4.76	0.8	5.16		
NP-CNGA120412TS2	★	2	12.7	4.76	1.2	5.16		
NEW NP-DNGA150404SF2	★	2	12.7	4.76	0.4	5.16		NEW PETIT CUT 
NEW NP-DNGA150408SF2	★	2	12.7	4.76	0.8	5.16		
NEW NP-DNGA150412SF2	★	2	12.7	4.76	1.2	5.16		
NEW NP-DNGA150404SE2	★	2	12.7	4.76	0.4	5.16		
NEW NP-DNGA150408SE2	★	2	12.7	4.76	0.8	5.16		
NEW NP-DNGA150412SE2	★	2	12.7	4.76	1.2	5.16		
NP-DNGA150404FS2	★	2	12.7	4.76	0.4	5.16		
NP-DNGA150408FS2	★	2	12.7	4.76	0.8	5.16		
NP-DNGA150412FS2	★	2	12.7	4.76	1.2	5.16		
NP-DNGA150404TS2	★	2	12.7	4.76	0.4	5.16		
NP-DNGA150408TS2	★	2	12.7	4.76	0.8	5.16		
NP-DNGA150412TS2	★	2	12.7	4.76	1.2	5.16		
NEW NP-DNGA150604SF2	★	2	12.7	6.35	0.4	5.16		
NEW NP-DNGA150608SF2	★	2	12.7	6.35	0.8	5.16		
NEW NP-DNGA150612SF2	★	2	12.7	6.35	1.2	5.16		NEW PETIT CUT 
NEW NP-DNGA150604SE2	★	2	12.7	6.35	0.4	5.16		
NEW NP-DNGA150608SE2	★	2	12.7	6.35	0.8	5.16		
NEW NP-DNGA150612SE2	★	2	12.7	6.35	1.2	5.16		
NEW NP-SNGA120404SF2	★	2	12.7	4.76	0.4	5.16		
NEW NP-SNGA120408SF2	★	2	12.7	4.76	0.8	5.16		
NEW NP-SNGA120412SF2	★	2	12.7	4.76	1.2	5.16		
NEW NP-SNGA120404SE2	★	2	12.7	4.76	0.4	5.16		
NEW NP-SNGA120408SE2	★	2	12.7	4.76	0.8	5.16		
NEW NP-SNGA120412SE2	★	2	12.7	4.76	1.2	5.16		
NP-SNGA120404FS2	★	2	12.7	4.76	0.4	5.16		
NP-SNGA120408FS2	★	2	12.7	4.76	0.8	5.16		
NP-SNGA120404TS2	★	2	12.7	4.76	0.4	5.16		
NP-SNGA120408TS2	★	2	12.7	4.76	0.8	5.16		
NP-SNGA120412TS2	★	2	12.7	4.76	1.2	5.16		NEW PETIT CUT 
NEW NP-TNGA160404SF3	★	3	9.525	4.76	0.4	3.81		
NEW NP-TNGA160408SF3	★	3	9.525	4.76	0.8	3.81		
NEW NP-TNGA160412SF3	★	3	9.525	4.76	1.2	3.81		
NEW NP-TNGA160404SE3	★	3	9.525	4.76	0.4	3.81		
NEW NP-TNGA160408SE3	★	3	9.525	4.76	0.8	3.81		
NEW NP-TNGA160412SE3	★	3	9.525	4.76	1.2	3.81		
NP-TNGA160404FS3	★	3	9.525	4.76	0.4	3.81		
NP-TNGA160408FS3	★	3	9.525	4.76	0.8	3.81		
NP-TNGA160412FS3	★	3	9.525	4.76	1.2	3.81		
NP-TNGA160404TS3	★	3	9.525	4.76	0.4	3.81		
NP-TNGA160408TS3	★	3	9.525	4.76	0.8	3.81		
NP-TNGA160412TS3	★	3	9.525	4.76	1.2	3.81		

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NEGATIVE INSERTS

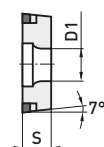
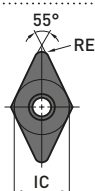
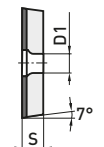
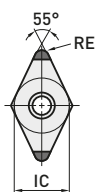
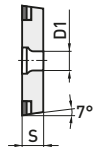
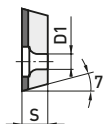
	Order Number	Stock	Teeth	IC	S	RE	D1	Shape	Geometry
NEW	NP-VNGA160404SF2	★	2	9.525	4.76	0.4	3.81		NEW PETIT CUT 
NEW	NP-VNGA160408SF2	★	2	9.525	4.76	0.8	3.81		
NEW	NP-VNGA160404SE2	★	2	9.525	4.76	0.4	3.81		
NEW	NP-VNGA160408SE2	★	2	9.525	4.76	0.8	3.81		
	NP-VNGA160404FS2	★	2	9.525	4.76	0.4	3.81		
	NP-VNGA160408FS2	★	2	9.525	4.76	0.8	3.81		
	NP-VNGA160404TS2	★	2	9.525	4.76	0.4	3.81		
	NP-VNGA160408TS2	★	2	9.525	4.76	0.8	3.81		
NEW	NP-VNGA160408SE3	★	2	9.525	4.76	0.8	3.81		
NEW	NP-VNGA160408FS3	★	2	9.525	4.76	0.8	3.81		
NEW	NP-WNGA080408SF3	★	3	12.7	4.76	0.8	5.16		NEW PETIT CUT 
NEW	NP-WNGA080408SE3	★	3	12.7	4.76	0.8	5.16		

POSITIVE INSERTS

	Order Number	Stock	Teeth	IC	S	RE	D1	Shape	Geometry
NEW	NP-VBGW110304SF2	★	2	6.35	3.18	0.4	2.85		NEW PETIT CUT 
NEW	NP-VBGW110308SF2	★	2	6.35	3.18	0.8	2.85		
NEW	NP-VBGW110304SE2	★	2	6.35	3.18	0.4	2.85		
NEW	NP-VBGW110308SE2	★	2	6.35	3.18	0.8	2.85		
	NP-VBGW110304FS2	★	2	6.35	3.18	0.4	2.85		
	NP-VBGW110308FS2	★	2	6.35	3.18	0.8	2.85		
	NP-VBGW110304TS2	★	2	6.35	3.18	0.4	2.85		
	NP-VBGW110308TS2	★	2	6.35	3.18	0.8	2.85		
NEW	NP-VBGW160404SF2	★	2	9.525	4.76	0.4	4.43		
NEW	NP-VBGW160408SF2	★	2	9.525	4.76	0.8	4.43		
NEW	NP-VBGW160404SE2	★	2	9.525	4.76	0.4	4.43		
NEW	NP-VBGW160408SE2	★	2	9.525	4.76	0.8	4.43		
	NP-VBGW160404FS2	★	2	9.525	4.76	0.4	4.43		
	NP-VBGW160408FS2	★	2	9.525	4.76	0.8	4.43		
	NP-VBGW160404TS2	★	2	9.525	4.76	0.4	4.43		
	NP-VBGW160408TS2	★	2	9.525	4.76	0.8	4.43		
	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		

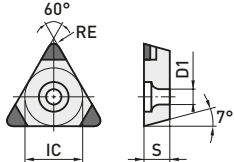
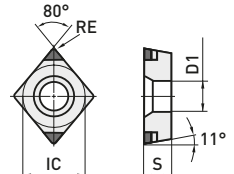
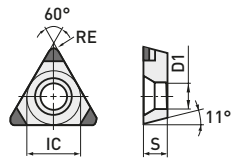
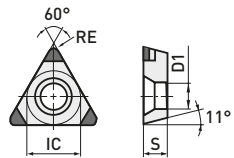
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POSITIVE INSERTS

Order Number	Stock	Teeth	IC	S	RE	D1	Shape	Geometry
NEW NP-CCGW060202SF2	★	2	6.35	2.38	0.2	2.8	  	NEW PETIT CUT
NEW NP-CCGW060204SF2	★	2	6.35	2.38	0.4	2.8		
NEW NP-CCGW060208SF2	★	2	6.35	2.38	0.8	2.8		
NEW NP-CCGW060202SE2	★	2	6.35	2.38	0.2	2.8		
NEW NP-CCGW060204SE2	★	2	6.35	2.38	0.4	2.8		
NEW NP-CCGW060208SE2	★	2	6.35	2.38	0.8	2.8		
NP-CCGW060202FS2	★	2	6.35	2.38	0.2	2.8		
NP-CCGW060204FS2	★	2	6.35	2.38	0.4	2.8		
NP-CCGW060208FS2	★	2	6.35	2.38	0.8	2.8		
NP-CCGW060202TS2	★	2	6.35	2.38	0.2	2.8		
NP-CCGW060204TS2	★	2	6.35	2.38	0.4	2.8		
NP-CCGW060208TS2	★	2	6.35	2.38	0.8	2.8		
NEW NP-CCGW09T302SF2	★	2	9.525	3.97	0.4	4.4		
NEW NP-CCGW09T304SF2	★	2	9.525	3.97	0.4	4.4		
NEW NP-CCGW09T308SF2	★	2	9.525	3.97	0.8	4.4		
NEW NP-CCGW09T302SE2	★	2	9.525	3.97	0.4	4.4		
NEW NP-CCGW09T304SE2	★	2	9.525	3.97	0.4	4.4		
NEW NP-CCGW09T308SE2	★	2	9.525	3.97	0.8	4.4		
NP-CCGW09T302FS2	★	2	9.525	3.97	0.2	4.4		
NP-CCGW09T304FS2	★	2	9.525	3.97	0.4	4.4		
NP-CCGW09T308FS2	★	2	9.525	3.97	0.8	4.4		
NP-CCGW09T302TS2	★	2	9.525	3.97	0.2	4.4		
NP-CCGW09T304TS2	★	2	9.525	3.97	0.4	4.4		
NP-CCGW09T308TS2	★	2	9.525	3.97	0.8	4.4		
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	  	NEW PETIT CUT
NEW NP-DCGW070208SF2	★	2	6.35	2.38	0.8	2.8		
NEW NP-DCGW070204SE2	★	2	6.35	2.38	0.4	2.8		
NEW NP-DCGW070208SE2	★	2	6.35	2.38	0.8	2.8		
NP-DCGW070204FS2	★	2	6.35	2.38	0.4	2.8		
NP-DCGW070208FS2	★	2	6.35	2.38	0.8	2.8		
NP-DCGW070204TS2	★	2	6.35	2.38	0.4	2.8		
NP-DCGW070208TS2	★	2	6.35	2.38	0.8	2.8		
NEW NP-DCGW11T302SF2	★	2	9.525	3.97	0.2	4.4		
NEW NP-DCGW11T304SF2	★	2	9.525	3.97	0.4	4.4		
NEW NP-DCGW11T308SF2	★	2	9.525	3.97	0.8	4.4		
NEW NP-DCGW11T302SE2	★	2	9.525	3.97	0.2	4.4		
NEW NP-DCGW11T304SE2	★	2	9.525	3.97	0.4	4.4		
NEW NP-DCGW11T308SE2	★	2	9.525	3.97	0.8	4.4		
NP-DCGW11T302FS2	★	2	9.525	3.97	0.2	4.4		
NP-DCGW11T304FS2	★	2	9.525	3.97	0.4	4.4		
NP-DCGW11T308FS2	★	2	9.525	3.97	0.8	4.4		
NP-DCGW11T302TS2	★	2	9.525	3.97	0.2	4.4		
NP-DCGW11T304TS2	★	2	9.525	3.97	0.4	4.4		
NP-DCGW11T308TS2	★	2	9.525	3.97	0.8	4.4		
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		

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POSITIVE INSERTS

Order Number	Stock	Teeth	IC	S	RE	D1	Shape	Geometry
NEW NP-TCGW110204SF3	★	3	6.35	2.38	0.4	2.8	NEW PETIT CUT	
NEW NP-TCGW110208SF3	★	3	6.35	2.38	0.8	2.8		
NEW NP-TCGW110204SE3	★	3	6.35	2.38	0.4	2.8		
NEW NP-TCGW110208SE3	★	3	6.35	2.38	0.8	2.8		
NP-TCGW110204FS3	★	3	6.35	2.38	0.4	2.8		
NP-TCGW110208FS3	★	3	6.35	2.38	0.8	2.8		
NP-TCGW110204TS3	★	3	6.35	2.38	0.4	2.8		
NP-TCGW110208TS3	★	3	6.35	2.38	0.8	2.8		
NEW NP-CPGB080202SE2	★	2	7.94	2.38	0.2	3.5	NEW PETIT CUT	
NEW NP-CPGB080204SE2	★	2	7.94	2.38	0.4	3.5		
NP-CPGB080202FS2	★	2	7.94	2.38	0.2	3.5		
NP-CPGB080204FS2	★	2	7.94	2.38	0.4	3.5		
NEW NP-CPGB090302SE2	★	2	9.525	3.18	0.2	4.5		
NEW NP-CPGB090304SE2	★	2	9.525	3.18	0.4	4.5		
NEW NP-CPGB090308SE2	★	2	9.525	3.18	0.8	4.5		
NP-CPGB090302FS2	★	2	9.525	3.18	0.2	4.5		
NP-CPGB090304FS2	★	2	9.525	3.18	0.4	4.5	NEW PETIT CUT	
NP-CPGB090308FS2	★	2	9.525	3.18	0.8	4.5		
NEW NP-TPGB090202SF3	★	3	5.56	2.38	0.2	2.9		
NEW NP-TPGB090204SF3	★	3	5.56	2.38	0.4	2.9		
NEW NP-TPGB090202SE3	★	3	5.56	2.38	0.2	2.9		
NEW NP-TPGB090204SE3	★	3	5.56	2.38	0.4	2.9		
NP-TPGB090202FS3	★	3	5.56	2.38	0.2	2.9		
NP-TPGB090204FS3	★	3	5.56	2.38	0.4	2.9		
NEW NP-TPGB110302SF3	★	3	6.35	3.18	0.2	3.4	NEW PETIT CUT	
NEW NP-TPGB110304SF3	★	3	6.35	3.18	0.4	3.4		
NEW NP-TPGB110308SF3	★	3	6.35	3.18	0.8	3.4		
NEW NP-TPGB110302SE3	★	3	6.35	3.18	0.2	3.4		
NEW NP-TPGB110304SE3	★	3	6.35	3.18	0.4	3.4		
NEW NP-TPGB110308SE3	★	3	6.35	3.18	0.8	3.4		
NP-TPGB110302FS3	★	3	6.35	3.18	0.2	3.4		
NP-TPGB110304FS3	★	3	6.35	3.18	0.4	3.4		
NP-TPGB110308FS3	★	3	6.35	3.18	0.8	3.4		

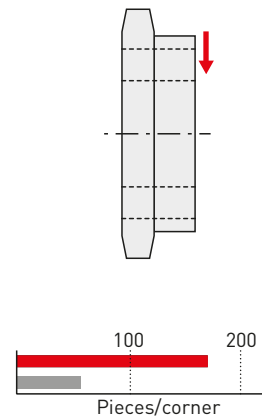
RECOMMENDED CUTTING CONDITIONS

Cutting conditions for full face

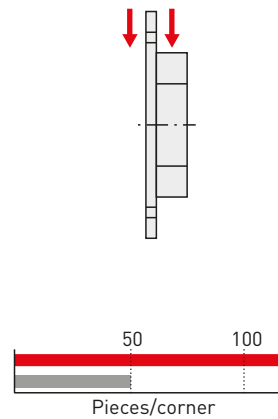
Workpiece	Cutting Mode	Vc (m/min)	f (mm/rev)	ap (mm)	Coolant
General sintered alloy	Turning	100 150 200 250 300	—0.2	—0.3 [—2.0]	Dry, Wet
High-strength sintered alloy	Turning	100 150 200 250 300	—0.2	—0.3 [—2.0]	Dry, Wet
Hardened sintered alloy	Turning	100 150 200 250 300	—0.2	—0.3 [—2.0]	Dry, Wet
Cast iron	Turning	250 500 750 1000 1250	—0.4	—0.5 [—2.0]	Dry, Wet
	Milling	250 500 750 1000 1250	—0.15	—0.5 [—2.0]	Dry

APPLICATION EXAMPLES

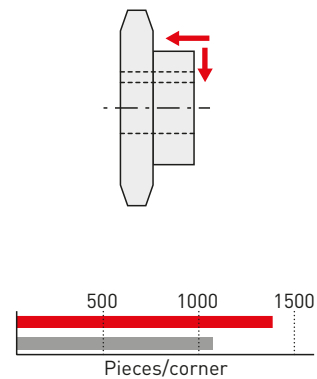
Insert	NP-TNGA160404TS3
Work piece	Carburized and quenched alloy. Interrupted facing.
Component	Variable valve parts
Cutting Speed (m/min)	140
Feed (mm/rev)	0.05
Depth of Cut (mm)	0.15
Coolant	Wet cutting
Results	A conventional CBN insert reached the end of tool life after machining 50 parts due to burr formation. MB4020 enabled longer tool life by machining up to 170 parts.



Insert	NP-TNGA160408TS3
Work piece	Carburized and quenched alloy. Interrupted machining of flange end faces.
Component	Variable valve parts
Cutting Speed (m/min)	110
Feed (mm/rev)	0.1
Depth of Cut (mm)	0.05
Coolant	Dry cutting
Results	A conventional grade showed unstable tool life after machining 20 – 50 parts. MB4020 enabled stable machining with longer tool life of over 120 parts.



Insert	NP-CNGA120404FS2
Work piece	General sintered alloy. External interrupted facing.
Component	Sprocket parts
Cutting Speed (m/min)	150
Feed (mm/rev)	0.1–0.15
Depth of Cut (mm)	0.2
Coolant	Dry cutting
Results	MB4020 maintained a good surface finish after machining 1400 parts compared with only 1100 parts from a conventional grade.

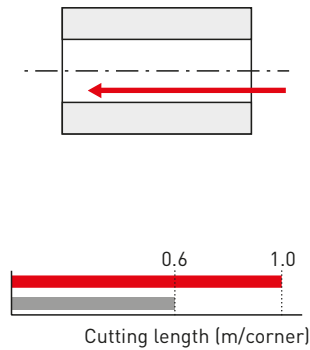


APPLICATION EXAMPLES

Insert	CCGW060204FS
Work piece	Internal turning (G5 Hv1180)
Component	Carbide die
Cutting Speed (m/min)	30
Feed (mm/rev)	0.05
Depth of Cut (mm)	0.15
Coolant	Dry cutting

Results

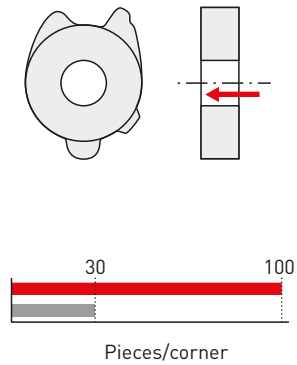
MB4020 achieved 1.6 times longer tool life per corner compared to conventional products.



Insert	CCGW09T304FS
Work piece	Internal turning (FCD450)
Component	Bearing retainer
Cutting Speed (m/min)	250
Feed (mm/rev)	0.12
Depth of Cut (mm)	0.2
Coolant	Wet cutting

Results

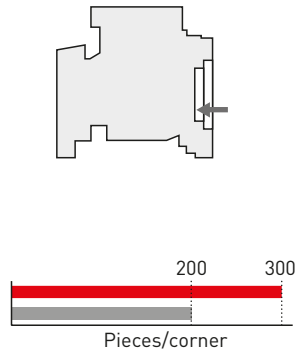
Resistance to friction enabled 3 times longer tool life compared to conventional products.



Insert	CCGW060204FS
Work piece	Internal turning (FC250)
Component	Crankcase
Cutting Speed (m/min)	400→450
Feed (mm/rev)	0.30→0.37
Depth of Cut (mm)	0.13
Coolant	Wet cutting

Results

MB4020 achieved high efficiency machining and 1.5 times longer tool life compared to conventional products.



MEMO

A series of horizontal dotted lines for writing.

GERMANY

MMC HARTMETALL GMBH
Comeniusstr. 2 . 40670 Meerbusch
Phone +49 2159 91890 . Fax +49 2159 918966
Email admin@mmchg.de

U.K.

MMC HARDMETAL U.K. LTD.
Mitsubishi House . Galena Close . Tamworth . Staffs. B77 4AS
Phone +44 1827 312312 . Fax +44 1827 312314
Email sales@mitsubishicarbide.co.uk

SPAIN

MITSUBISHI MATERIALS ESPAÑA, S.A.
Calle Emperador 2 . 46136 Museros / Valencia
Phone +34 96 1441711 . Fax +34 96 1443786
Email mme@mmevalencia.com

FRANCE

MMC METAL FRANCE S.A.R.L.
6, Rue Jacques Monod . 91400 Orsay
Phone +33 1 69 35 53 53 . Fax +33 1 69 35 53 50
Email mmfsales@mmc-metal-france.fr

POLAND

MMC HARDMETAL POLAND SP. Z O.O
Al. Armii Krajowej 61 . 50-541 Wrocław
Phone +48 71335 1620 . Fax +48 71335 1621
Email sales@mitsubishicarbide.com.pl

RUSSIA

MMC HARDMETAL RUSSIA OOO LTD.
Electrozavodskaya St. 24 . build. 3 . Moscow . 107023
Phone +7 495 725 58 85 . Fax +7 495 981 39 79
Email info@mmc-carbide.ru

ITALY

MMC ITALIA S.R.L.
Via Montefeltro 6/A . 20156 Milano
Phone +39 0293 77031 . Fax +39 0293 589093
Email info@mmc-italia.it

TURKEY

MMC HARTMETALL GMBH ALMANYA - İZMİR MERKEZ ŞUBESİ
Adalet Mahallesi Anadolu Caddesi No: 41-1 . 15001 35580 Bayraklı / İzmir
Phone +90 232 5015000 . Fax +90 232 5015007
Email info@mmchg.com.tr

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