

BC5110

COATED CBN GRADE FOR CAST IRON

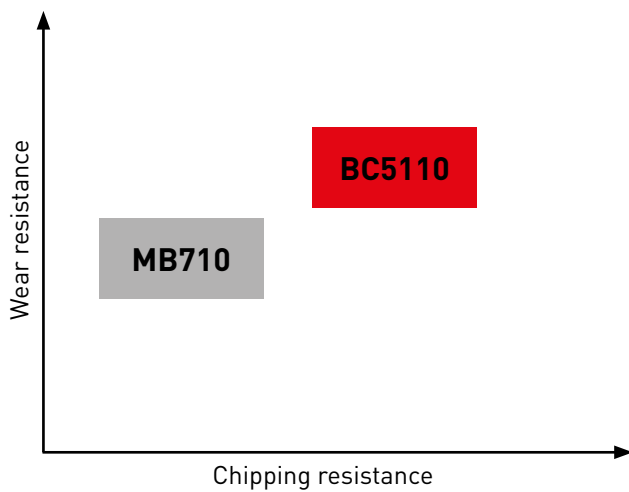


 **mitsubishi materials**

BC5110

TOUGH SUBSTRATE WITH A HIGH HARDNESS COATING PROVIDES EXCELLENT CHIPPING AND WEAR RESISTANCE

- Excellent wear resistance when turning grey cast iron at low cutting speeds.
- Provides fine surface finishes on low rigidity workpieces.



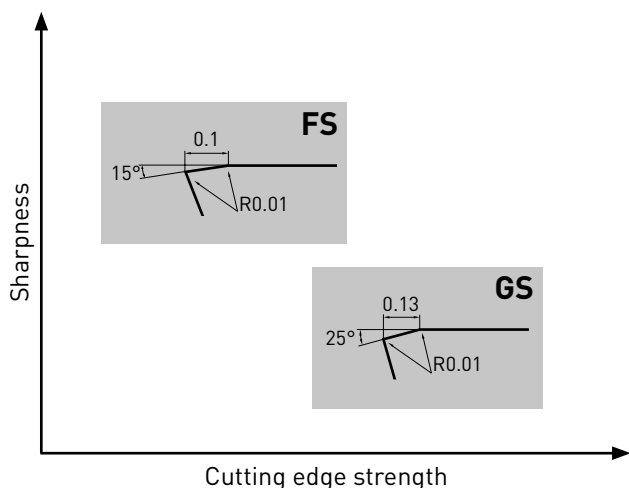
EXCELLENT CHIPPING RESISTANCE

Compared to conventional grades, the fine grain, high CBN content greatly improves chipping resistance that provides stability and long tool life.

EXCELLENT WEAR RESISTANCE COATING

The hard ceramic coating layer provides excellent surface finishes as well as wear and notch resistance during continuous cutting. Additionally, chipping and peeling of the coating layer is suppressed due to the improved bonding strength to the CBN substrate.

LINE-UP OF EDGE PREPARATION (HONING)



FS HONING

FS honing has a sharp edge with a small chamfer angle for good flank wear resistance. Recommended when burrs and dull finishes tend to occur.

GS HONING

GS honing is suitable for thin or low rigidity workpiece materials and for applications that are prone to chip the cutting edge.

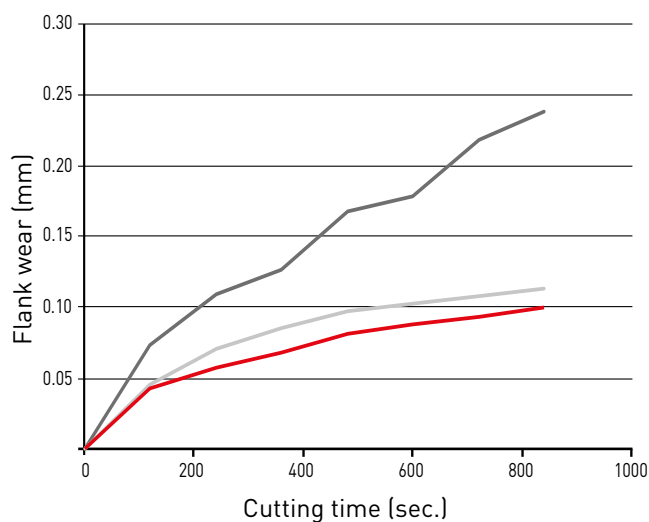
BC5110

CUTTING PERFORMANCE

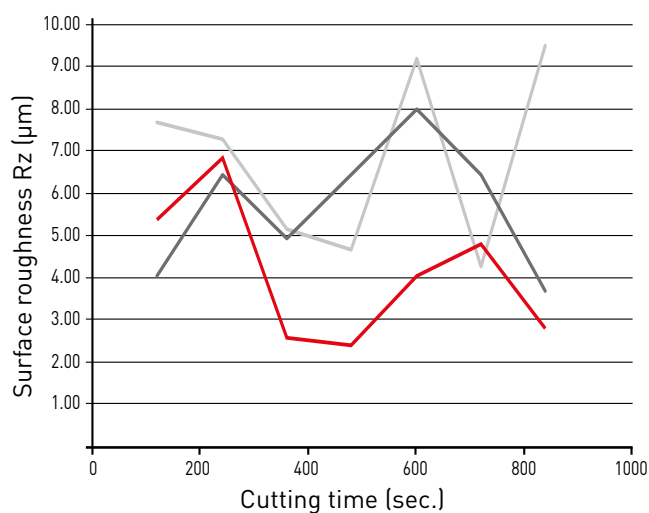
MACHINING GG25: COMPARING WEAR RESISTANCE AND SURFACE ROUGHNESS

The tough substrate and wear resistant coating of BC5110 provides good surface finishes when compared to conventional uncoated grades.

FLANK WEAR COMPARISON



FINISHED SURFACE COMPARISON



BC5110 after 900 sec.



conventional after 900 sec.



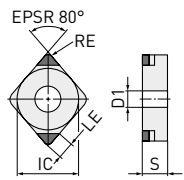
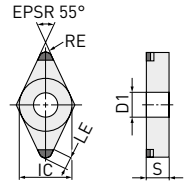
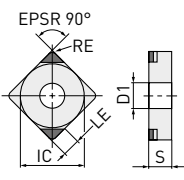
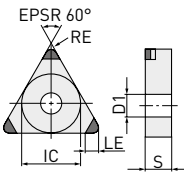
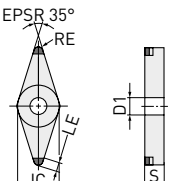
Material	Gray cast iron (GG25)
Tool	NP-CNGA120408GS2
Machining methods	External, continuous cutting
Vc (m/min)	300
f (mm/rev)	0.1
ap (mm)	0.2
Cutting mode	Wet cutting

CNGA, DNGA, SNGA, TNGA, VNGA

NEGATIVE INSERTS (WITH HOLE)

K

G Class

Order number	BC5110	ZEFF	IC	S	RE	D1	LE	Geometry
NP-CNGA120404FS2	●	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408FS2	●	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412FS2	●	2	12.7	4.76	1.2	5.16	2.2	
NP-CNGA120404GS2	★	2	12.7	4.76	0.4	5.16	1.8	
NP-CNGA120408GS2	★	2	12.7	4.76	0.8	5.16	2.0	
NP-CNGA120412GS2	★	2	12.7	4.76	1.2	5.16	2.2	
NP-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-DNGA150604FS2	★	2	12.7	6.35	0.4	5.16	2.1	
NP-DNGA150608FS2	★	2	12.7	6.35	0.8	5.16	2.0	
NP-DNGA150404GS2	★	2	12.7	4.76	0.4	5.16	2.1	
NP-DNGA150408GS2	★	2	12.7	4.76	0.8	5.16	2.0	
NP-DNGA150608GS2	★	2	12.7	6.35	0.8	5.16	2.0	
NP-SNGA120408GS2	★	2	12.7	4.76	0.8	5.16	2.2	
NP-TNGA160404FS3	★	3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408FS3	★	3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412FS3	★	3	9.525	4.76	1.2	3.81	1.9	
NP-TNGA160404GS3	★	3	9.525	4.76	0.4	3.81	1.6	
NP-TNGA160408GS3	★	3	9.525	4.76	0.8	3.81	1.7	
NP-TNGA160412GS3	★	3	9.525	4.76	1.2	3.81	1.9	
NP-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-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	

1/2

[1 insert in one case]

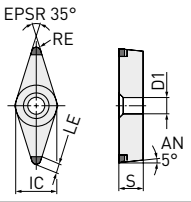
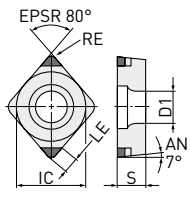
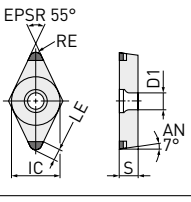
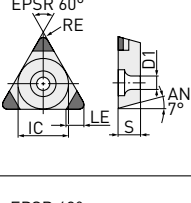
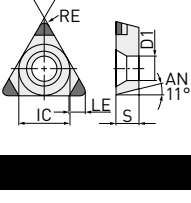
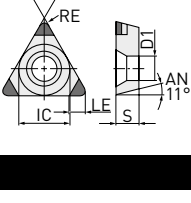


VBGW, CCGW, DCGW, TCGW, TPGB

POSITIVE INSERTS (WITH HOLE)

K

G Class

Order number	BC5110	ZEFF	IC	S	RE	D1	LE	Geometry
NP-VBGW160404GS2	★	2	9.525	4.76	0.4	4.43	2.5	
NP-VBGW160408GS2	★	2	9.525	4.76	0.8	4.43	2.0	
NP-CCGW060202FS2	●	2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW060204FS2	●	2	6.35	2.38	0.4	2.8	1.8	
NP-CCGW09T304FS2	●	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308FS2	●	2	9.525	3.97	0.8	4.4	2.0	
NP-CCGW060202GS2	●	2	6.35	2.38	0.2	2.8	1.7	
NP-CCGW09T304GS2	★	2	9.525	3.97	0.4	4.4	1.8	
NP-CCGW09T308GS2	★	2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070204FS2	●	2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW11T308FS2	★	2	9.525	3.97	0.8	4.4	2.0	
NP-DCGW070204GS2	★	2	6.35	2.38	0.4	2.8	2.1	
NP-DCGW11T304GS2	●	2	9.525	3.97	0.4	4.4	2.1	
NP-DCGW11T308GS2	●	2	9.525	3.97	0.8	4.4	2.0	
NP-TCGW110204FS3	★	3	6.35	2.38	0.4	2.8	1.6	
NP-TCGW110208FS3	★	3	6.35	2.38	0.8	2.8	1.7	
NP-TCGW090204GS3	★	3	5.56	2.38	0.4	2.5	1.6	
NP-TCGW110208GS3	★	3	6.35	2.38	0.8	2.8	1.7	
NP-TPGB090204FS3	★	3	5.56	2.38	0.4	2.9	1.6	
NP-TPGB110304FS3	★	3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308FS3	★	3	6.35	3.18	0.8	3.4	1.7	
NP-TPGB080204GS3	★	3	4.76	2.38	0.4	2.4	1.6	
NP-TPGB110304GS3	★	3	6.35	3.18	0.4	3.4	1.6	
NP-TPGB110308GS3	★	3	6.35	3.18	0.8	3.4	1.7	

2/2

[1 insert in one case]

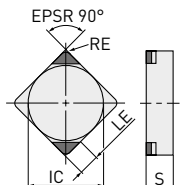


SPGN

POSITIVE INSERTS (WITHOUT HOLE)

K

G Class

Order number	BC5110	ZEFF	IC	S	RE	D1	LE	Geometry
NP-SPGN120412GS2	★	2	12.7	4.76	1.2	—	2.5	

1/1

[1 insert in one case]



BC5110

RECOMMENDED CUTTING CONDITIONS

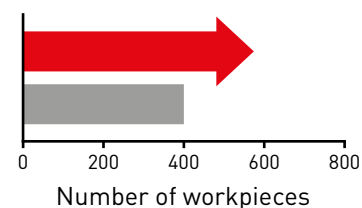
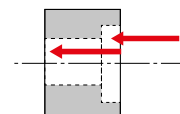
Material	Vc	f	ap	Cutting mode
K Gray cast iron GG25, GG30 etc.	100 – 600	≤ 0.5	≤ 0.5	Dry, Wet

1/1

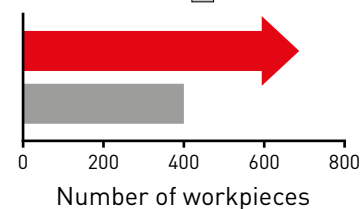
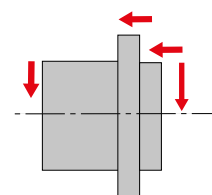
BC5110

APPLICATION EXAMPLES

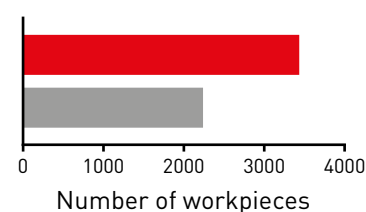
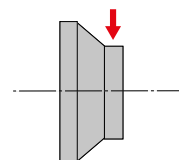
Material	Gray cast iron (GG25)
Component	Automotive parts
Tool	NP-DCGW070204FS2
Vc (m/min)	364
f (mm/rev)	0.1
ap (mm)	0.1
Cutting mode	Wet cutting
Results	BC5110 achieved 1.25 x longer tool life with stable dimensional accuracy, without cloudiness on the surface when compared with a conventional product.



Material	Gray cast iron (GG25)
Component	Automotive parts
Tool	NP-VCGW160408FS2
Vc (m/min)	530
f (mm/rev)	0.1
ap (mm)	0.1
Cutting mode	Wet cutting
Results	BC5110 achieved 1.5 x longer tool life and greatly suppressed flank wear when compared to a conventional product.



Material	Gray cast iron
Component	Ring
Tool	NP-VNGA160408FS2
Vc (m/min)	110
f (mm/rev)	0.12
ap (mm)	0.6
Cutting mode	Dry cutting
Results	BC5110 gave a 50 % increase in tool life plus an improved surface finish.



The above application examples are customer's applications, therefore can differ from the recommended conditions.

SYMBOLS

 Recommended cutting conditions	MACHINING TYPE
NEW Completely new products or expansions released in the current Spring or Autumn product launch and are not included in the latest version of the General Catalogue.	 Roughing
NEW Products or expansions that have already been introduced in one of the previous Spring or Autumn product launches but are not included in the latest General Catalogue.	 Medium cutting
APPLICATION	 Light cutting
 Face milling	 Pre-finishing
 Chamfer milling	 Finishing
 Shoulder milling with R	 Fine-finishing
 Face milling close to a wall	TOOL MATERIAL
 Shoulder milling	 Ultra micro grain carbide Ultra micro grain carbide substrate material.
 Side milling	 Cubic boron nitride Mitsubishi Materials' original CBN material.
 Slot milling	 Ceramic For high speed efficient machining of super alloys due to the excellent high temperature strength property.
 Ramping	 High hardness powder metallurgy HSS High hardness powder metallurgy HSS substrate material.
 Pocket milling	 High grade high alloy HSS High grade high alloy HSS substrate material.
 Slot milling with R	 Cobalt high speed steel Cobalt high speed steel substrate material.
 Copy milling	 High speed steel High speed steel substrate material.
 T-Slot milling	

SYMBOLS

COATING



SMART MIRACLE coating

New smooth and dense coating technology for high efficiency milling of difficult to cut materials.



CRN coating

Newly developed CrN coating for Copper Electrodes machining.



Violet coating

Increased tool life of 2-3 times more than TiN coated products.



DP coating

New generation coating suitable for a wide range of materials.



MIRACLE coating

The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.



[Al, Ti]N coating

[Al,Ti]N highly versatile application range.



[Al,Ti,Cr]N multi-layer coating

For carbon, alloy and hardened steels.



IMPACT MIRACLE coating

Single phase nano crystal coating technology has higher film hardness and heat resistance.



MIRACLE coating

The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.



VFR coating

The [AlCrSi]N/[AlTiSi]N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.



DLC coating

Hardness similar to CVD diamond coating achieved with high adhesion strength.



Diamond coating

Suitable for CFRP and CFRP-aluminium materials.



Diamond coating

Suitable for graphite machining.



Diamond coating

The original CVD diamond coating.



CVD Diamond coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

CUTTING EDGE PROPERTIES



Sharp corner edge

Indicates the end mill has a sharp corner edge.



Gash land

Indicates the end mill cutting edge has a protective chamfer.



Rake angle



Helix angle

Indicates the helix angle of the end mill.



Point angle

Indicates the drill point angle.



Roughing flute geometry



Variable helix



Rounded gash



Corner angle

WEB THINNING



X type point geometry

X web thinning used at the drill point.



XR type point geometry

XR web thinning used at the drill point.



S type point geometry

Easy cutting geometry.



N type point geometry

Effective when the point web is thick.



Chipbreaker

SYMBOLS

TOLERANCES



Tolerance of taper angle
Indicates the tolerance of the taper angle.



R tolerance
Indicates the radial tolerance of a ball nose end mill.



R tolerance
Indicates the radial tolerance of the corner radius.



R tolerance
Indicates the radial tolerance of a cutter with a corner radius.



Outside diameter tolerance
Indicates the diameter tolerance of the end mill.



Peak tolerance
Indicates the tolerance for the end diameter.



Shank diameter tolerance



Shank diameter tolerance



Drill tolerance / diameter

COOLANT HOLES



External coolant



Internal coolant



Internal coolant



Centered, internal coolant hole



Radial, internal coolant holes



Internal coolant holes



Internal coolant holes

MEMO

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